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\* Illustrated.

Table with columns for 'MINING NEWS' by region (Utah, Arkansas, Alaska, etc.), 'FOREIGN' (Utah, Australia, Canada, etc.), and 'MARKETS' (Lake Superior, Pittsburgh, etc.).

Mr. FRANK W. ELKINGTON, who was for some time engaged in the advertising department of the Export Edition of the ENGINEERING AND MINING JOURNAL, is no longer connected, in any way, with this paper.

We find that, through a misunderstanding, we published Mr. HOWE'S note on the Adams process prematurely. It appears that in writing it Mr. HOWE found himself in doubt as to several important points, and that he therefore submitted his proofs to the gentlemen in charge of the Adams process for correction and for explanation of these points. The matter, as we published it, had not undergone the needed changes.

THE proposal to build a fifty million dollar bridge across the Hudson River between Jersey City and New York is again attracting much attention in the daily newspapers, without, however, any prospect of getting financial support. The scheme, which, of course, is entirely practicable in an engineering sense, is wholly impracticable from an economic standpoint. The cost, that even in the preliminary estimates—which every one knows are usually too unstable to build anything on—is put at \$50,000,000, might reach far beyond that figure. Moreover, the bridge would necessarily prove an obstruction to the harbor, as the great Brooklyn bridge is, and no obstruction should be permitted under any excuse. Also, the center of a great city is not a convenient or economical place at which to bring railroads together, with the view of saving transshipment of freights and passengers. The scheme is magnificent on paper, and might become a magnificent monument of engineering skill, but even \$50,000,000 is altogether too much to pay for such a monument. Tunnels can be built under the river at a very small part of the cost of a bridge, and they can be made far more useful than a single bridge.

THE BROOKLYN BRIDGE.

The annual report of President HOWELL, of the New York and Brooklyn bridge, for the year ending December 1st, 1890, shows the receipts from tolls to have been \$1,127,094.50. The aggregate number of foot and railway passengers for the year was 40,898,484, an excess of 3,748,024 over 1889. The total receipts were \$1,239,493.90; balance on hand as per last report, \$91,619.13; expenditures, \$1,075,436.71; balance on hand December 1st, 1890, \$255,676.32.

In regard to the work of the board of engineers composed of Mr. SAMUEL SPENCER, Mr. CARL W. BUCHHOLZ, and Prof. GEO. W. PLYMPTON, appointed to determine some means for increasing the terminal facilities of the bridge, the report says: "In response to public announcement the board has received a large number and great variety of plans for improving the terminal facilities of the bridge. Upon these and the general engineering questions involved the board has deliberated, and its report will be presented at an early day."

We have already referred to some of these plans, and since the bridge, with its enormous traffic, where a delay of even five minutes inconveniences a great number of people, is an unsuitable place for trying experiments, we would respectfully suggest as the most satisfactory method of determining the very important question, that the several plans be tested experimentally—of course at the expense of the proposers—at some convenient location where nothing will interfere with the tests. This would of course be somewhat expensive, but there should be no mistake in the decision when arrived at.

FOUR DEMANDS FOR RECIPROCITY.

The Republic of Brazil is the first foreign nation to take advantage of the reciprocity section of the McKinley tariff law. Communications between the Brazilian representative in this country and the State Department during the last few weeks have resulted in a notification by Secretary BLAINE to the Cabinet of the fact. The State Department, presumably under the immediate direction of the Secretary of State, is now drawing up a treaty between the two countries, to be submitted to Congress early in the session.

Cuba, so far as that dependency of Spain can be committed, or can speak authoritatively by the voice of its leading citizens, is also seeking reciprocity.

In this connection Mr. JAMES P. KELLEY, a wealthy wool grower of Buenos Ayres, now in this country, states in an interview that the Argentine Republic greatly favors reciprocity with the United States. "The Argentine Republic," he says, "is the greatest wool growing country in the world," and he urges the establishment of steamship lines as an incentive to trade.

The Argentine country is not a coal and iron region, and what she consumes of these minerals she now draws mainly from other countries than the United States. Mr. KELLEY believes that with reciprocity between his country and the United States the former would take much of her requirements in both coal and iron and machinery of all kinds from us, and the increase of traffic thus secured would naturally result in the establishment of direct steamship lines between the two countries.

Canada, by far our most important market, and which takes very much more from us than we take from her, has long desired reciprocity, and has passed several times acts looking to this end; but all her efforts have not succeeded in getting reciprocity from our government. We believe Canada offers the very best opportunity for putting in practice the reciprocity clause in the McKinley bill. The more we increase our commercial intercourse with Canada the closer do we bind that country to us and hasten the day when the two countries will be united politically. Why does not Mr. BLAINE commence here where our greatest interest lies? This Canadian trade does not require any subsidized steamship lines.

## THE PRESIDENT'S MESSAGE.

The message of President HARRISON to Congress on the 4th inst. contain ed few points of much practical value; those which have most interest to our readers relate to the tariff, to reciprocity and to silver. It was not to be expected perhaps that the president would recommend the revision of the McKinley tariff, but he evidently feels it to be necessary to apologize for it.

The President strangely says: "I confidently believe that under it we shall secure a larger and more profitable participation in foreign trade than we have ever enjoyed, and that we shall recover a proportionate participation in the ocean carrying trade of the world," though the very object of the increase in duties is to reduce imports, and the effect of them is to so increase cost of manufacturing here that we are still less able to compete in foreign markets with our goods. A "study of the markets" would have given the President some light on these points.

With regard to reciprocity the President endorses the policy of seeking reciprocity by granting other nations free entry of certain of their goods in exchange for the lowering of their tariffs on some of ours. It is supposed that some of the duties in the McKinley act were made with the view of "having something to trade with." This seems a rather small kind of statesmanship, but it is a kind that others can play at also.

For instance Brazil, which has just proposed to avail itself of the reciprocity clause of our patent tariff act, has just enacted from 15th November, as we learn from the New York *Evening Post*, an entirely new schedule of customs rates. This new tariff comprises 1,085 articles, and shows in general a great advance of rates all along the line. On manufactures of woolen, cotton and all clothing in general, the increase in tariff taxation is 20%. Most silk goods, with gloves and manufactures of leather, go up from 10 to 15%. The rates on furniture are augmented by 20%. Flour and corn, potatoes, tea, beer and many manufactures of iron and steel remain as in the old tariff. The government also proposes to revise its export duties, with a view to abolishing them in the end. The present export tax is about 11% on coffee, although 4% of this goes to the province where the coffee is grown; thus the central government could remit only the 7% falling to its share. Peru, too, is to put a new tariff in force on February 1st. So that we shall not gain much in this direction. The best, the only way in which to develop foreign trade is to enable our manufacturers to make goods cheap enough to compete in the world's markets, and this ability is increased by allowing manufacturers to import raw materials free of duty.

Mexico has placed a prohibitory duty on cattle from this country in answer to our duty and treasury instructions, which excluded much of her silver lead ores. The effects of our policy have been to build up rival Mexican smelting works, partly with American capital, and to oblige us to import lead instead of ore, giving other countries the benefit of smelting them.

On the silver legislation:

"The act directing the purchase of silver bullion and the issue of Treasury notes thereon, approved July 14, 1890, has been administered by the Secretary of the Treasury with an earnest purpose to get into circulation at the earliest possible dates the full monthly amounts of Treasury notes contemplated by its provisions and at the same time to give to the market for silver bullion such support as the law contemplates. The recent depreciation in the price of silver has been observed with regret. The rapid rise in price which anticipated and followed the passage of the act was influenced in some degree by speculation, and the recent reaction is in part the result of the same cause and in part of the recent monetary disturbances. Some months of further trial will be necessary to determine the permanent effect of the recent legislation upon silver values, but it is gratifying to know that the increased circulation secured by the act has exerted and will continue to exert a most beneficial influence upon business and upon general values.

"While it has not been thought best to renew formally the suggestion of an international conference looking to an agreement touching the full use of silver for coinage at a uniform ratio, care has been taken to observe closely any change in the situation abroad, and no favorable opportunity will be lost to promote a result which it is confidently believed would confer very large benefits upon the commerce of the world.

"The recent monetary disturbance in England are not unlikely to suggest a re-examination of opinions upon this subject. Our very large supply of gold will, if not lost by impulsive legislation in the supposed interest of silver, give us a position of advantage in promoting a permanent and safe international agreement for the free use of silver as a coin metal."

Evidently the President anticipates the passage of the coinage act, and the consequent disappearance of our gold.

The President's message, however, will have little influence in directing legislation, and we must "wait and see" what the next Congress will do. The present Congress will not change the silver legislation of the last session.

## BOOKS RECEIVED

[In sending books for notice, will publishers, for their own sake and that of book buyers, give the retail price?—These notices do not supersede review in another page of the Journal.]

*A New Basis for Chemistry.*—Third Edition with new preface. By Thomas Sterry Hunt, LL.D. Published by the Scientific Publishing Co., New York, 1890. Pages 247. Price \$2.

*Annual Report of the Chief of Engineers, United States Army, 1890.* Published by the Government, Washington, D. C., 1890. Pages 378.

*Bibliotheca Polytechnica.* Directory of Technical Literature. A Classified Catalogue of all Books, Annals and Journals published in America, England, France and Germany, including their relations to Legislation, Hygiene and Daily Life. Edited by Fritz von Szczeplanski. First annual issue 1889. The International News Company, New York, London, Paris, St. Petersburg and Leipzig, 1890.

*Chemical and Geological Essays.*—Third Edition with new preface. By Thomas Sterry Hunt, LL.D. Published by the Scientific Publishing Co., New York, 1890. Pages 489. Price \$2.50.

*Mechanics of Engineering and of Machinery.* By Dr. Julius Weisbach. Volume III. Part I., Section 2. The mechanics of the machinery of Transmission. Second edition, thoroughly revised and greatly enlarged, by Gustav Herrmann, professor at the Royal Polytechnic School, Aachen, Germany. Translated by J. F. Klein, D. E., Professor Mechanical Engineering, Lehigh University, Bethlehem, Pa. Authorized Translation. With more than four hundred illustrations. New York, John Wiley & Sons, 1890.

*Mineral Physiology and Physiography.*—Second Edition with new preface. By Thomas Sterry Hunt, LL.D. Published by the Scientific Publishing Co., New York, 1890. Pages 710. Price \$5.

*The Life of John Ericsson.* By William Conant Church. Illustrated. Vol. L-II. New York, Charles Scribner's Sons, 1890.

*The Teaching and History of Mathematics in the United States.* By Florian Cajori, M. S. Published by the Government, Washington, D. C., 1890. Pages 400.

## CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested. All letters should be addressed to the MANAGING EDITOR. We do not hold ourselves responsible for the opinions expressed by correspondents.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Can you inform us as to the uses to which the metal titanium is put in the arts, and also its proximate market value?

CIRCULAR.

Iron in Silver Amalgam.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: If your correspondent "M." (ENGINEERING AND MINING JOURNAL, November 29th) will use sulphur and slag off with borax he will find no trouble in getting rid of his irons. Test slags for silver and increase or decrease quantity of sulphur.

A better way is to prevent its amalgamation by discontinuing the use of all alkalis, and if ores contain copper, sulphite of copper; and use an acid; sulphuric is the most convenient; sulphuric will separate iron from amalgam. Yours,

ENOCH KENYON.

145 BROADWAY, NEW YORK, NOV. 29, 1890.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Your correspondent "M" in ENGINEERING AND MINING JOURNAL November 29th, 1890, issue of your paper, is, I am afraid, "away off" in his diagnosis as to what is in his bullion. Iron in so large a percentage as he suggests in bullion would make the bullion infusible in any ordinary furnace or crucible. Again, the idea of adding bicarbonate of soda as a flux when iron is to be slagged off is amusing. Nitrate of soda and quartz are as a matter of course what was needed.

You will think that I find myself in the position of the man, the putative owner of a dog, who has been sued by a man bitten by the dog. But for the moment let us suppose the man really had a "dog." If "M" will take his dry, irony amalgam, break it gradually into a clean-up pan, running a thick mortar of screened wood ashes, then allow the pan to run two, three or four hours, hot or cold, adding a little quicksilver—if after, the first hour a hornspoon test does not show complete fluidity of the quicksilver, thinning out the pan with water, and after running thin for half an hour, drawing an upper plug while keeping on a stream of water, until the water runs off clear, he will then on straining anew find his amalgam entirely free from iron. MUSCULAR AMALGAMATOR.

NEW YORK, November 29, 1890.

Are Revolving Cylinder Furnaces Suitable for Copper Matte Roasting?

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Any one who has had experience during the past few years in calcining copper ores, and especially copper mattes, in cylinder or other automatic furnaces, would confer a great favor upon the profession at large, and no doubt benefit himself, by publishing accurate statements of his results.

To be valuable they should have been conducted on a large scale, and should especially cover the more practical points, such as size and capacity of furnace, time and perfection of the roasting, amount and quality of fuel used, chemical composition of ore before and after roasting, especially noting the terminal condition of the copper, whether, and how much of it, sulphide, sulphate and oxide; of the iron, whether, and how much of it, protoxide and sesquioxide, etc., etc. Results, as compared with the ordinary calciners used in the same works, cost and many other similar points.

Such observations are lacking in the literature of the profession, and will be far more profitable to the observer published than kept for his own secret use.

It is hard for some men to understand that the reputation gained by giving valuable information to the profession will, if only from a money standpoint, bring infinitely more profit to him who publishes it than it would to preserve it for his own private benefit, with the fancied idea that it is going to give him an advantage over his competitors.

I can speak with some feeling on the subject, as I never derived one-quarter the benefit from my own metallurgical experience while keeping it to myself as I did after giving it fully and openly to the public.

The information asked for is badly needed by the profession at large, and will add largely to the reputation of any one who can and will publish it fully and, above all, accurately.

EDWARD D. PETERS.

Boston, Mass., Nov. 30, 1890.

[A properly constructed revolving cylinder makes a very efficient and economical roasting furnace, and since it will completely roast pyrites of any kind it should certainly roast copper matte. An artificial draft is desirable in any roasting cylinder, and would permit of vastly increasing the capacity of the furnace.—Ed. E. AND M. J.]

On the Difference in Depth of Oxidation in the Wet Mountain and Sangre del Christo Ranges  
EDITOR ENGINEERING AND MINING JOURNAL:

SIR: As a foot note to my recent article in your valuable journal, "On the Difference in Depth of Oxidation in the Wet Mountain and Sangre del Christo Ranges," you kindly suggest that I "may not have taken into full account the depth of the drainage level in each case," and surmise that

the fact of the water disappearing on the Wet Mountains while it remains on the surface of the Sangre del Christo, seems to demonstrate that on the former it finds subterranean outlets at a considerable depth, and that in consequence oxidation will extend to the drainage level in each case.

In reply, I wish to say that as a matter of fact I had taken such into consideration before writing the article referred to, but found it quite unsatisfactory as an explanation of the phenomena in question. Indeed, it was in consequence of inability to account for the facts in this way that I suggested as an explanation the difference in the rate of denudation; and I may add that the difference in the amount of surface water-flow between the two ranges does not seem to result (as you suppose) from a difference in the depth of the general drainage level, but rather from a difference in the amount of precipitation on the two ranges, and this difference in the amount of precipitation seems to be due principally to the westerly situation of the Sangre del Christo range, relative to the Wet Mountain range, coupled with its higher elevation.

The prevailing direction of the wind in this part of Colorado is from west to east. The winds come from the Pacific slope laden with moisture, and striking the cold lofty peaks of the Sangre del Christo, are robbed of their moisture, which is precipitated as rain, snow and hail, and ultimately finds its way down the slopes of the range in streams and rivulets. The winds pass on and over the Wet Mountains to the east, on their eastward course, but having already deposited their surplus of moisture on the peaks of the Sangre del Christo, they are not in a favorable condition for precipitation on the Wet Mountain range. The relative barrenness of eastern Colorado and western Kansas testifies amply to the truth of this statement. What, then, I ask, is the logical inference to be drawn from a study of these facts, coupled with those contained in my former article? Most certainly this:

First.—That with greater precipitation we must have greater denudation (*ceteris paribus*), and where denudation is greatest oxidation will be least preserved.

Second.—That any two sections of country subject to exactly the same rate of oxidation, but to different rates of denudation, will in the long run present just the condition of things here to be accounted for.

THOMAS CHARLTON.

ROCKY MOUNTAIN SMELTING CO., WEST CLIFF, COLO., Nov. 24, 1890.

Wurtzilite and Wurtzite.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: There has just come into my hands a copy of the *Oil, Paint and Drug Reporter* of November 26th, 1890, which I find to contain an important communication from Mr. Wm. L. Lay, of Frisco, Utah. This gentleman was the first to publish, in the same journal (June 12th, 1889), under date of May, 1889, an account of the curious mineral to which Prof. Wm. P. Blake has done me the honor to attach my name. Mr. Lay, in this former letter (of May, 1889), says of wurtzilite: "I believe it is an unknown mineral," and displays remarkable intelligence and acumen in setting forth his grounds for this belief.

In the new communication from Mr. Lay now under notice there are some novel facts stated regarding the occurrence of wurtzilite, with some suggestions, which I wish to place before your readers. But first of all I desire to call attention to what seems an unlucky *contretemps* that has already occurred in relation to Professor Blake's name for the new mineral.

Mr. Lay, from the beginning to the end of his article, designates it as "*wurtzilite*," instead of wurtzite. He explains this by saying: "Prof. Wm. P. Blake named this mineral wurtzilite, in honor of, etc. . . . Afterward the name was changed to wurtzite, to conform with untahite, albertite and grahamite." Your mineralogical readers—as well as I myself, and doubtless Professor Blake especially—will crave to know *who* changed the name, and when and how it was changed. Only some high authority in the science of mineralogy would or could, at the present stage of the history of this species, undertake to change Professor B.'s specific name, without his consent and co-operation, or, indeed, in any way other than through his personal instrumentality.

But in this case it happens that there is an insuperable obstacle in the way of the adoption of the name employed by Mr. Lay; namely, that it would introduce confusion into mineralogical nomenclature, the name wurtzite having already been in common use since 1861 for designating a mineral belonging to a widely different class. The French chemist, Friedel, at that date observed a peculiar form of sulphide of zinc, which, instead of being crystallized in the regular or isometric system, in dodecahedral and other forms, like ordinary blende or sphalerite, is found in hexagonal prisms, like beryl, apatite, quartz, etc. Wurtzite was named after the famous Frenchman, Adolphe Wurtz, now deceased, who was deemed while living the first chemist in France, and the species and name are sanctioned by Dana and the highest mineralogical authorities. Wurtzite bears a similar relation to blende as, for example, aragonite does to calcite; argentite or silver-glance to acanthite, etc.

The reason is thus apparent why Professor Blake did not himself apply the simpler name wurtzite, but devised the new name wurtzilite,\* which is readily distinguishable from the former, and therefore admissible. Wurtzite, on the contrary, would be wholly excluded from mineralogical books, for the reason I have indicated, and an entirely new name doubtless be applied in such books to this peculiar mineral. As I have already said, it is unfortunate that the suggestion has been made to call it wurtzite, as more or less confusion must, for a time at least, be introduced into the literature on the subject.

To touch now upon the new and interesting points recently brought forward by Mr. Lay, it appears that wurtzilite is apparently destined to be more than a mineralogical curiosity of the cabinets. Mr. Lay says that a new locality was discovered in August of this year near Soldier's Summit, Utah, in the Price River Valley, nearly one hundred miles southwest of the first deposit discovered in April, 1889. A third locality is also spoken of by him, as "about half way between" the above two. The latter he says "appears to be a mixture of asphaltum and wurtzite" (wurtzilite). Of this last his account is rather obscure, and indeed we have

\* Similar cases have occurred frequently in the course of mineralogical discovery. Thus we have danaitite and danalite, humboldtite and humboldtillite, and many others. The writer himself, in naming the new compound of arsenic and silver from Silver Islet, in Lake Superior, discovered by himself, after Professor Stryer Hunt, finding that huntite had been already used, devised the name *huntillite*.

as yet far less of precise and detailed information regarding all these localities of curious hydro-carbons in the Wasatch chain and in the valley of the Green River and its tributaries than is desirable. Mr. Lay, who is clearly highly competent to do so, would confer a benefit on the public in the East by giving us very much more detail regarding the characters, locations and surroundings of these outcrops than we have had from other sources.

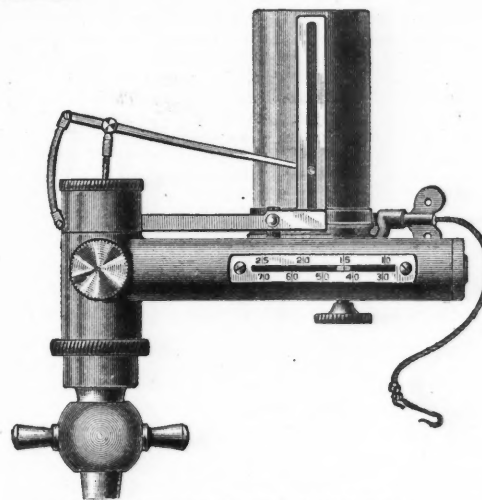
Mr. Lay closes with the suggestion that the United States government ought to send an exploring expedition into this range of country, to investigate and report upon all these materials. This is a matter which now would probably be regarded as pertaining specially to the functions of the Government Geological Survey, and would be referred thereto. It is to be hoped that this commission might take action as suggested.

HENRY WURTZ, Ph.D.

2149 SEVENTH AVE., NEW YORK, Dec. 2, 1890.

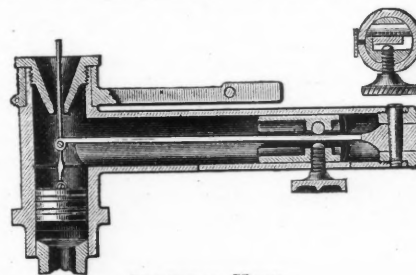
#### THE BACHELDER STEAM ENGINE INDICATOR.

The Bachelder steam engine indicator, for which several improvements over other indicators are claimed, is about to be introduced by Messrs. Thompson & Bushnell, of this city. Indicators, as heretofore made, use a spiral spring, separate springs being required for each different pressure. This necessarily entails considerable expense in outlay, besides no small amount of labor in removing one and substituting another spring for different pressures.



THE BACHELDER SPRING INDICATOR.

With the Bachelder adjustable spring indicator the change of scale to suit the pressure is easily and quickly made by an ingenious simplification of mechanism. The flat spring, as seen in the section view, is securely fastened in one end of the case and attached directly to the piston rod at the other end, as shown. The effective length of the spring is varied by changing the sliding fulcrum. By loosening the set screw the fulcrum can be moved until the line upon the block which protrudes through the slot in the case coincides with the one required on the scale plate. The change from one scale to another is made by



SECTIONAL VIEW.

changing the sliding fulcrum. Each instrument is fitted with two springs, the second or low-pressure spring being necessary only on compound engines. The height of the atmosphere line is adjustable by means of a swivel in the piston rod. The parallel motion is secured by confining the end of a pencil lever in a small roller which runs in a vertical slot. By unscrewing the vertical socket the piston becomes accessible for cleaning and oiling.

**Absence of Oxygen in the Solar Photosphere.**—Mr. J. Janssen has read before the Academie des Sciences a paper, reported in the *Moniteur Scientifique*, describing his ascent of Mont Blanc last August. The action of oxygen on light manifests itself in two systems of absorption, one being more or less obscure, fine rays, the other being obscure zones, which have so far proved to be insoluble in red, yellow, green, blue, etc. For the purpose of observing the behavior of oxygen in the solar spectrum, Mr. Janssen ascended, in October, 1888, Mont Blanc as far as Grands Mulets, or three-fifths of the entire height of the mountain. At this altitude he discovered that the groups of rays due to the action of the atmospheric oxygen diminished. In order to follow up this suggestive observation he made his second ascent last summer, and found that at the summit of the mountain both the rays and the zones in question appeared still further decreased in intensity. This seems to warrant the conclusion that these groups of rays would disappear altogether at the limits of the globe's atmosphere, and that consequently the solar atmosphere has no share in producing the phenomenon, or that the solar photosphere does not include oxygen.

## HAMILTON ORE COMPANY.

Written for the Engineering and Mining Journal.

The Hamilton Ore Company's property is located within the corporate limits of the city of Iron Mountain, Menominee county, Michigan, and adjoins the Chapin mine. As will be learned from a reference to the ENGINEERING AND MINING JOURNAL, August 16th, the Chapin lense of iron ore lies diagonally across that company's property, the trend being north of west and south of east. In the different openings of the Chapin mine at the depth of 633 feet, the lowest point reached, the lense was found to dip at an angle of from 75° to 80°, pitch to the west, and to preserve an extremely uniform width through the greater portion of its course. The Hamilton property lies in the line of this dip, and a vertical shaft was started in what was supposed to be the hanging wall in August, 1883. At 843 feet in depth the shaft cut through this same hanging wall—gray slate and jasper—into the ore. The shaft was continued through 432 feet of ore and into the foot wall formation 100 feet, making it 1,340 feet deep. Levels were run from the 843 foot point south, a distance of 69 feet, without encountering the foot wall. At the depths of 925, 1,025, 1,125 and 1,225 feet, levels were driven to the hanging wall. At the 1,225 level the lense was 152 feet wide. The bottom level was also run through to the foot wall. In addition to these openings a 140-foot winze was sunk from the north end of this last level and a drift east driven 400 feet in ore. This is the extent of openings in ore on this property.

The dip of the lense from the 845 to the 1,100-foot point is about 75°. From this latter point it seems to flatten, taking a dip of 45°.

A theory has been advanced to the effect that the Hamilton ore is a lense entirely distinct from that of the Chapin. In substantiation of this is offered the character of the deposit as it occurs in the Chapin. On the east end of this company's property the ore is found to be a solid body. As it approaches the west, or Hamilton workings, it is found in the form of kidney-shaped lenses having a jasper filling. In the Ludington property, which lies still further to the west, this tendency of the vein to split into lenses is more marked. The Ludington's owners are inclined to believe this theory. In running a drift west from their 1,250-foot level at "A" shaft for the purpose of holing with one east from the Hamilton, and when in 16 feet, there was struck a cap of jasper, which on being removed disclosed a lense of ore which proved to be the apex of a large lense which lies in the form of a wedge, spreading east and west and dipping north. And the Hamilton Ore Company claims now to have sufficient ground open to warrant the statement that there is in sight in its mine 2,000,000 to 3,000,000 tons of 63% soft hematite ore carrying about .05% in phosphorus.

The formation to the north or hanging-wall side, as given in a previous article descriptive of this district [ENGINEERING AND MINING JOURNAL, August 16th and 23d], is gray slate and so-called "soapstone," hard limestone and Potsdam sandstone, in the order named. About 2½ miles to the north and parallel with this ore formation lies a diorite bluff. On the south side of this diorite outcrop the old Connell mine produced 60,000 tons of ore in 1879 and '80. From the geological formation it is claimed that a great basin exists, in which the ore is to be found in a more or less continuous belt or stratum, having a flattening dip as the center is approached.

The Hamilton Ore Company, about 18 months ago, commenced the sinking of a second vertical shaft, 24 × 7 feet in the clear, with four compartments. It is located 400 feet east and 815 feet north of No. 1 shaft. It is now in dolomitic limestone, a distance of 800 feet, and is going down at the rate of from 60 to 80 feet a month. It is estimated that it will reach the ore in from 15 months to 2 years. The limestone now being encountered is gradually changing from a gray to a reddish color, and is growing harder. The land lying north of the company's property is owned by the Houghton Mineral Land and Iron Company, which is said to be largely interested in the Hamilton Ore Company.

A permanent plant is being constructed at this new shaft. It will consist of a 50 × 100 feet stone engine house, a pair of 36 × 72 inch Corliss engines, designed to handle 10-ton skips. A new hoisting plant has just been completed at No. 1 shaft. It consists of a pair of Webster, Camp & Lane Corliss engines 20 × 48 inches and flat rope hoisting drum.

The mine employs about 200 men. During the season of 1889 8,000 tons of ore were taken from the development openings. The shipments of 1890 amounted to 18,000 tons. Preparations are being made for a large output in 1891.

Mr. J. T. Jones is the superintendent of the company. It can be said that he conceived the plan of development of the property, which has given to its owners a mine of great value.

## DETERMINATION OF ZINC DUST.

By G. Klemp.

The author has devised a process for the above purpose which depends on the power of zinc to reduce potassium iodate to potassium iodide in an alkaline solution; when the solution is afterward acidified iodine is liberated by the interaction of the iodic and hydriodic acids, and is distilled off from the reaction mixture into potassium iodide solution and titrated with thio-sulphate. The details of the method, as published in *Zeits. Anal. Chem.* 29, 253-266, are abstracted, as follows, by the *Journal of Chemical Industry*:

0.5 — 1 gram of the well-mixed zinc dust is weighed in a tube and poured into a 200 c. c. stoppered flask, the tube being again weighed. For every 0.1 gram of zinc present, 10 c. c. of a solution of alkali (containing 370 grams of potassium hydroxide, or 300 grams of sodium hydroxide per liter) and 3 c. c. of a solution of potassium iodate (containing 15.25 grams of potassium iodate per 300 c. c.) are measured into a beaker and then poured into the flask. Some glass beads are added, and the flask stoppered and shaken for five minutes in the cold, no advantage being gained by heating it; its contents are then washed into a 250 or 500 c. c. flask and made up to the mark with water; 100 c. c. are now pipetted into the retort of a Topf's apparatus (*Zeits. Anal. Chem.* 26, 293); dilute sulphuric acid is added and the apparatus filled with carbonic anhydride. A solution of potassium iodide is placed in the receiver and the retort heated, at first gently and then more strongly till the contents are perfectly colorless; the stream of carbonic anhydride is

continued throughout the distillation, which generally occupies about 20 minutes. The solution of iodine in potassium iodide is then transferred from the receiver into a flask, a standard solution of sodium thio-sulphate added in slight excess, and the excess titrated back with weak standard iodine solution, starch being used as an indicator. After correcting for the excess, the quantity of zinc is calculated from the amount of thio-sulphate used.

The author finds that the addition of powdered lead and iron to the zinc makes very little difference in the quantity of zinc found by this process, the results being a little lower in the presence of these metals.

The results by this method agree well with those obtained by Fresenius' method, but are generally higher than those obtained by Drewson's and lower than those obtained by Topf's method.

## IRON IN ZINC DUST.\*

The zinc dust which deposits in the condensing chambers is generally treated as mineral in the works in Silesia. Experience has proved that the dust alone cannot be profitably treated owing to the considerable waste due to its extreme fineness, and to the fact that it contains too much sand and oxides of iron and of lead; these substances in contact with the hearth of the blast furnace produce a slag which dissolves the oxide of zinc and protects the mineral against the action of the reducing gases. Besides, the spelter from the dust is very much richer in iron than that from blende or calamine, the latter containing rarely more than 0.02 per cent. of iron, of which at least half comes from the tools and apparatus in contact with the liquid zinc. By adding from 6 to 8 per cent. of dust to blende or calamine, the raw metal contains at least 0.04 per cent. of iron. The raw metal from dust alone carries up to 0.71 per cent. of iron.

The general use in Silesia of the Cowper apparatus facilitates in a high degree the recovery of the dust; but as the introduction of the hot blast stove reduces the zinc in the dust, and the percentage of iron consequently increases, the question of iron in the spelter deserves serious attention. Part of the iron can be eliminated during the concentration of the zinc ore, but it is preferable to prevent the accumulation of iron in the metal.

The question how iron finds its way into the zinc, although the great difference between their fusing points makes a direct mixture impossible, admits of two answers. The very finely divided oxide of iron may be carried mechanically into the zinc bath and absorbed, as protoxide, or dissolved as metal, after having been reduced in the atmosphere of carbonic oxide; or, on the other hand, the presence of small quantities of chlorides in the dust may account for it. The chloride of lead, for instance, could, together with protoxide of iron, give chloride of iron that would be decomposed by the zinc; this metallic iron would then combine with the zinc fumes and be condensed or transformed into protoxide and then mixed with the zinc in this state.

Experiments with known quantities of anhydrous chloride of iron added to the mineral have demonstrated that the chlorine had a certain influence on the metal's richness in iron, but also that the chief cause of this accumulation of iron must be looked for elsewhere. In order to investigate the influence of the fine division of the substance in the dust upon the richness in iron, the dust was dried, sifted and separated according to size, the finest portion being specially ground. The average percentage of FeO being 22.96, the portion sifted through the 0.5 millimeter mesh contains 34.17. The finer the dust is, the more protoxide of iron is contained in it, so that the weight of each particle decreases the more finely divided the substance is. The conclusion is that very finely divided matter, rich in FeO, is carried mechanically into the zinc bath.

**The Florida Ship Canal Scheme.**—Press reports state that the Florida Ocean and Gulf Canal Company will begin this month the work of cutting the proposed ship canal from St. Augustine to Cedar Keys, Fla. The canal will be 117 miles long, 28 feet deep and from 200 to 250 feet surface width.

**Lightning Observation.**—Mr. Trouvelot, according to the *Moniteur Scientifique*, draws the following conclusions from his observations of the tempest which swept over Meudon May 8, 1890: (1) The tree-like lightning, when striking a cloud, electrifies it in the same manner as the electrical machine the sensitive disk. (2) As to the movements of the lightning, it can descend, rise, take a horizontal or inclined course, in short, travel in any direction. (3) Its form changes according as the storm is accompanied by rain or not, and is more complicated in the latter case. The fact that lightning of a tree-like and complex form moves in different planes, involving changing distances, explains the characteristic rumbling sound of thunder.

**The Beginning of Iron-making in America.**—It is certain that at Lynn, in the Province of Massachusetts Bay, was cast, in the year 1645, the first piece of hollow ware made in America—"a small iron pot capable of containing about one quart." This pioneer of all American-made castings was in existence in 1844, but recent efforts to ascertain its whereabouts have been unsuccessful. The works at Lynn appear to have been prosperous for a number of years; but after a time they became unpopular, owing to the flowage of lands by their dam and the great destruction of timber for fuel.

The Rev. William Hubbard, writing in 1677, says they were "strenuously carried on for some time, but at length, instead of drawing out bars of iron for the country's use, there was hammered out nothing but contentions and lawsuits."

After the establishment of this first successful "furnace" and "foundry" at Lynn, works for the manufacture of iron were erected in other parts of New England, and thence the business spread into New York, New Jersey, Pennsylvania, and Maryland. During the "French War" (1755) there was a number of furnaces in operation at which "cannon, bombs, and bullets" were made in great quantity, and many of these iron-works furnished similar supplies to the Continental army during the Revolution.—From *Early Steps in Iron-making*, by W. F. DURFEE, in *The Popular Science Monthly* for December.

\*Abstract of a paper by Edmund Jensch in *Zeitschrift für angewandte Chemie* p. 13-15, 1890.

## THE ROGERS TYPOGRAPH.

After four hundred years of typesetting, the craft is threatened with a revolution by an invention which promises to do more for the diffusion of education and enlightenment than any former invention, the lightning printing press, perhaps, excepted. What the new printing press is to the old heavy hand press the new typesetting and casting machine is to the old black wood letter. Many have been the contrivances during the past few decades to set, or compose, type by machinery. The same objections have been applied to nearly all of them, namely, that after all it was still type being set up, which had to be distributed when used, the difficulties of spacing each line by hand, the amount of labor required and the great cost of the machines. It can safely be asserted that until quite recently the typesetting machines were little, if any, improvement over the "compo" at the case. The fact that they have been very little used, and that the human machine has held its own in competition against them, attests this.

As the demand for better facilities for quick printing manifested itself, inventors produced what is now looked upon as an almost perfect machine, which prints, folds, pastes in sheets, counts out quires, and throws them off in lots, and all this with no more labor than the old press which merely printed one side at a time, and at one-twentieth of the speed now attained. With this improved presswork came the necessity for duplication of the type forms, which was met by the invention of stereotyping.

After the many experiments to secure more rapid and more accurate typesetting and casting at the same time, the goal seems to be reached in Professor Rogers' Typograph. This apparatus, which looks complicated at a first glance, is no more so than the sewing-machine or the typewriter.

In this machine there are no movable types, as the word type is under-

the quantity of type metal, the gas and the motive power (if used). To this must be added the rent of the machines, as they are not sold.

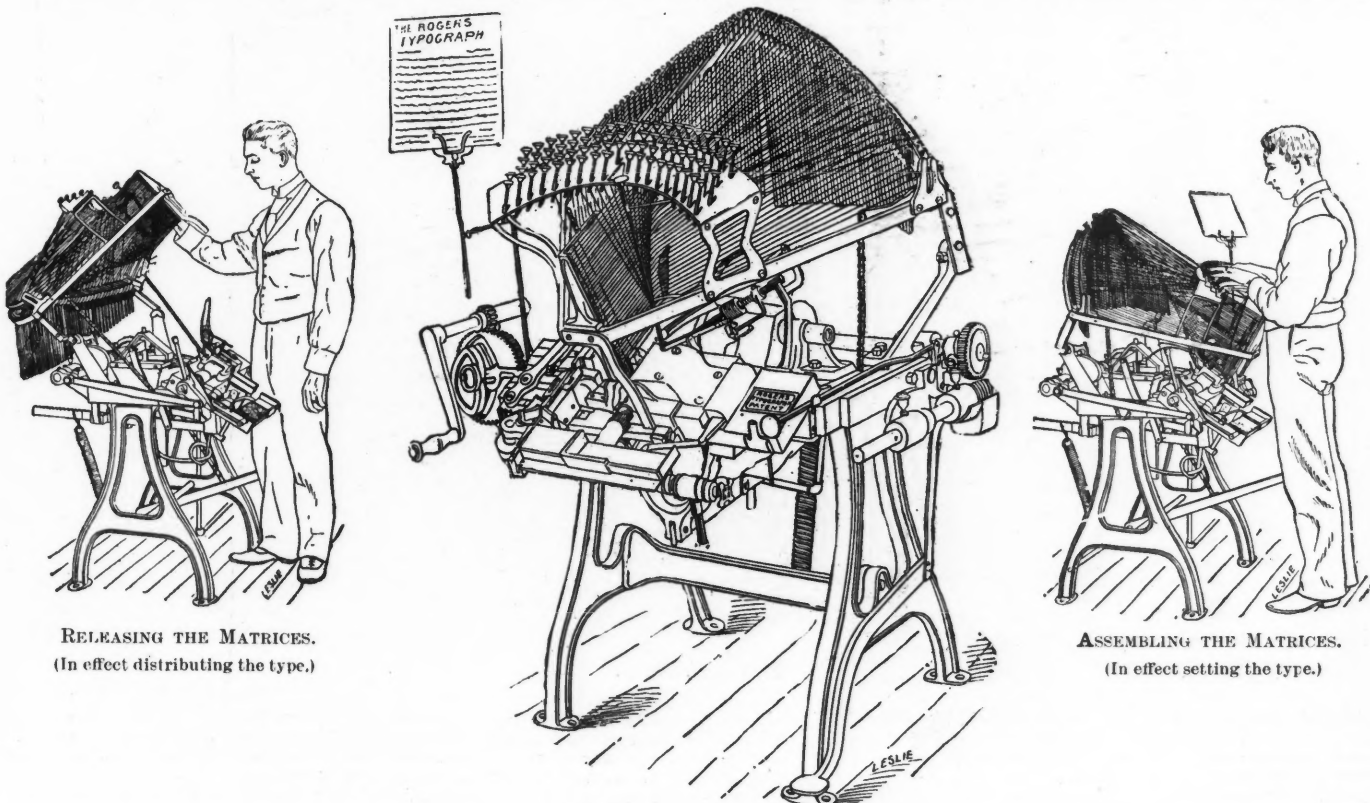
The distribution of the types, or matrices, is a marvel of speed and simplicity. As soon as the line has cast itself the operator raises the top of the machine, as seen in the illustration, and each of the letters slides back down the inclined wire to its place. This operation occupies no more time than does that by which the line is changed in a typewriter—perhaps a second and a fraction.

With no movable types, it is, of course, easy to set up a clean proof. When the galley is proofed, it is read, and the errors are corrected by taking out the line, resetting it, and replacing it, a much more rapid operation than digging out movable types.

As to speed, the effect of the Rogers typograph is as marvelous as its other functions. An average compositor distributing and setting up 1,000 ems will occupy more than one hour. Some are faster; some slower. The operator at the offices of the Typograph Company in the Pulitzer Building, Park Row, New York City, claims that he can set up, distribute and cast 4,000 ems in one hour.

Associated with Mr. Rogers in the development of the typograph has been Mr. Frederick E. Bright, an inventor of considerable reputation before he entered upon this field.

**The Kassner Method of Preparing Oxygen.**—Mr. G. Kassner has lately proposed a new method for the preparation of oxygen. This he obtains by heating together plumbate of calcium and sodium carbonate. Peroxide of lead and calcium carbonate are first formed, and on continuing the heating the former breaks into protoxide of lead and oxygen gas, and the operation is completed. Calcium plumbate is again formed by heating the lead oxide and calcium carbonate left from the previous oper-



THE ROGERS TYPOGRAPH.

stood. But at the bottom of each of the fringe-like steel rods at the back is a matrix of a letter. By pressing the required letter on the Remington keyboard, the matrix slides down its special inclined wire into its place in the "composing stick" under the operator. When the line is filled, by touching the letter keys and space keys, exactly as in the Remington typewriter, a pressure of the foot justifies and spaces the lines by rotating all the spaces, which are compensating twin disks, until the matrix line is just full. A little more pressure squeezes out a portion of the disks and admits another letter, and vice versa, so that the beauty of "even spacing" is mathematically accomplished.

When the line is ready to be cast a motion of the foot-power machine admits the molten type metal, casts it, shaves it down to exact proportions, trims a "nick" into it and drops it into its place on the galley. These operations, together with the spacing out of the line, occupy five seconds. But when the machine is driven by belt, carrying about one-eighth horse power, the same operation is performed in three seconds, during which time the operator glances at his copy and reads the next line he has to set up. Thus, there is no stoppage, as in setting type by hand, while the compositor is reading his copy.

The melting pot holds about thirty pounds of type metal, requiring about eight cubic feet of gas, at a cost of one cent an hour.

When the line is set up, as we have stated, it is "emptied" on to the galley automatically. There can be no "pi" on galleys here, for the line is the unit instead of the letter. To "pi" a stickful would mean the rearrangement of some twenty pieces or so instead of some 400 or so. With the Rogers typograph "pi" or scattered, fallen, broken and odd types about the cases and the floor is obviated. No type is required, nor cases and other tools. The only outlay is an infinitesimal depreciation in

ation in a current of air, after which the process first described can be repeated and a further supply of oxygen obtained.

**A Point Regarding Feed Waters for Steam Boilers.**—Mr. Leo Vignon's new method of analysis applicable to industrial waters which have to undergo a chemical purification leads him to the conclusion, according to *Moniteur Scientifique*, April, 1890, that in order to determine the elements of chemical purification, or the anti-incrustation agents, it is sufficient to determine the free or the half-combined carbonic acid, and to determine the quantity of sodium carbonate necessary to convert the soluble salts of calcium and magnesium into carbonates which are chemically neutral.

**The Longest Telperage Line.**—Probably the longest telperage line in the world has just been constructed in South America. The overhead electric railway will be 186 miles long, and will connect Buenos Ayres with Montevideo. Its object is to allow of traveling letter boxes to be dispatched every two hours between the two cities. The line will cross the La Plata estuary where it is 19 miles wide. The two wires will be supported on either side of the river by two towers nearly 270 feet high.

**Large Production of Basic Bessemer Steel.**—The production of basic Bessemer steel by the Aachener Hütten Actien Verein, of Rothe Erde, near Aachen, Germany, during ten years ending 23d of October last, reached the enormous total of 1,000,000 tons, a result which has scarcely been attained by any other works in the world. To commemorate this event the Aachener Hütten Actien Verein has given \$7,500 to its fund for providing for aged and incapacitated workmen, and \$2,500 for the erection of schools.

## LEADING COAL MEN.

Edwin H. Mead.

