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The out-put on the Barrier Range, Australia, notwithstanding the labor troubles and the complete shut down for 18 weeks will be surprisingly large. By special cable from Melbourne, courteously sent for use in compiling the mineral statistics for our forthcoming volume, *The Mineral Industry*, which will appear in January, we are informed that up to to-day the production has been 11,800,000 oz. of fine silver and 54,600 tons of 2,240 lbs. each of lead.

This production would undoubtedly have been larger if the supply of water had not failed, and, as a matter of course, if the strike had not been prolonged. The hopes of directors of the Broken Hill Proprietary Company who expected a total of at least 15,000,000 oz., from their own mine, have not been realized, but all things considered, they have reason to congratulate themselves that their production has approximated 8,500,000 oz.

The ore during the past year has averaged lower than in any previous period. The value per ton for the six months ending May 31st averaged £6 11s. 11d., as against a value of £7 18s. 1d. for the previous period of six months, £8 3s. 7d. for that before, and £9 7s. 7d. for the last half of 1890.

This confronts the company more and more with the serious and difficult problem of treating the low grade sulphide ores. If this is not successfully solved within a few years the production of the Barrier Range will continually decrease, until the less rebellious ores will be exhausted, when operations will necessarily cease. If, on the other hand, a process which can successfully combat with these difficulties is found, the production of both silver and lead from the enormous bodies of low grade ore will be an important factor in regulating the prices of these metals.

### THE GOLD-CLAUSE IN MORTGAGES.

Recently a paragraph discrediting the validity of the gold payment clause, now generally inserted in all mortgages for sums of moment, has been going the rounds of the press. It said:

"In opposition to the prevailing idea that bond and mortgage contracts can be legally made payable in gold, which contracts are to-day said to foot up into thousands of millions, in consequence of the usage which has lately existed to make such obligations payable in gold coin, the following summaries of decisions and statutes may prove of value: Jones vs. Smith, N. Y., 48 Barb., 552—The Supreme Court of State held that bill of exchange payable in specie is legally payable in greenbacks. Sanford vs. Hayes, Penn., 52, Stat. 9, held—Certificate of deposit payable in gold is satisfied by a tender of greenbacks of same nominal value. Indiana Bank of State vs. Burton, 27-426, held—The court cannot recognize any difference between the gold and greenback dollar. Appel vs. Waltman, Missouri Reports, 104, held—A tender of greenbacks cancelled a debt payable in gold. Nevada has decided that the special act of Jan. 4, 1868, providing that debts made payable in a certain kind of money shall be paid in such money, is in conflict with the acts of Congress making greenbacks a legal tender for debts, therefore Court cannot authorize judgment for gold coin. Sec. 3589 of Revised Statutes of United States says: 'United States notes shall be lawful money and legal tender in payment of all debts, public and private, except duties on imports and interest on the public debt.'"

Although not expressly stated, it is here intimated that bond and mortgage contracts can not be legally made payable in gold, which, if true, or even if it were only generally believed to be true, would, in the present unsettled financial state of the country, cause widespread alarm and possibly precipitate the crisis believed by many to be imminent. That the condition of our currency is critical there is, unfortunately, no doubt; gold is leaving us at a time of the year when precedent has taught us to expect importations of it, and at the same time that our gold reserve is being depleted the volume of our currency is being increased at the rate of \$4,500,000 per month.

This condition of affairs has produced a feeling of insecurity and lack of confidence generally, which of late has manifested itself in the insertion of a gold payment clause in bond and mortgage contracts whenever considerable sums are at stake. No one has had any doubt of the legality of such contracts, and the willingness of borrowers to make payment in gold has tended to allay alarm and strengthen a wavering faith in the ability of our Government to meet its obligations. In view of this, anything which discredits the legality of contracts specifically providing for payment in gold is an offense against the public weal.

To those well informed on the subject the above quoted paragraph may cause no alarm, but as there are some in whom it may create a renewed sense of uneasiness, the ENGINEERING AND MINING JOURNAL has thought fit to refer the question to one well versed in constitutional law, Mr. E. C. PERKINS, of New York, to whom our thanks are due, for the following opinion:

"The statement that a bond and mortgage contract cannot be legally made payable in gold is certainly inaccurate if not incorrect. It has been decided by the Supreme Court of the United States that the Legal Tender Acts do not apply to contracts expressly providing for payment *in specie*. The cases cited from the State Courts, if they hold as stated, are overruled by Bronson vs. Rhodes, 7 Wall. 71; Butler vs. Horwitz, 7 Wall. 253 and Trebilcock vs. Wilson, 12 Wall. 687; see also, 22 Wall. 109. The precise question involved was decided in Trebilcock vs. Wilson, Judge Field, who delivered the opinion of the court, said of the Legal Tender Act of 1862, which does not differ materially from that now in force, that it was not intended to interfere in any respect with existing or subsequent contracts payable by their express terms in specie; and that when it declares that the notes of the United States shall be lawful money, and a legal tender for all debts, it means for all debts which are payable in money generally and not obligations payable in commodities or obligations of any other kind.

"The case of Jones vs. Smith, N. Y., 48 Barb. 552 is incorrectly quoted and has been overruled.  
"The only possible danger that cannot be avoided by an express stipulation for payment of a debt in specie is, that Congress might hereafter pass an act expressly making some other form of currency a legal tender for the purposes of such repayment.  
"In the legal tender cases (12 Wall. 457) it was held that the act applied and was

valid to contracts made before its passage as well as those made after it, the Federal government unlike the States not being prohibited by the constitution from impairing the obligations of contracts, from which it logically follows that Congress has the power to pass an act making government notes a legal tender in cases where payment in specie is distinctly provided for.

"In the above cited case, Judge Field in his dissenting opinion suggests this very consequence of the decision, as an argument against it. He says (p. 673) 'the power to make the notes of the United States the legal equivalent of gold and silver necessarily includes the power to cancel with them *specific contracts for gold* as well as for money generally.'"

Briefly stated, the cases cited by Mr. PERKINS prove, firstly, that contracts can be legally made payable in gold, and that such payment can be enforced where it is specifically provided for; secondly, that Congress has the power to impair such obligations. It is not probable, however, that Congress will ever avail itself of this power, and therefore the custom of making contracts payable in gold may be considered safe and binding to take.

#### THE ARRASTRA IN THE METALLURGY OF GOLD.

The mule-driven arrastra, viewed from the standpoint of mechanical excellence, as an ore crusher, is a clumsy device, such as never could be successful except where steam power was wanting and animals cheap, or where only a small plant was wished. Notwithstanding the crudeness and simplicity of their construction, or, perhaps, on account of this, installations have been made, even in comparatively modern days, of several hundred in one hacienda in Guanajuato, Mexico. It has not been claimed by the metallurgists in charge of these plants that the arrastra was the most efficient of crushing devices, but that it furnished cheaply a product eminently well suited to the patio process.

It has long been a popular fallacy, firmly adhered to by that class of millmen who contend that hand-feeding to a stamp battery is preferable to mechanical feeding, that all rebellious gold ores amalgamate more perfectly in an arrastra than in a modern amalgamation plant with pans and settlers, or simply amalgamated copper plates. Annually a number of mechanical devices are patented which, the inventors assert, resemble the arrastra in their action, and for which are claimed all the supposed advantages of that ancient apparatus. It is but a few years since it was stated with all gravity concerning certain California mines that the former owners, using arrastras, managed to extract over \$500 per ton, while the company which purchased the property had to be content with less than a tithe of this. It is on such statements as this, loosely made and carelessly repeated, that the reputation of the arrastra mainly rests. As a matter of fact the superiority of the arrastra as an amalgamating apparatus for gold ores has never been clearly shown save in a few specific instances, and it is of two of these that we propose to speak.

The Bote Company in Zacatecas, an English corporation which has been in successful existence for many years, has an ore which contains a percentage of gold as well as a considerable quantity of silver. It has been well proven by the management, although we understand it is contemplating a change now, that the patio process was the one, all things being considered, best calculated for a successful beneficiation of its ore. But in this time-honored process experience has shown that the gold is but slightly attacked, and that the chemicals applied, as in our own pan amalgamation process, do not seem to increase the extraction of gold, however much they do that of the silver. The use of the patio having been, heretofore at least, obligatory, amalgamation of the gold in the arrastras has been applied with some success.

We have been informed by an engineer thoroughly conversant with the affairs of Zacatecas that here the surface of the close fitting cut stones forming the bottom of the arrastra are first coated with an amalgam of silver, and then to the ore, which is ground for 12 hours or more, sufficient mercury is added to form a dry amalgam, in the proportion of 1½ : 1, with the gold of the ore. A comparison of results with those obtained in a pan mill is not possible, but it certainly seems plausible that the amalgamation in the arrastra, where the ore is passed for fully 12 hours over an amalgamated surface, should be more efficient than the rapid flow over plates in the modern type of free gold mills, and it undoubtedly is. But the percentage of extraction of the gold in this favorable instance falls below what would be expected by the partisans of the process, being only 60 per cent.

It is interesting but not surprising, when Zacatecas conditions are considered, that an American company lately organized to operate there, installed arrastras driven by steam instead of a stamp mill, and this has been repeated in other parts of Mexico. By far the most convincing proof of the possible efficiency of the arrastra in the amalgamation of purely gold ores is obtained in Italy at the Pastarena mines, situated in the Val Anzasca. Stamps and amalgamated plates were tried here with the result that 65 per cent. only of the gold was obtained. As the ore was of low grade, higher extraction was necessary to earn a profit, and this has been accomplished in late years by the adoption of the Francfort mill, a modified arrastra, driven, in this instance, by steam. This mill is substantially a wooden pan, with dies and shoes of stone. Such an apparatus has been used in this country, but not to any extent.

At Pastarena 28 mills were used. Mercury was added to the pulp

when finely ground, and amalgamation and grinding the diluted pulp kept up for seven hours. From ore assaying \$12.30 a ton the mill extracted \$10.22 or 82½ per cent., and this for long periods of time.

The stone bed is said to last 10 months and the shoes from 6 to 8 weeks. The cost is said to be low.

It is quite possible that such an arrastra would work to the advantage of some of our ores, which require a longer period of amalgamation than the mere passing of the pulp over amalgamated tables. The installation is not costly, and while in any case a thorough test would have to be made before adoption, it would seem probable that in some instances it would be advisable. The drawback as a matter of course is the small capacity of the mill, it being usual to treat about 1,200 pounds only in 24 hours. However, the economic advantage of high extraction might outweigh this. This question is well worthy an investigation.

#### THE HISTORY OF SHIP TRANSPORTATION.

The interesting description of the Kioto Canal, Japan, in the issue of the ENGINEERING AND MINING JOURNAL of Dec. 17, spoke of the "very novel expedient" employed there, namely, transportation of the boats over a railroad in order to avoid locks. It is true that the installation, as a whole, with its employment of Pelton water wheels, dynamos and motors, driven by the water falling from the higher level, was exceedingly novel, but this usage of a cable plane is not modern; similar ones, as a matter of fact, have been in operation in Pennsylvania for over 50 years, and ones cruder, yet embracing the more essential features, existed centuries ago.

We are all familiar with the proposition of the late Cap'tain EADS, to build a ship railroad over the Isthmus of Tehuantepec, but the previous installations are comparatively so unknown that a brief survey of the history of ship railroads is not without interest.

There can be no doubt the origin of the ship railroad preceded the Christian era by many centuries. Indeed, so accustomed were the ancients to transporting heavy blocks of masonry large distances on rollers that it is not to be marveled that they made the application to ships where the circumstances required. It is known that ships were transported from the Ægean Sea to the Ionian so far back as 427 B. C., and at that time it was believed that the Dioclus, for such the crude railroad was called, had been in existence for over 300 years; some of the ships carried reached the length of 150 ft., and 18 ft. beam. It was indeed wonderful that the conveyance could have been made without seriously straining the framing of the vessel. It was unquestioned by the ancients that the railroad gave great commercial advantages to Corinth, and placed it in the front rank of maritime cities on the Peloponnesus. With the decay of the commercial supremacy of Greece this road was abandoned, and it is not until 1438 A.D. that we hear of another application of the principle, and that for warlike purposes. In that year the Venetians, following the plans of NICOLO SARBOLO and BLAISO DE ARBORIBUS, carried 30 galleys overland from the River Adegie to Lake Garda, 1,000 oxen, assisted by windlasses on the steeper grades, furnishing the motive power. One vessel alone was lost. The renown of this exploit was so great that it came to the ears of SOLEIMAN PACHA, who, in 1453, employed a similar expedient at the siege of Constantinople, transferring his fleet over timber ways, greased and laid on trestling and staging. By this move, which was accomplished in a single night, SOLEIMAN avoided the chain which formed an impassable barrier across the Hellespont, and succeeded in mooring his vessels in the Golden Horn under the walls of the besieged city, which soon capitulated.

In 1718 several vessels were conveyed from Stromstadt to Idelfal, in Sweden, by Count EMMANUEL SWEDENBORG, then an humble engineer, for which achievement he was ennobled.

In Cornwall, England, the canal boats on the Bude Canal, at Hobbacote Downs, ascend an inclined plane 900 ft. long, provided with two lines of rails, terminating at each end in the canals. The boats, which are provided with small iron wheels, are raised by an endless chain moved by two tanks alternately filled with water and descending into deep wells. There are seven such inclines on this canal, which was completed in 1826. In 1834 the Portage Railway, from Hollidaysburg to Johnstown, Pa., was completed to connect the canal systems of eastern and western Pennsylvania.

On this road, a system of gravity railways with 10 inclined planes, the large boats of the Pioneer Packet Line were carried up and down until the completion of the Pennsylvania Railroad. There was another portage of similar construction completed in 1831 on the Morris & Essex Canal, in New Jersey, and one proposed by JOSIAH WHITE in 1832 for the Lehigh Canal in Pennsylvania.

In 1860 Sir JAMES BRUNLEES proposed to the Emperor NAPOLEON III. a ship railroad across the Isthmus of Suez in lieu of the canal. It was referred by the Emperor to Marshal VAILLANT, then Minister of War, who, in turn, referred the project to M. DE LESSEPS, who rejected the plan. The proposed railroad was to have the advantage of greater speed,



20 miles an hour being proposed, and less first cost, the estimates being one-seventh of that of a ship canal. The railroad was to have been level throughout, and the ships were to have been supported on a framing of iron resting on wheels and springs and these again on ten rails.

In Germany vessels of 60 tons capacity have been carried for the past twenty years from the upper portion to the lower of the Elbing-Oberland Canal. In 1872 it was proposed by the Hondurenean Government to construct a ship railway across its territory from Puerto Cabellos to the Bay of Fonseca. Later, plans were prepared for a ship railway to overcome the cataracts of the Nile.

Then came Captain EADS' famous scheme for the Isthmus of Tehuantepec. The ship railroad in this case was to be 130 miles long between the Gulf of Mexico and the Pacific Ocean, with gradients of 50 feet to the mile.

One of the propositions which have the greatest feasibility is the Chignecto Ship Railroad, between the Bay of Fundy and the Gulf of St. Lawrence. Work on this was commenced in 1888. It is now three-fourths finished. Thus, we see that a ship railroad is not a modern idea by any means, save so far as the modifications which are required for vessels of larger tonnage are concerned. It must be confessed also that the canal-boat railway and gravity planes in place of locks, where great differences in elevation are to be overcome, is entirely feasible, and in the greater number of instances will effect a large saving in first cost. The Japanese engineers, who planned and constructed the Kioto Canal, are to be commended for their intelligent application of American and European ideas.

#### 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.

The Ropes Mine, Michigan.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In justice to those who are endeavoring to open the gold-bearing deposits of the Lake Superior mining districts I wish to correct the statements published in the Boston "Transcript" of the 20th inst. The Ropes mine is *not* about to wind up its business. A few unnecessary hands have been laid off. The work of mining mill rock will continue as usual and a limited amount of exploratory work will be done.

The 13th, 14th and 15th levels east are yielding good milling rock, the longitudinal extent of which has not yet been determined. The product of 40 stamps for November was about \$4,000 in bullion and \$700 net in concentrates. Some \$200,000 in assessments has been paid in and \$500,000 produced.

A careful study of the geological and mineralogical conditions here will convince the most skeptical that the possibilities are great and the work done is but a mere scratch. "L."

ISHPREMING, Mich., Dec. 6, 1892.

New Canadian Iron Fields.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR:—My attention has been drawn to an article in your issue of the 10th, headed "New Canadian Iron Fields," and signed "R. A. Parker." As this article is liable to be very misleading, though undoubtedly unintentionally, will you, in justice to our District, and to the owners of iron lands therein, allow me a few lines on the subject?

In the first place, the reader would naturally infer that the Atikokan, Arrow Lake and Gunflint Lake sections, referred to, were parts of the same belt or range, whereas the Atikokan belt is distant, at right angles to the general formation or strike, 60 miles from the Arrow Lake and Gunflint Lake belt (identical).

In the second place, it is insinuated that the presence of titanium is usual, or to be expected, in our ores. In the Atikokan belt no trace of titanium has ever been found at any point, and it has been repeatedly and thoroughly tested. On the Gunflint-Arrow Lake belt I have never yet heard of titanium having been found. In a letter from Dr. A. R. C. Selwyn, Director of the Geological Survey of Canada, dated January 23, 1891, he says: "Specimens obtained from the North Shore of Gunflint Lake, about 70 miles southwest of Port Arthur, collected by Dr. A. C. Lawson (Geol. Survey), gave: metallic iron, 61.08; insoluble matter, 19.65; titanic acid, none." In the same letter Dr. Selwyn says that specimens collected by himself from the same belt, but farther east, about 21 miles from Port Arthur, gave no titanic acid.

In conclusion, I may say that I do not know of one single instance in which any titanium has been found in any of the iron ores in the District of Thunder Bay.

PORT ARTHUR, ONT., Dec. 20, 1892.

W. W. RUSSELL.

Hydraulic Mining in British Columbia.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I wish to call the attention of your readers to the hydraulic mining ground in this Province, more especially on the Upper Fraser River. In early days, the surfaces of the bars and trenches were worked by means of small 12-in. sluices with a few inches of water and rockers, and by these primitive means very large quantities of gold were obtained. When the rich diggings at Cariboo were struck, the bars and trenches were abandoned for the new Eldorado, and until this last year no mining of this description has been carried on except in the primitive manner above mentioned. In February my firm sent out prospectors to examine the trench lands, and the reports being favorable, leases for 700 acres were taken up and applied for to the Government and some have been

granted. The ground in question is situated on the Fraser River, three miles above Lytton, on the Canadian Pacific Railway. The benches rise 110 ft. from high water mark and run back 1,200 ft.; the second bench rises 70 ft. above the first and runs back 600 ft. to the foot of the third bench, which rises 210 ft. and runs back some 1,000 to 1,500 yards. The Fraser River and Thompson River have evidently joined together at this point (at an earlier period), which is about two miles above the point where they now join. The whole of these benches are gold bearing, the most of the gold being of a coarse nature, and the fine portion can be saved by use of quicksilver and undercurrents. The water is obtained from Last Chance Creek, 1,000 to 2,000 in. and 3,000 in. from Steyne Creek, by means of ditches, 1½ miles in the former and 3½ miles in the latter case. Hydraulic mining can be carried on for ten months in the year. The ground was prospected by four shafts and two cuts, and the ground returned from a few cents to \$1.00 a cubic yard, averaging 10 cents a yard. In the middle bench a deep cut exposed the ancient channel of the Fraser River, and the ground on the edge of the channel gave \$1.00 a cubic yard in very coarse gold. 3,000 ft. of 18 in. diameter steel pipe, 11 gauge, have been laid from the upper bench to the face of the first bench on the Fraser River, having a head of 397 ft. A No 6 monitor is in use, with 14½-in. inlet and 9-in. outlet. The gravel is of moderate size and free, and it is estimated that the duty of the miners inch will be 5 cubic yards per diem.

It will thus be seen that the expected profits will be very large. Hydraulic mining was carried on for 60 hours, when work was suspended by a heavy fall of snow and frost, but everything worked most satisfactorily, and it is expected that work will be commenced again in February. Great interest is being taken in the development of this mine, as should the returns be in any way equal to the prospects given by the shafts and cuts, there will be one of the biggest excitements in hydraulic mining that has ever occurred on this coast. The amount of available hydraulic ground is very large, that on the Fraser River alone being as great in extent as the whole of the gravel deposits in California. We do not have to the same extent the cappings of lava and volcanic mud, and the amount of agricultural land that would be affected is infinitesimal.

In some parts of the province platinum exists with the gold in the gravel. In most localities there is abundance of water that can be utilized with small expenditure for ditches.

Our mining laws are very generous, aliens having equal rights with Englishmen. I cannot too strongly urge upon your readers who are interested in this class of mining the expediency of coming and "seeing for themselves." I shall take pleasure in forwarding to you the result of our first run.

VANCOUVER, B. C., Dec. 8, 1892.

#### PEAT AS FUEL.

In his presidential address to the English Society of Chemical Industry Dr. Emerson Reynolds took as his text the available sources of fuel and the exhaustion of our coal supplies. Among other fuels he devoted some attention to the value of peat as a fuel. Peat is an unmineralized coal, and consists, as coal does, of the remains of decayed vegetable nature. As an Irishman, Dr. Reynolds has devoted a good deal of study to the utilization of peat, as there is comparatively no coal in Ireland, whereas one-seventh of the whole of Ireland, or 3,000,000 acres, consists of peat bog. This great store of peat will form a valuable asset for the distressful country when our coal supplies run short, some 170 years hence.

Peat, however, well prepared, compares very unfavorably with coal in many ways. First, it is a very bulky fuel and its specific gravity is only 1-5th of that of coal. Secondly, it contains 15 to 25 per cent. of water and seldom less than 10 per cent. of ash. Thirdly, its thermal value is only 2-5ths of that of good English bituminous coal. Hence the thermal value, bulk for bulk, is only 1-13th of that of good coal. The use of peat is, therefore, at present greatly restricted. Efforts have been made from time to time to compress the peat in order to make it occupy less bulk. This process is of considerable advantage, for besides causing the peat to occupy much less volume, it gets rid of a large proportion of its moisture.

Extended trials of coal and good dense peat in steam engines have shown that the work done by one ton of peat was not more than 45 per cent. of that done by a ton of coal. So that before peat could be used as a fuel in competition with coal its price delivered would have to be reduced to less than 45 per cent. of that of coal. The present price at the bog in Ireland is 7 shillings per ton.

When peat is cut from the bog it contains quite 35 per cent. of moisture, so that it is absolutely necessary to stack and air-dry it before it can be sold. Thus in working the peat bogs a considerable amount of capital is sunk by the drying process.

Some 20 years ago, during the coal famine in Ireland, Dr. Reynolds proposed that the peat should be converted into gas in a Siemens furnace, as by this process drying could be dispensed with, and the ash would be got rid of. The suggestion was adopted at the Inchicore works of the Great Southern & Western Railway of Ireland, where it was used in connection with a Siemens regenerative gas furnace for working up scrap iron. Rough peat containing 35 to 40 per cent. of moisture was used, but no difficulty was found in keeping the welding chamber at a bright white heat for months together. The average consumption of peat was 5.09 tons per ton of finished iron forged from the scrap. Before this furnace was erected, an ordinary air furnace fed with coal was used, and the consumption per ton of iron was 4.96 tons of coal. So that the peat performed 97 per cent. of the work of an equal weight of coal. If, however, the coal had been gasified in the same way, only 3 tons of coal would have been needed for each ton of finished iron. Then the efficiency of the peat compared with coal would only be 60 per cent. Since that time Mr. Ludwig Mond has invented a process for the extraction of ammonia from gasified peat so that the process is made rather more practicable. Dr. Bindon B. Stoney has lately suggested that peat shall be used in the manufacture of water-gas by the continuous process, and that this gas be used for domestic and industrial purposes.

## PROGRESS OF GEOLOGICAL SURVEYS.

## ARKANSAS.

The Arkansas survey was begun with the expectation that the work should be brought to a definite end as soon as possible, and the Legislature of 1891 made the appropriations expecting that the work would be finished by the close of the present fiscal period which ends with the month of March, 1893. In view of these facts the past year has been devoted to gathering up the loose ends and rounding up the total results of the work of the survey since it was begun in 1881.

So far as the field work is concerned, the operations of the survey will be practically complete at the close of the present year, but the vast amount of material accumulated, the maps, sections and illustrations to be drawn and engraved, the chemical analyses to be made, and the writing and editing to be done, will not admit of the finishing of the reports by the end of the present fiscal term, or of their being printed, even if they were all now ready for the printer. The Legislature will therefore be asked to allow the reports to go over and to be printed during the next fiscal period.

Work has been carried on in forty-four counties with reference to the reports on marbles, coal, Tertiary geology, Lower Coal Measures, Benton county geology, mineral waters, clays, bauxites, kaolins, iron ores, novaculites, and zinc deposits.

The appropriations made by the last legislature for the survey for the period of two years are as follows: Salary of State Geologist, \$7,000; salaries of four assistants, \$15,600; contingent fund, \$10,000; total, \$32,600.

The printing, engraving, postage and stationery are paid for out of other appropriations for State purposes.

In the departure of Dr. Branner to accept the Professorship of Geology in Leland Stanford Junior University, the State of Arkansas has lost a most competent official. It was a mistake to limit the operations of the survey to a certain term of years, for the longer such work is continued under the direction of men like Dr. Branner the more valuable and indispensable does it become. A good geological survey is not of the nature of a bridge, built by contract and turned over to the owners at the expiration of a certain time. It is like a great railroad, on which the work of construction and improvement is always in progress. A survey planned on comprehensive lines should never come to an end.

## TENNESSEE.

The geological work done in Tennessee the past year has been very limited, owing to the fact that the last legislature made no adequate provision for such work. Extended field operations were out of the question. Certain local surveys, however, were made. One of these was a survey of a section of the western side of the Cumberland Mountain, well known as the Sewanee Region, forming the northeastern portion of Franklin County.

A report is in preparation which deals with the topography, geology, economical products and water supply of the region. The uppermost strata of the mountain here belong to the Coal Measures. These, less than 300 feet in thickness, are chiefly sandstones, and make the hard cap or floor of the mountain. Below the cap all is limestone, the thickness of which down to the level of the valleys is 800 feet. The Coal Measures in this region are the lowest and may be called Conglomerate Measures.

The section of the strata of the Sewanee Region is treated as a type of the measures of the western side of the Tennessee coal field, taking it along its entire extent, from Alabama to Kentucky. It consists, in a general way, of three sandstones and three coal horizons, each sandstone with a coal horizon below it. The coal horizons are shales, variable and subordinate in thickness. They may or may not contain coal. In the Sewanee Region, the upper sandstone is a great conglomerate, which may well be named the Sewanee Conglomerate. The middle sandstone is noted for its quarries, from which building stones are taken for use in Sewanee, and for shipment to Nashville, Chattanooga, Atlanta and other points. The coals are thin, but, in their northern extensions, often thicken and supply in some counties, as in White and Fentress, very important bodies of coal. The above will suffice to give an idea of the general drift of the report to be made. It may be well to caution the reader against inferring that the coalfield of Tennessee, as a whole, has suffered from denudation like its western side. Leaving the borders of the mountain, and going farther within its area, higher ground or terraces are met with, terraces in fact on the mountain, in which valuable beds of coal are found. For example 12 miles northeast from Sewanee, at Tracy City, one of these terraces appears in which is contained one of the most highly prized coal beds known in all southern Tennessee.

In addition to the survey noticed above, others of a local character have been made. These were chiefly in the part of our coal measures, on Cumberland Mountain, lying immediately west of Sequatchie Valley. In the sections surveyed, the coals both above and below the conglomerate are met with, the Tracy City bed being by far the most important of them all.

It is noteworthy that, in middle Tennessee, at a point in Stewart County, 50 miles northwest from Nashville, is an outcrop of dolomite, covering an area of nearly one square mile. In this, a quarry has been opened, from which a good quality of dolomite for furnace purposes is obtained. Much of this has of late been taken to St. Louis, where it is used in steel works. The rock is in demand.

So far as I can learn, there is no locality yielding such rock nearer to St. Louis than this. Before this the dolomite for these works was shipped from Alabama, at considerable expense. The outcrop in Tennessee is on the Memphis branch of the Louisville & Nashville Railroad.

The following are three analyses of the dolomite made in St. Louis:

	SiO <sub>2</sub>	MgCO <sub>3</sub>
1.....	0.42	49.09
2.....	0.78	38.80
3.....	1.36	35.26

## MISSOURI.

The principal subjects of work of the geological survey during the years 1891 and 1892, have been: 1. A general examination of the coal deposits of the State. 2. An examination of the iron ores. 3. An examination of the clay deposits, including a chemical and experimental investigation of the quantities of the principal clays. 4. An examination of the building stones. 5. A study of the mineral waters. 6. A general examination of the zinc and lead deposits. 7. A review of the metallurgy of lead in the State. 8. A study and review of the paleontology. 9. A study of the crystalline rocks of the southeast. 10. A general study of the glacial deposits. 11. Detailed mapping in two sections of the State.

Further, among minor subjects of the work, a large amount of statistical material has been collected for the purpose of preparing an historical sketch of the progress of mining in the State, and of the production of minerals from the inception of mining to the present time. For the purpose of preparing a dictionary of altitudes and a hypsometric map of the State, profiles have been collected of nearly all the railroads in the State, and the results of other leveling have been secured. Surveys have also been made for the construction of models to illustrate occurrences of special importance and interest.

Large additions have been made to the collections of the survey. The general examination of coal deposits have been made in 25 counties. This work has been prosecuted by Mr. Arthur Winslow, State Geologist. As a partial result a preliminary report on the coal deposits of the State has been issued and much additional material for a detailed and exhaustive report has been collected.

In addition during the past two years, chemical work has been done on 68 samples of different coals.

The work on iron ores had been in charge of Mr. Frank L. Nason, assistant geologist, and Mr. E. H. Lonsdale. The work was not begun until the summer of 1891, yet a report of over 400 pages has already been prepared and printed.

An examination of the clay deposits has been made in 80 counties. In addition experimental work has been done on about 50 samples of clay and 55 analyses have been made. The examination of the clays has been in charge of Prof. H. A. Wheeler, assistant geologist, of St. Louis, and Mr. Leo Gluck. The experimental work on these clays includes tests for plasticity, shrinkage and refractory qualities.

A study of the mineral waters has been made in 20 counties: St. Louis, Jefferson, Perry, Madison, Howell, Berry, Newton, McDonald, Vernon, Camden, Laclede, Benton, Morgan, Pettis, Jackson, Saline, Howard, Henry, Cedar, Cass.

About 80 springs have been visited and samples of water for analysis have been collected from a large number. Since that time some 36 analyses of waters have been made. In all very nearly 50 analyses have been made during the years 1891 and 1892.

The study of mineral waters, originally in charge of Mr. A. E. Woodward, assistant geologist, has been continued by Prof. Paul Schweitzer of Columbia. The work includes many chemical analyses as well as investigations at the springs. A report of over 250 printed pages has been prepared and printed.

A general examination of the zinc and lead deposits has been made in 41 counties. The examination of the zinc and lead deposits during the past year has been in charge of Mr. Winslow, the State Geologist, assisted by Mr. J. D. Robertson. Field work has been prosecuted in all sections of the State and the preparation of the report is now begun.

A study of the paleontology has been made in 26 counties. Mr. Chas. R. Keys has acted as paleontologist during the past two years. As an outcome of his work a valuable report on the paleontology of the State is now prepared, which will make some 500 printed pages and will be accompanied by over 50 plates of illustrations.

The entire area of Archaean or crystalline rocks in southeastern Missouri, has been mapped during the past years. This work has been continued by Prof. Erasmus Haworth, and the field work is completed. The report on this subject is now nearly entirely written.

During the past summer work on the Quaternary has been extended, and especial attention has been given to the margins of the glacial drifts and loess, and these were traced almost entirely across the State. This work is being prosecuted by Prof. J. E. Todd.

The following areas embracing nine sheets have been covered by detailed mapping: Randolph, Macon and Chariton counties, 240 square miles; Ray County, 230 square miles; Madison, St. Francois, Ste. Genevieve, Washington, and Jefferson counties, 400 square miles; Henry and Benton counties, 460 square miles; Jasper and Newton counties, 400 square miles; Polk County, 230 square miles; total, 1,960 square miles.

These, added to the 1,574 square miles mapped during 1891, makes a total of over 3,500 square miles, representing 14 sheets, of which field work is completed to date.

During the past two years some 2,500 specimens have been added to the survey collection, the larger portion of which have been examined or labeled and filed away for future study and use. A large number of these have been prepared and mounted and are now on exhibition in the survey cabinet. The collections of the survey now number about 5,000 specimens.

**Testing Briquettes of Cement.**—In this country a good deal of difficulty is experienced in testing cement, because of the liability of the briquettes breaking through the head instead of at the smallest cross-section. This irregular fracture can in most cases be attributed to the fact that the jaws grip the briquette along a line, instead of the surfaces of the jaws being in contact with the briquette over a considerable surface. In Europe a different form of jaw is employed, and according to the researches of a French Government commission of engineers, there are in consequence fewer cases of irregular fracture. In this report they say that these better results are due both to the form of the briquette, which is molded with a groove in its center, and to the form of the grip, which instead of being sharply convex, and thus affording only a small surface of contact, has a large radius of curvature at the point of contact,



A CHINESE SYSTEM OF GOLD MINING.\*

By Henry Louis, A. E. S. M., etc.

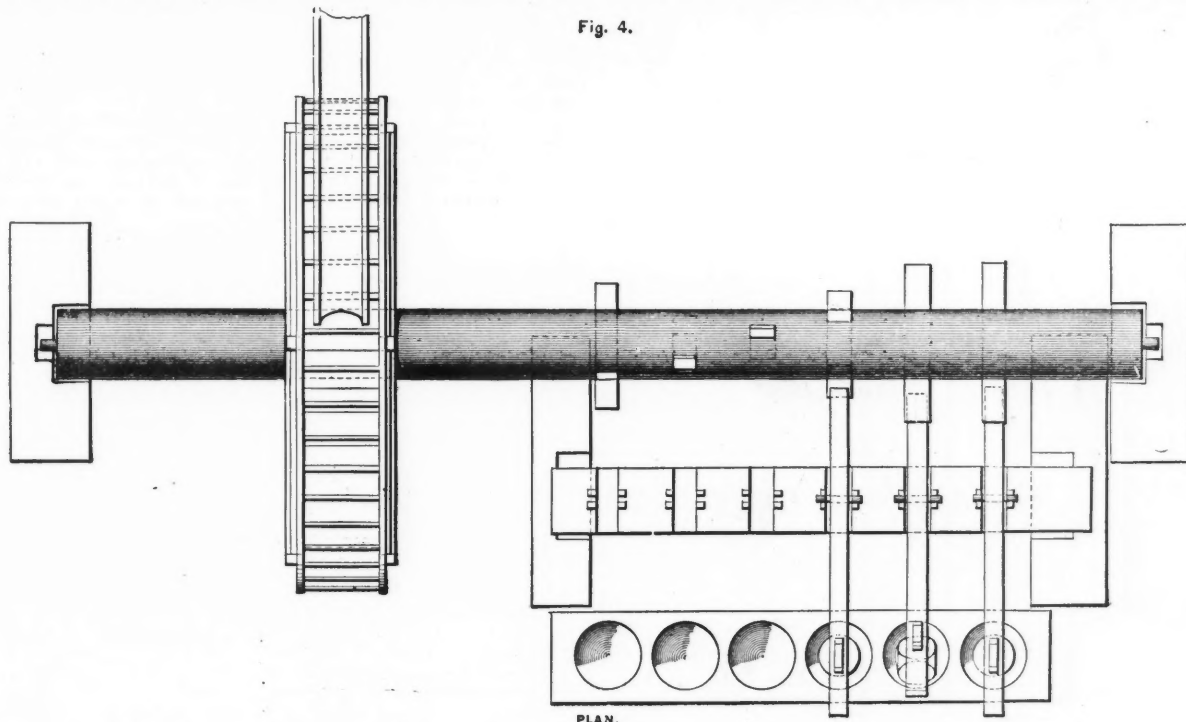
The District of Tomoh, one of the Siamese-Malayan states, has been worked for gold by the Malaysians and Chinamen for 150 years. The methods pursued are, of course, exceedingly primitive, but a record of them will be useful in compiling a history of gold mining and gold milling. In early times the Malaysians used to work the alluvial deposits for gold, but, after these deposits had been exhausted, they ceased regular operations, because they did not relish the continuous hard labor requisite in working the quartz reefs. Immigrant Chinamen afterward appeared on the scene and applied their energies with success. Every now and then the Malaysians would descend on the Chinamen's camp and exterminate it. This they did partly for recreation and partly to capture the proceeds of the Chinamen's hard work. Such disasters did not prevent other companies of immigrants from coming to the gold fields; and so, with a few breaks of this kind, the deposits have been worked continuously to the present day. Very few Europeans have ever been allowed to come near the workings; in fact, I believe that I was only the fourth foreigner that had ever been there.

This gold occurs in narrow veins and leaders of quartz intersecting and intercalated among irregularly upheaved and contorted highly metamorphosed micaceous and chloritic schists. The veins vary from three inches to three feet in thickness and are sometimes very rich. The extreme heat and moisture of the climate have in many places changed the rock to soft red, purple and yellow clays to great depths. In mining the gold a small water-furrow is first brought in at the highest possible level on a suitable hill side, and the stream is turned down the hill. By means of this stream and a heavy ironshod crowbar the earth and surface rock are

On each shift, day and night, two men look after and feed the mill, while a third does the sieving. Another man is usually employed in searching for bowlders suitable for hammer heads. On examining the crushed ore, I found it varied very much in fineness, and that a great deal was crushed far too fine. The size of the hole used at the power hammer is the same as with the foot power hammer, viz., 0.05 in., and fully 80 per cent. will go through 0.024 in. holes, and 40 per cent. will go through 0.008 in. holes.

This crushed ore is periodically taken out in wooden pails to another Chinaman, who sits beside a reservoir of running water and works the "dulang." This washing implement is an obtusely conical wooden dish about 2ft. in diameter, cut from the spurs of hard-wood trees. It resembles the South American "batea," though it has straight conical sides instead of curved conical ones. The conical point is carefully rounded off. The dulang is filled with 10 to 15 lbs. of crushed ore and is given the usual panning motion, while held just under the surface of the water in the reservoir. The barren pieces of quartz escape over the edge. When nearly cleaned the gold and concentrates are transferred to a smaller, very carefully made and polished dulang about a foot in diameter. The final separation of the quartz is effected here, and the gold is separated from the sulphurets by a skillful jerk. The sulphurets are stored and sometimes, but not always, treated for the recovery of gold. The gold from the dulang is melted over a small forge provided with a box-shaped wooden blower of the usual Chinese type. Charcoal is used as fuel, and the crucibles employed contain only about a couple of ounces. The gold dust is melted with borax and nitre as fluxes, and the slag is lifted off with an iron rod. The gold is granulated by immersion in water. The principal impurities appear to be sulphur, arsenic, and traces of copper and lead.

