R. BALL & CO.'S

Illustrated Catalogue

OF

WOOD-WORKING

MACHINERY.

28 SCHOOL STREET,

WORCESTER, MASS.

TWELFTH EDITION.

1869.

PRICE LIST

OF

Wood-Working Machinery,

MANUFACTURED BY

R. BALL & CO.,

Worcester, - - - - Mass.

AUGUST 1869.

Patent Planing and Matching Machines.

		Pages Catalogue.
No. 1, Single Two Cutter Cylinder, 4 Roll Planer and Matcher	$ 600.00	20-21
No. 1, " Three " " 4 " "	625.00	
No. 2, " " " " 4 " "	855.00	22-23
No. 2, Double " " " 4 " "	1,000.00	
No. 2, Single " " " 6 " "	1,000.00	
No. 2, Double " " " 6 " "	1,200.00	
No. 3, Single " " " 6 " "	1,568.00	26
No. 3, Double, " " " 6 " "	1,710.00	
No. 4, " 12-inch " 6 " "	950.00	24-25
No. 4, " 8-inch " 6 " "	800.00	

Extra Matcher Heads, per pair, No, 1, $30, No. 2, $35.

Patent Woodworth Surfacing Machines.

Two-Roll Surfacer, to plane 24 in. wide	$ 300.00	16-17
Four-Roll " " 24 "	400.00	18-19
No. 1, Single Cylinder 4 Roll Surfacer, to plane 24 in. wide	500.00	
No. 1, Double " 4 " " 24 "	625.00	
No. 1, Single Three Cutter Cylinder 4 Roll Surfacer, to plane 24 in. wide	550.00	
No. 1, Double " " 4 " " 24 "	675.00	
No. 2, " " " 4 " " 24 "	855.00	
No. 2, Single " " 4 " " 24 "	760.00	
No. 3, " " " 6 " " 30 "	1,450.00	
No. 3, Double, " " 6 " " 30 "	1,600.00	
No. 4, " " " 6 " " 24 "	850.00	
No. 4, Single " " 6 " " 24 "	750.00	

EXTRA CUTTERS.

No. 1, 24-inch Cutters, per pair	$ 9.00
No. 1, 14-inch " "	7.00
No. 1, Matcher, " per set for three thicknesses	9.00
No. 2, 24-inch " " for top-cylinder	14.00
No. 2, 24-inch " per pair for lower cylinder	9.00
No. 2, 14 inch " per set for top cylinder	10.00
No. 2, Matcher, " " for three thicknesses	9.00
No. 3, 30 inch " " for top cylinder	18.00
No. 3, 14-inch " " " "	10.00
No. 3, 30-inch " per pair for lower cylinder	12.00
No. 3, 14-inch " " " "	7.00
No. 3, Matcher " " for three thicknesses	10.00
24-inch Cutters for 2 and 4 Roll Surfacers, per pair	9.00

DANIELS' PLANERS.

The following Prices include Dead Weight and Fixtures Complete, and should they not be wanted a Discount will be made.

(See Catalogue, pages 8, 9, 10 and 11.)

TO PLANE.	*No. 1.* 18 in. WIDE.	*No. 2.* 20 in. WIDE.	*No. 3.* 24 in. WIDE.	*No. 4.* 27 in. WIDE.	*No. 5.* 30 in. WIDE.	*No. 6.* 36 in. WIDE.	*No. 7.* 42 in. WIDE.	*No. 8.* 48 in. WIDE.
7 feet long.....	$258	$296	$330	$373	$406	$470	$520	$578
8 " "	267	302	338	382	415	479	528	585
9 " "	274	310	348	390	423	487	538	594
10 " "	282	318	354	400	434	496	546	602
11 " "	290	324	363	407	444	504	554	611
12 " "	298	332	371	415	452	512	562	619
13 " "	306	340	380	424	460	521	570	627
14 " "	314	347	388	432	468	529	580	637
15 " "	321	353	396	443	475	538	588	644
16 " "	330	361	405	448	485	546	596	653
17 " "	338	370	413	457	494	554	604	661
18 " "	345	386	422	466	502	562	613	669
19 " "	352	394	430	475	510	570	621	677
20 " "	361	403	447	491	531	591	637	698
25 " "	396	445	490	537	573	663	679	741
30 " "	444	500	541	589	622	679	727	784
35 " "	500	540	596	627	664	722	779	831
40 " "	546	582	633	675	706	769	827	884
50 " "	627	668	706	752	789	846	909	961

Extra Cutters by the dozen, § square, $5.00, ½ square, $4.50.
Extra Dogging Apparatus for Daniels' Planer, $30.

Improved Patent Planer Arm.

(See Catalogue, page 11.)

To plane 16 in. wide.....	$ 5 00	To plane 30 in. wide.....	$13.00
" 18 "	6.00	" 36 "	16 00
" 20 "	7.00	" 42 "	20.00
" 24 "	10.00	" 48 "	26.00
" 27 "	12.00	" 56 "	34.00

R. Ball & Co.'s Patent Dimension Planers.

(See Catalogue, pages 12 and 13.)

To plane 24 in. wide, 8 ft. long...	$490.00	To plane 24 in. wide, 18 ft. long...	$615 00
" 24 " 10 " ...	515.00	" 24 " 20 " ...	640.00
" 24 " 12 " ...	540.00	" 24 " 22 " ...	680.00
" 24 " 14 " ...	565.00	" 24 " 25 " ...	715.00
" 24 " 16 " ...	590.00	Extra per ft. for additional length	12.00

Extra Feed Roll Attachment for Surfacing, $100.

Sash Moulding Machines.

		Pages Catalogue.
Large Size, Wood Frame, to work one side, with three Heads and Cutters.....	$225.00	28 30
" " " " " six " Extra Cutters.....	275.00	
Small Size " " " " three " Cutters.....	175.00	28 31
" " " " " six " Extra Cutters.....	225.00	
Large Iron Frame, with three Heads and Cutters.....	400.00	34-35
Small " " " "	280.00	36
Russ Patent Monitor Moulding Machine.....	800.00	32-33

Extra Heads from $7 to $12. Extra Cutters, per set, from $2 to $6.

Shaping Machines.

		Pages Catalogue
No. 1, Upright Shaping Machine	$190.00	37
No. 2, " "	210.00	
Horizontal "	45.00	38
" " with Smoothing Table	55.00	

Extra Cutters from $3 to $6 per pair.

Tenoning Machines.

No. 1, for Car Work, without Copes	$190.00	42
Lower Cope $22, Upper Cope $18	40.00	
Boring Apparatus and Bits, if wanted	20.00	
Extension Rod	4.00	
Extra Cutter Heads per pair	35.00	
Boxes per set	3.00	
Cutters per set	7.00	
Saw Spurs per set	4.00	

Boring when necessary, $8.00.

Persons ordering Extras for this Machine, will please say "for No. 1 Machine," otherwise they may not get what they want.

No. 2, for Agricultural and other heavy work	$180.00	43
Lower Cope $20, Upper Cope, $14.	34.00	
Boring Apparatus and Bits, if wanted	20.00	
Cut-off Saw Arbor to run in Cutter-head Boxes	9.00	
Extension Rod	3.00	
Extra Cutter Heads per pair	29.00	
Boxes. per set	3.00	
Set of Bolts, nuts and washers for same	2.00	
Cutters per set	7.00	
Saw Spurs	4.00	

Boring when necessary, $8.00.

All the Extras noted above will apply to Nos. 2, 3 and 4 Tenoning Machines—except cutters.

No. 3, for Doors and Long Tenons	$175.00	44
Lower Cope $20, Upper Cope $14, both	34.00	
Panel Gauge	3.00	
Extra Double Cutter Heads, per pair, with Cutters	45.00	
Extra Cutters, per set	14.00	

Boring when necessary, $7.00.

No. 4, for Sash, Blinds, Doors and all ordinary work	$162.00	45
Lower Cope $20, Upper Cope $14, both	34.00	

Boring when necessary, $7.00.

Mortising Machines.

New Patent Rail Car Mortiser	$550.00	56-57
New Patent Rail Car Mortiser with Auxiliary Boring Attachment	625.00	
" Improved Mortising Machine	220.00	52-53
" Power Mortising Machine, large size	190.00	50-51
Boring Shaft for same	75.00	
Counter-Shaft, Hangers and Pulleys for New Patent Improved Mortiser	35.00	
Patent Hub Mortising Machine, 16-inch Hub and less	700.00	
" " " " 12 " " " " "	550.00	54-55
Extra Rest for Square Work	25.00	
Portable Foot Mortising Machine	57.00	58

Power Mortising Chisels.

⅜ and less, each	$2.00	1⅜	$2.88
11-16 to 1 inch	2.25	1½	3.00
1⅛	2.50	1¾	3.50
1¼	2.75	2	3.75

Foot Mortising Chisels, ordinary sizes, $1.50.

Railway Cutting-Off Saw.

				Pages Catalogue.
Common Size	$100	Large Size	$115.00	60-61

Splitting Saw Tables.

		Pages Catalogue.
No. 1, with Cast Steel Arbors, Bed and Boxes	$50.00	36
No. 2, " " "	65.00	
No. 3, " " "	85.00	

Cast Steel Saw Arbors with Self-Oiling Boxes.

				Pages Catalogue.
No. 1	$11.00	No. 4	$21.00	68-69
No. 2	14.00	No. 5	24.00	
No. 3	17.00	No. 6	28.00	

Rod, Pin, and Dowel Machine.

		Pages Catalogue.
No. 1, for ⅜, ½ and ⅝ inch	$20.00	71
No. 2, for ¾, ⅞, and 1 inch	25.00	
No. 3, for 1⅛, 1¼, and 1⅜ inch	30.00	

Boring Machine.

		Pages Catalogue.
Upright Boring Machine	$95.00	72 73
Horizontal Car Boring Machine	$100 to 150.00	74
Hand Boring Machine	10.00	39

Wright's Patent Scroll Saw.

		Pages Catalogue.
Common Size	$145.00	76-80
Large Size	175.00	
Post Scroll Saw	95.00	82

Miscellaneous Patent and Other Machinery.

		Pages Catalogue.
Circular Re-Sawing Machines, 30-inch saw or less	$400.00	64-65
" " " 36 " "	450.00	
Cut-off and Splitting Saw Bench, iron frame, with two 12-inch saws	285.00	66-67
Cut-off Sawing Machine	80.00	62
Carriage Matcher	$380 to 500.00	46-47
Hand Matcher	80.00	47
Small Boring Shaft with Bits	20.00	49
Patent Blind Slat Tenoning Machine	100.00	70
Groover Heads for Nos. 2 and 3 Saw Arbors	17.00	60
New Patent Groover Heads	45.00	
Butting Machine	85.00	75
Crosby's Patent Blind Wiring Machine	22.00	83
Hall's Mitreing Machine	18 00	83
No. 1, Blind Slat Chisel, one set Cutters	5.50	81
Extra Cutters, per set	1 50	81
No. 2 Double Chisel for Mortising Sash Bars	2.00	81
No. 3, Staple Punch for Swivel Blinds	2.00	81
No. 4, Pin Tool, for making Pins	2.00	81
No. 5, Hollow Cutter, for Rounding Blind Slat Tenons	3.00	81
No. 6, Tool for pointing Pins	1.25	81
No. 7, R. Ball & Co.'s Patent Pin Tool, made of steel, with 2 sized tips	3.00	81
Crank and Index for No. 1 Planer and Matcher	22.00	
Knife Grinding Machine	15.00	47
Blind Slat Tenoning Heads, per pair	20.00	
Pattern Makers' Lathe, 20 in. swing	110.00	59
Wood-turning " 24 "	90 00	
" " 20 "	75.00	
" " 16 "	65.00	
" " 12 "	60.00	

For Boring Machines an Extra Charge is Made.

R. BALL & CO.'S

Illustrated Catalogue

OF

WOOD-WORKING

MACHINERY,

28 SCHOOL STREET,

WORCESTER, MASS.

TWELFTH EDITION.

1869.

DEDICATED

TO THE

Mechanics and Working Men

OF THE

UNITED STATES AND CANADAS,

BY THE PROPRIETORS.

PRINTED BY
NATHAN SAWYER & SON,
70 State Street, Boston.

CONTENTS.

TO THE PUBLIC.

We presume that no apology will be necessary from us, in presenting to our numerous friends and patrons the following ILLUSTRATED CATALOGUE OF WOOD-WORKING MACHINERY of our own and some other manufactures, of such kinds and qualities as we can recommend with confidence; giving such information in connection with the engravings of many of them as the case may seem to require, so that purchasers and operatives may have a clear and distinct idea of the principles and qualities of each machine.

And we desire to express our thanks to our friends and patrons for the very liberal patronage which they have bestowed on us for a series of years, and which is so rapidly increasing as to induce us to spare no efforts to supply them and the public generally with machines of the very best quality, believing that a discriminating public will amply reward us for such efforts.

We have recently added several machines to our heretofore large variety, and our list now comprises many of the most useful machines required for working wood.

We endeavor to keep on hand a general assortment of the more common kinds of machinery; and we invite persons about buying machines to examine for themselves before purchasing elsewhere.

R. BALL.
E. P. HALSTED.

CAUTION.