The President of the Pennsylvania Coal Company, Mr. Edwin H. Mead, is a man of long and tried experience, who has seen two generations of coal operators come on the scene and pass away. He has been connected with the coal business just fifty years, making his start in 1840 in the employ of Belknap & Mc Kercher, at that time the leading firm in the trade at Albany, N. Y. As Mr. Mead was born in Broadway, New York City, in 1822, he was just 18 years of age when his business career began. In 1823, on the outbreak of the yellow fever, Mr. Mead's parents removed to Berkshire County, Massachusetts, where they continued to reside for some years, and the subject of this sketch received a public school education.

From the commencement of his business life Mr. Mead's progress forward has been uninterrupted, and the success he has achieved is due to no such adventitious aids as influence or the possession of wealth. The influence which now surrounds him he has created, and the fortune he possesses he has earned. In February, 1852, Mr. Mead was elected to the responsible post of Secretary of the Pennsylvania Coal Company, and has been continuously with that company since. He was successively elected Secretary and Treasurer, then President and Treasurer, and finally President on the death of Mr. George A. Hoyt in December, 1887. Mr. Mead is also officially connected with the Erie & Wyoming Valley Railroad Company, the Washington Life Insurance Company and several other minor corporations.

The Pennsylvania Coal Company, as is known, was one of the pioneers in developing the anthracite coal fields in the Wyoming region, and has been markedly successful during 40 years under the successive adminis-

turbed by touching or the too violent action of the waves, it would immediately separate, the particles at once falling to the river bottom.

The above facts seem to show that coarse sand can be floated away by a current of far less velocity than 0.4545 miles per hour. They indicate a possible explanation of the coarser particles of sand occasionally found in otherwise very fine deposits.

## DETERMINATION OF METALLIC ALUMINUM IN THE ALUMINUM OF COMMERCE.

By G. Klemp.

The striking solubility of aluminum in alkaline lyes presents means— which do not prove available in the determination of zinc powder in consequence of the relatively sparing solubility of zinc—to effect the determination of aluminum in a simple manner. A weighed quantity of the aluminum is treated with potassa-lye, and the escaping hydrogen is determined either volumetrically as gas, or gravimetrically as water. For the former purpose most of the apparatus used for gas volumetry may be employed (especially Lunge's improved gas volumeter), and for the latter method the apparatus which R. Fresenius proposes for his method of determining zinc powder.

Fr. Schulze made use of the gas-volumetric method in order to compare the quantities of hydrogen gas evolved by different sorts of aluminum in alkaline solutions, which he designated as approximately corresponding to the proportion of pure aluminum. But, according to the instances given, it is not possible to arrive at a decisive conclusion, either as to quantity of the aluminum present or the applicability of the method. The author considers the gravimetric determination with the apparatus of Fresenius preferable to the volumetric method.



EDWIN H. MEAD.

trations of General John Ewen, Mr. George A. Hoyt and Mr. Mead, supported by boards of directors selected from among the ablest and best known business men and capitalists of this city.

Now in his 68th year, Mr. Mead possesses the virility of a man of 40, and was never more active in business and social affairs than at the present time, when he is so close upon the proverbial limit of three score and ten. Mr. Mead resides at South Orange, N. J., where for many years he has been closely identified with the government of the town, serving two terms as president of the town and one as trustee.

Mr. Mead possesses a surpassing activity and nervous energy, two characteristics which have been largely instrumental in his career. Socially, as well as commercially, he is well known for his cordial geniality of manner. He possesses magnificent health and doubtless will continue for many years to be prominent among the coal men and at the head of the company he so ably manages.

## SAND FLOATING ON WATER.

It is well known that a needle can be placed gently upon the water so as to float, the force of capillary attraction producing a surface tension so as to prevent its sinking. This principle apparently accounts for the following phenomenon described by Mr. J. C. Graham in *The American Journal of Science*, December. He saw sand being removed from a bar jutting out from an island in the Connecticut river. The erosion, carried on from the side of the bar against which the current did not strike, took place by gentle ripple waves splashing up against the sand bar (which was at an angle of about 150° to the surface of the water), and upon the retiring of each wave a little float of sand would be on the water. At first these were about the size of a silver quarter of a dollar, but by the union of a number, some floats would be formed of about six inches square. These blotches were so numerous as to be very noticeable in rowing up the river and could be traced for half a mile or more below the bank, from which the sand came, although this was but a few yards long. If one of the blotches were dis-

He uses a potassa-lye containing in 100 c. c. 35 grams KOH. The aluminum is reduced to thin fragments with a file; they were put in a weighing-tube, about one gram emptied into an Erlenmeyer flask holding about 150 c. c., and the weighing-tube was reweighed. Upon the aluminum there was poured a little water, and some vaseline added to prevent frothing.

The hydrogen evolved was burned to form water in the apparatus of Fresenius, and the water was collected in concentrated sulphuric acid. In order to prevent too violent reaction and too rapid development of hydrogen, the potassa-lye was added in small portions, proceeding otherwise according to the directions of Fresenius for the determination of zinc powder.

The solution went on regularly, and was completed in about 45 minutes. Towards the end, when the escape of gas became slow, heat was applied. In the flask there remains a brownish gray solution and a black undissolved residue.

The author proposes ascertaining whether this method is applicable to aluminum alloys (ferro-aluminum, aluminum bronze, etc.).—*Zeitschrift für Analytische Chemie*, Vol. XXIX., p. 388, through the *Journal of the Chemical Society*.

**How to Paint Iron.**—An exchange recommends, as a means to prevent paint on iron from scaling off in large flakes, to wash the iron surfaces before any paint has been used, and then brush it with hot linseed-oil. If the objects are small and bear being warmed, they may be heated, until the linseed-oil, with which they are brought in contact, begins to steam, then all the surfaces are carefully brushed with the oil and allowed to cool. They are now ready to take the paint. If the objects are too large, and a warming not to be recommended, the linseed-oil must be put on very hot. The thin liquid oil enters into all the pores, removes all moisture and adheres so firmly to the iron that frost, rain or air cannot effect a separation. To iron surfaces oiled in this manner the paint adheres well. This proceeding is also to be recommended for wood which is exposed to the open air.

A NEW PROCESS FOR GENERATING AND CUTTING THE TEETH OF SPUR WHEELS.\*

By Ambrose Swasey, Cleveland, O.

The theory of the interchange system of gearing according to the solution first given by Professor Willis, in his treatise on the *Principles of Mechanism*, is, "that in a set of wheels of the same pitch, having a constant generating circle for the flanks and faces of the teeth, any two wheels of the set will work correctly together;" and as a rack is a gear so infinitely large that its periphery forms a straight line, it follows that, if the rack teeth are also described with the same circle as that used for the wheels, any one of the set will run correctly with the rack.

The diameter of the generating or describing circle which gives one of the best forms of teeth for a set of wheels is equal to the radius of the pitch diameter of a 15-tooth pinion, making a  $7\frac{1}{2}$ -inch generating circle for one diametral pitch. The flanks of a 15-tooth pinion being radial, a 12-tooth pinion, which is the smallest generally used in practice, will have the flank of one tooth nearly parallel to that of the tooth following, thus allowing the space between the teeth to be cut with the regular gear cutter.

It was thought at the time this system was first brought out that its

theoretical lines than arcs of circles were laid out by means of Professor Robinson's Templet Odontograph, and cutters made from them with much better results. Later, the curves of coarse pitch teeth were laid out, and sheet-steel formers shaped to the lines as nearly as possible. These formers were then placed in a Pantagraph Machine, and cutters of the different pitches made from them; but it was found impossible, even with the large drawings, to make the formers sufficiently accurate. The Epicycloidal Milling Engine was then constructed for generating and milling the curves of one diametral pitch upon a steel plate, and, with these formers as a basis, cutters of any pitch were made. Thus step by step the process of making gearing with special cutters for each wheel, according to the Willis theory of the interchange system, has been brought to great mechanical perfection.

In the new process, which is the subject of this paper, instead of making all gears so that they will run into a rack, the rack is transformed into a cutting tool, and by it the teeth of wheels of any diameter are generated and cut at the same time.

Fig. 1 illustrates a gear-generating and cutting engine, designed and constructed by the writer, for the purpose of reducing to practice the principles of this process. The cutters are shown in position as they appear in the machine when the teeth are cut partly across the face of the wheel. The cutting spindles and the main spindle which carries the

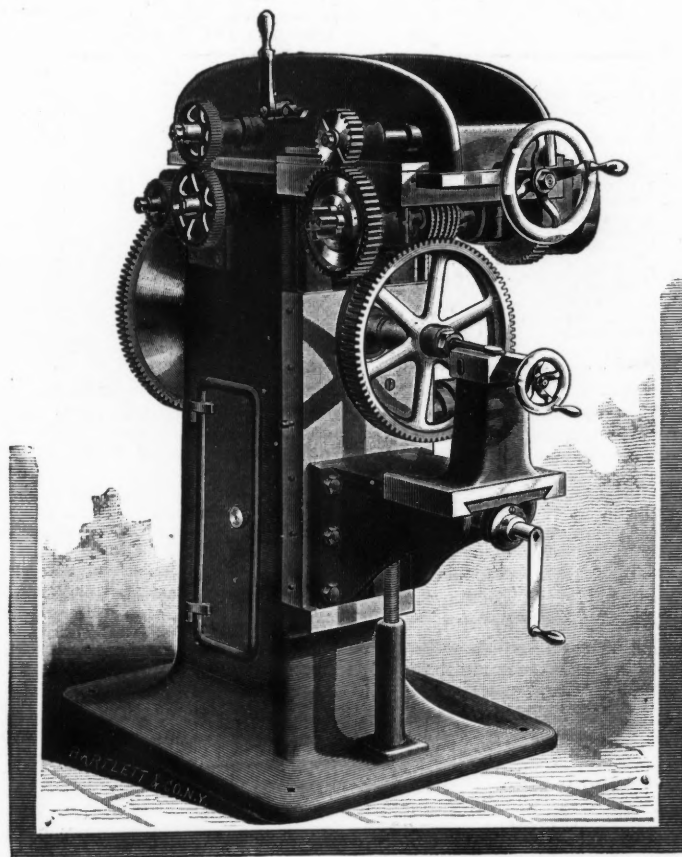


FIG. 1.—SWASEY GEAR CUTTING MACHINE.

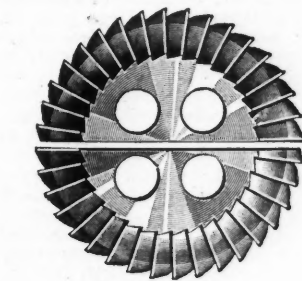


FIG. 2.

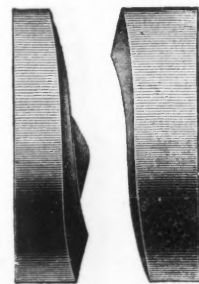


FIG. 5.

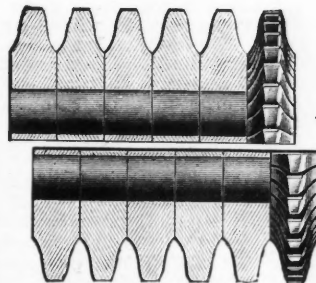


FIG. 3.

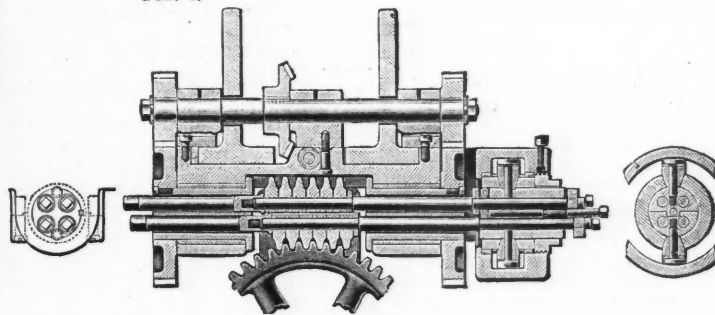


FIG. 4.

MACHINERY FOR CUTTING TEETH IN SPUR WHEELS.

use would be very limited, as in the case of change gears for lathes and where it was found necessary to construct a train of gear wheels, but time has shown that it has many advantages over other equally correct systems not on the interchangeable plan, and it has been constantly growing in favor, until it is now almost universally adopted, especially among those using cut gearing.

Prof. Edward Sang has also solved the same problem in another way, by taking the rack for the foundation of all curves for a set of interchange gear wheels. In the Sang theory, instead of using a constant describing circle, the rack acts as a constant generator, and the faces and flanks of all teeth throughout the whole set of wheels are described by it; therefore it is evident that, if the constant generating circle which is used for a set of wheels according to the Willis theory is also used to form the teeth of a rack, this same rack can be used in accordance with the Sang theory to generate another set of wheels, and any gear of one set will work correctly with the other.

For many years, one of the foremost mechanical problems in gearing has been to reduce these well-known theories to practice, and produce gear teeth having contours that correspond as nearly as possible to the theoretical curves. At first the teeth were drawn on paper or sheet metal, using arcs of circles which approximated the true curves, and then templets were made to these drawings by which the cutters were shaped; but it was found that cutters made in this way would not give as good results as desired, and afterward curves which were very much nearer

wheel are connected by means of change gears, the number of teeth to be cut in the wheel determining the proportion between the two on the same principle as the change gears of an engine lathe, which gives the cutting spindle as many revolutions to one of the main spindles as there are teeth in the wheel.

The cutting tool is composed of a series of cutters rigidly connected, which revolve and at the same time move longitudinally or endwise at right angles to the axis of the wheel to be cut; and, at the same speed, it is continually revolving at the pitch line, the motions being the same as in the case of a rack engaging with a revolving gear.

As it would be impracticable to continue moving the whole series of cutters endwise, they are bisected, and these segments are connected in series forming two sections, which revolve upon a common axis, and each section is given an independent endwise motion by means of a cam. When one section is engaged in cutting, it is carried endwise in the same direction and at the same velocity that the pitch line of the wheel is revolving, until disengaged from it, when the cutters, while continuing to revolve, are carried back by the cam to their original position, ready for the next tooth. By means of both sections, as they continually revolve and alternately slide forward while cutting, and back when disengaged, there is a continuous cutting and generating process of the teeth in the revolving wheel. The head carrying the cutters is automatically fed across the face of the wheel, and when the cutters have proceeded once across the gear is completed.

Fig. 2 is a side elevation of a bisected cutter, and Fig. 3 shows a series of six cutters, the end one being in elevation and the others in cross-section—these having cutting portions, which in cross-section represent

\* A paper presented at the Richmond meeting of the American Society of Mechanical Engineers, November, 1890.

the teeth of a rack, with the addition to the diameter of a given proportion of a pitch by which the clearance and fillets at the bottom of the teeth are made. If their cutting portions are formed of cycloids, then the whole set of gear wheels cut with them will be of the epicycloidal or double-curve system. If they are formed simply of straight sides, then a set of involute or single-curve gears will be generated and cut, or their cutting portions may be composed of both straight lines and cycloids and produce Professor McCord's recent system of gearing, which has composite teeth with the contours partly involute and partly epicycloidal.

All the cutters in a series are made exactly alike and interchangeable, the thickness of each or the distance from the center of one to the center of that adjoining being equal to the pitch of the gear to be cut. As indicated in Fig. 2, the two segments of the cutter are first made whole, with four holes in equal distance from the center, through which the rods pass that fasten them together. After the cutters are nearly completed, they are bisected with a narrow tool, leaving two holes in each segment.

Fig. 3 is a cross-section of the head, showing the mechanism for revolving and reciprocating the cutters. The rods which extend through the cutters serve not only to hold them firmly together, but to revolve them, and at the same time act as slides for the reciprocating motion. The spindles on either sides of the cutters, through which the rods extend, are revolved independently and at the same speed by means of a parallel shaft, having a pinion at each end, which engages with a large gear on each spindle. By this means the four rods carrying the two cutter sections are revolved from each end, thus avoiding the torsional strain which would result if driven from one end only. The pair of rods for each section, after passing through one of the spindles, terminate in semi-cylindrical blocks. From these blocks studs extend, on which are journaled rolls, which engage with a cam which is held rigidly to the head. This cam is shown in Fig. 5, the working portions being made in the form of a screw thread, which, if extended all the way round, would have a lead equal to the thickness or pitch of the cutter. As each section of the cutters engages with the wheel but three-fourths of a revolution, the thread portion of the cam which carries the cutters forward extends only three-fourths of its circumference, leaving the other one-fourth for the reverse curves of the cam to bring the cutters back to their starting point. Provision is made for adjusting one section of cutters so as exactly to coincide with the other, making the spaces and teeth of the wheel equal, or, as is often necessary, the space can be made wider than the teeth by setting one section past the other. The variation in the spacing from one tooth to another is reduced to a minimum, as the series of cutters act upon both sides of a number of teeth at the same time and serve to average and eliminate any local inaccuracies in the division of the index and driving gears; also to obviate any tendency to crowd the wheel from one side to the other.

The forward motion of the cutters and the revolving of the wheel at the pitch line being exactly the same, the process of generating and cutting the teeth goes on continuously and uniformly around its entire periphery, so that one part is not heated more than another, but all the teeth are cut under exactly the same conditions, and when the revolving cutters have once passed across the face all the teeth in the gear are completed and given the correct form for each diameter of wheel: and as by the Willis theory all gears are cut to run into a rack, so by this process the Sang theory is put into practice and a rack is made to cut correctly all gears.

#### NON-CONDUCTORS FOR STEAM PIPES.

The Boston Manufacturers' Mutual Fire Insurance Company gives the following information for the benefit of insurers:

A few years since a very exhaustive investigation was made at the instance of the Boston Manufacturers' Mutual Fire Insurance Company by Prof. John M. Ordway, then of the Massachusetts Institute of Technology, upon the non-heat-conducting properties of various materials, some of which may be used for covering steam pipes and boilers, while others, owing to their liability either to become carbonized or to take fire, cannot be directly applied to such use.

There are, however, other problems in preventing either the escape of heat or the ignition of woodwork by the impact of heat, for which purposes various substances are or may be offered to our members. It may not be assumed that because a given material is incombustible it is therefore not a quick conductor of heat. Neither may it be assumed that because a material is a quick conductor of heat it may not be made use of, in some cases, for protection against fire.

For instance, given the problem of making a fire-door. If the door be made of two thicknesses of solid wood, so adjusted each to the other as not to be liable to warp, this door may be incased in sheet-iron or tinned plates with the joints carefully locked, and it will become a good fire stop, although both the sheet-iron and the tin-plate are good conductors of heat. The reason of this is, that while the wood, which is in immediate contact with the metal, will be carbonized, yet even the sheets of hot metal, if thoroughly locked, and therefore thoroughly incasing the wood, keep out the oxygen; then, for want of sufficient air to ignite the carbonized wood, the door remains solid and strong for many hours. Thin plates of tinned iron or steel serve this purpose, where thick plates would warp or bend under heat so as to fail in keeping the doorway tightly closed. Iron doors and shutters are often worse than useless, owing to this tendency to warp or bend, opening a way for fire while obstructing the firemen; also, because when heated they do not serve as a guard near which the firemen may protect adjacent wood-work. Zinc is worthless as a fire stop because of its very low melting point. If a door is tinned on one side only, it may be burned about as quickly as if there were no tin upon it, although it may not be ignited quite so soon.

On the other hand, let it be assumed that this same wooden door were incased in asbestos made in thin sheets and strengthened in some way so as to serve the purpose—yet this covering would be of no value. Asbestos is incombustible, but it is rather a good conductor of heat, as will appear from the subsequent tables; also, being porous so that a free passage of air may be given through the interstices, it will wholly fail to prevent a wooden door or surface of wood from being quickly consumed, when laid on in thin sheets or put between floor plank and boards.

In order to show the relative merits of the different substances which are offered for preventing the escape of heat from boilers and steam pipes, or as substitutes for wire lathing and plastering, or for tin plates in the protection of elevator shafts, or of woodwork nailed closely to walls, the following tables are submitted. These tables and extracts are taken from a later report made by Professor Ordway. It will be observed that several of the incombustible materials are nearly as efficient as wool, cotton and feathers, with which they may be compared in the following table. The materials which may be considered wholly free from the danger of being carbonized or ignited by slow contact with pipes or boilers are denoted by a (†). Those which are more or less liable to be carbonized are denoted by a (\*).

Professor Ordway's report is as follows: "Careful experiments have been made with various non-conductors, each used in a mass one inch thick, placed on a flat surface of iron kept heated by steam to 310° Fahrenheit. The following table gives the amount of heat transmitted per hour through each kind of non-conductor one inch thick, reckoned in pounds of water heated 10° Fahrenheit, the unit of area being one square foot of covering.

"The first column of figures of results, therefore, gives the loss by the measure of pounds of water heated 10°. The second column gives the amount of solid matter in the mass one inch thick. The third column gives the amount of bulk of included or entrapped air."

Substance 1 inch thick. Heat applied 310° F.	Pounds of water heated 10° F. per hour through 1 square foot.	Solid matter in 1 square foot 1 in. thick. Parts in 1,000.	Air included. Parts in 1,000.
*1. Loose wool.....	8.1	56	944
*2. Live geese feathers.....	9.6	50	950
*3. Carded cotton.....	10.4	29	980
*4. Hair felt.....	10.3	185	815
*5. Loose lamp black.....	9.8	56	944
*6. Compressed lamp black.....	10.6	244	756
*7. Cork charcoal.....	11.9	53	947
*8. White pine charcoal.....	13.9	119	881
*9. Anthracite coal powder.....	35.7	506	494
*10. Loose calcined magnesia.....	12.4	23	977
*11. Compressed calcined magnesia.....	42.6	285	715
*12. Light carbonate of magnesia.....	13.7	60	940
*13. Compressed carbonate of magnesia.....	15.4	150	850
*14. Loose fossil meal.....	14.5	60	940
*15. Crowded fossil meal.....	15.7	112	888
*16. Ground chalk (Paris white).....	20.6	253	747
*17. Dry plaster of Paris.....	30.9	368	632
*18. Fine asbestos.....	49.0	81	919
*19. Air alone.....	48.0	0	1,000
*20. Sand.....	62.1	529	471

There are some mixtures of two materials which may be quite safe, although consisting in part of substances which may be carbonized. It must also be considered that a covering for a steam pipe or boiler should have some strength or elasticity, so that when even put on loosely and holding a great deal of entrapped air it may not be converted into a solid condition by the constant jar of the building, then becoming rather a quick conductor. This warning may be applied especially to what is called "slag wool," which consists of short, very fine threads of a brittle kind of glass. The following table, giving the figures on which the graphical table is based, has been submitted by Professor Ordway, with the following explanation:

"The substances given in the following table were actually tried as coverings for two-inch steam pipe, but, for convenience of comparison, the results have been reduced by calculation to the same terms as in the foregoing table."

Covering.	Pounds of water heated 10° F. per hour by 1 sq. ft.	Covering.	Pounds of water heated 10° F. per hour by 1 sq. ft.
*21. Best slag wool.....	13.0	*28. Paste of fossil meal with hair.....	16.7
*22. Paper.....	14.0	*29. Paste of fossil meal with asbestos.....	22.0
*23. Blotting paper wound tight.....	21.0	*30. Loose bituminous coal ashes.....	21.0
*24. Asbestos paper wound tight.....	21.7	*31. Loose anthracite coal ashes.....	27.0
*25. Cork strips bound on.....	14.6	*32. Paste of clay and vegetable fibre.....	30.9
*26. Straw rope wound spirally.....	18.0		
*27. Loose rice chaff.....	18.7		

"Later experiments, not yet published, have given results for still air which differ little from those of Nos. 3, 4, and 6. In fact, the bulk of matter in the best non-conductors is relatively too small to have any specific effect, except to entrap the air and keep it stagnant. These substances keep the air still by virtue of the roughness of their fibres or particles. The asbestos of 18 had smooth fibres, which could not prevent the air from moving about. Later trials with an asbestos of exceedingly fine fibre have made a somewhat better showing, but asbestos is really one of the poorest non-conductors. By reason of its fibrous character it may be used advantageously to hold together other incombustible substances, but the less the better. We have made trials of two samples of a "magnesia covering" consisting of carbonate of magnesia with a small percentage of good asbestos fibre. One transmitted heat which, reduced to the terms of the first of the above tables, would amount to 15 pounds; the denser one gave 20 pounds. The former contained  $\frac{25.0}{100.0}$  of solid matter; the latter  $\frac{33.6}{100.0}$ .

"Charcoal, lamp-black and anthracite coal are virtually the same substance, and Nos. 5, 6, 7, 8 and 9 show that non-conducting power is determined far less by the substance itself than by its mechanical texture. In some cases when a greater quantity of a material is crowded into the same thickness the non-conducting virtue is somewhat increased, because the included air is thereby rendered more completely fixed. But if the same quantity is compressed so as to diminish its thickness its efficiency is lessened; for the resistance to the transmission of heat is nearly, though by no means exactly, in proportion to the thickness of the non-conductor. Hence, though a great many layers of paper, as in No. 23, prove to be a tolerably good retainer of heat, one or two layers are of exceedingly little service. Any suitable substance which is used to prevent the escape of steam heat should not be less than an inch thick."

"Any covering should be kept perfectly dry, for not only is water a good carrier of heat, but it has been found in our trials that still water conducts heat about eight times as rapidly as still air."



A NOVEL FORM OF FLEXIBLE TUBING.

By T. E. Almond, New York City.\*

It seemed to me at first rather a wild kind of an idea to make a metallic tube which would be quite flexible, and which could be used for conveying illuminating gas. I have, however, after many experiments, succeeded not only in making a flexible tube for such purposes, but also one which will convey gases, steam, or liquids under considerable pressure. This tube has sufficient flexibility for all practical purposes, with the additional advantages of great strength and durability.

When a tube is formed by coiling a wire around a mandrel, the convolutions may be made to press upon each other with considerable force, and the joint formed at the point of contact of the individual convolutions will be tight in proportion to the amount of pressure exerted. If such a tube be bent, the joints will be broken all around the coils except at one point, and therefore, when bent, it is useless for conveying liquids or gases.

Wishing to utilize the peculiar flexibility of spiral spring tubing for the conveyance of gases in cases where a flexible tube is required, I conceived the idea of interposing a triangular-shaped wire between the coils of a round wire. When a tube so constructed is bent, the convolutions of the triangular coil adjust themselves to the spaces between the round coils, as shown in Fig. 1. The triangular wire is pressed between the coils of the round wire, during the process of constructing the tube, with sufficient force to spread them apart, so that the contact surfaces are at all times under pressure. The triangular wire serves two purposes—one is to spread the coils apart, so that the pressure will be exerted on the contact surfaces; the other, to fill the irregularly-shaped spaces between the coils of round wire, adjusting itself to the changing form of the spaces due to any given flexion. This pressure brings into play the element of friction to such an extent as partly to destroy the flexibility of the tube, which, when bent, will retain the form given to it. This was an unlooked-for and unexpected quality.

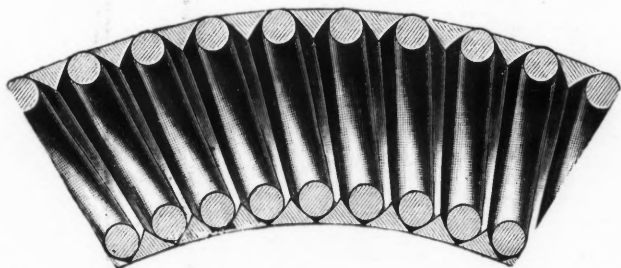


FIG. 1. TYPES OF FLEXIBLE TUBING.

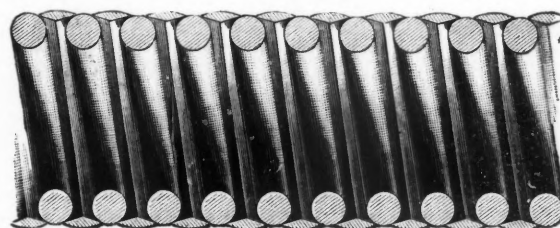


FIG. 3.

As the primary object was to obtain a flexible tube, trials were made with wire having a more obtuse angle; such is shown in Fig. 2. This gave better results, as a more perfect joint was produced with less tension of the inner coil, and the friction became correspondingly less, the result being a tight tube with sufficient flexibility. Fig. 3 shows the shape of the seats into which the round wires are forced by their tension. The seat for the inner wire is much more obtuse, and on this account the inner wire will not, under a given tension, be forced into such a seat so tightly as in the sharper V in Fig. 3. It will be seen that the degree of flexibility de-

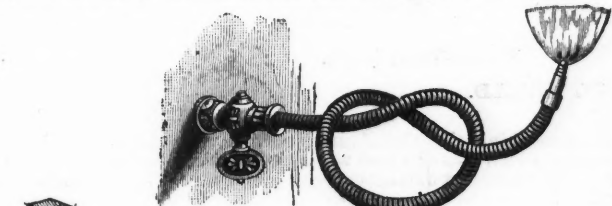


FIG. 2.

FIG. 4.

pend upon the amount of tension put upon the inner coil, or the extent to which the convolutions are forced apart. I have produced a perfectly tight tube with two coils of round wire, in which the outer coil is wound sufficiently tight between the convolutions of the inner coil to spread them apart for the purpose of getting pressure on the joints, substantially the same as with the triangular wire. This makes a very strong tube, but is too bulky for many purposes. Two half-round wires, or even less than half-round, may be used; or the inner wire may be round, and the outer half-round, or much less than half-round. The tube will then be less bulky, and, supposing the outer wire to be considerably less than half-round, the convexity of its surface may be such as to give results similar to the obtuse triangular wire shown in Fig. 2. I have made several tubes in which the contact surfaces of the coils are made to coincide with a circle whose center is the axis of the tube. The joints so formed are practically a series of ball and socket joints; such a tube has smoother outer and inner surfaces than those previously described. A serious objection to such a tube is that the wire changes its shape during the process of coiling, so that the joint surfaces will not make sufficiently complete contact, whereas the forms of wire previously mentioned are of simple construction, and the slight change of form which occurs during the process of coiling will not effect the result. The extent to which this tubing may be bent without leakage is considerable; a piece of one-quarter inch bore, tied as shown in Fig. 4, has been subjected to a steam pressure of 75 pounds without leakage; the smallest curves of the bent portion corresponded in this case to a

circle two inches in diameter. I have not yet made any tube larger than five-sixteenth inch bore, but think it possible to make them as large as one inch bore, and strong enough to stand any ordinary steam pressure. For purposes where pressure is not required, the tube may be made of sheet metal, and may possibly be made as large as two inches in diameter.

STEAM COMMUNICATION WITH BRAZIL.

Robert Adams, Jr., American Minister to Brazil, has reported to Washington on the carrying trade of Brazil, and in doing so has furnished an interesting tabular statement concerning shipping. Naturally the trend of his report is to prove that "if the United States wishes to secure her share of trade with Brazil, the government must give such assistance as will secure a proper and efficient steam service between the two countries." Trade between the United States and Brazil is developing to such an extent, Minister Adams urges, that it would assume enviable proportions if there were more frequent and rapid steam communication between the two countries.

He complains that the service of the only American line, the United States and Brazil Mail Steamship Company, is very inefficient, despite a Brazilian subsidy of \$90,000 a year. The company runs three steamers, with an average gross tonnage of 2,600 tons, and makes one outward and one homeward voyage a month, calling at Pernambuco, Maranham, Para, Bahia and Rio Santos. Of the twenty-eight lines mentioned in the table all but seven are subsidized. These are: Liverpool, Brazil and River Plate line, Belgian flag, 10 steamers, sailing from Liverpool and London via the United States; the Hamburg Steamship line, German flag, 29 steamers sailing from Hamburg; La Veloce Company, Italian flag, 5 steamers sailing from Genoa; the Adriatic Steamship line, Austrian flag, 10 steamers, sailing from Fiume; and the Hamonia line, German flag, 5 steamers, sailing from New York; Antwerp Direct line, British flag, chartered steamers only; Antwerp and London line, chartered steamers only. The Liverpool, Brazil and River Plate Company, as will be noted,

runs two lines, one of 42 steamers under the British flag, and not subsidized, and another of 10 steamers under the Belgian flag, subsidized by Belgium at £10,000 a year.

Following is a list of the subsidized lines:

Royal Mail Company, British flag, twenty four steamers, sailing from Southampton; paid by England.....	£96,000
Pacific Steam Navigation, British flag, forty-one steamers, sailing from Liverpool; paid by Chili and Australia.....	Uncertain.
Liverpool, Brazil and River Plate, Belgian flag, ten steamers, sailing from London and Antwerp; paid by Belgium.....	£10,000
New Zealand Shipping Company, British flag, five steamers, sailing from New Zealand and London; paid by New Zealand.....	Uncertain.
Shaw, Savill & Albion Company, British flag, five steamers, sailing from New Zealand and London; paid by New Zealand.....	Uncertain.
Mezeries Maritimes, French flag, fifty-eight steamers, sailing from Bordeaux; paid by France.....	frs. 23,000,000
Société Générale, French flag, seventeen steamers, sailing from Marseilles; paid by France.....	£20,000
Chargeurs Réunis, French flag, twenty-four steamers, sailing from Havre; paid by France.....	£10,000
National de Navigation, French flag, eight steamers, sailing from Marseilles; paid by France.....	£20,000
North-German Lloyds, German flag, sixty-five steamers, sailing from Bremen; paid by Germany.....	Uncertain
Navigazione Italiani, Italian flag, one hundred and nine steamers sailing from Genoa; paid by Italy.....	Uncertain
Austrian Lloyds, Austrian flag, eighty-three steamers, sailing from Trieste; paid by Austria.....	Uncertain
United States and Brazil Mail Steamship, American flag, three steamers sailing from New York and Newport News; paid by Brazil Cia. Brasileira, Brazilian flag, seven steamers, sailing from Rio; paid by Brazil.....	\$90,000
Cia. Nacional, Brazilian flag, eleven steamers sailing from Rio; paid by Brazil.....	\$296,600
Cia. Bahiana, Brazilian flag, number of steamers not stated, sailing from Bahia; paid by Brazil.....	\$77,500
Cia. Pernambucana, Brazilian flag, number of steamers not stated, sailing from Pernambuco; paid by Brazil.....	\$70,000
Cia. Maranhense, Brazilian flag, number of steamers not stated, sailing from Maranham; paid by Brazil.....	\$85,000
Cia. Transatlantica, Brazilian flag, four steamers under construction, sailing port not stated; paid by Brazil.....	\$150,000
Cia. Araguaya, Brazilian flag, number of steamers not stated, for river navigation; paid by Brazil.....	\$62,500
Amazon Steam Navigation, Brazilian flag, number of steamers not stated, for river navigation; paid by Brazil.....	\$387,000

The following passage occurs in the article which *Le Génie Civil* devotes to the recent international meeting of engineering societies:

"Every engineer that is well informed about the current of the foreign industrial movement feels an intense curiosity in regard to the United States. Each in his branch has heard of their huge productions, the enormous scale of their works, their mechanical methods of which the combinations and applications quite upset our set ideas. The American is not overburdened with learning and traditions which often keep us in the old rut; he is independent and has the genius for business, organization and mechanical devices."

\* A paper presented at the Richmond meeting of the American Society of Mechanical Engineers, November, 1890.

THE CONSTRUCTION OF THE ST. CLAIR TUNNEL.

The shield used in driving the St. Clair tunnel, on the Grand Trunk Railroad of Canada, was illustrated by a beautiful perspective drawing made from photographs and described in the ENGINEERING AND MINING JOURNAL of August 16th, 1890.

The work of building the tunnel was also clearly and fully described, but a recent visit to the work by the editor of the ENGINEERING AND MINING JOURNAL has enabled us to add some further data of interest to engineers, and we take the opportunity to supplement these details by the accompanying dimensioned drawings of the shield, for which we are indebted to the *Engineering News*.

As already stated, the shield was 15 feet 3 inches in length, 21 feet 6 inches in diameter, 1 inch thick, made of butt jointed plates, riveted with countersunk rivets so as to have a smooth outer surface. The front of the shell had a cutting edge. The detail of the rear edge is shown in Fig. 4, where is also shown the 2 1/2-inch square rubber packing ring that was proposed to prevent the water, mud, etc., from coming in from the back end of the shield; but this ring was soon abandoned as impracticable and a steel ring of the same size was substituted for the rubber.

The bulkhead in the shield was placed 4 feet from the rear edge, at the first circumferential joint, and its edge was riveted between the angle irons of this joint, as shown in the drawings. It was made of 1/2-inch steel plate. To its rear face 7 horizontal and 3 vertical stiffeners were riveted, extending 9 inches from the face. In the lower part of the bulkhead were two rectangular openings, each 6 feet high and 4 1/2 feet wide, through which all the material excavated in front of the shield was passed. These openings could be closed by a sliding door suspended by a chain, in case an inrush of water or quicksand in front of the

× 24 inches at each end of the tunnel, and the air was carried in through a 6-inch pipe.

These compressors gave great satisfaction and ran continuously day and night for nearly six months.

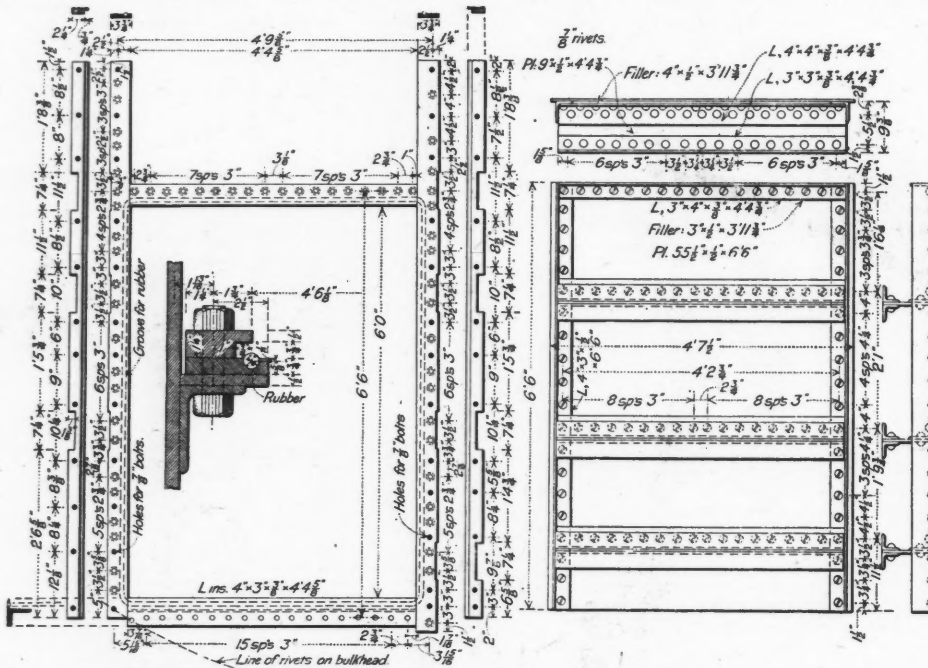
The pressure maintained in the tunnel and at the working face varied from 10 pounds at the commencement to 28 pounds as a maximum. This pressure, though much less than that necessary in the Hudson River tunnel, where the pressure often reaches 34 pounds, and has even touched 36, was still too high for comfort or even for safety, and a few lives were lost in the work, partly due to working under this 28-pound pressure, and extra wages of \$1 a day had to be paid to the workmen.

Mr. Hobson, the able chief engineer of the work, and to whose care and ability is due the remarkable success which crowned the undertaking, used every precaution to protect his men. He says:

"Each man underwent a medical examination before he was permitted to enter the compressed air. Cases of the 'bends' were numerous, however, and when the pressure was highest three men died from the disease. When the compressed air was first used the escape from the air lock was through a 4-inch globe valve. It was very soon found that with the rapid escape which this permitted, the men would come from the compressed air chamber through the lock altogether too fast for their health, even with the moderate pressures at first employed. A 1 1/2-inch valve was put in its place, therefore; but even with this the men would come through the lock when the air pressure was at 15 pounds in about two minutes."

This of course somewhat interfered with the rate of passing the cars through the lock, but this did not retard the work at the headings.

The loss of compressed air from leakage was generally slight, and was principally occasioned in working the locks. Sometimes, however, when a seam of gravel was penetrated, the escape of air was important.



FRAME FOR WATER-TIGHT DOOR.

WATER-TIGHT DOOR.

THE ST. CLAIR TUNNEL SHIELD.

shield should endanger the workmen. They were never closed, however, from the beginning of the work to the end. All around the frame of the door was a round rubber packing against which the door rested when it was shut.

The arrangement of the hydraulic rams is shown in the drawing, but was scarcely as convenient as that in use in the Hudson River tunnel shield, which was described and illustrated in the ENGINEERING AND MINING JOURNAL May 10th, 1890.

The St. Clair shield, as originally built, was found to have insufficient strength in some respects, and was strengthened with braces, etc. In front of the bulkhead three vertical and two horizontal partitions were built, as shown in the drawings. The rear of both horizontal and vertical partitions was 4 feet in front of the bulkhead, thus leaving plenty of room for the men at the working face to throw down the excavated clay in front of the bulkhead openings. At the front of the shield the horizontal partitions extended to the cutting edge of the shield. The vertical partitions were sloped back from the cutting edge. From the rear of the three vertical partitions flat tie rods, 7 inches broad and 1/2 inch thick, extended back to the bulkhead.

Borings were kept at least 8 feet ahead of the driving face as a precaution.

The use of compressed air was commenced when the shields reached the banks of the river on the American side 1,716 feet from the point of starting, and 1,994 feet on the Canadian side. Brick bulkheads were here built 8 feet in length of first quality brick, laid in cement mortar. Into each bulkhead were built two air locks, 17 feet long and 6 feet in diameter. A small air lock, 25 feet long and 10 inches in diameter, was built into one side of the bulkhead for passing through the lengths of compressed air pipe too long to go through the large locks. There was also built into the bulkhead a sighting tube 12 inches diameter, 25 feet long, with adjustable cross-hairs for carrying the survey line past the lock.

The air pressure was furnished by two Ingersoll compressors 20

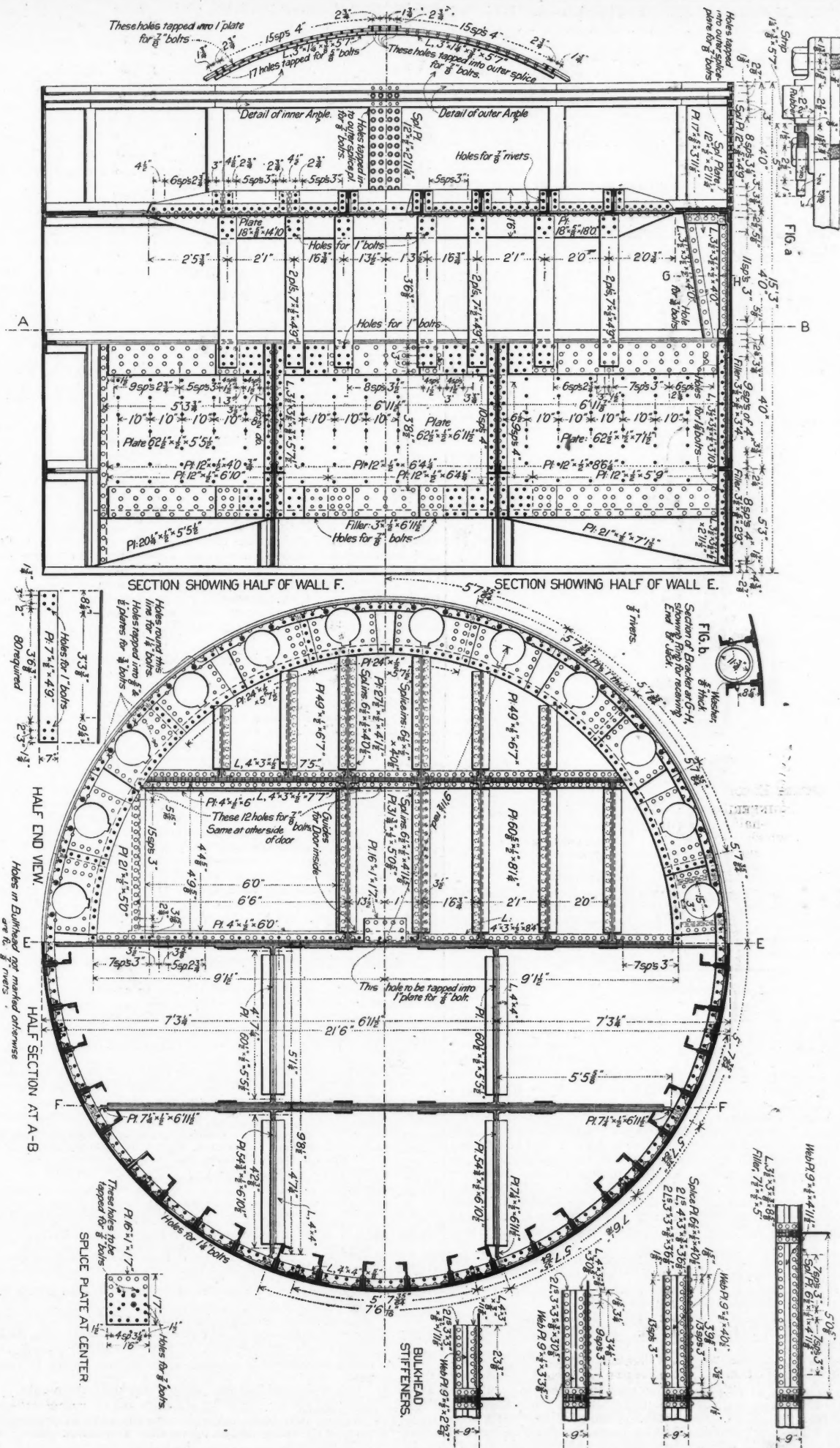
Mr. Hobson thinks that the advantages from a firmer face and roof at the heading which was obtained when working under pressure more than balanced the extra cost and other drawbacks attending the use of compressed air.