During my stay a wash-up of 2,000 lbs. of crushed ore was made, with what was considered as good results. From this 2,000 lbs. there were



WATER-POWER QUARTZ-CRUSHING MILL, PACHO NEAR TOMOH.

Scale 1/2 inch = 2 feet.  
Am. En. Note Co., N.Y.

broken and sluiced away. Any pieces of gold-bearing quartz that are seen in the tail race are picked out, but hardly any efforts are made to recover the loose gold. The surface of the shales which have been laid bare by the crowbars and water current are then searched for quartz veins. The quartz is dug out by rude picks and carried in baskets to the crushers. The excavations generally go in an upward direction into the side of the hill, but they cannot go far on account of the impossibility of preserving timbers in such a damp climate. The work of mining is done very slowly; a party of 27 miners, on my visit, considered half a ton of quartz as a very satisfactory day's output.

The quartz on being extracted is broken with hammers so as to pass a 1 1/2 in. ring and is then carefully hand-picked to separate the apparently barren rock from pieces showing visible gold and sulphurets. I say "apparently" barren rock because on assaying many samples of this refuse I have found from three to ten pennyweights per ton in it. The crushing of the ore is effected by tilt hammers, worked either by foot power (as in Fig. 1), or by water power (as in Fig. 2). The foot power hammer is the older type; and the water mill, in batteries of from three to six hammers, was introduced first about 12 years ago. The foot power mill is made entirely of wood with the exception of the hammer head, which is of hard quartzite. The mortar is also cut out of a solid piece of quartzite. A man working eight hours will crush from 70 lbs. to 100 lbs. of stone to a size which will go through a width of mesh equal to 36 to 40 holes per square inch, the sieve being made of strips of rattan one-tenth inch thick. The hammers of the water mill are worked by long, straight cams, if such a term is permissible. The average number of drops for each head is 27 to 32 per minute; the height of drop is two ft., and the effective falling weight is 70 lbs. The crushing capacity of a six-hammer mill varies from 850 to 1,400 lbs. per 24 hours, according to the hardness of the rock.

obtained the following: Rough gold before melting, 3 oz 11 dwts. 7 gr.; 5 1/2 lbs. of sulphurets for retreatment, yielding 16 dwts. gold; 28 1/2 lbs. of sulphurets supposed to be cleaned, yielding 6 dwts. of gold; total gold, 4 oz. 13 dwts. 7 gr. These two parcels of sulphurets gave by fire assay, per ton of 2,240 lbs.: No. 1, gold, 273 oz. 9 dwts. 13 gr., and silver 30 oz. 7 dwts. 3 gr.; No. 2, gold, 21 oz. 5 dwts. 8 gr., and silver 2 oz. 1 dwt. 16 gr. The tailings from this washing gave from fire assay, per ton of 2,240 lbs.: Gold, 15 dwts. 16 gr., and silver 7 dwts. 12 gr. As a general rule about one-third of the gold is left in the tailings. A rich ore assayed by me gave, per ton of 2,240 lbs.: Gold, 6 oz. 12 dwts 15 gr., and silver 1 oz. 1 dwt. 9 gr. The tailings assayed: Gold, 2 oz. 16 dwts. 10 gr., and silver 5 dwts. 6 gr. The Chinese consider that they obtain one-half of the gold in the ore.

**New York Rapid Transit.**—The scheme for building an underground railroad under the line of Broadway, this city, has fallen through entirely. On Thursday last the franchise was publicly offered for sale at the City Hall. There was only one bidder, and his bids were not considered advantageous to the public. The Rapid Transit Commissioners, therefore, stated that the tunnel scheme would have to be put on one side, and schemes for more elevated roads brought forward. The solitary bidder was a Mr. Amory, but it is not known what corporation or interests he represented. No doubt the great first expense and time occupied before a chance of earnings deterred capitalists from coming forward. The prospect of further elevated roads, however, is far from pleasant. The only route for another elevated road that would be useful and feasible would be up Centre street and Fourth avenue. Further up than Forty-second street, the tracks would have to be built over the tracks of the New York Central & Hudson River Railroad. Public opinion would be too strong against the use of Broadway for such a purpose.

\* Abstract of a paper read before the A. I. M. E., See Oct. 1891.

## PETROLEUM TANK STEAMERS.

Until the year 1886 American petroleum was shipped to Europe in sailing vessels, and while on board it was stored in barrels. The usual cargo was from 7,000 to 10,000 barrels, and in a few cases as many as 14,000 barrels were carried at one time. No firm of underwriters would insure a steamer laden with oil in barrels nor could a crew be found that would risk the danger of being burnt out of their ship. About the year 1880 one of the Baku oil owners organized a fleet of tank steamers to carry oil across the Caspian Sea to the mouth of the Volga, but the distance traveled is small, and no rough weather is met with on the Caspian Sea. Such craft would not be seaworthy even in the Mediterranean and are not to be compared with the modern tank steamer. They are only noteworthy on account of their having been the earliest forerunners of the modern system of ocean transport. In the year 1886 Riedemann & Schutte, of Bremen, first conceived the idea of adopting the tank system to their ocean traffic, and they accordingly fitted out one of their sailing ships with a series of seventy tanks made like horizontal boilers. These tanks were connected together with tubes and the end ones were left empty to allow for expansion. Their total capacity was 2,000 tons or 13,400 barrels. It was difficult to effect an insurance on this steamer, and harder still to get a crew. Still at the end of 1886 she sailed away from America for the first time, and after that time she performed several successful voyages, until she was finally wrecked on the British coast. Her success encouraged the owners to continue this method of shipment, but they decided to try steamers instead of sailing ships. Their first steamer was built at Newcastle-on-Tyne, and ever since the use of tank steamers has increased. At first the tank system had its violent opponents among the work-



CHINESE FOOT-POWER MILL.

men here, for the loading and unloading was of course done by steam pumps out of and into storage reservoirs instead of by manual labor as heretofore. The seamen also objected on account of the danger from fire, and the Standard Oil Company itself looked askance at it, for the disuse of barrels would throw their cooperage establishment out of work. The Knights of Labor had to be restrained by the police from interfering with the loading of the ships, and it was only with great difficulty that the first cargo was put on board. The new system was worth fighting for, as it enabled the shippers to deliver the oil much more rapidly. The old sailers which carried the oil in barrels used to take 45 days for the voyage from America to Bremen, and 35 days were occupied in the return voyage. Then it took a month to load and another to unload, so that a vessel could only make at the most three round trips a year and deliver 40,000 barrels during that time. A steamer, however, will make the voyage in 14 to 17 days, and requires only 5 days to load and 5 days to unload, so that it can make seven round trips every year and deliver five times as much oil. In the construction of tank steamers the chief points to be taken care of are to protect the oil from the heat of the furnaces by means of water spaces and to construct the tanks in such a way as to allow for the expansion and contraction of the oil. The latter point has caused the most trouble, for in most of the ships vacant spaces were left to provide for this expansion. These spaces are naturally usually filled with air and petroleum vapor, and many explosions have resulted. The latest arrangement to prevent these disasters is to form the upper part of the tanks in the shape of a hydraulic cylinder, and to allow for expansion and contraction by means of the movable piston whose rod passes through a stuffing box in the top of the tank. Such a construction will probably obviate all the danger that has hitherto been met with in tank steamers.

## SLAG POTS USED IN LEAD SMELTING.\*

By H. O. Hofman.

Twelve ordinary slag pots, 24 inches in diameter and 15 inches deep, are sufficient for a 33 by 100-inch furnace. Considerable improvements have been made in the construction, the aim being to make them light without diminishing their strength.

Figs. 125 to 128 show the usual paraboloid form of a slag pot with the ordinary compression-spoke wheel, the spokes being wrought iron, the axle machine steel. The length of the handle is 5 feet, the height of the crosspiece above the ground 2 feet 8 inches.

In order to lessen the friction at the hub, roller bearings (a, Figs. 128-131) have been introduced with satisfactory results.

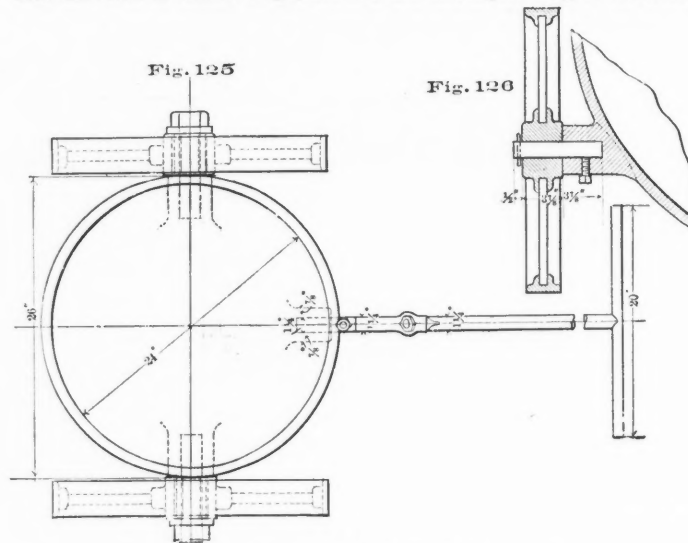
Terhune, Figs. 132 and 133, has made the bottoms of slag pots movable, so that they can be replaced when corroded or cracked.

When matte and slag are being tapped, there is danger that they may not separate well. To assist their doing so several slag pots have been constructed.

The Hles-Keiper pot is a large overflow pot which retains the matte, while the slag runs over through a spout in the side into an ordinary slag pot. To prevent the melted mass from solidifying, the pot has a cast-iron cover. Overflow pots have been used for a good many years. At some works the slag is allowed to harden in them from the surface down to a depth of several inches, the inlet and overflow for the slag being kept open. Thus the hardened slag, taking the place of the iron cover, prevents the liquid slag below from cooling, and promotes a good separation of matte and slag.

Werner has patented a slag pot which permits the separate pouring off of the bulk of the slag. On the rim of the bowl opposite the handle a segmental cover is pivoted, which is provided with a spout for the discharge of the slag. When the pot is filled, the slag is allowed partly to solidify, is then broken, the pot tilted, and a certain amount of the still liquid slag is allowed to run out, the remainder solidifying with the matte and speiss, and being removed with them. The writer has never seen this pot in use.

A third method, and the one in common use for preventing a loss of metal by shots of matte adhering to slag, is to allow the matte to settle in a catch pot and then to tap the still liquid slag above the level of the matte. Thus the matte in the bottom of the pots remains undisturbed, and the shell of chilled slag (that included the liquid slag) is recovered



SLAG POTS USED IN LEAD SMELTING.

and smelted over again, as it is the only part of the entire slag that is liable to be rich. Several patents have been taken out for different applications of this method. The catch pot of Murray (not patented), shown in Figs. 134-139 will serve to illustrate the third method. The pot has a cast-iron bowl of the usual paraboloid form, but  $3\frac{1}{2}$  inches above the bottom is the tap-hole a, through which the liquid slag is discharged after the matte has settled out. To prevent injury to the pot at the tap hole, when this is opened with a steel bar, the casting is made thicker by a ring b, ending in a rib c, which reaches the top.

In this pot is seen a third class of wheel. The hub d has alternate spoke sockets e and e', similar to those of the tension-spoke wheel. This wheel is more common than the ordinary compression-spoke wheel, as it is stronger.

The Nesmith Dumping Car, Figs. 140-144.—The object of this car, with its two large tilting pots A, A, is to convey the waste slag from a number of catch pots near the furnace building to the edge of the dump and to discharge it there. By this means the distance that the pots receiving the slag from the furnace have to be wheeled is shortened, and the disposal of the waste slag cheapened. Each tilting pot has a capacity of 7.38 cubic feet, and holds about 1,280 pounds of slag. The car consists of a truck frame a, with platform b, brake c, and railing d, by which the driver holds on. The frame carries the boxes e for the axles f of the wheels g. Two bridge beams h, lying transversely across the frame a, serve as support for the frame h', which carries the central pin socket m, in which the pin n is made fast by the nut n'. The swinging frame consists of the channel irons j, j (held apart by the central blocks j', j', in which are the swivel eye and the end blocks j', j') and the

\* From "The Metallurgy of Lead," by H. O. Hofman. Copyright, Scientific Publishing Company.





beams k, k (resting on the channel irons); the latter have on their under side the bearings of the trunnions l, l, of the tilting pots A, A. These are pivoted out of center, so that when in their normal position they may lean against the stop-pieces o. They are held in position by the pawls r, with disengaging handles r', which fasten into the teeth q of the projecting head or collar p of the trunnions. This collar also has the holes s for the operating bar t (Fig. 144), with which the pots are tilted. The weight complete of truck and pots is 5,000 pounds. When in their normal position, the pots are placed as shown in Figs. 140 and 141. When they are to be emptied, the frame i, l, k, k, is swung 90 degrees on the swivel (Fig. 144), the pots are emptied together on both sides of the track; or, if the slag is to be discharged only on one side, the frame is returned to its normal place after one pot has been tilted and the other pot swung into position.

THE PRESENT STATUS OF STAMP MILLING.

Written for the Engineering and Mining Journal by T. A. Rickard, M. E.

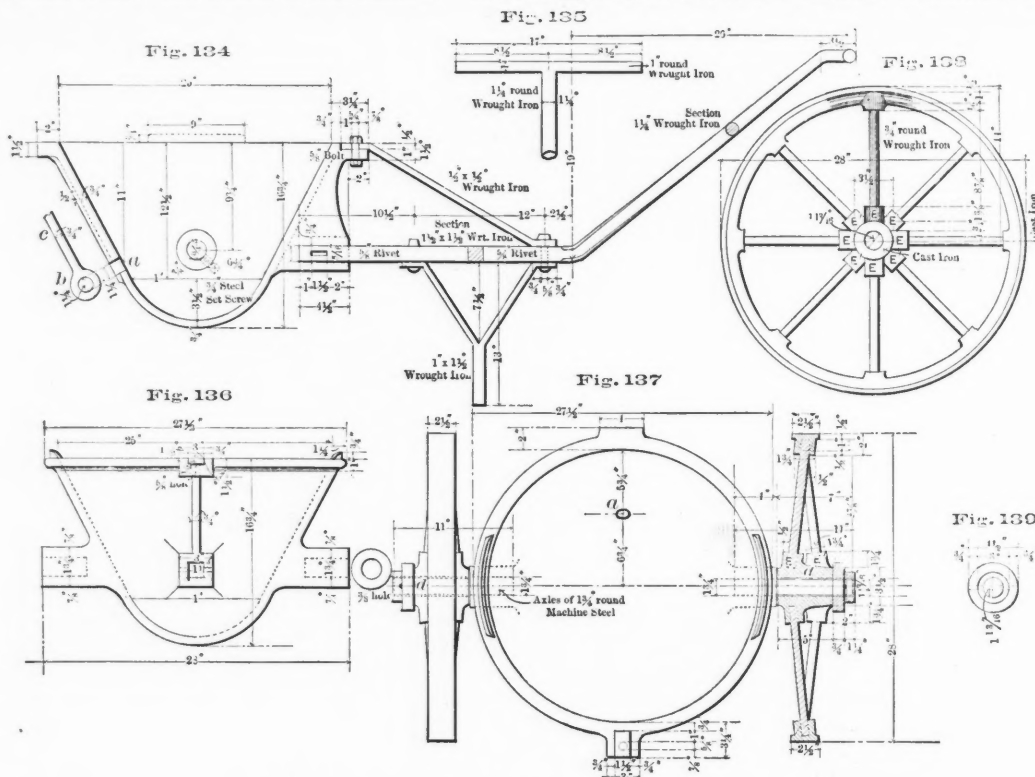
During the past year the stamp mill has contributed its customary share of the gold and silver extracted from the ores of the mines. The number of additional new mills erected has been considerable, and up to the general average. In Colorado particularly the opening up of new gold fields during the year has stimulated the demand for this type of reduction works. In California the addition to the number of stamps at work has been relatively small, while in Dakota, Montana and Arizona the stamp mill has held its own.

Owing to various causes, the deadness of the mining share markets and the uncertainty in the status of the white metal, there has been no unwonted activity in this or any other branch of mill building. This

have been invented and patented, each time directing attention to the fact that the stamp mill is at the very best only a very unsatisfactory machine. It is clumsy to erect and to regulate, it consumes an excess of power in proportion to the work done, and, while a simple pulverizer, it has the serious defect of sliming the ore. It is generally allowed that for preparing the millstuff for a wet concentration process, stamps are defective in that the pulp when sufficiently pulverized is not immediately discharged through the screen, but remains long after it is of a fineness admitting of its exit through the screen openings. This produces an excess of slimes. Further, for leaching processes dry crushing is preferable because it is easier for the solvent solution to replace air between the particles of the pulp than water. The stamp mill is, as a dry crushing machine, very inefficient, and has already been largely replaced by other appliances.

At present the stamp mill has the one overpowering argument in its favor that it is a simple and thoroughly tried machine, that a man knows what he can do with it, and that while able to treat a great variety of ores it does not require the services of a scientific engineer nor the adjunct of a laboratory. This is true, but the times are near at hand when this feature will diminish in importance, when milling will come into line with modern tendencies and be as systematically managed and as scientifically worked as any other of the more complicated fire reduction processes. The result will be to discredit the rule of thumb methods now so generally in vogue, and to further encourage the inventive genius of the age in the production of a machine which will be free from the radical defects of the stamp battery.

In the mean time no one who has been through the chief gold mining districts existing to-day can have avoided noting the fact that a model stamp mill, fully equipped with improved labor saving appliances and arranged so as to give the maximum of efficiency and economy, is as



SLAG POTS USED IN LEAD SMELTING (SEE PAGE 630).

is partly due to the greater care and judgment now exercised in these matters. The time has gone by, it may be hoped, when mills were put up in a hurry and allowed to rust in idleness and decay at leisure. The amounts of money wasted in the erection of costly plants where there was no mine capable of giving the necessary ore supply, or in the building of reduction works totally unsuited to the end in view, would if added up form a startling sum and compare well with the total dividends paid by the mines of the West. People are more careful now, more sane and businesslike, and, while the machinery business may be less lively the mining industry cannot but gain by the change.

The mortality among new processes is proverbially great, yet the past year has brought forth more than its usual quota of new methods for the extracting of the precious metals from their ores. Many of these processes have died young, others look decidedly unhealthy, but it must be allowed that something serious and valuable has been done in this direction. The cyanide process has of late been the theme of much discussion, the result of its comparatively recent introduction into this country. It is, to many, a thing either to swear by or to anathematize, to be called the "ultima Thule" of simple metallurgical treatment or to be scouted as impossible and impracticable. It is still in embryo, crude and dangerous in the hands of the unlearned and a puzzle to the most experienced. Though the knowledge extant upon the workings of this process would even if concentrated form but a weak solution, it is safe to say that it will in certain districts and with certain ores prove a most valuable aid to the miner.

New processes have been many, not only for the extraction of the gold and silver, but also for the preparatory crushing and pulverization of the ores. Mechanical devices of all kinds, and nearly all very ingenious,

uncommon as it is where found successful and satisfactory. There is more difference in the work done by and the results obtained from a badly constructed and carelessly arranged stamp mill and a model battery than there is between the latter and some other, perhaps better, type of reduction process. The moral is that while we may recognize the stamp mill to be defective and may foresee the approach of a time when it will give place to a better machine, yet in the mean time where we do use it let it be properly arranged and fully supplied with modern improvements, thereby making the best of existing methods until such time as newer methods shall have been demonstrated better than the old.

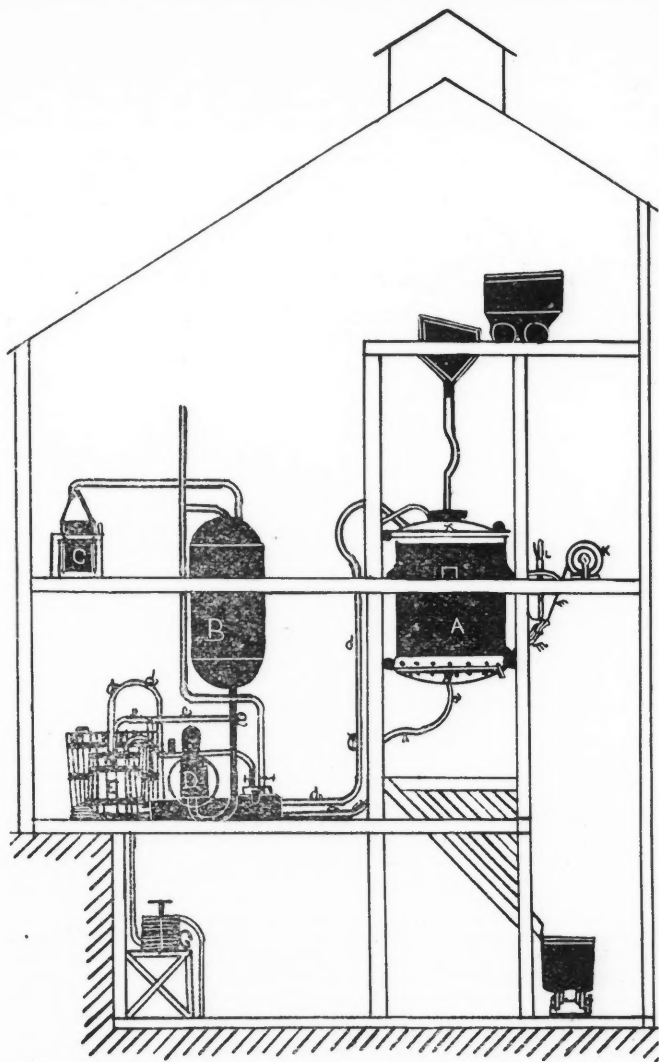
**The Hydrophone.**—A valuable apparatus for coast defense and also for the defense of ironclads has been brought into practical use in England. Its object is to give warning of the approach of a hostile torpedo-boat or battle ship during the night or in a fog. It consists of an instrument resembling a microphone. This instrument is placed inside an iron diving bell and suspended in the water at a convenient depth. The electric wires from the instrument are led to stations on the coast or on board the battle-ship, and variations in the current can be indicated in any suitable way. When a ship approaches within the range of a mile of the instrument the vibrations of its engines and the motion of the propellers produce a corresponding vibration in the diaphragm. This vibration in the diaphragm is used to produce a variation in the electric current, which in its turn indicates the vibrations on the station. The applicability of this instrument is very wide and it will prove useful in the merchant service for the object of informing the coast guard of the approach of a steamer to the rocks during the fog.



BOHM'S CHLORINATION AND CYANIDE PLANT.

The drawing illustrates a new chlorination plant, patented by W. D. Bohm. The principles involved in this or in any leaching process to which the method may be applied is that of a forced upward circulation of the solvent solutions through the powdered ore, placed in a suitable vat. This circulation is maintained until the precious metals are dissolved, when air pressure is applied above the charge, to force out as much of the solution as possible, wash water being subsequently forced up from below or admitted above the charge, and then forced out in a similar manner; the previous constant upflow having caused (it is stated) such a deposition of the sand as to allow the liquid to be expressed rapidly and cleanly. It is claimed that by using a solution of chlorine in water, and circulating it in closed pipes and vessels, that a considerable saving in gas is effected, and that as rapid results are obtained as when agitation is employed, with very much less power and wear and tear; while ores of a different character can be treated in a short time and with little labor.

The vats are constructed preferably of iron, and where chlorination is used are lined with lead. They are provided with hinged, dished tops, a tight joint being made between the flanges in the vat and cover by means of a rubber ring and hinge bolts. The top has a disc of wood secured to it, so that its outer surface is flush with the flange, grids



BOHM'S CHLORINATION PLANT.

being placed between it and the inside of the cover shell; it is also secured and supported by a feed tube *b*. The face of this disc is turned up into concentric grooves, each about  $\frac{3}{8}$  inch deep and  $\frac{1}{4}$  inch wide. A special close filter cloth is stretched over the disc, and secured at its center by the feed hole tube flange, a tight joint being made between its outer edge and the flanges of the vat and cover. A similar filter is arranged in the bottom of the vessel; the cloth in the case of a wash-out vat being secured in contact with the grooved false bottom by means of an iron ring and packing.

The powdered ore is let into the vat at the same time as the solution is being pumped up by means of diaphragm pump *D*. If a cyanide solution is used, a sufficient quantity of solution is mixed in a small division of tank *C*, and circulated upward through the ore in vat *A* at a uniform slow speed until the precious metals are dissolved—generally from 4 to 8 hours is required; the pump is then stopped and air pressure is applied above the charge, and as much solution is forced out into the small division of tank *B*. Wash water is then either added above the charge or pumped up from below and forced out again into the small division of *B* until the same bulk of solution started with is obtained. This solution is then run through the precipitators *E* back into the

small division of *C*, where it is tested and standardized for reuse; the subsequent washing being run into large division of *B*, and thence through precipitators into *C* for reuse. The precious metals are recovered on shavings of an alloy of zinc and sodium, which has been found to be more efficient than zinc alone.

In conducting the chlorination process the solution of chlorine in water or chlorine-water is circulated through the ore in a manner similar to that of the cyanide process. The chlorine vat has its bottom *H* shown hinged, so that it may be unbolted and dropped to release the tailings, by opening catches in front by means of lever *L*; wire ropes attached to a small geared windlass drum pull the bottom to place again. The chlorine solution is mixed in *B* by passing chlorine gas, from the generator, into the water with which it is filled. After the gold is in solution the liquid is expressed and the washing carried out in the same manner as in the cyanide process. The solution is either run through a precipitant consisting of a powdered complex sulphide, or may be treated with any precipitant. Fresh solution is being prepared during the treatment of each charge, ready for the next.

It is claimed for the electrolytic chlorine producing apparatus, the invention of two Russian chemists, which is worked in conjunction with this process, that a great reduction in the cost of producing chlorine is effected; that common salt will supply the place of sulphuric acid and chloride of lime; that the machine is simple and requires no skilled labor, and that it has been running with great success at the El Dorado Mine in Siberia. This plant, in charge of an engine driver, produces 40 pounds of chlorine gas from less than 150 pounds of common salt, utilizing 5 I. H. P. These results are vouched for by M. Leon Perret, Mining Engineer to the Imperial Government of Russia.

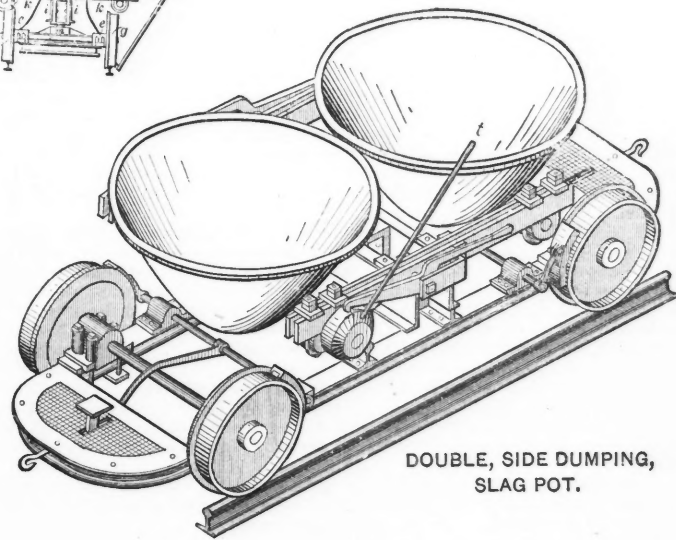
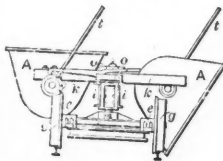
A diaphragm pump of special construction prevents any emulsified grease or other undesirable matter from becoming introduced to the solution, and insures non-leakage of precious solution through defective glands, etc.

Vats of considerable size can be built, and it is stated that one of 50 tons capacity is contemplated for Australia.

The cost of working by this process varies, of course, with the localities in which the works are situated. Kaolin ores of Mt. Morgan have been treated by the process before the erection of the electrolytic chlorine generator at the following cost: 10 pounds bleach at 4 cents, \$0.40; 8 pounds acid at 2 cents, \$0.16; labor and power, \$0.35; total, \$0.91. The time occupied for each charge was 4 hours.

A proportionate increase in cost of chemicals will, of course, be necessitated in the treatment of ores requiring more chlorine, as in any other chlorination process.

Fig. 1-1-1



SLAG POTS USED IN LEAD SMELTING (SEE PAGE 630).

**Chrome Steel Projectiles.**—Mr. Sergius Kern, of St. Petersburg, states that at the Russian manufactory of Holtzer chrome steel projectiles, the Pouteloff Iron and Steel Works, St. Petersburg, the ferrochrome from Boucau, France, is employed, as the Russian ferrochrome prepared at the Demidoff Works is too poor in chromium and has too large a phosphorus constituent. The Boucau samples contain from 49% to 60% of chromium and only 0.08% of phosphorus, as compared with 40% of chromium and 0.5% of phosphorus in the Demidoff samples. In making projectile ingots it is necessary to limit the sum of the phosphorus and sulphur to 0.03%, and the sulphur should never be more than 0.015%. The best results are obtained when the silicon and manganese amount to at least 0.8% and 0.20% respectively. The chrome steel thus made has a pasty appearance in the crucible; but if it has been prepared in a Siemens crucible furnace it has enough heat in itself to remain fluid in the crucible for from 10 to 15 minutes after the withdrawal of the crucible from the furnace. Care has to be taken in handling the ingots after they are cast. They must not be placed on wet ground or in any position where wind or rain can cool them; but they should be buried in ashes to cool. In forging ingots, the metal should not be heated higher than 1,100° C.

## DECISION IN THE RICO-ASPEN VS. ENTERPRISE MINING SUIT.

In the suit of the Rico-Aspen Mining Company vs. the Enterprise Mining Company, of Colorado, which has been pending in the United States Circuit Court for some weeks, Judge Hallett, on December 22nd handed down this decision ruling that the Jumbo II. claim does not extend into Vestal territory and referring other questions of fact to a jury.

In the Rico-Aspen cases I have a short opinion which is applicable to all of them. Complainants assert title to the ground in controversy under three locations, one called Vestal, made in 1879, another called Contention, made January 1st, 1888, and the third called Compromise, made November 18th, 1889. These locations are in the general course East and West and nearly coincident with the line of the Group tunnel, which is owned by respondents. One of complainant's locations, the Contention claim, in its western end, comes upon the eastern extension of the tunnel and the Compromise and Vestal, also owned by complainants, are adjacent on the south and parallel with it.

Jumbo II. is respondent's location, traversing the west ends of complainant's locations, embracing some part of each. It extends across the line of the Group tunnel 54 ft., being northeast from that line and 1,446 ft. southwest of that line. Respondents assert that they discovered the lode on which this location was made in the Group tunnel and at the date of the location, June 15th, 1892. After discovery they went on the surface and set their discovery stake immediately over the Group tunnel and marked out the Jumbo II. and recorded a certificate of location.

Assuming all the locations to be well made, if the date of its discovery be given to Jumbo II, the others are very much earlier and they must prevail upon the familiar rule that the first in time shall be first in right. But respondents aver that Jumbo II, having been discovered in the Group tunnel, shall have the date of the location of that tunnel, under section 2,323 of the revised statutes. And the Group tunnel was located July 25th, 1887, and thus became senior to the Compromise and Contention claims, which cover the territory contiguous to the line of the tunnel. The Vestal location is older in date and further removed from the tunnel, and it will not be necessary to refer to it again. There is a great conflict of testimony as to the form and position of the ore body on which Jumbo II was located, and whether it is a vein or lode which may be located in the time and manner adopted by respondents. Under our practice such conflicts are to be decided by a jury, and we are not at present concerned to ascertain the fact. We can only inquire as to the meaning of section 2,323 of the revised statutes in respect of the pre-emption of lodes and veins lying in the course of a tunnel, by locating the tunnel and prosecuting work on it in the manner prescribed. And certainly the language of the Act, both affirmative and negative, seems to give to the locator some such right.

It is first declared that "The owners of such tunnel shall have the right of possession of all veins or lodes within 3,000 ft. from the face of such tunnel on the line thereof not previously known to exist." And this is followed by the provision that "Locations on the line of such tunnel of veins or lodes not appearing on the surface made by other parties after the commencement of the tunnel, and while the same is being prosecuted with reasonable diligence, shall be invalid." Clearly enough this is a grant of lodes and veins on the line of the tunnel, and the only difficulty is in ascertaining the extent of the grant. The Supreme Court of this State interprets the act as giving only so much of such veins and lodes as may be in the tunnel itself. *Corning Tunnel Company vs. Pell*, 4 Colo., 507. But this seems to reduce the grant to a point of insignificance which deprives the act of all force and meaning. Certainly no one would be at the trouble and expense of driving a tunnel through a mountain for such small segments of lodes and veins as may be in the bore of the tunnel.

On the other hand, respondents contend that the grant is of the length of a surface location in any direction from the line of the tunnel, and, as stated above, almost the entire length of Jumbo II. is in a southwesterly direction from that line. Under this construction the location of a tunnel, followed by some lazy and perfunctory work twice in the year, will have the effect to withdraw from the public domain a tract 3,000 ft. square, or something more than a half section of land. And this in the face of the earlier declaration of the statute that "no location of a mining claim shall be made until the discovery of the vein or lode within the limits of the claim located." This view is so far inconsistent with the general policy of the law which forbids the granting of large areas of valuable mineral lands to one person or company, that it seems impossible to accept it.

If we look into all the acts of Congress relating to mines of precious metals, we shall find that it has not been the practice or policy to define absolutely the length or width of mining claims.

The act of 1865, which is the first on the subject, declares somewhat ambiguously for "the law of possession," meaning the local rules and customs of miners. It has nothing as to the length or width of claims. 13 Stat., 441.

The act of 1866, section 4, provides "that no location hereafter made shall exceed 200 ft. in length along the vein of each locator, . . . together with a reasonable quantity of surface for the convenient working of the same as may be fixed by local rules." 14 Stat., 252.

The act of 1872, which is continued in Revised Statutes, provided as follows:

"A mining claim located after the passage of this act, whether located by one or more persons, may equal, but shall not exceed, 1,500 ft. in length along the vein or lode.

"No claim shall be extended more than 300 ft. on each side of the middle of the vein at the surface, nor shall any claim be limited by any mining regulation to less than 25 ft. on each side of the middle of the vein at the surface, except where adverse rights, existing at the passage of this act, shall render such limitation necessary." 17 Stat., 91.

It will be observed that only the maximum length and width of claims is given in any of these acts, and the exact dimensions are left to the rules and regulations of miners, or to the local legislation of the States.

This accords with the general policy of Congress, which has not been to provide a complete code of laws for taking, holding and acquiring title to mining claims, but to recognize and establish the usages and customs of miners in mining districts, and the laws of the several states relating to

such matters. *Jackson vs. Roby*, 109 U. S. 440. *Jennison vs. Kirk*, 98 U. S. 457.

Looking to the general policy of the Government in dealing with its mineral lands, it seems highly improbable that Congress intended to fix the length of a location made upon a discovery in a tunnel, and we are strongly persuaded to say that in this instance as in others, the matter is subject to local regulation. In this view the words of section 2,323, "to the same extent as if discovered from the surface," mean only that the location shall be as good as upon a discovery from the surface.

Unquestionably in the case of a location from a discovery in a tunnel, it is necessary to mark the boundaries on the surface and file a certificate or record as in any other case, because there is no other method of acquiring title to a mining claim; but in such case the locator is not required to sink a shaft from the surface to the depths below in which the lode may be found. The discovery in the tunnel suffices for the usual work on the surface, such as a shaft, adit or other opening to the lode; but all other things must be done as in the case of an ordinary location on the surface.

In this view of the meaning and effect of section 2,323 of the federal statute, it is indeed true that without local regulation as to the length of a claim founded on a discovery in a tunnel, nothing would pass but the line of the tunnel itself. And in the Corning Tunnel Company's case the statute of the State on that subject was not referred to. Indeed, it would seem from the Court's statement of the case that the law of the State was not at all considered; for it is said that appellant's "claim is based entirely upon the right of tunnel owners under section 4 of the act of Congress."

If the act of 1861 had been presented to the Supreme Court of the State there is every reason to believe that it would have been recognized as a sound and effective supplement to the act of Congress, on which alone the opinion of the court proceeds.

The act of 1861, Section 5, provides that a tunnel locator shall have 250 feet each way from the tunnel on all lodes discovered in the tunnel. (1, Sess. 166.) It has survived through all revisions of the statutes to this time. No reason is perceived for declaring it obsolete. On the contrary, it appears to be of the highest obligation, as one of those laws relating to mines which has endured the scrutiny of many successive legislative assemblies of the State and has repeatedly received the sanction of Congress.

A similar act of the State of Montana (Comp. Stat. Mon., 1887, Sec. 1,488), was recognized and enforced by the Supreme Court of that State in *Hope Mining Company vs. Brown*, 11 Montana, 370.

If, then, we give effect to Jumbo II as a discovery in the group tunnel under Section 2,323, Revised Statutes, in connection with the act of the state of 1861, we are able to give it the date July 25th, 1887, when the tunnel was located, and the length, 250 ft. southwesterly from the tunnel. So understood it traverses the end of complainant's contention claim and a small part of the compromise claim.

As before stated, there are questions of fact touching the form and extension of the ore body and the validity of the several locations which must be referred to a jury. In the cases based on those titles the usual orders for injunctions pending the controversy will be entered.

In the view now adopted, Jumbo II does not extend into Vestal territory and we can enter a final decree for complainants in the case based on that title without a trial at law.

## "NICKEL ORE" FROM IOWA.

Written for the Engineering and Mining Journal by Charles Rollin Keyes.

A paragraph to the effect that rich and extensive nickel deposits have just been discovered in southeastern Iowa has recently appeared in various newspapers. For the most part these notices have been somewhat misleading. The occurrence of nickel referred to is in the form known as millerite—the sulphide of the metal. It is believed that this is the first time any of the nickel bearing minerals have been reported from the state. But while it is not at all probable that this occurrence will ever prove of any great economic importance there is no doubt that from a mineralogical standpoint the Iowa millerite is the most beautiful ever found in this country, if not in the world.