We deem it but fair to give a word of caution to those wishing a good article of machinery for working wood, against purchasing of any parties other than ourselves and our authorized agents. The great and increasing demand for machinery of the above kinds, within the past few years, has induced some parties who manufacture an inferior article to misrepresent us, and thus impose upon the credulity of unsuspecting parties; and, by the use of "soft soap" and other available matter, are able to palm off their spurious trash, making the purchaser believe, for the time being, that he is buying a genuine and durable article. This deception, however, he soon finds out, but often too late to remedy it without serious loss to himself, to say nothing of the mortification he feels at being made the dupe of bigoted and selfish pretenders. Persons wishing a good article of machinery, and who buy of agents, will please call for R. BALL & CO.'S IMPROVED, which stand unrivalled in this or any other country, and can always be obtained, at short notice, of us or our authorized agents.

And in this connection we take pleasure in expressing our thanks to our numerous patrons who have given such information to their friends and others wanting machinery as to prevent them from being defrauded by unprincipled representation.

We have a uniform list of prices, which purchasers will find in the hands of all our agents, and by which they can always know that they are getting machines at the manufacturers' price, with only the addition of freight from our shop. Purchasers will see, by comparing our machines with our price list, that they can get a good article at about the same price, and sometimes less, than the imitations that are hawked about the country like Connecticut clocks; and they can feel assured that when they get the genuine R. BALL & Co.'s Machine, they will always get their money's worth.

☞ All prices subject to change without notice.

R. BALL & CO.

MANUFACTURERS OF THE BEST

LABOR-SAVING MACHINERY

FOR

WORKING WOOD

EVER OFFERED TO THE PUBLIC,

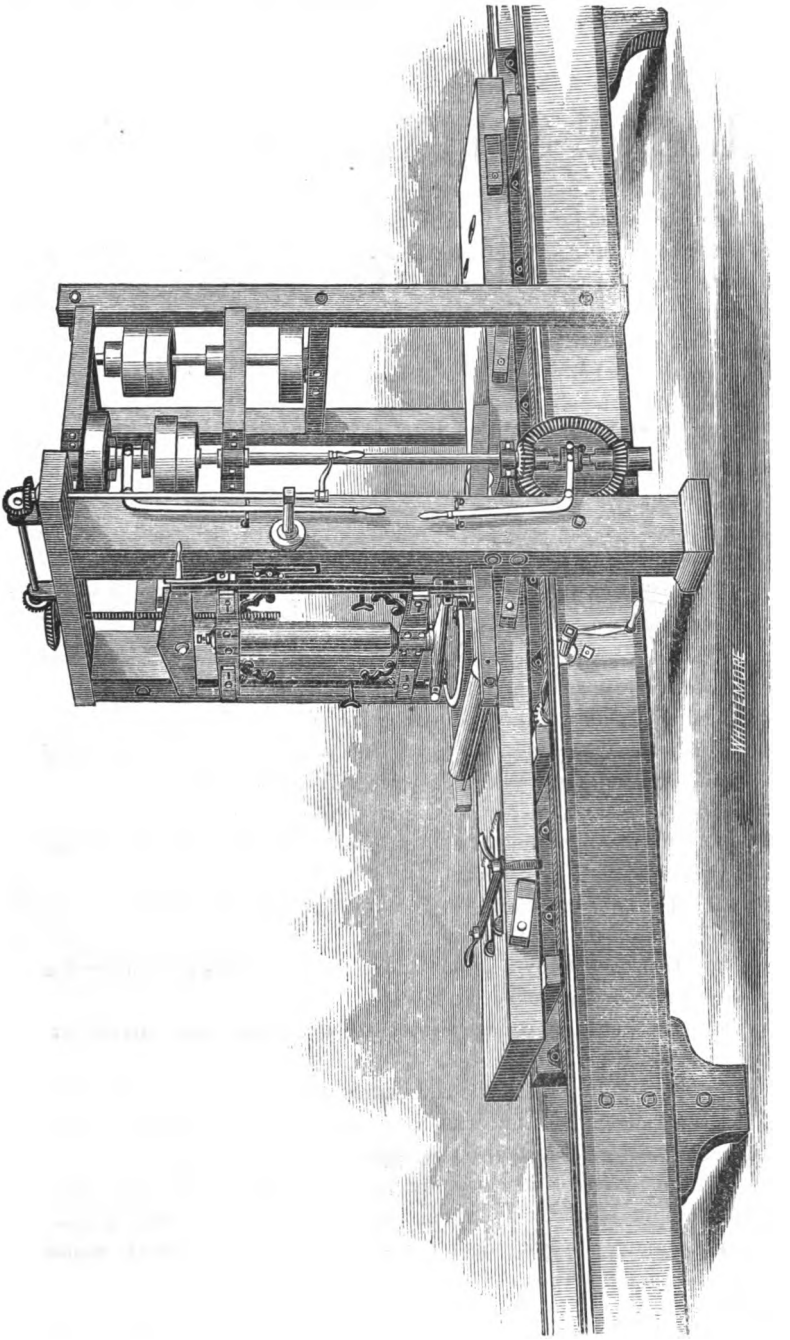
For which they have received Medals and Diplomas from various Associations.

CRYSTAL PALACE EXHIBITION, NEW YORK, 1854.

AWARDED FOR SUPERIOR WORKMANSHIP.

They have received Medals and Diplomas from the

AMERICAN INSTITUTE.....NEW YORK.
FRANKLIN INSTITUTE.....PHILADELPHIA.
METROPOLITAN INSTITUTE.....WASHINGTON.
MASSACHUSETTS CHARITABLE MECHANICS' ASSOCIATION..BOSTON.



DANIELS' IMPROVED PLANING MACHINE,

WITH IMPROVED FEED MOTION.

DANIELS' PLANERS.

Having been engaged over twenty years in the manufacture of these valuable machines, and having travelled extensively and taken great pains to make ourselves familiar with the wants of the community, we feel confident that we can supply the public with machines of better quality, and better adapted to their wants, than any other manufacturers.

We propose to give our customers, as heretofore, a machine of the very first quality, both as regards workmanship and symmetry of style.

We have made great improvements in these machines within the last six or eight years, which add very much to their value; and while we do not claim to be the "inventors" of all the ALTERATIONS that have been made in all the machinery that has been built in the country for the last twenty years or so, we believe that we are the ORIGINATORS of all the valuable improvements that have been added to the Daniels' Planer.

We make these remarks that buyers may not be deceived, and will enumerate some of the improvements, which they will find on the machine, as well as in the programme.

Our improvements in the *feed* work add very much to the value of this machine, and to the pleasure of the operator.

The advantages of our new feed work:

1. Of planing when the carriage is moving either way, and having any desired velocity.

2. The carriage is drawn from its centre by a rack underneath, which is secure from the shavings.

3. It is moved by a pinion above the rack, thus preventing the carriage from rising when in motion.

4. All belts below are dispensed with, and those above are out of the way of shavings.

5. The Shipper Handles are safely and conveniently arranged. These arrangements enable us to furnish a more symmetrical and durable machine than by the old style.

All the boxes for bearings are lined with Babbitt Metal. The dead weight is used for planing panels and thin stuff, and consists of a circular plate lying upon the stuff while being planed, which

is held in its place by side irons running above the cutter-shaft frame, that are connected together by a girt, in which is set a stud, forming a connection between that and the lever, which projects to the front of the machine, so that the operator can easily raise the plate from the stuff while the carriage is running back. When planing thick stuff, the dead weight is not wanted; we have therefore arranged it so that, by turning two nuts on the front of the cutter frame and allowing the clasps to slide back, it can be readily removed. When the dead weight is on, the machine planes three or four inches narrower than without it.

The pulleys on the machine are all of cast iron, and are turned on the face and edges, and carefully balanced.

The most common way of dogging or holding stuff to be planed out of wind is by dogs or hooks, held with a key in the forward end of the carriage, and darts driven into the rear end, the darts being held down by a strap running across the carriage, and clasps underneath, which are so arranged that they can readily be moved from one place to another on the carriage.

We sometimes put on a different kind of dog or holdfast, which is very handy for holding dimension stuff. It consists of a feeding or tail screw, hung in an iron box, let into the back end of the carriage, so as to come wholly below the surface of the carriage; on this screw is a nut with a traverse dog, for holding the stuff, and is operated by a hand wheel on the outer end of the screw. The front dog for holding the stuff consists of a plate, having teeth on one side, and running across the entire width of the carriage, held in its place by teeth on an iron plate let into the sides of the carriage, and require no bolts or keys to hold it firm.

This dog is considered an extra appendage, and is only put on when specially ordered, and for an extra charge.

The loose pulley on the back shaft was formerly made fast to a short shaft, with a step in the hub of the tight pulley, and a box on the top end of the shaft above the loose pulley. The step and the box are both lined with Babbitt Metal, and run very well for a while; but the difficulty of oiling the step through a hole in the pulley, which would often get filled up, causing the bearings to heat, induced us to devise another and better way. It seemed to us that one long bearing was better than two short ones. We therefore lengthened the hub on the loose pulley, and, by putting a box on the top end of the shaft above the loose pulley, we have a less complicated and more substantial bearing. The loose

pulley which turns on the shaft is lined with Babbitt Metal, and is not likely to heat.

We notice that some parties who formerly sold these machines for us, — since we have introduced many valuable improvements, — have set up for themselves; and not having ingenuity to get up anything of their own, have adopted the short shaft described as above, and are trying to make the public believe it their invention.

We have patterns for eight different widths of machines, and can make them any required length. They are used in most of the ship yards, and are adapted to planing ship knees, stern posts, and all kinds of heavy work, and of any required length or width.

The tight and loose pulleys to all machines that plane twenty-four inches wide and less, are twelve inches in diameter, four-inch face, and should make four hundred turns a minute. The twenty-seven inch machine has a twelve inch pulley, five-inch face, and should make four hundred turns. All widths over that, fifteen inch pulleys, six-inch face, and should make three hundred and fifty turns.

When the Dead Weight is on, the machine planes less in width than when it is off. No. 1 planes eighteen inches wide; No. 2 twenty inches wide; No. 3 twenty-four inches wide; No. 4 twenty-seven inches wide; No. 5 thirty inches wide; No. 6 thirty-six inches wide; No. 7 forty-two inches wide; No. 8 forty-eight inches wide.

IMPROVED PATENT PLANER ARM.

This Arm possesses great advantages over any Arm heretofore used on the Daniels' Planer.

It is much stronger and lighter, consequently takes much less power to run it; while its peculiar form allows it to run without that buzzing noise so objectionable with the old kind of Arm.

It can be applied to any Daniels' Planer now in use.

No one, knowing its advantages, would hesitate to lay aside their old Arm and purchase a new one.

R. BALL & CO.'S DIMENSION PLANER.

The above cut represents our Dimension Planer as recently improved, with solid iron posts and cross-head, in place of wood; also showing the position of Feed Rolls, or Woodworth's attachment for planing boards, when not in use, the frame in which they are hung being turned back, so as to allow the carriage to run back and forth, the lumber being dogged in order to plane straight and out of wind.

R. BALL & CO.'S

DIMENSION PLANER.

The recent improvements to this machine make it a very valuable machine for Carpenters and Builders, where a limited amount of planing is to be done of one particular kind. This machine needs only to be seen to be appreciated, being a combination of two machines — the Daniels' and the Woodworth — and at a trifling expense more than the cost of one.

The Cutter Head is attached to substantial Iron Posts running down to the floor, thoroughly bolted to the frame, with the Iron Head or cross-piece on the top slightly moulded and ornamentally painted, which gives the machine a neat and substantial appearance.

The peculiar form of the Cylinder or Cutter Head is such as to form a complete *Cap* or *Double Iron*, which is found indispensable for planing hard or cross-grained wood. As a Dimension Planer, it is particularly useful for *Sash* and *Door* Makers, Carpenters, Cabinet and Piano-forte Makers, Pattern Makers, Car Builders, etc.

The Dogs for holding the stuff are simple, effective, and easily arranged. When wanted for planing boards, the style of the machine is almost instantly changed, by sliding the carriage along and applying the Feed Rolls, when all kinds of boards for Carpenters' or Box Makers' use may be planed well and with much rapidity.

The frame of the Feed Rolls is attached to one side of the Planer by an improved arrangement, which allows the frame with the rolls to swing from a longitudinal to a transverse position. It consists of a disc attached to the way, and a corresponding plate attached to the bed of the frame. The disc and plate are gibed together in the most substantial manner.

The pulley which receives the driving belt, on the back side of the machine, is fourteen inches in diameter, and six-inch face, on all machines which are twelve feet and longer, and should revolve 700 turns per minute. Smaller machines have twelve-inch pulleys and five-inch face.

WOODWORTH PLANERS.

We have recently made great improvements in the style of our Woodworth Surfacing, and Tongueing and Grooving Machines, as will be seen by the cuts; and we believe them second to none, particularly when the cost is considered. We have increased the weight in connection with our late improvements, and now believe them to be sufficiently heavy and strong for all ordinary work.

The Cutter Head moves upon an angle, so that the same length of belt is required when planing a thin board as when planing a thick one.

The Cutter Heads to the No. 2 machine are six-inch diameter, and carry three cutters.

The Cutter Heads to the smaller machines are five-inch diameter, and carry two cutters. By this arrangement, we are able to plane smoother than can be done by the old style of planers, where the Cutter Heads are larger.