The ground through which the St. Clair Tunnel was driven was a tough blue clay, an ideal substance, and the work proceeded without accident or serious delay, or difficulty from start to finish. At one point springs brought in some sand and rendered the bolting on of the segments somewhat difficult. Between the segments strips of specially prepared paper were used, and in the clay, which was impermeable, answered well, but where wet ground was met with the joints leaked and had to be calked with lead—for this purpose lead pipe was used, driven in with the ordinary calking iron.

It was rather remarkable that the longitudinal lines of the tunnel instead of running straight, actually ran in a spiral, so that the key piece, which at the commencement was in the crown of the tunnel, finally came down several feet on one side. And this, though in different degrees, occurred in driving from each end. The key pieces do not therefore meet where the tubes came together. The rate at which the tunnel was built was remarkable, the average rate being nine feet a day on each end, working three eight-hour shifts. The speed of driving was limited by the time necessary for putting in the ring segments, which added 18 inches to the length for each ring. Three and sometimes four rings were added in an eight-hour shift.

The tunnel alignment was easily kept but the grade was more difficult to maintain. The direction was given exclusively by the use of the jacks, and in changing direction the danger was that the shield would change too fast and, before it could be stopped, get as much above the desired grade as it may have been below it. As the tube is really larger than is strictly necessary, these slight variations are taken up in the varying thickness of the concrete bed for the track.

The levels and lines were given every day on drawings, which showed



LONGITUDINAL AND TRANSVERSE AND HALF AND END ELEVATION OF SHIELD FOR THE ST. CLAIR TUNNEL.

exactly how much the shield was out of line and in what direction it had to go. This was the chart for the foreman until another chart was furnished.

In addition to Mr. James Hobson, the chief engineer and moving spirit, we should state that the work of locating the line and levels, and guiding the shields, was done by Mr. T. E. Hillman, first assistant engineer, aided by Mr. M. S. Blaiklock, second assistant engineer.

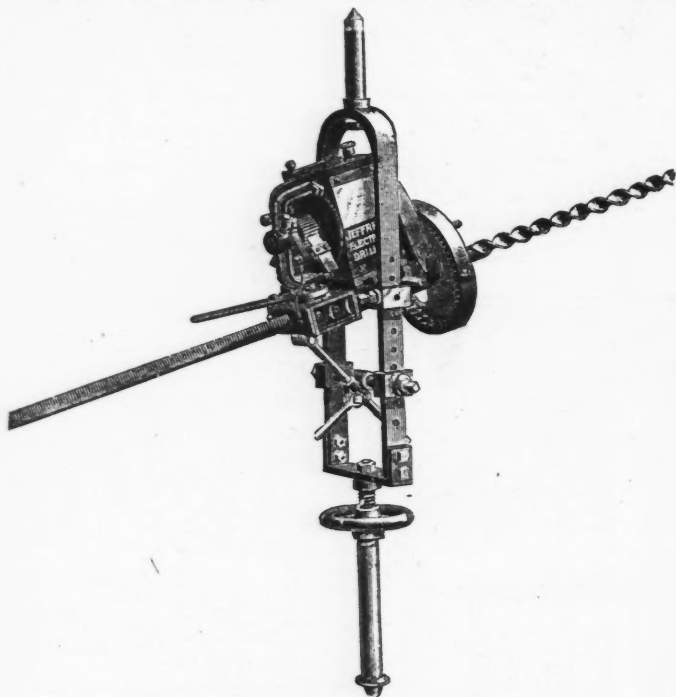
Mr. J. T. Eames, mechanical engineer, had charge of the machinery and the work of putting in the segments. The rapidity with which this part of the work was done, and the freedom from accident or delay in it testify to his ability.

Mr. Thos. Murphy was foreman of the miners and muckers and already had a wide experience, full of dangerous episodes, in the Hudson river tunnel. He is given great credit for his part of the work at St. Clair.

Mr. Wm. Gibson was contractor for the masonry of the portals and has done a good job.

#### THE JEFFREY ELECTRIC COAL DRILL.

This drill consists of a small electric motor hung in an upright frame having projections at the top and bottom, arranged with adjusting screws, by means of which it is fastened to the roof and floor of the mine. By means of a brace the frame is held rigid while the drill is in operation. The motor is of the same type as that on the Jeffrey Electrical Coal Mining



THE JEFFREY ELECTRIC COAL DRILL.

Machine, illustrated in the *ENGINEERING AND MINING JOURNAL* July 6th, 1889, and of a size to develop one-half horse power. It has a speed of 2,000 revolutions per minute, which is reduced by means of gearing to 100 revolutions at the feed bar. The motor is started and stopped with a simple switch, a rheostat not being necessary.

#### IRON METEORITES.

Mr. Edwin E. Howell describes in *The American Journal of Science*, September, two new meteorites from Hamilton County, Texas, and from Puquios, Chili. The former weighs 81½ kilograms; the two greatest dimensions were 17½ and 13 inches. It was almost entire; the thinner end had been considerably pounded; the iron, although very little oxidized, shows none of the characteristic striae and ridges seen in irons that have recently fallen.

The amount of troilite found in cutting the iron is not great, and seems to be all distributed in comparatively thin, narrow plates, no nodules having been seen. The largest example is 6 inches in length and less than ½ inch in average thickness, with an unknown width of certainly over 2½ inches. It is quite irregular in outline, and terminates at one end in a star with points about ¼ inch long. This form, which is very suggestive of certain crystallizations of marcasite, seems to be quite persistent, showing substantially the same in different sections for 2½ inches without any indication of coming to an end, any more than the plate with which it is connected.

The Widmanstätten figures are brought out with remarkable quickness on the application of very dilute acid. The lines and inclosed figures are in many parts a mere thread 5 to 8 millimeters in length. In this respect different parts of the same section vary greatly.

The analyses by Mr. L. G. Eakins show: Fe, 86.54; Ni, 12.77; Co, 0.63; Cu, 0.02; P, 0.16; S, 0.03; C, 0.11; total, 100.26. Specific gravity 7.95 at 27° C.

The Chilian meteorite, formed somewhat like a worn rhombic prism, is unusually smooth. The two largest diameters are 10 and 5½ inches, and the weight is 6½ kilograms. The interior shows that the mass has been fractured and dislocated, showing a distinct "faulting" of the Widmanstätten figures and of the troilite. Most of these faults can only be clearly seen with a pocket lens. These presumably first faults ever noticed in an iron meteorite are very remarkable considering the exceeding toughness of meteoric iron. The largest fault is seen in successive sections for 2½ inches, or as far as the iron has been cut, and apparently extends the en-

tire length of the mass; the throw of this fault is nearly ¼ of an inch. Careful examination reveals some crushing and branching along this line, and other parts of this and other sections show small fractures with slight displacements.

These faults are clearly not produced by the impact of its fall upon the earth, but are a part of its earlier history, and in the light of some experiments made two years ago with Toluca iron Mr. Howell inclines to believe that they were made when the iron was very hot—perhaps in its passage near the sun. He found that a piece of Toluca iron, although very tough when cold, would crumble under the hammer when heated to a white heat. The assumption that the faulting of this meteorite took place under similar conditions of heat presupposes a contact with some other body.

The Widmanstätten figures are produced very readily with weak acid; the finer lines inside the figures are unusually well developed, and are sometimes running parallel to the adjacent sides. Analysis by L. G. Eakins gives: Fe, 88.67; Ni, 9.83; Co, 0.71; Cu, 0.04; P, 0.17; S, .09; Si, tr. (?); Co, .04; total, 99.55; Sp. gr., 7.93, at 25.2° C.

**The magnesium flashing light**, which was a feature at the Northwest German Industrial and Trade Exhibition in Bremen, has been tried in Kaiserhafen to ascertain its applicability to light-houses. The experiments are said to be successful in cloudy as well as in clear weather; the apparatus used is from the machinery shops of C. C. Schirm, Berlin. The light has a power of about 100,000 candles. Concerning the most important point, however,—namely, whether the price at which this light can be produced has been reduced enough to make it practical—our exchange contains no information.

**Determination of the Heat of Vaporization.**—A note on the determination of the heat of vaporization by means of the steam calorimeter is given from an article by K. Wirtz in the *Journal of the Chemical Society*. With the steam calorimeter of Bunsen and Joly the author finds it easy to determine with considerable accuracy the heat of vaporization of liquids boiling below 100 degrees. The vessel in which the liquid is contained is a test tube 22 millimeters wide and 75 millimeters long, surrounded by a loosely-fitting glass jacket 55 millimeters long. This test tube is placed in the platinum basket, and the increase of weight noted on immersing it in steam. A second experiment is then made with the same apparatus, plus a weighed quantity of liquid. From the two weighings the quantity of steam condensed owing to the vaporization of the liquid can easily be obtained. For precautions against spurting and overheating the original paper must be consulted. The results of the author's experiments agree very well with those of Regnault, Andrews, and others.

**The Needle Industry in France.**—The Municipal Council of Saint Omer, in the north of France, will next year celebrate the 400th anniversary of the foundation of the first needle manufactory in France by Christopher Greening, an Englishman. The process of manufacture was greatly improved by one of Greening's successors, a Frenchman named Jean Gruez, who made a large fortune; and the reputation of Saint Omer's needles spread even abroad, surviving in England until the last century. The needle industry in France is at present in a decaying condition, all the finer sort of needles sold in France being made in England.

**Lead in Bismuta.**—Classen has been able to detect traces of lead in bismuth preparations which appeared to be free from lead by a spectroscopic examination. The substance is converted into nitrate and electrolyzed in the presence of an excess of nitric acid; lead peroxide and bismuth peroxide separate out, but the greater portion of the latter dissolves. The peroxide is converted into nitrate and saturated with pure soda solution, potassium bichromate is added to the pure solution, which precipitates bismuth chromate, whilst the lead remains in solution and may be precipitated from the filtrate by acidifying with acetic acid.—*Chem. Zeit.* XIV., 855-856, through *Jr. of the Society of Chemical Industry*

#### PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects, issued by the United States Patent Office:

- TUESDAY, DECEMBER 2d, 1890
- 441,643. Machine for Casting Metals. Thomas J. Close, Philadelphia, Pa.  
 441,686. Traveling Crane. Jasper Murrey, Cleveland, O.  
 441,740. Device for Supplying Feed-Water to Boilers. Charles B. Bosworth, Everett, Assignor to the Crosby Steam Gage and Valve Company, Boston, Mass.  
 441,745. Apparatus for Regulating Steam in Boilers. Albert M. Butz, Chicago, Ill., Assignor to the Consolidated Temperature Controlling Company, of Minnesota.  
 441,784. Metallic Railway Tie. Vernon A. Tyler, Morris Park, N. Y.  
 441,808. Machine for Covering Wires, Cables, etc., and for Making Tubing and Cord. Vernon Royle and John Royle, Jr., Paterson, N. J.  
 441,845. Machine for Manufacturing Tubing. Daniel N. Hurlbut, New York, N. Y.  
 441,858. Boiler Flue Cleaner. Gabriel S. Smith, Towanda, Assignor of one-half to George C. Jackson, Dushore, Pa.  
 441,862. Suspension Bridge. George M. Wildin, Melvern, Kan.  
 441,867. Ore Pulverizer. Calvin M. Fitch, Chicago, Ill.  
 441,897. Steam Engine Valve. August F. Radant, Wausau, Wis., Assignor of one-half to August Braatz, same place.  
 441,902. Machine for Rolling Metal. Henry B. Sargent and Benjamin C. Stevens, New Haven, Conn., Assignors to Sargent & Co., same place.  
 441,926. Machine for Cold Drawing Metallic Pipe. Thomas J. Bray, Warren, O., Assignor of one-half to Paige Tube Company, same place.  
 441,927. Metallic Cross Tie. Maximilian F. Bonzano, Philadelphia, Pa.  
 441,929. Machine for Bending Bridle Irons. Jeremiah Buckley and Michael G. F. Buckley, New York, N. Y.  
 441,931. Guide Attachment for Sheet Metal Cutting Machines. Frank H. Burnham, Bridgeton, Me.  
 441,932. Steam Engine. Frank Carey, Penn Yan, N. Y., Assignor of one-half to John W. Young, Tunkhannock, Pa.  
 441,947. Compound Engine. John H. Eickershoff, Cincinnati, Ohio, Assignor to the Triumph Compound Engine Company, same place.  
 442,016. Process of Treating Ore Containing Lead, Silver and Zinc. Charles L. Coffin, Detroit, Mich., Assignor of one-half to George H. Lothrop, same place.  
 442,017. Ore Distributor and Sampler. John D. Coplen, Denver, Colo.  
 442,036. Water Tube Boiler. Charles J. Galloway and John H. Beckwith, Manchester, England.  
 442,055. Crushing or Pulverizing Ores, &c. Thomas R. Jordan, London, England.  
 442,065. Process of Hardening or Tempering Steel Projectiles. Robert Low, Woolwich, England.  
 442,080. Steam Boiler. Daniel P. McQueen, Schenectady, N. Y.  
 442,090. Tube. Edwin T. Greenfield and Junius Nagel, New York, N. Y., Assignors by Mesne Assignments, to the Interior Conduit and Insulation Company

## PERSONAL.

Mr. R. A. Parker, mining engineer, of Marquette, Mich., has been appointed manager of the Barasa Mining Company, of Michigan.

Mr. J. P. Ladd, Mechanical Engineer of the Pennsylvania Steel Company, at Sparrow's Point, Md., it is said, has resigned because of ill health.

Mr. Jacob Scharr, Mr. J. E. Lawton and Mr. Kersick, all of St. Louis, Mo., are inspecting Gilpin, Colo., mining properties, in which they are interested.

There is a vacancy on the editorial staff of the ENGINEERING AND MINING JOURNAL. Editorial experience, professional knowledge and literary ability are essential qualifications.

Mr. M. B. Patch, superintendent of the Calumet & Hecla Smelting Works, Michigan, according to reports, has resigned, and it is stated, will soon go to Buffalo, N. Y., to take charge of the erection of a smelting plant at that place.

Dr. E. D. Peters, the well known metallurgist and author of Modern American Methods of Copper Smelting has returned from Arizona, and will remain east several weeks. He can be addressed care of Dr. B. Cushing, Percival avenue, Dorchester, Mass.

The Belgian Legation in Brazil, according to *Moniteur Industriel*, is authority for the statement that the rapid development of private industry in Brazil has withdrawn from the public service so many engineers and surveyors that men whose claim to competence in these directions is backed up by diplomas and testimonials, on their arrival in Brazil are sure of a position in the government service.

At the annual meeting held by the Engineering Association of the Southwest, at Nashville, Tenn., the following officers were elected: President, John B. Atkinson, Earlinton, Ky.; first vice-president, Wm. L. Dudley, Nashville, Tenn.; second vice-president, Charles Herman, Louisville, Ky.; secretary, O. H. Landreth, Nashville, Tenn.; treasurer, W. B. Ross, Nashville, Tenn. It was decided to hold the next meeting at Birmingham, Ala., on the second Friday of December.

The following changes have been made in the U. S. A. Engineer and Ordnance departments: Capt John Pitman is relieved from duty as chief ordnance officer Dept. Dakota, and is assigned to duty as inspector at the West Point Foundry, Cold Spring, N. Y. Capt. Lawrence L. Bruff is detailed as a member of the board of ordnance officers appointed for the purpose of preparing plans, etc., for the erection of an Army gun factory, vice Capt. Charles Shaler, relieved. First Lieutenant Frank E. Hohbs will repair to Washington on official business connected with contracts for field forgings.

## OBITUARY.

Col. S. D. Stewart died at Sutter Creek, Cal., on the 2d inst., of apoplexy. He was well known in mining circles.

Dr. John Barbour, who recently died in New Windsor, Mo., was an old resident of Leadville, Colo., and well known in mining circles there.

John P. Andrews, a well-known contractor and the builder of the Fourth avenue tunnel in this city, died in Cairo, N. Y., on the 26th ult., of apoplexy.

W. R. Lehman, of Denver, engineer in charge of the Union Pacific surveying party, was drowned in the sound near Seattle, Washington, on Tuesday by the capsizing of a sailboat in a squall.

Prof. Carl Frederik Fearnley, of the University of Christiania, an eminent astronomer, died lately in his seventy-third year. He was the author of numerous astronomical and meteorological publications.

Signor Orazio Silvestri, a distinguished chemist and vulcanologist, recently died at Catania, Sicily, at the age of fifty-five years. He was an industrious student of the eruptions of Mount Etna, and founded the laboratory on top of the mountain at the height of upward of 13,000 feet.

Prof. Heinrich Will, the successor of Liebig, at Giessen, Germany, died October 15th. He was in the first rank of chemical teachers. His work on chemical analysis and his editorship of *Jahresbericht*, made him prominent among the great pupils of Liebig, of whom Kopp, Fresenius, v. Hofmann and v. Pettenkofer still remain.

Captain Henry McGilvery, for many years well and favorably known to the export trade of this city, died on Sunday last at his daughter's residence in Brooklyn, in his sixty-eighth year. Captain McGilvery was the first American captain to sail an American vessel into Singapore. At one time he was the most prominent commander in the trade between America and China.

Mr. Charles M. Berwind, principal of the Berwind-White Coal Company of this city and Phila-

delphia, died at his residence in the latter city on Friday. Mr. Berwind was in the forty-fourth year of his age, and was prominently connected with several important corporations. He had been suffering for some time from the affection of the kidneys, to which he succumbed yesterday. The interment takes place to day at Philadelphia. [We shall publish a more extended biography and a portrait of Mr. Berwind in an early issue of the ENGINEERING AND MINING JOURNAL.]

Heinrich Berghaus, the geographer, died at Berlin, Germany, on the 4th inst. He was born at Cleves in 1797. He served in the army during the campaign of 1815, and afterward obtained a position as topographical engineer at Berlin. He took an active part in the trigonometrical survey of Prussia. In 1821 he was appointed to a post in the Berlin Academy of Architecture, and three years later was appointed Professor of Applied Mathematics in the Berlin School of Civil Engineering. He assisted Dr. Alexander Keith Johnston in the preparation of his Physical Atlas, and did much toward the improvement of map construction.

## ITEMS FOR EXPORTERS.

Manufacturers and shippers of American agricultural machinery who have been neglecting the Russian market may find encouragement in a recent report of an official Russian commission appointed to learn why more agricultural machines of foreign manufacture are sold to Russian farmers than of domestic make, despite the high import tax levied on such machines. The commission, after due investigation, reported: The machines built in Russia are most inaccurate in workmanship and unreliable in their working. Ten sowers of foreign make were taken apart, their various parts mixed up, and then were put together, working with perfect exactness, regulating the flow of the seed and their speed according to the given register, without the least impediment. One machine of Russian make was taken apart, and the wheels of one side did not fit the axles of the other, the screws could with difficulty be fitted into their respective mothers; and when the machine was put up again it could never be made to control exactly either the flow of seed or the speed of motion. Similar experiments with harvesting and ploughing machines showed similar results. The farmers said that Russian machines need repairing as soon as they are put to work, and with the best care bestowed on them last only three or four seasons.

The long-talked-of steamship line between Galveston, Texas, and South American ports has commenced to take shape. It has been named the Pan-American Steamship Line, and is capitalized at \$50,000,000. Several steam vessels will be running early in 1891, carrying fruit chiefly, and all other freight incidentally. The principal stockholders reside in Chicago, Omaha, Denver, Kansas City, Des Moines, Topeka and Galveston. So far the venture seems to have been promoted without any idea of seeking foreign subsidies.

A statement prepared by the chief of the Bureau of Statistics shows that the exports of merchandise from the United States during the twelve months ended October 31st last aggregated \$800,675,340 and the imports \$817,324,233, making the excess of exports over imports \$43,351,107. This shows an increase over the figures of the same period ended in 1889, of exports, \$62,047,960; imports, \$51,231,783, and excess of exports over imports of \$10,816,177. The exports of gold aggregated \$23,752,198 against \$63,146,411 in 1889, and of silver \$29,024,697 against \$39,435,030 in 1889. For the same period the gold imports were \$15,372,333 against \$11,793,332 in 1889, and of silver \$23,794,185 against \$19,169,090 in 1889.

The Canadian Government has determined upon a vigorous commercial foreign policy, and intends establishing commercial agents in Rio Janeiro, Buenos Ayres, Cuba, Mexico and other Central and South American points. The duty of these agents will be to advance Canadian commerce as far as possible.

The imposition of a duty of five cents a liter on kerosene oil imported into the Argentine Republic, for the purpose of fostering the domestic produce, does not seem to have protected it at all. Latest reports state that the people go on paying the tariff, but that they are doing nothing toward petroleum production.

Without variation, and with a monotonous reiteration that has not even the effect of the proverbial dropping of water, nearly all the consular reports have the same old refrain: American exporters will not pack to suit foreign markets, will not extend credit according to local requirements, and will make no move toward securing what should be a constitutional right—the privilege of flying the American flag on American-owned vessels.

"Of the \$128,412,110 of merchandise imported into the Argentine Republic during 1888," says Consul Baker, "the amount of \$44,044,110 was furnished by Great Britain, and of the 206,422,512 pounds of unwashed wool exported from the Argentine Republic in 1888 only 7,179,698 pounds were shipped to Great Britain. In other words the Argentines buy their imports from Great Britain in spite of

the fact that Great Britain buys scarcely a pound of Argentine wool in return. Why is this? It is simply because the English buy their raw materials where they can buy them to the best advantage, and the Argentines buy their imports where they can procure them either cheapest or with the least delay." It may be added that of the 5,935 steamers touching at Argentine ports during last year not one was under the American flag, and of the 7,558 sailing vessels only 85 hailed from the United States.

The United States minister to Brazil, Robert Adams, Jr., sees great prospects for American trade in our sister Republic at an early date. He says all the conditions are favorable for the increase of our trade. The recent difficulties between England and Portugal, which excited the sympathy of the Brazilians for their mother country, have strained their relations with Great Britain. Leagues were formed to boycott English goods and manufacturers, and resolutions were passed looking to the United States for their future supplies. The prompt resumption of diplomatic relation by the United States with the provisional government, we being the first so to do, followed by our formal recognition of the Republic, has created a most cordial feeling toward our country. That our manufactures are held in high esteem in Brazilian markets, wherever properly represented, is evidenced by the practical monopoly of American locomotives, a particular line of sewing machines, and one firm's agricultural implements. These and others, however, can only be sold by specimens exhibited on the spot by competent salesmen who speak the language.

It is now tolerably certain that a new line of steamers will shortly be established between Galveston, Tex., and Jamaica, W. I. Jamaica offers a good field for American products, but the opportunity is comparatively neglected, considering the proximity of the island to the United States. Out of a total trade of \$6,510,600 Jamaica exports to this country \$1,210,687 more than she imports. Consul Estes states that American manufactures and products are much liked, and he suggests that the following articles properly presented would find a ready market there: Arms, cement, clothing, cured meats, canned goods, all kinds of hardware and cutlery, jewelry, plated ware, soap, condensed milk and paper.

An Australian buyer recently gave a considerable order for halter chains manufactured by the Oneida Community Company. The American chain, it is admitted, is stronger and generally superior to the German, which has hitherto been supplied to the Australian market.

It is officially announced that commercial travelers in Brazil are not subject to the federal tax. But as soon as they settle down in any spot to do business they rank as commission merchants, and are liable to be called upon to pay the national taxes on industries and professions.

Here is some information intended for the advantage of English manufacturers by the British Consul-General to Persia. It should be particularly interesting to American manufacturers and exporters of hardware: Really good English penknives (not pocket-knives) are much in request in Persia, says he, for mending the reed pens with which all writing is done. It requires a very superior knife to mend these pens properly. Padlocks, screws, butchers' knives, saws, and adzes of a quality adapted to the country would also meet a ready sale. It would be necessary for whoever undertook the hardware business to study the market on the spot. The cheapest way to travel is by steamer from London or Liverpool to Batoum, thence by the Transcaucasus railway, via Tiflis, to Akstafa on the Tiflis and Baku line of railway, and drive thence to Tabreez. The journey can be accomplished, traveling second-class, for £30. There is no difficulty for any one speaking German, the number of German-speaking employes on the Russian Transcaucasus Railway and the telegraph stations being very large. A person speaking both French and German would have no difficulty whatever on the journey.

There is general complaint of the high landing charges which have to be paid at the Buenos Ayres docks. The practice of imposing landing charges has become a "universal and simple rule" (even in some of the English docks). Shorn of all disguise, however, the imposition at a landing dock has the same effect as a tax on imports. The docks at Buenos Ayres have been constructed at great expense, and it seems to be the intention that beyond the usual profit from wharfage and dockage, the importer of American and other merchandise shall help to pay for them. It amounts to a tax. A correspondent appropriately bewails the "absence of cheap accommodation which every port ought to have."

The Intercolonial Railway Commission, which is the outcome of the Pan-American Conference, met in the Diplomatic Chamber of the Department of State, Washington, on Thursday. The following commissioners were present: Mr. Leandro Fernandez, of Mexico; Mr. Jacob Balz, of Guatemala; Mr. Anselmo Vello, of Costa Rica; Mr. Climaco Calderon, Mr. Julio Rengifo and Mr. Frederico Farrago, of Colombia; Mr. M. Bomero, of Ecuador; Mr. Nicavnor Bolet Peraza, of Venezuela; Mr. F. C. C. Legavia and Mr. Manuel Elgara, of

Peru; Mr. John Stewart, of Paraguay, and Mr. Valente, of Brazil. There were also present Secretary Blaine, Mr. A. J. Cassatt and Mr. Henry G. Davis of the United States. A committee on organization was appointed before the commission adjourned. It is stated that several plans have already been submitted for a continuous line of railway from the United States to South America, connecting with existing systems.

#### INDUSTRIAL NOTES.

Employees of the British South Africa Company, who shall hereafter discover any mine in the country are to be made co-proprietors with the company.

St. Mary's Canal, at Sault Ste. Marie, is officially closed for the season. The number of boats passing through this season was 10,557, carrying 24,855 passengers and 9,041,213 tons of freight.

Mr. A. P. Granger, of Denver, Colo., through an advertisement in the ENGINEERING AND MINING JOURNAL, has secured a customer in Australia for one of his roller stamp mills and one dry ore separator.

A furnace of the Illinois Steel Company, located at Joliet, Ill., which had been blown out for re-lining and repairs, fell on Wednesday while eleven men were working inside. The entire eleven were killed.

The DeBardeleben Coal and Iron Company, of Alabama, has shut down its ovens at Johns Station and has banked one and blown out three furnaces at Bessemer and shut down the 900 coke ovens at that place.

The south side irrigating ditch, now being constructed by the Lamar Land and Canal Company, in Colorado, will be completed in the spring. It will be 50 miles long, and supply water for 50,000 acres of farming lands lying near Lamar, Colo.

Messrs. Hugh W. Adams & Co., of 56 Pine street, New York City, have been appointed sole agents for the sale of the Bushong and Reading pig irons (made by the Reading Iron Company, Reading, Pa.), in eastern New Jersey, New York and all the Eastern States.

The New Castle Steel Company and the New Castle Wire Nail Company, both of New Castle, Pa., have consolidated, the new concern taking the name of the last named corporation. The capital stock was increased from \$350,000 to \$500,000. R. W. Cunningham, of New Castle, is president of the new company.

The Landon Charcoal Furnace, of the Landon Iron Company, Chapinville, Conn., one of the oldest stacks in the Salisbury district, went into blast last week after an idleness of some years. During the past five months extensive repairs and improvements have been carried through. It is under the management of Mr. J. J. Morehouse.

The furnace of the Roanoke Iron Company, at Roanoke, Va., will shortly go into blast. Its output will be 150 tons per 24 hours, and employment will be given to between 700 and 800 men. In addition the company is erecting a puddling mill and a rolling mill, the dimensions of the former to be 332 x 76 x 26 feet, and of the latter 304 x 84 x 26 feet.

It is stated that nearly 1,000 steel tubular-frame eight-wheeled railroad cars, with automatic brakes, are to be put on the government railways of Natal. These are to be paid for by one-half the annual savings made by using them in moving freight as compared with the cost of moving an equal quantity on ordinary wagons, according to agreements formerly announced in these columns.

A new corporation, the Aschman Steel Company, has purchased the works of the Evans Iron Company, in Sharon, Pa., and is remodeling them to serve as a steel foundry. Various alterations, additions and improvements are being made. The open-hearth furnace and annealing ovens are to be built by the S. R. Smythe & Laughlin Company, of Pittsburg. The plant will be ready for operations early in January next.

Secretary Tracy of the Navy has decided to make a more careful test of the nickel-steel plate before expending the \$1,000,000 congressional appropriation. It is said that the department has learned that the supply of nickel in North America is sufficient to meet any demands made. Consequently only such portion of the appropriation will be used as may be necessary to determine the full value of the metal. Several large plates have been ordered from the Bethlehem Iron Works and Carnegie, Phipps & Co., the government furnishing the nickel.

The directors of the Westinghouse Electric and Manufacturing Company decided at a meeting held in Pittsburg, Pa., on Tuesday, to issue additional stock to the par value of \$2,000,000. This will make the total issue \$10,000,000. A proposition will now be made to the stockholders that \$3,000,000 of the stock be preferred, upon which an annual dividend of 6% be allowed, said dividend to be accumulative. It is said that the action of the directors is taken in order that the

business of the company may be conducted upon a cash basis and to permit of extensions of the company's plant.

A new inlet pipe for the Nashville (Tenn.) water-works is being laid in the bed of the Cumberland River. The pipe is 48 inches in diameter, and is being laid through a gravel bar, 1,200 feet, to the new pumping station. An 8-foot trench is being dredged through the bar; the contractors, Jackson & Hillman, are using a Bucyrus dipper dredge with satisfactory results. For a few hundred feet lime rock was encountered near the bottom of the trench which had to be blasted to a depth of 5 feet. The work is in progress at a low stage of water. J. A. Jowett, City Engineer, is in charge of the work, and J. F. Le Baron is consulting engineer to the contractors.

#### SOUTHERN INDUSTRIAL NOTES.

(From our Special Correspondent.)

The South Tredager Iron and Nail Works, of Chattanooga, Tenn., which has been practically idle for two years, has been sold to the Cardiff Land Company, and will be moved to Cardiff, Tenn., very soon. The purchasers have issued a circular asking subscription to the stock of the South Tredager Works.

At a meeting of the directors of the Newman (Ga.) Cotton Mills, it has been decided to purchase \$15,000 worth of new machinery. The order will be placed at once. This will increase the capacity of the mill about one-third. This step has been rendered necessary by the increasing demand for goods manufactured by these mills.

The following official statement has been given out by the Richmond Terminal: The annual report of President Inman of the company, which will be presented to the stockholders' meeting in a short time, will show the company has no floating debt whatever, and has cash in bank \$525,000, loaned on demand \$329,000, besides \$2,500,000 of good, active collateral in the box, exclusive of collateral behind the trust bonds.

The Murphy (N. C.) Improvement Company has been organized with a capital stock of \$500,000, and the privilege of increasing it to \$1,000,000. Mr. N. Duke, of W. Duke, Sons & Co., is president; A. B. Andrews, vice-president of the Richmond & Danville Railroad, vice-president; T. H. Martin, president of the Tobacco Board of Trade at Durham, is secretary, and W. N. Morgan, cashier of Morehead Banking Company, treasurer. The company owns about 400 acres of land in and around Murphy, which it intends to improve and place on the market.

The Dallas Cotton Manufacturing Company, of Huntersville, Ala., noted in the ENGINEERING AND MINING JOURNAL of November 24th, has elected Godfrey M. Fogg, of Nashville, president; William R. Rison, vice-president, and T. B. Dallas, general manager. The first mill to be erected will cost \$500,000, and will contain 25,000 spindles and 750 looms. The plans for the building are furnished by Lockwood, Green & Co., mill engineers, of Boston. A bleachery will also be established to finish goods for the Southern and Western markets. As soon as this mill is in operation a second one will be built.

#### MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If anyone wanting Machinery or Supplies of any kind will notify the "Engineering and Mining Journal" of what he needs, his "Want" will be published in this column.

Any manufacturer or dealer wishing to communicate with the parties whose wants are given in this column can obtain their addresses from this office.

No charge will be made for these services.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning American goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

These services are rendered gratuitously in the interest of the subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, nor have they any pecuniary interest in buying or selling goods of any kind.

#### GOODS WANTED AT HOME.

1,158. A standpipe 100 x 12 feet, either material ready for erection or complete; a compound duplex pump, 500,000 gallons per 24 hours, against 125 pounds pressure, with 85 feet piston speed per minute; about 1,000 feet 8-inch pipe, 800 feet 6-inch pipe, and 5,000 feet 4-inch pipe; 25 hydrants, 8 gates; 1 boiler, 14 feet x 48 inches; 1 feed pump for same and 1 heater. Specifications furnished on application. Texas.

1,160. Flint stones for a glaze mill, or a glaze mill complete, such as are used in potteries for grinding glazes. Ohio.

1,161. A second-hand pump in first-class order to deliver about twelve hundred gallons of water per minute at a speed of 100 feet of piston per minute. Georgia.

1,162. A good second-hand core diamond drill with outfit complete. Virginia.

1,163. A machine for making jack screws from 1 1/4 to 5 1/2 inch screws.

1,165. Prices on large lots of Trinidad asphalt. Pennsylvania.

1,166. An outfit for a brick plant. Virginia.

1,167. A boiler and engine with ample power to run a 200-barrel flour mill. Virginia.

1,168. A 15, 18, 24, and 30-inch lathe, two planers, two drills, two shapers, a Fox lathe and a boring mill. Pennsylvania.

1,169. Unrefined brown turpentine and naphtha. Pennsylvania.

1,170. Common strong sulphuric acid. Pennsylvania.

1,171. Machinery for a saw mill, general planing mill, and box factory. Maryland.

1,172. Estimates on a complete electric plant, one mile of track and two passenger cars. Plant to be of sufficient power to operate five or six miles. North Carolina.

1,173. Excelsior machinery. Texas.

1,174. Machinery for working gold quartz, such as a crusher, a mill to pulverize quartz, washers, etc. In fact all that is required for mining. Give description, capacity, and amount of power each machine will require; also prices, etc. North Carolina.

1,175. Drag saw, broom handle and chair machinery. Texas.

1,176. Phosphate mining machinery. Double drum winding machines, elevator platforms with safety attachment, etc., for vertical elevator hoists, automatic tippie cars, ore crushers, washing and drying machines, pumps, boilers, engines, mining and smith's tools. Florida.

1,177. A saw and planing mill with a capacity of 50,000 feet per day. Connecticut.

1,178. Complete equipment for five miles of railroad for logging purposes. Connecticut.

The attention of contractors and rockmen is called to the advertisement of the Jeddo Tunnel Co., Ltd., on page XXVII.

1,179. Prices and catalogues of hydraulic and other machinery for working diamondiferous alluvial gravels. Vaal River, South Africa.

1,180. Crusher and other machinery for a gold quartz mill. North Carolina.

#### AMERICAN GOODS WANTED ABROAD.

1,164. A double machine for punching and shearing for a watch factory to punch a two-inch hole through 1/2-inch brass or nickel and sharp angled smaller watch parts requiring a nicely adjusted machine, and also to shear brass or nickel bands 2 1/2 inches deep. Switzerland.

#### GENERAL MINING NEWS.

Shipments of iron ore from the mines of the districts mentioned below for the season up to and including November 26th were as follows:

	Tons.	Tons.
	1890.	1889.
Marquette, Marquette District.....	1,316,353	.....
St. Ignace, ".....	15,911	.....
Gladstone, Marquette District.....	8,190	.....
" Menominee ".....	78,368	.....
Escanaba, Marquette ".....	1,282,033	.....
" Menominee ".....	2,622,004	.....
" Gogebic ".....	342,079	.....
Ashland, ".....	2,065,133	.....
Two Harbors, Vermillion District.....	862,245	.....
Total tons.....	7,962,316	.....

\*Up to Nov. 19th only.

STANDARD OIL COMPANY.—Attorney-General D. K. Watson of Ohio has filed in the Supreme Court of that state an amended petition in the quo warranto suit he began several months ago to have the charter under which the Trust known as "The Standard Oil Company" has a legal existence declared void. The original suit was based upon several grounds, chief among which was the claim that the company has extended its operations beyond the bounds laid down in its charter and has merged into another corporation. The amended petition alleges that there are now in existence only seven of the original 35,000 shares of Standard Oil stock, and that by the agreements entered into between the directors of the Standard and the trustees of the Trust the former conveyed to the latter 34,993 shares of stock, and the trustees in return immediately issued an equal number of certificates of the Standard Oil Trust. The petition further sets up that none of the nine trustees of the monopoly is a resident of Ohio. Another allegation is that the company is not conducting the business stipulated in its charter.

#### ALABAMA.

##### \* COAL.

The coal miners in Alabama, some 8,000 in number, struck on December 1st. Some days ago a committee of the Mine Workers' Union asked for an advance in wages, which the operators refused to grant, and orders for a general strike were issued. Late telegraph advices state that the situation is unchanged, but that indications point to an early settlement.

## ALASKA.

Telegrams from San Francisco to the superintendent of the coast and geodetic survey, Washington, announce the receipt of news from the two survey parties who have spent the last year on the Upper Yukon in Alaska. Mr. Turner, chief of the Porcupine river party, completed his work on the 141st meridian last spring and reached St. Michael's August 30. All were well in his party. He will winter at St. Michael's. McGrath will spend the winter on the Upper Yukon, completing his astronomical observations. His party is in good condition, and provided with plenty of provisions. The last news from Mr. Turner, previous to this, was dated January last.

## ARIZONA.

## PIMA COUNTY.

(From our Special Correspondent.)

**OLIVE CAMP.**—This mine recently purchased by Geo. Westinghouse, of Pittsburg, Pa., is being put in shape preparatory to systematic and thorough development. Mr. R. D. Rhodes is superintendent. The ore is a refractory silver ore carrying a little lead.

## CALIFORNIA.

## AMADOR COUNTY.

**AMADOR GOLD MINE.**—Ten stamps of the mill were started recently on ore from the Doyle claim, which is close to the mill. It is the intention to run through five or six hundred tons, so as to secure a fair test crushing. The ore is said to look well, and the prospects are considered very favorable for a paying yield.

**CLINTON PEAK.**—The tunnel is 350 feet. Three veins or small seams of quartz have been encountered, one of them over two feet wide, and showing free gold and good-looking sulphurets. The main ledge, however, is believed to be considerably further in the hill.

## EL DORADO COUNTY.

(From our Special Correspondent.)

AUBURN, Nov. 26, 1890.

**AMERICAN RIVER COMPANY.**—This is an English company managing the Dalmatia mine. It is managed by Mr. George Cullen Pearson. The mine is located on the summit of a broad ridge between Rock creek and the South Fork of the American river, three-quarters of a mile east of Kelsey. It contains a wide belt of chloritic, or a fine amphibolitic schist, enclosed in clay slate. This belt locally but erroneously referred to as "porphyry" (a name which covers many petrographical sins) is greatly decomposed and filled with a great number of quartz seams carrying gold. The width of this auriferous zone is not exactly known, but a tunnel cutting across it about 150 feet below the croppings has shown it to be more than 130 feet. Its depth will be for future exploration to determine. Probably sulphurets will come in below. The whole mass of reddish, decomposed rock and quartz is mined. It carries on an average from \$1.50 to \$2 per ton. The ore is quarried in a wide, open pit at the croppings and dumped down to the tunnel level through several roomy shoots. At the mouth of the tunnel, which is about 300 feet long, the mill is situated. The cars dump the ore over a grizzly down to the level of the rock breaker.

The machinery consists of three Huntington mills, doing excellent work on the soft ore, a 10 stamp battery and a rock breaker. The ore carries but little sulphurets and these of a character hardly worth saving. The capacity of this plant is somewhat over 100 tons per day of 24 hours, say about 3,500 tons per month. The power station is situated at the mouth of Rock creek, 1,200 feet below the mill and two miles distant. A ditch owned by the company conducts the water of Rock creek, half a mile above the mouth. At the station it has a head of 110 feet. It is drafted through a 5½ inch nozzle to an 8-foot Pelton wheel giving 100 revolutions. One hundred and thirty horse power is developed. The generator is a 100 horse power Brush dynamo with 900 revolutions per minute. The current is conducted to the mill, and returned by means of a copper wire, No. 3, B. & S. gauge. A 60 horse power Brush motor receives the current at the mill and, running at 800 revolutions, transmits the power to the counter-shaft of the mill. The efficiency of the Pelton wheel is stated to be 86%, although we are not aware that any experiments have been made to ascertain it accurately at this place. The loss in conducting the current through the wire for two miles, measured by volts and amperes at the power station and at the mill, is about 10%. The actual amount of horse power furnished at the counter-shaft of the mill as compared to that furnished at the shaft of the generator, that is the efficiency of the whole electric plant, is not known at present and can only be ascertained by dynamometric measurements, but the probability is that it does not exceed 60 or 65%. Misleading statements by correspondents in several Western papers convey the impression that 85% of the power furnished by the wheel would be transmitted to the machinery in the mill. Besides producing electricity for motive power the generator runs incandescent lamps for lighting the mill. The plant was erected last spring, the work being greatly retarded by the rainy weather and bad roads. It has been in continuous operation for

about five months, and can be safely pronounced a great success. The operating expenses of the whole plant are surprisingly small. It was thought a few years ago that the limit was reached when the "Spanish Mine" in Nevada county could mine and mill its ore for something like 75 or 80 cents per ton. The ore of the Dalmatia is mined and milled for 50 cents per ton. The mining is done by contract, the price per ton being 7½ cents. The remaining 42½ cents represents milling, management and amortization of capital. We do not think, according to the figures furnished by Mr. Pearson, that this amount is too low; in fact, we are assured that the expenses for October will be still smaller.

It is needless to say that the successful installment of this plant opens a magnificent field for the many large bodies of low grade soft ore, easily mined, but at inconvenient distance from numerous water powers which are to be found in the gold belt of California. This company also owns the Boulder-Gopher mines near Relsey. It was found impracticable to work the ore by steam power. Since the success of the electric plant of the Dalmatia mine, an extension of the electric transmission to these mines is contemplated.

**BIG SANDY.**—A Toledo, (Ohio) company has erected a 4-stamp mill on this property. It has been running for several months. The ore is very low grade but is mined cheaply from an open cut. The mill is closed at present. A shaft is being sunk in the ore body.

**GENTLE ANNIE.**—This mine is located two miles north of Placerville on the same mineral-bearing belt as the Pacific. The ore body is 30 feet wide and is composed of a great number of small seams separated by clay slate. The ore is quite low grade, but the cheap way in which it can be mined allows a handsome profit. It runs high in sulphurets. The 10 stamp mill recently erected has been running continuously for several months.