The facts of the case are as follows: In quarrying near Keokuk recently in the compact Keokuk limestone (lower carboniferous), some feet below the "geode-bed" numerous cavities were encountered varying from several inches up to twenty inches perhaps. These hollows have large, thickly set rhombohedrons of calcite jutting out toward the center. The faces are brightly polished and the edges are sharply cut. On some of the calcites are to be found beautiful tufts of closely arranged needles of millerite pointing from the center of attachment in all directions to a distance of one-half to two and one-half inches. In some of the examples the tufts are made up of hundreds of filaments, often so close together that the needles of different branches are interwoven, forming a dense matted mass. Often a large perfectly transparent calcite has a tuft of long millerites completely inclosed in it; or a part of the tuft may be embedded in the lime crystal, the extremities of the needles left projecting outside.

One specimen of calcite covered thickly with matted needles of the nickel sulphide weighed over fifty pounds.

**Purifying Feed Water for Boilers.**—The purification of feed water for boilers by chemical means is receiving a good deal of attention at present in this country. Messrs. Bradley & Co., of Syracuse, N. Y., have recently placed an apparatus on the market for treating the water for stationary boilers chemically. The precipitant, consisting of soda ash, is added to the feed water after it has passed through the heater, and the water is then forced through a sand filter, which removes the sediment. This apparatus has been in use for some time at several establishments at Syracuse for purifying water carrying 22-42 grains per gallon of scale-producing substances. It is stated that perfectly satisfactory results are obtained in all these cases. The manufacturers guarantee that the apparatus will perform all that is promised of it, as demonstrated by an analysis of the water in the boiler.



A LARGE DIRECT ACTING REEL HOIST.

The hoisting plant illustrated by the accompanying cut is located in Montana on the property of the Granite Mountain Mining Co.

The machinery consists of two Akron-Corliss engines driving one shaft directly, on which are placed two reels 19 feet in diameter. The engines have 28x72 inch cylinders, fitted with the standard Corliss valve gear and a Stephenson link reversing motion. The engines are 1,000 H. P., and they are guaranteed to hoist fourteen tons at an average speed of 2,200 feet per minute. The reels are made very heavy at the rims, in order to obtain a certain amount of fly-wheel action. They have a capacity for 2,500 feet of flat wire rope 7 inches wide by 1/2 inch thick. It is at this great depth of 2,500 feet that the engines will exert their utmost power. The reels are fitted with powerful post brakes and friction clutches. The crank discs of the engines are also fitted with brakes, and the combined power of the brakes is such that the engines, while running at a speed of 52 revolutions per minute, can be brought to a complete standstill in less than one revolution. All operations of throwing on or off the clutches and brakes and of reversing the engines are performed by means of compressed air. To avoid any possibility of overwinding, the plant is provided with an automatic safety stop operated by the indicator, which is driven from the engine shaft. The safety stop is arranged to throw on all the brakes and close the steam valves on the engines instantaneously, bringing the engines to rest

feet of air per minute, under a drift-gauge of 1.6 inches. The Capell fan, 11 feet diameter and 7 feet wide, with two inlets of 7 feet diameter, at 168 revolutions per minute, and 1.7 inches water-gauge in drift, passed 84,720 cubic feet of air per minute. The results of trial at nearly same water-gauge gave:

Water-gauge.....	Guibal fan, 1.60 inches	Capell fan, 1.70 inches
Volume.....	60,010 cubic feet.	84,720 cubic feet.

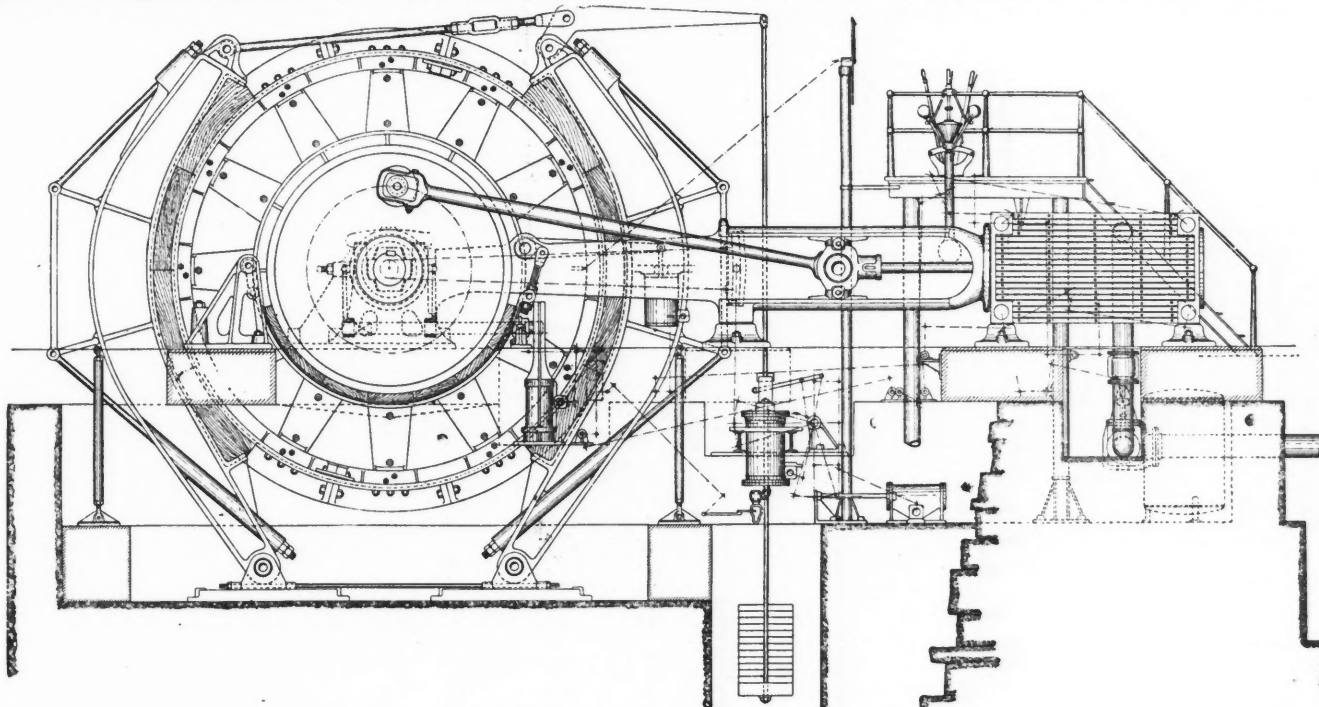
The experiments at Coalpit Heath Colliery, near Bristol, yielded the following results: (Guibal fan, 16 feet diameter, 5 feet 3 inches wide; Capell fan, 12 feet diameter, 5 feet wide, with inlet 7 feet diameter):

	Guibal Fan.	Capell fan.
Revolutions per minute.....	120	223
Water-gauge (inches).....	2.50	1.75
Mean air speed in drift per minute (feet).....	830	885
Area of drift (square feet).....	50	52
Volume per minute (cubic feet).....	41,500	46,020

At Silverhill Colliery a Capell fan gave results as follows:

Revolutions.....	(1) 123	(2) 132
Water-gauge (bank).....	1.40	.....
Water-gauge measured below at same place as with furnace (inches).....	1.30	.....
Volume per minute at returns (cubic feet).....	110,920	129,150

The shafts are each 400 yards deep and 15 feet in diameter.



WEBSTER, CAMP & LANE DIRECT-ACTING HOIST.

before any damage can be done. The admission of the steam to the cylinders is thoroughly under control of the governor, leaving the engineer absolutely free to attend to the other operations necessary for properly landing the cage. The total weight of the plant is 200,000 pounds. It was built by Webster, Camp & Lane Machine Company, of Akron, O.

OBSERVATIONS ON FANS OF DIFFERING TYPES WORKING ON THE SAME UPCAST SHAFTS.

By G. M. Capell.

The Capell fan differs from all fans previously made; it consists of two distinct fans built up into one, so that the air of the first is discharged into the second, its vis viva being destroyed by its expansion into the larger area, under greater water-gauge, by reason of the greater velocity of the fan.

Experiments were made with Capell and Guibal fans at the Prosper I Collieries, in Westphalia, under the following conditions:

A Guibal fan 40 feet 6 3/4 inches diameter and 8 feet 4 inches wide passed a volume of 59,340 cubic feet of air per minute, under a water-gauge at fan of 3.15 inches.

The Capell fan gave the following results: diameter of the Capell fan, 12 feet 6 inches; width, 6 feet; two inlets each 7 feet 3 inches; revolutions of engine, 87.5 per minute; revolutions of fan, 323 per minute; water-gauge in drift, 10.7 inches; volume of air, 127,574 cubic feet per minute; horse power in air, 214.9; horse power of engines, 384.6; useful effect, 55.6.

The water-gauge for 127,574 cubic feet of air produced by the Guibal fan would be, taking the squares of the volumes from the Guibal fan, 14.6 inches, or 3.9 inches more than the Capell fan, or a difference of 78 horse power in the air.

Other experiments were made at Gneisenau Colliery, near Dortmund. The Guibal fan, 40 feet 6 3/4 inches in diameter, produced 60,010 cubic

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 20TH, 1892.

- 488,207. Process of an Apparatus for Making Ammonia. Paul Kuntze, Aschersleben, Germany.
- 488,211. Coal Separator. Eugene F. Lo'g, Scranton, Pa., Assignor of one-half to Ezra H. Ripple, same place.
- 488,269. Rock Drill. Samuel G. McKiernan, Paterson, N. J.
- 488,349. Truss for Mining Machines. Lindsay H. Bradley, Flushing, O.
- 488,429. Coal Washing Machine. James Gallagher and George Lang, Chickasaw Ala.
- 488,452. Placer Machine. George M. Reed, Waltham, Assignor of one-half to Daniel H. Bishop, Boston, Mass.
- 488,453. Guide Holder for Stamp Mills. Peter C. Robertson, Phillipsburg, Mont.
- 488,467, 488,468, 488,469. Electric Metal Heating Apparatus. George D. Burton, Boston, and Edwin E. Angell, Somerville, Mass., Assignors to the Electrical Forging Company of Maine.
- 488,470. Process of Reducing Franklinite Ores. George G. Convers, Salisbury, Pa.
- 488,471. Process of Treating Franklinite and Willemite. George G. Convers, Salisbury, Pa.

TUESDAY, DECEMBER 27TH, 1892.

- 488,564. Coal Loader and Distributor for Box Cars. Joseph A. Ingalls, Evanston, Wyo.
- 488,580. Apparatus for Making Alumina. Henry W. Shepard, Camden, N. J., Assignor to the United States Chemical Company, same place, and Philadelphia, Pa.
- 488,606. Machine for Working Coal or Other Minerals. Walter T. Goolden and Llewellyn B. Atkinson, London, England.
- 488,623. Method or Process of Treating Sludge. Hans A. Frasc, Cleveland, O., Assignor to the Grasselli Chemical Company, same place.
- 488,661. Melting Furnace. William Rebmann, Chicago, Ill.
- 488,759. Stone Breaking or Crushing Machine. Ryerson D. Gates, Chicago, Ill., Assignor to the Gates Iron Works, same place.
- 488,766. Alembic. Victor J. Kuess, Paris., Assignor to Clement Henri Joseph Donnadien, Bordeaux, France.
- 488,767. Destructive Distillation of Mineral Oils. John Laing, Edinburgh, Scotland.
- 488,797. Ore Roasting Furnace. Richard Pearce, Denver, Colo.
- 488,879. Mine Car. Homer Durand, Starkville, Colo., Assignor to Homer Durand & Co., same place.
- 488,898. Process of Treating Materials Containing Metals. Robert F. Nenninger Newark, N. J., Assignor to Edward J. Ill, same place.

\* Abstract of paper read at the meeting of the North of England Institute of Mining Engineers, Dec. 10.

## PERSONALS.

Col. C. W. Carpenter, secretary of the Golden Reward Mining Company, of Deadwood, S. D., is at present in St. Paul, Minn.

C. C. Harvey has been appointed secretary of the Union Consolidated Mining Company, at San Francisco, Cal., vice A. W. Barrows, deceased.

Mr. James L. Flood was to have left San Francisco for New York on the 26th inst. to consult with John W. Mackay, Senator Jones, D. O. Mills, and others about the proposed drainage of the lower levels of the Comstock.

## OBITUARY.

Joseph P. Brunner, of Liverpool, founder of the Brunner Chemical Company and director of the Fowler Company (Limited), died on the 26th inst.

George Frick, a leading manufacturer of southern Pennsylvania, died at Waynesboro, Pa., on the 25th inst., aged 66 years. In 1869 he established the firm of Frick & Co., manufacturers of steam engines.

Franklin N. Drake, of Corning, N. Y., died at North Adams, Mass., on the 28th inst., aged 75 years. In 1866 he, with several others, purchased a tract of coal and timber land near Blossburg, Pa. They built a railroad and developed their land for coal and lumber purposes. He was made general superintendent of the Blossburg Coal Mining and Railroad Company. In 1867 the company bought the Tioga Railroad, and Mr. Drake was elected president. He was also elected president of the Blossburg Coal Company.

H. Stanley Goodwin, general superintendent of the Lehigh Valley Railroad, and eastern superintendent of the Philadelphia & Reading system, died suddenly in South Bethlehem on the 24th inst. Homer Stanley Goodwin was born in Morris, Conn., in 1832, and was a railroad engineer before attaining his majority. He entered the service in 1852, as a rodmán on the engineer corps of the Delaware, Lackawanna & Western Railroad. By rapid promotion he became chief assistant engineer of the Delaware, Lackawanna & Western, which place he occupied from June, 1852, until March, 1857. For a year after that he was the principal assistant engineer of the Honduras Inter-Oceanic Railway. From November, 1858, to June, 1860, he was resident engineer of the western division of the Pittsburg, Fort Wayne & Chicago Railway. During the early years of the war from June, 1860, to April 1st, 1863, he was superintendent of the Catawissa Railroad. From April, 1863, to April, 1866, he was the chief engineer of the Northern Central Railway. He then moved to South Bethlehem, and from April, 1866, to December, 1882, was eastern superintendent of the Lehigh Valley Railroad. He was then promoted to the general superintendency of the Lehigh Valley system. President McLeod recognized his value as a railroad man, and appointed him general eastern superintendent of the Philadelphia & Reading Railroad. Mr. Goodwin was an instructor in civil engineering at the Lehigh University under Dr. Henry Coppee's administration as president. He was a trustee and member of the Executive Committee of the Lehigh University ever since the university was founded by Asa Packer.

## SOCIETIES.

The first session of the annual meeting of the Geological Society of America opened on the 28th inst. in the railway committee room of the House of Commons, at Ottawa, Ont. Governor-General Lord Stanley delivered the address of welcome. Papers by fellows of the society in the United States and Canada were read, and the following officers were elected: President, Sir J. William Dawson, of Montreal; vice-president, G. C. Chamberlain, of Chicago; second vice-president, Professor Stevens, of New York; secretary, H. L. Fairchild, of Rochester, N. Y.; treasurer, J. C. White, of Morgantown, W. Va.

At the November meeting of the Engineer's Club, of Cincinnati, Col. Latham Anderson read a paper giving some suggestions concerning the proposed Miami & Erie Ship Canal, a bill to appropriate \$10,000 for the survey of which was introduced in Congress last winter by Senator Caldwell and another by State Senator Gear for the issue of \$40,000,000 of State bonds, the proceeds to be devoted to the building of the canal. The dimensions of the canal as contemplated by the Caldwell bill are: width on flow line, 150 ft.; depth, 15 ft.; width on bottom, 105 ft. The fifth annual meeting was held on December 15th. The following officers were elected to serve during the coming fiscal year: President, Col. Latham Anderson; vice-president, W. B. Ruggles; directors, M. D. Burke, Chas. A. Ewing, and H. L. Hoefler; secretary and treasurer, J. F. Wilson. The retiring president chose for the theme of his annual address "Ethics of Engineering," which he treated very thoroughly and understandingly. His paper was ordered printed for distribution.

## INDUSTRIAL NOTES.

An explosion in the refining department of the Chicago Refining and Oil Company injured one workman and caused a fire which did \$75,000 worth of damage to the company's plant December 24th.

The Pittsburg Testing Laboratory of Messrs. Hunt & Clapp announce that it has decided to discontinue the Philadelphia office at the close of the year, and that thereafter there will be but one executive office with headquarters at Pittsburg, Pa.

It is reported that the Illinois Steel Mills, at Joliet, Ill., will close for repairs and to settle the scale of wages, as the present schedule expires on the 31st inst. It is thought that the mills, which employ over 2,000 men, will not resume before April.

The Wilmington City Electric Company, of Wilmington, Del., have placed the contract for their new boiler house with the Berlin Iron Bridge Company, of East Berlin, Conn. The building will be made entirely of brick and iron from the designs of the Berlin Company.

The old mills of the Bethlehem Iron Works, Bethlehem, Pa., shut down on the 24th inst. for an indefinite period. The converting department, Bessemer mill, rail mill, billet mill and puddling department are now idle and nearly 1,200 have been thrown out of employment, who, it is said, will remain idle until orders are secured. The government department is not affected by the shut down.

The statement that has appeared in a number of papers, viz., that "Geo. H. Babcock succeeds Babcock & Wilcox, boiler manufacturers, at Plainfield, N. J., as sole proprietor of the concern" is erroneous, and is due to mistaking the winding up of the old business of the firm of Babcock & Wilcox for the affairs of the Babcock & Wilcox Co., the latter being an incorporated company in which both the above mentioned gentlemen are stockholders.

The firm of James W. Queen & Co., of Philadelphia, has been reorganized as a corporation under the name of Queen & Co., incorporated, with a paid up capital of \$600,000. The incorporators, who are also the directors for the first year, are S. L. Fox, E. B. Fox, J. G. Gray, Wm. Biddle, Jr., J. G. Biddle, and F. W. Stanwood. The manufacturing interests of this concern have largely increased in the last year or two, and it is now manufacturing extensively all kinds of electrical and scientific instruments and apparatus, engineering instruments, meteorological instruments, steam and vacuum gauges and optical instruments.

The Berlin Iron Bridge Company has the contract for three new iron buildings and iron roofs for the East River Gas Co., to be built at Ravenswood, L. I. It has also the contract for a new iron fireproof storehouse for the Pope Manufacturing Co., at Hartford, Conn.; and the contract for a new machine shop to be built at Newport News, Va., for E. C. Hillyer & Co. The building will be 82 ft. in width, divided into a central portion 40 ft. between crane girder columns, with a wing on each side 21 ft. in width. The wings will be two stories high, the balcony floor being used for light work. The central portion of the building will be controlled by a 20-ton travelling crane.

A press despatch from Allentown, Pa., says that the Coplay Iron Company has confessed judgment to the estate of Asa Packer, deceased, to the use of the E. P. Wilbur Trust Company for \$50,000, in accordance with a resolution of the board of directors passed September 14th, 1889, and approved March 31st, 1890. The judgment is signed by E. P. Wilbur, president; W. A. Wilbur, secretary, and R. M. Gummere, treasurer. The sheriff has levied on the furnaces and other property of the company and will sell. The company dates its existence from 1853, when Stephen Balliet & Co. associated themselves in an iron producing firm. In the next year they were incorporated as the Lehigh Valley Iron Company. Three stacks were built respectively in 1854, 1862, and 1867. They were the nucleus and foundation of the present borough of Coplay. The panic of 1878 caused a reorganization as the Coplay Iron Company (Limited), with a capital stock of \$200,000. The debt was merged into bonds secured by a mortgage for \$200,000, the trustees of which was General William Lilly, of Mauch Chunk, Pa. The mortgage was to run for 15 years from January 1st, 1878. It was signed by Joseph Laubach, president, and B. S. Levan, secretary of the Lehigh Valley Iron Company. The furnaces have been idle for some time.

## MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one 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 and his address will be furnished to any one desiring to supply him.

Any one wishing to communicate with the parties whose wants are given in this column can obtain their address at 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 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.

All these services are rendered gratuitously in the interest of our 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 of goods of any kind.

## Goods Wanted at Home.

2,858. A second-hand 20-ton hand-power crane. Pennsylvania.

2,859. A second-hand 500 to 800-lb. power or steam hammer. Pennsylvania.

2,860. A second-hand drill press. Pennsylvania.

2,861. A complete distilling outfit; capacity 50 to 100 gallons. Alabama.

2,862. Machinery for mining pebble phosphates. Florida.

2,863. Three good second-hand Embrey concentrators; also split wood pulleys for a gold mill. North Carolina.

## GENERAL MINING NEWS.

## ARIZONA.

## Mojave County.

(From our Special Correspondent.)

As reliable information as I could obtain from the White Hills, in this county, to which a stampede was recently made and the usual big stories of rich discoveries circulated, is to the effect that a Denver syndicate had bought a group of mines including the Grand Army, but all that work was suspended, and that many who had gone in with great expectations were coming out rich in experience if poor in pocket. At and near Kingman, in this county, I was informed that several prospects were being slowly developed, but all the workings were shallow. This camp, I learned, was some 20 years old and had been self-supporting, but that no work that could be considered really of a development nature had been performed.

## Pima County.

(From our Special Correspondent.)

Crocker Mining Company, Quijotoa.—The vein is showing strong in the south drift, from east crosscut 300 level, with a small foot wall showing ore on the east side. The vein is principally quartz, from which good grade ore is being extracted.

Peerless Mining Company, Tuijotoa.—The vein shows strong in the face of the north drift, 300 level. The breast is in quartz for width with ore of fair grade showing in bunches.

## San Diego County.

(From our Special Correspondent.)

Several capitalists interested in mines south of the line in Lower California are taking the steps necessary for the erection of a smelter. Heretofore much of the ore has been shipped to Pueblo, Col., but as the necessary lead and iron pumps for high grade ore can be obtained at a price making it more profitable to smelt, new arrangements are being made with that end in view. Definite information regarding the proposition will be obtainable within the next 30 days. Possibly the plans of the promoters will be regulated somewhat by the action of the parties who had commenced clearing ground at Los Angeles for the purpose of erecting a smelter, but who were enjoined by the City Council on the plea that works of such a character would be detrimental to the city.

## Yavapai County.

(From our Special Correspondent.)

I have recently visited the Jerome copper-silver camp in the Verde Mining District, in this county, where I found nearly all work suspended for the winter by the United Verde Company, the only producer and shipper of concentrates in the camp, on account of the withdrawal of transportation. This, I learned, was customary during the winter months because the wagon road into Jerome was rendered extremely dangerous across the mountains by the heavy snow and ice. The company has made an effort to overcome this difficulty, which really only exists on the six or seven miles of road immediately northwest of Jerome, by erecting a bucket line tramway across the mountains for this distance; but up to the time of my visit this has proved a miserable failure. Whether the expert, who arrived about the same time, was able to make it a success I am unable to say. Jerome, although an old camp, the first discoveries having been made about 1876, is to-day what might be termed a one-group or one-company camp; for outside of the mines worked by the United Verde Company, I could learn of no producers. Locations and prospects are numerous, covering a surface area of about three or four miles in length and one or two in width. Beyond this main camp, as it may be termed, are scattering locations to the south and southwest for a few miles farther, and about 12 miles distant on the Verde River is a 10-stamp quartz mill; but Jerome proper depends to-day on the copper-silver production of the United Verde Company. This company has a smelter of 160 tons daily capacity, comprising one 100-ton jacket and two of 30 tons each. Machinery for refining has just been delivered and will be erected during the winter. It is very difficult to ascertain any reliable information regarding the work of this company, but the fact that it has paid



\$207,500 in dividends previous to January, 1892, should be evidence that the property has been valuable, and the ores, as nearly as I could learn, yield from 20% to 60% in copper and an unknown quantity of silver. Aside from the group of mines owned by the company, I saw in the camp several prospects which show up quite favorably so far as work has progressed, but sufficient has not been performed to warrant any judgment on final results. As the surface was covered with snow, it was difficult, in fact impossible, to pass judgment on the outcroppings, but sufficient evidence exists that several ledges of mineral bearing quartz, as well as some iron ledges carrying copper and silver, form a bulkhead at the northern end of the camp, where the company's group is located, and these can be followed with more or less regularity and continuity to the southwest and south; while the mineral flow can be traced to the southeast in the form of a conglomerate consisting of copper stained pebbles and bowlders.—The general tendency of the vein matter is to dip toward the east at an angle from 25° to 40°, but as no deep workings exist—the deepest being about 30 feet, I was informed, on the company's mine—it is impossible to predict greater results when greater depth is attained. The general formation is a magnesian limestone, overlaid with either a magnesian sandstone or malapi, usually capped with conglomerate of copper stained pebbles and green and blue carbonates of copper. —Among the more promising prospects I visited were the Maine, the Green-Up, Three Sisters, and Cliff.—This camp is located 30 miles east of Prescott, but the nearest railroad station is at Verde, on the Prescott & Arizona Central Railroad, 24 miles distant.

## CALIFORNIA.

## Butte County.

Cherokee.—This mine was announced for sale by the sheriff to satisfy a claim for \$36,551 of the Bank of California. The sale was to take place on the 27th inst.

## Calaveras County.

The "Calaveras Chronicle" publishes the following items of mining news: "A 5-stamp mill is to be erected on the Elencino Blue Gravel mine, near the Junction. A force of men are at present grading for a 5-stamp mill for the Moser Mining Company, which is operating about a mile from the Mokelumne. The Linderaxa mine, situated near the Mokelumne River, about two miles from Mokelumne, which was recently bonded by the Sandy Bar Gold Mining Company, is showing up well in developments."

## Mono County.

Bodie Consolidated Mining Company.—The latest official weekly letter says: "The east crosscut No. 1, 550-ft. level, was extended 6 ft. East crosscut from main north drift, 300-ft. level, was extended 7 ft. West crosscut from south drift, 200-ft. level, was extended 8 ft. We have started a west crosscut from 200-foot level, Lent shaft."

Mono Mining Company.—The latest weekly official letter says: "The west crosscut from main south drift, 550-ft. level, was extended 14 ft. East crosscut from same drift was extended 13 ft."

## San Bernardino County.

Needles Reduction Works.—The first shipment of gold bars, amounting to \$12,000, was made by the reduction works last week, says the "Eye," as a result of a clean-up of the Gold Bag ore. Fully 95% of the metal was saved.

## Shasta County.

Reid Mines Consolidated Company.—It is reported that the directors of this company propose to use the proceeds from all ore shipped in developments on the company's properties. A contract has been let to build a wagon road from the Spanish shaft to the Sampson tunnel, and another for the completion of the Sampson tunnel to the main ledge of the mountain, which is expected to be reached in another 200-foot tunnel. The mill belonging to the Reid company on the other side of the mountain is being run on ore from two ledges on that side.

Texas Consolidated.—The Redding "Free Press" says that R. G. Hart has started tunnel No. 5 at this property, and has advertised for bids to push the tunnel 700 ft. This tunnel opens up a ledge 12 ft. wide of ore, and is 135 ft. below tunnel No. 4. When finished it will give about 885 ft. of ore backs. According to the "Free Press," the mine will produce this month about \$15,000. From 10 tons of ore shipped to Selby the company netted \$2,900.

## Siskiyou County.

According to the Yreka "Journal," all the claims along the Klamath River, except the Phil Mott and McConnell & Quinne, are still being worked with success. In the Centennial a rich pay streak has been found at bed-rock of last cut, from which a good supply of dust is realized. The Chinese claim, below Honolulu, pays exceedingly well at one derrick, but the other does not pay very much, hence the Chinese company is not doing as well this year as during last season.

## Tulare County.

The coal mines near Coalinga, on the west side, are being worked by 25 men, and are said to be in a prosperous condition. About 200 tons are shipped weekly.

## COLORADO.

## El Paso County.

Electric Tramway and Tunnel Company.—This company has been formed to tunnel through Bull Mountain at Cripple Creek. It will pierce what is said to be the richest portion of the camp at a depth of 1,200 feet from the summit, and will start from a location at the base of the hill on the west side. The company owns seven acres of land adjoining, on which a large mill is to be erected, and which will be run by electrical power. This will be furnished to the adjacent mines, and their ores will be received for treatment at the mill by means of chutes and chambers connecting with the tunnel, which will be double-tracked for that purpose. The tunnel, on which a large force is working, is already in 30 ft. and solidly timbered.

General Manager Collbran, of the Colorado Midland Railway, has closed a contract with the Colorado Fuel and Iron Company for the steel rails with which to construct the new Cripple Creek branch, now being graded.

## Clear Creek County.

Barnum Tunnel Gold Mining and Development Company, Idaho Springs.—The prospects for the future are good. The Bismarck, Gen. Newton and other producing properties through which the tunnel will eventually pass are steadily increasing in their outputs. The Gen. Newton was sold last week for \$150,000 cash. The general outlook for the Chicago Mountain, we have been informed, is extremely good. The tunnel properties cover the whole of this with a few exceptions.

## Gunnison County.

Surveying the new proposed branch of the Union Pacific, from Baldwin to Anthracite station in the coal country, is being pushed by a force of men under Division Engineer Davis. Assistant Chief Engineer Wolle claims that no construction work will be done until spring, but it is stated, says the Denver "Republican," that men are being shipped to Baldwin and that the graders are already following the surveyors. The Rio Grande, which owns coal ground in the same vicinity, and really began to open up its resources there before the Union Pacific, also has a force engaged in building a line between Crested Butte and Irwin.

## Hinsdale County.

Carmi.—Considerable ore is being taken from this mine at Lake City. One lot of quartz gave returns of \$5,000 to the ton, and there were 20 lbs. of nuggets of malleable tellurium that ran higher than this. Several rich specimens of black sulphurets have been taken out of the Big Injun.

## Pitkin County.

The railroads report the shipment from Aspen of 3,113 tons of ore for the week ending December 24th, an increase of about 1,000 tons over the preceding week, says the Aspen "Times." The great mines are all looking unprecedently well, and are probably at the present time capable of furnishing a larger amount of ore to the market than at any period since they began their career. The low price of silver and lead, however, has resulted in the curtailed shipments.

## Lake County.

At Leadville the Thespian mine, which has been closed for several weeks, has resumed operations. The main shaft is down 600 ft., while the drift is in 800 ft. The Humboldt is shipping a large quantity of sulphide with good returns. Ore is being taken out of the St. Mary impregnated with lead sand, highly mineralized, running 20 oz. silver and a slight excess of iron. The Silver Cord is treating 90 tons daily of crude ore, which concentrates to 180 bars, 360 lbs. each.

## Saguache County.

The course of the Amethyst vein has been traced for 3,000 ft. beyond the Amethyst line, says the Denver "Times." In reference to the reported claim-jumping at Creede, the same paper says: "As far back as October 26th, 1891, the Golden Eagle was located on an undoubted lead of mineral in place. On January 19th, 1892, Gray & Mann located a claim they called the Happy Thought. Their discovery shaft they sunk 13 feet inside the lines of the Golden Eagle in the work. It has always been held in the courts that a second location cannot be made with the discovery shaft inside of a recorded claim. Last August, Gray & Mann sold the Happy Thought to Major Norton and George C. Dewey of Wheeling, West Virginia, and these parties took hold of the claim to find the Amethyst lead, the erratic course of which was then suspected. Shortly after the location of the Happy Thought, on January 25th of this year, the Mary Taylor was located and conflicted with the north end of Gray & Mann's location. On the Mary Taylor 170 feet of development was done before work temporarily ceased, the mineral found not being of sufficient richness to pay expenses. When the fact that the Amethyst vein had turned became fully established and new claimants began to uncover it, the old ones came in and began to work their properties again. In this wise the Mary Taylor people ran an underground drift and found that the Amethyst apex was not in their side lines where their claim conflicted with the Happy Thought, as they had supposed. Manager Miller, discovering this on December 12th, made a new location, which he named the Ironclad, to run from the intersection of the Happy Thought and Ar-

genta lines to the end of the Golden Eagle and covering a portion of the Happy thought location. The following day Manager Dewey, of the Happy Thought, alarmed by the new movement, abandoned the original discovery shaft of his claim and located a new claim at the shaft he had sunk 100 feet deep on the vein outside the Golden Eagle, but then inside the Ironclad, and called this the Happy Thought apex. The fight was thus brought between the two new locations, with the Ironclad on the lead one day ahead. Miller was informed that the Happy Thought was preparing to drive his men away, so he sent two armed men up, prepared to meet any emergency. Dewey, the next day sent armed men to drive away Flinn's men, who had been set to work on the Golden Eagle. Beyond this no armed demonstration has been made."

The Denver "Times" publishes the following correspondence from Creede. "The Golden Eagle is owned by the Golden Eagle Consolidated Mining Company, comprising Sen. A. B. McKinley, Louis N. McLane, Rod Kavanaugh and others. They have been working more or less all year and have expended considerable money on the property. During the summer F. L. Roubush worked it to some extent under a bond, but failed to disclose a sufficient amount of mineral, allowed his option to lapse. The owners are now sinking on the Amethyst lead, which runs through the north end, and for which their original location is now supposed to have been a cross vein. Beyond this disputed territory lie the Moran and Park Regent grounds, which furnished the excitement of last month. A combine has just been formed between Moran and the Stanhope for a common issue against the True Friend. The several claimants are working industriously. A steam plant was recently erected on the True Friend shaft of the Park Regent company, and development goes on steadily. The Argenta, of the Baltimore-Creede Company, comes in for 400 feet of the big lead. They have a steam plant in and are pushing work on their deep shaft. Fifteen plants of steam machinery have been erected on Bachelor Hill this fall and all are at work. The New York Chance is preparing to put in an air plant to operate Burley drills and will increase the output as fast as possible. The Transfer shaft is on its third 100 feet of contact, and has about 200 more to go before commencing to output from the rich ore body disclosed by the diamond drill. The Amethyst and Last Chance are getting out all the ore possible, and ship from 14 to 23 cars a day. The output from these two mines for 1892 will go above \$3,000,000 net. On Mammoth development goes on without much talk. The Spar opened into an ore body last week, and the Nancy Hanks is still looking for walls. On the Grub Stake, work goes on apace, and it is expected that the lead will be cut in the cross drift in a few days. The Mother, the extension of this claim, has been stocked, and it is expected that a new shipper will result from the work upon it."

## IDAHO.

## Alturas County.

Pass Mining Company.—A strike has been made in the Goffre claim, it is said. The men at work there ran into ore filled with bromides. There is a width of eight inches of this which assays \$4,987.50 per ton. The discovery was made at a depth of 227 ft. The ground is so soft that the men ran about 42 feet in three days.

Red Elephant.—About 25 men have been laid off at the Red Elephant group of mines. Only 50 men are employed there now. They are all working in ore, however. The output of the property will not be curtailed at present.

## Boise County.

The New Mineral smelter blew December 21, treating the ores of Boone Hill, Egan group and the Jeff Davis.

## Owyhee County.

The De Lamar Mining Company (Limited).—The following is an abstract of a report by Messrs. Muir and Brand, directors, who have just returned from a visit to the property:

"Captain Plummer having satisfied himself by numerous experiments that a mixture of ores from various parts of the mine gives the best results in the mill, ore is now being taken from no fewer than 35 different places. The richer and more refractory ores in the latest veins are however for the most part being left untouched, until our milling arrangements are adapted to their economical treatment without undue loss. It is not necessary that we should here enter into the question of reserves, but there is no doubt that the work of the past six months has added to them materially, and that they are far ahead of our present milling capacity. Throughout the mine are left untouched large blocks of second-class ore, say up to \$6@-\$12 per ton. No tonnage estimate has been made of these, nor are they considered in the question of reserves. At some future time, owing to reduced costs and improved processes, they will doubtless have a real value, and come into estimates that may then be made. The experiments with the McArthur-Forrest cyanide process for the treatment of ores, referred to in the annual report, were not sufficiently successful to warrant the adoption of the system, and after exhaustive trials were abandoned. While we were at the mine, Professor Kendal, of New York, at the request of Captain De Lamar, was conducting a series of experiments

upon our ore-pulp, tailings and concentrates, with an agent which he claims to be much more powerful than that used in the McArthur-Forrest process, and to a certain extent, we understand, he was successful. The experiments are still being continued, and it is sincerely to be hoped may be brought to a satisfactory conclusion. It is well, however, not to expect too much from this, as laboratory success in such matters does not always mean successful practical working. Supposing the efforts to find a satisfactory method of treating chemically our ores, and especially our refractory ores, to fail, it will probably be decided to put up as early as possible in the spring a concentrating plant adapted to the capacity of our present mill, and to concentrate our ores from the batteries before pan amalgamation. By a careful and continued series of experiments with a Frue-Vanner machine, Captain Plummer has fully satisfied himself that this would be perfectly practicable and effective, and that our most refractory ores so treated would yield savings at least as good as those now obtained from our best ores without concentration. The adoption of a concentrating plant will involve the bringing in of the "Louise Creek" water, so as to secure a sufficient supply at all seasons of the year. The distance is some four miles and the cost will be heavy, but we should then be assured a sufficiency for the mill at the driest time of the year, and also a certain horse power for our machinery, equivalent to a considerable saving annually in our consumption of fuel. In getting an expert's opinion on the question of water-power available from "Louise Creek," Captain Plummer will also ascertain whether at a small cost the water of Jordan Creek, passing through the property, could not be utilized so as to give us a considerable horse-power for several months in the year. Anything which will tend to economy in the consumption of fuel is worthy of careful examination and effort."

#### Shoshone County.

The news has been received that the Supreme Court of the United States has, at Washington, D. C., decided the long pending suit between the Stemwinder and Last Chance mining companies in favor of the last named.

The jury in the case of D. W. Leasure, on trial at Rathdrum, Idaho, for the murder of Ivory Bean and conspiracy in the Coeur d'Alene mining riots last July, has returned a verdict of not guilty. The result of the trial is very important, as it virtually decides there was not conspiracy in the Coeur d'Alene trouble, and the acts of the union miners were defensive and not rebellious.

#### MICHIGAN.

##### Iron—Menominee Range.

Chapin Iron Company.—At this mine about 1,000 men are employed, and they are sending out somewhere in the neighborhood of 2,000 tons of ore daily. This ore is all being stocked, as no rail shipments are now being made. We are of the opinion, says the Norway "Current," that the much-talked-of start-up of the new pump at the Chapin is near at hand, and that it will occur some day when "nobody's lookin'."

Curry Iron Company.—The drift going west at the sixth level of No. 1 is now in about 500 feet from shaft, and still in ore. The outlook at the bottom has improved somewhat, although it is not yet satisfactory.

Florence Iron River Company.—The Norway "Current" states on good authority, we learn, that the Florence Iron River Company have sold for 1893 delivery 300,000 tons of ore.