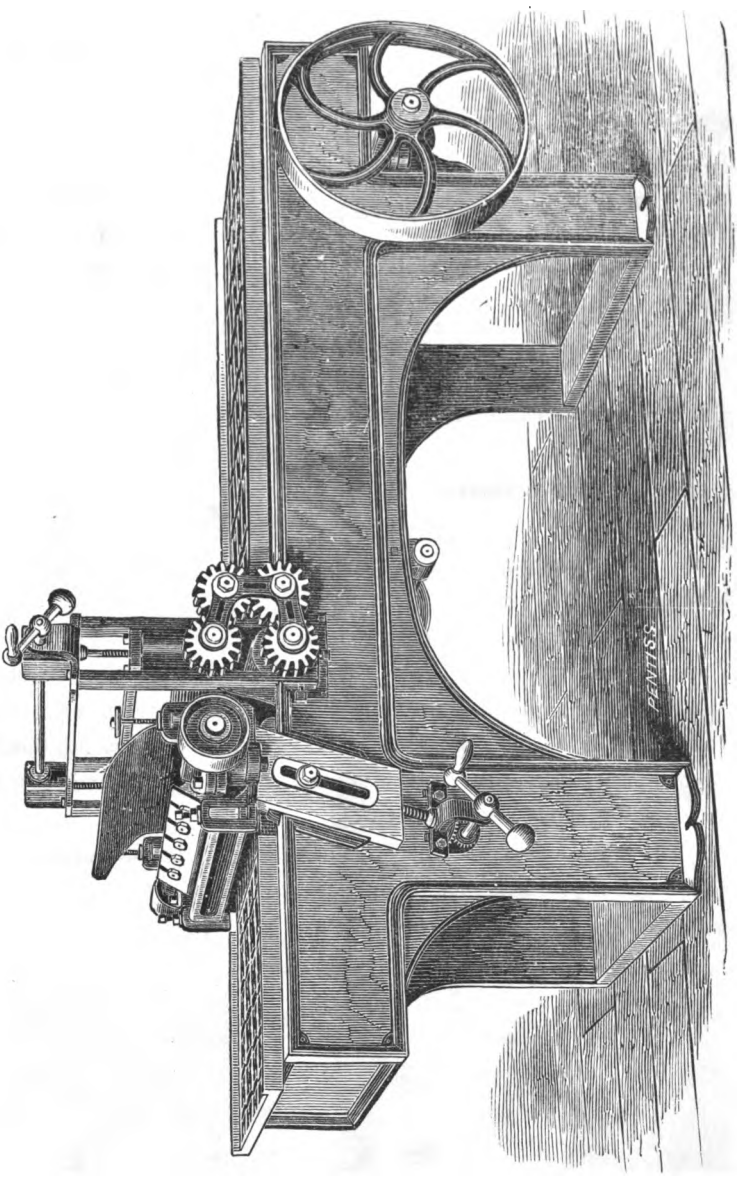
All our machines have Babbitt Boxes throughout, and are lined with the best of lining metal.

These machines are all started up before they leave the shop, and are known to be in perfect order, so that, when they are set in the place where they are to run, nothing is required but to put on the belts and commence work.

We have built a large number of these machines since we made the improvements enumerated and shown in the cuts, and believe they give universal satisfaction. Some of our customers have volunteered to give us letters, within the last year, that speak in the highest terms of these machines, after having thoroughly tried

them, and have recommended them to their friends. We warrant every part of them to be made in the most perfect manner, and fully adapted to the uses for which they are intended.

The great fault with low-priced machines heretofore has been that they are not well arranged, and are poorly made, sometimes with wooden frames, so the irons had to be taken off and the wood work trued up, whenever a change in the weather caused the wood to shrink or swell, a matter very annoying, when one wants to do a small job that requires to be done well. We never build any wooden framed machines of this kind; but have heard so much complaint about them by parties who have bought them of other manufacturers, that we have come to the conclusion that a substantial iron machine is the cheapest in the end, and sometimes costs less to commence with.



WOODWORTH SURFACING MACHINE,

WITH ONE PAIR FEED ROLLS. — WEIGHT 1800 LBS.

WOODWORTH SURFACING MACHINE.

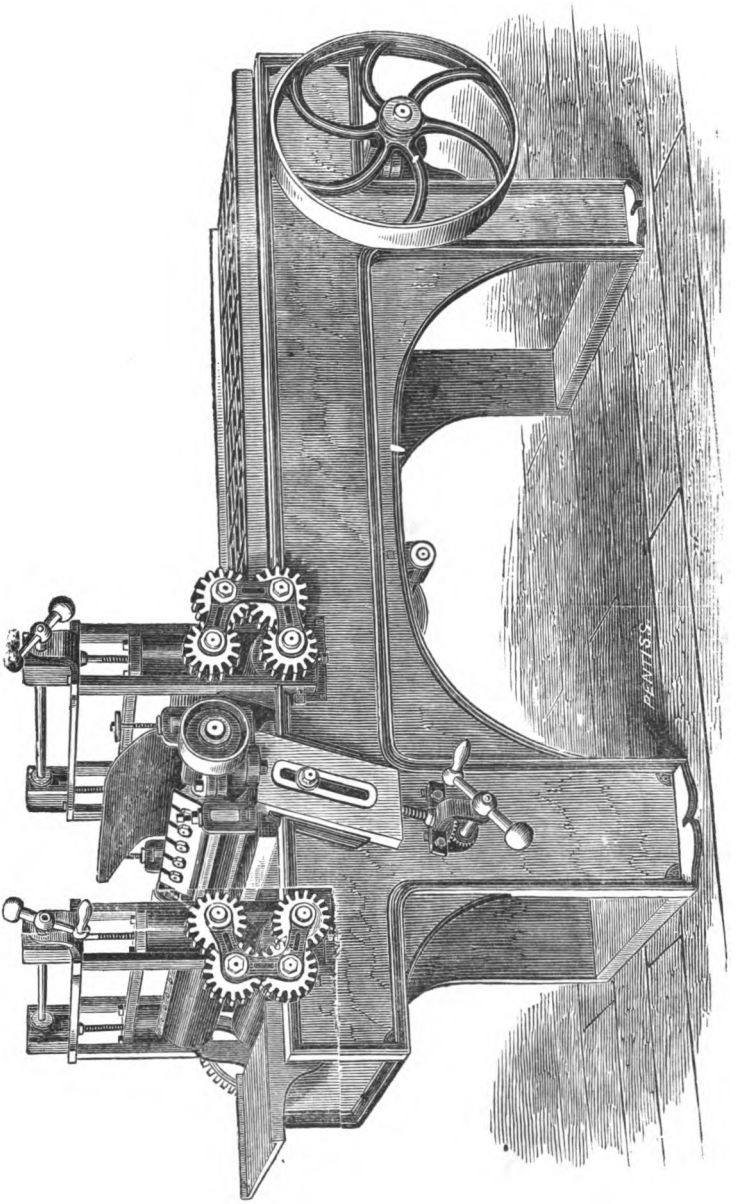
PATENT WEIGHTED FEED ROLLS.

This cut represents our recently Improved Surfacing Machine, with one pair of five-inch Patent Weighted Feed Rolls, and improved expansion gears.

This machine is extensively used by Carpenters and Box Makers; also for planing a variety of stuff in a Sash and Door Shop.

The Frame is made of cast iron, in a neat and substantial manner. The Cutter Head is wrought iron, with steel Arbors, running in self-oiling boxes, and made in such a manner as to form a complete Cap or Double Iron, so that it will plane hard or cross-grained wood perfectly smooth, and will plane any thickness less than three inches, and twenty-four inches wide.

The tight and loose pulleys are twelve-inch diameter, six-inch face, and should make 800 revolutions per minute.



WOODWORTH SURFACING MACHINE,

WITH TWO PAIR FEED ROLLS.—WEIGHT 2400 LBS.

WOODWORTH SURFACING MACHINE.

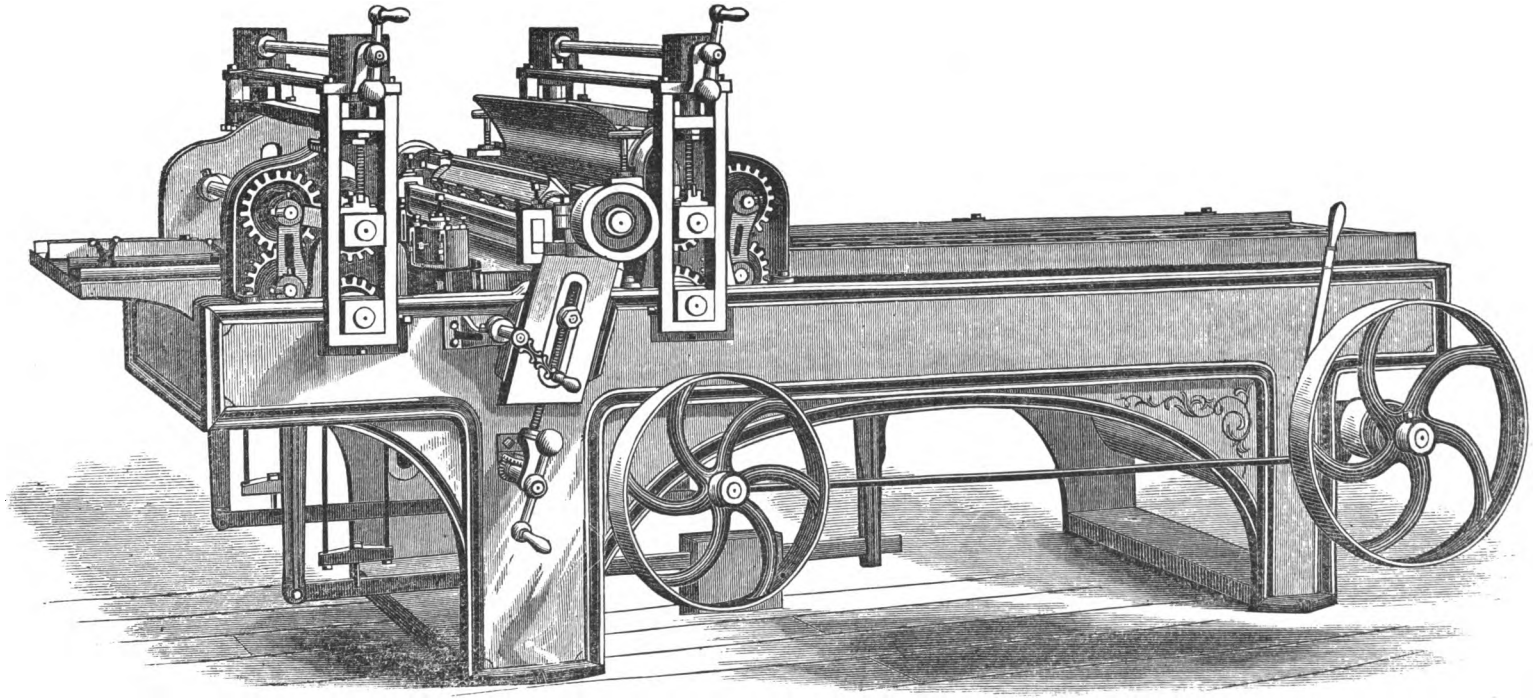
PATENT WEIGHTED FEED ROLLS.

This cut represents our recently improved Surfacing Machine, with *two* pair of five-inch Patent Weighted Feed Rolls, and improved gears.

It is built in the same manner as the one on the preceding page, with the exception of its having two pair of Feed Rolls.

The advantage of the second pair of Feed Rolls, besides giving a stronger and more even feed, is of taking the board out of the machine without putting in the second board to push the first one out.

The tight and loose pulleys are twelve-inch diameter, six-inch face, and should make 800 revolutions per minute.



PATENT PLANING, TONGUEING AND GROOVING MACHINE, NO. 1.—WEIGHT 3000 LBS.

Patent Planing, Tongueing and Grooving Machine.

NO. 1.—WEIGHT 3000 LBS.