**IDLEWILD GOLD MINING COMPANY.**—This company, of which Mr. E. W. Chapman is manager, and Mr. W. E. Dennison superintendent, owns and operates the Taylor mine. The quartz vein of the mine is in slate with greenstone on the footwall. The strike is northwest and dips east; width 2-ft. A shaft has been sunk to the 500-foot level and considerable development work done. The ore is said to average \$8 per ton in gold. It contains about 2% of sulphurets. A 20-stamp mill has been erected; the stamps are each 1,000 lbs. Four Woodbury concentrators are doing service in the mill.

**LONE JACK.**—This property is located south of the Taylor. At present it is idle but is soon to be started up. It has a 10-foot vein and has been worked to a depth of 400 feet. There is a 10-stamp mill on the property.

**MAMMOTH.**—This property of Col. Davis', which consists of an enormous bank of gravel on the Placer county side of the river, is being successfully worked on a large scale day and night. During the night it is illuminated by powerful arc lights. Higher up, as at Texas Bar, smaller companies are working. Up at Horseshoe Bar, below Michigan Bluffs where the river makes an extensive bend 300 feet wide at the narrowest point, a tunnel has been completed calculated to carry all the water of the river. It is intended to turn the river into this tunnel next year, and large returns are expected from the 5,000 feet, or thereabouts, of channel laid dry.

**MOUNT PLEASANT MINING COMPANY.**—This company, of which J. Hague is president, has, according to reliable information, a very good mine located at Grizzly Flat. However, it is being worked in a curious, desultory way, a condition of affairs which may be explained by the fact that there is a dispute about the title. The mill was run for a short time this season.

**SIERRA NEVADA LAND AND WATER IMPROVEMENT COMPANY.**—Last year this company, the owner of the Pacific mine, acquired the South Fork ditch with its water rights and began to develop their property. The 20-stamp mill was repaired and a run made on the ore from the old slopes of the mine. It did not, however, prove rich enough to warrant a steady run, and the company now has six men at work sinking for the 1,000-foot level with the hope of striking paying ore at that depth. The working expenses of the mine are comparatively high.

**THE OAK CONSOLIDATED.**—Mr. J. Ryan is developing a promising vein in granite six or seven miles south of Grizzly Flat, and has this summer erected a 5 stamp mill in order to give the mine a thorough test. The mine is situated in the cañon of the Middle Fork of the Cosumnes.

## COLORADO.

(Special Report for the ENGINEERING AND MINING JOURNAL.)

Mineral surveys approved by the United States Surveyor General of Colorado, during the week ending November 29th, 1890:

Survey No. 6,544, land district Montrose, name of claim, Pontiac, Speedwell, Extension and Dubois lodes and the Pontiac Mill Site; 6,352, Pueblo, Coter; 6,709, Central City, Osage, Miami and Native Silver; 6,715, Durango, Caesar; 6,478, Leadville, Iron, Search No. 4, Search No. 3, Search No. 2, Search No. 1, Dreadnaught, Hattie S. and Supervisor; 6,670, Leadville, Ocean Wave; 6,762, Central City, Silver Queen.

## GILPIN COUNTY.

**SAN JUAN.**—This mine averages \$19,800 per month in gold, \$8,000 in smelting ore, and in addition a considerable sum from tailings. Seventy stamps are employed in the mill. Sinking operations have been resumed in the shaft. Its present depth is 260 feet.

## PITKIN COUNTY.

Mr. Willard Morse, it is stated, will associate himself with Mr. E. R. Holden in the operation of the lixiviation works to be erected at Aspen. This company will begin the construction of this plant early in January next.

**EDISON No. 2.**—Up to a very recent date the lessees of the middle section of the Edison have been working a large chute of a very low grade. Newspaper reports are to the effect that a discovery has been made. A streak, 18 inches thick, carrying 70 ounces of silver to the ton, is reported to have been struck.

**MONTE CRISTO MINING AND MILLING COMPANY.**—During the months of September, October and November up to the 20th, this company's property was worked under a lease by the St. Louis Colorado Smelting and Mining Company. The property has now been shut down for a short time.

## SAN JUAN COUNTY.

**YANKEE GIRL.**—Concerning this property, London advises furnish the following: H. H. Warner, of Rochester, N. Y., part owner of this mine, is in London. It is said that he has consummated a sale of the property by which he will clear \$500,000 for himself and his partner, Mr. Crawford, of Pittsburg, Pa.

## SAN MIGUEL COUNTY.

**GOLD KING MINING COMPANY.**—A 100-horse-power Westinghouse generator is being put in by this company at Luke Fork. The power will be furnished by two six foot Pelton wheels. The head is 298 feet. This generator will supply the power for operating a 40-stamp mill. It is expected that the plant will be in operation sometime during the month of December. The furnishing of power for the Gold King mill will be only a portion of the work designed for the plant. It is said to be the intention during the coming year to put in two more horse-power generators, with which to furnish power for a mill in Turkey Creek basin, for one on Prospect basin and for a third on Bear Creek. The lines over which the wires are to run have been surveyed.

## FLORIDA.

## MARION COUNTY.

It is stated that an English syndicate has just completed the purchase of 75,000 acres of land in this county, on which large deposits of rich phosphates have been found. Mining operations will be commenced at an early day. The amount involved in the purchase is said to be about \$500,000.

## GEORGIA.

(From our Special Correspondent.)

## BARTOW COUNTY.

About three weeks ago Messrs. Alexander M. Willingham and Aaron Colling purchased a tract of land about two miles northwest of Cartersville, in this county, through which the Etowah Iron Company's railroad runs. Upon prospecting it three leads of iron ore were found. It is a magniferous iron ore containing very little phosphorus. A stock company will be organized at once for the purpose of developing and working its deposit.

**CARTERSVILLE OCHRE COMPANY.**—This company on the 21st ult. made its first shipment of 50 tons to England. This is said to be the first ochre ever exported from America. We have heretofore been large importers. Cartersville ochre, it is said, is considered by experts to be of very high grade.

## LUMPKIN COUNTY.

Messrs. Geo. Stumon and W. D. Hix are making preparations to hydraulic on the Griscum lot. The English properties are mostly idle, and there is no information as to when they will resume work.

General Murry is erecting a five-stamp mill on the Williams lot on Cavender's Creek, for the purpose of testing the deposits in that vicinity.

Mr. Herbert has resumed work at the Singleton mine.

Messrs. Obrock & Smith have purchased the lot, known as the mill lot, from Mr. A. F. Stowe and will erect a stamp mill on it at an early day. Their address is Dahlonega.

Dr. Howard has opened the Barlow or Pigeon Roost lead at three places on lot No. 930. He has also cut the Ivey lead at two places on the same lot. He reports a very good showing at each of these places.

**FINDLEY GOLD MINING COMPANY.**—Mr. Hughes, president of this company, arrived at Dahlonega during the past week from New York city. It is understood that this mine will again be worked.

**HAND GOLD MINING COMPANY.**—This company is now opening a large vein of sulphuret ore on the Benning property. N. H. Hand, president of the company, is at Dahlonega investigating its affairs. The Gordon gold mine is being repaired and will be in running order in a few days. The Hand ditch has been cleaned out and is in first-class condition. No decision has yet been arrived at regarding the new plant for treating concentrates from the Hand mines.

## WHITFIELD COUNTY.

Northern parties are reported as having purchased over 300 acres of land from Mrs. M. H. Mad-dox, for the purpose of erecting and developing marble works. It is said that a stock company is to be organized with a capital of \$300,000.

## IDAHO.

## OWYHEE COUNTY.

DELAMAR AND SOMMERCAMP.—English experts have been examining these two groups of claims in the interest of outside capital. The Silver City *Avalanche* learns from Captain DeLamar that the trade has been made on a very conservative basis, the terms of which leave a three-fifths interest and the control and management of the property in his hands. In addition a consideration of considerable over a million dollars has been paid. The property involved consists of the entire DeLamar and Sommercamp group of mines, with their mill sites and water rights. A large portion of this property has been patented, and applications for patents have been made on the remaining portions. It covers about 480 acres. The mineral belt of which the DeLamar property is a part and about the center, is fully nine miles in length by about one mile in width, with the Cow Creek mines on the north end and Florida Mountain on the south. The estimate made by the purchasers of the improvements now made, and of the timber, fuel, quicksilver and other supplies now on hand, is \$425,000. This amount, together with the original purchase price of the property, has been paid out of the mine. A joint stock company will at once be organized in London, and a large sum appropriated for extensive improve-ments. A new mill of 100 stamps will be erected west of the old one. This mill now doing duty has a daily capacity of 70 tons.

## ILLINOIS.

## COAL.

On December 1st the Jupiter Mining Company and the Bailey & Browning mine management decided to pay the miners of the Duquoin district the Columbus scale of wages. It is said to be only a question of a few days before the other operators will adopt the same scale.

## KANSAS.

## CHEROKEE COUNTY.

A special report shows that during the week ending November 29th the output of ore from the mining districts of Galena and Empire City was: Rough ore, pounds milled, 2,310,390; zinc ore, pounds sold, 1,145,900; lead ore, pounds sold, 107,640. Sales aggregated a total value of \$17,335, and the total value of the output was \$20,445.

## KENTUCKY.

(From our Special Correspondent.)

EASTERN KENTUCKY IMPROVEMENT, MINING AND LAND COMPANY.—This company has been incorporated with a capital stock of \$1,000,000. Messrs. A. H. Martin, S. T. Bastian and G. W. Craig are among the incorporators.

## CAMPBELL COUNTY.

HOMELAND MINING COMPANY.—This company has been incorporated for the purpose of dealing in, developing and working phosphate lands; the capital stock is \$60,000. Messrs. W. H. Justice and M. W. Lane are among the incorporators.

## MONTANA.

## DEER LODGE COUNTY.

(From our Special Correspondent.)

## BUTTE CITY, Nov. 29, 1890.

This community seems to be passing through a turbulent period. Last month the carpenter's union, which had just been formed, raised the rate of wages from \$4 per day of ten hours to \$4.50 per day of nine hours. As there was considerable work in process which had to be completed before winter set in, the carpenters won an easy victory, at least for the time being. The success of this move probably had its effect upon the members of the miner's union. This body served a printed request on all mine owners and superintendents to the effect that the hours of labor be reduced from ten hours per day to eight hours; the rate of wages was to remain \$3.50 per day as before. The mine superintendents held a meeting and returned to the union a written reply signed by all interested.

The purport of this reply has been withheld from the public up to the present time. The reply was to have been read at the meeting of the union on Tuesday, the 25th inst., but for some reason it was not. From this silence it is inferred that the reply was not satisfactory, and that the leaders are consulting over the matter before proceeding further in the movement. The notice served by the union on the superintendents stated that the subject had been under consideration for some time past, and the request was made at this time, as it felt the present was the time for action. If this statement, that the matter had been under discussion for some considerable time, is correct, it is hardly possible that the union will back down on the first denial of its request. If it insists on an acceptance of its terms, the result may be the closing down of all the mines in camp. If the union does back down, it would be quite in the order of things for the superintendents to make a counter demand. Such action would doubtless have the effect of closing down the mines.

It is the writer's opinion that the flowery ac-

counts which are being continually published by the local press of different mines has created an uneasy feeling among the men. One newspaper in particular in its ardent desire to boom things makes some very ludicrous statements. It frequently publishes the statement that the Lexington mine, which is 1,500 feet deep, draws considerable ore from its lower levels for use in the Lexington mill, and says that this proves that the mines here have only to attain depth in order to establish the position of this camp as a town which shall last for all time. In reality the sinking of the Lexington has been the loss of a very large sum of money without any return, or prospect of return. Very little ore has been taken out of the Lexington mine below the 700-foot level. On the 1,000-foot level the company ran a crosscut south about 1,300 feet, and north 300 feet. The veins run east and west, and while several veins were cut, no ore of any value was found. The company found very little ore on the 1,500-foot level that will assay above 5 ounces, and this is altogether too low to work. In consideration of this and similar statements it is not to be wondered that the miners obtain an exaggerated idea of the profits of mine owners, and make demands that are beyond all reason.

It is doubtless the poor success that the Lexington mine has met with in sinking that leads the owners of the Moulton to hesitate about throwing money away in a similar manner. However, the Moulton has a prospect in view. The Alice mine, which is east of the Moulton, and on the same lead, is taking considerable quantities of rich ore from below the 1,000-foot level. We understand that it is from the rich ore opened up in the lower levels of this mine that the recent dividends have been obtained. The supposition is that the Alice ore continues into the Moulton ground.

The townspeople are after the smelters this year with their usual hue and cry. For about three months, from the middle of November to the middle of February, the town is troubled with the smoke from these smelters. The natural climatic conditions of the season and country give rise to frequent fogs or mists. These fogs hold the smoke in suspension. It is estimated that there are in the neighborhood of 150 tons of sulphur thrown off every 24 hours by burning and calcining the ore. At a Board of Trade meeting last Tuesday evening a committee was appointed with instructions to formulate a scheme to abate the nuisance. The City Council, not to be behindhand, has instructed its attorney to draw up an ordinance to regulate the roasting of ore in open heaps or piles. This roasting in piles is the *bleu-noir* of a section of the community. The fact that the sulphur is thrown off just as much in a Bruckner furnace, or any other calcining furnace, as in the heaps, does not seem to be recognized in this action. It is claimed that if the smelters would roast their coarse ore in stalls, and carry the fumes through stacks 200 ft. high, there would be no trouble. As these parties have nothing to lose and everything to gain, it is natural that they would like to see the experiment tried, even if it incurred great expense to the companies. The only possible solution of the difficulty is a plan to draw the smoke and fumes through dampened diaphragms by suction, thus absorbing the sulphur. Water, however, is scarce in Butte. Perhaps some of your readers may be able to express an opinion upon the feasibility of this scheme. The suggestion has been made that the city advertise for a plan providing the best means of getting rid of the fumes.

ALTOONA AND CALEDONIA.—J. A. Merrill has taken a \$30,000 bond on these properties. About \$50,000 has already been spent on the Altoona with little success. It is said that a company is to be formed for the purpose of developing the property.

ANACONDA MINING COMPANY.—The following press dispatch concerning this company is dated on the 4th inst.: The Mountain Consolidated, the Green Mountain, the Wake Up Jim and the High Ore mines at Butte, belonging to the Chambers syndicate but controlled by the Anaconda Company, have closed down. Eight hundred men are out of work, as the Anaconda smelter largely depended on those mines. The smelter is also liable to close, throwing 2,000 more men out of work.

COMBINATION.—The threatened temporary shut-down of this mine and mill, says the *Helena Journal*, revives interest in the affairs of that company, whose record has been one of fair success since the date of its organization three or four years since. The stamps of its 10-stamp mill commenced dropping two years and a half ago, since which time, according to official reports, \$452,382 has been realized from the sale of concentrates and bullion. According to a recently published statement, 987 tons of ore were crushed during September, while in October 1,008 tons were put through. The work of sinking the new shaft 250 feet, which is also being done by contract, will also be completed and accepted. The company has 140 men in its employ.

HASMARK.—This lode, located near Philipsburg, has been bonded by Messrs. J. K. Pardee and Allan McDonel for \$30,000. The bond runs 60 days. They have put a force of men at work, and express their intention of taking up the bond at its expiration.

LION MINING COMPANY.—It is stated that a chute of high-grade ore has been encountered in the breast of the drift on the south vein of the 300-foot level in this mine, in Oro Fino district. When the chute was first discovered it was not over three or four inches wide, but with two days' work it increased to 10 or 12 inches. This strike was not made on the main vein, which lies to the north and has not yet been tapped on the 300-foot level. A cross-cut is now in progress, however, and it will be opened up within the next two weeks. Though the developments of this property have been continuous, it has been slow and expensive; the mine has been opened up to a considerable extent on the 200-foot level though without particularly satisfactory results. Nevertheless, stoping has been in progress for some time on that level.

MINERAL HILL.—Operations commenced November 20th. The shaft will be sunk to a depth of 400 feet. A temporary road is being constructed to connect with the Deer Lodge road at Champion. In the spring the company will make its outlet by the way of Bernice.

SILVER BELL.—It is stated that this mine has been bonded to the owners of the Paragon mine for \$75,000. The deal involves two adjoining claims. It is said that a force of 100 men will be employed and the property thoroughly developed.

## MADISON COUNTY.

BEDFORD.—Major Joseph R. Muffly, representing a syndicate of eastern capitalists, it is said has perfected a deal by which he has secured control of this group of Galena mines on Ramshorn Creek. A force of men is at present employed in repairing the roads leading to the mines, preparatory to taking in needed machinery and other supplies, and in burning coal, chopping wood and doing other work preliminary to active operations.

## MISSOULA COUNTY.

CURLEW.—The new concentrator at this property near Victor, Missoula County, has been in operation two weeks and is said to be doing excellent work. The Curlew has shipped quite 300 tons of crude ore during the season, which has returned approximately \$50,000. Now that its concentrator is at work it is anticipated the mine's output will be materially increased. Messrs. A. M. Holter and S. T. Hauser are prominent among the owners of the property.

## SILVER BOW COUNTY.

A deal was recently made between J. A. Coran, of Boston, representing a syndicate of English capitalists, and James Talbot, representing the old Silver Bow hydraulic company, which, it is said, will insure the construction of a water-works system at Butte, Mont., at the cost of \$2,000,000. The plan is to take the water from the summit of the divide, twenty-five miles west of the city, and bring it in through a thirty-inch main. Supply reservoirs with a capacity of 500,000 gallons will be built on the divide and a distributing reservoir will be placed back of the city capable of containing at least two weeks' supply. One hundred thousand dollars has been set apart for preliminary work and construction will be commenced as soon as the engineers can perfect their plans.

BUTTE & BOSTON MINING COMPANY.—It is authoritatively stated that this company, the property of which is located at Butte, has decided to build a 3,000-ton smelter at Great Falls.

## MICHIGAN.

## COPPER.

ALLOUEZ MINING COMPANY.—This company's November output was 120 tons of mineral. The Calumet conglomerate has not yet been cut on the property.

ATLANTIC MINING COMPANY.—The November product was 213 tons of mineral, against 230 tons for October, and 207 tons for November last year. This makes 2,286 tons for 11 months, against 2,338 tons last year, a decrease of 52 tons.

CALUMET & HECLA MINING COMPANY.—The output of mineral during November was 3,634 tons, against 4,151 tons for October, and 3,267 tons for November, 1889. For 11 months the product has been 38,500 tons, against 26,972 tons last year, an increase of 11,528 tons.

FRANKLIN MINING COMPANY.—This company is said to have surpassed previous output records during November. The output was 633 tons and 705 pounds of mineral. This compares with 306 tons in October and 464 tons in November, 1889. This makes 2,959 tons produced since January 1, against 2,407 tons in 1889, an increase of 552 tons. The large product is attributed to the season's clean-up preparatory to the closing of lake navigation.

NATIONAL MINING COMPANY.—The unwatering of this mine was recently completed. Concerning the condition in which the mine was found upon inspection is given by Superintendent Johnson Vivian as follows: "We found the shaft on the whole in a very fair condition. Some places required new timber, which was put in as fast as the water was lowered, consequently the shaft is in good working order from the surface to the bottom at the twelfth level; 180 feet west of the shaft a winze has been sunk below the twelfth level about 30 feet. This opening is still full of water, but we hope to have it all out by the last of the



month. It is reported by the miners who last worked in the bottom of the winze to be showing a good paying lode for barrel and stamp copper, all of which may be true and it may not be true. In a stope in the back of the twelfth level, 170 feet west of No. 2 shaft, we have taken out a mass of copper, about 1,000 pounds, and two others that are from 250 to 300 pounds each. In the east end of this stope there is several hundred pounds of mass copper in sight, and may prove to be a much larger mass than the one which we have taken out, for, as you are aware, it is impossible to tell the size of a mass of copper until it is out of the ground. The ground at this point seems to be very favorable for producing copper in good paying quantities. We shall start regular stoping at this point with one or two drills at once. We shall also start to sink No. 2 shaft below the twelfth level within next ten days and open up the thirteenth level as fast as possible. The general appearance of the mine is much better than I expected to find it. At one of our bottom levels we shall run a cross cut north to the amygdaloid. The machinery is in a very fair condition, and can be operated without much expense for repairs for at least a year. There is wood enough on the mine to last eight or nine months, and steel iron and other supplies of that kind that will last a year."

**QUINCY MINING COMPANY.**—This company produced 550 tons of mineral in November, against 602 tons in the same month last year.

**IRON.**  
**MARQUETTE RANGE.**  
(Special Telegram.)

**MARQUETTE, Dec. 4.**  
Edison's experimental magnetic ore concentrating plant, located at the Humbolt mine, was destroyed by fire on the night of December 3d. It was ignited at the exposed woodwork near the boilers. The loss exceeds \$12,000. It was covered by an insurance of \$5,000. The building contained two dynamos, three magnetic ore separators, two Gates crushers and other valuable machinery. Preparations had been completed for the shipment of a car load of ore which had been raised from 50% to a figure nearer 70%. It is uncertain whether the plant will be rebuilt.

**MISSOURI.**  
(From our Special Correspondent.)  
**JASPER COUNTY.**

**JOPLIN, December 1st, 1890.**  
There was a large output of ore during the week ending Saturday, but sales were rather light on account of a decline of zinc ore. The local ore buyers are in the market, but are bearish, and inclined to put the price down to from \$27 to \$28 per ton, while the miners believe they should get not less than \$30 per ton; as a result our ore bins are full from last week's production. Lead ore is also on the decline, and producers are holding for an advance.

Following are the sales from the different camps as far as reported:  
Joplin mines, 1,049,450 pounds zinc ore and 168,850 lead; value, \$17,582.  
Webb City mines, 659,510 pounds zinc ore and 43,030 lead; value, \$9,845.  
Cartersville mines, 778,000 pounds zinc ore and 153,220 lead; value, \$14,948.  
Zincite mines, 193,370 pounds zinc ore and 6,990 lead; value, \$2,896.  
Oronogo mines, 80,000 pounds zinc ore and 12,000 lead; value, \$1,432.  
Lehigh mines, 43,490 pounds zinc ore; value, \$634.  
Galena, Kans., mines, 1,145,900 pounds zinc ore and 107,640 lead; value, \$17,335.

All districts, total value, \$62,672.  
The Joplin electric street railway started its line Sunday evening. There was a large crowd to witness the trial trip, which was a perfect success.  
The John Price, Wetherell and Pat Murphy hunting party, mentioned in the **ENGINEERING AND MINING JOURNAL** last week, returned last Tuesday loaded with game of all kinds. They had enjoyed the trip, although some of the party were attacked by buck fever the first few days in camp. Some of the game was shipped through to Philadelphia.

**RUBY LEAD AND ZINC COMPANY.**—This company, composed of St. Louis parties, is operating an 80-acre tract of land two miles south of the city. It has just completed a model plant of machinery, consisting of a 100 horse power boiler, large engine, two sets of large crushers, and two complete sets of jigs. The plant is so arranged that all can be run together or separately.

**NEVADA.**  
**STOREY COUNTY—COMSTOCK LODGE.**  
(From our Special Correspondent.)

**SAN FRANCISCO, Nov. 29.**  
**CROWN POINT MINING COMPANY.**—The pumps continue working most successfully, the excessive heat while working under a head of steam being minimized by returning to the system of driving the pumps by compressed air. The water has been lowered some 100 feet, and the probabilities are all in favor of no further delays. Caves will be met with, no doubt,

but it is thought that in the lower levels the great pressure of water will have prevented any very serious damage.

**KENTUCKY MINING COMPANY.**—At the annual meeting of this company, held recently, 26,884 shares of stock were represented. A new board of directors were elected, as well as a new superintendent. The officers who will serve during the ensuing year are as follows: R. E. Kelley, president; Thomas Anderson, vice-president; J. B. Low, Morris Hoeflich and J. W. Pew. The last named gentleman was reappointed secretary, and H. M. Gorham was chosen to replace S. L. Jones as superintendent. The financial statement submitted by the secretary showed that during the year three assessments of 30 cents each had been levied, aggregating \$26,987.90. The disbursements during the year amounted to \$27,386.85, the deficit being more than made up by revenue from other sources, which also left a cash balance on hand of \$1,124.99. The present change in the directorate, and perhaps more particularly the change of superintendent, is not without significance. At the last annual election E. Conradt was reappointed superintendent, but some months later he was ousted and S. L. Jones put in his place. Mr. Conradt, it is said, has a record in connection with the Kentucky property, and, without going into it at length, it is sufficient to say that shortly before he was removed from office last year he discovered an ore-body that seemed to promise rich returns. By his reports on file in the company's office the assays during one month ranged from \$40 to over \$1,000 per ton. Just when shareholders were probably promising themselves some return on their investment Mr. Conradt was peremptorily removed and, for all the shareholders have been benefited by the ore body he discovered, it must have been removed, too. Nothing has since been heard of it and Mr. Jones, in the report he submitted on Wednesday, makes no reference to any ore body of particular value. What the new order of things may bode to holders of Kentucky stock is a moot point, but at least the course of the new superintendent will be watched with interest. Superintendent Jones, in his report, states that during the year 522 feet of winzes have been thoroughly cleaned out and repaired and 700 feet of drifts retimbered. He recommends the re-timbering of 250 feet of shaft and the continuation of the 580-foot crosscut west from the 16-foot level.

**NORTH CAROLINA.**  
(From our Special Correspondent.)  
**DAVIDSON COUNTY.**

**EUREKA.**—Pittsburg parties have recently investigated this mine with a view of purchasing. A stamp mill is to be erected and the mine given a working test.

**MONTGOMERY COUNTY.**  
**NEW RUSSELL GOLD MINING COMPANY, LIMITED.**—The London directors have very recently sent over Mr. Henry Hutchison, an expert, for the purpose of investigating the practicability of resuming work on the property.

**OHIO.**  
**HOCKING VALLEY COAL AND IRON COMPANY.**—This company, just organized, is a consolidation of several companies in the Hocking Valley coal region. It is incorporated under the laws of West Virginia with a capital stock of \$1,500,000. John C. V. Staunton, of New York, is president, and David J. McNeice, of New York, is secretary and treasurer. President Mayer and First Vice-President King, of the Baltimore & Ohio Railroad, appear among the principal subscribers to the capital stock. The companies which have gone into the combine up to date are the Superior Coal and Iron Company, of Athens, Shawnee and Iron Point Coal and Iron Company, and the Ohio and Western Coal and Iron Company. The facts came to light through the filing of a mortgage for \$400,000 in favor of the Mercantile Trust Company, of New York, in the counties of Vinton, Athens and Perry.

**PENNSYLVANIA.**  
**COAL.**  
Contractor A. C. Douglass is now driving a drainage tunnel from Continental colliery to connect with the Centralia drainage tunnel. When finished it will drain the Philadelphia Coal and Iron Company's North Ashland and the Lehigh Valley Coal Company's Continental colliery, while the Centralia tunnel, in addition to this water, will carry away the water from the Centralia colliery and the old Provost mines.

The Schuylkill Coal Exchange has issued a report, dated Pottsville, December 1st, which shows the collieries drawn to return prices of coal sold in November, 1890, to determine the rate of wages to be paid, make returns as follows, P. & R. C. & I. Co.: Indian Ridge Colliery, \$2.31 3/4; Shenandoah City Colliery, \$2.22 7/8; Schuylkill Colliery, \$2.31 9/16; Bast Colliery, \$2.21 3/8; Otto Colliery, \$2.39 1/8; total, \$1.46 3/8. The average of these rates is \$2.29 3/8. The rate of wages to be paid for work done during the last two weeks of November and the first two weeks of December, 1890, is seven per cent. below 2.50 basis.

**CENTRALIA.**—L. A. Reilly & Co., the operators of this colliery, are preparing to mine the two-foot

vein of coal, which was cut near the north end of the Centralia drainage tunnel by the tunnel in Locust Mountain at a point about seven hundred feet south of the Buck Mountain vein in Centralia colliery. It is supposed to be a leader of the Lykens Valley.

**DELAWARE & HUDSON CANAL COMPANY.**—We have been officially advised that the company's Baltimore No. 2 shaft has reached the red ash vein of coal.

**GUMBERT & HUEY.**—It is said that these mines are soon to be started up by the assignee. It is said that there are over 100 acres of good coal lands in the tract which have not been worked out.

**HILL FARM.**—A Scottdale, Pa., special says: "The work at this mine has again been abandoned. Ten men who were in search of the bodies of their fellow-workmen became overcome by black-damp and were only removed with the greatest difficulty. After this accident the opening to the main entry was closed up and operations indefinitely suspended."

**HICKORY SWAMP AND HICKORY RIDGE.**—Work on these mines at Shamokin has been stopped, owing to the dullness of the coal trade. The Cameron mines, it is said, will close within a short time.

**STOCKTON No. 2.**—A breaker is to be built at this colliery, at a cost of \$40,000. Its capacity will be 600 tons per day. The contract has not been awarded, but the preliminary work will soon be commenced.

**TURNER COAL AND MINING COMPANY.**—This company has leased the old Monticello furnace property, about 2 1/2 miles above Kittanning. The tract contains about 300 acres of coal land.

**NATURAL GAS.**  
Two new gas lines are being laid to supply the manufacturing establishments of Pittsburg. One will cost \$60,000 and the other \$85,000. The *Pittsburg Dispatch* says the frreeness with which many of the manufacturers continue to invest large sums of money in gas line extensions would seem to indicate that all faith in the supply had not been lost. The general theory is that there is plenty of gas if developments are extended into new territory as fast as old fields give out.

**PHILADELPHIA COMPANY.**—This company has annulled all contracts covering the supply of gas for puddling furnaces and boilers of rolling mills. Notice of this action was given consumers October 25, and editorially noted in the **ENGINEERING AND MINING JOURNAL** November 1st. Since then the majority of the 450 puddling furnaces which were then operated with fuel gas purchased of this company have been realterred for coal. Such furnaces as have not already been changed will remain idle until this work is done. Pittsburg will once more be known as the Smoky City.

**OIL.**  
Exports of refined, crude, and naphtha from the following ports, from January 1st to November 26th, were as follows:

	1890.	1889.
	Gals.	Gals.
From Boston.....	2,424,274	4,334,927
Philadelphia.....	154,431,601	149,736,986
Baltimore.....	12,802,461	8,434,744
Perth Amboy.....	14,335,807	15,755,196
New York.....	423,718,835	407,478,646
Total.....	607,712,978	585,740,499

**SOUTH CAROLINA.**  
(From our Special Correspondent.)  
It was mentioned in the **ENGINEERING AND MINING JOURNAL** on November 29th that English capitalists were investigating the phosphate lands of this State. It is now definitely known that a syndicate is negotiating the purchase of all the phosphate lands, together with the machinery, etc., used to work the same, and its agents are now on the ground making a schedule of the principal stocks and fixing values. It is said that \$10,000,000 is about the figure involved.

**SOUTH DAKOTA.**  
**LAWRENCE COUNTY.**  
(From our Special Correspondent.)

**DEADWOOD, Dec. 2.**  
The attention of prospectors has lately been attracted towards the deposits of hematite iron ore, of which there are some very extensive ledges, never before prospected, near Boulder and Bear Butte Creeks. A local company was formed a few days since to explore and locate the district. The samples so far brought in by prospectors are pronounced as a high grade of this ore, well adapted for the manufacture of pig iron. The ledges of this ore discovered heretofore in the district carry too much silica.

**HARMONY MINING COMPANY.**—This company's property consisting of four claims is located on the dry ore belt near the base of Terry's Peak. The stock is all owned by local capitalists and no assessment has ever been levied. Ore has been shipped regularly to Omaha for several months, returning very satisfactory results. The openings consist of an open cut exposing a breast of ore averaging at least 10 feet thick, and two tunnels or rather drifts, with the formation, running in ore about 200 feet, with ore still in the faces clearly

proving that the ore body exposed in the open cut is continuous into the hill.

**HARDSCRABLE.**—This mine which adjoins the Harmony property is owned by Martenell and Carr, of Lead City. One of the spurs of the Burlington & Missouri River Railroad is now being graded across this location, and the graders have exposed to view a fine body of dry ore, which the owners of the mine are sorting preparatory to shipment to Omaha. As is characteristic of all the flat dry ore deposits of the district, the one under consideration was first encountered close to grass roots, where it was found having a wedge shape. It widened to five or six feet where gouge matter and quartzite were struck.

**HOMESTAKE MINING COMPANY.**—It is reliably reported that the ore taken from the seven hundred foot level of this mine is carrying more pyrites of iron than that from any other level, and consequently the tailings from the mills will increase in value.

**POORMAN GULCH.**—It is only within the last few weeks that any development work was performed on this property. Since then large bodies of dry ore, covering an area of about one hundred acres, have been exposed in prospect drifts, shafts and tunnels, indicating that a continuous body exists on the hills at the head of this gulch. The dry ore overlies the cement deposits of free milling ore, which were discovered years since nearer the base of the hill. Being within a few hundred yards of the terminus of the Black Hills & Fort Pierre Railroad renders shipment to Omaha very convenient. Already several car loads have been shipped, returning a yield between \$20 and \$30 a ton. More thorough development is necessary before the value of these prospects can be fully determined.

#### PENNINGTON COUNTY.

**HARNEY PEAK TIN MINING AND MANUFACTURING COMPANY.**—The following facts concerning this company are embodied in a telegram of November 29th from its General Manager, H. C. Wickers: "The new vein in Addie shaft is now 7 feet wide, and shows richer tin rock for about 5 feet of its width in bottom of the 185 foot shaft than the mine has yet produced. An average of the rich streak shows over 11% cassiterite."

#### UTAH.

##### UINTAH COUNTY.

**VICTORIA COPPER MINING COMPANY.**—In the action of this company vs. William Hawes, et al., in which Judge Anderson recently gave judgment for the plaintiff for the possession of the Copper, the Ace and Antietam mines in Uintah County, with about \$2,000 damages. R. C. Chambers was appointed receiver on the 24th ult.

#### VIRGINIA.

A fine vein of coking coal has recently been opened up in south eastern Virginia. It belongs to the flood top or Pocahontas field that has become universally known for its coke and steaming qualities.

#### WYOMING.

The miner's convention, to which reference was made in the ENGINEERING AND MINING JOURNAL November 15th, will be held at Cheyenne on the 20th inst.

#### CARBON COUNTY.

(From our Special Correspondent.)

**BRUSH CREEK.**—These claims are located 46 miles west of Laramie, on the western slope of the Snow range, at the headquarters of Brush, Pass and Medicine Creeks. The altitude is 10,000 feet. The formation is massive, consisting of syenite and schist, a white quartz containing coarse gold, some indications of copper carbonates, but as yet no lead. The trend of the formation is northeast and southwest. From 70 to 80 claims are located in the district. A road is kept open from Saratoga, and a second one is being built from Laramie. Prospecting and development are showing gratifying results. The widths of the veins were from 10 inches to 3 feet. Among the principal might be mentioned the Leviathan, Little Giant, Wyoming and Acine. From 30 to 40 miners will winter in the camp. Heavy snow falls retard development during the winter.

#### FOREIGN MINING NEWS.

##### AUSTRALIA.

##### VICTORIA.

Victoria, the foremost of the Australian colonies in the value of its manufactures, had until lately to import all its coal from New South Wales and Queensland. Prospecting and extended borings with a drill in which hardened steel takes the place of diamonds have within the past year or so, resulted in valuable discoveries of coal in Gippsland, at and near Morewell, about 80 miles from Melbourne. Nearly all these coals are brown coals of varying degrees of hardness, but one deposit of black and lustrous coal 15 feet thick has been discovered, which is said to contain 33.35%

of volatile matter, 43.55% of fixed carbon, and no sulphur; it does not clinker, burns down to a white ash, and used for melting pig iron it produces a casting of better quality than that obtained by the use of coke.

#### CANADA.

The latest experiment, with a view to utilizing Canadian peat beds, is being made in the county of Dundas, where the beds are reported to be so extensive as to be practically inexhaustible. Pressed peat, with a fine glossy texture, is reported to be selling at \$1 a ton. Its relative calorific power would depend largely on the depth of the peat bed. A bed 36 feet deep should produce fuel having nearly five-sixths the calorific power of soft coal. If such fuel could reach the consumer for \$3 a ton, in sufficient quantities, it would displace all other kinds of fuel. The trouble with many of the peat beds is that they are too shallow to have thoroughly solidified, and cannot be drained. The latter defect can be overcome by dredging machinery only to a certain depth.

#### PROVINCE OF ONTARIO.

Advices from Montreal state that it is officially announced by the Commission of Crown Lands for Ontario that the action of the government in suddenly withdrawing from the market the mining lands in the Algoma district was determined by the report of the commission of the United States Navy Department investigating the Algoma nickel deposits. The step has caused consternation among speculators and those who had applied for lands. The latter were required to pay upon two hours' notice. It is reported the government has received information that the lands are much richer than was anticipated.

#### PROVINCE OF QUEBEC.

(From an Occasional Correspondent.)

##### BLACK LAKE, Nov. 29.

The asbestos in this district is found in the serpentine as explained in our last letter (see ENGINEERING AND MINING JOURNAL, November 29th). Necessarily there is a large per cent. of rock mined with the asbestos, the average being 100 tons of the former to 2 tons of the latter. This waste is left on the surface, and as is very often the case, covers the ground so as to prevent exploration. The asbestos is always found in an outcrop. In fact, all the operating mines have started developments on one of these outcrops. Fall and winter weather retards mining operations. The ore must be dry before sorted. In damp weather this is effected by artificial means. By working the less exposed ground in the winter and suspending operations a short time after Christmas, most of the mines continue operations throughout the winter.

**UNITED ASBESTOS COMPANY.**—This company has its headquarters in London and operates a number of mines in Italy. Last November it purchased what was known as the Kreshette mine in this district. At the time of sale it was practically undeveloped. Mr. J. Penhall was appointed superintendent. A plant consisting of a Rand compressor and a Bacon double hoisting engine and derricks and two boilers of 145 combined horse power was erected. The mine's output will be doubled this year. The property is very narrow, being a mile long and 90 acres in extent. There is a "cross-course" running through it. This is composed of spar and other minerals of no value. The asbestos is found in paying quantities on each side of this formation.

#### FRANCE.

An exploration company has recently been formed with a capital of £48,000 for searching for coal in the basin of the Loire. The enterprise is backed up by the Naval Steel Works Company, which has contributed capital to the extent of £32,000.

#### GERMANY.

According to the business account of the mining company in Dortmund, including "Nachtigall," in 1889-90 an average selling price of coke of 75.53 marks per 100 centimeters was realized; for coal, 34.12 marks. The net output amounted to 2,940,120 centimeters, the cost price being 31.13 marks per 100 centimeters. The increased cost price is the consequence of raised wages and increased prices of the rolling-stock. The receipts amounted for coals to 610,828 marks; for coke to 891,577 marks; together to 1,502,404 marks. The 80 coke furnaces produced from 1,689,480 centimeters of coal, 1,180,500 centimeters of coke. The gain from rough material amounted to 705,203 marks. Of these were written off 92,976 marks, toward the funds for renovation went 100,000 marks, to the reserve funds 25,611 marks, shares in profits 38,929 marks, dividend 10% on preference shares, amount carried forward, 27,326 marks. The company has closed on its total production of coke until January 1st, 1891, at an average price of about 98 marks per 100 centimeters and on the production of coal almost entirely until April 1st, 1891, at an average price of about 60 marks. The first three months 1889-90 showed a surplus of 180,682 marks.

#### INDIA.

The Singareni coal mines are said to be in full working order, and their output amounts to a daily average of 400 tons. This has been deemed so satisfactory that the Home Board is stated to

have stopped further borings and sinkings for the present. The output in 1887 amounted to 3,259 tons, in 1888 to 13,382, and in 1889 to 59,646 tons, and this figure will probably be doubled this year.

A Bangalore paper calculates that from two miles of the length of the champion lode in Kolar 90 lakhs of rupees' worth of gold have been extracted within the last two years, and that from surface down to a depth of only 1,000 feet, the reef will return 1,000 lakhs of rupees worth of gold. Mysore is covered with auriferous reef—hundreds of square miles of country being proved by competent geologists to be gold bearing, showing signs of extensive working in ancient days.

#### MEXICO.

On a portion of the anthracite coal fields, situated 100 miles from Guaymas, which hitherto have awaited development and cheap transportation to the coast to find a market, a syndicate of Chicago capitalists has obtained a bond and hopes are entertained that during the coming year a purchase will be made and construction of a railway commenced. This coal is of good quality and is accessible over easy grades from Guaymas. The veins or seams vary from 4 to 10 feet in thickness.

#### STATE OF SOUVRA.

(From our Special Correspondent.)

##### DISTRICT OF MAGDALENA.

Jas. Farrell, late superintendent and manager of the Imuris copper mines, was shot and instantly killed on Sunday morning, October 26th, in Nogales, Ariz., by Geo. W. Rood. The latter claimed an interest in the mines which Farrell sold to an English company, of which Mr. Whitall is president. Mr. Seymour, who came from England with Mr. Whitall, succeeds Mr. Farrell in the management.

##### DISTRICT OF HERMOSILLO.

**SOCORRO.**—This mine, which was flooded and partially filled with sand and boulders last August, during the heavy rains, burying 22 miners, who were underground at the time, has been sold to Chicago capitalists. The work of unwatering and cleaning out the mine has begun under the supervision of Mr. John Gowan.

#### SERVIA.

The mineral resources of this country are, according to current opinions, of great value, but only virtually so, as their development has hitherto been neglected. The government is now, however, encouraging mining operations in different ways, and the results are very promising. The coal mines at Zaitschar have been bought by a Belgian company with a capital of five million francs, and, in consequence, the shipment of coal by way of Rodoujevatsch on the Danube has increased so rapidly that a briquette factory has already been started in that locality.

Another and perhaps the richest coal mine in Servia, Seignic, at Tschupua, is worked by the State, which has assigned to the military engineer corps the planning and execution of a railroad from the mine to a point favorable for the commercial distribution of the output.

The government proposes also to take over the antimony mine at Castainik, as the lessee, Mr. Binder, has forfeited his rights by failure to comply with the state laws in regard to mining. It is presumably this property for the purchase of which Messrs. Allatini of Salonica are reported to be negotiating.

#### SWEDEN.

Discoveries of apatite have for some time attracted considerable attention, as reported in our issue of September 27th, 1890, and two syndicates have applied for permission to carry on experimental working for apatite in the parishes of Gellvaara and Juckasjärvi.

#### DIVIDENDS.

Silver Mining Company of Lake Valley, dividend of 5%, \$15,000, payable December 11, at the office of the company, No. 119 South Fourth street, Philadelphia, Pa. Transfer books close December 4th and reopen December 11th.

#### ASSESSMENTS.

COMPANY.	No.	When levied.	D't'nt' in office.	Day of Sale.	Amn't per share.
Alliance, Utah.....	9	Oct. 15	Nov. 15	Dec. 8	.10
Atlantic Con., Nev. .	5	Nov. 11	Dec. 29	Jan. 19	.25
Big Camas, Idaho..	17	Oct. 15	Nov. 17	Dec. 17	.05
Confidence, Nev. .	17	Nov. 17	Dec. 22	Jan. 12	.75
Con. Imperial, Nev..	29	Oct. 13	Nov. 15	Dec. 8	.05
Con. New York, Nev..	4	Nov. 12	Dec. 17	Jan. 6	.15
Martin White.....	24	Oct. 17	Nov. 24	Dec. 16	.25
Mexican, Nev.....	41	Oct. 18	Nov. 20	Dec. 10	.25
Morgan, Cal.....	14	Oct. 30	Dec. 6	Dec. 29	.10
Prior Hill, S. Dak..	1	Oct. 27	Nov. 29	Dec. 15	.004
Russell, Cal.....	7	Oct. 13	Nov. 17	Dec. 8	.05
Seabury-Calkins, S. Dak.....	13	Oct. 27	Nov. 29	Dec. 20	.01
Washoe, Nev.....	1	Oct. 28	Nov. 28	Dec. 27	.05

MEETINGS.

Aspen United Mining and Milling Company, at Room 11, Arapahoe Building, Denver, Colo., December 9th, at 3 p. m.