Vulcan Iron Company.—At Southeast Vulcan the ore has been reached in the south formation, at the bottom, and the north formation at the same level shows, so far, only Jasper where ore was expected.

#### MINNESOTA.

##### Iron—Mesaba Range.

The late meeting of the Merritts with the American Steel Barge Company in New York appears to have resulted in a consolidation of the iron mining, railroad and vessel shipping interests, and probably the manufacture of iron ore into iron and steel, into one company, says the St. Paul "Pioneer Press." It looks as if the American Steel Barge Company is backing the Merritts or had taken them virtually into their company. It is now stated by the Merritts that they have abundant capital to complete their road to Duluth and to put in terminals costing upwards of \$500,000, provided the city will purchase dockage facilities for them and give to the company right of way into the city. It is estimated that this will cost about \$240,000. The line has been surveyed on an easy grade for the whole route, and options have been procured for a 2,500-foot dock to cost \$400,000. These docks will cover a pier 400 feet wide, which will contain three double ore docks with 100 pockets on a side and slips for vessels between. The docks will be larger when completed than any ore docks in the world. Options for space necessary for the docks have been secured at Oneota and also in the main division at Duluth.

#### MONTANA.

##### Deer Lodge County.

Anaconda Mining Company.—This company has paid off 600 men at the Anaconda and St. Lawrence mines, and no ore will be shipped to the smelter for about 60 days.

#### Jefferson County.

Elkhorn Mining Company (Limited).—The board has declared an interim dividend (No. 11) for the quarter ending November 30th, 1892, of 2 shillings per share, which was payable on the 21st.

The following is the cabled return for the month of November: Mill worked 27 days and crushed 1,008 tons, producing \$39,975; proceeds of 263 tons of ore sold to smelters, \$17,822; total produce, \$57,797; total expenses, \$24,370; profit for month, \$33,427. Delay consequent upon the accident to the compressed air drills has materially reduced the output of high grade smelting ore during the month.

The latest information with regard to the 1,450 level by cablegram to-day, shows that on the south side the level has been driven a total distance of 560 ft. After striking the first ore-body, intrusions of sandrock (which have appeared from time to time in other parts of the mine) made their appearance; but apart from these portions of the vein which are necessarily more or less mixed with sandrock, there have now been uncovered in this level two well-defined and clean bodies of ore, the first 32 ft. long, with an average width of 16 ft., and the second 35 ft. long, the width of which is not yet determined, the average value of both bodies being 75 oz. per ton. The ore is still being followed in the face of the level.

On the north side of the 1,450 level beyond the body of medium grade milling ore already reported, there has been uncovered what from present appearances promises to develop into one of the largest and richest ore bodies yet discovered in the mine. Developments are still proceeding at this point, but at present the ore body is 10 ft. long, with an average width of 19 ft., and an estimated average value of \$70 per ton. The importance of the discoveries in this part of the mine can hardly be overrated, proving as they do the existence of a large and valuable ore body equal to anything hitherto discovered on the south side, and a portion of the mine which has hitherto been regarded as of secondary importance only.

#### Lewis and Clarke County.

Moatana Company (Limited).—The total output for November was \$45,952 (the price of silver being taken at 85 c. per oz.), and the working expenses for the month \$37,500. In addition to 7,800 tons of ore crushed in the mills during November, 3,900 tons of tailings from the dams were treated, yielding \$11,500, at a cost of \$4,900, which figures are included in the above return.

#### Meagher County.

Eureka Mining Company.—The machinery is now at Armington. It consists of two boilers of a combined capacity of 80-horse power, engine, hoist and pump. The company owns two claims—the Eureka and Chinook—and the machinery will be erected between the two, where the shaft now is. The shaft is now down about 100 ft., and it is the intention to sink 200 feet farther as soon as practicable. The ore body is of considerable extent and is free milling, though it is hardly expected that it will continue so at greater depth.

Moulton Consolidated Mining Company.—The officers of the company have changed their minds about delaying matters until spring, and will push work forthwith. The contract is signed to put up the buildings and machinery, and work has already begun. The machinery consists of a 45-horse power boiler, engine, hoist and pump. This plant will have sufficient power to sink 1,000 feet. It is the intention of the company to sink a double compartment shaft to a depth of 200 ft. and then crosscut to the lead. The properties of this company are the Moulton, Harrison, Belfont and Pioneer, and on the first named the work mapped out at present will be done.

#### Silver Bow County.

Butte & Boston Mining Company.—A notice of authorization to mortgage the property of this company to secure additional bonds to the amount of \$2,500,000 has been filed with the county recorder of Silver Bow County, according to the proposition adopted at a special meeting of the stockholders held on Boston on September 20th. The bonds shall not exceed 2,500 of the value of \$1,000 each, and to become due 200 each year from 1902 to 1912, and 300 in 1913, and in the meanwhile to bear interest at a rate not to exceed 7%, payable semi-annually, according to a resolution of the board of trustees, the principle and interest to be payable in gold. The security is to be a consolidated mortgage on all the property of the company, and subject the present outstanding mortgages. Of the new issue \$1,000,000 of the bonds are to be deposited with the Massachusetts Loan and Trust Company and kept there for the purpose of retiring the outstanding bonds falling due September 1, 1898; \$1,000,000 to be offered to each stockholder pro rata at not less than 80 cents on the dollar, with a proviso that they cannot be sold for less; \$500,000 to be placed in the treasury of the company to be disposed of by the trustees, as may hereafter be determined, in acquiring adjoining properties, building additions to the plants, etc., and to be sold at not less than par. In case it should be found expedient to sell them at less than par the stockholders shall have the first right to subscribe for them. The property to be covered by the proposed mortgage in the Gray Rock, Josephine, Sister, Midnight, La. Plata, Free for All, Lone Tree,

Gabriella, Chicago, Delmonte, Buenos Ayres, Allie Brown, Wapello, Silver Bow, Missoula, Flag, Belle of Butte, Transit, Annie and Ida, Atlantic, Crotch, Baltic, and Town Gulch lode claims, and the Talbott and Jones, Harrington, Talbott & Downs and two other placers; also 18 lots in the Talbott & Jones addition, together with the Silver Bow mill, water rights and ditches on the Silver Bow creek, and all buildings, machinery and tools of the company. The notice is signed by Stephen M. Crosby, Charles Van Bunt, Albert S. Bigelow, Thomas Nelson, Leonard Lewisohn, Joseph A. Coram, Alexander S. Maltman, Charles H. Palmer and John F. Forbis as trustees. There were 184,428 shares in favor of the proposition and none against.

Poulin.—During last week a 3-ft. body of ore was struck in the east 300-ft. level of the Poulin, located near the Moscow, west of Centerville. An assay of the ore gave it a value of 54 oz. in silver and 26 9-100% copper. The property is owned by William J. and William McNamara, but at the present time is under lease to John and Hayes Cannon.

#### NEVADA.

##### Esmeralda County.

(From our Special Correspondent.)

Mount Diablo Mining Company, Candelaria.—A shipment of bullion containing 10,136 fine oz. of silver has been received at San Francisco.

##### Lincoln County.

Bullionville Mining and Reduction Company.—This Bullionville Company owns 150,000 tons of tailings, which were left from the mills near there. These tailings, it is claimed, will average from 12 to 20 ounces of silver and from \$2.50 to \$5 in gold per ton. The company have a plant erected to work these ores by a process which is as yet experimental. It was found that they could be imperfectly worked by Hypo-solution or by Cyanide, so it is proposed to use both solutions. Experiments show that the combination is a success it is claimed. The mill is expected to be in operation inside of 30 days. The capacity of the plant will be 2,600 tons per month. The officers of the company are: W. S. Godbe, president and manager; Thomas Marshall, vice-president; W. S. McCormick, treasurer, and A. H. Godbe, secretary.

##### Storey County.

The Virginia "Chronicle" says: "Notices are being filed every day in the Recorder's office of annual assessment work done on claims in this county. The owners of claims have until the first of the year to complete the work. Next year, shortly after the 1st of January, notices of relocation will be filed thick and fast."

##### Storey County—Comstock Lode.

Belcher Mining Company.—The latest official letter says: "The west crosscut from the south drift, on the 350-ft. level, has been advanced 22 ft., making its total length 34 ft. It cut a stringer of ore about 18 in. wide, and the face is now in porphyry. We have continued the north drift on the 350-ft. level for a distance of 33 ft. north of the bottom of the north winze from the 300 ft. level. The face is in porphyry and low-grade quartz. We are still following the pay north and south from the winze with no change of importance to note. In the south stope between the 300 and 400 ft. levels we have opened 9 sets south from the main raise, on the 16th floor, and 6 sets on the 15th floor. The pay varies from 3 to 4 ft. in width and is of good grade."

Challenge Consolidated and Confidence Mining Companies.—The latest official weekly letter says: "The joint west crosscut No. 7 from the north drift on the surface level is out 144 ft., having been advanced 19 ft. during the week. The face shows quartz of no value. We are shipping some ore to the Brunswick mill for reduction."

Consolidated New York Mining Company.—The San Francisco "Report" says that the battery returns of the Consolidated New York ore, which is being crushed at the Washoe mill, average from \$34 to \$35 per ton, with a high percentage of gold. The mine has steadily improved in the stopes and at lower points during the week ending December 23d.

Comstock Mill and Mining Company.—This company has reduced the charge for milling Consolidated California & Virginia ore to \$5 per ton, beginning December 1st, 1892.

Crown Point Mining Company.—The latest weekly official letter says: "The west crosscut from the southwest drift, 150 ft. south of the shaft on the 400-ft. level, has been advanced 26 ft. since last report, making its total length 117 ft. The face is in hard porphyry. In the west slope, on the 160 ft. level, we are still following the pay streak south on the 2d and 4th floors. It ranges from 8 in. to 2 ft. of fair grade ore."

Kentuck Consolidated Mining Company.—At the annual meeting of this company there was a change in the control. The representation of stock was 69,229 shares and the following were elected directors: R. E. Kelly, H. Zadig, W. H. H. Hart, Sol. Jacobs and Ang. Waterman. R. E. Kelly continues as president, but Aug. Waterman was chosen as secretary in place of J. W. Peew, and James H. Kim head as superintendent in place of H. M. Gorham. The company has \$2,854.06 cash on hand. The retiring superintendent in his annual report to the stockholders says that during the past year 533 tons of ore were extracted from the mine and milled, the



bullion yield of the same having been valued at \$9,575.83, and returning coin amounted to \$7,526.14. Mr. Gorham says the bullion yield would have been larger had it not been for the rebellious character of the ore, that which came from and above the 160-foot level, and which contained a large amount of manganese. The latest weekly official letter says: "We have completed the chute and are now opening out north and south on the pay streak on the fifth and sixth floors above the east crosscut on the 160-foot level. We are saving about two tons of ore per day, assaying per car samples \$20 to \$30 per ton. Have completed repairs to the tank station."

**Ophir Mining Company.**—At the annual meeting of this company on the 21st inst., at San Francisco, Cal., 88,200 shares were represented. The old directors were reelected, with Charles H. Fish president and Nat T. Messer vice-president. E. B. Holmes was reappointed secretary, and D. B. Lyman superintendent. The company had an indebtedness on December 15th of \$4,032.16, with all bills paid for November. During the past year the mine yielded bullion valued at \$15,609.80.

**Savage Mining Company.**—The latest official weekly letter says: "We have hoisted 462 cars of ore, shipped to Nevada mill 525 tons of ore and milled 455 tons of the same. Average car sample assay, \$25.19 per ton. Average battery sample assay, \$22.38 per ton. Bullion yield for the week, \$7,129.85. Shipped to the United States mint at Carson, 361 lbs. of bullion. On the 1,100-ft. level we are stopping north and raising in the ore on the fourteenth floor, which continues the same in size and quality as at last report. The north drift on the eleventh floor is advanced 24 ft. The face is in good milling ore."

(From our Special Correspondent.)

The following is the weekly tabulated statement of ore hoisted from Comstock mines and milled, with the car and battery assays, bullion shipments, etc.:

Mine.	Tons hoisted.	Car sample, as y.	Tons milled.	Average battery assay.	Bullion product, for week.	Bullion shipped.
Con. Cal. & Va.	227	23.47	936	21.43	.....	\$18,134.73
Col. New York.	177	35.63	117	34.92	.....	.....
Justice	.....	.....	.....	.....	.....	.....
Overman.	27	20.55	31	16.27	.....	.....
Potosi.	354	29.10	353	24.25	.....	\$343 3/4 lbs.
Savage.	462	25.19	455	22.38	7,129.85	361 lbs.

<sup>1</sup> First shipment on December account. <sup>2</sup> and <sup>4</sup> Crude bullion. <sup>3</sup> Cars.

The Comstock Pumping Association has had very fair success in its appeal to the companies of the North and Middle Comstock. An inclination is being shown to join in and share the expense of draining the lower levels of the mines, provided that it shall be a united effort in which all companies affected shall join. At present the hitch seems to be with the wood, water and railroad companies, who never have displayed the slightest inclination to cut rates for any reason. It remains to be seen whether these autocrats will give way a point in the hope—far distant it is true—of plundering on a larger scale at a later date.

**Belcher Mining Company.**—The west crosscut 350-level has cut a stringer of ore about 18 inches wide, the face of the drift being in porphyry. In the south slope, between 300 and 400 levels, nine sets south from the main raise on 16th floor have been opened, and six sets on the 15th floor. The pay ranges from 3 to 4 feet in width, and is of good grade. It is hoped that the south drift, 400 level, will make into ore, when prospects will be encouraging.

**Consolidated California & Virginia Mining Company.**—No further trouble is anticipated, as the gas escaping from the Consolidated Virginia shaft has diminished very considerably. Superintendent Lyman is of the opinion that ore extraction may be resumed south of the shaft, 1,500 level, within the next two or three weeks.

The Comstock Mill and Mining Company, alias Senator Jones, Flood & Mackay, have reduced the charge for milling Consolidated California & Virginia ore to \$5 per ton, beginning December 1st. This Comstock octopus thus poses, in the midst of the demoralization caused by the fires in the mine and the general depression on the Comstock, as a public benefactor, willing to forego some profit for the general good. In reality it is simply a Machiavelian move by which the corporation gave \$1 per ton to the stockholders with one hand—and presumably gain full return for the concession in the credit obtained—and take back more than the \$1 per ton conceded by reducing the assay value of the ore. It must never be forgotten that the mill-owners fix the assay values of the ores shipped for reduction and with this fact understood the graciousness of the Comstock Mill and Mining Company is not of any such great magnitude after all. Stockholders of the Bonanza mine might with perfect safety to their own pockets give the milling company \$10 per ton for working the ore if, in return, Messrs. Jones, Flood & MacKay would return to the stockholders the bullion product of the Annex, or, as more familiarly known "the Little Joker." There is little hope of that, however, for the Comstock Milling and Mining Company do not carry on business in that kind of way.

Grant County.

The output of the Silver Creek district is larger now than it has ever been before, writes the Silver City correspondent of the New York "Sun." There has been shipped from the Maud S. mill considerably over a ton of bullion within the past two months. The bullion produced is gold and silver in the proportion of about \$2 in silver to \$1 in gold. There are now over 30 men employed by the Maud S. Company in the mine and mill. About 250 lbs. of bullion have been shipped from the Last Chance mill since it was started up the last time, but it is not now in operation. A number of miners are working in the mine, and it is expected that the mill will be started again soon.

Since the decline in the price of lead the shipments of ore from Cook's Peak, the largest lead producing camp in New Mexico, have fallen off considerably. There are large deposits of argentiferous lead ores in the Cook's Peak range which run from 40 to 60% lead and from 6 to 9 oz. in silver per ton. Until recently the lead in the ores paid for mining, transportation, and treatment, and returned a good profit besides, but now, says the New York "Sun," there is little profit in working the mines.

**McDermott.**—Thirty tons of ore were recently shipped from this mine at Carlisle which will run \$100 per ton. This ore was taken out of the mine while development work was going on, and all came from the development workings.

**Pacific Gold Company.**—This company is making preparations to start up the Pacific mill again. Vanuers have been purchased to put in the mill in place of those taken out and placed in the Mountain Key mill last summer, when the Pacific Gold Company leased that mill. There is plenty of water now, and the Pacific mill will be running very shortly. The company will continue to operate the Mountain Key mill under a lease, the output of the mine being sufficient to keep both mills running. The capacity of both mills is 90 to 95 tons of ore a day.

Sierra County.

At Kingston there are more men at work than there were last year at this time, and work is to be resumed on some of the leading properties there in a few weeks, says the New York "Sun." The Templar, Keystone and Virginian mines, on the North Percha, near Kingston, have been consolidated, and they will be worked under one management in the future. All of these mines have been large producers, but none of them has been worked recently.

**Hillsborough.**—The output of the Hillsborough gold mine is now over 400 tons a week, and further increase is looked for. Next to Pinos Altos and White Oaks, says the New York "Sun," this is the largest gold producing camp in New Mexico. The Silver Creek district is not far behind, but it has not been so steady a producer as Hillsborough.

OHIO.

Belmont County.

**Pittsburg & Wheeling Coal Company.**—This company has two large plants located and operated on full time on the line of the Cleveland, Loraine & Wheeling Railroad. The larger is at the Wheeling Creek mines, two miles north of Bridgeport, and the other is at Maynard. Mr. J. E. Waters is general manager of the mining department. The first mine opened on the company's property was No. 1 at Wheeling Creek, into what is known as the No. 7 or Pittsburg coal seam, running from 5 1/2 to 6 ft. in thickness. This mine has a finely timbered double track drift opening into the coal seam about 800 yds. back from the tippie. The mine is worked on the square block system. No. 2 mine is located on the opposite side of the ravine from No. 1 tippie. It is reached by a short incline plane and gravity road to No. 1 tippie. The third opening has been made into a piece of coal left when No. 1 opening was made. It can be worked to an advantage and run on to the large tippie. A new furnace has been put in and a short incline plane built to this new opening, and everything will be placed in readiness to operate it when the spring trade commences. The block of 50 coke ovens located near the big tippie are all in blast, consuming the finer screenings. About 450 men are employed. The Pittsburg mine was opened about six years ago at Maynard Station, 12 miles north of Bridgeport. This company also owns large tracts of coal property at this point. Two drift openings were made into the Pittsburg or No. 8 seam, and a large tippie built about 1/4 of a mile back from the station, reached by a branch road running up to it. The company built 94 dwelling houses, while a number of comfortable homes have been built by other parties. The miners here work on the same basis as the Wheeling Creek men. At present about 175 men are employed.

PENNSYLVANIA.

Coal.

Surveyors are working on the mountain north of Centralia, known as Montana, laying out a map for Bethlehem capitalists, who have formed a company for the purpose of tapping the veins of coal which are said to exist along the Montana Valley.

**North Carolina Coal Company.**—Further particulars have reached us of the suit which has been begun in the Lackawanna County courts by Mrs. Ann W. Phillips, of Philadelphia, against Mrs. Mary C. Wallace, executor of the estate of the late Francis B. Wallace, and against the Ontario, Scranton & Carbondale Railroad Company and Simpson & Watkins,

the coal operators of Lackawanna County, a brief account of which was published in last week's ENGINEERING AND MINING JOURNAL. In 1864 the North Carbondale Coal Company was chartered in this State, and subsequently purchased the lands in question. The charter was for 20 years, and the company did not develop the lands. In 1880 the Legislature ordered the affairs of the company settled up. F. B. Wallace was the owner of 25,510 of the 60,000 shares of the company's stock. Of the remainder, 32,294 were surrendered and canceled. At the meeting of the company in 1883 to close up its affairs, as charged by Mrs. Phillips, a proposition was made and carried by the large majority of stock held by Mrs. Wallace, as executor of her husband's estate, to convey all of the company's property to Mrs. Wallace for \$1. Under this conveyance Mrs. Wallace in 1884 leased a large portion of the land to Simpson & Watkins, rich coal veins having in the mean time been discovered on contiguous land. She also sold them the timber on the land and required them to cut 2,000,000 ft. a year, the district being primitive hemlock forest. This the lessees have been doing every year since. Mrs. Phillips owns 490 shares of the North Carbondale Coal Company's stock, and claiming that the transfer of the company's property to Mrs. Wallace was illegal, brings the suit to have it set aside, which will compel the other defendants in the case to account for coal and timber they have taken from the property, which was not Mrs. Wallace's to lease to them. The case is now being heard by Judge Hand at Scranton.

**Philadelphia & Reading Coal and Iron Company.**—Fire was discovered in the West Mahanoy City colliery on the 23d inst., and has been burning ever since. It has already reached the Buck Mountain vein. A nest of 16 boilers and several out-buildings have sunk into the mine by the burning away of the timbers. The North Mahanoy colliery is one of the largest coal producers in the Mahanoy Valley. Its present capacity is about 500 tons daily, employing over 600 men and boys.

**Philadelphia & Reading Coal and Iron Company.**—A dispatch from Pottsville says that owing to the recent large number of mine fires in Schuylkill County, this company has taken steps toward preventing the recurrence of such disasters. Stringent orders have been issued whereby the dangers of further fires will be reduced to the minimum. Probably the most destructive mine fire among those which are still known to be ranging in the upper anthracite coal fields is the fire at the old Wadesville shaft; located about two miles from Pottsville. This fire is burning some hundred feet below the surface and for 34 years has baffled the efforts of the most efficient practical mining experts to subdue it. It started in 1853 on the Mammoth vein and has been burning since that time in a westerly direction and has already covered a distance of about two miles, and as the Philadelphia & Reading company's Beechwood colliery at Mount Lafee works the same vein in an easterly direction grave fears are entertained for the safety of that operation. With a view of trying to stay the progress of the fire toward Beechwood the Reading company has put a force of men at work closing up breach holes and all openings to cut off all draft from the burning mine.

**Philadelphia & Reading Coal and Iron Company.**—The expected announcement of an agreement between the Philadelphia & Reading Railroad Company and the Finance company, of Pennsylvania, was made on the 27th inst. It was given out officially by the Reading that the Finance Company had been appointed to take charge of the coal business of the Reading Company. It is understood that the Finance Company will have full charge of all the financial details relating to the distribution of the Reading's coal production. This branch of the business not only required a large cash outlay but a great deal of labor, all of which has heretofore fallen upon President McLeod.

The following is the official circular: "The Reading Railroad Company announces that it has perfected arrangements of a very important character with the Finance Company, of which George H. Earle, Jr., has lately become President. It is a well known fact that for many years the Reading has sought by various ways to separate the large commercial business conducted by the Coal and Iron Company from its railroad business proper, and the present arrangement effectually separates the two, so far as conducting the finances of the Coal and Iron Company are concerned. The arrangement is of such a character that the interests of both companies are made secure, and it is one which will be profitable to the Finance Company as well as economical and of great advantage to the Coal and Iron Company.

"Some such arrangement as this has become a necessity since the acquisition of the Lehigh Valley and the Jersey Central, as well as a large number of individual operators from which it purchases coal, making the aggregate of this enormous commercial business reach from five to six millions per month, or sixty to seventy millions per year.

"This large commercial business, if handled by one concern, can be made very profitable to it, as well as relieving the Coal and Iron Company from the financial part of its business, and to the advantage of both that company and the Railroad Company. Fortunately for both companies, the Finance Company has a charter which will enable it to do this business, and it is the only institution of the kind in this State that is authorized by its charter to carry on the various branches of this business,



Commencing January, 1893, the Finance Company will become the commercial agents of the Reading Coal and Iron Company. The Coal Company's organization will continue to handle and distribute the coal and conduct all the details as heretofore, and the management will be of such a character as will secure the Finance Company perfectly in all advances made, while the Coal Company will not lose the advantages of its faithful and trained employees."

**Upper Lehigh Coal Company.**—This company is reopening old No. 3 slope near Freeland, that was sunk about 25 years ago. At present men are engaged in retimbering and sinking it through a rock fault, with good hopes of finding the vein, which is Mammoth E, in good condition. The average height of the vein is 24 ft., and if it proves successful it will be the means of giving employment to many men. The slope will probably reach a good depth before the basin is struck.

#### SOUTH DAKOTA.

##### Lawrence County.

**Carbonate Hill Mining Company.**—This company's ground lies near the Black Buttes and consists of six claims. The ore is carbonate and lead, assays of which show it to go \$45 per ton silver and 10% lead. The ore lies in verticals. On one claim the miners are down 65 feet in solid ore. From now on two shifts will be worked getting out ore for shipment to the D. & D. smelter, it being the intention of the owners to begin shipping about January 10th. The properties are under bond.

**Green Mountain Mining Company.**—This company was recently organized to work the new gold properties discovered near Sundance. The company organized with the following officers: President, J. S. Joseph; secretary, T. Hooper; treasurer, A. A. Rounds. The capital stock of the company is 1,000,000 shares, par value \$1. 100,000 shares of the stock will be sold and proceeds to go toward the erection of a 49-stamp mill at the mines. It owns 13 claims, each showing outcroppings of free milling ore, which averages from \$1 to \$30 per ton. The ore body lies between lime and porphyry.

**Inter-Ocean.**—The mill at Bear Gulch will be placed in operation January 1st, the last details of the placing of machinery being well under way. The mill is equipped with 20 stamps at present but will be increased to 40 next summer, providing developments warrant it.

**Minnesota Consolidated Mining Company.**—In the spring it is said this company will erect a 120 stamp mill, to be arranged after the most approved plan. The location of the mill is on the B. & M. railroad, four miles below Rochford, where sidetracks and station facilities will be put in. The mines are situated about four miles from the mill site, and ore will be transported by a system of narrow gauge railroad, equipped with electric motors or locomotives and modern dump cars.

Power will be furnished by turbine wheels, giving at least 365 H. P. Water will be brought by a huge flume two and a half miles.

The mill will be started with 60 stamps, and another 50 will be added later on. Over \$20,000 has been spent so far on development work, which has blocked out a deposit of ore 300 feet deep by 100 feet wide. There has been milled 3,000 tons of ore and other material just as it was taken out, which yielded \$3.18 per ton in gold and a small amount of silver. The cost of mining, handling, transporting and milling, it is said, will not exceed \$1.50 per ton.

#### UTAH.

Articles of incorporation of the Salt Lake & Deep Creek Railroad were filed with the territorial authorities, Salt Lake, December 22d. The road is to be constructed from this city to Mnucey, Nev., a distance of 220 miles. Their capital stock is \$4,400,000, 51% of which has been taken by New York capitalists, the remainder by local capitalists. It is believed that the Union Pacific is behind the new road, heading off the proposed encroachment of the Northwestern on their territory. Grading is to commence early in January.

(From our Special Correspondent.)

During the past few weeks readers of the ENGINEERING AND MINING JOURNAL have probably read more or less in regard to the new placer gold discoveries in Southern Utah, along the San Juan River, and every railway running South or West from here, is at present making heroic efforts to secure the travel, which it is expected, will soon set in towards the New Eldorado. It is the old story; many will spend all they have to reach this far away country, and after going through the many privations, and the exposure, invariably incident to pioneer life, especially in a mountainous district, leave the diggings, disgusted; some will be able in consequence of a booming business in certain lines at least for a while, to earn a better living than they could elsewhere, and a few, a small percentage always, will, provided gold is found in paying quantities, secure a competency, and perhaps a fortune.

From the southwestern portion of Colorado, from different mining districts of Utah, and from many points in New Mexico a stream of fortune hunters is at present making its way towards the San Juan River, and I am informed that there are already about 3,000 people on the ground, each trying to get a location. It is evident that any "tenderfoot" ought to think twice before risking his little all in an effort to get there.

From information on hand at this time there are several ways of getting to these mines. From the nearest railroad point the path leads through deserts and along rocky chasms, where thus far very few white men have ever trod. The mouth of the San Juan River lies about 125 miles south of Green River station, on the Rio Grande Western Railroad, in Utah; about the same distance west of Dolores, Colo., on the Rio Grande Southern, and a little further in a northerly direction from Winslow, Ariz., on the Atlantic & Pacific line. The bottom of the cañon of the San Juan River can at many points be reached from points 50 to 75 miles above the river's mouth. In case of a great rush there is no doubt but that before long the necessary means of transportation will be furnished by enterprising owners of stage and freight lines, and some provision made for the entertainment of man and beast. Already one enterprising firm at Dolores, I am told, is offering passage to the gold fields in a wagon at \$20. Although the southern route, that from Winslow, Arizona, might be easier to travel at this time of the year on account of smaller quantities of snow, which may fill the mountain roads and cañons in the northern and trails, the neighboring Navajo Indian reservation ought to be taken into consideration. These Indians, as a rule, are peaceable and roam more or less over the surrounding country, but they have always been opposed to prospecting along the San Juan River. By directing their course in a northwesterly direction from the above point, prospectors would strike the river further up and steer clear of the Indian country.

Naturally there is a great demand for correct maps of that unexplored country. Hayden's map is undoubtedly the best in existence.

Strong indications of copper and asbestos have also been found in the vicinity, and I understand that some experienced men are about to make extended investigations in that regard.

The road to the San Juan placers passes about nine miles east of the Henry Mountain mining district, which lies about 75 miles south of Green River, Utah. The manager of one of the leading properties in that district was in Denver recently on his way to Europe. He is of the opinion that that district will before long become a prominent producer. The ore is principally a free milling gold ore, and on the Bonita Park property a fine stamp mill is in operation. Along parts of the San Juan river, he says, are found a number of cliff dwellings, and way up in the sides of the steep walls of some of the cañons are frequently still found the dried bones of that extinct people. The army of men at present making their way into this, thus far almost unexplored country, will therefore during their search for hidden treasures, probably bring some very interesting historical facts to light.

#### Juab County

It now seems certain that an 80 stamp lixiviation plant to use the Russell process will be erected at Lehi, to treat the Tintic low grade ores. The company which will build the mill consist of Gen. L. T. Michener, Charles H. Lawrence, W. W. Dudley and P. Chapin. The capacity of the plant will be 225 tons daily.

#### Salt Lake County.

The Mingo Furnace Company on the 29th inst. transferred to the Mingo Smelting Company the smelter near Salt Lake City, which is said to have cost \$500,000.

Owing to the continued low silver and lead rates, the Niagara group of mines at Bingham, Utah, in which over \$500,000 is invested, has shut down, and the managers of the old Jordan group have notified the men that they will have to accept a reduction in wages in January 1st or find themselves out of work.

#### Summit County.

**Anchor Mining Company.**—Another Anchor assessment was levied upon the stockholders last week. It amounts to 20 cents per share, and is payable on or before January 25th, 1893. David Keith and A. B. Richardson resumed Monday from their visit to Cleveland, O., to attend the meeting of the board of directors of the company. Mr. Keith returned as manager and Mr. Richardson as secretary.

#### WEST VIRGINIA.

##### McDowell County.

**Algeria Coal and Coke Company.**—This company's mines are on fire.

#### FOREIGN MINING NEWS.

##### BRITISH COLUMBIA.

The fortnightly shipments on the 17th of November amounted to 5,268 oz., valued at \$93,977. The total output for the year up to date is 110,156 oz., valued at \$1,980,914.

##### Lardo.

This camp was discovered last September. It is about 200 miles north of Spokane. From Bonner's Ferry one can go by steamboat and rail and steamboat to Kalso, on Kootenai Lake; thence across the lake 20 miles by boat, and from the head of the lake to the Lardo region is 60 miles, without a trail or road.

The leads thus far discovered are found in a lime and slate contact. The lime belt tends north-

east and southwest, is from 1,500 to 2,000 feet in width and rises up nearly perpendicular to a height of 2,000 to 3,000 feet. The Abbott claim, chief of the C. P. R. group has 40 feet of galena ore. All the ore runs well in gold. There is an abundance of timber and plenty of water. The timber is described as very fine. The mountains are covered with cedar trees 8 to 10 feet thick at the butt, and towering 100 feet without a limb. More than 30 locations have been made.

#### ECUADOR.

At Ecuador, the new law sanctioned in Quito on August 15th last, reforming the mining laws, has been published. Among the principal alterations, compared with the previously existing laws, are the following: The following articles are added to the list of mines subject to be denounced: Sulphur, chromium, rhodium, iridium, tungsten, petroleum and coal. Metals and precious stones found isolated on the surface of the soil are to belong to the first finder. Any person may denounce, and obtain, in accordance with the dispositions of this code, up to 20 concessions, always provided that they are on vacant ground, or ground not occupied by other miners, and also that they are contiguous to each other, on the course of the same vein, and without leaving intermediate spaces. The annual duty for each concession is fixed at 8 sucres (about \$5). This is to be paid in advance, and can be paid into any of the treasurer's offices throughout the country. It is enacted that the mine concession shall only terminate on the failure in payment of duty for the term fixed by this law, in which case the mine will be put up to auction by the fiscal judge for the purpose of sale to the highest bidder, with the condition that he shall go on paying the respective duty. In the regular beds or veins each concession will be of 600 metres horizontal length by 200 metres breadth, provided there be so much land vacant or unoccupied by other miners. In the gold sands the concession shall comprise a superficies of 50,000 square metres in the form required by the interested party, but the width shall in no case be less than 50 metres. An exemption is granted for 25 years, to be counted from the promulgation of this law, from all fiscal or municipal taxes on the transfer of the proprietorship in mines, and from all royalty duties on mines or their products. For the same period mining property shall not be charged any other contribution than that of the duty before mentioned, nor shall any fiscal or municipal dues be charged for the importation of machinery, tools, utensils, explosives, for the working of the mines or the elaboration of their products.

#### REPUBLIC OF COLOMBIA.

**Caribbean Manganese Company.**—This company, with headquarters at Baltimore, Md., has been organized to develop some manganese properties in the department of Pauama. The mines are from three to six miles from the small port of Viento Frio, or 45 miles northeast of Colon. Preliminary lines have been surveyed for a railroad from the mines to the coast, and as soon as the location is completed the work of construction will be begun.

#### RUSSIA.

The works of Bogoslawsk are in reality the only successful ones in the Urals. Some ten years ago the State Counsellor Polortzof purchased for 6,000,000 rubles this mineral district, covered by forests and abounding in ores of iron, chromium copper and gold, and which has been systematically explored by the director of the district, M. Auerbach, mining engineer.

The copper works are situated at the village of Bogoslawsk, in the department of Perm, 238 versts north of Konchva, a station on the railway between Perm and Tionnen. The copper mines are 6 kilometers from the reduction works, and are reached by a narrow gauge road which is prolonged for 50 versts to the Sosva River. This railroad is employed to haul the ores to the works and to transport the copper to Filkina, the point of embarkation on the Sosva River, from whence it is carried by boats to Tionnen.

From Tionnen they send the copper by the railroad to Perm, thence by the Kama River to Nijni Novgorod, which is the principal market for the metal. But one shipment of copper is made annually, and that in the springtime, when the melting of the snows permits of the navigation of the rivers. The Bogoslawsk works are too far distant to utilize the bituminous coals of poor quality which are produced in the Urals, so that the only fuel used is wood. The wood is cut in the autumn, then transported in winter on sleds, or on rafts in the spring when there is high water in the numerous small rivers of the district.

The ore treated is a cupriferos pyrite, which occurs in veins in diorite, carrying 4 to 5% copper. The copper mines have become poor in depth, and since 1881 the percentage of copper in the ores heated has steadily declined. In 1881 the average was 10.09%, while in 1887 it was but 5.23%. In 1890 the mines of Rachette hoisted 21,967 tons of ore, which when sorted by hand gave 10,750 tons of crude ore. The Bachmakoff mines raised 17,255 tons in the same period, which were sorted to 15,408 tons. These ores were then partially roasted at the mines, yielding 10,266 and 14,200 tons respectively. The Troitzky and Pestschank mines are merely prospects, and as yet have furnished but insignificant quantities of



ores. The average cost of the roasted ores on the ground at the mines is 10.424 roubles per ton.

SICILY.

The fires in the silver mines of Lucia, near Girgenti, which have been smouldering for years, but have been confined to the remoter galleries, broke through the barriers Dec 3 and filled the mine with smoke. Five miners were choked by the fumes and 10 others were injured. The fires have again been isolated by new barriers and work has been resumed.

SPAIN.

Rio Tinto Company, Limited.—The Rio Tinto Company, Limited, an English corporation operating the famous copper mines in Spain, is offering through the Commercial Bank of Scotland, £600,000 (\$3,000,000) third mortgage debenture bonds, bearing 5% interest per annum. The capital of these bonds is repayable at par by half-yearly drawings extending over twenty-four years, and the price of issue is 95%. The bonds are secured by a deed of mortgage and trust in English form upon the Rio Tinto mines, as well as upon all property of the company now existing in Spain, but subject, as to the bulk of such property, to the outstanding first and second mortgage bonds of the company. The first and second mortgage bonds are extinguishing by two several annuities extending to April 1st, 1913, and April 1st, 1917, respectively. These annuities already have been applied to reduce the first and second mortgage bonds by over £600,000 (\$3,000,000). The present issue, therefore, does not exceed the mortgage debt previously authorized.

SWEDEN.

During the past summer 131,000 tons of iron ore have been shipped, at Lulea, from the ore deposits of the Gellivara Malinfalt Company, and the daily output of iron ore amounts to about 1,000 tons. The diamond borings at the ore mountain, which are still going on, have reached a depth of about 130 ft., and show right through nothing but pure ore. A new railway is under contemplation from Gellivara to the northern end of the ore mountain, where the important ore deposits, Koskull and Tingvall, are situated. While great activity prevails as regards the winning of iron ore, of which this year's exports are very heavy, the Swedish iron industry is not otherwise flourishing. A number of iron works are being closed; in Warmland alone during the last year or so thirteen iron works have suspended operations. In the Jonkoping district the iron industry is also in a depressed state, and here six iron works have been closed during the last 12 months. There appears to be some truth in the statement made in Germany, that Sweden is losing ground in the world's market as a producer of iron, owing to the improved methods which have been adopted elsewhere of late years, and through which inferior iron ore now yields a good saleable article. That Sweden still holds the position she does in, on the face of it, owing to the purity of her iron ore deposits and the liberal supplies of charcoal.

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Pittsburg, Deadwood, S. Dak.; St. Louis, Helena, Mont.; London and Paris, see pages 646 and 648.]

NEW YORK, Friday Evening, Dec. 30th, 1892. The last week of 1892 being a "holiday week" has been one of dulness in the mining stock market. There was no special feature to report; trading has been limited to a few stocks, none of which was much of a favorite. The shares of the gold mining companies were in better demand, although actual sales have been very light.

The past year has been anything but active, so far as speculation in mining shares is concerned. The market has grown duller and duller and the volume of business has been growing smaller for the past few years. We trust that 1893 will see the old activity return, that we may be enabled to publish other than tiresome records of a dull and featureless mining market.