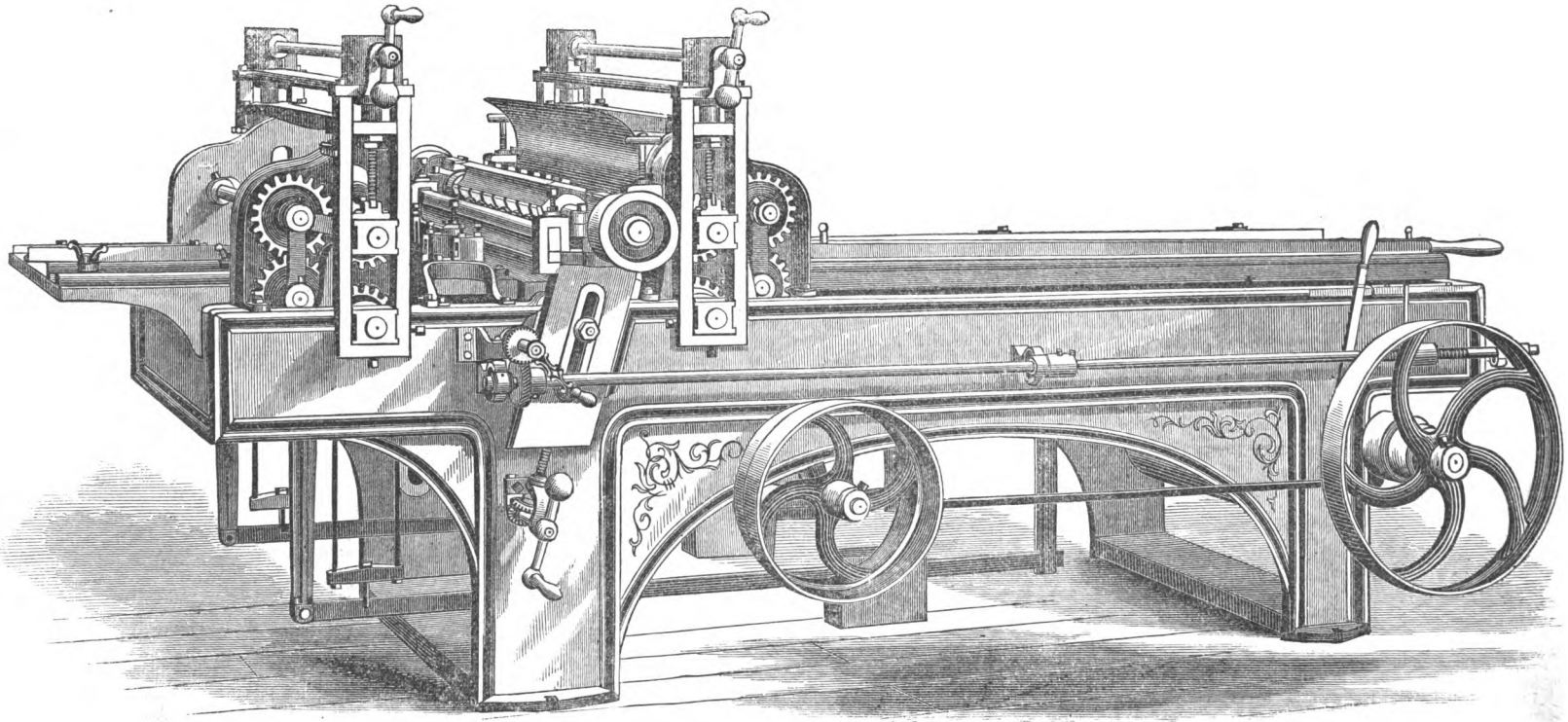
We have taken great care in perfecting our Planers, with the intention of having as good a machine as can be bought, even at an advanced price, and we believe have fully succeeded.

We have no hesitation in saying that this machine will do as much good work as machines that cost twice as much; it is therefore much more economical.

It has four five-inch feed rolls, geared at both ends, patent weighted, tight and loose pulley instead of shipper, and all our recent improvements.

The cutter head is five-inch diameter, and carries two or three cutters, as desired. It is made of solid wrought iron, with steel arbors one and seven-eighths inches in diameter, running in self-oiling Babbitt Boxes, lined with the best quality of lining metal. We use gun-metal when ordered, but prefer the lining metal, because, if by accident the bearings become dry, and rough up, they are easily replaced.

This is in every respect a first-class machine. It will tongue and groove from ten to fifteen thousand feet in ten hours. It will plane, tongue and groove about twelve inches wide, and when the matcher-heads are taken out, planes twenty-four inches wide and three inches thick. The tight and loose driving pulleys are twelve-inch diameter, six-inch face, and should make 800 revolutions per minute.



PATENT PLANING, TONGUEING AND GROOVING MACHINE, NO. 2.—WEIGHT 4200 LBS.

Patent Planing, Tongueing and Grooving Machine.

NO. 2.—WEIGHT 4200 LBS.

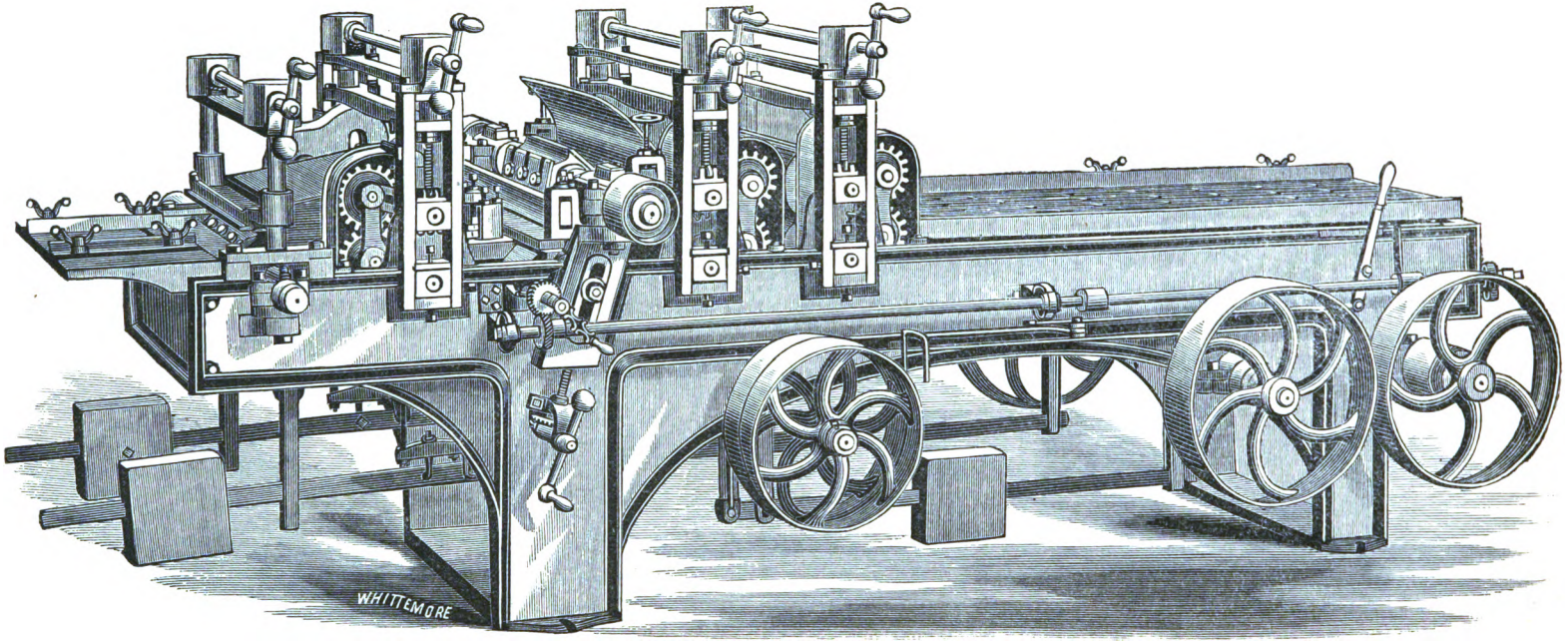
We have taken great care in perfecting our Planers, with the intention of having as good a machine as can be bought, even at an advanced price, and we believe have fully succeeded.

We have no hesitation in saying that this machine will do as much good work as machines that cost twice as much, and is therefore much more economical.

It has four six-inch patent weighted feed rolls, geared on both ends, and tight and loose pulley instead of shipper, and all our recent improvements.

The cutter head is six-inch diameter, and carries three cutters; is made of *solid wrought iron*, with *steel arbors* one and seven-eighths inches in diameter, running in self-oiling Babbitt Boxes, lined with the best lining metal. We use gun-metal boxes when ordered, but prefer the lining metal, for if, by accident, the bearings should get dry, and rough up, they are easily replaced.

This is in every respect a first-class machine, and will tongue and groove from ten to fifteen thousand feet in ten hours. It will plane, tongue and groove about twelve inches wide, and when the matcher-heads are taken out, planes twenty-four inches wide and four and one-half inches in thickness. The tight and loose driving pulleys are fourteen-inch diameter, six-inch face, and should make 800 revolutions per minute.



PATENT TWELVE-INCH DOUBLE PLANER AND MATCHER.—WEIGHT 3700 LBS.

Patent Twelve-inch Double Planer and Matcher.

WEIGHT 3700 LBS.

This machine has a substantial iron frame, with six five-inch feed rolls, geared at both ends, and patent weighted. Its upper and under heads are twelve inches long, made of wrought iron, so constructed that the edge of the head comes near the edge of the knife, so as to form a cap to the same, enabling it to plane cross-grained lumber smooth. The arbors are cast steel, one and seven-eighths-inch diameter. The upper head carries three knives, and runs in self-oiling boxes. The under head carries two knives.

This machine will plane both sides, and tongue and groove twelve inches wide and three inches thick. The matcher heads are made of composition, and all the boxes are lined with Babbitt Metal. The tight and loose pulleys are twelve-inch diameter and six-inch face, and should make 800 revolutions per minute.

This is in every respect a first-class machine, and will plane, tongue and groove from ten to fifteen thousand feet of lumber in ten hours.

Patent Planing, Tongueing and Grooving Machine.

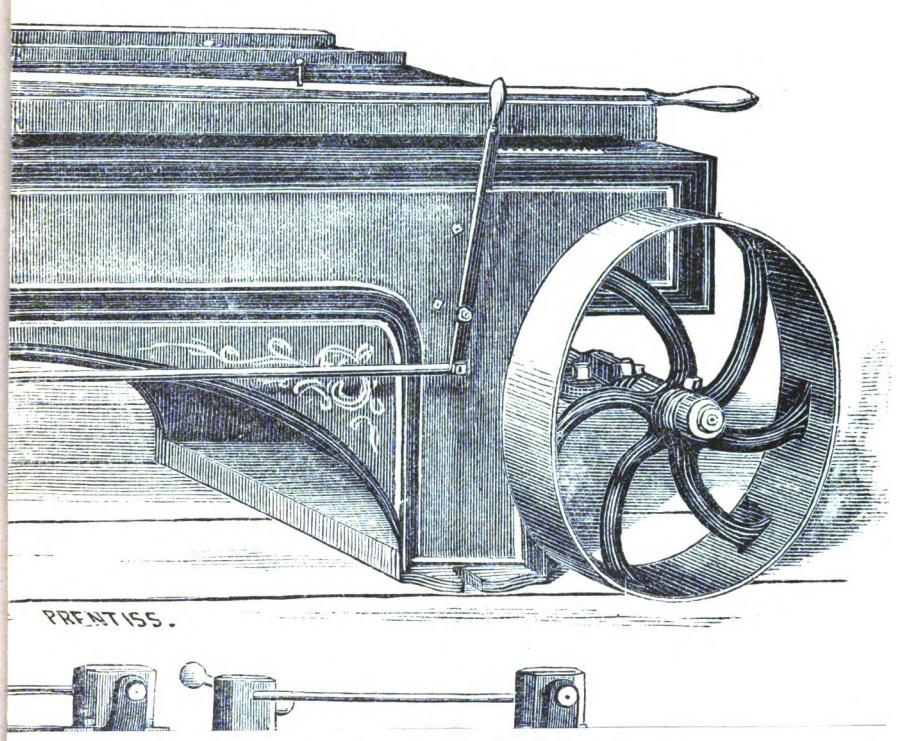
LARGE SIZE—NO. 3.—WEIGHT 8500 LBS.

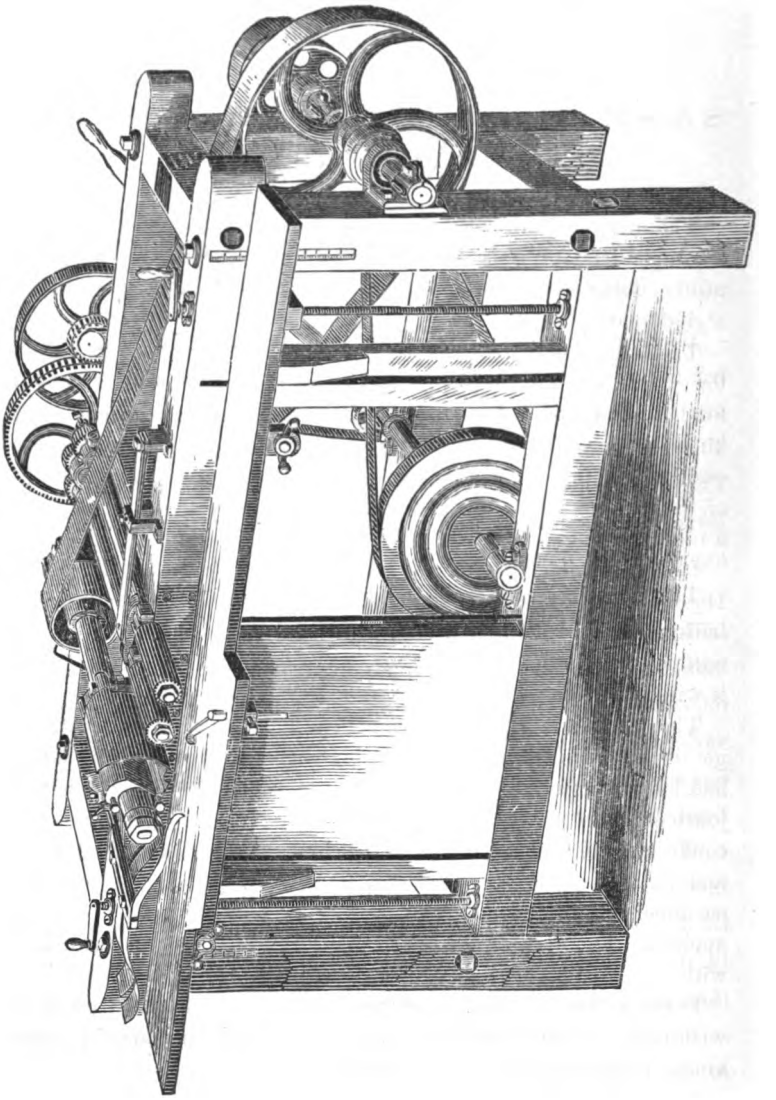
This machine has three pair of patent weighted feed rolls, eight-inch diameter, and geared on both ends. It planes thirty inches wide and five inches thick, tongues and grooves fifteen inches wide, and planes *one* or *both* sides, as desired.