Gould & Curry Silver Mining Company, at Room 69, Nevada Block, No. 309 Montgomery street, San Francisco, Cal., December 15th, at 1 p. m.

MINING STOCKS.

For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City, Minneapolis, St. Louis, Pittsburg, Birmingham, Ala.; London and Paris, see pages 667 and 668.

NEW YORK, Friday Evening, Dec. 5.

Despite the fact that dealers in mining shares say they do not note much improvement this week, it is our opinion that the wider distribution of activity, the greater number of shares sold and stocks traded in, and the optimistic ideas of *ex-dévant* pessimists—speak of an improvement. True, the present week is not one that leaves nothing to be desired. If it did, it would have been perfection, and perfection is hard to achieve, especially in the mining stock market. We think that we see better features about the current market. Let our dealers be comforted by the knowledge that if dealing in mining shares is not very much better than last week, it surely is no worse. This is a great point in this time of financial uncertainty.

Trading in Alice has been resumed at lower prices than have ruled for some time; 700 shares at \$1.95@2 were sold. Boston & Montana has one sale at \$4.50.

Black Hills stocks: Caledonia was in demand at 80@85c. Deadwood Terra has one sale of 500 shares at \$1.25.

Minnesota Iron Company shows one sale at \$2.

Of the copper stocks Calumet & Hecla had one sale at \$273.25; Franklin was quiet at \$18.25; Osceola has one sale of 50 shares at \$34.88; Huron was in fair request at \$3.50@4.13.

Of the California stocks Bodie Consolidated was quoted at \$1.10. Mono shows a solitary sale at 73c. Transactions in Standard aggregated 610 shares at 90c.@\$1.

Plymouth has advanced, and 300 shares were sold during the week at \$2@2.25.

We note one sale of Quicksilver common at \$6.

Astoria was stationary at 6c.

During the week 14,000 shares of Brunswick Consolidated changed hands. The stock declined from 19c. to 12c., at which price it was sold at the close. The management of this company will say nothing about the reported strike.

Horn Silver was dealt in at \$3@3.30. Ontario shows sales of 115 shares at \$42.75@43.

El Cristo was quiet, and declined from 70c. to 65c.

Mutual Smelting and Mining Company shows sales of 2,000 shares at \$1.45@1.50.

Of Phoenix of Arizona, 4,000 shares changed hands. The stock opened at 75c. and kept its price fairly well up to to-day, when at the close it sold for 55c.

Shoshone, which has not been dealt in for some weeks, shows up again with sales of 1,300 shares at 3c.@4c.

Of the Colorado stocks, American Flag, which has not been traded in for some time, shows a solitary sale of 100 shares at 4c. Colorado Central Consolidated, another stranger, shows transactions of 500 shares at \$1.20@1.25; Leadville Consolidated was quiet at 13c. Little Chief declined from 35 to 33c.; 1,100 shares of this stock changed hands. Small Hopes was neglected, and the stock declined 95c. to 85c.

Of the Comstocks, we note sales of Consolidated California and Virginia at \$3.45; Crown Point at \$2; Gould & Curry, \$1.65@1.85. Hale & Norcross, at \$2@2.10; Ophir, \$3.75@3.90, and Savage at \$2.10@2.20. Sierra Nevada opened at \$2.25, advanced to \$2.40, but at the close sold at \$1.90. Yellow Jacket was quiet at \$2@2.40. Alta was in fair request at \$1@1.15. Best & Belcher was quiet at \$2.40@2.50. Chollar started at \$3.15, and underwent a decline of \$1, but rallied at the close and sold at \$2.60. Comstock Tunnel stock has one sale of 100 shares at 15c., and the scrip another at 25. Julia was in fair demand at 37c.@39c. Mexican was stationary at \$2.65. Occidental was quiet at from \$1 to 90c. Potosi has one sale at \$5; Scorpion another at 40c. Utah appeared in fair demand, 1,100 shares changing hands at 75c.@85c. Sutro Tunnel shows a solitary sale of 300 shares at 9c.

We note a moderate trading in the Tuscaroras. Del Monte, which had not been dealt in at this exchange for some time past shows sales of 200 shares at 75c. Nevada Queen, another stranger, also has a sale of 100 shares at \$9.

Boston.

Dec. 4.

(From our Special Correspondent.)

This has been a dull week in copper stocks, and the tendency generally, with few exceptions, is for lower prices. The money market is the cause of declines, as it is almost impossible to borrow on any kind of securities and copper stocks as a general rule are not favorite collaterals with

money lenders. Another factor is the apparent weakness in lake ingot copper. The stock market has been very irregular the past week, being quite strong at times, but showing weakness whenever any attempt is made to unload. We do not look for any revival of activity or higher prices before the new year.

Allouez was quite strong early in the week at 5, but declined to \$4 1/4, recovering to \$4 1/2 on later sales.

A small sale of Atlantic is reported at \$17. Boston & Montana opened strong at \$45 1/4 but declined to \$43, gaining a point in later transactions.

Butte & Boston dropped to \$14 1/4, but sold a fraction higher to-day at \$15.

Calumet & Hecla declined from \$279 to \$265, recovering later to \$268. There has been more stock offering of late and the price under the circumstances has been fairly well maintained.

Centennial dull but quite steady at \$14@15 1/4.

Franklin has been exceptionally strong under the favorable report from the mine, the output for November surpassing all previous monthly products (633 1/2 tons). Agent Vivian writes that the outlook for December is very favorable. The stock sold up to \$18, and very little offering. Kearsarge has been heavy, declining to \$11, with a rally to \$12. We hear no unfavorable reports regarding the mine.

National advanced from \$1 1/4 to \$2 1/4 with later sales at \$2 1/2. The reports from the mine are to the effect that the water has been pumped out and that the lower levels are showing well in copper.

Osceola opened strong at \$35 1/4, declined to \$31 1/2 and recovered to \$33 1/2. The stock has been in good demand and has held fairly well.

Quincy sold at \$95 and declined to \$90 on later sales.

Tamarack touched \$160, declined to \$153 and closed at \$155.

Santa Fé sold at 40c. and 50c. as extremes, closing at 45c.

Huron sold at \$4 and \$3 1/2—only 100 shares. Bonanza sold at 52 1/2c.

Silver stocks are a little more inquired for. Catalpa sold at 30@32 1/2c., Crescent at 14c., Dunkin at 65c. and Napa Quicksilver at \$3 1/4.

3 p. m.—The market at the close was fairly steady and prices unchanged.

By Telegraph.—Calumet & Hecla, \$265; Boston & Montana, \$43; Osceola, \$33; Franklin, \$17 1/4; Atlantic, \$16; Allouez, \$4 1/4; Huron, \$3 1/4.

San Francisco.

Nov. 29.

(From our Special Correspondent.)

During the current week the mining share market has shown firmer symptoms, and it is generally believed now to be in a fair way to recover from the depression that has paralyzed business in the boards and cleared weak margin holders out by wholesale. The collapse in Andes and Occidental Consolidated first unsettled the market, and then the financial crisis in England and in New York, with the break in the prices in silver, served to send prices down to a very low point. While margin holders have, to a large extent, been cleaned out, they have not been the only sufferers, as several brokers were caught with heavy blocks of stock on their hands, with which, at their depreciated value, they could do nothing. One firm only, however, has failed—that of C. E. Anderson—and as the amount of indebtedness is believed to be not large, no serious results will accrue. Money having gone back to almost nominal rates, and silver having sharply recovered with a probability of it advancing again, the prospects of a revival in stock trading are very fair. The chances of a free coinage bill being passed by Congress next session is thought here to be good, and as the Dow pumps in the Crown Point incline are successfully working, this combination of circumstances tends to encourage local speculators. During the week the Gold Hill shares have been selling firmly at a marked advance, and sharp speculation in these stocks is anticipated later. When the 1600 and 1900 levels of Crown Point and Belcher have been drained the extraction of ore from large bodies known to exist will commence at once.

The Tuscarora shares were the least affected during the late depression, and although they declined several points in sympathy with the market, the recent dividend paid by Commonwealth and the large shipments of bullion from the Union mill to joint account of Commonwealth and North Belle Isle, indicated that these mines were promising well. It is reported that in the near future North Belle Isle, Nevada Queen and Navajo will figure as dividend payers. The drawback in the stock market just now is that few men of any weight are operating, and in consequence the market is so sensitive that it responds either way to the irregular operations of the "chippers" and curb stone brokers.

The following annual meetings of mining companies will take place during the month of December: Comstocks—Mexican, Nevada Block, room 79; Baltimore, 402 Montgomery street, room 17, Tuesday, 2d. Gould & Curry, Nevada Block, room 69, Monday, 22d, and Ophir, Nevada Block, room 4, Wednesday, 24th. Arizona and miscellaneous: Dudley, Nevada Block, room 56, Monday, 15th; Mount Diablo, 318 Pine street, room 16; Locomo-

tive, Nevada Block, room 23, Monday, 22d. Peer, and also the Peerless, Nevada Block, room 26, Thursday, 25th.

Denver.

Dec. 1.

(From our Special Correspondent.)

Trading has been rather light during past week, but prices firmer. The removal of the Exchange to more central quarters, now being agitated by many of the members, will no doubt create more interest and a larger attendance by the outside and speculative public. Many camps are complaining of a scarcity of cars, not only for ore out, but for supplies in. Aspen made a decided fight with both railroad companies for more cars, and they will soon move all surplus ore. The gross tonnage will far exceed any previous December's output.

Prices and sales for the week ending Nov. 29th.

Table with columns: Company, Opening, H., L., Closing, Sales. Lists various mining companies like Alleghany, Amity, Bangkok, etc., with their respective prices and sales figures.

Total for the week..... 85,700

\*Buyer 30 days. †Buyer 60 days. ‡Seller 60 days. Seller 30 days. a Asked. b Bid.

Kansas City.

Dec. 1.

Table with columns: Company, Opening, H., L., Closing, Sales. Lists mining companies like Argonaut, Bates-Hunter, Big Six, etc., with their respective prices and sales figures.

Total..... 27,680

Pit sales.....

†Bid. ‡Asked. \* Buyer 30. § Seller 30. \* Seller 60. †Buyer 60.

Lake Superior Iron and Gold Stocks.

Table with columns: Name of company, Par value, Bid, Asked. Lists iron mining stocks like Ashland Iron Co., Aurora Iron Co., etc., with their respective values and market prices.

Table with columns: Name of Company, Par value, Lowest, High. Lists gold mining stocks like Gold Lake M. Co., Grayling Gold & Silver Co., etc., with their respective values and market prices.

PIPE LINE CERTIFICATES.

(Specially reported by Messrs. WATSON & GIBSON.)

The oil market has been dull with a downward tendency.

Buckeye oil has been about as unfortunate a speculation as North American stock, though luckily but few people traded in the petroleum.

It was put on the market last August at about 40 cents, and within three months it fell to 15 cents per barrel, at which figure it now hangs.

The visible supply of Ohio oil is a little over twenty million barrels, and of Pennsylvania oil about nine millions.

Some time ago, when oil was in the eighties, we predicted 70 cents for it; it is now about 67 for January delivery, and we believe it will easily go to 60 cents, though the market in it is so narrow and dull there is not much use to trade in it.

Table with columns: Opening, Highest, Lowest, Closing, Sales. Rows for Nov. 29 and Dec. 1-5.

Total sales in barrels..... 43,000

Table with columns: Opening, Highest, Lowest, Closing, Sales. Rows for Nov. 29 and Dec. 1-5.

Total sales in barrels..... 317,000

COAL TRADE REVIEW.

NEW YORK, Friday Evening, December 5. Statistics.

STATEMENT of shipments of anthracite coal (approximated) for the week ending November 29th, 1890, compared with same period last year:

Table with columns: Regions, Nov. 29, 1890, Nov. 30, 1889, Difference. Rows for Wyoming Region, Lehigh Region, Schuylkill Region, and Totals.

PRODUCTION OF BITUMINOUS COAL for week ending November 29th and year from January 1st:

Table with columns: Eastern and Northern Shipments, Week, Year, 1889, 1890. Rows for various regions like Phila. & Erie R.R., Cumberland, Md., etc.

Estimated \* Week ending Nov. 22d.

Table with columns: Western Shipments, Week, Year, 1889, 1890. Rows for Pittsburgh, Pa., Westmoreland, Pa., Monongahela, Pa.

Grand Total..... 371,397 15,973,398 11,721,895

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending November 29th, and year from January 1st, in tons of 2,000 lbs.: Week, 106,230 tons; year, 4,882,637 tons; to corresponding date in 1889, 4,095,830.

Anthracite. The sales agents were happy last Friday after their meeting because they had agreed upon a reduction of tonnage for the month of December.

general sentiment that 2,000,000 tons would have sufficiently fed the already overstocked coal yards. That is still the prevailing opinion.

During the week business picked up a trifle, and the three days of cold caught many consumers so short that a little rush to the coal yards resulted.

Hard coal is moving along as fairly as can be expected, though not as quickly as desired.

A rumor has been going round the market to the effect that some of the companies are seriously considering the advisability of abandoning the present method of managing the market by union among the sales agents, and of returning to the former method of disposing of their coal by auction.

December prices are: Stove, \$4.40; egg, \$4.10; broken, \$3.75; chestnut, \$3.95.

Bituminous.

The supply during the week has not caught up with the demand, though vessels have been a little easier, and freight, paradoxically, a little stiffer.

Although prices are in every way satisfactory to all concerned at this point, there is to be an attempt at Philadelphia to increase them by a revival of the half moribund "Seahoard Coal Association."

Most of the coal soft coal operators laugh at the idea, as one expressed it, "of putting life into the old bones of the association."

Prevailing freights are: From Philadelphia to Boston, \$1; Baltimore to Boston, \$1.15; Philadelphia to Sound ports, 90c., and 10c. higher from Baltimore.

Buffalo.

(From our Special Correspondent.)

The annexed statistics of the coal trade of Buffalo are essentially on the lake and canal commerce; about 12,000 tons are to be added, since December 1st, to lake shipments, which will make the movement nearly the same as that of 1889, but about 300,000 tons less than the figures of 1888.

There is no change to note in quotations for hard and soft coal, and it is said none will be made during December.

The weather here is now cold and wintry; occasional snow storms. About 20 vessels are yet on the lakes, destined for this port, and a few are on their way with coal hence to Toledo, Chicago and Milwaukee.

Complaints of short supply of cars are not so

plentiful, and it is hoped that the worst of this trouble is past.

Buffalo will, if all plans are carried out, soon add to its railroad facilities two of the largest systems in this country and Canada.

The report that Col. J. A. Price, of Scranton, Pa., had or was about to retire from the Coal Waste Commission, he emphatically denies, and states that he has begun the compilation of statistics, etc.

The shipments of coal by lake from this port from November 26th to December 3d, both days inclusive, were 43,928 net tons, distributed as follows: 34,840 to Chicago, 4,200 to Milwaukee, 1,900 to Superior, 2,950 to Toledo, and 38 to Port Colborne; total this season to date, 2,158,460.

Canal movement for fourth week in November of coal at this port: Receipts, 2,365 net tons; shipments, 1,855 net tons.

Statistical.—Railroad receipts and shipments of iron at this port are, according to request, not reported. No receipts of coal by lake this season.

Shipments of coal by lake this year as compared with 1889 show a decrease of about 10,000 net tons, and a decrease against 1888 of 301,710 net tons.

Shipments of coal by lake from Buffalo thus far this season to December 1st were distributed about as follows:

Table with columns: Buffalo to—, Net tons, Buffalo to—, Net tons. Rows for Chicago, Milwaukee, Toledo, Racine, Green Bay, Superior, Saginaw, Kenosha, Manitowoc, Menominee, Serpent River, Dover, Ludington, Perry Sound, Kincardine, Detroit, Ashland, Washburn, Duluth, Gladstone, Hancock, Escanaba, Houghton, Alpena, Au Sable, Muskoka, Winoand, Huron, St. Clair.

Boston. Dec. 4.

(From our Special Correspondent.)

The anthracite coal market appears to be featureless. A change is anticipated; and now that real cold weather has arrived the situation bids fair to assume a new phase.

Bituminous coal is coming forward very slowly from the mines. Spot offerings are insignificant. The inquiry continues to be sharp.

Vessels are offering freely, but this fact does not depress freights. The rates are held firm, probably owing to the severe weather which has been prevailing.

Most of the dealers have fair-sized stocks on hand. However, the prospect of a good trade will cause them to buy early.

A large towboat, built for G. M. Winslow & Co., was launched during the present week. She will be used for long-distance towing.

**Pittsburg.** Dec. 4.

(From our Special Correspondent.)

**Coal.**—We can report a firm market and active demand. There have been no river shipments since last report on account of low water in the Ohio River. The return of the mills and foundries to burning coal will increase the demand and put up prices. Shipments by the river from January to date exceeds same time last year 21,588,000 bushels. Present rates:

Per 100 bushels.		Per 100 bushels.	
1st pool.....	\$4.75@4.80	3d pool.....	\$4.00
2d pool.....	4.50@4.55	4th pool.....	3.50
Railroad coal, \$5.00@5.50.			

**Connellsville Coke.**—The market has undergone no change; demand active; prices are firm. The lake trade having been closed, a larger supply of cars may be looked for; one leading coke man remarked: "We could load 150 to 200 cars more daily." The demand exceeds the supply on all lines. Coke continues to accumulate in yards; most of the companies are running six days per week. Active men in the region, about 14,700; week's shipment, 6,750 cars; increase, 1,140 cars; Western shipments increased 650 cars, distributed as follows: Points west of Pittsburg, 1,560; shipments in tons, 121,680, exceeding previous week, 20,080 tons.

The rates were for 2,000 pounds f. o. b. cars at ovens: Blast furnace coke, \$2.15; foundry coke, \$2.45; crushed coke, \$2.65.

**Freights** to Pittsburg, 70c. per ton; Mahoning and Shenango Valleys, \$1.35; St. Louis, \$3.35; Cleveland, \$1.70; Chicago, \$2.75.

**FREIGHTS.**

**From Philadelphia to:** Alexandria, †.85; Boston, 1.00@1.10; Fall River, .90; Galveston, 2.25; New Bedford, .85; Newburyport, .95; New York, †.90; Norfolk, .60; Portland, \*1.00; Portsmouth, .95; Salem, .90@1.20; Savannah, .95; Washington, †.85; Wilmington, .80.

† Along-ide.  
\* And discharging.

**METAL MARKET.**

NEW YORK, Friday Evening, Dec. 5.  
Prices of silver per ounce troy.

No.	Sterling Exch'ge	London Pence.	N. Y. Cts.	Dec.	Sterling Exch'ge	London Pence.	N. Y. Cts.
29	4.86	48½	1.06½	3	4.87	48½	1.05½
1	4.86	48½	1.06½	4	4.87	47¾	1.04½
2	4.87	48½	1.06	5	4.87	47¾	1.04½

The decline in exchange on London, a lack of orders for India, and an active money market have combined to temporarily depress silver.

A cable under date Lisbon, December 4th, says the Bank of Portugal has decided to issue notes of 5,000 reis (about \$5.40), payable in silver.

The United States Assay Office at New York reports total receipts of silver for the week to be 170,000 ounces.

Concerning the recent attempt of Colorado mine owners to combine for the purpose of limiting the silver output, a Denver exchange, under the caption of "A Foolish Project Dwindling Away," publishes the following: "The meeting of mine owners and mining men generally, with reference to the proposition to restrict the output of silver, will not be held for some time at least. President Taylor, of the Mining Exchange, the prime mover of the project, is East, and is not expected to return for some time. It is more than probable that the work of influencing Congress to pass a free-coinage bill, and thereby raise the price, will be carried on in the East by the Colorado people for some time to come, as there are several men deeply interested in the State's industry in or near Washington at present."

**Silver Bullion Certificates.**

NEW YORK STOCK EXCHANGE.  
Price.

	H.	L.	Sales.
Nov. 29.....	107½	106	75,000
Dec. 1.....	107½	106½	212,000
Dec. 2.....	106½	105½	100,000
Dec. 3.....	107½	105½	125,000
Dec. 4.....	105	104½	175,000
Dec. 5.....	105	104	157,000
Total sales.....			844,000

**Foreign Bank Statement.**

The governors of the Bank of England at their weekly meeting on Thursday reduced its rate for discount from 6 to 5 per cent. During the week the bank gained £213,000 bullion, and the proportion of its reserve to its liabilities was raised from 42:32 to 45:27 per cent., against a decline from 43:38 to 38:06 per cent. in the same week last year, when its rate for discount was 5 per cent. On the 4th

inst. the bank gained £752,000 bullion on the foreign balances. The weekly statement of the Bank of France shows a gain of 6,150,000 francs gold and a loss of 1,325,000 francs silver, against, for the same week of last year, a loss of 13,275,000 francs gold and 1,125,000 francs silver.

**Coinage at the Mints of the United States.**

The following statement shows the coinage executed at the mints of the United States during November:

Denominations.	Pieces.	Value.
Double eagles.....	75,000	\$1,500,000.00
Eagles.....	12,500	125,000.00
Half eagles.....	16,600	80,000.00
Standard dollars.....	3,443,373	3,443,373.00
Dimes.....	1,629,036	162,903.60
Five cents.....	1,898,000	94,900.00
One cent.....	9,950,000	99,500.00
Total coinage.....	17,023,909	5,505,676.60

**Domestic and Foreign Coin.**

The following are the latest market quotations for American and other coin:

	Bid.	Asked
Trade dollars.....	\$.80	\$.83
Mexican dollars.....	.81	.82½
Peruvian soles and Chilean pesos.....	.73	.75
English silver.....	4.80	4.84
Five francs.....	.94	.95
Victoria sovereigns.....	4.84	4.93
Twenty francs.....	3.86	3.90
Twenty marks.....	4.74	4.78
Spanish doubloons.....	15.55	15.70
Spanish 25 pesetas.....	4.80	4.85
Mexican doubloons.....	15.55	15.70
Mexican 20 pesos.....	19.50	19.60
Ten guilders.....	3.96	4.00
Bar silver.....	1.04½	1.05½

**Copper.**—The market has been rather flat during the week, and on the exchange 25,000 pounds of lake copper sold at 16c. for December delivery. Further quantities are offered at about 16:15@16:25, but buyers do not come up at these prices, although at 16c. sales could be made. The larger lake companies are still holding for 17c., and it is understood that Arizona copper also sold somewhat below the prices given last week, but the figures are not recorded. For casting copper quotations are fully upheld, and we have to quote 14½@14¾.

The London market was rather irregular and prices declined to £55 5s., but afterward a much better feeling set in, and after touching £56 7s. 6d. the market closes firm at £56@£56 2s. 6d. for spot and £56 15s.@£56 17s. 6d. for three months. We quote: English tough, £60 10s.@£61; best selected, £61@£61 10s.; strong sheets, £68; India sheets, £63@£64. Yellow metal sheets are quiet at 6d.@6½d. The Boston News Bureau says: Col. Livermore, the Treasurer of the Calumet & Hecla Mining Company denies that he has made any such statements as attributed to him by the American correspondent of the London *Statist*, which were to the effect that the Calumet had in store and unsold some 14,000,000 pounds of copper and that the price was likely to be 15½c. early in 1891. He says: "The Calumet & Hecla has no more than its average stock of copper on hand unsold. It is simply a question of demand and supply; but as yet the Calumet has not sold one pound under 17c., and so far as I can see, it will not." The visible supply in Europe again shows a decrease of about 1,200 tons for the second half of November, making the total decrease during that month nearly 3,000 tons.

Tin is very firm and the light stocks, on which we have already commented repeatedly have caused spot and December tin to advance materially, and from ½c. to ¾c. premium is obtainable over futures. For futures there is also more demand at higher prices, and we quote: Spot, 21¼; December, 21¼; January, 21¼; February, 21¼; March, 21:05.

In London the market was quiet, but was very steady until the latter part of the week, when strong buying set in which immediately drove prices up about £1 10s. and the closing prices are: Spot, £33 2s. 6d., three months £33 15s. The statistics in Europe show an increase for the second half of the month of 600 tons.

Lead has been declining throughout the week, and has come down now to 4½ on the spot, at which price rather large transactions took place. Western smelters have entered the market quite freely and offered lead down. The arrivals of foreign lead have been very heavy, and amount to almost 2,000 tons for the last ten days. The market closes rather irregular.

The lead and silver smelters concluded their deliberations in Chicago on Wednesday, the 3d inst., after adopting a plan for organizing an association which should include all the lead and silver smelting plants in the United States. The question will be discussed by the respective companies, and some time in January another meeting will be held in Chicago and the organization perfected. An appraisal of the property of the several companies will be made, and the whole interest will be recapitalized. The figure is said to be \$50,000,000. W. P. Thompson, the chairman of the conference, is said to be the leading spirit. He was the organizer of the Standard Oil Trust.

With a clearly devised plan of organization in their minds the representatives at the conference will go home to their companies, and show the

stockholders how the value of their holdings can be increased. It is confidently expected that the gigantic lead and silver smelting combine will be organized early next year.

The following companies were represented at the meeting: Omaha and Grant Smelting and Reducing Company, Kansas City Consolidated Smelting Company, Globe Smelting Company of Denver, Colo., Pueblo Smelting Company, Philadelphia Smelting Works, Chicago and Aurora Smelting Works, National Smelting Works, of Chicago; Pennsylvania Lead Company, of Pittsburg; American Smelting Company, of Leadville; San Juan Smelting Works, of Durango, Colo.; St. Louis smelter and associated interests; the Helena & Montana Smelter Company, of Helena, and Great Falls and the Germania smelter, of Utah.

**St. Louis Lead Market.**—Messrs. John Wahl & Co. telegraph us as follows: "There has been almost no demand for lead during the week, owing to which fact there has been a gradual decline in prices. Sales have been made at 4:35c. Some sellers display a great anxiety to sell at any price, and to find buyers seems to be the great question of the hour."

**Spelter.**—The scarcity of this metal continues, and sales have been made here in carload lots at from 6:12½-15, and there are further buyers at this price; but for shipment from the West, the market is possibly easier, and not above 5:90 is obtainable. Smelters remain firm, and having no surplus on hand they all stick out for their prices.

**Antimony** is dull and neglected. We have to quote: Cookson's, 2½; L. X., 18¾; Hallett's, 17¾.

**IRON MARKET REVIEW.**

NEW YORK, Friday Evening, Dec. 5.

While the iron market is not in any sense panicky there is no room for doubt that it reflects the panicky financial situation. It is quoted all round as dull, but decidedly firm. This is true in part. It is dull all round and firm in spots. The spots are structural iron and pipes and tubes. It would, perhaps, be harsh to say the market is weak, because, practically, there is no market just now, and prices are firm because they are all asked prices. Bids are as scarce as butterflies. At the same time there is no apparent desire to force iron and steel on the market to keep things going for the sake of appearances. It is a state of reflection, stagnation and anticipation. It is also a condition which confronts the market, and that is one of mistrust. No one is anxious to do business unless for spot cash or gilt-edged paper, and both of these commodities are as scarce as usual immediately after a Wall street flurry.

Naturally, at this time of year, some dullness is to be expected. But hope shines brightly ahead. Stocks of iron have been low for some months, and as many furnaces have recently gone out of blast, and others are reported as about to shut down within hours or days, it is on the cards that with the new year's revival the seller will have the buyer just where the buyer has got the seller now—down, and ready to come to reasonable terms.

**American Pig Iron.**—Only off-grade pig iron is reported as plentiful. No. 1 foundry and No. 1 Southern are quoted as unobtainable except at stiff figures, which buyers will not give unless their needs are urgent. There is no mistaking the fact that the situation is partly due to the general lack of confidence, as some concerns are holding moderate quantities of pig iron which they would be glad to part with at current rates under normal conditions. It is the general opinion in the market that pig iron will be lower before it rises, based upon the expectation of a duller December than usual. But the same parties are sanguine that when business revives the market will take all the iron the country produces. Prices are quoted as: Northern iron, No. 1 X, \$17.50@18; No. 2 X, \$16.50@17. Southern, No. 1 X, \$16.50@17.50, and No. 2 X, \$15.50@16.50.

**Scotch Pig Iron.**—There is very little apparent disposition here to import pig iron from Glasgow, and there does not appear to be over-much eagerness to export it from there. The use of this metal in this country is growing rapidly less and less, as it is found that the best American iron answers the same purpose unless in very exceptional cases. The transactions for the week are sales of something less than 300 tons to arrive at \$24. Some Summerlee is held for \$24.25, the odd quarter dividing buyer and seller. The supply as well as the demand here has fallen off. The stock in Connal & Co.'s Glasgow yards at this time in 1889 was 967,718 tons. This year it is 612,684 tons, with six furnaces now in blast against 88 at the corresponding period of last year. Up to nearly the end of November this year 13,000 tons only had been imported, as against the following amounts for corresponding periods in former years: 1889, 29,000 tons; 1888, 56,000 tons; 1887, 135,670 tons. This falling off in four years is more expressive than any argument. Prices are nominal: Eglinton, \$20.50@21; Dalmellington, \$22.50; Summerlee, \$24.

**Spiegeleisen and Ferromanganese.**—This market is virtually at a standstill for the present

no transactions which would justify actual quotations being heard of. Little, if any, is being imported, as stocks in hand, bought at last year's lowest prices in anticipation of a rise, are still large enough to meet the demands for consumption. We quote: 20 per cent. spiegeleisen, \$30@ \$31 and 80 per cent. ferromanganese \$67@ \$68. These prices, however, are entirely nominal and do not represent sales.

**Steel Rails.**—The past week has brought with it what is hoped is the final culmination of a long period of comparative stagnation and uneasiness. An alarm was sent out by daily newspapers that the Bethlehem Iron Company had shut down their works, and it was broadly stated that this was due to the tightness in the money market and the general refusal to do business on a paper basis. The fact of the matter is, as stated by representatives of the company, that out of 4,000 hands employed 1,300 were laid off, and they happened to be those working on steel rails. It has been customary to shut down in this department for a week or so at this time of year, and it is stated that the company is afraid they will have to open up again in a week or so. To a reporter of the JOURNAL the word "afraid" was actually used. Makers of steel rails do not seem to care much to continue operations at present in the unsettled condition of the money market. No large railroads are building at present, and the only buyers in the market are those who must have small lots with which to complete local lines. Manufacturers absolutely decline to sell ahead at present, but not much material has been bought for next year. They will not buy ore until they can form some idea as to how business is going to pay. "We don't want to do business just now," said one. "There is no demand, no supply, no market, no quotations, and poor prospects. Things have arrived at that stage when they are so bad that they cannot be worse, and any change must be for the better," said another, who felt in a pessimistic mood. The nearest approach to a nominal quotation would be \$28 per ton.

**Rail Fastenings.**—Nothing doing. Quotations are given same as last week in absence of sales: Spikes, 2.15c.; angle plates are 1.80@1.90c.; bolts and square nuts, 2.75c.; hexagonal nuts, 2.95@ 3c.; complete joint, iron and steel according to weight.

**Tubes and Pipes.**—The mills are busy on existing contracts and the companies are not looking for any new business just now. The Association did not meet last week, and the scale of ruling discounts on car lots remains: 4 1/2% per cent. on butt, black; 40 on galvanized; 60 on lap, black, and 47 1/2% on lap, galvanized; boiler tubes, 45 on 1 1/2-inch, and smaller; 50 for 2 inches and larger. Casting, all sizes, 50 per cent.

**Structural Iron and Steel.**—This is the most active branch of the market. Although no large new contracts are being figured on, and none of any account are expected till the new year, manufacturers state that they have all they can do to keep up with current demand. No change in prices has been made, nor is any expected this year. Universal plates, \$2.30; bridge plates, \$2.40; angles, \$2.20@ \$2.30; tees, \$2.65; beams, \$3.10.

**Merchant Steel.**—The prevailing dullness has not had as much effect on merchant steel as in other quarters. Business is fair in small lots and prices are in some cases slightly, though not quotably, stiffer than those given last week. The outlook is good for the remainder of the year, and the mills are kept working at nearly full capacity. The larger dealers expect a rise in prices as soon as the iron trade recovers. Prices are: Best English tool, 15c. net; American tool steel, 7 1/2@ 10c.; special grades, 13@ 20c.; crucible machinery steel, 5c.; crucible spring, 3 1/2c.; open-hearth machinery, 2.60c.; open-hearth spring, 2.60c.; tire steel, 2.60c.; toe calks, 2.60c.; flat file, 4 1/2c.; mill file, 5 1/2c.; taper file, 7 1/2c.; first quality sheet, 10c.; second quality sheet, 8c.

**Old Rails** continue scarce here, but as there is little demand, except for speculative purposes, the nominal price continues \$25 for tees and \$26 for doubles.

**Scrap Iron.**—A steady business is being done in small jobbing lots of good yard scrap at \$21.75@ \$22. Inferior qualities are not in demand.

**Cleveland.** Dec. 4.

(From our Special Correspondent.)

The shipping season for Lake Superior iron ores is now practically at an end. The Salt Canal was closed yesterday, and Green Bay, where Escanaba is situated, is beginning to freeze over. We will soon have reliable data as to the exact amount of ore that has been shipped this year, and in all probability the total amount will be somewhere in the neighborhood of eight million tons. There is not a great deal of iron ore on hand unsold, but there is an equally light demand.

Unlike last year, transactions covering business for the 1891 season of navigation will probably be delayed until toward next spring. The very large increase of tonnage makes it very probable that Lake freights will be 16 to 25 cents a ton lower next year than they were last year. This would mean about \$1 to \$1.10 from the head of Lake Superior, and about 85c. from Escanaba.

There are not enough transactions at present to

make a good basis for sending you in a reliable list of prices, consequently I repeat last quotations:

Specular and Magnetic Ores. Bessemer, 66@69 per cent. \$6.00... Non " 66@69 " 5.00@5.50 " " 62@65 " 4.50@ 5.00 " " 57@60 " 3.75@ 4.25 Soft Hematites Dried at 212°. Bessemer, 63@65 per cent. \$4.75@ \$5.25 Non " 55@63 " 3.50@ 4.25

Above prices are for deliveries on docks at Lake Erie ports.

**Louisville.** Dec. 2.

(Special Report by Messrs. Hall Bros. & Co.)

The market is devoid of any features of special interest. Trade still continues in light quantities, and buyers show no anxiety to contract very far ahead. On the other hand, it may be said that furnaces are equally as indifferent about engaging their product far into the future at present lot range of prices, which barely exceed the cost of production.

**Hot Blast Foundry Irons.**—Southern coke, No. 1, \$15@ \$15.25; No. 2, \$14.25@ \$14.50; No. 3, \$14@ \$14.25. Mahoning Valley, lake ore mixture, \$17.75 @ \$18.75; Southern charcoal, No. 1, \$17@ \$17.50; No. 2, \$16.50@ \$17. Missouri charcoal, No. 1, \$18@ \$18.50; No. 2, \$17@ \$17.50.

**Forge Irons.**—Neutral coke, \$13.75@ \$14; cold short, \$13.75@ \$14; mottled, \$12.75@ \$13.25.

**Car Wheel and Malleable Irons.**—Southern, standard brands, \$22@ \$23; other brands, \$18@ \$19. Lake Superior, \$22.50@ \$23.

**Philadelphia.** Dec. 4.

(From our Special Correspondent.)

**Pig Iron.**—Certain parties who, when they buy iron, buy large lots, have been close observers of the market here and in the South for several days, believing that the opportunity would be presented to get iron on more favorable terms than in January. Several opportunities have been offered to buy iron which they do not want, but first-class iron cannot be had at less prices than two or four weeks ago.

Nothing is being done outside small, prompt or early delivery lots. An immense quantity of iron is being melted up in rolling mills all over the State, and contracts run out at the end of the year in a good many mills. The outside delivery price offered or likely to be offered by a good many buyers is \$15, and that only for a first-class article. It is probable that a great deal of No. 2 iron has been required for recently, but as yet very little has been contracted for. No. 1 is quiet, but desirable brands are held quite firmly at \$18@ \$18.25. Bessemer is lifeless at \$18.

**Muck Bars.**—Some makers ask \$29.50, but several mills are delivering good bars at \$29, and that is about a fair quotation.

**Steel Billets.**—Large lots are under inquiry, and as several concerns are out, the presumption is that orders for additional supplies will be placed this week or next at \$29.50, delivered.

**Merchant Iron.**—Prices run from \$1.70 to \$1.95, but three-fourths of all the iron sold goes at \$1.80. Mills keep pretty well supplied with orders, but there are a few concerns threatening the stability of prices in their anxiety to get business for January and February.

**Nails.**—A great many storekeepers, contractors and builders have been prevailed upon in this and other markets to make large purchases of nails, and as factories have been run full time stocks have not declined as much as they should. Quoted at \$1.75@ \$1.90.

**Sheet Iron.**—Only a few large buyers have taken advantage of the easier prices that have been named. Mills are pretty well supplied with business, but the chances are the winter dullness will bring about a further depression.

**Merchant Steel.**—Sharp competition has brought about a further shading of prices.

**Skelp.**—More business is in sight, but large orders are held back, in view, buyers say, of a little farther decline. To-day's quotations \$1.95@ \$2.10.

**Wrought Iron Pipe.**—Prices remain where they were, and small orders keep dropping in.

**Plate and Tank.**—The only feature to notice is a further weakness; but it has not tempted large buyers to hurry up. Still there is enough business to keep all mills on full time. Tank, \$2.15 for iron and \$2.30 for steel; bridge plate, \$2.20 and \$2.40; shell, \$2.40 and \$2.60.

**Structural Iron.**—Prices remain where they have been. Angles, \$2.20; sheared plates, \$2.30; tees, \$2.70; beams and channels, \$3.10. No important new business, but all conditions remain the same.

**Steel Rails.**—A large amount of business is assured as soon as railway managers can rely upon a permanent condition of things. A great deal of new work is talked of, but for the present nothing is likely to be done beyond taking care of repairing requirements. Quotations, \$23.50@ \$29.

**Old Rails.**—Offered at tide water at \$25@ \$25.50. No sales at tide of small lots.

**Pittsburg.** Dec. 4.

(From our Special Correspondent.)

**Raw Iron and Steel.**—The past week has been one of unusual excitement. To say the iron men are in an exceedingly bad humor is drawing it

very mild. The principle cause is the shortage of gas, compelling a return to coal, which makes it very probable that Pittsburg will soon be the "Smoky City" again. A view from any of the hills that surround the city will show smoke issuing not only from the mills and other work shops, but also hundreds of dwelling houses that have been compelled to return to the use of "King Coal" in order to keep from freezing.

It was the general impression that the removal of gas from the various mills and foundries would enable the Philadelphia and other companies to furnish dwellings with the amount required, but such is not the situation. The shortage is on the increase; parties who have a supply to day are in dread of what may be the situation to-morrow. All things taken into consideration, the iron and steel market does not present a healthy appearance. When you talk to an iron man about business the answer is, "Wait." The money situation shows little improvement. The Pittsburg banks are undoubtedly in a healthy condition, and from present indications they intend to remain so by refusing extensive loans. It may be set down as a certainty that no improvement may be expected during the present year.

If the Shenango and Mahoning Valley furnace men mean what they say we may look for a general shutting down of furnaces, unless there is a reduction in the price of coke and railroad freights and raw materials are reduced. There has been no serious depression and no material change in values, although the market is narrower, and for the time being shows little indications of recovery. The general tendency of prices, however, has been toward a lower level, with few exceptions. As a matter of fact the best that can be said of the entire market is that it has not declined much, and as regards some leading specialties, such as pig iron, steel rail, steel billets, etc., it cannot decline much no matter what turn things may take.

The situation: Bessemer pig shows no decline; the demand has fallen off. Grey forge seems to be neglected—at the present at least. Muck bar was steady but least inquired for. Blooms, billets and slabs can be obtained at last week's prices. Manufactured iron steady, with a falling off in the demand. Scrap material: the demand has been fairly maintained at prices that ruled last week. Old rails are scarce with prices maintained.

**Scrap Material.**

200 Tons No. 1 W. Scrap, net. \$22.50 cash. 200 Tons Iron Axles, net. 28.50 cash. 150 Tons Soft Steel Scrap, gross. 22.00 cash. 100 Tons W. Turnings, net. 15.00 cash. 100 Tons Cast Scrap, gross. 15.25 cash. 100 Tons No. 1 W. Scrap, net. 21.50 cash. 100 Tons Mixed Steel, gross. 19.00 cash. 100 Tons No. 1 W. Scrap, valley, del. net. 23.25 cash. 100 Tons Car wheels, gross. 19.50 cash. 50 Tons Iron Axles, Extra, net. 32.00 cash.

**Old Iron and Steel Rails.**

200 Tons American T's. 27.00 cash. 100 Tons Long Steel Rails. 22.00 cash. 700 Tons American T's. 27.50 cash.

**Coke Smelted Lake and Native Ores.**

2,500 Tons Bessemer, at city furnace. 16.85 cash. 1,500 Tons Bessemer, at city furnace. 17.00 cash. 1,500 Tons Bessemer, No. 1. 17.50 cash. 1,000 Tons Grey Forge, December, January. 14.75 cash. 500 Tons Bessemer, extra. 17.50 cash. 800 Tons Grey Forge. 15.00 cash. 500 Tons Bessemer, Spot. 17.00 cash. 500 Tons Bessemer, December. 17.00 cash. 250 Tons No. 1 Foundry. 17.00 cash. 125 Tons No. 2 Foundry. 16.25 cash. 100 Tons Silvery. 16.50 cash. 75 Tons Silvery, extra. 19.50 cash.

**Charcoal.**

75 Tons No. 2 Foundry. 22.50 cash. 80 Tons No. 1 Foundry. 23.50 cash. 50 Tons Cold Blast. 26.00 cash. 50 Tons No. 2 Foundry. 22.00 cash.

**Muck Bar.**

1,000 Tons Neutral, December, January and February. 30.65 cash. 1,000 Tons Neutral. 30.75 cash. 500 Tons Neutral, December. 30.50 cash. 500 Tons Neutral, January. 30.50 cash.

**Steel Slabs and Billets.**

750 Tons Billets and Slabs, January and February. 27.00 cash. 500 Tons Billets, December. 27.50 cash. 400 Tons Billets, Wheeling. 28.20 cash. 1,000 Tons Billets, January. 27.00 cash.

**Skelp Iron.**

800 Tons Sheared Iron. 2.30 4 m. 350 Tons Narrow Grooved. 1.97 1/4 4 m. 250 Tons Wide Grooved. 2.02 1/2 4 m.

**Ferro-Manganese.**

200 Tons 80 per cent. Baltimore, January and February. 63.50 cash. 85 Tons 80 per cent. Jersey City spot. 63.00 cash.

**Bloom Ends.**

700 Tons Bloom Ends, January and February 18.00 cash. Steel Wire Rods. 350 Tons American Fives, January shipment 38.00 cash.

**CHEMICALS AND MINERALS.**

**NEW YORK, Friday Evening, Dec. 5.**

**Heavy Chemicals.**—Heavy shipments have arrived during the week, but the market for heavy chemicals continues dull and quiet. Our Liverpool correspondents report all chemicals, with the exception of caustic soda, strong.

**Caustic Soda.**—The large arrivals spoken of above consisted in part of caustic soda. Of the 60% variety values are a little firmer, and sales for future shipments have occurred at 3'30@ 3'35c., according to quantity and time of delivery. Sales of 70% to 74% have also taken place dur-

ing the week, 3.20@3.25c. being the price for spot goods, and 3.10@3.15c. for future delivery.

There is not much 77% here, but a few sales, for shipment, are reported at 3.10@3.15c., according to quantity.

Carbonated Soda Ash.—Large arrivals of 48% carbonated soda ash are reported; nevertheless, the available supply for prompt delivery is not large, inasmuch as the arrivals are under contract for consumption by glass men.

Caustic Soda Ash.—Several hundred tons have been sold at 1.55@1.60c., according to brand, for delivery during the early part of 1891.

Sal Soda.—Holders of goods on the spot ask 1.20@1.25c., but for future shipments 1.10@1.15c. is the figure.

Bleaching Powder.—This market is easier owing to the recent large arrivals, and 1.75@1.80c. is now quoted. There has been a good demand for bleach, both for spot and future deliveries.