The Comstocks, with but few exceptions, are lower, and have been much depressed. Of Consolidated California & Virginia 1,800 shares were sold at \$1.45@1.85. Gould & Curry were stationary at \$1, with sales of 200 shares. An equal number of shares of Hale & Norcross were sold at 90c. Of Savage 200 shares were sold at \$1.10@1.15. Other sales were as follows: 100 shares of Sierra Nevada at \$1.25; 300 shares of Best & Belcher at \$1.20@1.50; 4,000 shares of Comstock Tunnel stock at 8c.; 300 shares of Mexican at \$1.05@1.40, and 100 shares of Union Consolidated at \$1.05.

Of the California stocks Quicksilver, preferred, showed sales of 100 shares at \$17. There was a sale of 500 shares of Belmont at 30c. Of the Brunswick Consolidated 1,000 shares changed hands at 11@12c. On the 23d inst. the shaft of the Brunswick Consolidated Gold Mining Company's mine was down to the 700-foot level and the station was being cut at that point. The West drift has reached a total length of 150 feet, and is in ore which continues to improve; the ledge is two feet wide. The east drift is in 145 feet. The ore there is the same as last reported. The bins are full of ore. The annual meeting of this company takes place in San Francisco on January 12th, 1893.

The "Amador Ledger" has the following item: "The Albany Gold Mine, of which J. H. Tibbits, of Sutter Creek, is superintendent, is a corporation whose property consists of five claims on the Mokelumne River, near Middle Bar. Ten men are at work there at present."

The Colorado stocks have been very quiet during the week. Leadville Consolidated continues the favorite; during the week 2,500 shares were sold at 21@22c. Of Chrysolite 900 shares changed hands at 22@23c. A sale of 200 shares of Lacrosse at 5c. is reported.

Of the Black Hills stock Deadwood Terra shows sales of 200 shares at \$1.45@1.50. Iron Hill was dealt in during the week for the first time in some months; 200 shares were sold at 10c.

Sales of Ontario this week aggregate 110 shares at \$15.50 to \$18.

Of El Cristo 500 shares were sold to-day at 20 to 22c.

Phoenix of Arizona was fairly active during the week. Sales have aggregated 2,500 shares at 55@62c. This company's mills started up on the 24th inst. after a shut down of one year and a half. There is plenty of ore on which to run, it is claimed.

Boston.

Dec. 29.

(From our Special Correspondent.)

The week ending to-day has been extremely dull for copper mining stocks, and in the early dealings prices were inclined to a lower level, although there was no apparent pressure to sell. For the past two days there is noted quite an improvement in demand and more disposition to purchase good stocks at better prices. The feeling in copper circles seems to be more hopeful for the future, and it is believed that the coming year will see not only an increased demand for the metal, but better prices for the leading mines. Boston & Montana sold down to \$31½ early in the week, but since the holidays there has been more inquiry for the stock, and sales were made to-day at \$33½, with good buying of the stock by parties who are in position to know the value of the property.

Butte & Boston was heavy at 90%, with sales at that figure; later it sold at \$11, and is in good demand at this price.

The old standby Calumet & Hecla sold at \$295@ \$295½, and is readily taken at this price.

Osceloa, in sympathy with the balance of the list sold down to \$34½, but recent advices from the mine has stimulated buying, resulting in an advance to \$35½, with but little stock in the market.

Tamarack advanced from \$154 to \$158, and all offered at the latter price was freely taken. Tamarack, Jr., improved \$1 per share, selling at \$21 for 100 share lots.

Franklin sold ex-dividend at \$13, a gain of \$½. Kearsage touched \$12 for a small lot, and Centennial sold for \$7¼@7¾ for 100 shares only.

Quincy sold at \$144 for 10 shares, but no round lots could be bought except at a much higher figure.

We note sales of Wolverine at \$1¼, and Bonanza at 25c. Santa Fe has nearly dropped out of sight. Sales were made at 5c., and later at 3¼c.

Of the silver stocks we note sales of Dunkin Mining Company at 17½c., and Crescent at 7c.

3 P. M. The market closes quite firm with sales of Boston & Montana at \$34. Franklin at \$13½, and Osceloa at \$35½.

San Francisco.

Dec. 16.

(From our Special Correspondent.)

The Mining Stock Market has during the week displayed every symptom of being in a very demoralized condition, and marked inactivity has alternated with spasmodic efforts on the part of brokers, acting on orders from the inside, to revive public interest and prevent other collapses. Ordinarily business is not particularly brisk at holiday time, but the present depression cannot be accounted for in any such ordinary way, with the Bonanza mine no longer producing any bullion, the mainstay of the market has been removed. On Wednesday the total volume of trade amounted to only 1,340 shares of stock, valued at \$1,092 50; yesterday, the market was supported and Consolidated California & Virginia and Ophir were in demand, while to-day Potosi has sold freely.

The fact is, assessments are in order, and it is generally believed that, as "Jim" Flood, when he leaves for the East next week, goes to confer with Mr. Mackay agent the scheme for draining the lower levels of the Comstock, and upon his return all the north and middle companies will probably join the Pumping Association, assessments will be levied along the entire line of Comstock companies. The State of Nevada has swallowed up, as usual, most of the assessment money on the Pacific coast during the year. California and other of the coast States have received below, rather than above, the average, and the difference in totals in favor of 1892, as compared with the year previous, is thus accounted for.

The following list, which is approximately correct, shows how assessments have been divided on the Pacific Coast: Nevada 43, amounting to \$2,236,120; California 26, amounting to \$173,000; Arizona 7, amounting to \$73,000; Oregon 1, amounting to \$1,250; Idaho 1, amounting to \$3,000; British Columbia 2, amounting \$45,000; Mexico 1, amounting to \$30,000.

Totals 81, \$25,566,370—145 calls. 1891, 90 assessments; \$2,925,540—138 calls. 1890, 89 assessments; \$2,392,460—131 calls.

There is no means available for knowing how much stock was forfeited for non payment of assessments, but doubtless such amounts will more than

equalize the amounts received by companies of which no record has been made.

During the past 12 months the fluctuations in Consolidated California & Virginia have, in a general way, indicated the course of the market, and it will be noticed in the following monthly quotations that the trend of prices has been steadily downward:

	Highest.	Lowest.		Highest.	Lowest.
January.....	6:25	3:65	July.....	3:85	3:20
February....	6:25	4:20	August.....	3:45	3:15
March.....	5:37	4:05	September....	4:80	2:85
April.....	5:25	3:85	October.....	1:45	2:60
May.....	5:50	3:45	November....	3:10	1:25
June.....	4:05	3:20	December....	2:80	1:50

Yesterday the leading stock sold to \$1.65, but opened to-day at a 10 cents decline, closing at \$1.60. Ophir sold at the same price. Mexican sold for \$1.25; Sierra Nevada for \$1.20, and Mexican Consolidated for \$1.10. All these prices show a decline on the week's trading of from 10 to 25 cents.

Of the middle Comstocks, Potosi has been the only stock showing activity. In the early days of the week it sold down to \$1.60, but recovered this afternoon to \$1.90, closing steady at that figure bid. Gould & Curry sold for 85c; Chollar for 55c; Hale & Norcross for 65c., and Savage for 85c.

The south end Comstocks and Gold Hill stocks have sold at rates much under those ruling a week ago. No new developments having taken place in the Belcher mine, the stock, which has been a favorite for so long, sagged with the rest of the list. This afternoon Belcher sold for \$1.50, strengthening toward the close of the session to \$1.60. Bullion sold for 75c; Challenge Con. for 35c; Crown Point for 50c.; Con. New York for 50c.; Confidence for \$1.60; Occidental for 30c.; Overman for 35c.; Seg. Belcher for 15c.; Silver Hill for 10c. and Yellow Jacket for 50c.

Sales of outside stocks have been merely nominal, the quotations to day being: Bodie, 15c.; Bulwer, 15c.; Mono, 15c.

In the Quipoton group there has not even been a bid. Central and Crocker were held for 5 cents and Peer and Peerless for 10 cents.

The same applies to the Tuscarora stocks. Belle Isle, Del Monte, Navajo and North Belle Isle have each been held for 15 cents; no bids. Commonwealth and North Commonwealth at 5c. each, and Grand Prize and Nevada Queen at 10c. each have failed to find purchasers.

SAN FRANCISCO, Dec. 30. (By telegraph).—The opening quotations to-day are: Best & Belcher, \$1.35; Bodie, 15c.; Bulwer, 15c.; Chollar, 60c.; Consolidated California & Virginia, \$1.85; Eureka Consolidated, \$1.50; Gould & Curry, 90c.; Hale & Norcross, 90c.; Mexican, \$1.25; Mono, 15c.; North Belle Isle, 10c.; Navajo, 15c.; Ophir, \$1.80; Savage, \$1.05; Sierra Nevada, \$1.30; Union Consolidated \$1.05; Yellow Jacket, 45c.

DIVIDENDS.

American Turquoise Company, dividend No. 1, of six per cent., payable January 15th, at the office of the company in New York. Transfer books close December 24th and reopen January 3d.

ASSESSMENTS.

COMPANY.	No.	When levied.	D't'nt' in office	Day of sale.	Amb per share.
Alpha Cons., Nev....	10	Dec. 20	Jan. 24	Feb. 14	.10
Belle Isle, Nev.....	16	Nov. 5	Dec. 12	Jan. 4	.10
California, Cal.....	6	Sept. 28	Dec. 20	Jan. 7	.01
Challenge, Nev. ...	13	Nov 16	Dec. 31	Jan. 25	.25
Commonwealth, Nev. ....	10	Nov. 23	Dec. 28	Jan. 24	.10
Confidence, Nev. ...	22	Dec. 21	Jan. 26	Feb. 15	.75
Con. Cal. & Va., Nev	..	Dec. 13	Jan. 21	Feb. 10	.50
Con. Imperial, Nev.	34	Nov. 22	Dec. 29	Jan. 19	.03
Crown Point, Nev.	59	Dec. 20	Jan. 24	Feb. 14	.25
Del Monte, Nev.....	7	.....	Dec. 23	Jan. 24	.10
E. Best & Bel., Nev.	7	.....	Dec. 24	Jan. 18	.20
Eclipse, S. Dak.....	7	Nov. 18	Jan. 3	Jan. 23	.001½
El Leopoldo, Mex...	1	Nov. 11	Dec. 14	Jan. 2	.10
Evening Star, Nev.	7	.....	Jan. 12	Jan. 31	.61
Gold Mountain, Cal.	4	Dec. 21	Jan. 28	Feb. 15	2.00
Gould & Curry, Nev	70	Nov. 22	Dec. 23	Jan. 20	.25
Gay Eagle, Cal. ...	31	Dec. 15	Jan. 23	Feb. 16	.17
Indian Creek, Cal...	3	Nov. 4	Dec. 14	Jan. 6	.10
Martin White, Nev.	28	.....	Jan. 16	Feb. 20	.25
North Gould & Curry, Nev.....	14	Nov. 21	Dec. 24	Jan. 16	.10
North Belle I., Nev.	21	Nov. 14	Dec. 20	Jan. 17	.01
Hussell, Cal. ....	3	Nov. 14	Dec. 19	Jan. 16	.01
Sierra Nevada, Nev.	163	Nov. 9	Dec. 14	Jan. 3	.25
Siskiyou Con., Cal.	5	Dec. 16	Jan. 23	Feb. 10	.10
Trent, S. Dak.....	4	Oct. 29	Dec. 15	Jan. 5	.001
Utah Con., Nev.....	16	Dec. 13	Jan. 19	Feb. 9	.10
Yellow Jacket, Nev.	53	.....	Jan. 6	Feb. 14	.30

METAL MARKET.

NEW YORK, Friday Evening, Dec. 30, 1892.

Prices of Silver per Ounce Troy.

Dec.	Sterling Exchange.	London Pence.	N. Y. Cents.	Value of sil. in \$1.	Dec.	Sterling Exchange.	London Pence.	N. Y. Cents.	Value of sil. in \$1.
24	187¾	38	82	632	28	187¼	38¼	82¼	634
26	187¾	38	82	632	29	187¼	38¼	82¼	636
27	187¾	35	82	632	30	187¼	38¼	82½	637

\* Holiday.

The ability of the India Council to negotiate their drawings at 1s. 2¾d, or better has given tone to th

silver market, and large amounts are being absorbed on India account. The shipments to-day from New York were about 600,000 oz.

The United States Assay office at New York reports the total amount of silver for the week to be 51,000 ounces.

**Gold and Silver Exports and Imports at New York for Week Ending December 24th, 1892, and for Years from January 1st, 1892, 1891.**

Week..	Gold.		Silver.		Excess of Exports.
	Exports.	Imports.	Exports.	Imports.	
1892....	\$4,437,125	\$38,066	\$415,970	\$71,309	\$4,763,720
1891....	70,743,221	8,490,293	22,583,272	3,050,724	1,744,570
1891.....	76,066,356	32,041,779	20,264,064	2,776,476	61,452,735

During the week ending December 31st the exports and imports, so far as ascertained, have been as follows: Exports, gold, \$83,312.50; silver, \$277,438. To this should be added \$500,000 withdrawn on Friday for Saturday's export via French steamer, and \$850,000 withdrawn from the sub-Treasury during the week, which sum, it is said, will go to Montreal to help swell the bank reserves before the regular annual report is made. The imports are: Gold, \$28,731; silver, \$8,824. Of the silver exported, \$230,000 consisted of American bullion.

The movement of bullion at San Francisco during the year 1892, exclusive of December, has been as follows: The imports of gold in November were \$1,604,309, and for the year to date \$4,933,181. The exports for November were \$66,161, and for the year \$723,051. The imports of silver in November, \$336,627, and for the year \$2,727,375. The exports of silver in November and December were \$1,380,456, and for the year \$11,838,791.

**NOTES OF THE WEEK.**

The year closing with this issue has seen even a larger net export of gold than that which took place during 1891, and the oft predicted panic is still in the future. Still it is to be observed that values generally are lower than at this time last year, and it is safe to say that they will be still lower unless some sign of amelioration in the state of our currency appears.

Among the more pressing of the questions needing settlement is that defining the status of silver. During the year, the government has purchased 54,000,000 oz. of silver, and over 50,000,000, or nearly \$1 per capita has been added to our currency.

This has cheapened money rates to such an extent that capital has been idle. Gold has been exported in response to small premiums paid by foreign countries, in face of unfavorable rates of exchange and our gold reserve has been and is dangerously near the \$100,000,000 limit. The situation has been accentuated by the failure of the cereal crop to reach the high standard obtained in 1891.

Early in the year the urgency of the silver question was appreciated by the Administration and steps were taken toward holding an International Monetary Conference. The results accomplished by this conference were unimportant, and it adjourned, recommending a meeting in May next. This ending was expected from the beginning, not only here but abroad, and many believe the calling of the conference was for political effect only, a feeling which was strengthened by the appointment of Senator John P. Jones as a delegate.

At the conference no plan was submitted that assumed to be a settlement of the question at issue, the American delegates simply proposing a renewal of a debate already exhausted on the subject of bimetallism on the ratio 15 1/2 or 16 1.

In striking contrast to all these plans is that proposed by the ENGINEERING AND MINING JOURNAL, first published in our issue of December 3d, and which for its completeness surpasses any yet presented. From time to time we have published the opinions of various financial authorities on this plan, and to day we add several more. Mr. Muhleman, of the sub treasury, says: "The plan grows on one, the better it is understood the more it is appreciated, for it is a complete solution of the question and the benefits which would follow its adoption are obviously to the advantage of all." Mr. Robert Basser, of Mannheim, Germany, writes:

"Of all the propositions I have seen, I believe the plan proposed by Mr. Rothwell to be the most able and ingenious one to solve the silver question in the way the American people wish it to be solved. But the Brussels Conference has conclusively shown that the leading European nations do not wish such a solution. The reasons have been so fully stated that I will not intrude on your valuable time by repeating them here once more. Suffice it to say that England, Germany and France will stick to their respective monetary systems, and that they will allow the United States to do as they please. People in Europe are prepared to see a heavy drop in the price of silver as soon as the United States shall stop their purchases of the metal, but no one thinks that any government will demonetize their silver coins and throw the metal on the market. Of course there will be more or less heavy disturbances, but events long foreseen have, when they happened, generally spent the greater part of their force."

In conclusion it may be said that the situation is one fraught with difficulty if not with danger and that it calls for the interested patriotic consideration of all the people of our country.

In closing the year, we again invite the attention

of our readers to this plan and ask that they favor us with their opinions of it both pro and con.

**Domestic and Foreign Coins.**

The following are the latest market quotations for the leading foreign coins:

	Bid.	Asked
Mexican dollars.....	64 1/4	65 1/4
Peruvian soles and Chilean pesos.....	59	61
Victoria sovereigns.....	4.85	4.88
Twenty francs.....	3.85	3.88
Twenty marks.....	4.74	4.78
Spanish 25 pesetas.....	4.78	4.81

The holidays have seriously interfered with business, and all prices are more or less nominal.

**Copper.**—The exports of this have considerably increased, the Calumet & Hecla Mining Company alone sending to Havre by one steamer some 800 tons. Consumers not having bought much of late, a good demand is anticipated ere long. We quote: 12 1/4 @ 12 3/4 for Lake, 11 1/4 @ 11 3/4 for casting and 10 1/2 for Arizona pig copper.

The London market is dull and without an interesting feature, although G. M. B.'s close a little better at £46 15s. for spot, and £47 5s. for three months prompt. Refined and manufactured sorts we quote as follows: English tough, £49 10s. @ £50; Best Selected, £50 10s. @ £51; Strong Sheets, £50 @ £50 10s; India Sheets, £55 @ £55 10s.; Yellow Metal, 5 1/2 d.

The exports of copper from the port of New York during the past week were as follows:

To	Commodity	Units	Lbs.	Value
To Havre—	Copper.	279 bbls.	337,500	\$42,188
S. S. La Champagne.....		1,170 "	1,462,500	182,913
S. S. St. Bernard.....	1,486 pigs		455,776	53,000
To Rotterdam—	Copper.			
S. S. Spaarndam.....	100 bags		16,625	\$2,100
To Liverpool—	Copper Matte.			
S. S. Naronic.....	4,400 bags		476,469	\$20,000
" Germanic.....	4,070 "		444,585	20,100
" Flaxman.....	5,691 "		569,100	25,000
" Gallia.....	3,725 "		394,389	18,000
To Liverpool—	Copper.			
S. S. Naronic.....	28 bags		22,800	\$3,000
" Gallia.....	248 pigs		70,924	8,500
To Bordeaux	Copper			
S. S. Tancorville.....	8 casks		9,847	\$1,100

Tin continues in the same nervous state in which it has been for some weeks; sales of spot have been made at 19 1/4 @ 19 1/2, with January delivery generally quoted at ten points higher, and February to June at 19 3/4 @ 20c. Stocks here are very large.

In London prices have somewhat declined, the absence of orders from America telling on that market in which the closing prices are £91 @ £91 5s. for spot and £90 15s. @ £91 for three months prompt.

Lead closes easier, the advance having been short lived. Sales of small quantities have been made, at from \$3.85 down to \$3.82 1/2.

The London market has slightly improved and now Spanish lead is quoted at £10, and English at £10 2s. 6d., at which prices there are buyers for forward delivery, but sellers ask a premium of 5s.

**Chicago Lead Market.**—The Post Boynton Strong Company telegraph us as follows: "The market is a shade easier and quiet with 3 60c. asked and very little lead offering."

**St. Louis Lead Market.**—The John Wahl Commission Company telegraph us as follows: "The market is slightly easier and the metal has declined from 3 65 to 3 57 1/2c. At the close buyers and sellers at this price are about equally divided and we should not be surprised to see another reaction soon."

**Spelter** is a trifle firmer, at least for nearby deliveries, but in futures there is nothing doing. We quote 4 40 @ 4 42 1/2, New York. The London market price is unaltered—£18 5s. for ordinaries and £18 7s. 6d. being the quotations.

**Antimony.**—This metal is dull, with little doing in it. Cookson's we quote at 11 1/2, l. X. at 10 1/4 and Hallet's at 10 1/4.

**Nickel** is rather irregular at from 50 @ 55c.

**Quick silver.**—There is no change to report in this market. Quotations are as follows: New York \$37 @ \$37.50; London, £6, 4d.

**IRON MARKET REVIEW.**

NEW YORK, Friday Evening, Dec. 30, 1892.

**Pig Iron Production.**—The following table gives the number of furnaces in blast and the estimated production of pig iron in the United States during the week ending Saturday, December 24th, 1892, and for the corresponding week ending Saturday, December 26th, 1891. Also the total estimated production from January 1st of each year to these dates. This table has been corrected by the official returns of the American Iron and Steel Association for the first six months of this year. The figures are in gross tons:

**Pig Iron Production During Weeks Ending December 19th, 1891, and December 17th, 1892, and During Both Years to These Dates.**

Fuel used.	Week ending		From Jan., '91.	From Jan., '92.
	Dec. 26, '91.	Dec. 24, '92.		
Anthracite..	F'cs. 86	Tons. 35,250	F'cs. 69	Tons. 33,500
Coke.....	162	143,710	135	133,000
Charcoal....	56	11,890	42	9,700
Total.....	304	190,850	246	176,200
			8,127,312	8,959,646

The year just closing has been marked throughout its entire course by the greatest depression in the iron trade ever recorded in this country. Taking everything into consideration the prices realized have been lower than at any time since the first cast of pig iron was made 270 years ago. Not only is this the case, but the outlook has less of comfort, and the signs of improvement lag farther behind. This state of affairs is not restricted to the United States, for the same story comes from other countries, noticeably from Great Britain, where a very low price goes hand in hand with very low stocks.

No one who is at all familiar with the history of prices here can doubt that the upward movement will begin sooner or later. And it may be added that in all probability it will be quite gradual. As we remarked last week, there does not seem to be a regularity of oscillation, a swift advance being at times followed by a swift decline and at times by one of more deliberate movement. So also as regards the advance after a protracted depression, it may be swift or slow according to circumstances that can not always be foreseen and whose hidden energies are deep within the arena of commercial life.

The low prices that have ruled through the year seem to have followed upon the necessity under which some furnaces have lain of selling iron at buyers' figures. They were in blast; it was, on the whole, cheaper to go on than to stop, and rather than stock against an uncertain future they preferred, and indeed wisely, to sell out of hand. The result was what might have been expected, a forcing of a market already weak and a consequent fall in price. There has not been a year in which the furnaces have had a harder struggle for life, nor one in which economy has been so marked, and, we may add, so successful.

We are now making pig iron as cheaply as any country in the world, Great Britain not excepted, and this desirable result has been brought about by the economies which, in great measure, were thrust upon us. The low price of iron is not an unmixed evil, bad as it is, for it has taught our ironmasters that cost sheets which were supposed to be unassailable could be thrown aside as inapplicable to present conditions.

We have passed the period of high cost of manufacture, and are now able to take advantage of any advance in selling price that may come in sight.

Things are rarely so bad but that they might be worse. The present condition of the market reminds one of the story of the commercial tourist in Louisville who was found up to his neck in mud: "My dear sir," said a compassionate acquaintance, "you are in a dreadful fix. Can I do anything for you?" "Oh, no, thank you," cheerfully replied the tourist, "I'm pretty well off, but the man I'm standing on is catching Hail Columbia." The pig iron market is up to its neck, but surely it is standing on something, and to this whatever it be we tender our hearty sympathy.

Prices here are as last week. Southern, ex-steamers No. 1 F., \$15.26; No. 2 F., \$14.26; No. 3 F., \$13.76; Gray Forge, \$13.01; Northern, tide-water, No. 1X, \$15; No. 2X, \$14; No. 2 plain, \$13.50; Gray Forge, \$13. Southern irons are quoted, nominally, 26c. higher than Northern.

**Spiegeleisen and Ferromanganese.**—Ferro is dull at \$60. Spiegel, \$26.50 with no special movement.

**Steel Rails.**—The market is dull at \$20.

**Rail Fastenings.**—Prices rule as follows: Fish and angle plates, 1 55 @ 1 65c.; at mill; spikes, 1 90 @ 2c.; bolts and square nuts, 2 40 @ 2 70c.; hexagonal nuts, 2 70 @ 2 80c., delivered.

**Merchant Iron and Steel.**—Prices stand Mushet's special, 48c.; English tool steel, 15c. net; American tool steel, 6 1/2 @ 7 1/2c.; special grades, 13 @ 18c.; crucible machinery steel, 4 75c.; crucible spring, 3 75c.; open hearth machinery, 2 25c.; open hearth spring, 2 30c.; tire steel, 2 25c.; toe calks, 2 25 @ 2 50c.; first quality sheet, 10c.; second quality sheet, 8c.

**Structural Iron and Steel.**—We quote: Beams, 2 3 @ 2 55c., except for 20-in. beams which are 2 75c.; angles, 1 95 @ 2 15c.; sheared plates, 1 90 @ 2 10c.; tees, 2 30 @ 2 60c.; channels, 2 35 @ 2 50c.; universal plates, 2 @ 2 10c.; bridge plates, 2 @ 2 10c.; steel hoops, 1 90 @ 8c. All on dock.

**Buffalo.**

Dec. 29.

(Special Report by Rogers, Brown & Co.)

The characteristics of this holiday week have not differed from the usual except in the two particulars of iron going forward on old contracts much more heavily than customary, and there being quite a little inquiry concerning 1893 contracts. Very little actual new business has been booked during the week. Such orders as are going are for small amounts and urgent delivery. Prices stationary. We quote f. o. b. cars Buffalo, on cash basis, as follows: No. 1 X Foundry Strong Coke Iron Lake Superior ore, \$15.25; No. 2 X Foundry Strong Coke Iron Lake Superior ore, \$14.25; Ohio Strong Softener No. 1, \$15.25; Ohio Strong Softener No. 2, \$14.25; Jackson County Silvery No. 1, \$17.30; Jackson County Silvery No. 2, \$16.80; Lake Superior charcoal, \$17.25; Southern soft No. 1, \$14.40; Alabama car wheel, \$19; Hanging Rock charcoal, \$20.50.

**Chicago.**

Dec. 29.

(From our Special Correspondent.)

Throughout the various departments of the iron and steel trades there is an increasing quietude so far as regards new business, but shipments on con-



tracts for crude and finished material have been well maintained up to this writing. Concerning Southern iron and the weakness displayed by some of the smaller producers, this feature has not extended to the larger furnace companies so far as regards prices, but it has affected them in regard to extended deliveries. Contracts have been made within the week for regular monthly shipments up to April and May, and in some instances to July 1, though these latter are rare. Consumers here who are large buyers of local pig iron are withholding orders in hopes of lower figures, but agents are of opinion that no change will be made, as values are now as close to cost of production as present prices of raw material and labor will permit and leave a small margin for profit. The amount of structural material of iron and steel to be given out in the next few weeks will reach large proportions. This will include elevated railways, bridges and viaducts in and around the city, the slice recently secured by the Carnegies, of Pittsburg, being a small share of it. In other lines requiring bars, plates and sheets there is nothing particularly worthy of comment, and the outlook is that prices will not be as strong during the first quarter of the new year as they have been since October 1st.

**Pig Iron.**—The market is quiet; orders small, and current rates on local coke iron well sustained. There is, however, a very confident feeling among dealers and furnace agents that next month will develop a good buying movement. Plausible reasons are alleged for this belief. Stocks, as usual at this season, are light in foundry yards; the buying during December transactions, though aggregating a good tonnage, have been almost entirely confined to small lots for prompt shipment or very near-by delivery, hence if consumption is to be kept up at the same pace as that which has obtained during the past late summer and fall, the purchases must be large inside the next thirty days. Furnaces in this district, while unwilling to concede anything in the way of prices, are, however, willing to make contracts for twelve months' deliveries at current quotations. The larger Southern companies decline to do this, and restrict deliveries to July 1st. Lake Superior charcoal iron is very quiet and firm and sales at less than our quotations are very exceptional.

Quotations per gross ton f. o. b. Chicago are: Lake Superior charcoal, \$16.07@17.25. Lake Superior coke No. 1, \$14.25@14.75; No. 2, \$13.75@14; No. 3, \$13.25@13.75; Lake Superior Bessemer, \$15.50; Lake Superior Scotch, \$15@15.50; American Scotch, \$16.50@17; Southern coke, foundry No. 1, \$14.50; No. 2, \$13.10; No. 3, \$12.85; Southern coke, soft, No. 1, \$13.85; No. 2, \$13.10; Ohio silveries, No. 1, \$17; No. 2, \$16.50; Ohio strong softeners, No. 1, \$17; No. 2, \$16.50; Tennessee charcoal No. 1, \$17; No. 2, \$16.50; Southern standard car wheel, \$20@21.

**Steel Billets and Rods.**—The mills here will shut down for extensive repairs, and as there is little inquiry, prices are nominal at \$24.50 for billets and \$33 for rods.

**Structural Iron and Steel.**—Orders for material for current consumption are light, but a number of new enterprises are taking shape, and a good business for next season is assured. Quotations, car lots, f. o. b. Chicago, are as follows: Angles, \$2@2.20; tees, \$2.35@2.45; universal plates, \$1.95@2; sheared plates, \$1.95@2; beams and channels, \$2.35@2.50.

**Plates.**—Warehouse trade is fair, but agents expect a more active movement after the holidays. Mill business is quiet with weak and irregular prices. Steel sheets, 10 to 14, \$2.30@2.40; iron sheets, 10 to 14, \$2.20@2.30; tank iron or steel, \$2.05@2.15; shell iron or steel, \$2.50@2.75; firebox steel, \$4.25@5.50; flange steel, \$2.75@3; boiler rivets, \$4@4.15; boiler tubes, all sizes, 65¢ and firm.

**Merchant Steel.**—Several agents of the leading manufacturers of implement steels state that they are full of orders, and specifications coming forward freely. Tool steel is quiet. We quote: Tool steel, \$6.50@6.75 and upward; tire steel, \$2@2.10; toe calk, \$2.30@2.40; Bessemer machinery, \$2.10@2.20; Bessemer bars, \$1.70@1.75; open hearth machinery, \$2.30@2.40; open hearth carriage spring, \$2.10@2.20; crucible spring, \$3.75@4.

**Galvanized Sheet Iron.**—Demand is sensibly declining and stock in agents' warehouses is accumulating; but discounts are unchanged at 70% and 10% off on Juniata and 70 and 15% off on charcoal, and jobbing quantities at 70 and 5% off on the former and 70 and 10% off on the latter.

**Black Sheet Iron.**—There is only a very light demand from mill and warehouse, and quotations on iron sheets are easy at 2.85¢ for No. 27, common; steel sheets are 3c. Jobbers quote 2@3.10c. for iron and 3.10@3.15c. for steel, same gauge.

**Bar Iron.**—With the exception of one or two lots of car iron now being figured on, there is little doing for consumers or jobbers, and prices are irregular and easy at 1.60@1.62¢, half extras, f. o. b. Chicago. Jobbers now quote 1.75@1.85c. for iron or steel bars, and business is light.

**Nails.**—Wire nails are in fair inquiry, but orders are slow at \$1.60 base in mill lots f. o. b. Chicago; jobbing price is \$1.70 for small lots. Steel cut nails

are in some demand from factory at \$1.60, 30c. average. Jobbers quote \$1.65 in less than carloads.

**Steel Rails.**—The mills here will shut down for repairs, readjustment of wages, and some departments will probably remain closed for 90 days. Demand is light for standard section at \$31@32. We quote iron or steel splice bars 1.65@1.70; spikes, \$2.05@2.15 for 100 lbs.; track bolts, hexagonal nuts, \$2.65; square, \$2.55.

**Scrap.**—Inquiry and demand are of a light nature and quotations nominal. No. 1 railroad, \$15.50; No. 1 forge, \$15; No. 1 mill, \$9.50; fish plates, \$16.50; axles, \$19; horseshoes, \$16; pipes and flues, \$7; cast borings, \$6; wrought turnings, \$8; axle turnings, \$9.50; machinery castings, \$10; stove plates, \$6.50; mixed steel, \$10.50; coil steel \$15; leaf steel, \$15.50; tires, \$14.50.

**Old Material.**—Iron rails are held at \$18.75; steel rails, \$12.25@14.75, according to length and condition; and old wheels very dull at \$14.50@14.75. Demand for everything under this head is very quiet.

Louisville, Dec. 24.

(Special Report by Hall Bros. & Co.)

The same general features prevail that have ruled for several weeks past, quietness is the only feature of prominence. Buyers take hold very sparingly and no buying of consequence is looked for until after the holidays. No special activity is looked for immediately after the opening of the new year; as previously reported, we look for a quiet market for several weeks, most people will be busy in closing up the old year's accounts, and in a great many instances it requires considerable time after the close of the year to put the finishing touches, thus absorbing a great part of their attention during that time. In the meantime the market it is thought will hold its own fairly well.

**Hot Blast Foundry Irons.**—Southern coke No. 1, \$13.50@13.75; Southern coke No. 2, \$12.50@12.75; Southern coke No. 3, \$12@12.25; Southern charcoal No. 1, \$16@17; Southern charcoal No. 2, \$15.50@16.

**Forge Irons.**—Neutral coke, \$11.50@12.00; motled, \$11@11.25.

**Car Wheel and Malleable Irons.**—Southern (standard brands), \$20@21; Southern (other brands), \$18.50@19.50; Lake Superior, \$19.50@20.50.

Philadelphia, Dec. 29.

(From our Special Correspondent.)

**Pig Iron.**—No changes have taken place within the week, except a shading of 25c. per ton on a few brands of Southern iron, which makers are anxious to introduce into this market. Pennsylvania brands have already been reduced as low as makers propose to put them. The only scales of No. 1 foundry worth nothing this week, were at \$15.25 for standard brands; several others sold at 25¢@50¢ less. Nothing has been done in No. 2. There is inquiry for mill irons, but no sales of consequence. It is not probable that good brands will sell above \$13. There is, of course, much talk about advancing prices and declining prices; the market is a little uncertain. Furnace men would like to increase output. There are rumors of large transactions pending in Bessemer iron.

**Muck Bars.**—The preference for soft steel is driving muck bars back, and mill men have about ceased soliciting—at least for the present. Market quotations, \$24.50.

**Steel Billets.**—As has been frequently stated, there would be no difficulty in selling large quantities of steel billets if buyers' offers were accepted; but buyers know, or ought to know, that some of the figures they are offering are so near cost as to make production no object. Nothing but a general improvement in the market will help the steel billet department.

**Merchant Iron.**—The mills are all idle this week, and nothing of importance is doing. There is very little inquiry.

**Nails.**—The nail manufacturers are satisfied with the policy they have pursued, but are unable to point out any actual benefit from it, so far.

**Skelp.**—Selling prices, 1.60. There is a promise of a large amount of business at that figure.

**Wrought Iron Pipe.**—A great deal of business in pipes and tubes is promised during the winter, but just now, everything is dead.

**Sheet Iron.**—A rumor is current to-day to the effect that large sales of sheet iron are about to be made at cut rates. For small orders, card rates are the rule, especially for light sheets.

**Plate and Tank.**—There is talk that some large buyers will close early in January for large quantities of plate and tank, but specifications in hand do not point to an enormous business, but simply an increase, such as all expect. Rates range from 1.80 for tank up.

**Structural Material.**—Those who are posted in structural iron matters look for quite a run of business during the winter. They admit with reluctance that there has been some shading on large orders, which brings prices down almost to cost, for which there seems to be no remedy. Beams, tees and channels are quoted at 2 to 2.10.

**Steel Rails.**—Inquiry at sources from which information ought to be obtainable, fails to bring out any decided statement as to whether steel rails are to be sold at \$29. Offers have been made at that figure and less, and the probabilities are, if it is safe to make a guess, that some large business will result.

**Old Rails.**—A good many more old rails are being offered than this market is willing to take, but prices do not drop below \$18 for iron, and small lots sell at 50c. higher.

Pittsburg, Dec. 29.

(From our Special Correspondent.)

**Raw Iron and Steel.**—There has been a large falling off in the demand for leading descriptions of material that comes under this head. As most of the mills are undergoing repairs, they will be in no hurry to start up until there is a better demand. While certain parties fix the date for an improvement in trade at the middle of January, others have an entirely different opinion, and say it will be the first of February before there will be a revival of business. Soft steel is making such inroads on iron as to promise that in a very short period it will have usurped the place of the latter altogether. It is more economically manufactured and yields more profit than muck bar. Reports recently published show that many puddling furnaces have been closed down for lack of orders, evidencing the fact that the number in operation was in excess of requirements. While the leading furnaces are not forcing the market by offering concessions, a number of transactions are reported at prices a shade below the quoted rates a short time ago. While certain dealers appear anxious to realize, there are others who are content to wait and take the chances of the market. At the same time the shading system is by no means general, but the knowledge that orders for the small lots taken have been placed at a slight reduction on previous quotations, causes the market to exhibit a depressed and feverish condition. In the present state of the pig iron trade there is little in the situation to warrant the belief that prices will shortly improve, although, statistically, the market is in a very satisfactory shape. Consumer's yards, generally, are bare of stock. Purchases, cannot, therefore, be postponed indefinitely, and as deliveries are being taken freely there is a possibility that the resumption of active buying after the opening of the New Year may enable bolders to maintain prices or even secure a slight advance, at all events the present outlook is considerably mixed.

An Eastern dealer has this to say about the situation: "Sellers are beginning to recognize the fact that buyers have held off so long that they must of necessity be in the market early in the new year, so that it is hardly worth while trying to persuade them that delays may be dangerous. Earlier in the month there was considerable pressure to realize, and while holders are still anxious for business, they begin to feel that they have about reached the extreme limit as regards prices, for which reason (besides others) it is not unlikely that a period of reaction may be near at hand. Everything depends on developments during the next twenty days. If consumers really need material to the extent that is supposed, it will soon show itself, and that is precisely what both sides are trying to find out. Taking everything into consideration, it is not unlikely that just a trifle of improvement will be the next turn in the market. There are too many sellers to permit anything very decided, but almost any kind of demand will be sufficient to counteract further weakness, and although the closing week of the year shows prices to average the lowest on record, and the outlook not specially encouraging, there is at least the satisfaction of knowing that under any circumstances anything beyond mere fractional decline in prices is simply impossible."