The cutter cylinder is seven-inch diameter, and carries three cutters; is made of solid wrought iron, with steel arbors running in self-oiling Babbitt Boxes, lined with the best lining metal. We put in gun-metal boxes, if ordered.

This machine has all of our modern improvements, more particularly described on the preceding pages.

GROOVING MACHINE.





SASH MOULDING MACHINE.

LARGE SIZE.

R. BALL & CO.'S
SASH MOULDING MACHINE.
LARGE SIZE.

The merits of this machine are such that it needs no puffing, as a simple trial of it is enough to convince any one of its great utility, doing the work of several other machines with accuracy and despatch.

The large-size machine is designed for making heavy moulding for cornices, architraves, and other large work, but will do all kinds of smaller work equally as well. It is used for sticking all kinds of sash, both hard and soft wood; also for rabbeting casings, planing blind slats, etc. It will also do a great variety of planing, and is very useful when persons are not supplied with a regular planing machine.

It is a valuable machine for House Carpenters, Sash, Blind and Door Makers, Car Builders, Cabinet Makers, and is almost an indispensable machine to a shop; and, in most kinds of work, it will pay for itself in a short time, reckoning the amount of labor it will perform over hand labor.

The machines, after being finished, and the paint and varnish get dry and hard, are again put together by workmen who have had long experience; the bands are put on, cutters fitted up, the journals and all parts examined and put in the best possible condition, and their perfection tested by running; the cutter heads and pulleys being well balanced, so that, when forwarded to our customers they are ready to operate as soon as the power can be applied. The necessary wrenches, springs, etc., are all furnished with the machine.

Persons ordering these machines will please state the work they wish to do, and the number and kinds of heads wanted, as some kinds of work require different cutters from others.

The feed work to this machine is geared, so that the strength is increased about four-fold, consequently there is no danger of the bands slipping, a difficulty which is very annoying in machines from other manufacturers. The feed rolls are adjustable on arbors, running in swivel or rolling boxes, so there is no danger of cramping or breaking the connection gear.

The usual number of heads sent with a machine is six, but may be had with more or less, and the prices varied accordingly, viz: —

1. One planing head, to plane eight inches wide, on which may be placed large cutters to work crown mouldings, wide architraves, etc., $5.50; straight cutters, $4.00.

2. One head, for rabbeting casings, door panels, etc., $9.00; cutters, $3.00.

3. One head, for various kinds of sash, $4.00; cutters, $1.25 per set.

4. One head, for O. G., bevel and square jointed doors, working the mouldings and cutting the groove for the panel at one operation, $4.00; cutters, $1.75 per set.

5. One head, for planing blind slats either oval or flat surface, $4.00; cutters, $2.00 per pair.

6. One four-inch head, for ordinary kinds of mouldings, $8.00; cutters, $2.50 per set.

These are the six heads mostly used, and are those sent when a machine is ordered with six heads and nothing is said about the different kinds.

We also make for this machine three and one-half-inch and four and one-half-inch moulding head, with caps, $8.00; five-inch and six-inch moulding head, with caps, $9.00. Also heads for working pump tubing, of different sizes, which are much used for chain pumps.

The cutters sent with the six heads first referred to are: one set for planing, $4.00; six sets for different size moulding, $2.50 per set; four sets for different kinds of sash, $1.25 per set; three sets for doors, $1.75 per set; one set for rabbeting, $3.00; two sets for blind slats, $2.00 per set.

Purchasers wishing to substitute any other head for the regular one, can do so, by naming it in their order and giving the kinds that are wanted; also can have a greater or less number, and the prices varied accordingly.

Persons having any of our Sash and Moulding Machines, and who want extra heads or cutters, will please state which size machine they are wanted for, and the kind of work to be done. By observing these suggestions, purchasers may often save themselves the trouble of writing a second letter.

The tight and loose pulleys are seven and one-half-inch diameter, and should make 850 turns per minute.

R. BALL & CO.'S

SASH MOULDING MACHINE.

COMMON SIZE.

The general principles and construction of this machine are the same as the large size, and of similar materials and workmanship.

The machines are belted, and all put in complete working order, before they are sent out of the factory.

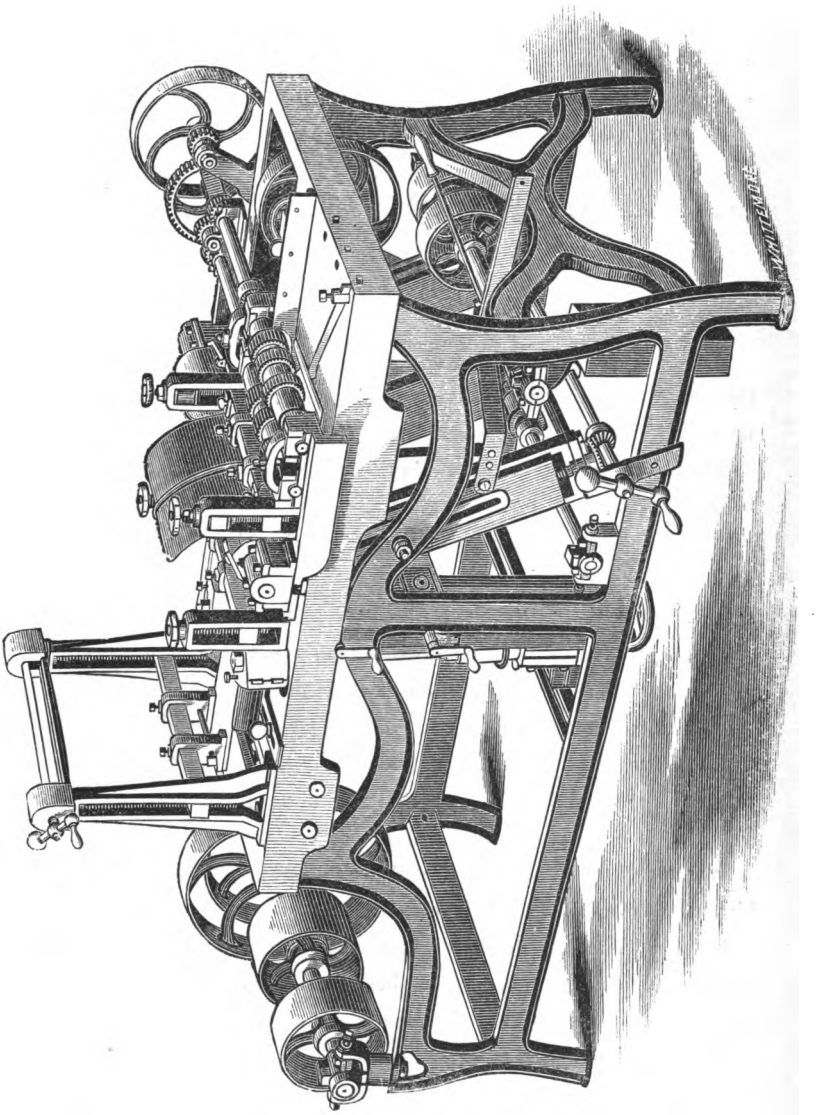
The usual number of heads wanted with this size machine is six, viz: —

No. 1. One planing head, to plane six inches wide.
" 2. " rabbeting head, for casings, panels, etc.
" 3. " sash head, with cutters for four kinds of sash.
" 4. " blind-slat head, for oval or straight surface.
" 5. " door head, O. G., bevel, and square jointed door.
" 6. " two and one-half-inch moulding head, with six sets of cutters, assorted.

We have, in addition to the above, several sash-moulding and blind-slat heads, viz: 3¼, 4, 4½ and 5-inch.

Persons ordering machines can make their own selection of heads and cutters, only remembering that the large size and common size machine do not take the same head.

Prices of heads and cutters same as large size machine.



LARGE IRON FRAME MOULDING MACHINE.

TO WORK FOUR SIDES.

R. BALL & CO.'S

Large Size Four-sided Moulding Machine.

This machine will plane four sides, smooth or moulded. It will surface both sides, and tongue, groove or mould one edge of a board twelve inches wide, and both sides and both edges of a board nine inches wide. It will also mould four sides of a piece nine inches wide and three inches thick, and as small as may be desired.

The upper head can be raised eight inches above the table, and will therefore surface top and bottom of a stick eight inches thick.

The upper arbor has three bearings, one at each end, and one between the head and pulleys, each of which is self-oiling. The box on the outside of the head can be removed, by loosening one screw, so that the head may be removed, and replaced by another, without disturbing the arbor.

The upper and lower heads are slotted, so that any kind of cutters can be placed upon them in any desired position. The lower head, with a portion of the table, is adjustable.

The lumber is carried through the machine by four geared rolls, two under and two upper. The top rolls are weighted. When heavy work is being done, the weight should be brought out near the end of the lever.

The table is supplied with adjustable guides.

Upon the pressure bars there are slides, between which can be clamped a pressure shoe of any desired form, and placed in any desired position.

The vertical heads can be inclined.

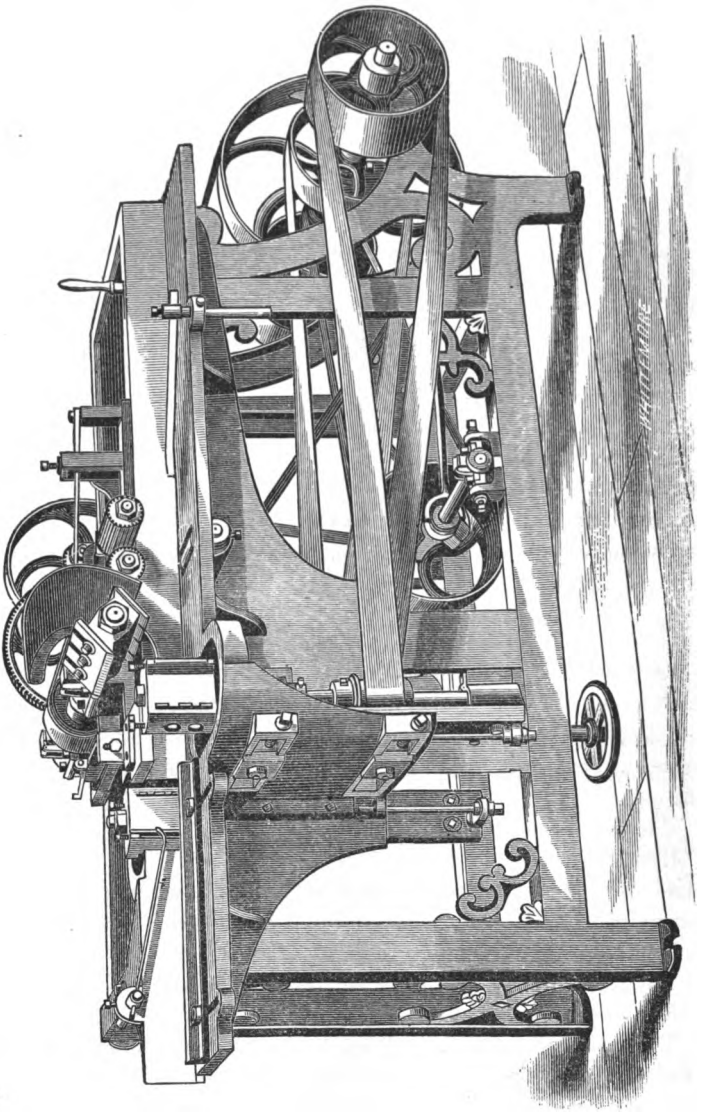
The belts are all away from the operator.

The base is broad, consequently it stands firmly.

The machine is made of iron, steel and composition. Where strength is needed, stock has not been spared. It is a very compact, beautiful and cheap machine, for one capable of doing the same work.

Its tight and loose pulleys are ten inches in diameter, four and one-half-inch face, and should make 850 turns per minute.

Weight, 2000 pounds.



IRON FRAME MOULDING MACHINE,

WITH SIDE CUTTERS.

R. BALL & CO.'S

Large Size Improved Iron Frame Moulding Machine,

WITH SIDE CUTTERS.

This machine is made entirely of iron and steel, in the most substantial manner, and is adapted to sticking all kinds of sash, both hard and soft wood, rabbeting casings, architraves, etc.; also for sticking all kinds of mouldings, from the smallest up to a cornice moulding eight inches wide.

It has side cutters on vertical arbors, which may be so adjusted as to work any required angle with a straight or rabbeting cutter, which is a great convenience in working mouldings, planing up door stuff, planing, tongueing and grooving sheathing or flooring, and for dressing narrow lumber generally.

The usual number of heads furnished with this machine is three, one upon each arbor, with one set of cutters to each head.

Persons ordering these machines will take notice that they get no moulding cutters unless specially ordered, for which an extra charge will be made.