Acids.—Just now the acid market is generally quiet. The Knickerbocker Chemical Company is little heard of these days. A report was published in a trade paper to the effect that the meeting of the "combination" to be held to-day would be the last, but the officers of the Knickerbocker Company deny this, and, as usual, will say nothing of their future plans.

So far as actual business is concerned manufacturers do not speak as jubilantly as they did. Prices are unchanged, and we quote acid per 100 pounds in New York and vicinity: Acetic, \$1.72@1.75; muriatic, 18", 90c.@\$1.30; muriatic, 20", 95c.@\$1.50; muriatic, 22", \$1@1.15; nitric, 36", \$3@3.25; nitric, 40", \$3.50@4.50; nitric, 42", \$4@4.75; sulphuric, 60", 70@80c., and sulphuric, 66", 80@95c.

Fertilizing Chemicals.—The week has been a quiet one. There have been a few sales, but nothing of any importance is to be noted. We repeat our quotations, as nothing has occurred to justify a change. High grade dried blood, \$1.80@1.85. For the low grade the price is \$1.70@1.75.

70% phosphate, \$17@17.50 per ton. Dissolved bone black is nominally 95c. per unit for available phosphoric acid, although on large lots prices might be somewhat reduced, and acid phosphate 80c. per unit for available phosphoric acid. Steamed bones, unground, \$20@23; ground, \$25@26.

Our special Charleston, S. C., correspondent writes under date of the 1st inst.: "Carolina rock continues short and hard to buy at any price just now, but it is probable pressure will be relieved about the end of the week, when I think the exchange will increase the quota of the miners. These are limited in their sales by the rules of the exchange. Kiln dried and wet land rock f.o.b. vessels on Ashley River are \$7 and \$6 respectively."

Muriate of Potash.—Arrivals of 1,000 tons at the various ports are reported this week. Quotations are as follows: \$1.77½, for New York; \$1.80 for Philadelphia; \$1.82½ for Southern ports, and \$1.85 for Gulf ports.

Nitrate of Soda.—The spot supply is still light. Some sales from store are reported at \$1.80.

Brimstone.—Owing to very low rates of freight by steamer to New York some business has been done at \$27 for best unmixed seconds, and \$26.50 for best unmixed thirds. Buyers are still holding off in expectation of lower prices, but if the unanimous statements of reliable importers are to be believed there is but little hope of any early decline in values.

The advance continues under the impulse of active demand from France, which has bought largely within the past few days, and which wants still more. England, too, is inquiring, but so far has managed to keep off, although it is bound to come in pretty soon. If present prices last for one month longer, when we shall have the Spanish and Portuguese orders, then we can safely say that no decline is to be anticipated, at least, until the next meeting.

Liverpool. Nov. 26.

(Special Report by J. P. BRUNNER & Co.)

The United Alkali Company, Limited, has been successfully floated, and the position of heavy chemicals all round is strong, with the one exception of caustic soda, which article meets with little favor from buyers at the moment.

Soda ash strong at 1½d.@1¼d. for any position, and very scarce for balance of this year.

Soda crystals are now held for £3 10s. per ton, and this is minimum price for prompt or 1891 delivery.

Caustic soda dull, but prices unchanged. The syndicate figures for December, 1890, or first three months, 1891, 70%, £11 5s.; 60%, £10; 74%, £12 5s.; 76%, £13 5s. and upwards. Five shillings per ton less for contracts extending over January—June or January—December, 1891.

For December delivery resale parcels of 70% are offering at 2s. 6d. under syndicate price.

Bleaching powder very scarce for balance of this year, at £7@£7 5s., and business done for all 1891 at the minimum price of £7.

Chlorate of potash firmer, at 5¼d. per pound, and it is not unlikely that that price will shortly be advanced.

Bicarb Soda firm at £8 and upward, for one-cwt kegs, with usual allowances for larger packages.

Sulphate of Ammonia flat and declined to £10 17s. 6d.@£11 for good grey, 24% f.o.h. here, in double bags, early delivery, but a better inquiry at the close.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, Dec. 5.

Brick.—The accumulations of brick, which at one time threatened to glut the market, have been so much decreased of late that they have ceased to cause serious concern to manufacturers. Both the demand and the supply have been good, but prices are no higher, being exactly those we quoted last week and which we herewith repeat: Haverstraws, \$5.50@6.25 per thousand; Uprivers, \$5@5.50; Jerseys, \$4.75@5.25, and pale, \$3@3.25.

Lime.—The bad weather which prevailed during the early part of the week delayed lime-laden vessels to such an extent that there were not more than three or four arrivals. The demand has been fair, and some brands are well sold ahead. Supplies are not abundant, and reports from the Maine lime district are to the effect that a great many kilns have stopped burning lime for the balance of the year. The St. John article is also scarce. The McKinley bill seems to have administered a death blow to Canadian lime, but the St. John people say they continue to ship lime to this market as long as they can do so without actual loss.

Cement.—A fair market is reported in cement, with a moderate demand and an ever-decreasing supply. Winter has set in and shipments will hereafter amount to little. We quote this week: Rosendale, \$1@1.10; Portland, American, \$2.25@2.50; foreign, \$2.35@2.75; special brands, \$2.60@2.85; Roman, \$2.80@3.75; Keene's coarse, \$4.50@5.50; Keene's fine, \$7.25@8.50 per barrel.

IMPORTS AND EXPORTS OF METALS AT NEW YORK FROM NOVEMBER 22 TO NOVEMBER 29 AND FROM JANUARY 1.

Table with multiple columns: Imports (Spelter, Tin, Pig Lead, Tin Plates, Pig Iron, Bar Iron, Scrap Iron, Old Rails, Copper Matte, Spiegeleisen), Exports (Steel and Iron Rods, Iron Ore), and various company names and quantities.

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES.

Main table with columns: NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES (No., Par), ASSESSMENTS (Total levied, Date and amount of last), DIVIDENDS (Total paid, Date & amount of last), NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES (No., Par), ASSESSMENTS (Total levied, Date and amount of last).

G., Gold. S., Silver. L., Lead. C., Copper. \* Non-assessable. + This company, as the Western, up to December 10th, 1881, paid \$1,400,000. † Non-assessable for three years. ‡ The Dead wood previously paid \$275,000 in eleven dividends, and the Terra \$75,000. Previous to the consolidation in August, 1884, the California had paid \$31,320,000 in dividends, and the Con. Virginia 240,000,000. \* Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends.



NEW YORK MINING STOCKS QUOTATIONS. DIVIDEND-PAYING MINES. NON-DIVIDEND-PAYING MINES.

Main table of New York Mining Stocks Quotations, listing companies like Adams, Atlantic, Batcher, etc., with columns for dates (Nov. 29, Dec. 1-5) and sales.

\* Ex. dividend. † Dealt in at the New York Stock Ex. Unlisted securities. ‡ Assessment paid. § Assessment unpaid. Dividend shares sold, 9,055. Non-dividend shares sold, 34,900. Total New York, 43,955.

BOSTON MINING STOCK QUOTATIONS.

Table of Boston Mining Stock Quotations, listing companies like Atlantic, Bodie, Bonanza Development, etc., with columns for dates (Nov. 28, Nov. 29, Dec. 1-4) and sales.

Boston: Dividend shares sold, 9,511. Non-dividend shares sold, 3,758. Total Boston, 13,269.

COAL STOCKS.

Table of Coal Stocks, listing companies like American Coal, Cambria Iron, Cameron Coal & L Co, etc., with columns for dates (Nov. 29, Dec. 1-5) and sales.

† Ex-dividend. \*\* Sales in New York, 55,530; in Philadelphia, 57,707. Total sales, 386,733.

San Francisco Mining Stock Quotations.

Table of San Francisco Mining Stock Quotations, listing companies like Alpha, Alta, Belcher, etc., with columns for dates (Nov. 28, Nov. 29, Dec. 1-4) and sales.

STOCK MARKET QUOTATIONS.

Table with columns for Baltimore, Md. and Birmingham, Ala. listing various companies and their stock prices.

Table with columns for Birmingham, Ala. listing various companies and their stock prices.

Table with columns for Pittsburgh, Pa. listing various companies and their stock prices.

Table with columns for St. Louis, Mo. listing various companies and their stock prices.

Table listing various commodities and their prices, including Major Budd, Mont., Mexican Imp., etc.

Trust Stocks. Dec. 5. The following closing quotations are reported to-day by C. I. Hudson & Co., members of New York Stock Exchange:

Table listing foreign quotations for various commodities like Almada, Mex., Canadian Phos., etc.

Table listing Paris market prices for various commodities like Belmez, Spain, Callao, Venez., etc.

Table listing current prices for various commodities like Acid-Acetic, Muriatic, Nitric, etc.

Table listing current prices for various commodities like Ammonia, Alum, Sulphur, etc.

Table listing various commodities and their prices, including Ammoniates, Blood, Bones, Bone black, etc.

Table listing various commodities and their prices, including Bromine, China Clay, Chrome Yellow, Cobalt, etc.

Table listing various commodities and their prices, including Mineral Wool, Naphtha, Ochre, Phosphate Rock, etc.

Table listing various commodities and their prices, including Salt Cake, Silica, Soda, Caustic ash, etc.

Table listing various metals and their prices, including Aluminum, Arsenic, Barium, Bismuth, Cadmium, etc.

Table listing various building materials and their prices, including Bricks, Cement, Portland, etc.



in 12.00; 44, Double Action, 4 in., \$12.50; 44, Double Action, 5 in., \$12.75; 44, Double Action, 6 in., \$13.00; 44, Double Action Favorite, 5 in., \$12.75.



Colts.  
Discount, 10 per cent from following prices.

Double Action Army, 44 and 45 calibre, 4 1/4, 5 1/4, 7 1/4 inch bbl., \$13.00.  
Double Action, 41 calibre, 2 1/4 to 6 inch bbl., \$11.20.  
Single " Army, 45 calibre, 4 1/4, 5 1/4, and 7 1/4 inch bbl., \$12.00.  
Single Action Army, 44 calibre, "Frontier," 4 1/4, 5 1/4, and 7 1/4 inch bbl., \$12.00.  
New Line, 41 calibre, blued or nicked, \$4.00.  
" 32 " " " " 2.00.  
" 22 " " half or full plate, 2.10.  
Old Model, 22 calibre, by the hundred, half or full plate, \$1.50.  
Colt Deringer, 41 calibre, per pair half or full plate, 5.50.

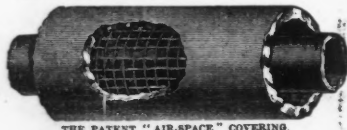


American Bull Dog

Double Action 32, 38 and 44 calibre, 2 1/4 inch barrel, \$1.60.  
Double Action 32, 38 and 44 calibre, 4 1/4 inch barrel, \$1.85.  
Double Action 32, 38 and 44 calibre, 6 inch barrel, \$2.10.

F. & W. British Bull Dog revolvers, 32 and 38 calibre 2 1/4 inch bbl., \$1.80.  
F. & W. Automatic revolver, 32 and 38 calibre, 3 1/4 inch bbl., \$5.50.  
H. & R. Automatic revolver, 32 and 38 calibre, 3 1/4 inch bbl., \$4.75.  
Defender revolvers, Single Action, 22, wood handle, 65.  
" " " " " 22, rubber " 70.  
" " " " " 32, wood " 85.  
" " " " " 32, rubber " 90.  
Remington Army revolver, Single Action, 44 cal., frontier cartridge, 5 1/4 inch barrel, \$6.50.  
Remington Army revolver, Single Action, 44 cal., frontier cartridge, 7 1/4 inch barrel, \$8.00.  
Remington Double Deringers, 41 cal., rim fire, \$4.05.  
National Deringers, 41 calibre, per pair, half or full late, \$4.00.  
New House, 41 or 38 calibre, blued or nicked, \$5.00.  
" Police, 38 calibre, 6 in., " 7.00.  
" " 38 " 4 1/2 in., " 7.00.

Asbestos Goods.



Patent air-space coverings, Per sq. ft., 25c. Discount, 20%.



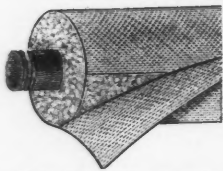
Wick packing, per pound, 50c. Discount, 20%.



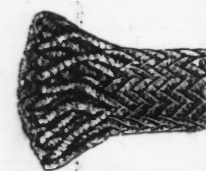
Removable pipe coverings, Sq. ft. 20c. Disc., 20%.



Tube cleaner, "The National," Per inch, \$1. Discount, 50%.



Fire felt covering for steam pipes, Per sq. ft., 25c. Discount, 20%.



Piston Packing, Per pound, 50c. Discount, 20%.

Asbestos fibre for filtering, per lb. 40c. disc 20%  
Cord and Sewing " " \$1.50 " 20%  
Twine " " " " " 2.00 " 20%  
Asbestos cloth, 36 inches wide, per yard 2.00 " 20%  
cement for boilers, per bbl. 4.00 " 25%  
sheathing, per lb. .18 " 20%  
building felt, " " .14 " 20%  
hair felt for hot and cold water pipes, per sq. ft. .10 " 25%  
Asbestos mill board, per lb. .18 " 20%  
soldering blocks, per doz. 6.25 " 25%

Assay Furnace:

Hydro-Carbon Blow-Pipe Assay Furnace.  
No. 2, Muffle Furnace taking C Battersea Muffle 8x4 1/2x3 in., \$10.00  
No. 3, taking F Muffle, 10x6x4 in., 15.00  
No. 1, Crucible Furnace, taking Battersea, U or Colorado B Crucible, 4 in. dia. 5 1/2 deep, 4.00  
No. 2, taking Batter-  
As E, round, 5 in. dia., 6 1/2 deep, 5.00

Blow-Pipe No. 1, with half gallon tank, made of plain, strong sheet metal, \$18.00  
Blow-Pipe No. 2, with half gallon tank, made entirely of seamless brass, 23.00  
Blow-Pipe No. 3, with one gallon tank, otherwise same as No. 2, 26.00  
Blow-Pipe No. 1, Muffle Furnace No. 2, and Crucible Furnace No. 1, 32.00  
Blow-Pipe No. 2, Muffle Furnace No. 2, and Crucible Furnace No. 1, 37.00

Axes, etc.  
Axes, Handled.  
Brands, Collins. Sharp. Pecks.  
Dis., % doz. doz. doz.  
3 1/4 @ 4 1/2 lbs. \$10.75 \$15.00 9.50  
4 1/4 @ 5 1/4 lbs. 11.00 15.50 9.50  
4 1/4 @ 6 lbs. 11.50 16.00 10.00  
5 @ 7 lbs. 12.50 17.50 11.00

American Blair. Free-man.  
Brands, Hurd. Ideal. doz. doz. doz.  
Dis., % Net Net Net  
3 1/4 @ 4 1/2 lbs. \$8.50 \$11.00 \$8.00 \$6.50  
4 1/4 @ 5 1/4 lbs. 8.50 11.00 8.00 7.00  
4 1/4 @ 6 lbs. 8.75 11.25 8.25 7.00  
5 @ 7 lbs. 9.00 11.50 8.50 7.50

Brands, Collins. Sharp. Pecks.  
Dis., % doz. doz. doz.  
Three-quarter axe, \$8.00 \$13.50 \$13.50 \$13.50  
Boys' axe, No. 2, 8.00 13.50 13.50 13.50  
Half axe, 7.00 12.50 12.50 13.00  
Quarter axe, 6.50 10.00 10.00 11.00

Brands, Collins. Hurd. Free-man.  
Dis., % doz. doz. doz.  
Three-quarter axe, \$13.50 \$13.50 \$7.50  
Boys' axe, No. 2, 13.50 13.50 7.50  
Half axe, 12.50 12.50 6.50  
Quarter axe, 12.00 12.00 6.00



Hatchets, with handles.  
AXE PATTERN. HUNTER'S.  
Both patterns, same price.

Dis., % Collins. Sharp. Pecks. Sim-mons.  
Dozen, \$6.00 \$10.00 \$9.00 \$9.00

SHINGLING. CLAW.  
Brands, Collins. Sharp. Pecks. Mann.  
Dis., % No. 1 Doz. \$4.75 \$8.00 \$8.00 \$8.00  
No. 2 " 5.25 8.50 8.50 8.50  
No. 3 " 5.75 9.00 9.00 9.00



LATHING. BROAD.  
Brands, Collins. Sharp. Pecks. Blair.  
Dis., % No. 1 Doz. \$4.75 \$8.75 \$8.00 \$8.00  
No. 2 " 5.25 7.50 8.50 8.50  
No. 3 " 5.75 8.25 9.00 9.00

Broad Axes. Steel polls.  
Brands, Collins. Hunt. Sharp. Pecks.  
Dis., % Dozen, \$20.00 \$30.00 \$29.00 \$32.00



Adzes.  
YANKEE, OR OHIO. PENNSYLVANIA. NEW ORLEANS.  
Brands, Collins. Sharp. Pecks. Blair. Mann.  
Dis., % Dozen, \$19.00 \$32.00 \$32.00 \$32.00  
Handled, extra, \$4.

RAILROAD. SQUARE HEAD. SHIP CARPENTER'S  
Brands, Collins. Hunt. Sharp. Pecks. Hurd  
Dis., % 10 45 50 50 50 50  
Railr'd, heavy, doz., \$14.00 \$26.00 \$26.00 \$26.00 \$26.00  
Flat head " 15.00 21.00 24.00 24.00 24.00



Brands, Collins. Hunt. Sharp. Pecks. Hurd.  
Dis., % 10 45 50 50 50 100  
Square head, doz., \$12.50 \$24.00 \$24.00 \$24.00 \$24.00  
Brands, Collins. Hunt. Sharp. Pecks.  
Dis., % 10 45 50 45  
Ship Carpenter's or Spur  
Head, doz., \$13.00 \$25.00 \$25.00 \$25.00

Axe Grease.

Frazer's (2-lb. tins), per gross, \$18.00  
2-lb. wooden boxes, 12.00  
Discount, 25 and 5%  
Dixon's Everlasting, boxes 1 lb., per doz., \$1.20  
" 2 lbs., " 2.00

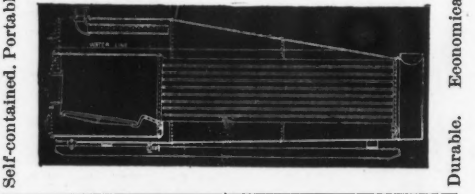
See Oils, page 10.  
Bellows.  
Miner's Bellows: 24 in., \$8.50;  
26 in., \$9.75; 28 in., \$11.00; 30 in., \$11.25; 32 in., \$13.50.  
60 and 5 1/2 dis.  
Standard, each: 18 to 24 in., \$10; 28 in., \$12; 32 in., \$14; 34 in., \$16; 36 in., \$18; 38 in., \$20; 40 in., \$23; 44 in., \$32.  
60 and 5 1/2 dis.  
Hand Bellows, per doz.: 6 in., plain, \$10; fancy, \$20; 7 in., plain, \$12; fancy, \$24; 8 in., plain, \$14; fancy, \$28; 9 in., plain, \$16; fancy, \$32; 10 in., plain, \$18; fancy, \$36.  
50% dis.



Belting. LEATHER BELTS.  
Standard Manufacturers List.  
Single belts per foot.  
Width. Width. Width.  
1 inch, 10 6 inch, 76 20 inch, 2.84  
1 1/4 " 13 7 " 90 21 " 3.02  
1 1/2 " 17 8 " 1.02 22 " 3.20  
1 3/4 " 20 9 " 1.15 23 " 3.37  
2 " 23 10 " 1.29 24 " 3.54  
2 1/4 " 26 11 " 1.42 26 " 3.92  
2 3/4 " 30 12 " 1.55 28 " 4.30  
3 " 33 13 " 1.68 30 " 4.64  
3 1/4 " 36 14 " 1.82 32 " 5.00  
3 1/2 " 43 15 " 1.98 34 " 5.35  
4 " 50 16 " 2.14 36 " 5.70  
4 1/2 " 56 17 " 2.31 40 " 6.40  
5 " 63 18 " 2.49 44 " 7.10  
5 1/2 " 70 19 " 2.66 48 " 7.80

Double belts twice the price of single.  
Dis. single and double belts, cemented, 50 and 5%  
Dis. single and double belts, riveted and cemented, 50 and 5%  
Dis. single belts, cemented and lacesewn, water-proofed, 50%  
Dis. double belts, cemented and lacesewn, water-proofed, 45%

Boiler (Scotch Flue).

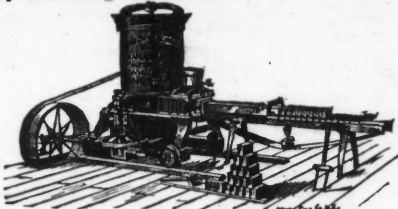


Self-contained. Portable. Economical. Durable.  
Horse power, 8 10 15 20 25 30 35  
Diameter, 28" 32" 36" 40" 44" 48" 52"  
Length, feet, 9 10 12 14 16 18 20  
Weight, pounds, 3500 4000 4500 5000 6500 8000 9500  
Price, \$, 387 487 580 634 767  
Horse power, 40 45 50 55 60 70 80  
Diameter, inches, 44 48 48 52 52 56 56  
Length, feet, 17 1/2 18 1/2 18 1/2 18 1/2 18 1/2  
Weight, pounds, 8000 8500 8800 9500 10,000 11,000 12,000  
Price, \$, 827 920 1027 1147 1227 1387 1500

Brick Machinery.

Heavy Steam Power Machine, \$25.00  
Horse-Power Machines, 300.00  
Additional Horizontal Pugmill, 225.00  
Brick Moulds, \$2.50 to \$3.00  
Brick Trucks, 5.00 to \$13.50  
Brick Barrows, 7.25  
Brick Barrows with Springs, 8.20  
Sand Barrows, steel tray, 6.40

Clay Working Machines.



No.	brick per day.	Complete
No. 10 D	50,000	\$1,500
No. 10 S	30,000	1,200
No. 4	40,000	1,100
No. 7 S	20,000	650
No. 6 S	15,000	575
No. 2 E. H. P.	6,000	3,300

Brushes.  
PAINT BRUSHES.  
Intermediate prices not quoted.  
Prices per dozen.

No.	4.	2.	0.	3-0.	5-0.	7-0.	Dis.
X.....	\$1.15	\$1.80	\$2.50	\$3.15	\$4.00	\$5.25	\$6.75 25%
Atlantic.	1.25	2.15	3.80	5.25	7.00	10.00	13.00 25%
Standard	1.60	2.60	4.00	6.00	8.00	11.00	16.00 25%

VARNISH OVAL.

No.	4.	2.	0.	3-0.	5-0.	7-0.	Dis.
Globe.....	\$1.15	\$1.80	\$2.50	\$3.25	\$4.00	\$5.00	\$6.00 25%
Crown....	1.25	2.00	2.75	4.00	5.25	7.00	10.00 25%

VARNISH FLAT.

No.	1 1/4.	2 2/4.	3.	Dis.
X.....	\$0.48	\$0.72	\$0.96	\$1.20 25%

No.	1.	3.	5.	7.	9.	Dis.
XX.....	\$0.25	\$0.40	\$0.60	\$0.85	\$1.20	25%
	0.40	0.75	1.10	1.40	2.00	25%

No.	6.	7.	8.	Dis.
Brown....	\$1.25	\$1.60	\$2.00	25%
Pure.....	2.40	4.00	6.00	25%

SHOE.

No.	8.	9.	25.	15.	26.	Dis.
	\$11.50	\$12.50	\$15	\$18	\$25	25%
	\$20.00	\$24.00	\$28.00	\$31.00		

HORSE.

No.	Patent.	Dis.
	\$20.00	25% \$24.00
	\$18.00	\$30.00

SCRUB.

No.	Patent.	Dis.
	\$12.00	25% \$16.00
	\$6.50	\$8.50

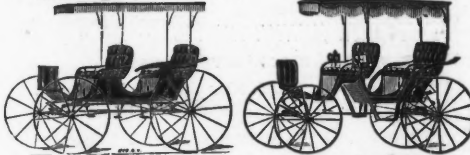
SHAVING.

No.	Patent.	Dis.
	\$0.60	25% \$1.00
	\$0.36	\$1.50

COUNTER.

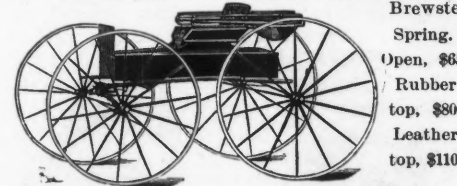
No.	Patent.	Dis.
	\$3.00	25% \$4.00
	\$2.00	\$5.00

Carriages, Etc.



Windsor Surrey. Open, \$150. Canopy top, \$180. Leather extension top, \$210 Pole or shafts.

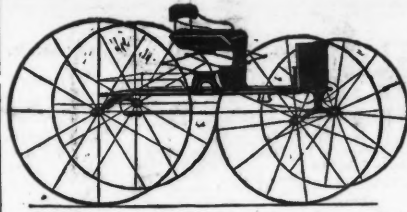
Cut under Surrey. Canopy top, \$185. Leather extension top, \$220



Brewster Spring. Open, \$65. Rubber top, \$80. Leather top, \$110.



Runabout, \$65.



Buckboard. \$80 : shafts.



No. 0. Cart, top and fenders..... \$150  
 No. 1. Cart, top and fenders..... 90  
 No. 2. Cart, one man cart, open..... 65  
 No. 2. Cart, one man, top and fenders..... 85  
 No. 3-H. Cart, two man, open..... 54  
 No. 4. Cart, two man, top..... 86  
 No. 5. Cart, two man, top and fenders..... 90  
 No. 6. Cart, two men, top and fenders..... 90  
 No. 7. Two man combination cart..... 110  
 Wide track 5 feet.  
 Narrow track 4 feet 8 inches.  
 Discount 33 1/2 per cent. off.

Crucibles.

No.	Battersea Crucibles, Triangular.		Per doz.	Per doz.
	Height. Inches.	Width. Inches.		
S.....	4 1/2	4 1/2	\$1.00	\$0.50
T.....	4	3 3/4	0.80	0.50
U.....	3 1/2	3 1/4	0.60	0.40
V.....	3 1/4	2 3/4	0.45	0.40
W.....	2 3/4	2 3/8	0.35	0.30
X.....	2 1/2	2 1/4	0.30	0.30
Y.....	2 1/4	2 1/8	0.25	0.30
Z.....	1 3/4	1 3/8	0.20	0.30

Battersea Muffles, any size, made to order. See illustration in advertisement.

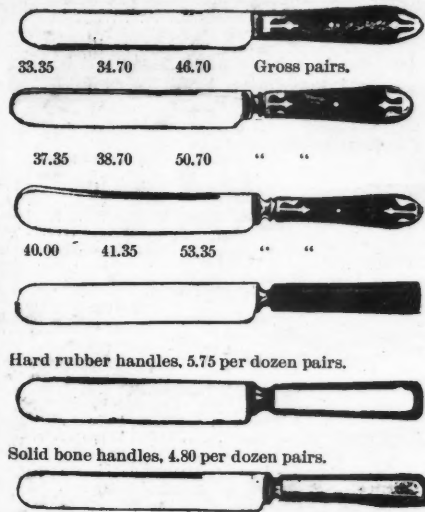
No.	Long. Inches.	Wide. Inches.	High. Inches.	Price. Each.
A.....	7	3 1/2	2 1/2	\$ .60
B.....	7 1/2	4 1/2	2 3/4	.75
C.....	8	4 3/4	3	.85
D.....	8 1/2	5	3 1/4	1.00
E.....	9	5 1/2	3 3/8	1.15
F.....	10	6	4	1.25
G.....	11	6 1/2	4 1/2	1.50
H.....	10 1/2	5 1/2	3 3/8	1.00
J.....	12	6	4	1.25
K.....	14	8	5	1.75
L.....	15	9	6	2.00

Export discount 15 %.

Cutlery.

KNIVES—TABLE.

14.70	16.00	18.70	"	"	medium size.
17.35	18.70	24.00	"	"	full size.
17.35	18.70	21.35	"	"	medium.
20.00	21.35	26.70	"	"	full size.
22.70	24.00	29.35	"	"	
27.35	28.70	36.00	"	"	
Cocobola Ebony Bone handles. handles. handles. gross pairs.					
28.00	29.35	38.00	"	"	
28.65	30.00	38.00	"	"	
28.65	30.00	38.00	"	"	
32.00	33.35	38.00	"	"	
34.70	36.00	48.00	"	"	



Hard rubber handles, 5.75 per dozen pairs.  
 Solid bone handles, 4.80 per dozen pairs.  
 Celluloid handles, 7.35 per dozen pairs.  
 Forks are made to match all above patterns, with either three or four prongs.  
 Discount 25 %.

BUTCHERS'—COCOBOLA HANDLES.

	Per dozen.									
4 and 4 1/2 in.	5 in.	5 1/2 in.	6 in.	6 1/2 in.	7 in.	8 in.	9 in.	10 in.		
1.15	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20

1.15	1.20	1.30	1.40	1.70	1.90	2.35	3.00	3.70	5.
1.45	1.60	1.70	2.00	2.35	2.80	3.25	4.70	5.1	
2.00	2.15	2.30	2.35	2.70	3.00	3.50	4.25	5.00	7.50
2.45	2.70	2.95	3.15	3.45	3.70	4.35	5.00	6.00	
2.10	2.20	2.35	2.50	2.80	3.40	4.35	5.30	6.85	...
3.40	3.55	3.70	4.10	4.60	5.30	7.00	8.75	11.00	
4.10	4.25	4.40	4.80	5.30	6.00	7.75	9.50	12.50	
2.00	2.15	2.30	2.35	2.70	3.00	3.50	...	...	...
2.55	2.70	3.00	3.20	3.55	4.00	5.00	6.00		
2.55	2.70	3.00	3.30	3.55	4.00	...	...	...	...

Discount 25 and 10 %.

HUNTING—EBONY HANDLES.

5 1/2 in. 6 in. 6 1/2 in. 7 in. 8 in. 9 in.  
 Per Dozen.

Discount, 25 and 10 %.  
 Per Dozen.

Putty knives, cocobola handles..... \$1.30@1.51



**SHEARS.**  
TAILORS'—JAPANESE OR NICKEL HANDLES.  
Per pair.  
12 in..... 6.00  
12½ in..... 7.00  
13 in..... 8.00  
13½ in..... 9.00  
14 in..... 10.00  
14½ in..... 11.00  
15 in..... 12.00 | 16 in..... 14.00  
Discount, japanned, 60%; nickle, 45%.

**BENT TRIMMERS.**  
Per dozen.  
6 in..... 13.00 | 10 in..... 27.00  
7 in..... 15.00 | 11 in..... 30.00  
8 in..... 17.00 | 12 in..... 33.00  
9 in..... 22.00

**STRAIGHT TRIMMERS.**  
Per dozen,  
6 in..... 12.00 | 10 in..... 25.00  
7 in..... 14.00 | 11 in..... 30.00  
8 in..... 16.00 | 12 in..... 33.00  
9 in..... 19.00

**LADIES' SCISSORS.**  
Per dozen.  
4½ in..... 10.00 | 6 in..... 11.00  
5 in..... 10.00 | 6½ in..... 12.00  
5½ in..... 10.50 | 7 in..... 13.00

**PAPER AND BANKERS'.**  
Per dozen.  
9 in..... 18.00 | 13 in..... 36.00  
10 in..... 25.00 | 14 in..... 42.00  
11 in..... 27.00 | 16 in..... 54.00  
12 in..... 32.00 | 18 in..... 60.00

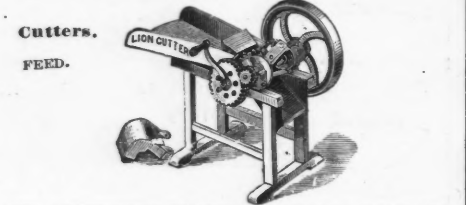
**BARBERS—Per dozen.**  
7½ in..... 15.00 | 9 in..... 18.00  
8 in..... 16.00 | 9½ in..... 20.00  
8½ in..... 17.00

**SCISSORS.**  
**BUTTON-HOLE.**  
5 and 5½ in., 14.00 per dozen.  
Disco int, japanned, 70 and 10% nickel, 60 and 10%

**PRUNING.**  
1 B., 9 in., 24 per dozen; 2 B. 3½ in., 21; 3 B., 7¾ in., 19.80.

**PRUNING SHEARS FOR LONG HANDLES.**  
No. 1, \$36 per dozen; No. \$30 per dozen.  
Discount, 35%.

**Cutters.**  
**FEED.**



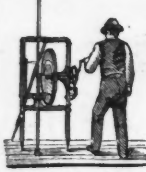
No. of cutter.	No. of knives.	Length in inches of knives.	Length in inches of feed cut.	Price.
1	2	6½	½, ¾ and 1½	\$18.00
2	2	7½	½, ¾ and 1½	21.00
2½	1	7½	¾, 1 and 1½	21.00
3	2	8½	¾, 1, 1½ and 2	25.00
3	2	8½	¾, 1, 1½ and 2	27.00
4	1	10	¾, 1, 1½ and 2	30.00
4	2	10	¾, 1, 1½ and 2	33.00
5	2	10	¾, 1, 1½ and 2	35.00
6	2	11	¾, 1, 1½ and 2	45.00
6½	2	11	¾, 1, 1½ and 2	45.00
7	2	13	¾, 1, 1½ and 2	60.00
7½	2	13	¾, 1, 1½ and 2	60.00
10	2	16	¾, 1, 1½ and 2	80.00
12	2	20	¾, 1, 1½ and 2	100.00
11	2	11	¾, 1, 1½ and 2	45.00
13	2	13	¾, 1, 1½ and 2	60.00
16	2	16	¾, 1, 1½ and 2	80.00
0	2	20	¾, 1, 1½ and 2	100.00

The knife arbor for all sizes are made of machinery steel. 30 per cent. dis.

**VEGETABLE—GALE'S.**

No.	Size.	Weight of Fly Wheel, Pounds.	Will cut per hour, Pounds.	Price
No. 1½		20	1,500	\$12
No. 2½		32	1,700	15
No. 3½		32	1,700	15
No. 4		42	2,000	18
No. 5		50	3,000	25
No. 10		65	8,000	35

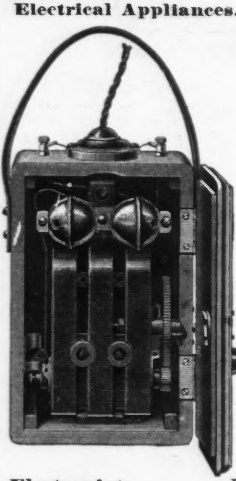
30% dis.



**Drill—Portable Hand Rock.**

Price, \$225.

Dis., 20%.



**Electrical Appliances.**

20,000 ohm Testing Generator..... \$10.00  
Pony Magneto Bell..... 6.00  
Standard Magneto Bell..... 7.50  
Standard Extension Bell..... 4.00  
Pony Extension Bell..... 3.00  
Discount 40 per cent.

**Electroplate.**

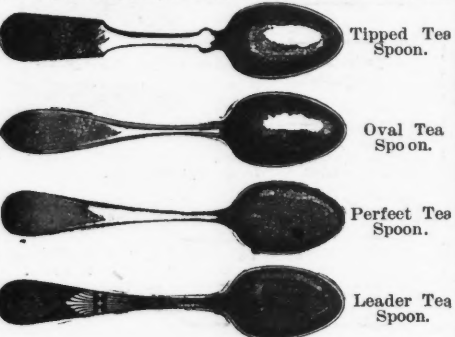
	Extra plate, per doz.	Double plate, per doz.	Triple plate, per doz.
Oyster forks.....	7.00	9.00	11.00
Sugar shells.....	9.00	11.00	13.00
Sugar tongs.....	25.50	31.50	37.50
Butter knives, twist or reversed handles.....	10.50	12.50	14.50
Nut picks.....	4.75	6.00	7.25
Pie knives, engraved blades.....	42.00	51.00	60.00
Soup ladles.....	48.00	60.00	72.00

Dis. 60 and 2%. Aesthetic medium fork.

Tea spoons.	Table spoons.	Medium forks.
7.50	15.00	15.00 per gross.

Discount, 30 and 5%  
Children's sets on cards. 3 pcs. 4 pcs.  
Leader pattern, as per cut... 21.00 24.00 doz. 60 and 5%  
Aesthetic pattern, as per cut... 5.75 7.25 doz. 30 and 5%

**SPOONS, FORKS, ETC., BEST PLATE ON HARD WHITE METAL**



5 oz. or extra plate—Perfect and Leader.  
Tea spoons..... 4.25 8.00 8.50 4.75 per doz  
Dessert spoons..... 7.50 8.00 8.50  
Table spoons..... 8.50 9.00 9.50  
Coffee spoons..... 4.25 4.50 4.75  
Dessert forks..... 7.50 8.00 8.50  
Medium forks..... 8.50 9.00 9.50  
Discount, 60 and 5%  
Spoons and forks, German silver, tipped pattern.  
Tea spoons. Table spoons. Medium forks.  
22.50 45.00 45.00 per gross.  
Discount, 60 and 25%  
Spoons and forks, made from brass, and silver plated a coating of hard, white nickel.

**CASTERS.**



1,200—Dinner. Dis., 60 and 5%. 232—Breakfast.

**Dinner Casters.**  
No. 1,200. 17½ in. high, \$3.00, quadruple plate.  
No. 80. 17 in., \$6.00, quadruple plate.  
No. 140. 16 in., \$7.50,  
No. 830. 16 in., \$5.00, Plain, 50 cents less.  
No. 25. 16 in., \$4.00, double plate.  
No. 33. 16 in., \$3.75, " "  
No. 53. 15 in., \$3.00, " "  
No. 15½. 14½ in., \$2.00, single plate.  
No. 19. 14½ in., \$1.85, " "  
No. 40. 14 in., \$1.75, " "

**PICKLE DISHES**  
No. 144. 12 in. high, \$3.50  
No. 66. 10½ in. high, \$2; as sorted colored glass.  
No. 155. 12 in. high, \$4; as sorted colored glass.  
No. 146. 12½ in. high, \$9; hand decorated glass.  
No. 156. 12½ in. high, \$6; hand decorated glass.



**TEA SETS.**  
No. 255. 6 pieces, \$35, quadruple plate.  
No. 301. 4 pieces, \$23, quadruple plate.  
No. 1847. 6 pieces, \$42, quadruple plate.  
Dis., 60 and 5%.

**Engineering Instruments.**

Full Engineer's Standard Transit. 7 in. graduated circle..... \$255  
6 in. " "..... 245  
5 in. " "..... 235  
4 in. " "..... 225  
Standard Engineer's Level, improved centre and seat attachment, 18 in. telescope..... 140  
Plain railroad level, 18 in. telescope..... 125

**Explosives.**

Dynamite, 75% Nitro-Glycine, per lb..... .32  
" 60% " "..... .25  
" 40% " "..... .20  
Blasting powder A, per keg 25 lbs..... \$2.40  
Sporting powder, standard brands, per keg 25 lbs..... 5.00  
" " " " 12½ lbs. 2.75  
" " " " 6½ lbs. 1.50  
" " " " 6¼ lbs. 3.00  
" " " " per can 1 lb..... 60  
" " " " fancy brands " 1 lb..... 1.00  
Discounts special for quantity.  
Safety fuse, cotton, 12 M. ft. in case..... \$2.85 per M. ft.  
" " " " single tape, 6 M. ft. in case..... 4.25 " "  
" " " " double tape " " 5.40 " "  
" " " " triple tape " " 6.50 " "  
Discount 17½%  
Detonating caps, triple force, 25 M. in case..... \$5.00 per M.  
" " " " quintuple force, 25 M. in case..... 7.50 per M.  
Electrical exploders, 4 ft. wires..... \$3.00 per 100  
" " " " 6 " " 3.54 " "  
" " " " 8 " " 4.08 " "  
" " " " 10 " " 4.62 " "  
Discount 15%. Long lengths to order.

**Magneto Blasting Machines.** No. Capacity. 1 V. 8 holes \$17.00  
" " " " 2 V. 20 " 25.00  
" " " " 3 L. 20 " 25.00  
" " " " 3 V. 30 " 30.00  
" " " " 4 V. 60 " 50.00  
Discount 15%.  
Blasting cables..... \$5.00 each, discount 40%  
reels..... 5.00 " 20%

**Flouring Mill Machinery.**

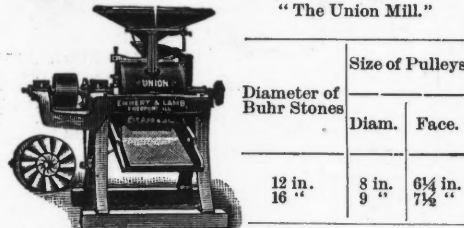
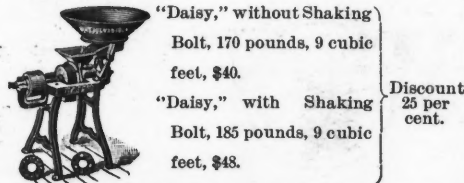
20-inch New Era Mill for Wheat, Corn, and Middlings.  
Size. Power. Pulley. Capacity  
Inch. H. P. Inch. Bush.  
20 4 to 10 14 x 7 12 to 40  
Speed. Weight. Price.  
Lbs.  
500 to 800 660 \$150  
Farm and Plantations Mills.

Diameter of burrs.	Power to drive.	Size of pulley.	Capacity per hour.	Revolutions per minute.	Weight.	Price
18 in.	H. P. 2 to 4	9 x 5½	4 to 14 bushels	690 to 1200	370 lbs.	\$100
14 in.	" 4 to 10	11 x 6½	18 to 40 bushels	400 to 700	600 lbs.	130

The Dixey Mill—Stiff Spindle Style.

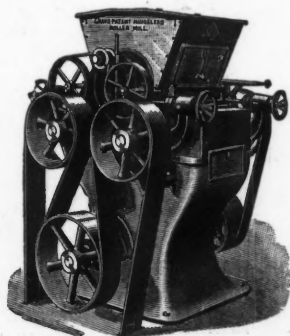
Size.	Power.	Capacity.	Weight.		Pulley.	Iron gear.	Mortise gear.
			Pulley.	Gear.			
18	4 to 6 H.P.	8 to 25 bu	560 lbs	650	\$130	\$165	
22	6 to 8 "	12 to 30 "	800 "	1000	165	200	
26	8 to 12 "	16 to 40 "	1100 "	1500	185	220	
30	10 to 15 "	25 to 60 "	1300 "	1700	215	255	

GRINDING MILLS.



Horse Power	Capacity in B'sh's	Speed	With-out Bolt	With Bolt	Sack-ing Elevator, Extra	Extra Metal Buhrs
8 to 10	12 to 30	1200 to 1500	\$90.00	\$105.00	\$15.00	\$1.20 pair
10 to 15	20 to 50	1000 to 1600	160.00	178.00	17.50	1.50 "

Flour Mills.

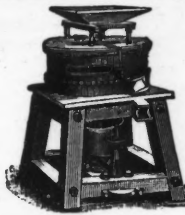


For grinding corn, feed, rye, etc.  
Gray's pat. noiseless belt roller-mills, porcelain rolls.

H. power required.	Revolutions per minute.	Width.	Length.	Height.	SIZE OF ROLLS.	Price
						Price
2 1/4	300 to 400	4'	5'	3'	14" x 18"	\$600.00
2 1/2	300 to 400	4'	5'	3'	14" x 18"	\$600.00
2 1/2	300 to 400	4'	5'	3'	14" x 18"	\$600.00
2 1/2	300 to 400	4'	5'	3'	14" x 18"	\$600.00
2 1/2	300 to 400	4'	5'	3'	14" x 18"	\$600.00
2 1/2	300 to 400	4'	5'	3'	14" x 18"	\$600.00
2 1/2	300 to 400	4'	5'	3'	14" x 18"	\$600.00

Size.	Height.	Width.	Length.
6" x 12"...	4'	6"	3' 5"
9" x 14"...	5'	8"	3' 10"
9" x 18"...	5'	8"	4' 9"
9" x 24"...	5'	8"	5' 6"

The Nordyke Bradford Portable Mill.