**Coke Smelted Lake and Native Ores.**

1,500 Tons Bessemer, next four months.....	\$13.75 cash.
1,000 Tons Bessemer, Jan., Feb.....	13.70 cash.
1,000 Tons Grey Forge, Jan.....	12.50 cash.
1,000 Tons Grey Forge, Jan., Feb., March.....	12.40 cash.
1,000 Tons Bessemer, Jan., Feb., March.....	13.75 cash.
1,000 Tons Bessemer, prompt.....	13.75 cash.
500 Tons Grey Forge.....	12.50 cash.
500 Tons Bessemer.....	13.75 cash.
500 Tons No. 1 Foundry.....	14.25 cash.
400 Tons No. 2 Foundry.....	13.25 cash.
300 Tons Off Bessemer.....	13.00 cash.
300 Tons No. 2 Foundry Extra.....	13.75 cash.
100 Tons Silvery No. 1.....	16.25 cash.
100 Tons Silvery No. 2.....	15.25 cash.
100 Tons No. 1 Foundry, all ore.....	15.00 cash.
100 Tons No. 2 Foundry, all ore.....	14.00 cash.

**Charcoal.**

75 Tons Cold Blast.....	26.50 cash.
50 Tons Cold Blast.....	26.00 cash.
25 Tons No. 4 Foundry.....	19.00 cash.
25 Tons Cold Blast.....	26.00 cash.
25 Tons No. 2 Foundry.....	19.00 cash.

**Steel Blooms, Billets and Slabs.**

2,000 Tons Soft Billets Jan., Feb., March, April, f. o. b., at Maker's Mill.....	22.00 cash.
2,000 Tons Billets, first four months at Mill, f. o. b.....	22.00 cash.
1,000 Tons Blooms and Billets, Jan., Feb.....	22.15 cash.
500 Tons Steel Slabs next two months.....	22.25 cash.

**Muck Bar.**

550 Tons Neutral, Jan.....	24.60 cash.
300 Tons Neutral.....	24.50 cash.

**Ferro-Manganese.**

180 Tons, 80%, delivered.....	60.25 cash.
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*Blooms, Beams, Rail, etc.*

1,000 Tons Bloom and Rail Ends	15.70 cash.
1,000 Tons Bloom and Rail Ends	15.75 cash.
500 Tons Billet and Bloom Ends	16.00 cash.
<i>Steel Wire Rods, Five-Gauge American.</i>	
300 Tons Five-Gauge American, at mill.	30.80 cash
<i>Sheet Bars.</i>	
350 Tons Sheet Bars, at mill	29.00 cash.
<i>Skelp Iron.</i>	
300 Tons Na row Grooved	1.57 1/4 m.
200 Tons Wide Grooved	1.57 1/4 m.
180 Tons Sheared Iron	1.77 1/2 m.
<i>Steel Skelp.</i>	
150 Tons Wide Grooved	1.40 4 m.
<i>Old Iron and Steel Rails.</i>	
500 Tons American T's, del. Youngstown	21.00 cash.
500 Tons Short Steel Rails, spot	16.00 cash.
200 Tons " " delivered	16.40 cash.
200 Tons American T's.	21.00 cash.
<i>Scrap Material.</i>	
300 Tons No. 1 R. R. W. Scrap, net	16.25 cash.
300 Tons Scrap Steel, net	21.00 cash.
200 Tons Cast Borings, gross	8.00 cash.
200 Tons Cart Scrap, gross	12.00 cash.

**COAL TRADE REVIEW.**

New York, Friday Evening, Dec. 30.

PRODUCTION OF BITUMINOUS COAL for week ending December 24th, and year from January 1st.

	1892.		1891.
	Week.	Year.	Year.
Phila. & Erie R. R.	3,922	96,744	154,866
Cumberland, Md.	79,827	3,775,827	4,017,275
Barelay, Pa.	1,115	66,238	192,054
Broad Top, Pa.	16,462	612,366	504,901
Clearfield, Pa.	76,588	3,946,342	3,896,268
Allegheny, Pa.	31,776	1,271,962	1,192,381
Beach Creek, Pa.	32,787	2,187,987	2,314,844
Pocahontas Flat Top.	65,041	2,642,268	2,231,286
Kanawha, W. Va.	72,333	2,686,836	2,344,430
Total	379,851	17,316,570	16,849,365
*Week ending November 30th.			

	1892.		1891.
	Week.	Year.	Year.
Fittsburg, Pa.	22,680	1,218,650	1,222,08
Westmoreland, Pa.	40,336	1,770,498	1,881,287
Monongahela, Pa.	13,012	690,143	58,902
Total	76,028	3,678,700	3,639,178
Grand total	455,879	20,995,270	21,539,483

PRODUCTION OF COKE on line of Pennsylvania R.R. for the week ending December 24th, 1892, and year from January 1st. in tons of 2,000 lbs.: Week, 107,420 tons; year 5,332,121 tons; to corresponding date in 1891, 4,119,089 tons.

**Anthracite.**

The continued cold weather has helped the retail trade, and, so far as this feature of the market is concerned, it is in good order. The end of the year finds no great changes in the condition of the trade as a whole.

It is stated that the Finance Company, of Philadelphia, is to act as the commercial agent of the Reading system. If this report is confirmed, and there seems to be no doubt of it, the combine enters upon a new phase of development. The tonnage of the Reading system now amounts to about 18,000,000 tons yearly, and this will be controlled by the Finance Company, of which Mr. Earle is president. The coal sales will be directed by President Earle.

If the new plan will relieve the Reading of the necessity for providing the six or seven millions of dollars required for moving its coal, it will be a distinct advantage from this stand point alone.

Up to this date the total amount of anthracite coal shipped to market in 1892 is 40,320,177, as compared with 39,251,884 during the same period of 1891. About one-half of the collieries are now at work, and stocks are being depleted.

It is said that the Finance Company will receive 1 1/2 cents per ton for handling Reading coal, say \$215,000 a year, that the sales agents will not be disturbed, and that they will be paid the commissions at present.

The state of the weather for the next two or three months will determine the conditions of the market more than any other single factor. There are some who look to an advance by the middle of January.

The anticipations of those who looked for a weakening of the combine, consequent upon public dissatisfaction, have not been realized. Perhaps the dissatisfaction did not take a shape formidable enough to frighten the upholders of the scheme, who are not to be turned from their course by any ordinary bug-a-boo. Perhaps they have been frightened so often as to have become inured to attempts against their peace. Perhaps they look upon themselves as public benefactors, transferring to their own pockets money that might have been spent by a heedless generation in the allurements of egg-nog and Christmas cards. Perhaps they feared lest the anthracite coal business were tottering toward its ruin, and nobly pressed forward to its succor. The public have been the "sneakers" this time, to the extent of paying from \$1 to \$1.50 per ton more than they paid last year for the same quality of coal.

Whatever may be the mental, moral, intellectual or spiritual attitude of the operators, be it one of profound calm based on the successful termination of a hazardous enterprise, or one of increasing jubilation over the beautiful innocence of congress-

sional committees; or one of self-abnegation, fasting, sackcloth and ashes, because they did not advance the price \$3 a ton instead of \$1. Whether any one of these, or all of them together, in a grand *olla podrida* of sentiment, joy and business, we cannot undertake to say.

In these closing days of the year, when "Peace on earth, high-priced coal to men" would seem to be the song of operators and sales agents alike, it is a great pity that so few are found to swell the chorus.

Next to the meeting of the directors of the Anglo-Bengalee Loan and Disinterested Company, which will always remain a model of its kind, the monthly meetings of the operators and sales agents will rank as the most entertaining of its class. It is to be hoped that they will be continued through the coming year as the great practical school of Know-nothingism. Messrs. A, B and C, who, of course, know nothing themselves, *i. e.*, corporately they know nothing, meet with Messrs. D, E and F, who know nothing either individually or corporately, to instruct them in the art of progressive ignorance. It is a grand sight, although it must be said that it comes a bit high.

At the risk of departing from a long established custom, that of discouraging the use of rhymes in market reports, we venture to present a Christmas stanza to these gentlemen to be sung at their next meeting:

Hark the herald angels sing,  
"High-priced coal is just the thing,  
Peace on earth, to men good-will,  
A dime a peck and rising still."

**Bituminous.**

The car service remains in its usual unsatisfactory condition, with perhaps a tendency to become even worse. As soon as shipments coast wise are checked by wintry weather, we may expect to hear that cars are plentiful. We can generally get what we want when we don't want it.

The long talked of Combination among the producers of soft coal for the sea board trade still gives room for gossip. It is only a question of time when some arrangement will be made to equalize the burdens that are now, in some instances, proving too heavy for comfort.

The projected pool in Ohio will not affect Eastern trade. This pool is said to be under way by the Columbus, Hocking Valley & Toledo; the Toledo & Ohio Central; the Columbus, Hocking Valley & Shawnee, and the Baltimore & Ohio railroads. The bituminous coal output of Ohio is about 6,000,000 tons this year, and the plan of organization is said to include the pro rata division of this amount and the control of the price by one sales agent. It is not unlikely that the year 1893 will see a strong combination among Pennsylvania, Maryland and Virginia operators to control the Atlantic seaboard trade; among Ohio, Kentucky, Illinois and Indiana men to control the Central and West Central trade, and among Alabama and Tennessee companies to control the trade of the lower Mississippi and the South and Southwest.

Northbound water shipments are hindered by ice in the Chesapeake and Delaware bays, the disturbance reaching even to Newport News.

Charter rates that can be quoted are: Philadelphia to Sound Ports, \$1.00; to Boston, Portland and Portsmouth, \$1.10.

Baltimore to Sound Ports, \$1.10; to Boston, Portland and Portsmouth, \$1.35.

From New York to Boston, Portland, New Bedford and Providence there are no standard rates; for instance, 70c. was asked to Boston and 55c. was paid; 80c. was asked to Portland and 55c. was paid.

We do not give these figures as actual ruling rates, but merely to indicate what has been done within the last few days.

**Boston.**

Dec. 29.

(From our Special Correspondent.)

The market continues quiet. Dealers are fairly well stocked and are not in need of fresh supplies, just at present at least. The Reading and allied companies are maintaining prices well, but outsiders are cutting t secure business. The local dealers who have studied the situation, at least, think the combination will not touch prices in January as it would be inopportune. The buying next month will not be as heavy as first anticipated. This fact may tend to induce the companies to let prices remain as they are. Prices on anthracite remain unchanged.

Bituminous coal is firm and higher. This is greatly owing to the sharp advance in freight rates. The supply is insufficient and transportation facilities are lax. George's Creek coal on cars here is worth from \$4 to \$4.10 per ton, and Clearfield, from \$3.70 to \$3.75.

Freight rates have, with one exception, advanced all along the line. New York rates continue low, owing to the large number of barges sailing from there. Vessels are especially shy of going to Philadelphia for fear of ice on the river. Rates are: From New York to Boston, 50c.; from Philadelphia, \$1@ \$1.05; to Bath, \$1.10@ \$1.15; to Providence, 85c.; from Baltimore, \$1; from Newport News, \$1; to Sound Ports, 85@90c.

In a retail way there is a very good business doing owing to the temporary cold snap we are having. The temperature has fallen as low as zero in the past week, which means a heavy demand for coal. Retail prices here are: Stove, \$6.25; nut, \$6.25; egg, \$6.00; furnace, \$5.75; Franklin, \$7.50; Lehigh egg, \$6.25.

The receipts of coal at the port of Boston for the week ending December 24th, were 29,719 tons of anthracite and 23,379 tons of bituminous, against 23,662 tons of anthracite and 7,496 tons of bituminous for the corresponding week last year. The total receipts thus far this year have been 2,034,711 tons of anthracite and 856,528 tons of bituminous, against 2,041,385 tons of anthracite and 960,852 tons of bituminous for the same time last year.

**Buffalo.**

Dec. 29.

(From our Special Correspondent.)

Business good for local use as the weather has been of a zero character for several days. Prices unchanged. Stocks of anthracite ample, and of bituminous all that buyers and sellers require are to hand daily on the various coal roads.

Our local bituminous coal freight agents held a meeting lately with a view of advancing rail rates westward, but did not accomplish anything, deciding to wait the coming year and then try it again.

There is a large increase in the consumption of soft coal, coke and natural gas in Buffalo this season as compared with a year ago, probably on account of the high price of anthracite coal.

Mr. Ralph E. McWilliams has been appointed western coal sales agent for the New York, Ontario & Western Railroad Company, with headquarters at Buffalo. He was formerly agent for the Delaware & Hudson Canal Company in this city.

The Baltimore & Ohio Railroad Company would like to extend its lines to Buffalo; a terminal point is said to have been selected and a plan mapped out by which its wish can be accomplished.

The Gatling Ordnance or Gun Company have purchased 30 acres of land, a short distance from Buffalo, and will immediately commence the erection of the necessary plant. A three-story brick and stone pottery factory, 600 by 450 feet will be built next spring just outside our city line. It will employ a thousand men at least.

Mr. Samuel F. Goodman will be the general freight traffic agent of the N. Y. C. & H. R. R. Road on January 1st, 1893—a new office entirely. He has been stationed in Buffalo for many years as Assistant General Freight Agent.

It is proposed to start a company to build a new breakwater, 2,000 ft. long from Stony Point, to connect with the Government breakwater at this port. Also to buy land, build docks, trestles, chutes and also dig canals and other channels for the use of vessels. To complete the scheme the sum of \$25,000,000 would have to be expended!

**Chicago.**

Dec. 29.

(From our Special Correspondent.)

For the past few winters the coal trade has witnessed more or less relaxation during the holiday season, but this year has in a measure been an exception, and in anthracite the demand though light, very light, has continued steady. The severe and bitter cold, zero weather experienced throughout the west, is responsible for the steady movement of small quantities of hard coal to western and northwestern dealers. The orders, to be sure, are in lots of two, three or five cars, and occasionally as many as eight or nine, and is only further evidence of the continuance of the policy adopted by the country trade months ago, purchasing for current requirements only. The probabilities are, that should the cold weather hold on through January the shippers will be able to reduce the ir piles on dock and railroad yards. Retail demand has become quite active again, and dealers have about all they can do. One yard having exceptional facilities for loading teams by shutes, reports a large increase of business to dealers, fully 200 tons a day in its daily output during this week. This, we think, is a fair criterion of the condition of the retail trade in general throughout the city and suburbs. Circular prices are said to be well maintained.

There is always a noticeable falling off in production during the holiday season and the present one is no exception. The demand continues unprecedented for all grades of bituminous coal and yet, while full circular prices are readily obtained on all new business, there has been no exorbitant rates nor any serious interference with the filling of orders, as at this time in years past. The scarcity of soft coal which would have resulted from the recent festive season was, to a certain extent, provided against, and while there is some grumbling at the unsatisfactory condition of deliveries, we have heard of no serious inconvenience to large dealers and consumers.

Every indication now points to a continuation through January of this prosperous condition of affairs. Railroads anticipate a continuance during next month of the present heavy traffic in general merchandise, which will require all the surplus coal that the mines, with which they have contracts, can supply them. Hence soft coal operators and mine owners are as happy as the old farmer, who, with a year of abundant crops, regretted that he had no hog corn.

Coke (foundry) is quiet, as many of the larger consumers are now either busy talking stock or preparing to do so, and, of course, are in no shape to take in supplies. No reaction is looked for until about the middle of next month. From the nature of the inquiry coming forward, shippers expect a fair amount of activity when shipments are resumed. We have just learned that some of the West



Virginia coke manufacturers are putting in coke crushers for the purpose of furnishing the trade with regular anthracite sizes, the same as that made at Connellville.

Quotations are: \$4.65 furnace; \$5.05 foundry, crushed, \$5.40 Connellville; West Virginia, \$3.90 furnace, \$4.10 foundry; New River foundry, \$4.75; Walston, \$4.65 furnace, \$5 foundry.

Circular prices are at the following rates: Lehigh lump, \$6.50; large egg, \$5.85; small egg, range and chestnut, \$6.10. Retail prices per ton are: Large egg, \$7.25; small egg, range and chestnut, \$7.25.

Prices of bituminous per ton of 2,000 lbs., f. o. b. Chicago, are: Pittsburg, \$3.40; Hocking Valley, \$3.20; Younghoeheny, \$3.25; Illinois block, \$1.90@2; Brazil block, \$2.60@2.75.

Pittsburg. Dec. 29. (From our Special Correspondent.)

Coal.—The Monongahela coal strike is not yet over. One of the best informed coal operators has this to say regarding the situation among the coal miners who are holding out for the 3 1/2 cent rate, said he: "It seems just as far off as ever for a settlement, and it is my opinion the situation will be serious before a great while. The men insist on not going to work without the advanced rates, and the operators will not pay the prices they demand. It is the general opinion that if the miners do not return to work and accept the reduction, there will be a large importation of miners in a few weeks. The matter is much talked of among the operators and many are in favor of bringing miners from a distance. One of the operators had an offer of 100 workmen to go in the mines if he would supply them with houses. All that kept them back was the scarcity of houses in the vicinity of the mines. The same operator has 50 diggers at work."

The condition of the miners is said to be discouraging to them; even at the present time it is generally believed they will soon find themselves without employment even if they wish to go to work. Prices in all the lower markets are weak and unsatisfactory. Allegheny, Monongahela and Ohio froze over.

Connellsville Coke.—Since our last some charges have been inaugurated in the burning of the ovens in the region. The car supply was decidedly better—we hear no complaint. A slight increase in shipment is noted in the average days worked in the region. The past shows 516 as against 517 the week previous. The H. C. Frick Company made only 457, as against 472 the preceding week, and 465 for the preceding week. Of the 17,307 ovens in the region there are now 13,306 in active

operation and 4,011 entirely idle. The shipments for the week aggregated 137,811 tons, distributed as follows: To points west of Pittsburg, 3,600 cars; points east of Scottdale, 1,562 cars; to Pittsburg, 1,987 cars; total, 7,149 cars. Pittsburg shipment increased 112 cars; Western shipments 100 cars; Eastern shipments decreased 81 cars. Prices are unchanged.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Dec. 30, 1892.

Heavy Chemicals.—The last week of 1892, so far as actual business on the spot is concerned, has been very quiet, and we have no sales of importance to report. For contracts over 1893, however, considerable business has been done, especially in caustic soda and alkali. The latter chemical, 58%, is quoted at 1.20@1.30c., according to quantity. Caustic soda, 70%, for forward contracts, was sold at 2.75c. Bleaching powder is in better demand both for spot and future delivery.

Our quotations to-day for goods on the spot are as follows: Caustic soda 60%, 3.17 1/2 @ 3.27 1/2 c.; 70%, 2.95 @ 3.12 1/2 c.; 74%, 2.97 1/2 @ 3.15 c.; 70%, 3.12 1/2 @ 3.25 c.; 77%, 3.12 1/2 @ 3.25 c. Carbonated soda ash, 48%, 1.57 1/2 @ 1.60 c.; 58%, 1.47 1/2 @ 1.52 1/2 c. Alkali, 48%, 1.50 @ 1.55 c.; 58%, 1.37 1/2 @ 1.42 1/2 c. Sal soda, English, on the spot, .97 1/2 @ 1 c.; American, .90 @ .95 c.; bleaching powder, 2.30 @ 2.50 c.

Acids.—The past month has been one of excellent business; the demand for the various acids showed no signs of falling off, and sales for delivery over 1893 aggregate a large amount. Manufacturers report busy times at their works, and every one apparently is enjoying the active trading which has characterized the acid market for the latter part of the past year. There is no change to report in prices, which continue as follows: Acid, per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, \$1.60 @ \$2, according to quality; muriatic, 18", 90c. @ \$1.10; 20", \$1 @ \$1.25; 22", \$1.25 @ \$1.50; nitric, 40", \$4; 42", \$4.50 @ \$4.75; sulphuric, 90c. @ \$1.10; mixed acids, according to mixture; oxalic, \$6.50 @ \$7.25. Blue vitriol is quoted all the way from \$3.25 @ \$3.75; glycerine for nitro glycerine, 1 1/2 @ 1 1/2 c., according to quality and quantity.

Brimstone.—The brimstone market has been very quiet during the past week, and orders have been quite scarce. We quote: Best unmixed seconds, ex-steamer due, \$24; shipments, \$20.50 @ \$21. Thirds are \$1 less.

Fertilizing Chemicals.—Owing to the fact that

this is a holiday week, as well as to a decrease in the demand for fertilizers, the market has been somewhat duller, and in some cases prices have declined. In the case of the potash salts, as may be seen by the quotations given below, the syndicate has fixed the prices for 1893 lower than they ruled during the past year. Our quotations this week are as follows: Sulphate of ammonia, \$2.00 @ \$2.95 for bone goods and \$2.95 @ \$3 for gas liquor. Dried blood, \$2.45 per unit for high grade and \$2.35 for low grade; acidulated fish scrap, no stocks on hand; dried scrap, \$26.50 @ \$27; Azotite, \$2.40 @ \$2.45. Tankage, high grade, \$25 @ \$26; low grade, \$22 @ \$24. Bone tankage, \$22.50 @ \$23.50; bone meal, \$24.50 @ \$25.50. The price of double manure salts for 1893, for orders, placed prior to January 31st, has been fixed by the syndicate as follows: New York and Boston, \$1.10; Philadelphia, \$1.12 1/2; Charleston and Savannah, \$1.15 cwt., basis 48 @ 50%, in 50 ton lots on foreign weights and analysis. Sulphate of potash, 90% to 96%, basis 90%; New York and Boston, \$2.05; Philadelphia, \$2.07 1/2; Charleston and Savannah, \$2.10. Sulphate of potash, 96-99%, basis 90% is 4% higher.

Prices on orders placed after January 31st will be at the rate of 2c. per 100 lbs. higher on double manure salt and 3c. per 100 lbs. higher on sulphate of potash. Buyers have the option of increasing the quantity by 25%, such option to be decided on or before September 1st, 1893.

Phosphates.—Phosphate rock, Florida, 60 @ 70%, is quoted from Punta Gorda at \$4.50 per ton of 2,240 lbs. Charleston rock is quoted at \$4.50 @ \$5 f. o. b., Charleston.

Kainit.—Arrivals during the week amount to 600 tons of kainit and 500 tons of sylvanite. Prices for next year have not been fixed yet. We therefore continue to quote: \$8.75 for invoice weight and \$9 for actual weight, New York and Philadelphia; Southern ports \$1 higher.

Muriate of Potash.—Arrivals during the past week amounted to 150 tons. Prices for 1893 on orders placed prior to January 31st are as follows: New York or Boston, \$1.75; Philadelphia, \$1.77 1/2; Southern ports, \$1.80. Prices on orders placed after January 31st will be 3c. higher per 100 lbs. Buyers have the option of increasing the quantity by 25%, such option to be decided on or before September 1st, 1893.

Nitrate of Soda.—Nitrate of soda on the spot is higher owing to the shortness of supplies. The total wreck of the "Yorktown" on the coast of Brazil with 13,000 bags on board has tended to make the market firmer. The stocks in store are unprecedentedly low. We quote, nitrate on the spot, \$2.17 1/2 @ \$2.20; ex-steamer due, \$2.15.

CURRENT PRICES.

These quotations are for wholesale lots in New York unless otherwise specified.

Table listing various commodities and their prices, including Acid-Acetic, Alcohol, Alum, Ammonia, Antimony, Argon, Arsenic, Asbestos, Ashes, Asphaltum, Barium, Bauxite, Bromine, Cadmium, China Clay, Chlorine, Chromic, Cobalt, Copper, Corundum, Cryolite, Emery, Epsom, Feldspar, Fluorspar, French Chalk, Fuller's Earth, Glauber's Salt, Glass, Gold, Kaolin, Kieserite, Lead, Litharge, Magnesia, Manganese, Mercuric Chloride, Marble Dust, Metallic Paint, Mineral Wool, Mica, Naphtha, Nitrate, Nitric Acid, Oxalic Acid, Potassium Cyanide, Pyrites, Quartz, Sals, Soapstone, Sodium, Strontium, Sulphur, Sylvanite, Talc, and Zinc.

Table listing various commodities and their prices, including American No. 2, Terra Alba, English, American No. 1, American No. 2, Tin Crystals, Muriate, Oxymur, Vermilion, Am. quicksilver, Chinese, Trieste, American, Zinc White, Antwerp, Paris, Muriate solution, Sulphate crystals, American No. 2, Terra Alba, English, American No. 1, American No. 2, Tin Crystals, Muriate, Oxymur, Vermilion, Am. quicksilver, Chinese, Trieste, American, Zinc White, Antwerp, Paris, Muriate solution, Sulphate crystals.

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THE RARE METALS.

Table listing various rare metals and their prices, including Aluminum, Arsenic, Barium, Bismuth, Cadmium, Calcium, Cerium, Chromium, Cobalt, Didymium, Erbium, Gallium, Gadolinium, Indium, Iridium, Lanthanum, Lithium, Magnesium, Manganese, Molybdenum, Niobium, Niobium, Osmium, Palladium, Platinum, Potassium, Rhodium, Ruthenium, Rutherfordium, Selenium, Sodium, Strontium, Tantalum, Tellurium, Thallium, Thorium, Tungsten, Uranium, Vanadium, Yttrium, Zirconium.

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

Main table of New York Mining Stocks Quotations, listing companies like Adams, Amador, Atlantic, etc., with columns for dates (Dec. 24-30) and sales.

\*Ex-dividend. †Dealt in New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. Dividend shares sold, 6,910 Non-dividend shares sold, 9,400. Total shares sold, 16,310

BOSTON MINING STOCK QUOTATIONS.

Table of Boston Mining Stock Quotations, listing companies like Atlantic, Bodie, Bonanza Development, etc., with columns for dates (Dec. 23-29) and sales.

Dividend shares sold, 3,344. Non-dividend shares sold, 1,750. Total shares sold, 5,094

DIVIDEND-PAYING MINES

NON-DIVIDEND PAYING MINES

Large table detailing mining companies with columns for Name and Location of Company, Capital Stock, Shares, Assessments, and Dividends.



DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES.

Main table with columns for Name and Location of Company, Capital Stock, Shares, Assessments, Dividends, and Date of last payment. It lists numerous mining companies and their financial details.

G. Gold, S. Silver, L. Lead, C. Copper, B. Borax. \* Non-assessable. † This company, as the Western, up to December 10th, 1881, paid \$1,400,000. ‡ Non-assessable for three years. § The Deadwood 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 Cons. Virginia \$42, 90,000. \*\* Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends. †† This company paid \$190,000 before the reorganization in 1880. ††† This company acquired the property of the Raymond & Kly Company which had paid \$3,075,000 in dividends. †††† Previous to this company's acquiring Northern Belle, that mine declared \$2,400,000 in dividends against \$425,000 assessments.

COAL, RAILWAY AND OTHER STOCKS.

Table with columns for stock names, Dec. 24, Dec. 26, Dec. 27, Dec. 28, Dec. 29, Dec. 30, and Sales. Lists various stocks like Adams Express, Am. Sugar, etc.

COAL, RAILWAY AND OTHER STOCKS.

Table with columns for stock names, Dec. 24, Dec. 26, Dec. 27, Dec. 28, Dec. 29, Dec. 30, and Sales. Lists various stocks like Nor. Amer. Co., Am. Sugar, etc.

Holiday. Total shares sold, 1,95,001.

San Francisco, Cal.

Table with columns for stock names, Dec. 23, Dec. 24, Dec. 26, Dec. 27, Dec. 28, Dec. 29. Lists stocks like Alpha, Alta, Belcher, etc.

St. Louis. Dec. 28

Table with columns for stock names, Bid, Asked. Lists stocks like American & Nettie, Bi-Metallic, etc.

Foreign Quotations.

Table with columns for stock names, Highest, Lowest. Lists stocks like Alaska Treadwell, Amador, etc.

STOCK MARKET QUOTATIONS

Table with columns for stock names, High, Low, Sales. Lists stocks like Anaconda, Amity, Brownlow, etc.

Helena, Mont.

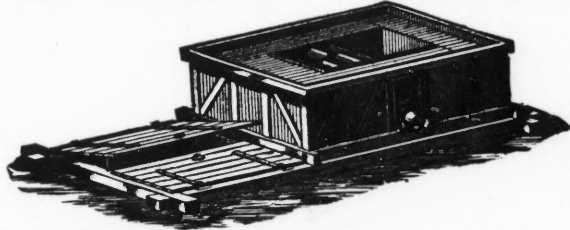
Table with columns for stock names, H, L. Lists stocks like Bald Butte, Benton Group, etc.

Paris. Dec 15.

Table with columns for stock names, Francs. Lists stocks like Belmez, Spain, East Oregon, etc.



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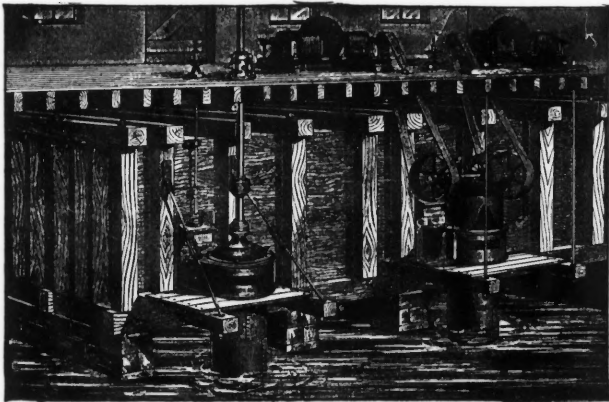
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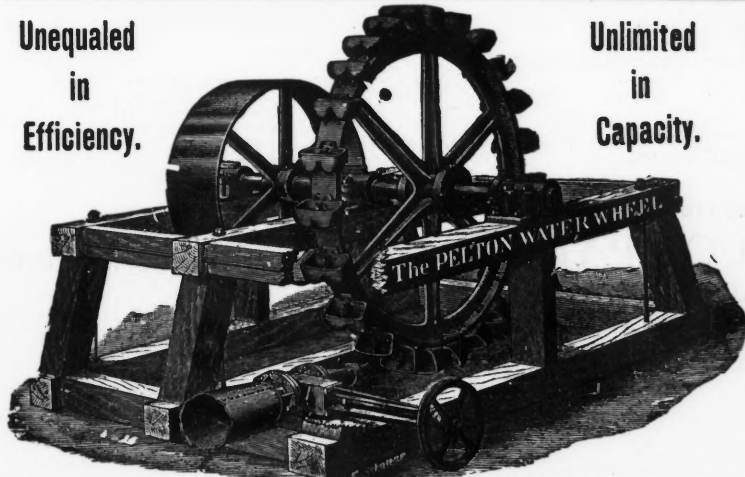
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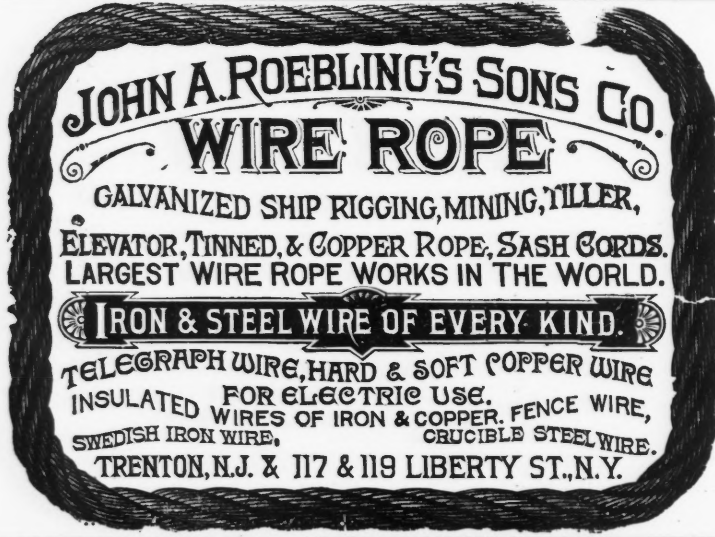
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**TREASURY DEPARTMENT, Office Supervising Architect, Washington, D. C., June 24th, 1892.** Sealed proposals will be received at this office until two o'clock P. M. on the 30th day of July, 1892, and opened immediately thereafter for all the labor and materials required for concrete and stone footings, etc., for the United States Post Office building at Washington, D. C., in accordance with the drawings and specification, copies of which may be had on application at this office, or the office of the superintendent on the building site. Each bid must be accompanied by a certified check for a sum not less than two per cent. of the amount of the proposal. The right is reserved to reject any and all bids, and to waive any defect or informality in any bid or in the requested letters to accompany bids, if it be deemed in the interest of the Government to do so. Proposals received after the time stated will be returned to the bidders. Proposals must be enclosed in envelopes, sealed and marked, "Proposal for Concrete and Stone Footings, Etc., for the United States Post Office Building at Washington, D. C.," and addressed to W. J. Edbrooke, Supervising Architect.

**TREASURY DEPARTMENT, OFFICE OF THE Supervising Architect, Washington, D. C., June 29th, 1892.** Sealed Proposals will be received at this office until 2 o'clock P. M., on the 27th day of July, 1892, and opened immediately thereafter, for all the labor and materials required for the erection and completion (except plumbing and heating apparatus) of the United States Post Office building at Ashland, Wis., in strict accordance with drawings and specification, copies of which may be had on application at this office or the office of the Superintendent, at Ashland, Wis. Each proposal must be accompanied by a certified check for a sum not less than 2% of the amount of the proposal. The right is reserved to reject any and all bids and to waive any defect or informality in any bid, if it be deemed in the interest of the Government to do so. All bids received after the time stated will be returned to the bidders. Proposals must be enclosed in envelopes, sealed and marked, "Proposals for the Erection and Completion (Except Plumbing and Heating Apparatus) of the United States Post Office Building at Ashland, Wis.," and addressed to W. J. Edbrooke, Supervising Architect.

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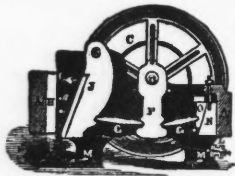
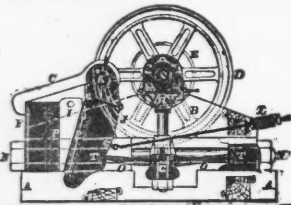
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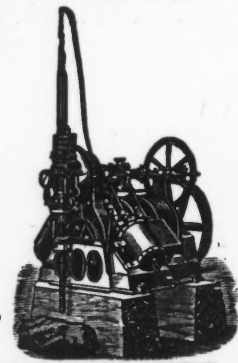
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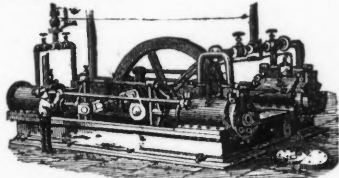


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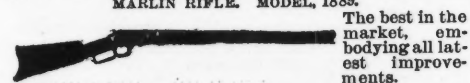


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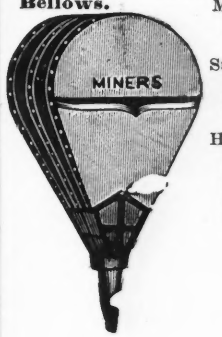
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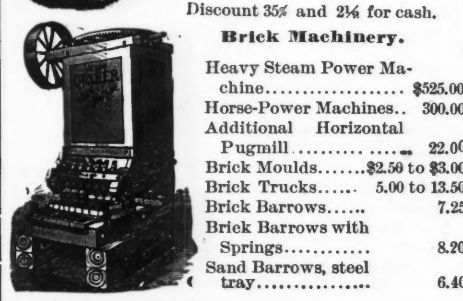


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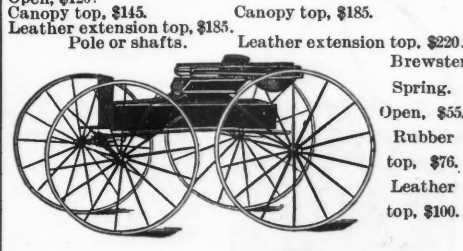


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Standard, each: 18 to 24 in., \$10; 28 in., \$12; 32 in., \$14; 34 in., \$16; 36 in., \$18; 38 in., \$20; 40 in., \$22; 42 in., \$27; 44 in., \$32	
Hand Bellows, per doz.: 6 in., plain, \$10; fancy, \$20; 7 in., plain, \$12; fancy, \$24; 8 in., plain, \$14; fancy, \$28; 9 in., plain, \$16; fancy, \$32; 10 in., plain, \$18; fancy, \$36.	

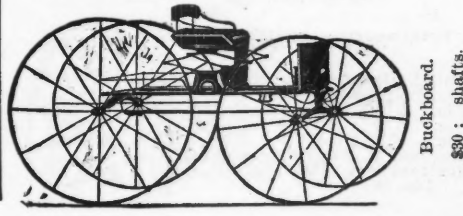


Blowers and Disc Fans.	
12 inches.....	\$30
18 " " " 40 "	125
24 " " " 50 "	160
30 " " " 65 "	200
36 " " " 85 "	

Discount 35% and 2 1/2% for cash.



Carriages, Etc.	
Windsor Surrey.	
Open, \$120.	
Canopy top, \$145.	
Leather extension top, \$135.	
Cut under Surrey.	
Canopy top, \$185.	
Pole or shafts.	
Leather extension top, \$220.	
Brewster Spring.	
Open, \$55.	
Rubber top, \$76.	
Leather top, \$100.	




Runabout, \$65.	
Buckboard, \$30; shafts.	





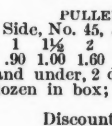
**PULLEY HOOK (New Floor.)**  
Deep cut thread, forged point.



Per doz.  
net..... \$1.90


1/4 in. wrought iron, 8 in. long, list..... \$1.90  
net..... 1.00

**WELL WHEEL.**  
New pattern.  
Japanned.



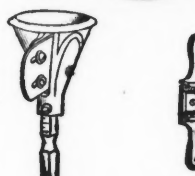
In. 8 10 12 14 16  
Pr.d. 7.00 9.50 12.50 20.00 30.00  
Discount, 70%.

**PULLEYS.**  
Side, No. 45, Japanned.



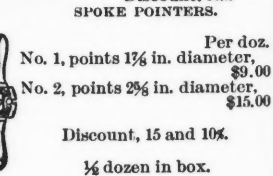
Inches... 1 1 1/2 2 2 1/2 3 4 5  
Per doz. .90 1.00 1.60 2.40 3.50 9.00 15.00  
2 inch and under, 2 dozen in box; 2 1/2, 3 and 4, 1 dozen in box; 5 inch, 1/2 dozen in box.  
Discount, 70%.

**SHEAVES.**  
Patent Common  
Turned and polished  
iron wheels, round corners, brass pin, one set in box.



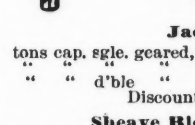
2 1/2 inch..... \$1.50  
3 "..... 2.00  
4 "..... 2.60  
5 "..... 3.50  
Discount, 60%.

**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.

**Jack Screws.**



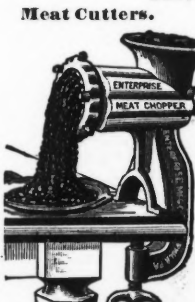
tons cap. sg. geared, \$40 12 tons cap. d'ble geared, \$135  
" " d'ble " 60 18 " " " 175  
" " " 100 20 " " " 200  
Discount, 20% 10 days.