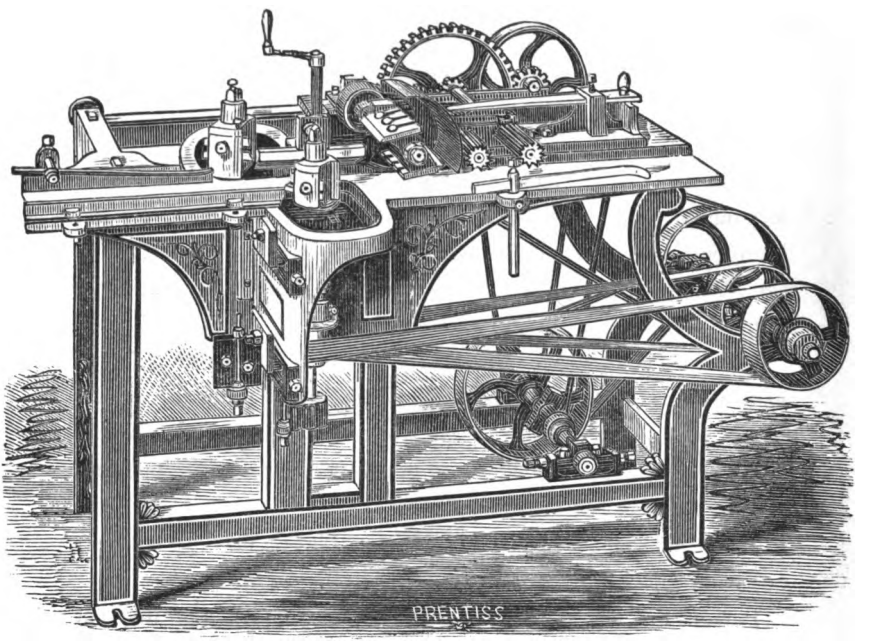
The tight and loose pulleys are ten-inch diameter, four and one-half-inch face, and should make 850 turns per minute.

The machine weighs 1200 pounds.

R. BALL & CO.'S

Small Size Improved Iron Frame Sash Moulding Machine,

WITH SIDE CUTTERS.



This machine is built in a substantial manner, and is well adapted to sticking all kinds of sash stuff, *hard wood* or *soft*, all kinds of small mouldings, working the *top* and *both edges* at *once* passing through. It has a planing head six inches wide, and will stick a moulding five inches wide, return the bead, and joint the back edge, or mould the edges in any form.

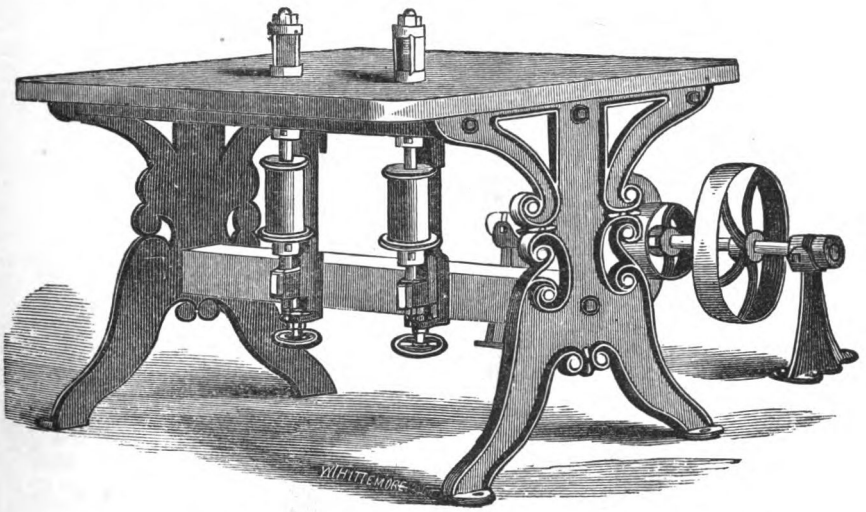
The usual number of heads furnished with this machine is three, one upon each arbor, with one set of plain cutters in each head.

All moulding cutters made to order, and charged as extras.

The tight and loose pulleys are seven and one-half inches in diameter, four-inch face, and make 900 turns per minute.

The machine weighs 800 pounds.

UPRIGHT SHAPING MACHINE.—NO. 1.

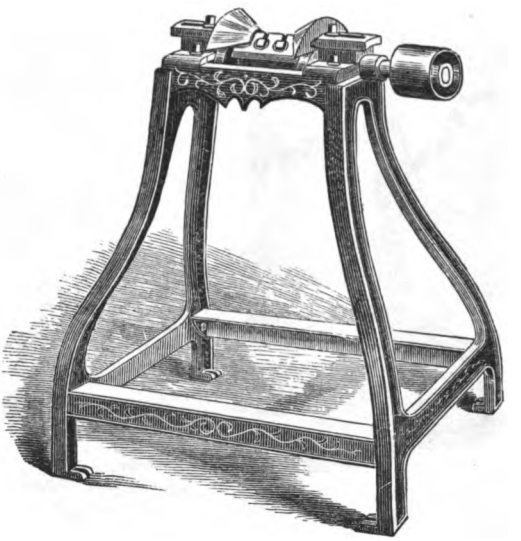


This machine is coming into very general use, from its adaptation to a great variety of work, for circular cutting of wood, and for any irregular cutting, either on the inside or outside, or any crooked work requiring to be neatly smoothed.

The machine is adapted to any kind of circular work in house, car building, carriage or furniture work, etc. It may be made to work in any circle, from two inches upwards. It is simple in its construction, with upright spindles and right and left-hand cutters, which may be either straight, circular, or moulded, according to the purposes wanted. A counter-shaft and pulleys are connected with the machine, thus getting up the speed required. The driving pulleys are sixteen inches in diameter, and three and one-quarter-inch face. The tight and loose pulleys are seven and one-half inches in diameter, and four-inch face, and should make 1000 revolutions per minute.

The No. 2, or large size machine, has an iron girt and larger heads.

Horizontal Shaping and Cornering Machine.

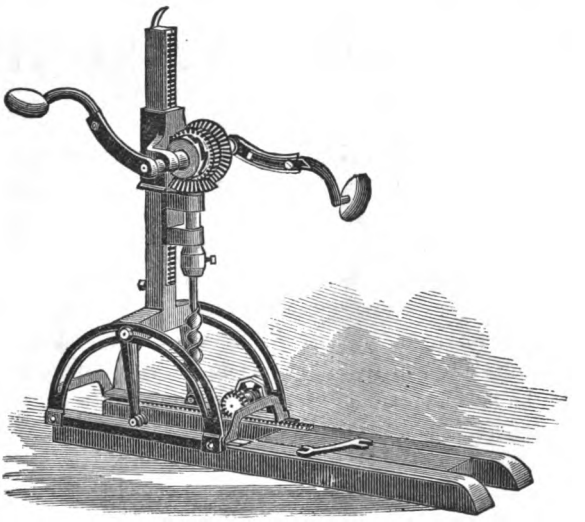


The above cut represents a machine with iron frame, for planing crooked stuff to a pattern, or cornering; and is sufficiently strong for agricultural work. This machine has no counter-shaft or table.

We also make one for the same purposes, to which we attach an iron table, which is hung at one end, while the other is raised and lowered by a screw, which is used for planing or smoothing stuff for agricultural work, etc.

R. BALL & CO.'S

PATENT HAND BORING MACHINE.



This machine is constructed mostly of malleable iron, and so arranged that when once set in the line of a mortise to bore any number of holes required without moving. This is accomplished by means of a rack fastened to the side rail, and a pinion running into it, fastened to the base, with a hand wheel attached to the pinion; by turning this wheel, the whole top, including the augur, is moved along the line of mortise. It is constructed so as to bore on any angle desired, and, by means of a stop on the back of the upright, to any required depth. The arms are made to elongate, to increase the power when a large augur is used. The augur is raised from the wood by a central gear, and by the same motion required to propel it, and held by a spring at the top of the column. When desired to bore, press the spring forward, and the augur will be let down to the wood in readiness to operate.

This is, beyond question, the most perfect machine of the kind in existence, and is made in the most approved style and workmanship.

It is warranted perfect in all its parts, and will give entire satisfaction.

R. BALL & CO.'S

IMPROVED TENONING MACHINE.

The large experience which we have had in manufacturing and using these machines, the opportunity afforded by our extensive travel of examining the different kinds, with a view of making a more complete and perfect machine, and adapting it to the wants of mechanics generally; their rapidly increasing sale in this and foreign countries; the many complimentary remarks bestowed upon them by many of the most skillful mechanics and best judges, at the principal Shops, Institutes and Fairs, fully convince us that they are the best Tenoning Machines ever offered to the public.

These machines are made in a substantial and compact form, of stock thoroughly seasoned and well put together, and are finished up in a manner highly attractive and ornamental.

The carriage on which the stuff is placed to be tenoned, is raised and lowered by turning a crank, to give the right depth of shoulder to the tenon, and is so arranged that no setting out is required, the length being regulated by stops and gauges in the carriage. The slide nearest to the cutter heads, under the carriage, and upon which the carriage moves, instead of being about four inches from the cutter heads, is placed the other side of the cross girt, close up to the cutter heads, rendering them much more firm and is a *great improvement* over the old way.

The cylinders or cutter heads are made open, and are not liable to clog with shavings, while the twisted or spiral cutters, always presenting the same angle to the stuff at the cutting point, work much freer and smoother than flat cutters set on an angle or otherwise.

The cutters are bolted on to the heads, and are easily adjusted to their place by gauges on the front edge, and may be sharpened without removing them from their place.

The upper part of the frame, which holds the upper cutter head, is raised and lowered by a screw, to give the required thickness of tenon.

The saw spurs on the cutter heads are held by a small key bolt, with a nut on the opposite side, and are much safer than when held by a key only.

We make the spurs one and three-quarters of an inch wide; the cutting part being made in the form of saw teeth, and is particularly useful in cutting hard wood, as they are not liable to heat, and will do ten times the amount of work of the common spur without sharpening, and cut the shoulder perfectly smooth.

We have an entirely new arrangement of the copes, and superior to anything ever introduced, in connection with these machines, by which we obviate the trembling of the upper cylinder from running the copes, as they have no connection with the upper frame, but are placed in boxes which stand upon an iron bar running across the lower part of the frame, and are adjustable with screws, which make them much more convenient than those used in machines of other manufacturers, where they have to be driven to their place by a hammer.

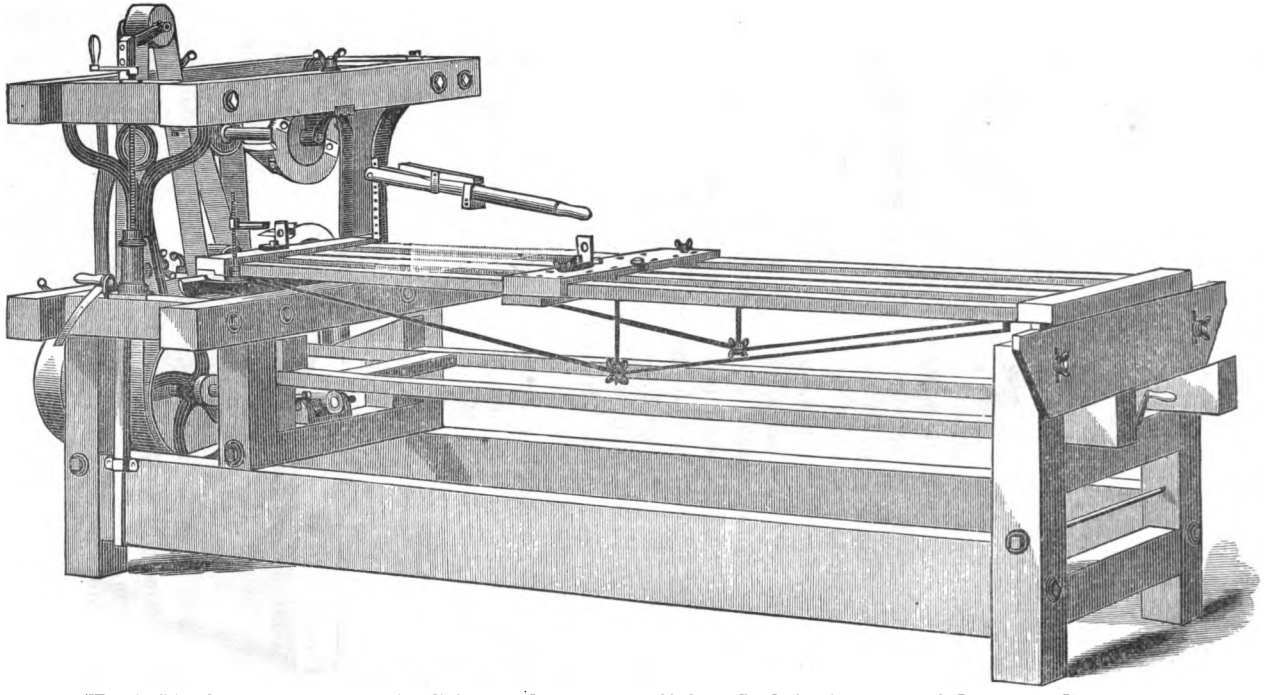
The cope heads are placed in rear of the cutter heads, so that tenons are made and one or both shoulders are coped at once passing through.

A boring apparatus can be attached to these machines, by bolting it to the upper frame, and is driven by the same belt that drives the cutter head, with a change of pulleys to give different speed to the different sized augurs.

The cut-off saw arbor runs in the place of the lower cutter-head arbor, and is driven by the same band. It is used for cutting different pieces of stuff to the same length, either square or on an angle, and is a very convenient appendage. The extension rod is attached to the carriage, and is used for getting the length between the shoulders, when the stuff is longer than the carriage.

We put belts on to the machines, sharpen the cutters and try them before sending them out, so that no difficulty is experienced in starting them by those who are not familiar with them.