Grinding capacity.	Weights.		Gearing mills.		
	Sing'l gear.	Double gear.	Pulley mill.	Iron wh'ls.	Mor-tise wh'ls.
8 to 10	4	550	625	\$130	\$165
10 to 12	5	600	700	140	175
12 to 15	5	700	850	160	190
15 to 18	6	900	1050	175	210
18 to 20	8	1200	1400	185	225
20 to 25	10	1500	1700	225	265
25 to 30	14	1800	2100	315	355
35 to 40	19	2000	2300	390	435

Flue Cleaner. Hurley's Automatic Steam Flue Cleaner.

Driving pulley.	Revolutions per minute.	Length of belt above floor.	Approximate shipping weight	Price.
10" x 5 1/4"	400 to 500	14'		\$500.00
14" x 6 1/4"	350 to 450	18'	2600 lb.	600.00
14" x 7 1/4"	350 to 450	18'	3050 lb.	650.00
14" x 8 1/4"	350 to 450	18'	3350 lb.	735.00

Forges (Portable).

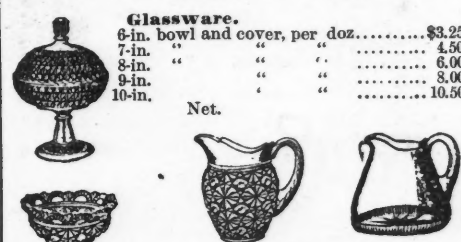
No.	Weight	Hearth	Price
2c	155 lbs.	21 x 27 hearth	\$42.00
3a	80 "	18 in. diam.	27.00
3b	75 "	18 " "	24.00
3c	85 "	18 " "	30.00
No. 6a	weight 45 lbs.	14 in. diam. hearth	18.00
No. 6B	weight 45 lbs.	14 in. diam. hearth	16.00



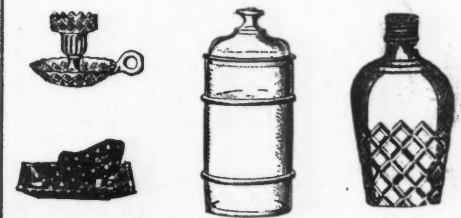
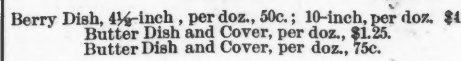
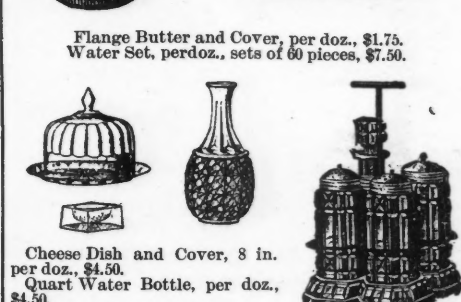
Riveting Forges. Bellows, 18 in., 20 in., 22 in., 24 in. \$8.00, \$10.00, \$13.00, \$17.00 20% dis.

Fruit Evaporator.

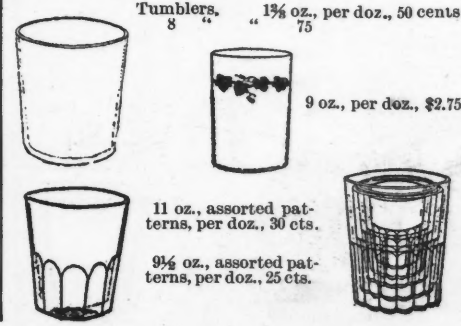
No. 1. Evaporator	\$30
No. 2. Fruit Drier and Baker, with Bleacher attachment. Weight, 225 lbs. Capacity, 5 to 7 bushels apples per day; 24 in. deep, 26 in. wide, 5 1/2 ft. high; 12 trays, 22 x 22; 40 square feet drying surface.	
Complete	\$50
No. 3. Capacity, 15 to 20 bushels per day	100
No. 4. Capacity, 20 to 30 bushels per day	160
Dis. No. 1, 3 and 4 = 20%. No. 2 = 30%.	
Boxing, extra:	
No. 1, \$3.00; No. 2, \$5.00; No. 3, \$7.50; No. 4, \$12.50.	
Freight to New York:	
No. 1, \$4.00; No. 2, \$6.00; No. 3, \$12.00; No. 4, \$18.00.	

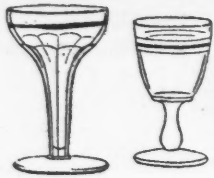


Nappy, 4 1/4-inch, per doz., 50c.; 6-inch, per doz., \$2 nch., per doz., \$3; 8-inch, per doz., \$4.  
Cream Pitcher, 1 pint, per doz., \$1.25; one quart, per doz., \$3.50; 3 pints, per doz., \$4.50.  
Pint Pitcher, per doz., \$1.50; quart pitcher, per doz., \$2; 1/2 gallon pitcher, per doz., \$3; 3 quart pitcher per doz., \$4.50.



Candlesticks, per doz., \$2.00. Glass Slipper for Flowers, per doz., 50 cents; slipper and tray, per doz., \$1. Jam Jar and Cover, 1 qt., per doz., \$2.50; 1/2 gal., per doz., \$3.25; 3/4 gal., per doz., \$4; 1 gal., per doz., \$5; 1 1/2 gals., \$9; 2 gals., per doz., \$12. Pocket Flask, 1 pint, \$1.





1 oz. to 12 oz., nested for shipping, per doz. nest, \$2.  
Goblets, banded, per doz. 65 cents.  
Claret to match, per doz., 55 cents.  
Wines, to match, per doz., 50 cents.  
Cordials, to match, per 45 cents.

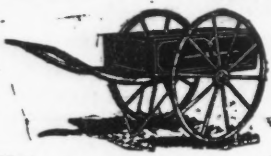
Goblets, per doz., 50 cts.  
Claret, " 50 "  
Wine " 35 "

Banded, open, hollow stem.  
Champagne, per doz., \$1.25.



1/2 Pt. tumbler, per doz. .55 cts.  
1/2 Pt. mug to match, " .65 "  
Goblet, " " .50 "  
Spoon holder, cream pitcher, sugar butter dish to match.  
Sets of 4 pieces, per doz. sets, 48 pieces, \$3.75.

**Hand Carts** No. 0 42 wheel in. tread, 1 in. axle-box 48x28x10 deep, \$10.50.  
No. 1, 36 wheel, 1 in. tread, 3/4 in. axle, box 40x23x10 deep, \$9.00.  
No. 2, 30 wheel, 3/4 in. tread, 3/4 in. axle, box 32x20x9 deep, \$8.25.  
With Wagon-Seat Spring.  
No. 6, same sizes as No. 0, \$12.00.  
" 7, same sizes as No. 1, 10.50.  
" 8, " " " " 9.75.  
With Third Wheel, Without Springs.  
No. 3, same sizes as No. 0, \$12.00.  
" 4, " " " " 10.50.  
" 5, " " " " 9.50.



**Hardware Specialties.**

**AUGERS.**

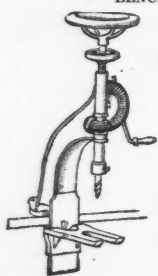


Patent Adjustable Hollow.  
Cuts from 1/4 to 1 1/4, pivoted jaws, graduated scale to 1-16ths, per doz., \$60.00

Discount, 15 and 10%.

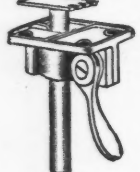
Inch	5-16	3/8	7-16	1/2
With bits	12.00	12.00	12.00	12.00
Without bits	8.00	8.00	8.00	8.00
9-16	9/16	3/4	7/8	1
14.00	14.00	16.00	16.00	20.00
9.00	9.00	9.00	13.00	13.00
1 1/4	1 1/2	1 3/4	2.00	24.00
20.00	24.00	24.00	14.00	
14.00	16.00	15.00		

Discount, 15 and 10%.

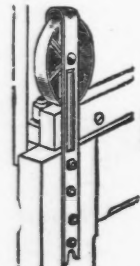


Adjustable bed plate.  
2 3/4 high drills to 1/2 in. hole, 3/4 run of screw.  
List price, each, \$10.00  
Net, " " " " 3.75

Bench Vise, Steel Jaws, 3 1/2 in., opens 3 in.; weight, 12 lbs.; list price, each, \$4.00.; net price, each, \$1.60.



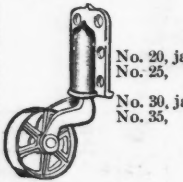
**BENCH HOOK.**  
Patent, adjustable and reversible  
List \$9 dozen, 1/2 dozen in box.  
Discount, 20 and 10%.



**BARN DOOR HANGER.**  
4 in., per doz. pairs, \$12.00  
5 " " " " " " 14.40  
Track, per foot, .08  
One dozen pairs in case, Dts., 50%.



**BLACKSMITH'S TONGS.**  
Swivel Jaw.  
No. 1, 16 in., per doz. \$10.00  
" 2, 18 " " " " 10.00  
Dis., 20%.

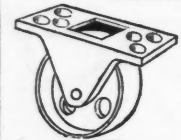


**CASTERS.**  
Swivel Store Truck  
No. 20, japanned, 4 in. wheel, each, .55  
No. 25, " " " " 5 " " " " .75  
Noiseless turned wheel.  
No. 30, japanned, 4 in. wheel, each, 1.30  
No. 35, " " " " 5 " " " " 1.60  
Discount, 25%.

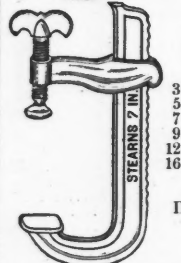


**CLOTHES REEL.**  
Extra heavy, gray iron, japanned.  
List per doz. \$15.00  
Net " " " " 7.00

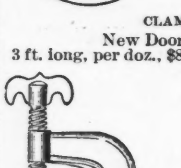
**JACK SCREWS.**  
New pattern wrought iron screw.  
Diameter  
No. screw. High. screw. Price.  
20 4 1/2 in. 10 in. 2 in. \$4.50  
25 6 1/2 " 12 " 2 " 5.25  
30 8 1/2 " 14 " 2 " 5.75  
35 11 1/2 " 16 " 2 " 6.50  
Discount, 40%.



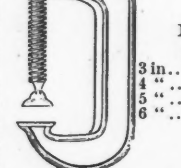
**Store Truck, stationary.**  
No. 50, 5-inch wheel, 1 1/2 inch wide each, \$1.05.  
No. 60, 5-inch, extra heavy, 1 1/2 inch wide, each \$1.50.  
Discount, 25%.



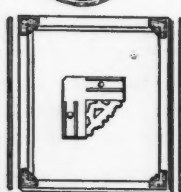
**SCREW CLAMPS.**  
Adjustable.  
3 in., per doz. \$4.00  
5 " " " " 6.50  
7 " " " " 9.00  
9 " " " " 10.50  
12 " " " " 15.00  
16 " " " " 20.00  
1/2 doz. in box.  
Discount, 20 and 10%.



**CLAMPS.**  
New Door Frame.  
3 ft. long, per doz., \$8 list; \$5 per doz. net.



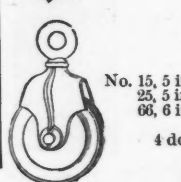
**Malleable Iron Screw Clamps.**  
Per Doz. Per Doz.  
3 in. \$7.00 7 in. \$20.00  
4 " 10.00 8 " 25.00  
5 " 12.00 9 " 27.50  
6 " 16.00 10 " 30.00



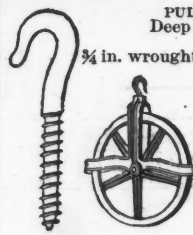
**WINDOW SCREEN FRAMES.**  
Patent Japanned Corners.  
No. 25, 36 by 36 corners and screws, without bead, per doz., \$2.50.  
No. 25, 36 by 36 corners and screws, with bead, per doz., \$2.90.  
No. 35, 42 by 42 corners and screws, without bead, per doz., \$2.90.  
No. 35, 42 by 42 corners and screws, with bead, per doz., \$3.30.  
Black satin stain, sticks 3/8 by 1 in.  
Dis., 20%.



**PULLEYS.**  
Side, No. 45, Japanned.  
Inches... 1 1 1/2 2 2 1/2 3 4 5  
Per doz. .90 1.00 1.60 2.40 3.50 9.00 15.00  
2 inch and under, 2 dozen in box: 2 1/2, 3 and 4, 1 dozen in box; 5 inch, 1/2 dozen in box.  
Discount, 50%.



**HAY FORK PULLEY.**  
New pattern.  
No. 15, 5 in. iron wheel, per doz. \$4.50  
25, 5 in. wood " " " " 4.50  
66, 6 in. " " " " 6.00  
4 dozen in case, 8 dozen in barrel.  
No. 15, per dozen, \$2 net.

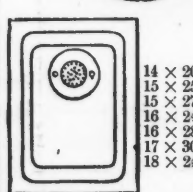


**PULLEY HOOK (New Floor.)**  
Deep cut thread, forged point.  
3/4 in. wrought iron, 8 in. long, list, \$1.90  
net, 1.00



**WELL WHEEL.**  
New pattern.  
Japanned.  
In. 8 10 12 14 16  
Pr.d. 7.00 9.50 12.50 20.00 30.00

Discount, 70%.



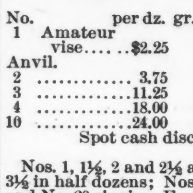
**SHEAVES.**  
Patent Common  
Turned and polished iron wheels, round corners, brass pin, one set in box.  
2 1/2 inch, \$1.50  
3 " 1.60  
4 " 2.00  
5 " 2.60  
Discount, 50%.



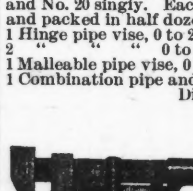
**SINKS.**  
All 6 inch deep.  
14 x 20 in. \$1.50 18 x 30 in. \$2.50  
15 x 25 in. 1.75 18 x 32 in. 3.00  
15 x 27 in. 2.00 18 x 36 in. 3.00  
16 x 24 in. 1.80 20 x 30 in. 3.00  
16 x 28 in. 2.10 20 x 36 in. 3.70  
17 x 30 in. 2.25 20 x 40 in. 4.00  
18 x 24 in. 2.10  
Discount, 60%.



**SPOKE POINTERS.**  
Per doz.  
No. 1, points 1 1/2 in. diameter, \$9.00  
No. 2, points 2 1/2 in. diameter, \$15.00  
Discount, 15 and 10%.  
1/2 dozen in box.



**SILENT SAW VISE.**  
No. 10, 10 in. jaw, per doz. \$15.00  
Dis., 33 1/2%.



**WRENCHES.**  
Coes Wrenches.  
**BLACK.**  
Knife Handle.  
Size. # doz. Size. # do  
6 inch \$9.00 10 " 12.00 15 inch 24.00  
8 " 10.00 12 " 14.00 18 " 30.00  
21 inch 36.00  
**BRIGHT.**  
Knife Handle.  
4 inch \$10.00 10 inch 14.00 18 inch 32.00  
6 " 10.00 12 " 16.00 21 " 38.00  
8 " 11.00 15 " 26.00  
Discount, 55, 10, 7 1/2 and 3 %.  
Coes Mechanics' Screw Wrenches, same list, less 55, 10, 7 1/2 and 3 %.  
Patent Screw Wrench, same list. Dis., 55, 10, 7 1/2 and 3 %.

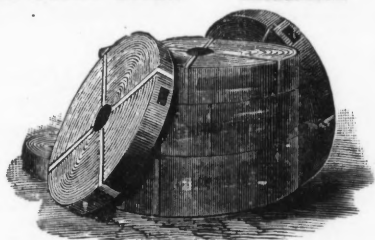


**ICE MACHINES (Family).**  
No. 1, Ice machine, ice and ice cream molds, 1 lb. ice, \$15.00.  
No. 2, Ice machine, ice and ice cream molds, 1 1/2 lbs. ice, \$20.00.  
No. 3, Ice machine, ice and ice cream molds, 1 carafe 1 bottle holder, 2 lbs ice, \$26.50.  
No. 4, Ice machine, ice and ice cream molds, 2 carafe 1 bottle holder, 4 lbs. ice, \$33.00.  
No. 5, Ice machine, ice and ice cream molds, 3 carafe 1 bottle holder, 6 lbs. ice, \$40.00.  
No. 6, Ice machine, ice and ice cream molds, 4 carafe, 1 bottle holder, 9 lbs. ice, \$46.50.



**India Rubber Goods.**

**MECHANICAL.**



**RUBBER BELTING.**

Inches.	2 ply per foot.	3 ply per foot.	4 ply per foot.	5 ply per foot.	6 ply per foot.
1	\$0.07				
1 1/4	0.09				
1 1/2	0.11				
2	0.15	\$0.17	\$0.21		
2 1/4	0.18	0.22	0.26		
3	0.22	0.26	0.31		
3 1/4	0.26	0.30	0.37		
4	0.30	0.34	0.42		
4 1/4	0.33	0.39	0.47		
5	0.36	0.43	0.52		
6	0.43	0.52	0.62		
7	0.51	0.60	0.73		
8	0.59	0.70	0.84	\$1.05	\$1.25
9	0.67	0.80	0.95	1.18	1.42
10	0.75	0.90	1.07	1.33	1.60
11	0.83	1.00	1.18	1.47	1.77
12	0.91	1.08	1.30	1.62	1.95
13	1.00	1.18	1.42	1.77	2.13
14	1.08	1.28	1.54	1.92	2.31
15	1.16	1.38	1.66	2.07	2.49
16	1.25	1.50	1.78	2.22	2.67
18	1.41	1.70	2.02	2.52	3.03
20	1.58	1.90	2.26	2.82	3.39
22	1.76	2.12	2.52	3.15	3.74
24	1.96	2.36	2.80	3.50	4.20
26	2.18	2.60	3.08	3.85	4.62
28	2.42	2.84	3.36	4.20	5.04
30			3.64	4.55	5.46
32			3.92	4.90	5.88
34			4.20	5.25	6.30
36			4.48	5.60	6.72
38			4.76	5.95	7.14
40			5.04	6.30	7.56
42			5.32	6.65	7.98
44			5.60	7.00	8.40
46			5.88	7.35	8.82
48			6.16	7.70	9.24
50			6.44	8.05	9.66
52			6.72	8.40	10.08

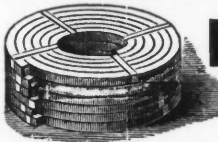
Dis. Reliance, 60 and 5. Dis. Royal, 60, 10 and 10. Dis. Manhattan, 70 and 5. See Leather Belting, page 3; Link Belting, page 9.

**PACKING.**

**Piston Packing.**



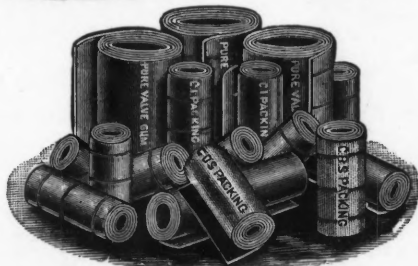
Round Piston Packing Per lb. 85c. Discount, 60, 10 and 5 per cent.



Square Piston Packing. Price same as above. Round and square piston packing is made in lengths of twelve or twenty-four feet.



Square Piston Packing. Rubber back, per pound \$1. Discount 60 per cent. Best only. Square piston packing rubber back is made in lengths of twenty feet.



**Steam Packing.**  
Cloth Insertion, Rubber Outside.  
Cloth Insertion, Cloth on one or both sides.

Thickness.	1-Ply.	2-Ply.	3-Ply.	4-Ply.
1-64 inch.	70 cts.			
1-32 "	65 cts.			
1-16 "	60 cts.	63 cts.	66 cts.	
3-32 "	55 cts.	58 cts.	61 cts.	
1-8 "	55 cts.	55 cts.	58 cts.	61 cts.
3-16 "	55 cts.	55 cts.	55 cts.	58 cts.
1-4 "	55 cts.	55 cts.	55 cts.	55 cts.

One-ply of cloth to every 1-16 inch thickness.  
Three cents per pound additional will be charged for each extra ply of cloth. Each cloth, whether insertion or on outside, to count as one ply.  
All cloth insertion or plain packing is one yard wide, and any length desired.  
Wire insertion packing, all thicknesses, per lb. 50 cents.  
Discounts: Reliance, 70 & 10; Royal, 60, 10 & 10; Manhattan, 60 per cent.

**HOSE.**



Improved "Smooth Bore" Rubber Suction Hose. On spiral flat or round tinned steel wire.

In. Diam.	Per ft.	In. Diam.	Per ft.
2	\$2.60	7	\$13.56
2 1/2	3.50	7 1/2	15.00
3	4.00	8	16.51
3 1/2	5.50	9	19.50
4 1/2	7.50	10	22.50
5	8.50	11	27.50
5 1/2	9.50	12	
6	10.50		
6 1/2	12.00		

Suction hose discount: Reliance, 50 and 10%; Royal, 60, 10 and 5%; Manhattan, 70 and 5%.



**SUCTION HOSE.**

In. Diam.	Per ft.
1/2	\$1.00
1	1.25
1 1/4	1.65
1 1/2	2.10
2	2.50



**RUBBER HOSE.**

Conducting Hose—Two-ply.		Int. diam.		Per ft.	
1/2 in.	\$0.20	2 in.	\$0.66	5 in.	\$1.65
3/4 in.	25	2 1/2 in.	75	6 in.	1.98
1 in.	33	3 in.	83	7 in.	2.31
1 1/4 in.	42	3 1/2 in.	92	8 in.	2.64
1 1/2 in.	50	4 in.	99	9 in.	2.97
1 3/4 in.	58	4 1/2 in.	132	10 in.	3.33

**HYDRANT HOSE—THREE-PLY.**

In. diam.	Per ft.	In. diam.	Per ft.
1/2 in.	\$0.25	1 1/2 in.	\$0.60
3/4 in.	30	2 in.	70
1 in.	40	2 1/2 in.	80
1 1/4 in.	60	3 in.	90
		4 in.	1.60

Discount—Reliance, 60; Royal, 70; Manhattan, 70 and 10 per cent.

**FIBROUS.**

1/2 inch thick, or less, per lb. \$0.90  
5-32 inch thick, and upwards, per lb. \$0.80

**CLOTH INSERTION.**

1-16 inch thick, or less, per lb. \$1.25  
There is one ply of cloth to every 1-16 in thickness.

Five cents per pound additional for each extra ply of cloth.  
Dis., 60, 10 and 5%.

**CORRUGATED RUBBER MATTING.**

Rolls 1 yard wide, 30 yards long, cut to any size required.

**Indurated Fibre Ware.**

**SPITTOONS.**

In. diam.	In. high.	Doz.
16 in. dia., 8 in. high.		\$24.00
12 1/2 in. dia., 5 1/2 in. high.		10.80
9 in. dia., 5 in. high.		7.80

**WASH TUBS.**

No.	In. diam.	In. deep.	Doz.
No. 0,	23 in.	12	27.00
Nos. 0, 1, 2 and			
3, nested.	1 in.	3 1/4	22.50
No. 1, 21 in.	10 1/4	24.00	
No. 2, 19 1/2 in.	9	21.00	
No. 3, 18 1/2 in.	9	18.00	
Nos. 1, 2, and			
3, nested.	1/2	9 1/4	21.00

**CHAMBER PAILS.**

12 in. dia., 9 in. deep, 3 gal., 16.00

**WATER COOLERS.**

Gal.	Doz.
2 gal.	\$32.00
4 "	40.00
5 "	44.00
6 "	48.00
8 "	64.00
10 "	80.00
12 "	96.00
15 "	120.00

Dis., 40 and 2 1/2%.

**WATER COOLERS AND FILTERS.**

Gal.	Doz.
4 gal.	\$96.00
5 "	108.00
6 "	120.00
8 "	144.00
10 "	192.00
15 "	288.00

Dis. 40%.



Dis. on all 40 and 2 1/2%.

**Pails.**

Pails.	N. o. doz.	Cubic feet.	Price per doz.
Ladies' or Weaver's pails, 6 qt.	1	2 3/4	\$5.35
Half or buggy pails, 6 qt.	1	3 1/4	4.80
Star pails (standard plain), 12 qt., stenciled "for fire only" without extra charge.	1	3 1/4	6.00
Deck or Mason's pails (same size as Star, but heavier, with heavy wire bail).	1	4	6.60
Railroad or fire pails, 14 qt. (also stenciled "fire" without extra charge).	1 1/2	3 1/4	7.80
Fire pails, round bottoms.	1	4	7.80
Milk pails, 14 qt.	1	4	7.80
Stable pails, flush bottom, heavy wire bail, 14 qt.	1	4	7.80
Stable pails, 16 qt., same as above.	1 1/2	3 1/4	8.40
18 "	1 1/2	3 3/4	10.70
20 "	1 1/2	4	12.00
Covers for fire or star pails.	1	1	3.35



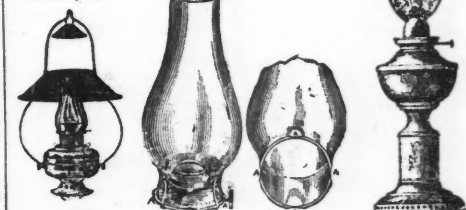
**MILK OR VEGETABLE PANS.**

Size	Doz.
13 1/2 in. dia. 3 1/2 in. deep, 6 quarts, \$3.60 per doz.	
12 1/2 in.	\$4.80
12 in.	\$4.20
11 1/2 in.	3.60

**WASH BASINS.**

Size	Doz.
12 1/2 in.	\$4.80
12 in.	\$4.20
11 1/2 in.	3.60

**Lamps.**



Drummond Electric Hanging Lamp, 300 candle power, complete, each \$3.50.  
The electric lamp, 60 candle-power. With decorated shades, nickel, per doz. \$22.00.  
With opal plain shades, nickel, per doz. 18.00.  
With decorated shades, brass, per doz. 21.00.  
With opal plain shades, brass, per doz. 17.00.  
Lamp chimney patent for Sun burners.

Per doz. No. 0, 50 cents. No. 1, 60c. No. 2, 75c.  
Hitchcock nickel table lamp (No. 654), each \$3.25  
" hanging " 656 " 7.25  
" bracket " 651 " 3.50  
" " with reflector 653 " 3.75  
French bronze bracket, with reflector, No 653, each \$3.75.



**Miners'.**

Brass, Collar and Breast in one piece, Spout and Body in one piece.  
Price, \$9 per gross net.

Demmler Bros.  
"Cherry" Miners' Lamps, double spout. Doz. \$2.00  
" Drivers' " single " 2.70  
" " " " 2.50

Harp, complete, with square tin shade, per doz., \$9.50.  
Complete, with Burner and chimney, per doz., \$1.50.  
Hurricane lanterns 25 cents extra with guards.  
875, 3/4 wick, without guards, per doz., \$5.00.  
876, square safety lifting globe, per doz., \$5.50.  
877, 3/4 wick, safety lifting globe, per doz., \$6.75.  
Nickel plated diamond reflector reading lamp, 30 candle-power, \$13.50 per doz.  
Net  
Illuminated night clock, per doz., \$37.



**PAPER LAMPS.**  
Lined with oil proof composition.

No. 0.	No. 1.	No. 2.
Height, 2 1/4 in.	3 in.	3 1/4 in.
Diameter, 3/4 in.	2 1/4 in.	2 1/2 in.
Weight, 3/4 doz., 3 1/2 lbs.	1 1/4 lbs.	2 lbs.
Price, \$2.75 per doz.	\$2.25	\$2.75

No. 0.	No. 3.	No. 4.
Height, 2 1/4 in.	5 in.	6 1/4 in.
Diameter, 3/4 in.	3 1/4 in.	4 in.
Weight, 3/4 doz., 3 1/4 lbs.	3 1/4 lbs.	7 lbs.
Price, \$2.75 per doz.	\$3.25	\$4.50

Dis., 20%.

Laundry Appliances.



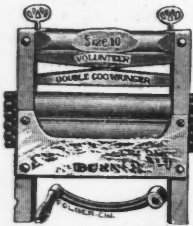
Washing Machine.

THE CATARACT.

All Metal.

Cubic Measurement 15 ft.

Price \$20.

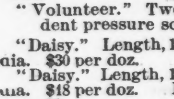


Rolls.

"Volunteer." Length, 10 in. x 1 1/4 in. dia. \$40 doz.

"Volunteer." Length, 11 in. x 1 1/4 in. dia. \$50 per doz.

"Volunteer." Length, 12 in. x 1 1/4 in. dia. \$60 per doz. Dis., 40%.



"Volunteer." Two independent pressure screws.

"Daisy." Length, 10 in. x 1 1/4 in. \$30 per doz.

"Daisy." Length, 12 in. x 1 1/4 in. \$48 per doz. Dis., 40%.



"Empire." Length, 10 in. x 1 1/4 in. dia. \$63 per doz.

"Empire." Length, 11 in. x 1 1/4 in. dia. \$74 per doz.

"Empire." Length, 12 in. x 1 1/4 in. dia. \$84 per doz.

"Empire." Length, 12 in. x 1 3/8 in. dia. \$87 per doz.

"Empire." Length, 14 in. x 2 1/4 in. dia. \$156 per doz.

"Empire." Length, 14 in. x 2 1/4 in. with pulleys. \$220 per doz.

"Empire." Length, 16 in. x 2 1/4 in. with pulleys. \$360 per doz. Dis., 40%.



Closed.



Open for use.

Dis., 60 and 5% cash 30 days, f.o.b. New York.

**Lawn Mowers.**

n.	Lbs.	In.	Weight, Lbs.	Price.
0	30 1/4	13	33	\$19.00
2	31 1/2	15	41	21.00
4	36	17	41	21.00

Dis. 60 and 5%.

10 in. Croquet, 18 pound mower. \$11.00

10 in. \$13.00; 12 in. \$15.00; 14 in. \$17.00; 16 in. \$19.00; 18 in. \$21.00; 20 in. \$23.00

Dis. 60 and 5% cash 30 days, f.o.b. New York.

**Excelsior Three-Blade Mower and Roller.**

8 in., \$11.00; 10 in., \$13.00; 12 in., \$15.00; 14 in., \$17.00; 16 in., \$19.00; 18 in., \$21.00; 20 in., \$23.00. Dis. 60% and 5% cash 30 days f.o.b. New York.

Ink Belting.

Price per running foot, net.

No.	Price.	No.	Price.
25	\$0.13	78	\$0.40
32	13	83	45
33	12	85	50
34	13	88	50
35	14	95	60
42	16	103	75
45	16	105	70
51	20	106	90
52	25	107	80
55	22	108	80
57	24	109	90
62	30	114	1.10
68	30	122	1.50
67	30	124	1.30
75	35	146	1.40
77	35		

Sprocket wheels.

25%

Locks.

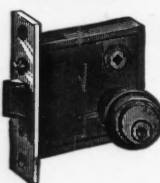


YALE PATENT RIM STORE LATCH.

Per doz.

3 x 5 in., 4 keys..... \$48.00

2 1/4 x 4 in., 3 keys..... 39.00



RIM NIGHT LATCH.

Spring lock, 3 keys..... 18.00

Dead lock, 3 keys..... 25.00



NIGHT LATCH.

Escutcheon..... 39.00

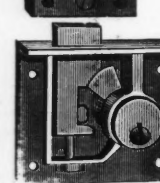
"..... 36.00



MORTISE DEAD LOCK.

4 1/2 x 3 1/2..... 45.00

2 1/2 x 3 1/2..... 24.00



CUPBOARD LOCKS.

Plated Nose..... 13.20

Brass Nose..... 12.00



CUPBOARD

Dead Lock..... 10.80

Spring Lock..... 13.80



CHEST LOCKS.

Plated nose..... 19.20

Brass..... 18.00



DRAWER LOCK.

Plated nose..... 10.20

Brass..... 9.00



KNOB LOCKS.

5 x 3 1/2..... 22.50

5 x 3 1/2..... 20.00

4 1/4 x 3 1/2..... 13.25

3 1/2 x 3 1/2..... 10.50



STANDARD LATCHES.

Dead locks.

3 1/4 x 2 1/4..... 24.00

2 1/4 x 3 1/4..... 14.00

1 1/4 x 2 1/4..... 12.00

NIGHT LATCHES.

3 1/4 x 3 1/4..... 20.00

2 1/4 x 3 1/4..... 18.00



DRAWER LOCKS.

2 x 1 1/2, two tumblers..... 7.50

Plated nose..... 6.00

Brass..... 6.00

Three tumblers..... 9.00

Plated nose..... 7.50

Brass..... 7.50

RIM FLUSH DRAWER LOCK.

2 in. diameter.

2 tumblers. 3 tumblers.

Plated nose..... 7.50 9.00

Brass..... 6.00 7.50

BRONZE SPRING PADLOCK.

2 flat steel keys.

In.

1..... 11.00

1 1/4..... 12.00

1 1/2..... 13.50

1 3/4..... 14.50

2..... 16.00

2 1/4..... 17.50

Subject to special net prices; no discount.

YALE KEYS.



Machinery—Foot Power.



Engine Lathes

8 in. swing, 20 in. bet. centers, 36 in. bed, 240 lbs. weight, \$60.

8 in. swing, 30 in. bet. centers, 46 in. bed, 260 lbs. weight, \$70.

8 in. swing, 36 in. bet. centers, 52 in. bed, 280 lbs. weight, \$75.

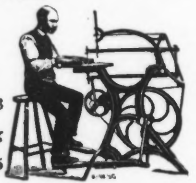
Boxing for export, \$2.50 extra; f.o.b. at Cincinnati, 25¢ dis.

SAWS AND LATHES



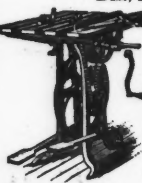
Victor Scroll Saw, Cuts to 3 Inches.

24-inch swing, with 12 saw blades.... \$4 Dis., 20%.



Empire Scroll Saw, Cuts to 3 Inches.

24-in. swing, drill and tilting table. Price, boxed..... \$25 Dis., 20%



The Acme Combination Saw.

Hand or steam power.

Adjustable table and gauges.

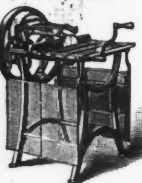
Price, boxed..... \$40

Scroll saw attachment..... 7

Boring attachment..... 10

Moulding attachment..... 10

Dis., 20%.



Paragon Self Feed Rip Saw.

Two changes of speed; three changes of feed.

Price, with one 10 in. saw, \$50.00

Dis., 20%.



Diamond Mortising Machine.

With mortise 1/4 to 1 in. wide, 3 in. deep.

" cut tenons 1/2 to 3/4 thick, 3 in. wide.

Price, with 3 chisels..... \$25.00

Dis., 20%



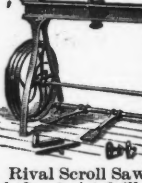
The "Star" Lathe.

Swings 9 x 25 in., back geared screw cutting.

Feeds in or out, right or left. Ad justable Tail Stock for Tapers.

Price..... \$75.00

Dis., 15%.



The Crown Lathe.

Swings 10 x 36 in.

Price, boxed..... \$45.00

Compound slide rest .. 15.00

Countershaft ..... 10.00

Dis., 20%.



Rival Scroll Saw, with six extra saw blades, twist drill and wrench.

Price..... \$10.00

Lathe attachment..... \$3.00

Dis., 25%.



The Challenge Scroll Saw, for shell, bone wood, or metal.

Nickel Plated, with six extra saws, twist drill and wrench.

Boxed..... \$20.00

With lathe attachment..... \$5.00

Dis., 25%.



Hand Circular Rip Saw.

Cuts 3/4 thick, 19 in. wide.

Price \$50.00.

Dis.,



Scroll and Circular saw Combined.

Combined Machines.

Combined circular scroll saw and boring attachment—2 circular saws, 12 assorted scroll saws, boring attachment, and self-centering drill chuck..... \$50.00

Combined circular and scroll saw—2 circular and 12 scroll saws..... 40.00

Circular saw—1 extra rip and 1 cross-cut saw..... 35.00

Scroll saw—12 assorted scroll saws..... 32.00

Counter shaft for steam power..... 10.00

Dis., 35%.



Foot Power Former. \$20.00; Knives extra, \$1.00 each. Dis., 35%.



Mortising Machine. \$22.00; Chisels, \$1.00 each.

Blind Slat Chisels, 3 set bits, \$5.00. Dis., 20%.



Tenoning Machine. Price, \$25. Dis., 35%.



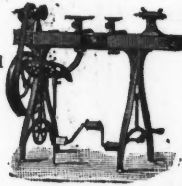
Velocipede Scroll Saw.

Without boring attachment.....\$20.00 With 1 doz. saw blades, 1 3-16 hit. } Included. Dis., 35%.

Lathe.

centres, 1 spur, 2 tool rests and sockets, 1 turned face-plate, \$35.

Dis., 30%.

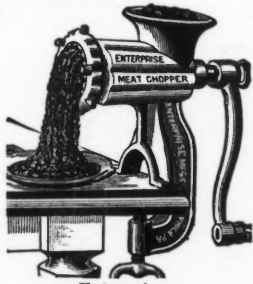


Lathe.

One turned face-plate, two pointed and one spur center, two rests, with sockets and plate for hand tools, slide rest-wrench, belting, etc., \$40. Dis., 25%.



Meat Cutters.



5, each.....\$2.00 10, " ..... 3.00 22, " ..... 4.00 41, " ..... 5.00 This is a power machine. Dis., 40%.

Motors (Water).

Size No. 8, for Sewing Machines, etc., \$18 each. No. 9, 1/4 horse-power (30 lbs. pressure), 1/4 h. p. (50 lbs.), 1/2 h. p. (100 lbs.), 3/4 h. p. (150 lbs.), 1 h. p. (200 lbs.), \$30. No. 10, 1/2 horse-power (30 lbs. pressure), 1/2 h. p. (50 lbs.), 1 h. p. (100 lbs.), 1 1/2 h. p. (150 lbs.), 2 h. p. (200 lbs.), \$50. No. 10 1/2, 3/4 horse-power (30 lbs. pressure), 1 h. p. (50 lbs.), 2 h. p. (100 lbs.), 3 h. p. (150 lbs.), 4 h. p. (200 lbs.), \$75. No. 11, 1 horse-power (30 lbs. pressure), 1 1/2 h. p. (50 lbs.), 3 h. p. (100 lbs.), 4 1/2 h. p. (150 lbs.), 6 h. p. (200 lbs.), \$100. No. 12, 2 horse-power (30 lbs. pressure), 3 h. p. (50 lbs.), 6 h. p. (100 lbs.), 9 h. p. (150 lbs.), 12 h. p. (200 lbs.), \$175. No. 13, 3 horse-power (30 lbs. pressure), 5 h. p. (50 lbs.), 10 h. p. (100 lbs.), 15 h. p. (150 lbs.), 20 h. p. (200 lbs.), \$235. Dis., 40%.

Governors for 11 and 12, \$25 extra; for No. 13, \$35 extra.



Concentrating Machinery.

Blake Improved Crusher: 10x7, weight 7,500; \$410.00. Blake Improved Crusher: 15x9, weight 9,000; \$580.00. Discount 25%.

Cornish Crushing Rollers:

20 diameter, 10 face, weight 5,400; \$450.00. Cornish Crushing Rollers: 20 diameter, 14 face, weight 6,000; \$500.00. Cornish Crushing Rollers: 22 diameter, 14 face, weight 9,500; \$625.00. Cornish Crushing Rollers: 27 diameter, 14 face, weight 13,000; \$750.00. Cornish Crushing Rollers: 30 diameter, 14 face, weight 15,000; \$850.00. Discount 25%.

Complete Sizing Arrangement, consisting of Revolving Screens of Steel Sheet and Hydraulic Classifier. For Concentrator, 25 tons capacity, \$250; 50 tons capacity, \$350; 75 tons capacity, \$450; 100 tons capacity, \$800. Discount, 10 per cent.

Automatic working Jig Machines, all complete, woodwork included, with sliding motion; 2 sieves, \$310; 3 sieves, \$360; 4 sieves, \$460.

With Eccentric Motion, all complete, woodwork included: 1 sieve, \$200; 2 sieves, \$270; 3 sieves, \$320; 4 sieves, \$330.

Automatic working Double Jig Machines, all complete, woodwork included: 4 sieves, \$210; 6 sieves, \$335; 8 sieves, \$425. Discount, 25 per cent.

Single Rittinger Percussion Tables, all the iron parts, \$350; Double Rittinger Percussion Tables, all the iron parts, \$500. Discount, 10 per cent.

Improved Rotary Tables, all the iron parts and pipes, \$200. Discount, 25 per cent.

Nails and Tacks.

Table with columns for Swedes and Tacks, listing various sizes and prices per dozen.

O. H. Swedes.

Price, same as Swedes. Swedes steel tacks same list price as iron.

Upholsterers.

Discounts, 7 1/2, 10 and 2 1/2. Price, same as Swedes.

Cut Tacks. Price per dozen ounces.

Table with columns for Cut Tacks, listing sizes and prices per dozen ounces.

Carpet Tacks, flat and oval heads.

Table with columns for Carpet Tacks, listing sizes and prices per dozen.

Finishing Nails.

Table with columns for Finishing Nails, listing sizes and prices per hundred.

Common and patent brads.

Table with columns for Common and patent brads, listing sizes and prices per hundred.

Oil.

Lubroline A cylinder oil 50 in. barrels. Lubroline D cylinder oil 40 in. barrels. Lubroline A machine oil 45 in. barrels. Lubroline B machine oil 35 in. barrels. Lubroline A engine oil 50 in. barrels. Lubroline B engine oil 40 in. barrels. In cases 5c gal. extra. Crescent Axle Grease.—Barrels, 3c per lb.; 100-lb. kegs, 3 1/2c lb.; 2-lb. decorated tins, \$12, gross less 5 per cent. Texas Star Axle Grease.—Barrel, 4, 2 1/2c per lb.; 100 lb. kegs, 3c per lb. See Axle Grease, page 2.

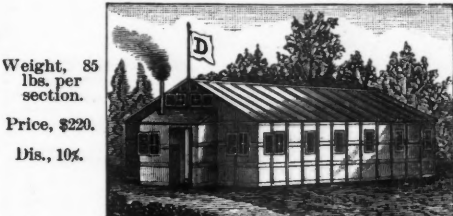
Packing.

Eureka, 75c. per lb. Dis., 40%. Soapstone—Standard, 8c. per lb. XX, 11c. per lb. Crown—No. 1, 23c. per lb. No. 2, 26c. per lb. Climax, 9c. per lb. Net. SELDEN'S PATENT. For Steam, Air, Water and Ammonia, With Rubber Core, 60 cents per lb. Dis., 25 and 5%. With canvas core, 50 cents per lb. Dis., 25 and 5%.

Portable Houses.



Weight, 450 lbs. Price, \$150. Closes securely. Dis., 10%.



Weight, 85 lbs. per section. Price, \$220. Dis., 10%.

No. 10.—26 x 33 ft., including veranda and rear extension. Main part, 19 x 26 ft. \$500.00 Dis., 10%.



F. o. h. Cars Chicago or New York

Table with columns for Size, Doors, Windows, No. porch, End porch, Side porch, listing various house sizes and prices.

Post Hole Diggers.



Little Giant..... \$36.00 doz 11 cu.ft. Hercules..... 30.00 " " " " New Champion.... 20.00 " " " " Scheidler..... 36.00 " " " " Dis. 40% f.o.h. New York or Boston.

Press.



Combined press for cutting, forming, horning and seaming. Particulars of flat front presses, including beds, slides, bolsters, plates, etc. Prices are net, delivered on steamers in New York, including insurance, etc.

Table with columns for Nominal size of press, Price, including et ceteras, Weight, about, Greatest diameter that can be wired, Greatest depth that can be wired, Hole through bed—circle intersecting, Hole through back—width, Width between die clamps—clear, Distance back from center of slide bar, Height to slide-bar when up, Stroke of slide-bar, Adjustment of slide-bar, Diameter of fly-wheel, Width of fly-wheel, Weight of fly-wheel, about, Speed per minute, about, Cubic feet boxed, about.

Printers' Sundries.

Wood rules, 12 cents per yard. Wood rules, on end wood, 15 cents per foot. EUREKA STAND, 12 full cases. Price without cases.....\$12.00 Boxing and cartage..... 1.25

SHOOTING STICKS.