**Sheave Blocks for Derricks.**

Single Shell Block with Becket Eye Hook.				Double Shell Block with Becket Swivel Hook.			
No.	Diam. in inches.	Capacity tons.	Price.	No.	Diam. in inches.	Capacity tons.	Price.
190 1/2	10	3	\$10.75	223 1/2	10	3	\$15.10
191	12	3	11.50	224	12	5	16.60
192	12	5	11.85	225	12	8	17.20
193	14	5	12.60	226	12	10	18.00
194	14	8	13.20	227	14	8	18.00
195	16	8	14.00	228	14	10	19.25
196	16	10	14.85	229	14	12	20.50
197	16	12	15.75	230	16	10	20.50
198	18	12	17.00	231	16	12	21.75
199	18	12	18.00	232	16	20	23.50
200	18	20	20.00	233	18	10	24.00
				234	18	12	25.25
				235	18	20	27.50

Discount, 20% 10 days.

**Meat Cutters.**




5, each.....\$2.00  
10, "..... 3.00  
22, "..... 4.00  
41, "..... 50.00  
This is a power machine.  
Dis., 50%.

**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.  
No. 7, Ice machine, ice and ice cream molds, 5 carafe, 1 bottle holder, 12 lbs. ice, \$60.00.  
Siberia, 18 lbs., \$120, Dis., 20 and 10%.

**India Rubber Goods.**



**MECHANICAL.**

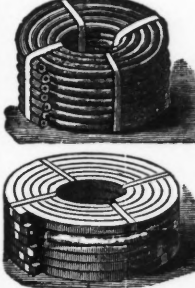
**RUBBER BELTING.**

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		
8	0.59	0.70	0.84	\$1.05	\$1.25
10	0.75	0.90	1.07	1.33	1.60
12	0.91	1.08	1.30	1.62	1.95
14	1.08	1.28	1.54	1.92	2.31
16	1.25	1.50	1.78	2.22	2.67
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
28	2.42	2.84	3.36	4.20	5.04
30			3.64	4.55	5.46
34			4.20	5.25	6.30
36			4.48	5.60	6.72
40			5.04	6.30	7.56
42			5.32	6.65	7.98
46			5.88	7.35	8.82
48			6.16	7.70	9.24
50			6.44	8.05	9.66

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.

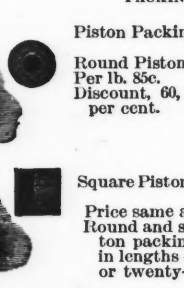
**PACKING.**

**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.

**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.

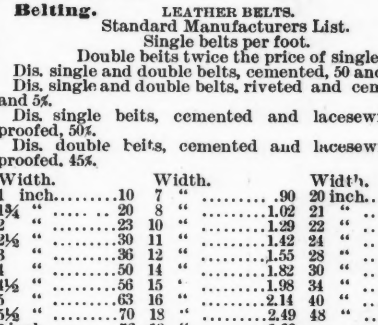
One-ply of cloth to every 1-16 inch thickness.  
Three cents per pound additional will be charged for each extra ply of cloth. Each cloth, whether insertion or on outside, to count as one ply.  
All cloth insertion or plain packing is one yard wide, and any length desired.  
Wire insertion packing, all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

**Belting.**

**LEATHER BELTS.**  
Standard Manufacturers List.  
Single belts per foot.  
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, waterproofed, 50%.  
Dis. double belts, cemented and lacesewn, waterproofed, 45%.

Width.	Width.	Width.	
1 inch.....	10 7 "	20 inch.....	2.84
1 1/4 ".....	20 8 "	1 1/2 ".....	3.02
1 3/4 ".....	23 10 "	2 ".....	3.20
2 ".....	30 11 "	2 1/2 ".....	3.54
2 1/4 ".....	36 12 "	3 ".....	4.30
3 ".....	50 14 "	4 ".....	4.64
3 1/4 ".....	56 15 "	5 ".....	5.35
4 ".....	63 16 "	6 ".....	6.40
5 ".....	70 18 "	8 ".....	7.80
6 ".....	76 19 "		

**Rosendale Hair Belting.**



Width.	Per ft.
3 in.....	\$ .72
3 1/4 ".....	.79
3 1/2 ".....	.86
3 3/4 ".....	.93
4 ".....	1.00
4 1/4 ".....	1.06
4 1/2 ".....	1.12
5 ".....	1.26
5 1/2 ".....	1.40
6 ".....	1.52
6 1/2 ".....	1.66

Width.	Per ft.	Width.	Per ft.	Width.	Per ft.	Width.	Per ft.
7 in.....	\$1.80	12 in.....	\$3.10	20 in.....	\$5.68	28 in.....	\$8.60
7 1/2 ".....	1.92	13 ".....	3.36	21 ".....	6.04	29 ".....	8.94
8 ".....	2.04	14 ".....	3.64	22 ".....	6.40	31 ".....	9.28
8 1/2 ".....	2.17	15 ".....	3.96	23 ".....	6.74	32 ".....	10.00
9 ".....	2.30	16 ".....	4.28	24 ".....	7.18	34 ".....	10.70
9 1/2 ".....	2.44	17 ".....	4.63	25 ".....	7.46	36 ".....	11.40
10 ".....	2.58	18 ".....	4.98	26 ".....	7.84	40 ".....	12.80
11 ".....	2.84	19 ".....	5.32	27 ".....	8.22	42 ".....	13.50

Belts up to 6 1/2 in. are made in X and XX thickness.  
" " 20 " " " XX  
" 12 to 42 " " " XX and XXX

**DISCOUNTS:**  
On X belts, stronger than single leather, 70% and 2%.  
On XX belts, " " double " 50%, 10%, 5% and 2%.  
On XXX belts, " " triple " 25% and 2%.

**Belt Clamp.**



For Drawing Belts Together for the purpose of Lacing them.

Size.	Price.
8 inch.....	\$14.00
12 ".....	18.00
16 ".....	10.00
20 ".....	20.00
24 ".....	30.00
28 ".....	34.00
32 ".....	38.00
36 ".....	44.00

Discount, 30% and 10%.

**HOSE.**

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

Int. Diam.	Per ft.	Per Diam.	Per ft.
2 inch.....	\$2.60		
2 1/2 ".....	3.50		
3 ".....	4.00		
3 1/2 ".....	5.50		
4 1/2 ".....	6.50	7 1/2 ".....	\$13.50
5 ".....	7.50	8 ".....	15.00
5 1/2 ".....	8.50	9 ".....	16.50
6 ".....	9.50	10 ".....	19.50
6 1/2 ".....	10.50	12 ".....	23.50
8 ".....	12.00	12 ".....	27.50

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

**SUCTION HOSE.**  
On spiral brass or iron wire

Int. Diam.	Per ft.
3/4 inch.....	\$ .77
1 ".....	1.00
1 1/4 ".....	1.25
1 1/2 ".....	1.65
1 3/4 ".....	2.10
2 ".....	2.50

**RUBBER HOSE.**

**Conducting Hose—Two-ply.**

Int. diam.	Per ft.	Int. diam.	Per ft.	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	2 3/4 in.....	.83	7 in.....	2.31
1 1/4 in.....	.42	3 in.....	.92	8 in.....	2.64
1 1/2 in.....	.50	3 1/2 in.....	.99	9 in.....	2.97
1 3/4 in.....	.58	4 in.....	1.32	10 in.....	3.33

**HYDRANT HOSE—THREE-PLY.**

Int. diam.	Per ft.	Int. diam.	Per ft.
1 1/2 in.....	\$0.25	1 1/2 in.....	\$0.60
3/4 in.....	.30	1 3/4 in.....	.70
1 in.....	.40	2 in.....	.80
1 1/4 in.....	.60	2 1/4 in.....	.90

Discount—Reliance, 60; Royal, 70; Manhattan, 70 and 10 per cent.

**GASKETS AND RINGS.**

**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  
3-32 inch thick, and upwards, per lb.....\$1.00  
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%.

**Indurated Fibre Ware.**

**SPITTOONS.**

Size.	Doz.
16 in. dia., 8 in. high.....	\$21.00
12 1/2 in. dia., 5 1/2 in. high.....	10.80
9 in. dia., 5 in. high.....	

**WASH TUBS.**

No.	Size.	Price.
No. 0, 23 in.....	1/2 12	27.00
No. 1, 21 in.....	1/2 10 1/2	24.00
No. 2, 19 1/2 in.....	1/2 9	21.00
No. 3, 18 1/2 in.....	1/2 9	18.00
Nos. 0, 1, 2 and 3, nested....	1 in. 3 1/2	7.50
Nos. 1, 2, and 3, nested....	1/2 9 1/2	5.25

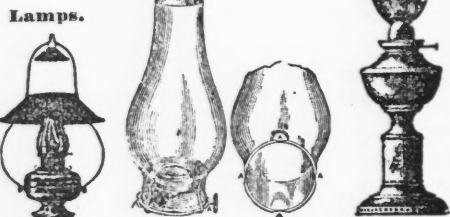
Dis. on all 40%.

**KEELERS.**

Size.	Price per Doz.
A—20 in. 7 in. deep.....	16.20
B—19 " ".....	15.60
C—18 1/2 " ".....	14.00
1—17 1/2 " ".....	13.2
2—15 1/2 " 6 in. ".....	12.0
3—13 1/2 " 5 in. ".....	10.2
4—12 " 4 in. ".....	9.0



MILK OR VEGETABLE PANS.  
13 1/2 in. dia. 3 1/4 in. deep, 6 quarts,  
\$3.50 per doz.  
WASH BASINS. Doz. \$3.60  
12 1/4 in. ....



Lamps.  
Hanging lamp. \$12 per doz.  
6. Clock lamp. \$21 per doz.  
7. Hand lamp \$1.50 per doz.



Demmler Bros' Cherry " Miners' Lamps, double spout. Doz. \$2.00  
" Drivers' " single " " " 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.  
\$75. 3/4 wick, without guards, per doz., \$6.00.  
\$76. square safety lifting globe, per doz., \$5.50.  
\$77. 5/8 wick, safety lifting globe, per doz., \$6.75.  
Nickel plated diamond reflector road lamp, 30 candle-power, \$13.50 per doz., net.  
Illuminated night clock, \$27, per doz.

PAPER LAMPS.

lined with oil proof composition.  
No. 1. Height, 2 1/2 in., per doz. \$1.00  
No. 2. " " 3 " " .85  
No. 3. " " 3 3/4 " " 1.25  
No. 4. " " 5 " " 1.50  
No. 5. " " 6 1/2 " " 1.75

Link Belting.

No.	Height	Price	No.	Price
25	3	\$0.13	78	\$0.40
32	3 1/2	.13	83	.45
33	3 3/4	.12	85	.50
34	4	.13	88	.50
35	4 1/4	.14	95	.60
42	4 1/2	.16	103	.75
45	4 3/4	.16	105	.70
51	5	.20	106	.90
52	5 1/4	.25	107	.80
55	5 1/2	.22	108	.80
57	5 3/4	.24	109	.90
62	6	.30	114	1.10
66	6 1/4	.30	122	1.50
67	6 1/2	.30	124	1.30
75	6 3/4	.35	146	1.40
77	7	.35		



No.	Working strain.	Pitch of link.	Size pin.	Price per foot.
21	700	2 1/4 "	3/8 Malleable.	\$ .40
22	1,000	3 1/4 "	7/16 Steel.	.65
23	1,400	4 "	1 "	.90
24	2,800	6 "	1 1/8 "	25

Disc., 20%.

STEEL THIMBLE ROLLER CHAIN.



Is used extensively for heavy driving purposes.

No.	Work'g strain.	Width of steel.	Thickness.	Pitch of link.	Pin.	Price
17	1,800 lbs.	1 1/4 x 2 1/4	3/8	2 1/2 ins.	1/2 in.	\$1.65
14	3,500 "	1 1/2 x 2 3/4	3/8	3 1/8 "	5/8 "	2.15
112	6,000 "	2 x 3 1/2	1/2	4 "	3/4 "	3.00
115	6,000 "	2 x 3 1/2	1/2	5 "	3/4 "	3.00
116	6,000 "	2 x 3 1/2	1/2	6 "	3/4 "	3.00

Disc., 20%.

Roller Chains.

Made of malleable iron, with malleable iron and steel pins.

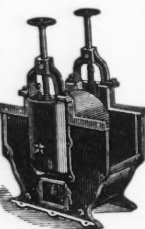


These chains are made up with riveted pins, but coupling pins can be inserted at any interval desired.  
The price of the chain includes the attachment links when not occurring but once in every foot.

No.	Working strain.	Pitch of link.	Width of link.	Size pin.	Price per foot.
52	500	1 1/4	1 5/8	10/16 Malleable iron	\$0.35
55	500	1 3/8	1 5/8	" "	.35
77	800	2 1/4	2	" "	.45
0	800	2	1 3/4	" "	.45
9	700	2	1 3/4	" "	.50
88	1,200	2 5/8	2 1/8	" "	.65
17	1,200	2 3/8	2 1/8	" "	.70
18	1,400	3	2 1/8	" "	.80
12	1,500	3 1/4	2 3/8	1 1/2 Steel.	1.20
1	2,000	3	2 3/8	" "	1.10
2	1,600	3 1/4	2 3/8	" "	1.30
126	2,500	4	3 1/4	" "	1.30
103	1,800	3 1/4	2 3/4	" "	1.20
3	2,000	4	3 1/4	" "	1.30
114	2,000	4 3/8	3 1/2	" "	1.30
124	2,900	4 3/8	3 1/2	" "	1.70
5	3,000	5	3 3/4	" "	1.85

Discount, 45%.

Elevator Boots with Sprocket Wheels.



Diam. of pulley.	Length of bucket.	Price of cast iron boot.	Price of hard-wood boot.
12	5	\$28.00	\$28.00
12	6	30.00	30.00
14	7	35.00	35.00
14	8	40.00	40.00
16	9	45.00	45.00
16	10	50.00	50.00
18	12	60.00	60.00
18	14	65.00	65.00
18	16	70.00	70.00
20	18	85.00	85.00
20	20	90.00	90.00

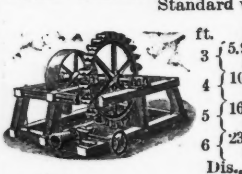
Discount, 35%.

Sprocket Wheels.

Bored, Set-Screwed or Key-Seated.  
In ordering always state which are the driving, and which the driven wheels.

Wheels made in halves split) or with large hubs, and solid webs, can be furnished, for which an additional charge is made.  
Discount, 40%.

Water Wheels (Pelton).



Standard wheels.  
Under heads of:  
ft. 50 ft. 280 ft. 500 ft.  
3 5.9 H.P. 68.7 H.P. 188 H.P.  
4 10.6 H.P. 118.5 H.P. 335 H.P.  
5 16.6 H.P. 185 H.P. 524 H.P.  
6 23.9 H.P. 266 H.P. 755 H.P.  
Disc., 10%.



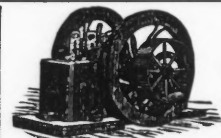
No. 1 ..... \$30  
No. 2 ..... 60  
No. 3 ..... 125  
No. 4 ..... 175  
No. 5 ..... 275

Under pressures of

30 lbs.	60 lbs.	100 lbs.
.3 H. P.	1. H. P.	2.1 H. P.
.8 H. P.	2.3 H. P.	4.9 H. P.
1.3 H. P.	3.3 H. P.	8.3 H. P.
2.4 H. P.	6.9 H. P.	14.7 H. P.
4.3 H. P.	12.4 H. P.	28.1 H. P.

Disc., 10%.

Power according to pressure:  
3 to 50, 10 to 100, 15 to 150, 20 to 200, 30 to 300 H. P.



Concentrating Machinery.

Blake Improved Crusher:  
10x7, weight 8,000 lbs., \$450.  
Blake Improved Crusher:  
15x3, weight 15,000 lbs., \$750.  
Discount 20%.

Cornish Crushing Rollers:

20 diameter, 10 face, weight 5,400; \$450.00.  
Cornish Crushing Rolls: 20 diam., 14 face, weight 6,000; \$500.00.  
22 diameter, 14 face, weight 2,500; \$625.00.  
27 diameter, 14 face, weight 13,000; \$750.00.  
30 diameter, 14 face, weight 15,000; \$850.00.  
Discount 25%.

Complete Sizing Arrangement, Revolving Screens and Hydraulic Classifier. For 25 tons capacity, \$250; 50 tons capacity, \$350; 75 tons capacity, \$450; 100 tons capacity, \$800. Discount, 10 per cent.

Automatic Jig complete, woodwork included, with slide motion: 2 sieves, \$3.0; 3 sieves, \$3.0; 4 sieves, \$4.50. With Eccentric Motion, complete, woodwork included: 1 sieve, \$2.0; 2 sieves, \$2.70; 3 sieves, \$3.20; 4 sieves, \$3.30. Automatic Double Jig complete, woodwork included 4 sieves, \$2.10; 6 sieves, \$3.35; 8 sieves, \$4.25. 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.

Per doz.	Tacks.		
	1 1/2	2	2 1/2
1/4 wt.	35	40	46
5/8	10	12	14
1.00	1.20	1.40	1.60
1.75	1.85	2.15	2.45
2.15	2.45	2.65	3.4
Doz. full weight	60	70	80
90	1.00	1.10	1.20
1.40	1.40	1.60	1.80
2.00	2.00	2.20	2.40
3.00	3.00	3.20	3.4
4.00	4.00	4.20	4.6
5.00	5.00	5.20	5.6

Discount, 67 1/2, 10 and 2%.

Cut Tacks.

1/4 wt.	Price per dozen ounces.			
	1 1/2	2 1/2	3	4
1	15	18	20	24
2	18	20	24	30
3	24	28	30	36
4	30	36	40	48
5	36	42	48	60
6	42	50	55	65
8	55	65	70	80
10	70	80	90	100

Finishing Nails.

Inch.	3/8	1/2	5/8	3/4	7/8	1
Per lb.	45	40	32	28	24	22

O. H. Swedes.

Price, same as Swedes.  
Swedes steel tacks same list price as iron.

Upholsterers.

Discounts, 7 1/2, 10 and 2%.

Carpet Tacks, flat and oval heads.

Blued, doz.	oz.	4	6	8	10	12	14	16	18	20
1/4 wt.	....	35	40	45	50	55	65	75	85	95

Tinned, doz. 1/4 wt.

oz.	4	6	8	10	12	14	16	18	20
1/2 wt.	....	4	6	8	10	12	14	16	18

Lubricants.

LUBRICATING.  
Lubrolene A cylinder oil 50 inch barrels.  
Lubrolene D cylinder oil 40 inch barrels.  
Lubrolene A machine oil 45 inch barrels.  
Lubrolene B machine oil 35 inch barrels.  
Lubrolene A engine oil 50 inch barrels.  
Lubrolene B engine oil 40 inch 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.—Barrels, 2 1/2c per lb.; 10 lb. kegs, 3c per lb.

Axle 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

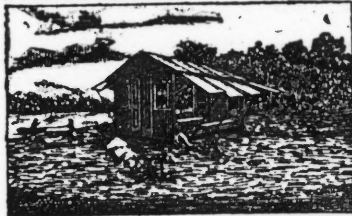
See Oils, page 10

Packing.

"Eureka," 60c. per lb Dis., 40%. Soapstone—Standard, 5c per lb. XX, 11c. per lb. Crown—No. 1, 23c. per lb. No. 2, 26c. per lb. Clinax, 9c. per lb. Net.  
"Seldon," for Steam, Air, Water and Ammonia. With Rubber Core, 60 cents per lb. Dis. 25%. With canvas core, 50 cents per lb. Dis., 30%.



Portable Houses.



Size. Wgt. 450 lbs. Price, \$150. Dis., 10%.

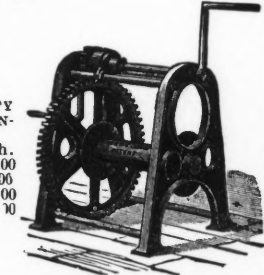
Post Hole Diggers.



Little Giant..... \$36.00 doz 11 cu. ft. Hercules..... 30.00 " " " " New Champion.... 20.00 " " " " Scheidler..... 36.00 " " " "

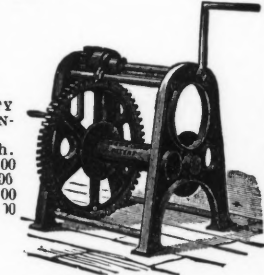
Pulley Blocks.

WESTON DIRECT. Each. 1 ton..... 34 1/2 ton..... 60 5 tons..... 110 1 ton..... 20 3 tons..... 250



WESTON CRAB SAFETY BRAKE.

Each. 21..... \$35.00 22..... 45.00 23..... 65.00 25..... 100.70



Pumps.

Prices on all pumps include cylinders. Fig. 101. No. Dia. Cyl. Suction. Cap. stroke. Iron. Brass cyl. Price. 0 2 in. 1 in. 1-15 gal. \$3.50 4.00 \$6.00 1 2 1/2 1 1/2 1-11 4.50 7.00 2 3 1 1-10 5.00 8.00 3 4 1 1-8 5.50 10.00 4 5 1 1-6 6.50 14.00 5 6 1 1-5 8.00 18.00 6 8 1 1-3 12.00 20.00

Fig. 120. No. 3/4 standard and cylinder, 1 1/4-in. pipe, \$18.00. No. 7/8 standard and cylinder, 1 1/4-in. pipe, \$15.00. No. 8 1/2 standard and cylinder, 1 1/4-in. pipe, \$18.00. With hose and discharge pipe, add \$3.00 to list price. Fig. 133. Dis., 5%.

No. 1, diam. cyl., 2 1/2 in.; cap. stroke, 1-8 gal.; size pipe, 1/4 in. Price, iron, \$12.50; brass cyl., \$17.50. No. 2, diam. cyl., 3 in.; cap. stroke, 1-6 gal.; size pipe, 1/4 or 1/2 in. Price, iron, \$14.50; brass cyl., \$18.50. No. 3, diam. cyl., 4 in.; cap. stroke, 2-5 gal.; size pipe, 1/2 or 2 in. Price, iron, \$23.00; brass cyl., \$34.50. Fig. 275. Dis., 5%.

No. 1, diam. cyl., 3 in.; suction, 1 1/4 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., \$60.00. No. 3, diam. cyl., 3 in.; suction, 2 in.; cap. stroke, 6-7 gal. Price, iron, \$35.00; brass cyl., \$90.00. No. 4, diam. cyl., 6 in.; suction, 1/2 in. cap. stroke, 1 1/5 gal. Price, iron, \$45.00; brass cyl., \$120.00. Dis., 4%.

Fig. 278. With Tight and Loose Pulleys.

Pulsometer and Vacuum Pumps.



Table with 5 columns: Gals. per minute, Weight, Net price, H. P. boiler.

Table with 6 columns: No., Height, Space occupied, Size of steam pipe, Size of suction pipe, Size of discharge pipe.

Roofing.

CORRUGATED IRON.

Table with 3 columns: Gauge, Per square, Price.

Railroad Dumping Cars and Carts.

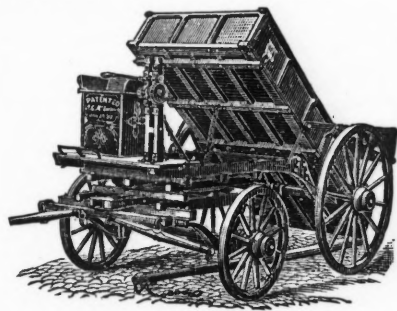


Table with 5 columns: Cars, Gauge, Net. 1 c. y., Net. 2 c. y., Net. 3 c. y.

\*These cars built of any gauge from 18" to 56 1/2" and of any capacity from 1/2 to 6 cu. yd.

Saws.

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, Beech handle, polished edge; 4 screws. 26 in. \$20.00 per doz. Dis., 20%. One man Cross-Cut-Supplementary Handle. 3 ft. 3/4 ft. 4 ft. 4 1/2 ft. 5 ft. 5 1/2 ft. 6 ft. Great American, \$2.75 \$3.00 \$3.50 \$4.00 \$4.50 \$5.00 \$5.50 Champion Tooth, 2.35 2.60 3.15 3.50 3.85 4.25 4.65 One man cross-cut handles, \$4.50 per doz. Dis., 45%.

PATENT GROUND AND TEMPERED SOLID TOOTH CIRCULAR SAWS.

Table with 6 columns: Diameter. Inch., Thickness. Gauge., Size of hole—Inch., Price each., Extra for each additional gauge, heaver., Prices for beveling new saws or grinding old saws, extra, Per gauge.

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%.



Saw Set.

Adjustable ball and socket saw clamp.

Japaned, \$14 per doz.



Shears.

The Patent "Eureka" No. 1 cuts round metal up to 1/2 in. steel to 3/8, \$12. No. 2 cuts round metal up to 1/2 in. steel to 3-16, \$20. Discount, 25%.

Scales.—Discount on scales, 4%.

Postal scales. No. 1, capacity 1/2 to 9 oz. \$3.00. No. 2, capacity 1/2 to 12 oz. \$4.00. No. 3, capacity 1/2 to 34 oz. \$8.00. No. 4, capacity 1/2 oz. to lbs., \$8.00.



Iron Set Screws. (Case Hardened.) 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.

Table with 10 columns: Diam. screw., 1/4, 5-16, 3/8, 7-16, 1/2, 9-16, 5/8, 3/4, 7/8, 1. Length. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20.

Manufacturers' Standard List Machine Bolts, with Square Heads and Nuts, Finished Points.

Table with 10 columns: Length., 1/2, 3/4, 5/8, 7/8, 1, 1 1/4, 1 1/2, 1 3/4, 2.





RAILROADS.

Railway Track Punch

Round Point.  
15c. lb., net.  
Track Wrench.  
7 3/4 lb., net.  
Ra Fork.  
9c. lb., net.  
Crow Bars,  
Wedge Points,  
3 3/8 lb., net.  
Pinch Point,  
3 3/8 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, 10 and 5%.

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, 10 and 5%

No. 2, 4 lbs., \$11.50.  
Western Pattern, No. 3, 4 1/2 lbs., \$12.  
Baltimore Pattern, No. 1, 3 3/4 lbs., \$11.  
Baltimore Pattern, No. 2, 4 1/2 lbs., \$11.75.  
Baltimore Pattern, No. 3, 5 lbs., \$12.75.  
Baltimore Pattern, No. 4, 5 3/4 lbs., \$13.50.  
Dis., 60 and 10%, 5.

Grub Hoes.

Western Pattern, No. 0, 3 lbs., \$10.50.  
Western Pattern, No. 1, 3 3/8 lbs., \$11.  
Western Pattern

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....  
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..... 10  
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.  
Will mortise 1/4 to 1 in. wide, 3 in. deep.  
" cut tenons 1/4 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. Adjustable Tail Stock for Tapers.  
Price, No. 1.....\$75.00  
Dis., 20%.

Challenge.  
Hand Circular Rip Saw.  
Cuts 3 3/4 thick, 19 in. wide.  
Price \$50.00.  
Dis.,

Scroll and Circular saw 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  
Dis., 35%.

Foot Power Former.  
\$20.00; Knives extra, \$1.00 each.  
Dis., 35%.

Mortising Machine.  
\$22.00; Chisels, \$1.00 each.  
Dis., 35%.

Tenoning Machine,  
Price, \$25.  
Dis., 35%.

Velocipede Scroll Saw,  
Without boring attachment.....\$20.00  
With doz. saw blades, } Included. Dis., 35%  
3-16 bit. } 23.00

Vise.

No. 1. Solid Box Vises.  
No. 25, 3 3/8 in. Jaw.....\$12.00  
" 30, 3 3/8 " " " 11.00  
" 35, 3 3/8 " " " 10.00  
" 40, 4 " " " 10.50  
" 45, 4 1/4 " " " 11.00  
" 50, 4 1/4 " " " 11.50  
" 55, 4 1/2 " " " 12.00  
" 60, 4 1/2 " " " 13.00  
" 65, 4 3/4 " " " 14.00  
" 70, 5 " " " 15.00  
" 75, 5 " " " 16.00  
" 80, 5 1/4 " " " 17.50  
" 85, 5 1/4 " " " 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 1/4 " " " 25.00  
" 120, 6 1/2 " " " 26.00  
" 125, 6 1/2 " " " 27.50  
" 130, 6 3/4 " " " 29.00  
Each.  
No. 135, Jaw.....\$31.50  
" 140, " " " 33.00  
" 145, " " " 35.00  
" 150, 7 " " " 36.00  
" 160, 7 1/4 " " " 41.50  
Dis., 60 and 10%.

CARPENTERS'.

BEADER (Universal Hand.)  
For Beading, Reeding, Fluting, or for light Routering.  
No. 66. Iron Stock, with seven Steel Cutters, 1.00.  
Dis. 20, 10 and 10%.

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 3/8 inches wide.  
Plate. Middle. Edge. Bound.  
Square joint.....\$7 \$9 \$18  
Arch " " 9 11 20  
Two feet, two-fold, 1 1/2 inches wide.  
Square joint. 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 tipped..... 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, 36.00  
Mason's level, 2 plumbs, polished, 42, 36.00  
PATENT ADJUSTABLE PLUMBS AND LEVEL.  
Arch Top plate, 2 side views 26 to 30 in.  
Polished and tipped.....\$27.00  
Polished and tipped..... 30.00  
Polished, tipped and tipped..... 39.00  
Mahogany..... 27.00  
Mahogany, lipped..... 33.00  
Mahogany, lipped and tipped..... 48.00  
Polished, triple stock, lipped and tipped..... 48.00  
Mahogany " " " 60.00  
Rosewood, lipped and tipped..... 90.00  
Dis., 75, 10, 10%

POCKET LEVELS.

Iron top, Japanned..... 2 50  
Brass top..... 3.00  
Dis., 70, 10, 10%.

BAILEY'S PATENT WOOD PLANES.

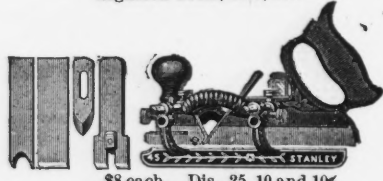
Smooth. Handle smooth.  
9 x 1 1/4 in. 8 x 2 in. 9 x 2 in.  
\$2 \$2 \$2.50 each  
Jack. Fore. Jointer.  
15 x 2 1/4 in. 20 x 2 3/4 in. 26 x 2 3/4 in.  
\$2.50 \$2.75 \$3.25 each  
Dis., 40, 10 and 10%.

PLANES, BAILEY'S PATENT IRON.

With pat. lateral adjustment.  
Smooth, 8 in. x 1 1/4 in., \$3;  
9 in. x 2 in., \$3.25; 10 in. x 2 3/4 in.  
\$3.75 each.  
Jack, 14 in. x 2 in., \$3.75.  
Fore, 18 in. x 2 3/4 in., \$4.75  
Jointer, 24 in. x 2 3/4 in., \$6.50  
each. Dis., 50 10 and 10%.

STANLEY'S READING, RABBET, SLITTING AND MATCHING PLANE.

Eighteen Tools, Bits, etc.



\$8 each. Dis., 25, 10 and 10%.

STANLEY IRON BLOCK PLANES.



ADJUSTABLE

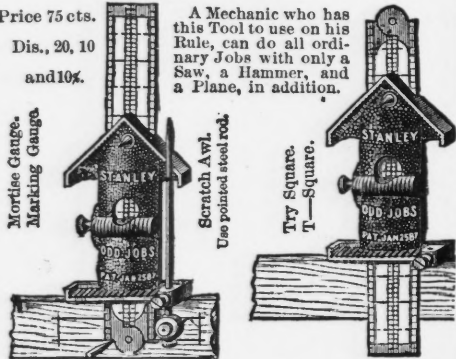


3 3/4 x 1 in. 20c. 5 1/4 x 1 1/4 40c. 7 1/4 x 1 3/4 in. 60c. each. 5 1/2 x 1 1/4 in. 60c. 7 1/4 x 1 1/4 in. 85c. each. Dis., 50, 10 and 10%

STANLEY "ODD JOBS."

Price 75 cts. Dis., 20, 10 and 10%.

A Mechanic who has this Tool to use on his Rule, can do all ordinary Jobs with only a Saw, a Hammer, and a Plane, in addition.



Mortise Gauge, Marking Gauge.

Scratch Awl. Use pointed steel rod.

Try Square, T-Square.

Double Gate Brass Valves.



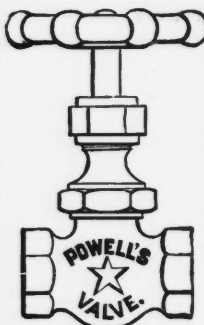
Table with columns for Size, Screw socket, Flange, Diameter of Standard Flange, Face to face of Screw socket, Face to face of Flanges, Extra for slide gate in and subject to discount.

EDDY VALVES.



Table with columns for Class 1, Class 2, Class 3, and Class 4. Rows include Brass valves, steam metal, Iron, brass mounted, and All iron for gas.

All Iron Valves, Class 2, 10 per cent. less than Brass Mounted.



Star Globe, Angle and Check Valves.

Table with columns for Size, Globe and angle, Check V, and various dimensions.

Also made heavy and extra heavy for special uses.



Star Sight Up-Feed Lubricator.

Class A.

Table with columns for Capacity, Finished, and Plated in various units.

Dis., 50%.

Signal Sight Feed Oiler.



Table with columns for Numbers, Diameter of glass, Height of glass, Capacity, Size of shank, Signal Sight Feed Oiler, Signal Sight Feed Oiler nickel plated.

Wheelbarrows.

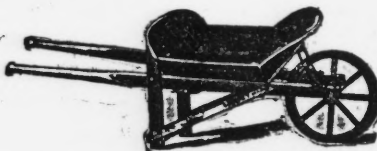
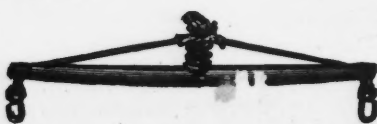


Table listing various types of wheelbarrows and their prices, including Climax Bolted Barrow, Common Nailed Barrow, and Lansing's Patent Iron-Bolted Barrow.

Capital Patent Barrows With Iron Tray, A, per doz., \$30.00 B, \$42.00

The Leader Iron and Steel Barrows. Gas-pipe Legs and Handles in one piece.

Whiffletree.



Willson spring.

Table with columns for No., Size, Price, and Discount.

Including either steel hooks or rings Discount, 45 and 5%.

Whims-Horse.

Common-sense Steel.

Dis., 25%, in car lots.



Windmills.

Table with columns for size and price for various windmill models.

Plus cost of packing.



Delivered on board of vessel at New York packed for export. Dis., 45%.



"Stover" Pumping Windmills.

Table with columns for Size wheel, Wt. packed, Cubic ft., and Price for Stover and Zenith windmills.

"Zenith" Geared Windmill (no tower). Prices include upper set of Gears and about 5 feet vertical extra heavy shaft in windmill head.

Table with columns for size and price for Zenith geared windmills.

Wire Rope.

Large table with columns for Circumference in inches, Diameter in inches, Price in cents per foot best crucible cast steel rope, Price in cents per foot best bright iron rope, and Price in cents per pound galvanized iron rope.

Discounts, for export in bond, requiring from four to six weeks time. 55%.

Galvanized wire rope thimbles.

Diameter rope... Price, each...

Galvanized thimbles spliced in.

Diameter rope... Price, each...

Galvanized thimbles with hooks spliced in.

Diameter rope... Price, each...

Forged wire rope clips.

Table with columns for diameter of rope and price for forged wire rope clips.

Dis.: 20% cash 10 days.

THE GREATEST ADVERTISING MEDIUM EVER BROUGHT BEFORE THE PUBLIC.



Reported 4/3/1893

# THE ENGINEERING AND MINING JOURNAL

OL. LIV.. No. 27

NEW YORK, SATURDAY, DECEMBER 31, 1892.

PRICE 10 CENTS.

"THE MINERAL INDUSTRY: ITS STATISTICS, TECHNOLOGY AND TRADE."

Being the ANNUAL STATISTICAL SUPPLEMENT OF THE ENGINEERING AND MINING JOURNAL.



See Page 20.

## ST. LOUIS SAMPLING AND TESTING WORKS

1225 AND 1227 SPRUCE STREET, ST. LOUIS, MO.



**COMPLETE PLANT FOR SAMPLING AND TESTING ORES, Etc.,**

On a Commercial Scale, by any Process.

ASSAYING and CHEMICAL WORK IN ALL BRANCHES.

W. B. POTTER, E. M., Manager; OTTO RISSMANN, Chemist; ELIOT C. JEWETT, Assayer; P. T. NEWITT, Foreman; H. A. WHEELER, E. M., Specialty: Concentration; ARTHUR THATCHER, E. M., Specialty: Milling.

## WORTHINGTON MINE PUMPS.

Unequaled in Design, Workmanship and Finish. Send for New Catalogue.

**HENRY R. WORTHINGTON, NEW YORK.**

70 Kilby St., BOSTON.                      607 Arch St., PHILADELPHIA.  
93 & 95 Lake St., CHICAGO.              404 & 406 Walnut St., ST. LOUIS.  
1762 Larimer St., DENVER.