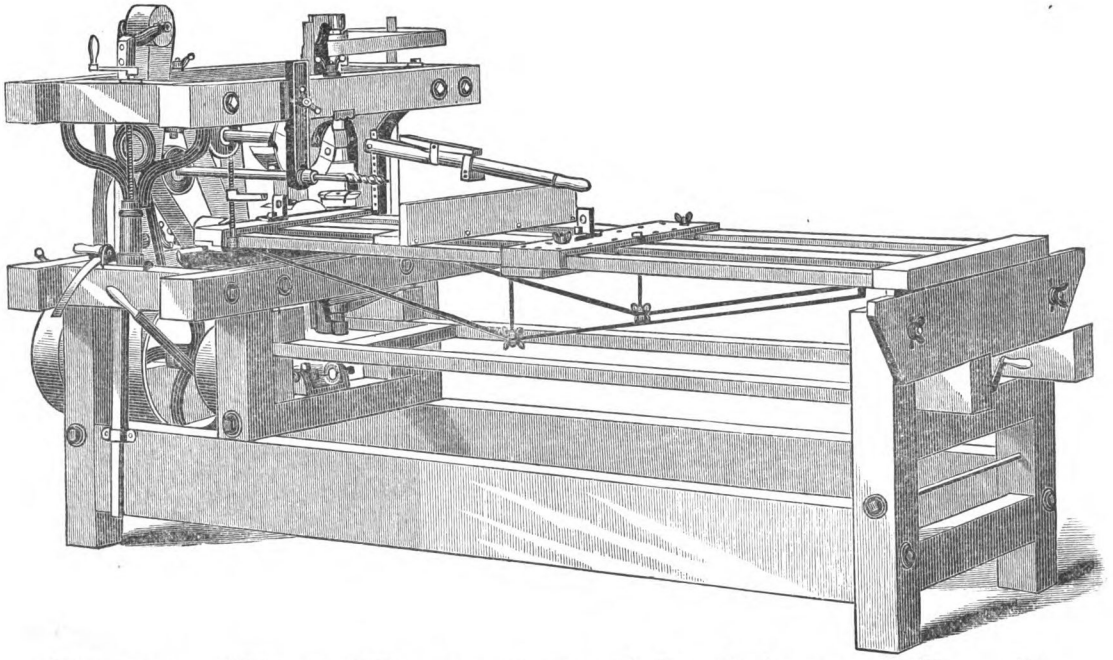
These machines are made of four sizes.



LARGE SIZE TENONING MACHINE.—NO. 1.

This machine was got up to meet a want long felt for heavy work. Both the iron and wood work are much heavier than any heretofore built, and are just what is wanted for Railroad shops. The cutter heads are ten-inch diameter, and every part proportionately strong. It will cut a tenon three and one-quarter inches long and from one-eighth to four inches thick. No Car Builder should be without one.

The tight and loose, or driving pulley, is twelve inches in diameter, five-inch face, and should make 450 revolutions per minute.



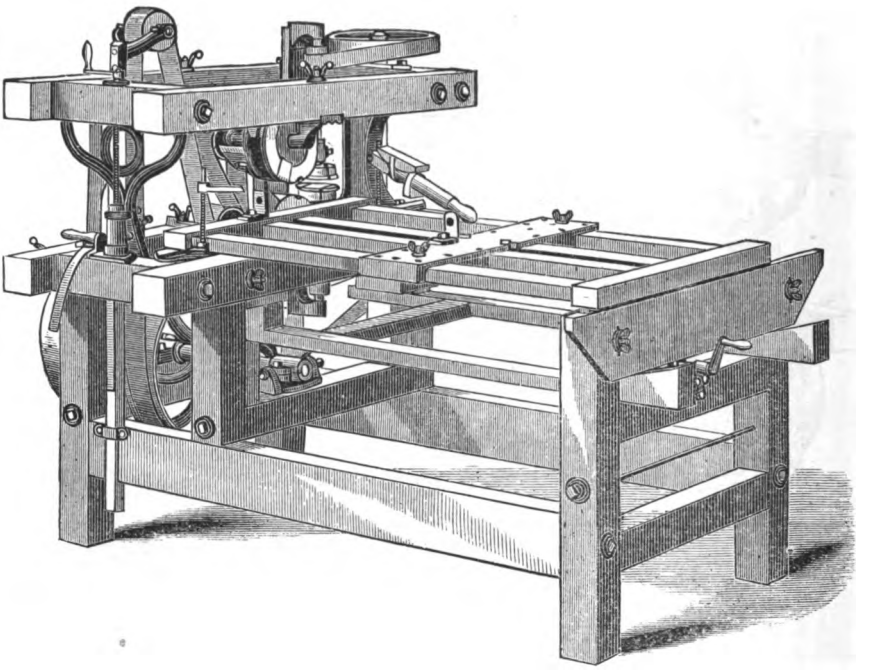
Large Size Tenoning Machine.—No. 2.

This size machine is designed for agricultural and other kinds of heavy work. It is used by Car Builders, and gives entire satisfaction. Its size is eight feet by four.

The tight and loose, or driving pulley, is twelve-inch diameter, four and one-half-inch face, and should make 500 turns per minute.

TENONING MACHINE.

MEDIUM SIZE.—NO. 3.



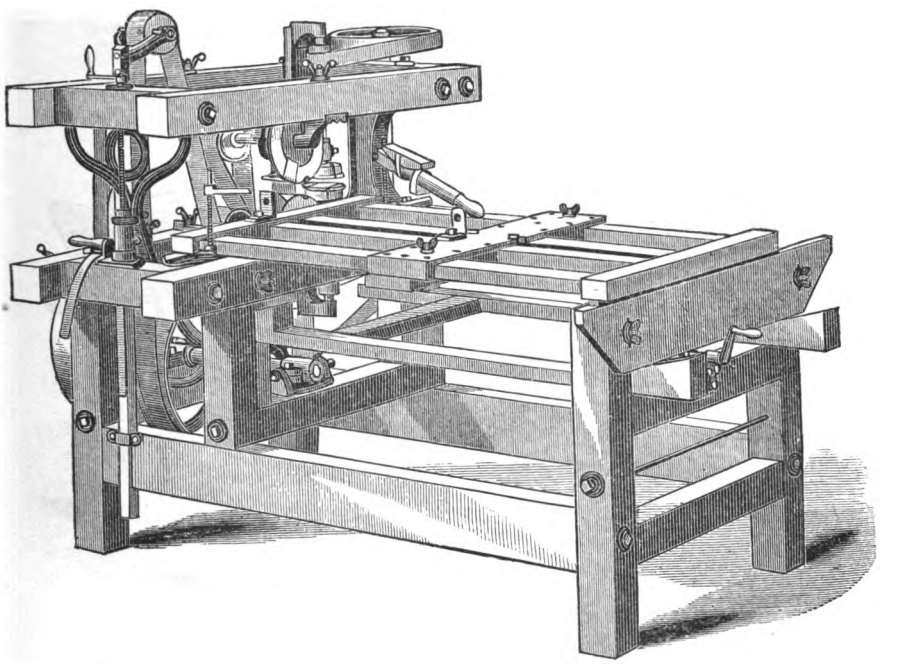
This machine is particularly adapted to the manufacture of doors and long tenons. It has double cutters, or four cutters on each head, so adjusted as to cut or tenon six inches long at once passing through.

In cutting door tenons it will do the work of twenty men. One or both copes are attached to this machine, and it has all of our late improvements.

The tight and loose, or driving pulley, is twelve-inch diameter, three and one-half-inch face, and should make 500 turns per minute.

TENONING MACHINE.

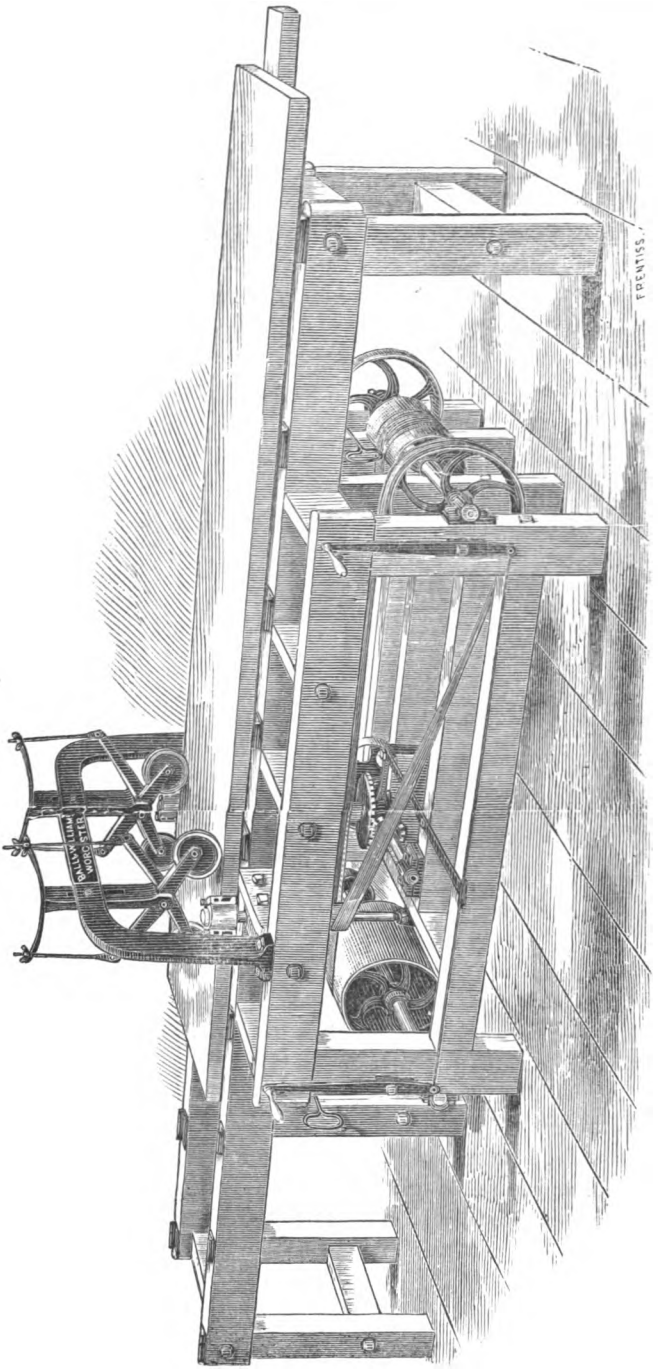
COMMON SIZE.—NO. 4.



This machine is six feet by four, and is designed for all ordinary work, — sash, blinds, doors and shutters, cabinet, carriage work, etc., — and will cut a tenon three and one-quarter inches long.

We sometimes affix to this machine a set of boxes for tenoning blind shades, so arranged as to cut the shoulder a little standing.

The tight and loose, or driving pulley, is twelve-inch diameter, three and one-half-inch face, and should make 550 revolutions per minute.



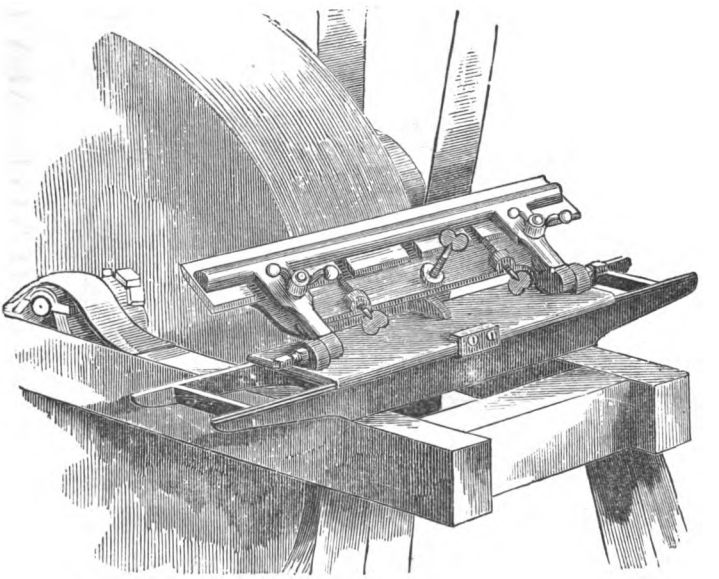
IMPROVED CARRIAGE MATCHING MACHINE.

Improved Carriage Matching Machine.

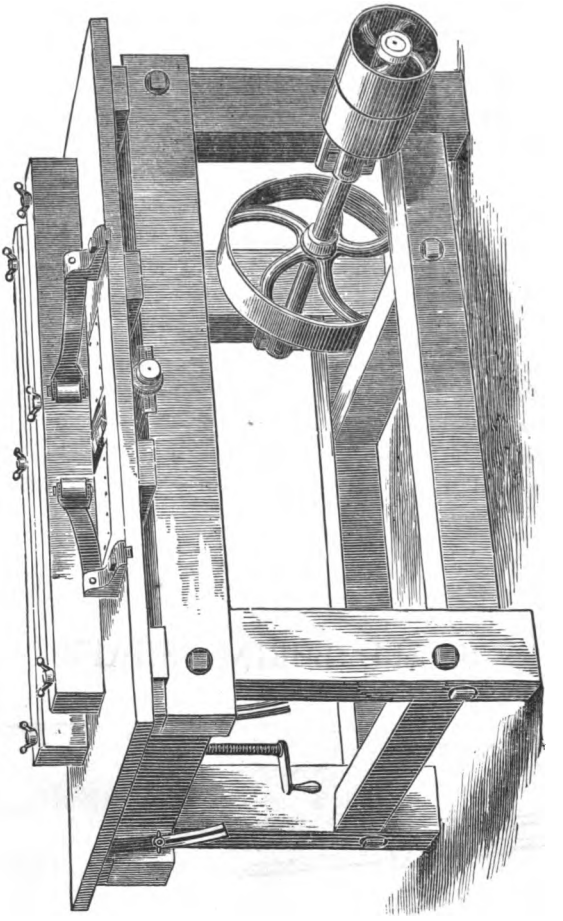
This machine is designed for jointing and matching stuff either tapering or parallel. They are built with a carriage to traverse like the Daniels' Planer, and will make a perfectly straight joint, and tongue or groove at the same time. They can be arranged with a gauge to work parallel. They will match 6000 feet per day.