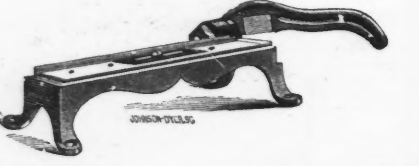


Each.  
No. 1, 75c.  
No. 2, \$1.  
No. 4, 45c., black.  
No. 4, 60c., bright.  
No. 5, 60c., black.  
No. 5, 75c., bright.

GAUGE PINS—ALL SIZES.  
Brass, 40c. doz. Steel, 60c. doz.  
Wire, 25c. doz. Golden, 40c. doz.

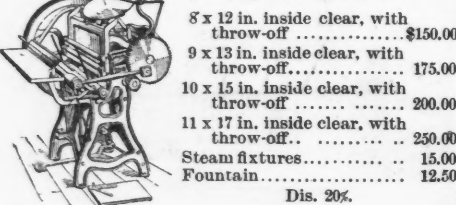
MITRE BOXES.  
Regular size, 2 in., 50c. each.  
Extra size, 3 1/4 in., 75c. each.

LEAD CUTTER.



Curtis' Lead Cutter ..... \$2.00  
PROOF PRESS, "OUR OWN."  
9 x 32, complete, with Brayer ..... \$28.00

THE GLOBE PRESS.



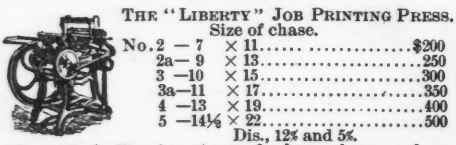
8 x 12 in. inside clear, with throw-off ..... \$150.00  
9 x 13 in. inside clear, with throw-off ..... 175.00  
10 x 15 in. inside clear, with throw-off ..... 200.00  
11 x 17 in. inside clear, with throw-off ..... 250.00  
Steam fixtures ..... 15.00  
Fountain ..... 12.50  
Dis. 20%.

THE "LIBERTY" CYLINDER PRESS.

For Newspaper and Job Printing.

Bed.	Form.	
No. 5-29 x 42	24 x 40	\$1,200
6-33 x 47	28 1/2 x 45	1,300
7-37 x 51	33 x 49	1,600

Dis., 20 and 5%.



THE "LIBERTY" JOB PRINTING PRESS.

No.	Size of chase.	
No. 2	7 x 11	\$200
2a	9 x 13	250
3	10 x 15	300
3a	11 x 17	350
4	13 x 19	400
5	14 1/2 x 22	500

Dis., 12% and 5%.

Two sizes built extra strong for boxmakers, embossing, etc.  
No. 3a-11 x 17 ..... \$375  
4-13 x 19 ..... 425

Fountains, either size, \$25 extra, if ordered with press.  
Steam fixtures, either size, \$15 extra.

THE AMERICAN CARD AND BILL HEAD PRESS.

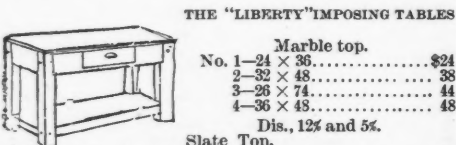
No. 5-4 x 6	\$14
7-6 x 9	38
8-8 x 12	61

Dis., 20% and 5%.



THE "LIBERTY" PAPER CUTTER.

Cuts 30 inches ..... \$140.00  
Extra knife ..... 18.80  
Dis., 12% and 5%.



THE "LIBERTY" IMPOSING TABLES

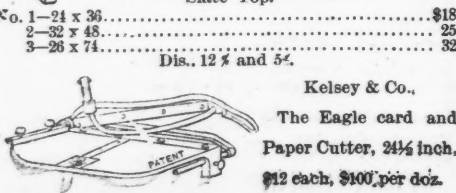
No.	Marble top.	
No. 1-24 x 36	\$24	
2-32 x 48	38	
3-26 x 74	44	
4-36 x 43	48	

Dis., 12% and 5%.

Slate Top.

No. 1-24 x 36	\$18
2-32 x 48	25
3-26 x 74	32

Dis., 12 1/2 and 5%.



Kelsey & Co.  
The Eagle card and Paper Cutter, 2 1/4 inch.  
\$12 each, \$100 per doz.

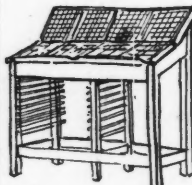
THE "LIBERTY" TYPE CABINETS.

Number of cases.	Stained.		Grained.	
	Flat.	Gal. ley.*	Flat.	Gal. ley.*
12 1/2	12.00	14.50	14.00	17.00
16 1/2	15.00	17.50	17.00	20.00
18 1/2	16.50	19.00	18.50	21.50
20 1/2	18.00	20.50	20.00	23.00
12 1/2	15.00	17.50	17.00	20.00
16 1/2	18.00	20.50	20.00	23.00
18 1/2	19.50	22.00	21.50	24.50
20 1/2	22.00	24.50	23.00	26.00
12 full	18.00	20.50	20.00	23.00
16 "	22.00	24.50	24.00	27.00
18 "	24.00	26.50	26.00	29.00
20 "	26.00	28.50	28.00	31.00

Number of cases.	Pine.		Cherry.		Napanoch.		Walnut.	
	Flat.	Gal. ley.*	Flat.	Gal. ley.*	Flat.	Gal. ley.*	Flat.	Gal. ley.*
12 1/2	18.00	21.00	20.00	23.00	22.00	25.00	23.00	26.00
16 1/2	22.00	25.00	24.00	27.00	26.00	29.00	27.00	30.00
18 1/2	24.00	27.00	26.00	29.00	28.00	31.00	29.00	32.00
20 1/2	26.00	29.00	28.00	31.00	30.00	33.00	31.00	34.00
12 1/2	18.00	21.00	20.00	23.00	22.00	25.00	23.00	26.00
16 1/2	21.00	24.00	23.00	26.00	24.00	27.00	25.00	28.00
18 1/2	23.00	26.00	25.00	28.00	26.00	29.00	27.00	30.00
20 1/2	25.00	28.00	27.00	30.00	28.00	31.00	29.00	32.00
12 full	18.00	21.00	20.00	23.00	22.00	25.00	23.00	26.00
16 "	22.00	25.00	24.00	27.00	26.00	29.00	27.00	30.00
18 "	24.00	27.00	26.00	29.00	28.00	31.00	29.00	32.00
20 "	26.00	29.00	28.00	31.00	30.00	33.00	31.00	34.00

\*Furnished with galley top and extra drawer for copy.  
Dis., 20 and 5%.

THE "LIBERTY" CASE STANDS AND RACKS.



Stands.  
Single, without racks ..... \$3.75  
" with racks for 8 full cases ..... 4.06  
Single, with racks for 10 full cases ..... 4.2  
Single, with racks for 12 full cases ..... 4.50  
Single, with racks for 14 full cases ..... 4.75  
Double, without racks ..... 4.25  
" with racks for 8 full cases ..... 4.50  
Double, with racks for 10 full cases, and gal. rest ..... 6.25  
" " " " 24 " " " " " ..... 6.50  
" " " " 24 1/2 " " " " " ..... 6.75  
" " " " 8 full and 8 1/2 cases ..... 5.00  
" " " " 8 " " " " " ..... 5.25  
" " " " 10 " " " " " ..... 5.55  
" " " " 12 " " " " " ..... 5.70  
" " " " 12 " " " " " ..... 6.05  
Stands with closed ends, extra ..... 2.00  
Extra slides for stands, each ..... .00

GALLEY RACKS.

From \$3 up.

LEAD CUTTERS.

From \$2 up.  
R and 5%.

THE "LIBERTY" TYPE CASES.

Name.	Outside Measurements.
Full size	32 1/2 x 16 1/2 x 19-16
Rooker size	28 1/2 x 14 1/2 x 19-16
1/2 size	26 x 16 1/2 x 19 1/2
1/4 size	22 1/2 x 16 1/2 x 19 1/2

Enlarged size ..... 32 1/2 x 25 x 23-16  
Wood type " ..... 32 1/2 x 23 x 19-16  
Mammoth " ..... 44 x 23 x 19-16  
Cabinet case sides extend 1 1/2 to 3 inches. In ordering cabinet cases, state whether high or low fonts are wanted.

THE "LIBERTY" STEEL SHOOTING STICKS.  
Bright, \$1 each.  
Nickelplated, \$1.25 each.  
Dis., 40%.

STANDARD METAL FURNITURE  
25c. a pound.  
In fonts of 25, 50, 75 and 100 lbs.  
Dis., 15%.

THE "LIBERTY" MALLET.  
Hickory, small ..... \$ .20  
" medium ..... .25  
" large ..... .30  
" iron bound ..... 1.00  
Lignum Vita, No. 4 ..... .30  
" No. 3 ..... .40  
" No. 2 ..... .50  
" No. 1 ..... .70  
Dis. 20 and 5%.

THE "LIBERTY" PLANERS AND PROOF PLANERS.  
Midget planer ..... 10c.  
Small Maple ..... 20c.  
Large ..... 25c.  
" b'ked with leather ..... 30c.  
Midget Proof planer, faced with cloth, 50c.  
Dis., 40%.

COMPOSING STICKS.



GROVER'S PATENT AND UNION.  
Screw or News.

6 in.	1.10	1.10
8 "	1.20	1.10
10 "	1.40	1.20
12 "	1.60	1.40
14 "	1.80	1.60
16 "	2.00	1.80
18 "	2.20	2.00
20 "	2.40	2.20

Composing rules, 14 ems pipe and under, 25 cents.

THE "LIBERTY" COMPOSING STICKS.

Size.	Price.	Size.	Price.
6 in., Steel	\$ .80	16 in., Steel	\$1.80
8 " "	1.00	18 " "	2.00
10 " "	1.20	20 " "	2.20
12 " "	1.40	Extra Clasp	.10
14 " "	1.60	Extra Knee	.40

Screw.  
6 in., Steel ..... \$ .75  
8 " " ..... .80  
10 " " ..... 1.00  
12 " " ..... 1.15  
14 " " ..... 1.30

Dis., 40%.

6 in., Steel ..... \$ .75  
8 " " ..... .80  
10 " " ..... 1.00  
12 " " ..... 1.15  
14 " " ..... 1.30

16 in., Steel ..... \$1.45  
18 " " ..... 1.60  
20 " " ..... 1.75  
Extra Knee ..... .30  
Screw and Nut ..... .10

Dis., 40%.

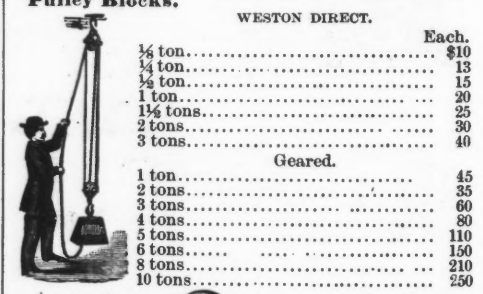
6 in., Steel ..... \$ .75  
8 " " ..... .80  
10 " " ..... 1.00

12 in., Steel ..... \$1.15  
Extra Knee ..... .30  
Clamp and Screw ..... .15

Other Sizes to Order.  
Dis., 40%.

6 in., Steel ..... \$1.00  
8 " " ..... 1.10  
10 " " ..... 1.20

6 in., German Silver ..... \$1.50  
8 " " ..... 1.75  
Extra Screw and Nut ..... .10



Pulley Blocks.  
WESTON DIRECT.

1/4 ton	Each \$10
1/2 ton	13
3/4 ton	15
1 ton	20
1 1/2 tons	25
2 tons	30
3 tons	40

Geared.

1 ton	45
2 tons	35
3 tons	60
4 tons	80
5 tons	110
6 tons	150
8 tons	210
10 tons	250

DOUBLE LIFT HOISTS FOR HATCHWAYS, ETC.

500 lbs.	\$25.00
1000 "	50.00
1500 "	65.00
2000 "	80.00
500 "	30.00



WESTON CRAB SAFETY BRAKE, HANDLES CAN NOT FLY BACK.

21	Each \$33.00
22	45.00
23	65.00
25	100.00

Pumps.

Prices on all pumps include cylinders.  
Price

No.	Dia.	Cyl.	Suction.	Cap.	stroke.	Iron.	Brass
0	2 in.	1 in.	1-15 gal.			\$3.50	
1	2 1/2 "	1 1/4 "	1-12 "			4.00	\$6.00
2	2 3/4 "	1 1/2 "	1-11 "			4.50	7.00
3	3 "	1 3/4 "	1-10 "			5.00	8.00
4	3 1/4 "	2 "	1-8 "			5.50	10.00
5	3 1/2 "	2 1/4 "	1-5 "			6.50	14.00
6	3 3/4 "	2 1/2 "	1-4 "			8.00	18.00
7	4 "	3 "	1-3 "			12.00	20.00

Dis., 65%.

Standard and Cylinder for 1 1/2 in. Iron Pipe,  
Dis., 55%.

No. 6 1/2, standard and cylinder, 1 1/2 in pipe, \$13.00.  
No. 7 1/2, standard and cylinder, 1 1/2 in pipe, \$15.00.  
No. 8 1/2, standard and cylinder, 1 1/2 in pipe, \$18.00.  
With hose and discharge pipe, add \$3.00 to list price.  
Dis., 55%.

No. 1, diam. cyl., 2 1/2 in.; cap. stroke 1-8 gal.; size pipe, 1 1/2 in. Price, iron, \$12.50; brass cyl., \$17.50.  
No. 2, diam. cyl., 3 in.; cap. stroke, 1-6 gal.; size pipe, 1 1/2 or 1 3/4 in. Price, iron, \$14.50; brass cyl., \$18.50.  
No. 3, diam. cyl., 4 in.; cap. stroke, 2-5 gal.; size pipe, 1 1/2 or 2 in. Price, iron, \$23.50; brass cyl., \$34.50.  
Dis., 55%.

No. 1, diam. cyl., 3 in.; suction, 1 1/2 in. cap. stroke, 3-10 gal. Price, iron, \$28.00; brass cyl., \$38.00.  
No. 2, diam. cyl., 4 in.; suction, 1 1/2 in.; cap. stroke, 1-2 gal. Price, iron, \$32.00; brass cyl., \$40.00.  
No. 3, diam. cyl., 5 in.; suction, 2 in.; cap. stroke, 6-7 gal. Price, iron, \$35.00; brass cyl., \$40.00.  
No. 4, diam. cyl., 6 in.; suction, 2 1/2 in.

cap. stroke, 1-5 gal. Price, iron, \$45.00; brass cyl. \$120.00.

No.	Diam. cyl.	Cap. stroke.	Stroke.	Pipe.	Price.
0	2 1/2 in.	1-11 gal.	7 in.	1 in.	\$21.50
1	3 in.	1-5 "	7 "	1 1/4 "	23.00
2	3 1/4 in.	1-3 "	7 "	1 3/4 "	25.25
3	4 in.	4-10 "	7 "	2 "	27.25
3 1/2	4 1/4 in.	1-2 "	7 "	2 1/4 "	30.50
4	4 1/2 in.	8-10 "	10 "	2 1/2 "	37.50
4 1/2	5 in.	1 "	10 "	2 3/4 "	44.00
5	6 in.	1-5 "	10 "	3 "	47.00

Dis., 40%.

No.	Diam. cyl.	Cap. stroke.	Diam. pipe.	Price.
1	2 in.	1-5 gal.	1 in.	\$39
2	2 1/4 in.	1-3 "	1 1/4 "	41
3	3 in.	1-2 "	1 3/4 "	45
4	3 1/4 in.	6-7 "	2 "	51
5	4 in.	7-8 "	2 1/4 "	63
6	4 1/2 in.	1 "	2 3/4 "	80

Dis., 40%.

With Tight and Loose Pulleys.

No. 1, cap. per rev., 1-6 gal.; size of pipe, 1 1/4 in.; price, iron, \$26; bronze, \$45.  
 No. 2, cap. per rev., 1-5 gal.; size of pipe, 1 1/2 in.; price, iron, \$31; bronze, \$55.  
 No. 4, cap. per rev., 1-3 gal.; size of pipe, 2 in.; price, iron, \$48; bronze, \$75.

Pulleys on Nos. 1 and 2 are 8 in. diam., 2 1/2 in. face; on No. 4, 12 in. diam., 3 1/2 in. face.  
 Balance wheels for above pumps, \$1, \$2, and \$3, according to size.  
 No. 2, 1/2 to 2 gal. per min.; length of drive pipe, 25 to 40 ft.; calibre of pipes, drive, 3/4 in.; discharge, 1/2 in.; price, \$9.  
 No. 3, 1 to 4 gal. per min.; length of drive pipe, 25 to 40 ft.; calibre of pipes, drive, 1 in.; discharge, 3/4 in.; price, \$11.  
 No. 4, 2 to 8 gal. per min.; length of drive pipe, 25 to 40 ft.; calibre of pipes, drive 1 1/4 in.; discharge 1/2 in.; price \$14.  
 No. 5, 3 to 14 gal. per min.; length of drive pipe, 25 to 40 ft.; calibre of pipes, drive 2 in.; discharge 1 in.; price \$22.  
 No. 6, 4 to 25 gal. per min.; length of drive pipe, 30 to 40 ft.; calibre of pipes, drive, 2 1/2 in.; discharge, 1 1/4 in.; price, \$40.  
 No. 7, 8 to 60 gals. per min.; length of drive pipe, 30 to 40 ft.; calibre of pipes, drive, 4 in.; discharge, 2 in.; price, \$75.  
 No. 8, 12 to 120 gal. per min.; length of drive pipe, 30 to 50 ft.; calibre of pipes, drive, 6 in.; discharge, 2 1/2 in.; price, \$125.  
 Dis., 4%.

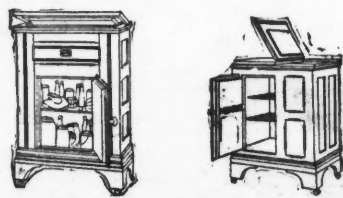
**Railroad Dumping Cars and Carts.**



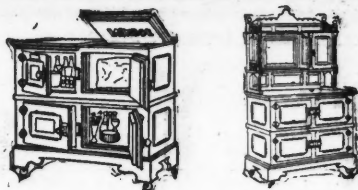
Cars.	Gauge.	Cap.	Net	Cap.	Net	Cap.	Net
Side Dumping	24"	1 c. y.	\$55	2 c. y.	\$65	3 c. y.	\$75
End	"	"	55	"	65	"	75
Revolving	"	"	70	"	80	"	90
Bottom	"	"	50	"	60	"	70
Tunnel	"	"	50	"	60	"	70
Mine	"	"	50	"	60	"	70
Plantation	30"	"	43	"	"	"	"
Logging	36"	"	170	"	"	"	"
	4' 8 1/4"	"	185	"	"	"	"
Hand	36"	"	45	"	"	"	"
	4' 8 1/4"	"	50	"	"	"	"
Push	36"	"	40	"	"	"	"
	4' 8 1/4"	"	40	"	"	"	"
R.R. Construction	36"	"	60	"	"	"	"
	4' 8 1/4"	"	65	"	"	"	"
Carts	4' 8 1/4"	"	65	"	"	"	"
Plantation	"	"	45	"	"	"	"
and Railroad	"	"	70	"	"	"	"
Wagons	"	"	75	"	"	"	"
McEwen Patent Dumping	"	"	175	1 1/2 "	"	200	"

\*These cars built of any gauge from 18" to 56 1/2" and of any capacity from 1/2 to 6 cu. yd.

**Refrigerators.**  
 Indurated Fibre and Stoneware-Lined.



No.	High.	Wide.	No. 75.	Deep.	85.	Price.
35	46 1/4	28 3/4	20 1/4	23 1/4	28	\$20.00
75	44 1/4	33 1/4	23 1/4	28 1/4	34	28.00
85	47 1/4	38	23 1/4	28 1/4	34	34.00



No.	High.	Wide.	Deep.	Price.
2	41	46	26	\$36.00
6	84	46	26	60.00

Mirror 16 by 18 in. Dis., 40 and 2 1/4%.

**Rat Traps.**



1 doz. in box.  
 1 gross in case.  
 \$30 per gross.  
 Dis. 50 and -0%.

**Roofing.**

CORRUGATED IRON.  
 2 1/4 inch corrugations.

Gauge.	Per square.
No. 18, painted red	\$9.10
No. 20, " "	7.60
No. 22, " "	6.50
No. 24, " "	5.35
No. 26, " "	4.65
No. 27, " "	4.35
No. 28, " "	4.00
No. 18, galvanized	13.30
No. 20, " "	10.60
No. 22, " "	9.10
No. 24, " "	7.45
No. 26, galvanized	7.05
No. 27, " "	6.95
No. 28, " "	6.75

Dis. 10% F. o. b. N. Y.

**Sash Chains.**



No. A. "Giant" metal, 15c. pr. ft., wts. not over 125 lbs.  
 No. 1. "Giant" metal, 12c. pr. ft., wts. not over 75 lbs.  
 No. 2. "Giant" metal, 10c. pr. ft., wts. not over 40 lbs.  
 No. 0. "Giant" metal, 8c. pr. ft., wts. not over 25 lbs.  
 No. 1. Red metal, 10c. pr. ft., wts. not over 40 lbs.  
 No. 2. Red metal, 8c. pr. ft., wts. not over 30 lbs.  
 No. 0. Red metal, 6c. pr. ft., wts. not over 15 lbs.  
 No. 1. Steel, 8c. pr. ft., wts. not over 75 lbs.  
 No. 2. Steel, 6c. pr. ft., wts. not over 30 lbs.  
 No. 0. Steel, 4c. pr. ft., wts. not over 15 lbs.  
 No. 1. Steel, black enameled, 9c. pr. ft., wts. not over 75 lbs.  
 No. 2. Steel, black enameled, 7c. pr. ft., wts. not over 30 lbs.

No. 0. Steel, black enameled, 5c. pr. ft., wts. not over 15 lbs.

Fastenings for hanging a window of 2 sashes for Nos. 1 and 2 chains, consisting of 4 hooks, 4 rings, 4 sash irons, a set, 18c. per set.  
 Fastenings for hanging a window of 2 sashes for No. 0 chains, 14c. per set.  
 Dis. on "Giant" metal chain 40 10 10%  
 " " Red metal chain 40 10 10%  
 " " Steel " 40 10 10%  
 " " Fastenings 40 10 10%

**Saws.**



PATENT GROUND AND TEMPERED  
 SOLID TOOTH CIRCULAR SAWS.

Diameter.	Thickness.	Size of hole.	Price each.	Extra for each additional gauge, heavier.	Prices for bevel-ling new saws, handling old saws, extra.	Per gauge.
1	24	1/2	\$0.50	\$0.01	\$0.06	
2	23	3/8	.60	.01 1/2	.08	
3	21	1/2	.70	.02 1/2	.10	
4	19	3/4	.90	.03	.14	
6	18	1	1.30	.05	.18	
8	18	1 1/4	1.75	.08	.22	
10	16	1 1/2	2.30	.12	.28	
12	15	1 3/4	3.00	.17	.35	
16	14	1 3/4	5.50	.25	.50	
20	13	1 5/8	8.50	.35	.70	
24	11	1 3/4	12.00	.55	.90	
28	10	1 1/2	16.00	.80	1.20	
32	10	1 1/8	20.00	1.00	1.40	
36	9	1 1/8	25.50	1.40	1.70	
40	9	1 1/4	35.00	2.00	2.00	
44	8	1 1/4	52.50	3.00	2.40	
48	8	1 1/2	70.00	4.00	2.80	
52	7	1 1/2	90.00	5.00	3.25	
56	7	1 3/4	115.00	7.00	3.75	
60	6	1 3/4	145.00	9.00	4.25	
64	6	2	180.00	12.00	5.00	
68	5	2	225.00	18.00	5.75	
72	5	2	290.00	24.00	6.55	
76	5	2	375.00	30.00	7.50	

Circular saws to cut metal or ivory, 50% advance. No extra charge for saws one gauge thicker than list. Circular saws beveled one gauge without extra charge up to 44 inches; 44 inches and larger, beveled two gauges without extra charge. Dis., 4%.

Hand-London Spring Steel; four brass screws. 26 in. \$30.00 per doz. Dis., 20%.

Hand-Skew Back Saw, Apple Handle; 5 screw. 26 in. \$22.00 per doz.

Hand-Grained Blade, Peec handle, polished edge; 4 screws. 26 in. \$20.00 per doz.

Dis., 20%.  
 One man Cross-Cut-Supplementary Handle.

3 ft. 3 1/4 ft. 4 ft. 4 1/4 ft. 5 ft. 5 1/4 ft. 6 ft.  
 Great American, \$2.75 \$3.00 \$3.50 \$4.00 \$4.50 \$5.00 \$5.50  
 Champion Tooth, 2.55 2.60 3.15 3.50 3.85 4.25 4.65  
 One man cross cut handles, \$4.50 per doz. Dis., 45%.

**Saw Set.**

Adjustable ball and socket saw clamp, Japanned, \$14 per doz.



Butter Trip Scales, slab, weights and scoop.

No.	Capacity.	Price.
No. 1	1/2 to 9 oz.	\$3.00
No. 2	1/2 to 12 oz.	\$4.00
No. 3	1/2 to 34 oz.	\$6.00
No. 4	1/2 oz. to 1 lbs., \$8.00	



Butter Trip Scales, slab, weights and scoop.  
 No. 7, 1/2 oz. to 10 lbs., 10 in. slab, without side beam \$10.50  
 " 8 " " 20 lbs., 12 in. " with " 11.50  
 " " " " " without " 12.50  
 " " " " " " 13.50

Tea Scales-All Seamless Scoops.  
 Capacity. Scoop. Capacity. Scoop.  
 1/4 oz. to 10 lbs. Tin ..\$8.00 1/4 oz. to 10 lbs. Brass .. 9.00

Druggists.  
 Capacity. Scoop. Capacity. Scoop.  
 1-16 oz. to 8 lbs. Tin ..\$10.00 1-16 oz. to 8 lbs. Brass .. \$11.00

Even balance trip scales, seamless scoop, with weights.  
 No. 1, capacity 1/2 oz. to 2 lbs., tin scoop, \$5.50  
 brass scoop, \$4.50  
 No. 2, capacity 1/2 oz. to 4 lbs., tin scoop, \$6.50  
 brass scoop, \$7.50  
 No. 2 1/2, capacity 1/2 oz. to 18 lbs., tin scoop, \$11; brass scoop, \$12.50.

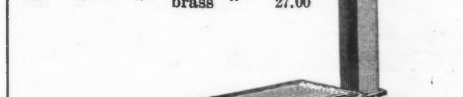


Counter.  
 Capacity. Scoop. Capacity. Scoop.  
 1/2 oz. to 36 lbs. Tin ..\$10.00 1/2 oz. to 36 lbs. Brass .. \$12.00

Grocer.  
 Capacity. Scoop. Capacity. Scoop.  
 1/2 oz. to 62 lbs. Tin ..\$12.00 1/2 oz. to 62 lbs. Brass .. \$14.00

Meat or Butter Scales, with Slab.  
 1/2 oz. to 62 lbs., with Single Beam ..\$14.00  
 Double .. 15.00

Patent Boston platform, 13 1/4 in. long by 10 in. wide.  
 Pillar, 18 in. high, double beam, marked both sides.  
 With large seamless tin scoop, \$25.00  
 brass " 27.00



Platform scales. -Without Wheels.  
 No. Capacity. Platform. Price.  
 1 400 lbs. 21 1/4 by 15 inches. \$23.00  
 2 600 lbs. 25 by 16 " 30.00  
 3 800 lbs. 25 by 17 " 34.00  
 4 1,000 lbs. 26 by 17 " 39.00  
 5 1,200 lbs. 28 by 20 " 45.00  
 6 1,600 lbs. 29 by 21 " 55.00  
 7 2,000 lbs. 32 by 23 " 70.00

With Wheels.  
 No. Capacity. Platform. Price.  
 1 400 lbs. 21 1/4 by 15 inches. \$26.00  
 2 600 lbs. 25 by 16 " 33.00  
 3 800 lbs. 25 by 17 " 38.00  
 4 1,000 lbs. 26 by 17 " 43.00  
 5 1,200 lbs. 28 by 20 " 49.00  
 6 1,600 lbs. 29 by 21 " 60.00  
 7 2,000 lbs. 32 by 23 " 76.00

Brass sliding poise at same price if so specified in order

**With Wheels and Drop Lever.**

No.	Capacity.	Platform.	Price.
4	1,000 lbs.	26 by 17 inches.	\$51.00
5	1,200 lbs.	28 by 20 "	59.00
6	1,600 lbs.	29 by 21 "	70.00
7	2,000 lbs.	32 by 23 "	82.00
8	2,500 lbs.	33 1/4 by 24 1/4 "	94.00
9	3,000 lbs.	38 by 30 "	125.00

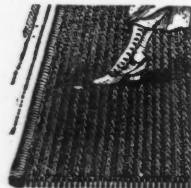


No. 1 cuts round metal up to 1/4 in. steel to 1/8, \$12.

No. 2 cuts round metal up to 1/4 in. steel to 3-16, \$20.

Discount, 25%.

**Steel Wire Mats.**



Galvanized Steel Wire.			(Style A)
No. 2.	Size	Each	"Hartman Flexible."
No. 3.	18x30.	....	2.00
No. 4.	22x36.	....	3.00
No. 5.	26x48.	....	4.50
No. 6.	30x48.	....	5.25
No. 7.	35x48.	....	6.50
No. 8.	38x60.	....	8.00
No. 9.	38x72.	....	10.00

Brass mats "Hist" double the price of galvanized Style A for similar sizes.  
3 doz. lots, dis. 33 1/3%.  
6 doz. lots, dis. 40%.  
12 doz. lots, dis. 40 and 5%.



**Screws.**

STEEL SCREWS ADD 50% TO LIST. Prices are per 100. Hexagon Cap Screws. Heads on Steam-tight Screws not polished, unless so ordered. Can make these 12 inches long.

Diam. head.	Length head.	Diam. screw.	Length under head.											
			7-16	1/2	9-16	5/8	3/4	13-16	7/8	1	1 1/8	1 1/4	1 1/2	
3/4	5-16	3/8	3/8	7-16	1/2	9-16	5/8	3/4	13-16	7/8	1	1 1/8	1 1/4	1 1/2
1	3/4	7-16	1/2	9-16	5/8	3/4	13-16	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2
1 1/4	1	9-16	5/8	3/4	13-16	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2
1 1/2	1 1/4	3/4	13-16	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3
2	1 1/2	1	1	1 1/8	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2
2 1/4	1 3/4	1 1/4	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4
2 1/2	2	1 1/2	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	4 1/4
3	2 1/4	1 3/4	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	4 1/4	4 1/2
3 1/2	2 3/4	2	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	4 1/4	4 1/2	4 3/4
4	3	2 1/4	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	4 1/4	4 1/2	4 3/4	5
4 1/2	3 1/4	2 3/4	2 3/4	3	3 1/4	3 1/2	3 3/4	4	4 1/4	4 1/2	4 3/4	5	5 1/4	5 1/2
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6	4	3 1/2	3 1/2	3 3/4	4	4 1/4	4 1/2	4 3/4	5	5 1/4	5 1/2	5 3/4	6	6 1/4
6 1/2	4 1/4	3 3/4	3 3/4	4	4 1/4	4 1/2	4 3/4	5	5 1/4	5 1/2	5 3/4	6	6 1/4	6 1/2
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8 1/2	5 1/4	4 3/4	4 3/4	5	5 1/4	5 1/2	5 3/4	6	6 1/4	6 1/2	6 3/4	7	7 1/4	7 1/2
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36	19	18 1/2	18 1/2	18 3/4										

60 days, 2% 10 days.

Vise.

No. 1. Solid Box Vises.

Each.	
No. 25, 3 3/4 in. Jaw	\$12.00
" 30, 3 1/2 "	11.00
" 35, 3 1/8 "	10.00
" 40, 4 "	10.50
" 45, 4 1/4 "	11.00
" 50, 4 1/2 "	11.50
" 55, 4 3/4 "	12.00
" 60, 4 1/2 "	13.00
" 65, 4 3/4 "	14.00
" 70, 5 "	15.00
" 75, 5 1/4 "	16.00
" 80, 5 1/2 "	17.50
" 85, 5 3/4 "	18.50
" 90, 5 1/2 "	20.00
" 95, 5 3/4 "	21.00
" 100, 6 "	22.00
" 105, 6 "	23.00
" 110, 6 1/4 "	24.00
" 115, 6 1/2 "	25.00
" 120, 6 1/4 "	26.00
" 125, 6 1/2 "	27.50
" 130, 6 3/4 "	28.00

Each.	
No. 135, 6 3/4 in. Jaw	\$31.50
" 140, 7 "	33.00
" 145, 7 1/4 "	35.00
" 150, 7 1/2 "	36.00
" 160, 7 3/4 "	41.50

Dis., 60 and 10%.

Each.	
No. 170, 7 1/4 in. Jaw	\$44.50
" 180, 8 "	47.00
" 190, 8 1/2 "	53.00
" 200, 8 3/4 "	56.00

Dis., 60 and 10%.



Adze Eye Coal Picks. Same list and dis. as No. 16.



Anthracite Coal Picks. Same list and dis. as No. 16.



Stone Picks, per doz. No. 18, 6 to 7 lbs...\$15.50. No. 18, 7 to 8 lbs... 17.50. No. 18, 8 to 9 lbs... 18.50. Dis., 60 and 5%.

Coal Picks.		Per doz.	
No.	Weight, lbs.		
16.	2 1/2	.....	\$8.50
16.	3	.....	9.00
16.	3 1/2	.....	9.50
16.	4	.....	10.00
16.	4 1/4	.....	10.50
16.	4 1/2	.....	11.00
16.	5	.....	11.50
16.	5 1/4	.....	12.00
16.	5 1/2	.....	12.50
16.	6	.....	13.00
16.	6 1/4	.....	13.50
16.	7	.....	14.00

Packages charged at cost. Dis., 60%.



Adze Eye Miners Picks—Surface, Drifting and Poll. No. 19, Surface, No. 1, 4 lbs...\$14.00. No. 19, " No. 2, 4 1/4 "..... 15.00. No. 19, " No. 3, 5 "..... 16.00. No. 19, " No. 4, 5 1/4 "..... 17.00. No. 19, " No. 5, 6 "..... 18.00. No. 19, " No. 6, 6 1/4 "..... 19.00. No. 19, " No. 7, 7 "..... 20.00. No. 20, Drifting, No. 1, 3 "..... 12.50. No. 20, " No. 2, 4 "..... 14.00. No. 20, " No. 3, 4 1/4 "..... 15.00. No. 20, " No. 4, 5 "..... 16.00. No. 20, " No. 5, 6 "..... 17.50. No. 21, Poll, No. 1, 3 1/4 "..... 15.00. No. 21, " No. 2, 4 "..... 16.00. No. 21, " No. 3, 4 1/4 "..... 17.00. No. 21, " No. 4, 5 "..... 18.50. No. 21, " No. 5, 6 "..... 20.00. No. 21, " No. 6, 6 1/4 "..... 21.50. Dis., 60, 10 and 5%.

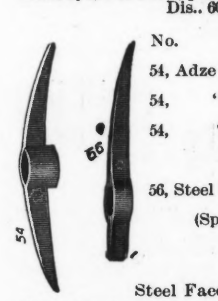
Tamping Picks.



Adze eye, 6 to 7 lbs., per doz., \$17. Adze eye, 7 to 8 lbs., per doz., \$18. Adze eye, 8 to 9 lbs., per doz., \$19. Hunt eye, 6 to 7 lbs., per doz., \$17.



Hunt eye, 7 to 8 lbs., per doz., \$18. Hunt eye, 8 to 9 lbs., per doz., \$19. Dis., 60 and 10%.



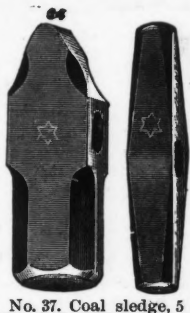
Ore Picks. No. 54, Adze Eye, 5 to 6 lbs.....\$12.00. No. 54, " 6 to 7 "..... \$13.00. No. 54, " to 8 "..... \$14.00. No. 56, Steel Lake Superior Mining Pick (Special Price and Quality.) Dis., 60 and 10

Steel Face Hammers.

No. 43, hand drilling hammers, 2 to 5 lbs.; No. 45, napping hammers, 2 to 5 lbs.; No. 39, mason hammers, 3 to 8 lbs.; No. 42, smiths' hand hammers, 2 to 5 lbs.; No. 44, smiths' striking hammers, 2 to 5 lbs., all steel face, per lb., 26c. Dis., 70 and 10%.



No. 43, hand drilling hammer, 5 lbs. and over, 36c.; 3 to 4 lbs., 40c.; under 3 lbs., 45c. per lb. Dis., 70 and 10%.



Steel Face Sledges. No. 34, Smiths' sledges, 6 to 30 lbs., steel face, 17c. per lb. No. 35, Stone sledges, 6 to 30 lbs., steel face, 17c. per lb. No. 36, Striking sledges, 6 to 30 lbs., steel face, 17c. per lb. No. 37, Coal sledges, 5 to 10 lbs., steel face, 18c. per lb.

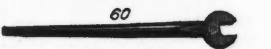
Cast Steel Sledges. No. 34, Blacksmiths' sledge, 5 lbs. and over, 30c.; 3 to 5 lbs., 30c.; under 3 lbs., 45c. per lb. No. 35, Stone sledge, 5 lbs. and over, 30c.; 3 to 5 lbs., 36c.; under 3 lbs., 45c. per lb. No. 36, Striking sledge, 5 lbs. and over, 30c.; 3 to 5 lbs., 36c.; under 3 lbs., 45c. per lb. No. 37, Coal sledge, 5 lbs. and over, 30c.; 3 to 5 lbs., 36c.; under 3 lbs., 45c. per lb.

Cast Steel. No. 42, blacksmiths' hand hammer, 5 lbs. and over 30c.; 3 to 5 lbs., 34c.; under 3 lbs., 45c. per lb. No. 44, drilling or striking hammer, 5 lbs. and over, 30c.; 3 to 5 lbs., 36c.; under 3 lbs., 45c. per lb. No. 45, napping hammer, 5 lbs. and over, 30c.; 3 to 5 lbs., 35c., under 3 lbs., 45c. per lb. Dis., 70 and 10%.

RAILROADS. Railway Track Punch



Round Point. 15c. lb. net. Track Wrench. 7 1/2 lb., net.



Ra Fork. 9c. lb. ret.



Crow Bars, Wedge Points, 3 1/2 lb., net. Pinch Point, 3 1/2 lb., net.



65 Tamping Bar, 6c. lb., net.



66 Claw Bar, 7c. lb., net.



Railroad Spike Mauls 6 to 16 lbs., Steel Face 18c. lb. Dis., 50, 10, and 5%.



Steel Track Chisel, 15c. per lb., net.



Railroad or Clay Picks.

No.		Per doz.	
11,	Adze eye, 4 to 5 lbs.	.....	\$11.00
11,	" 5 to 6 "	.....	12.00
11,	" 6 to 7 "	.....	13.00
11,	" 7 to 8 "	.....	14.00
11,	" 8 to 9 "	.....	16.00
11,	" 9 to 10 "	.....	18.00
12,	Hunt eye, 4 to 5 "	.....	11.00
12,	" 5 to 6 "	.....	12.00
12,	" 6 to 7 "	.....	13.00
12,	" 7 to 8 "	.....	14.00

Dis., 60 and 10%.

Mattocks—Price per doz.

2,	Adze Eye, Long Cutter, 6 lbs.,	\$16.00.
3,	Adze Eye, Short Cutter, 5 1/2 lbs.,	\$15.50.
2,	Adze Eye, Long Cutter, Light,	\$15.00.
3,	Adze Eye, Short Cutter, Light,	\$15.00.
4,	Hunt Eye, Long Cutter, 6 lbs.,	\$16.00.
5,	Hunt Eye, Short Cutter 5 1/2 lbs.,	\$15.50.

Adze Eye Pick		Mattocks.....\$16.	
Hunt Eye Pick		Mattocks.....\$16	

Dis., 60 and 10%.



Grub Hoes.

Western Pattern, No. 0, 3 lbs., doz., \$10.50. Western Pattern, No. 1, 3 1/2 lbs., doz., \$11. Western Pattern, No. 2, 4 lbs., doz., \$11.50. Western Pattern, No. 3, 4 1/2 lbs., doz., \$12. Baltimore Pattern, No. 1, 3 1/2 lbs., doz., \$11. Baltimore Pattern, No. 2, 4 1/2 lbs., doz., \$11.75. Baltimore Pattern, No. 3, 5 lbs., doz., \$12.75. Baltimore Pattern, No. 4, 5 1/2 lbs., doz., \$13.75. Dis., 60 and 10%.

CARPENTERS'.

BOXWOOD RULES.			
Two feet, four-fold, 1 inch wide.			
Plate.	Middle.	Edge.	Bound.
Round joint.....	\$4		
Square ".....	5	\$7	\$15
Arch ".....	6	8	16

Two feet, four-fold, 1 1/4 inches wide.			
Plate.	Middle.	Edge.	Bound.
Square joint.....	\$7	\$9	\$18
Arch ".....	9	11	20

Two feet, two-fold, 1 1/4 inches wide.			
Square joint.	Arch.	Arch.	Bound.
\$5	\$7	\$16	
12	14	24	

Gunter's Slide. Dis., 80, 10 and 10%.



LEVELS.			
10 to 18 to			
16 in. 24 in.			
Arch top plate, 2 side views..\$9.00			
\$12.00			

PLUMBS AND LEVELS.			
Arch top plate, 2 side views.			
12 to 18 to 24 to			
18 in. 24 in. 30 in.			
Polished.....	\$14.00	\$16.00	\$18.00
Mahogany.....	16.50	22.50	
Mahogany tip'd and lip'd	27.00		
Polished and lip'd.....		24.00	
Polished and tipped.....		28.00	
Polished, lip'd and tip'd			35.00

Mason's level, 2 plumbs, polished, 36, \$30.00. Mason's level, 2 plumbs, p'd and t'd, 36, 38.00. Mason's level, 2 plumbs, polished, 42, 38.00.

PATENT ADJUSTABLE PLUMBS AND LEVEL.			
Arch Top plate, 2 side views 26 to 30 in.			
Polished and lip'd.....\$27.00			
Polished and tipped..... 30.00			
Polished, lip'd and tipped..... 39.00			
Mahogany..... 27.00			
Mahogany, lip'd..... 33.00			
Mahogany, lip'd and tipped..... 48.00			
Polished, triple stock, lip'd and tipped..... 45.00			
Mahogany..... 60.00			
Rosewood, lip'd and tipped..... 90.00			

Dis., 70, 10, 10%

POCKET LEVELS.

Iron top, Japanned.....	2 00
Brass top.....	3 00

Dis., 70, 10, 10%.

SCREWDRIVERS.

Varnished handles, pat. metallic fastening. Size 1 1/4, \$1 per dozen; 2, \$1.50; 3, \$2; 4, \$2.50; 5, \$3; 6 \$3.50; 7, \$4; 8, \$4.75; 10, \$6; 12, \$8. Dis., 75 %.

BAILEY'S PATENT WOOD PLANES.

Smooth.	Handle smooth.	
9 x 8 3/4 in.	8 x 2 in. 9 x 2 in.	
\$2	\$2.50 each	
Jack.	Fore.	Jointer.
15 x 2 1/4 in.	20 x 2 1/4 in.	26 x 2 1/4 in.
\$2.50	\$2.75	\$3.25 each

Dis., 40, 10 and 10%.

PLANES, BAILEY'S PATENT IRON.

With pat. lateral adjustment.	
Smooth, 8 n. x 1 1/4 in.,	\$3;
in. x 2 in.,	\$3.25; 10 in. x 2 1/4 in.,
\$3.75 each.	
Jack, 14 in. x 2 in.,	\$3.75.
Fore, 18 in. x 2 1/4 in.,	\$4.75
Jointer, 21 n. x 2 1/4 in.,	\$6.50

each. Dis., 40, 10 and 10 %.

STANLEY IRON BLOCK PLANES.

3 1/4 x 1 in.	20c.
5 1/4 x 1 1/4 in.	40c.
7 1/4 x 1 1/4 in.	60c. each.