## GOLD MINING IN THE SOUTH.

Has not been a record of successes. The difficulty in extracting from the low grade sulphuretic ore has precluded profitable working. The cost has been out of proportion to the results. This is all changed now with the introduction of the Crawford Mill. Ores from over forty Southern mines have already been treated by this mill, with the surprising result of an average saving on free milling ores of nearly 95 per cent., and on refractory ore 85 per cent. In some cases the saving was double what had been secured by ordinary stamps. This makes possible the working of previously abandoned mines, and opens out a new future for mining in the South. The advantages of the Crawford Mill are summarized in the following report of a well-known mining expert:

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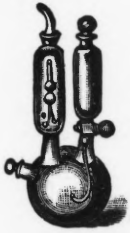
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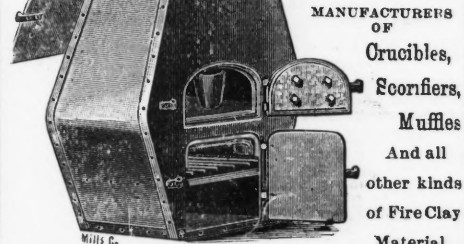
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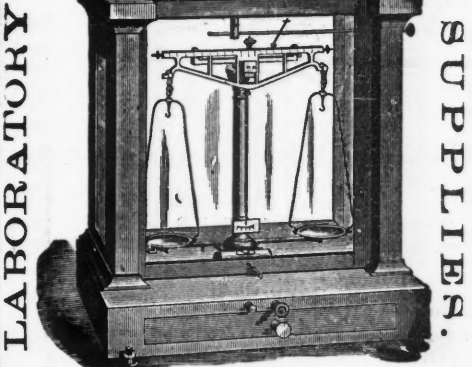
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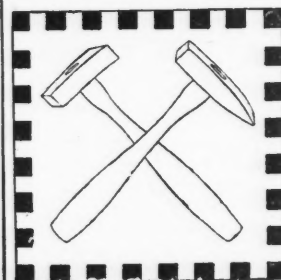
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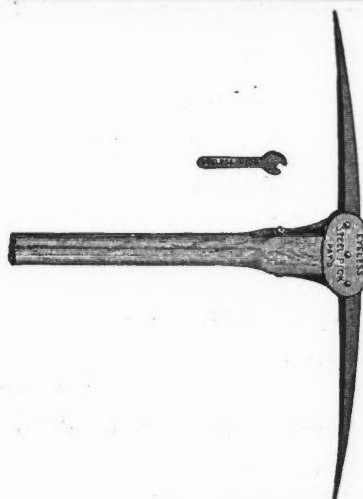
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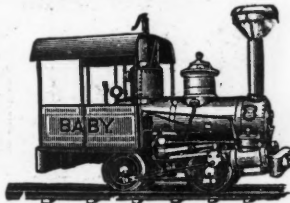
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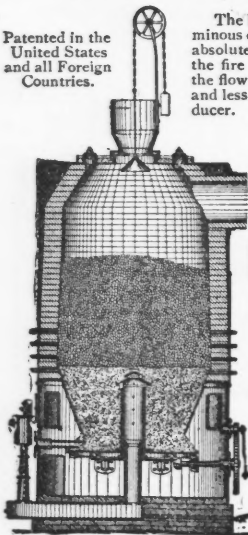
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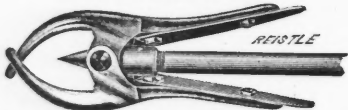
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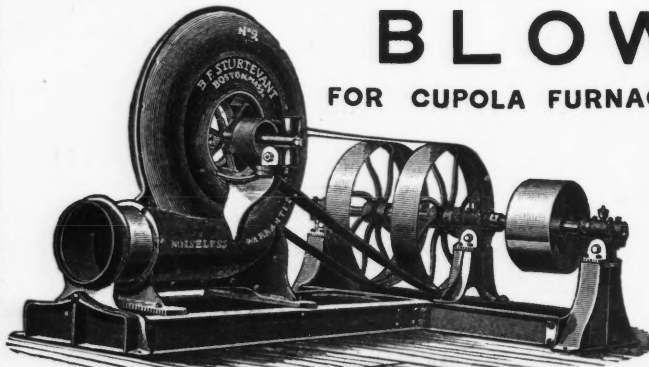
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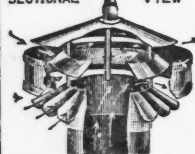
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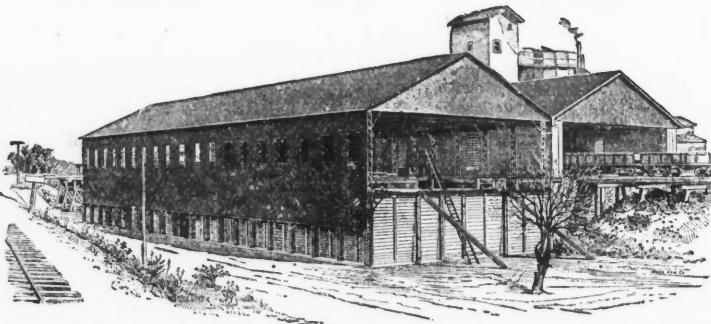
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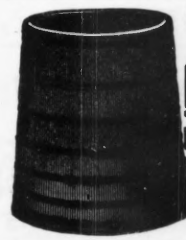
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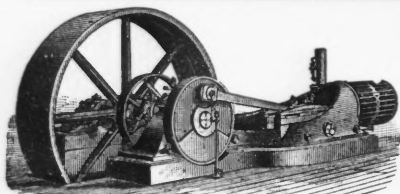
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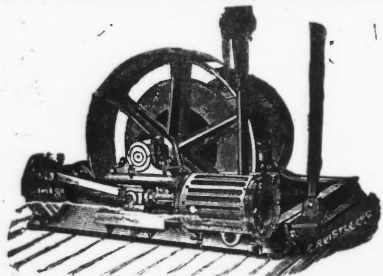


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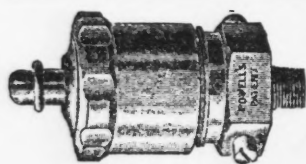
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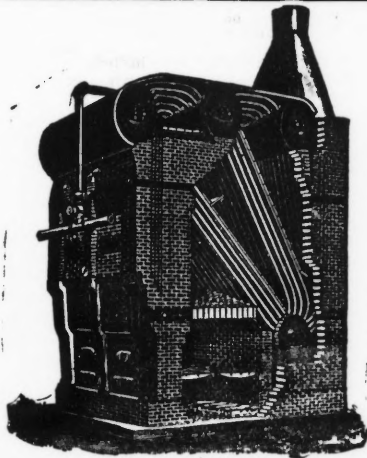
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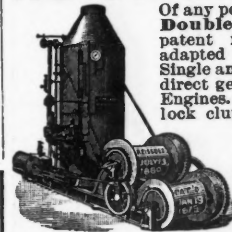
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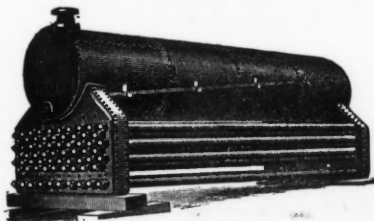
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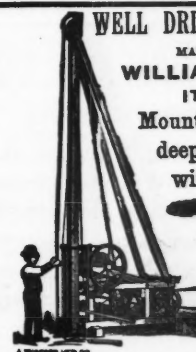
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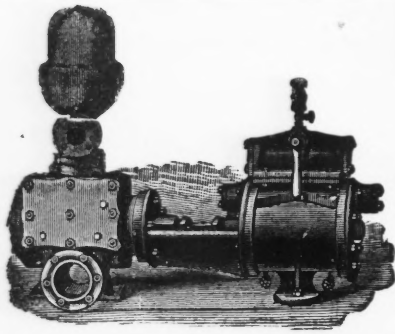
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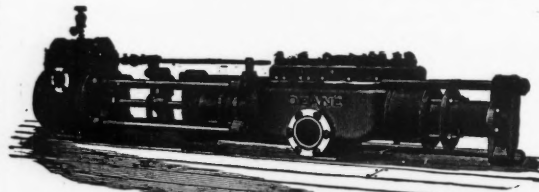


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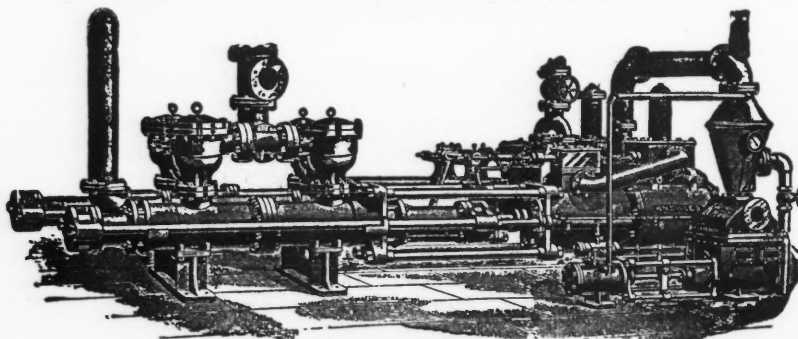
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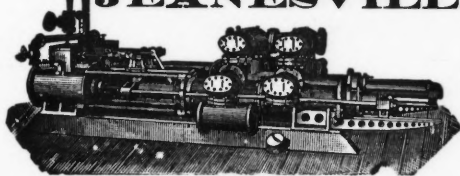
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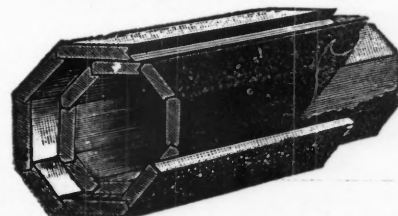
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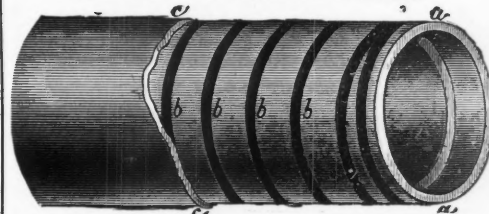
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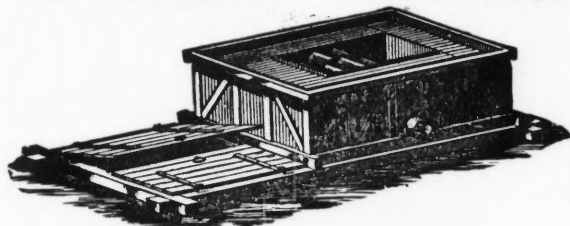


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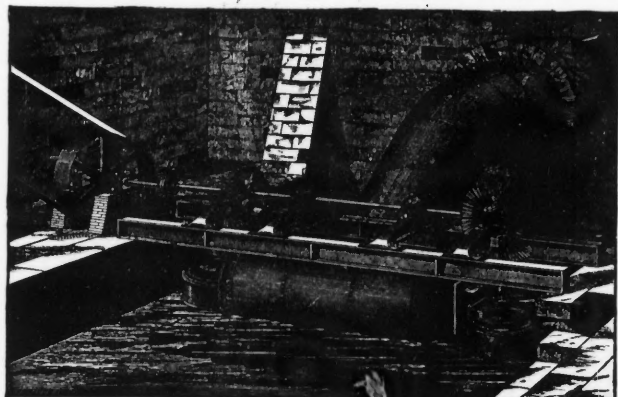


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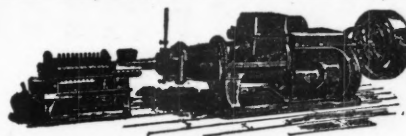
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58 per cent.....	"PURE SODA."														
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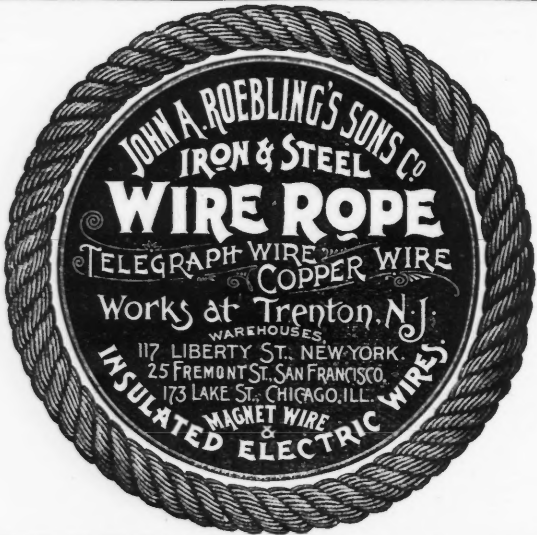


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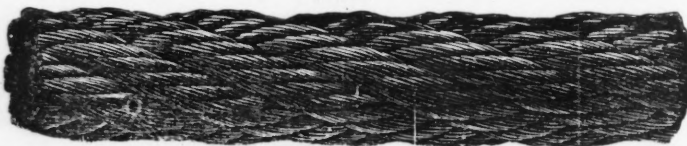
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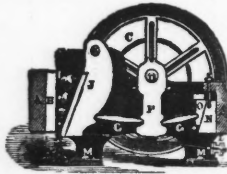
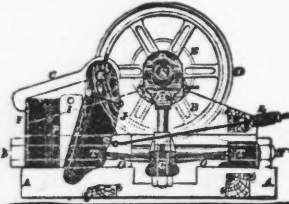


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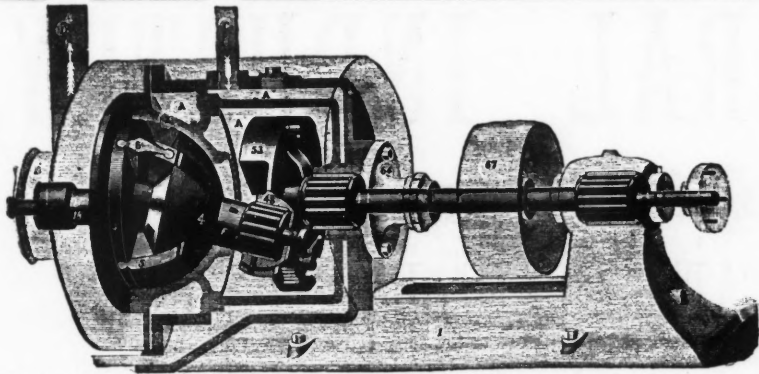
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CONTINUED ON PAGE 25.



CONTINUED FROM PAGE 24.

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The labor and expense involved in ascertaining what positions are open, in gratuitously advertising them and in attending to the correspondence of applicants, are incurred in the interest and for the exclusive benefit of subscribers to the ENGINEERING AND MINING JOURNAL.

Applicants should inclose the necessary postage for forwarding their letters.

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**U. S. ENGINEER OFFICE, NEWPORT, R. I.**  
—Sealed proposals, in triplicate, for dredging in Pawtucket and Providence Rivers, R. I., and Green Jacket Shoal, Providence Harbor, R. I., will be received at this office until January 9th, 1893, and then opened. The attention of bidders is invited to the Acts of Congress approved February 26th, 1885, and February 23d, 1887, Vol. 23, page 332, and Vol. 24, page 414, Statutes at Large, and the Act of August 1st, 1892, Sections 1 and 2 (Public No. 193). The United States reserves the right to reject any or all proposals, and to waive any informalities. Full information furnished on application. W. H. BIXBY, Captain Corps of Engineers, U. S. Army.

**TREASURY DEPARTMENT, OFFICE OF THE** Supervising Architect, Washington, D. C.—Sealed proposals will be received at this office until the 17th day of January, 1893, and opened immediately thereafter, for furnishing all the labor and materials, and fixing in place complete, the low pressure, return circulation, steam heating and ventilating apparatus required for the U. S. Court House, Post Office and Custom House building at Bay City, Mich., in accordance with the drawings and specification, copies of which may be had at this office, or the office of the Superintendent at Bay City, Mich. Proposals must be inclosed in envelopes, sealed and marked "Proposal for a Low Pressure, Return Circulation, Steam Heating and Ventilating Apparatus for the U. S. Court House, Post Office and Custom House Building at Bay City, Mich.," and addressed to W. J. EDBROOKE, Supervising Architect.

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The space of time to be taken before entering the contract after the close of tendering is supposed to be about five months, during which parties tendering have to appoint their representative in Japan (whether Japanese or foreigner residing in Japan), and inform the Osaka Shi Sanji Kwai (the Osaka City Council) the name of the representative at earliest convenience.

The space of time allowed for manufacturing and conveying them to Kobe, Japan, after signing of the contract, shall be 12 months.

Sealed tenders addressed to the Osaka Shi Sanji Kwai are to be forwarded to the undersigned before or on February 28th, 1893, after which no tender will be received. KUMASABRO TANABE, Cbancellor in charge of the Japanese Consulate General, 7 Warren Street, New York City.

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**PROPOSAL FOR DREDGING PLANT, U. S.** Engineering Office, No. 1 Prytania street, New Orleans, La., November 29th, 1892.—Sealed proposals for Dredging Plant will be received at this office until January 2d, 1893, and then publicly opened. Specifications and blank forms, and all available information will be furnished on application to this office. JOHN MILLS, Captain of Engineers, U. S. Army.

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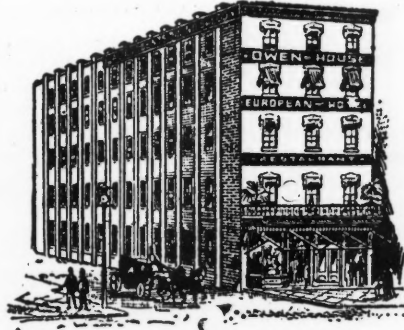


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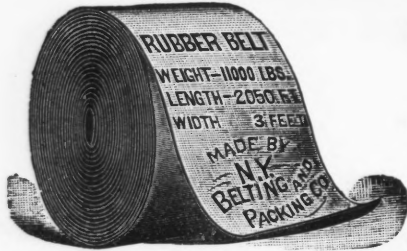
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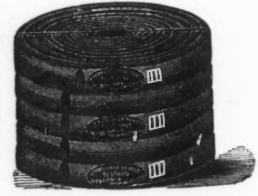
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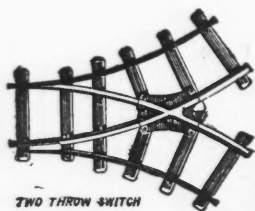
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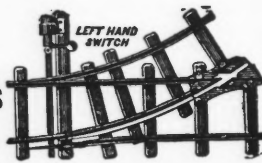
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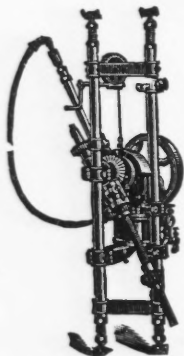
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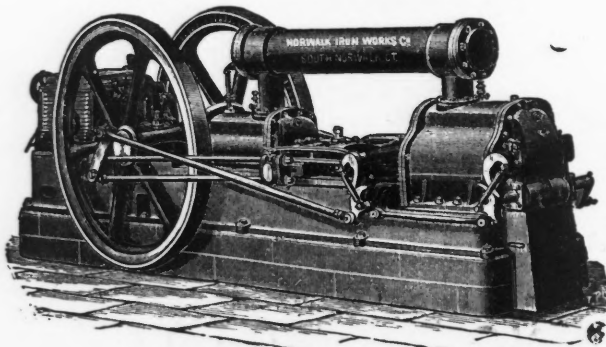
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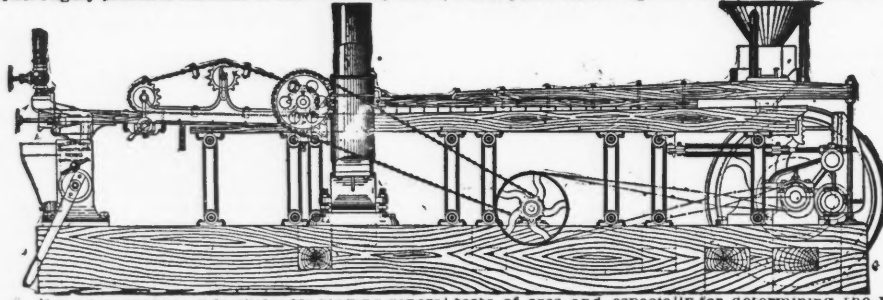
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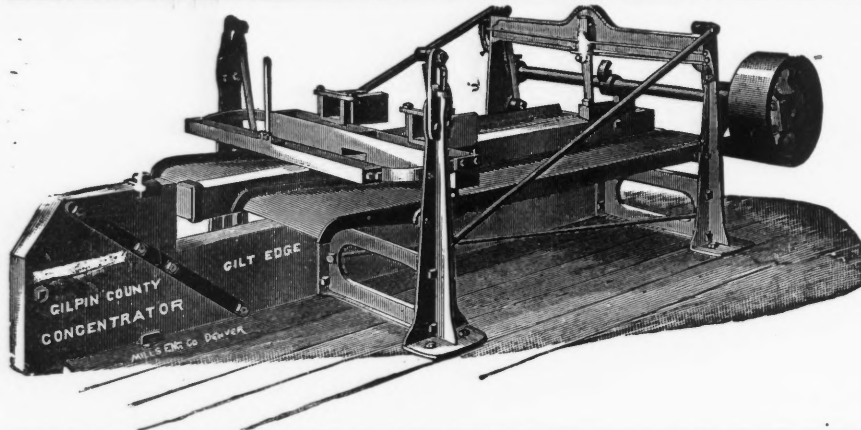
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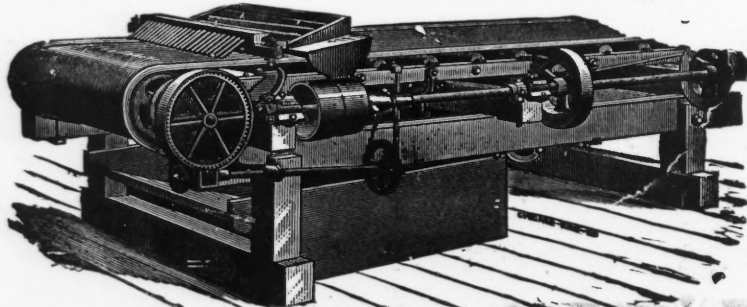
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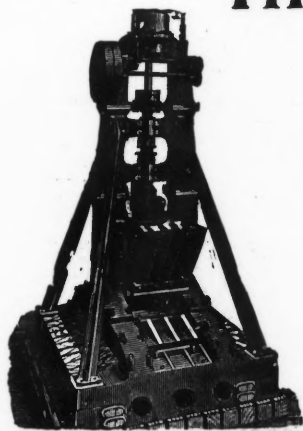
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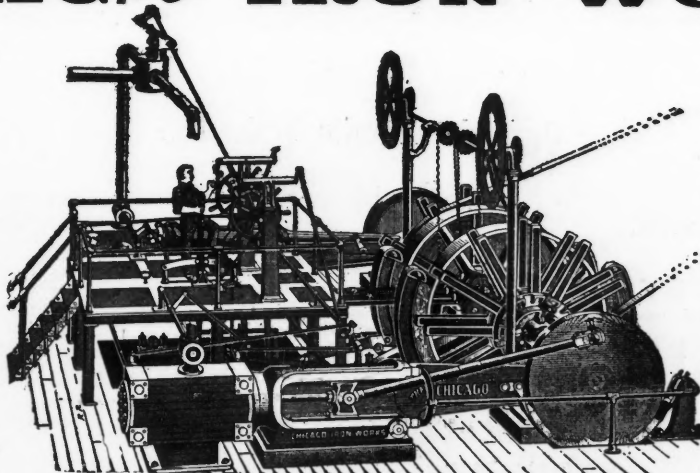
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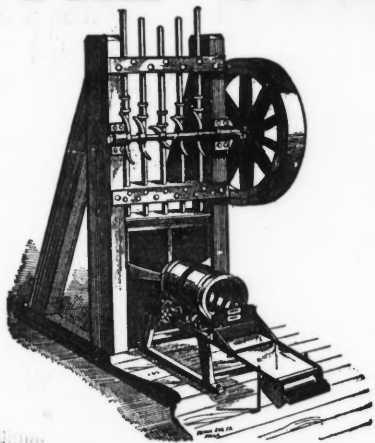
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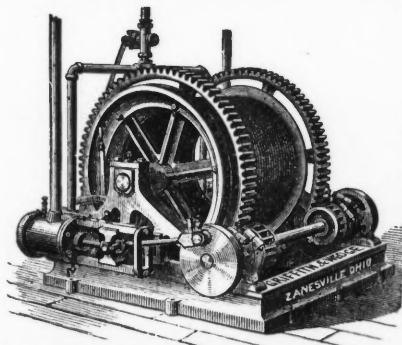
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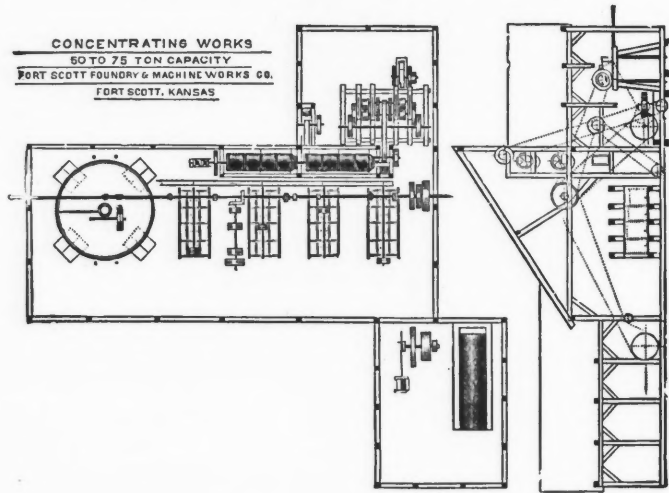
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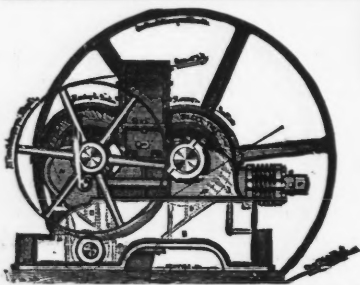
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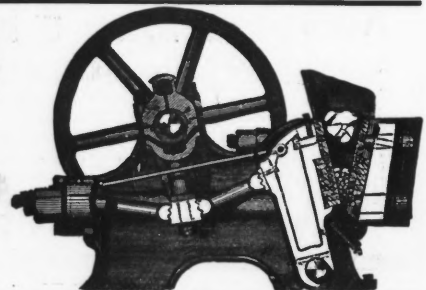
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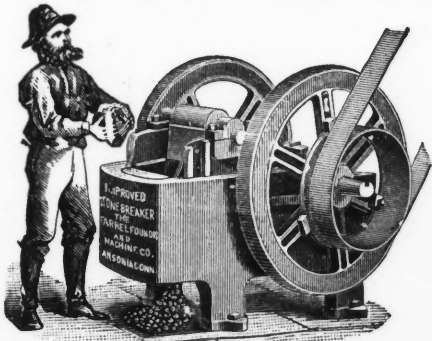
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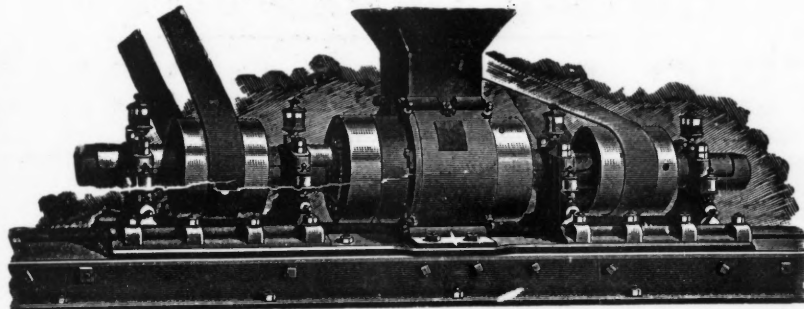
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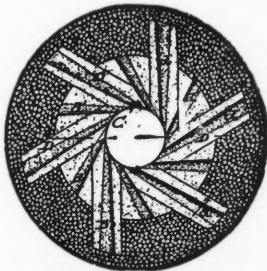


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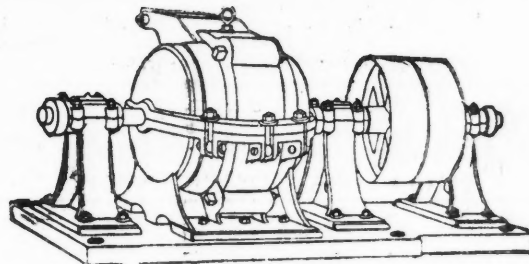
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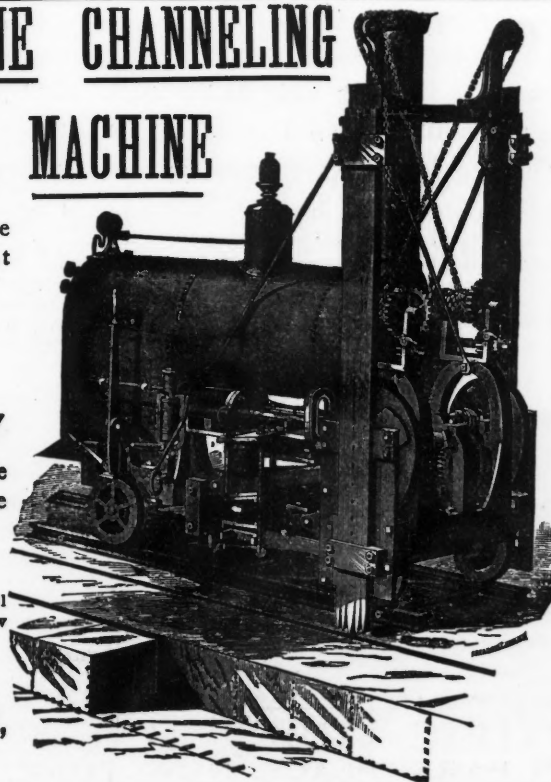
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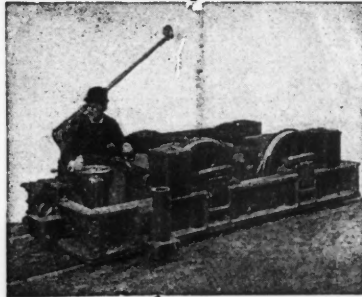
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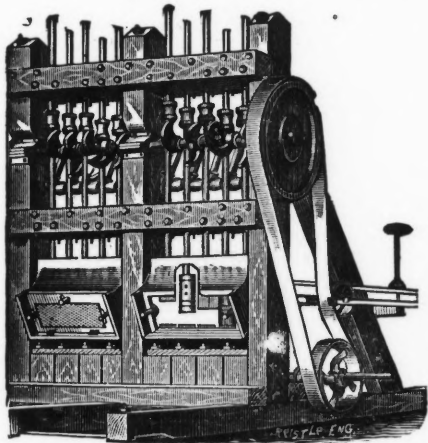


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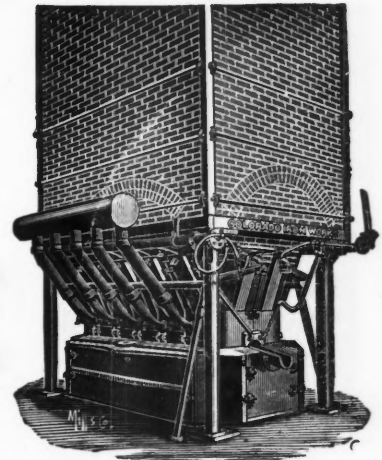


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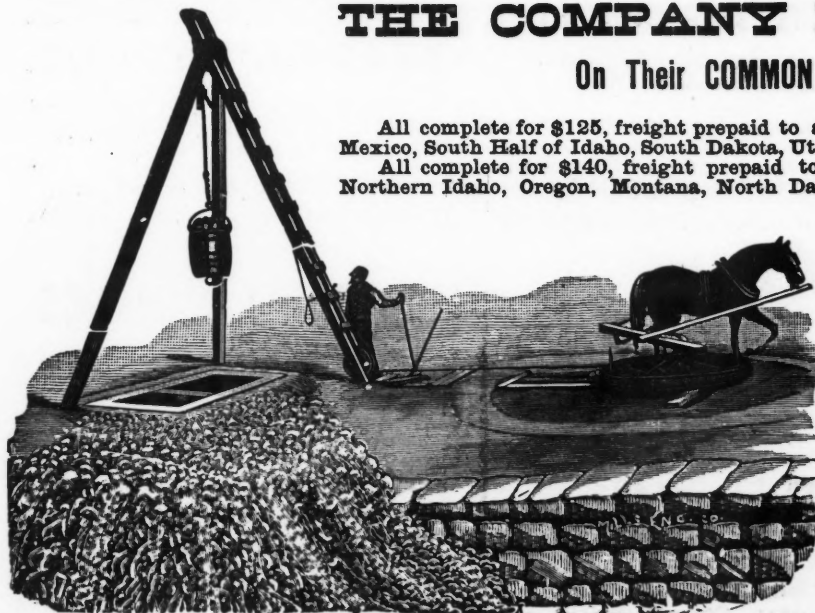
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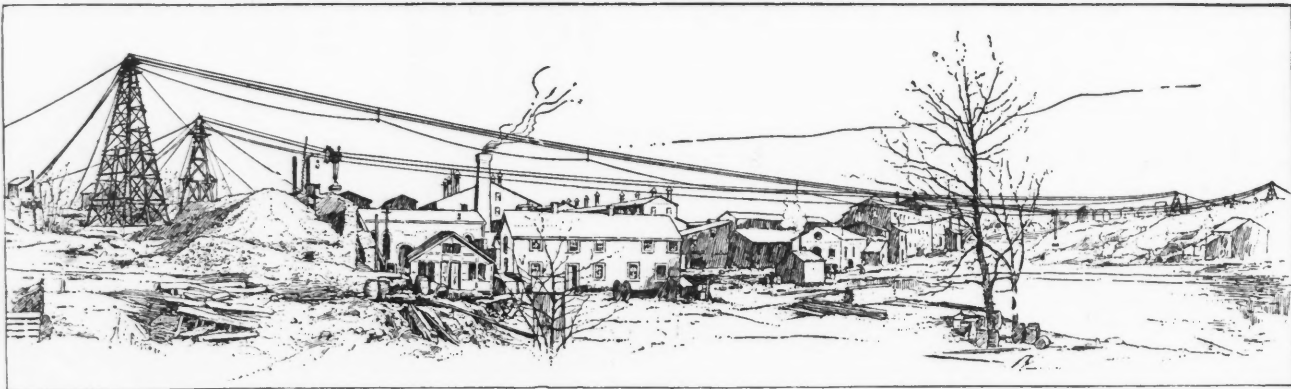
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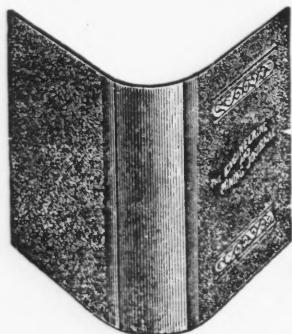
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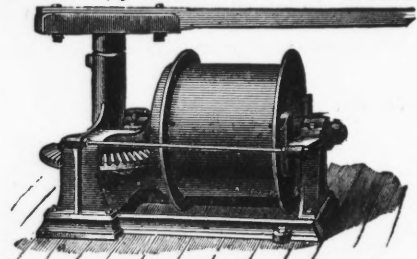
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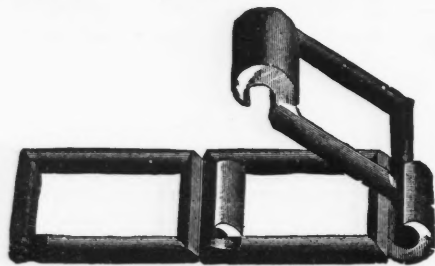
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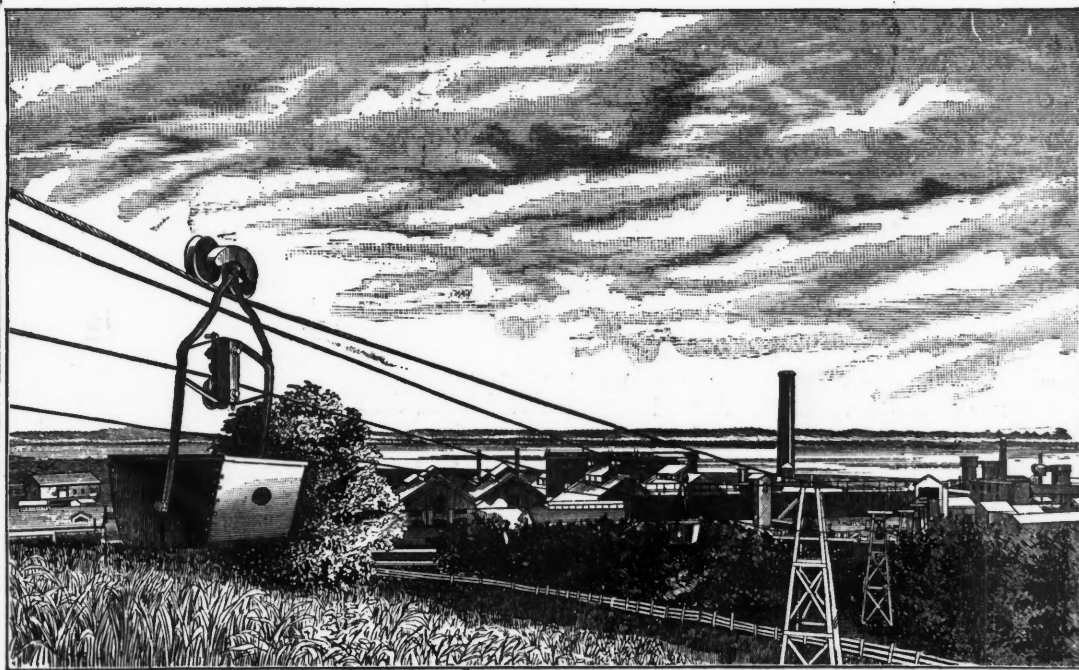
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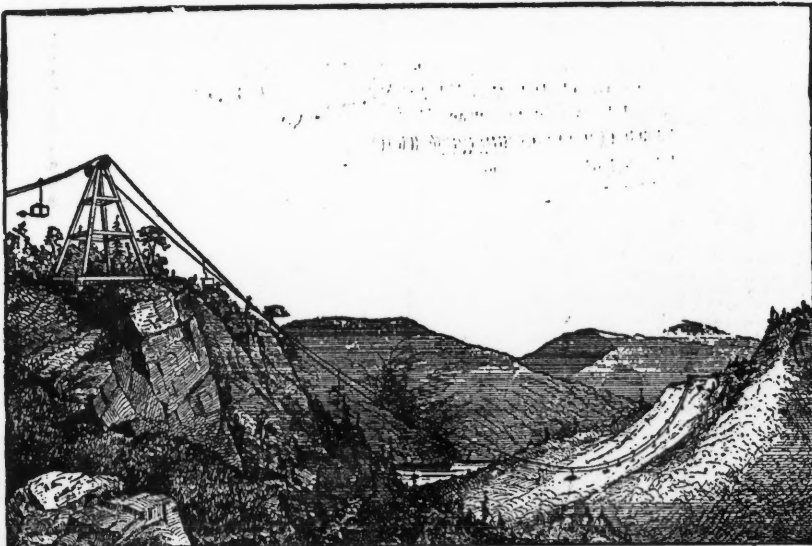
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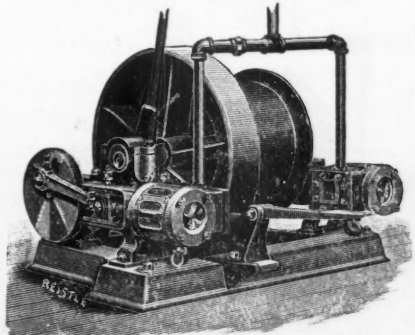
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