The heads are made of malleable iron, and are perfectly safe to run in hard wood, hemlock or pine. They are usually made to work stuff eighteen or twenty feet long and twenty inches wide, but may be made any other size desired.

GRINDING MACHINE.



This is an apparatus for grinding planing knives for Woodworth or Dimension Planers. It consists of a frame with a sliding carriage, upon which the knife is fastened in such a position as to give the knife a straight edge and a true bevel.



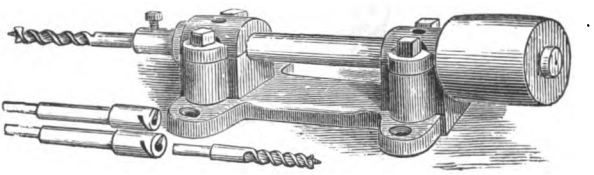
HAND MATCHING MACHINE.

HAND MATCHING MACHINE.

This is a very handy machine, and is used for tongueing and grooving stuff for short boxes; also for sheathing and other light work. It has a strong, hard wood frame, about four and a half feet long by two and a half feet wide, and of convenient height to work at. It has two heads running upon the same arbor, one for tongueing and the other for grooving. The arbor is bolted to the frame under the table, which is raised and lowered to accommodate the depth of work required. It has also a counter-shaft on the bottom of the frame, for getting up the speed, with a tight and loose pulley, as shown in the cut. The cutter heads are sufficiently thick to receive cutters for grooving the edges of plank two and a half inches thick.

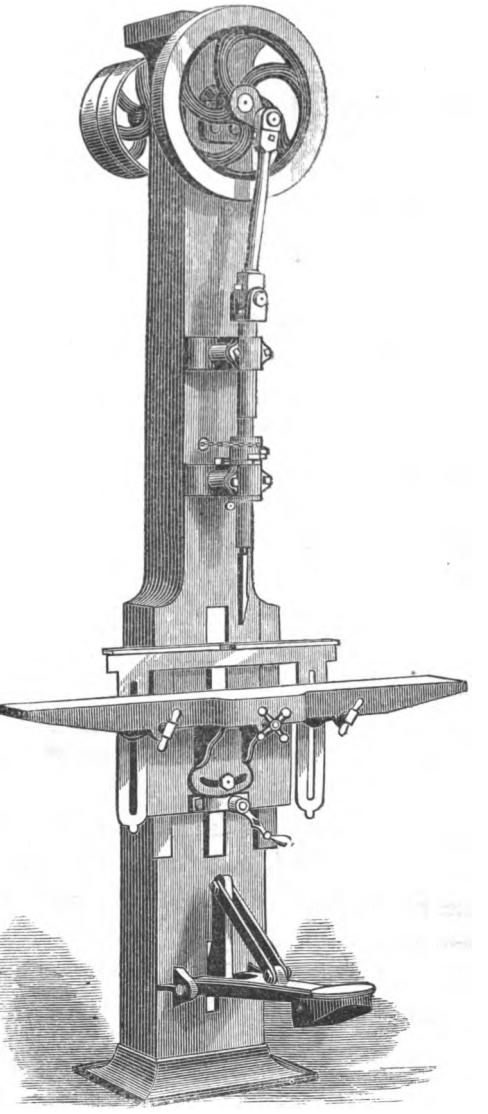
The tight and loose pulleys are seven and one-half inches in diameter, and should make 800 revolutions per minute.

SMALL BORING SHAFT.



This shaft is fitted with a small iron frame, with Babbitt Boxes, and may be held on to a bench or other convenient place to apply the power.

It is used for boring blind styles or other small holes. It has two augur bits, five-sixteenth and three-eighth, and two hollow augurs of corresponding sizes, for rounding blind-shade tenons.



PATENT POWER MORTISING MACHINE.

PATENT POWER MORTISING MACHINE.

This is a strong and powerful machine, built entirely of iron and steel, and weighs about 1000 pounds. The post, including the base and boxes that the chisel arbor runs in, is cast in one entire piece. The carriage on which the stuff is laid is raised by the treadle, and adjusted with a screw to graduate the depth of the mortise, and so arranged as to mortise any angle required.

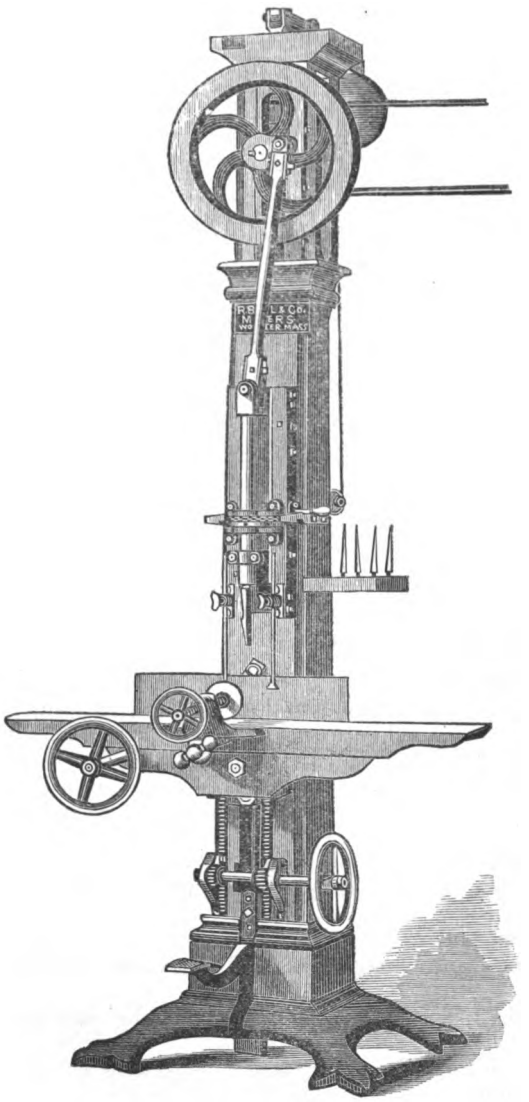
The chisel is reversed by an entirely new method, for which we have secured a patent. It is simple and sure in its operation, and not likely to get out of order.

When required, we put on a boring shaft, which stands on a line with the chisel, and is operated by a treadle. This is not wanted, however, except for hard wood, when it is necessary to bore a hole the size of the chisel before making the mortise.

The machine does not require to be stopped while changing the stuff, and will make 500 strokes per minute. For mortising door stuff and all kinds of soft wood, no boring is required.

This machine is designed for Door, Sash and Blind Makers, Coach and Car Builders, Manufacturers of Agricultural Implements, etc. Every part is made in the most thorough, neat and substantial manner, and is believed to be one of the best machines for general work now in use.

The tight and loose pulleys are twelve-inch diameter, three-inch face, and should make 400 turns per minute.



NEW PATENT DOOR MORTISING MACHINE.

R. BALL & CO.'S

NEW PATENT DOOR MORTISING MACHINE.

This machine is designed for all ordinary work of soft wood, and, with the boring attachment, which we furnish when desired, will bore and mortise all kinds of hard wood, of any size, up to twelve inches deep and six inches wide.

It has a stroke of five inches, and will make a mortise four and three-quarter inches deep.

This machine has several new and valuable improvements, which have been secured by Letters Patent.

The reversing arrangement is simple in its construction, and sure in its operation. The wearing parts are all hardened, and not easily got out of repair.

It is constructed so that the treadle can be stopped in its upward motion at any desired point, thereby saving much of the time and labor of the operator, when making mortises of little depth.

The rest can be raised or lowered instantly, and set so as to mortise on an angle when desired.

This machine has all the improvements of the Hub Mortiser, described on the following page, as applied to the balance-head weight, spring, and boring shaft.

The machine is built wholly of iron and steel, strong and durable in all its parts, and will work with great speed and accuracy, and cannot fail to suit the purchaser.

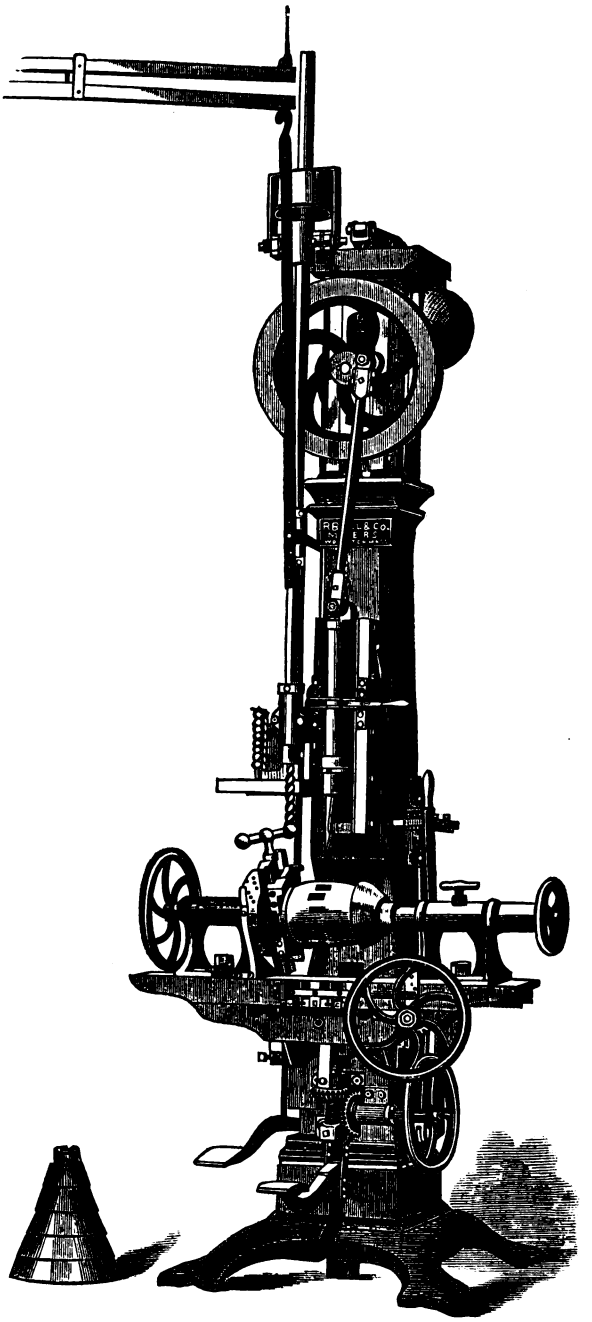
The tight and loose pulleys on the counter-shaft are twelve-inch diameter, four-inch face, and should make 300 revolutions per minute. The pulley on the machine is ten-inch diameter, three and one-quarter-inch face, and should make 360 revolutions per minute.

Counter-shaft, hangers and pulleys, will be furnished when desired.

This machine has been perfected by a skillful artisan, after a lifetime of study, and is the best of the kind in use. We can warrant it to be perfect in all its parts.

The purchaser will find it to his advantage to have the counter-shaft, hangers and pulleys with the machine.

Weight, 1300 pounds.



NEW PATENT HUB MORTISING MACHINE.

R. BALL & CO.'S

NEW PATENT HUB MORTISING MACHINE.

This machine is made wholly of iron and steel, with hardened wearing points; strong and substantial in all its parts, quick and easy in all its operations.

The patterns are new, and designed by a man who has had many years experience in the manufacture of mortising machines.

It has several important and useful improvements, which are secured by Letters Patent.

The rest-bevel is constructed so as to give a positive stop at any desired point. The handle is placed where the operator can easily adjust it when standing in front of the machine. The whole apparatus connected with the bed-plate can be raised or lowered without changing the bevels.

Adjustable stops, for giving the length of even or zig-zag mortises, are attached to the carriage, and can be operated with the fore-finger of the hand, when hold of the wheel that moves the carriage.

The dial-ring is accurately spaced for ten, twelve, fourteen, sixteen and eighteen spokes. It is held by a spring, and made so that it can be turned by the left hand alone, when hold of the wheel.

There is a spring so attached to the rod as to give a quick upward motion to the treadle, when the foot is removed; and, as it lessens the weight of the ball, makes it easier for the foot to bring the treadle down.

The ball is suspended by a malleable iron lever at the top of the post, so as to prevent much of the jar and rattle so common to other machines, by drawing up the joints in the same direction that the chisel drives them when it strikes.

The balance-wheel head is connected top and bottom, and secured to the post at all the corners.

The boring shaft is driven direct from the counter-shaft that drives the Mortiser, thus avoiding the noise of bevel gears.

This machine will bore and mortise hubs up to twelve inches in diameter and sixteen inches long.

An extra rest for square mortising, for any size work, up to twelve inches deep and eight inches thick, will be furnished when desired.

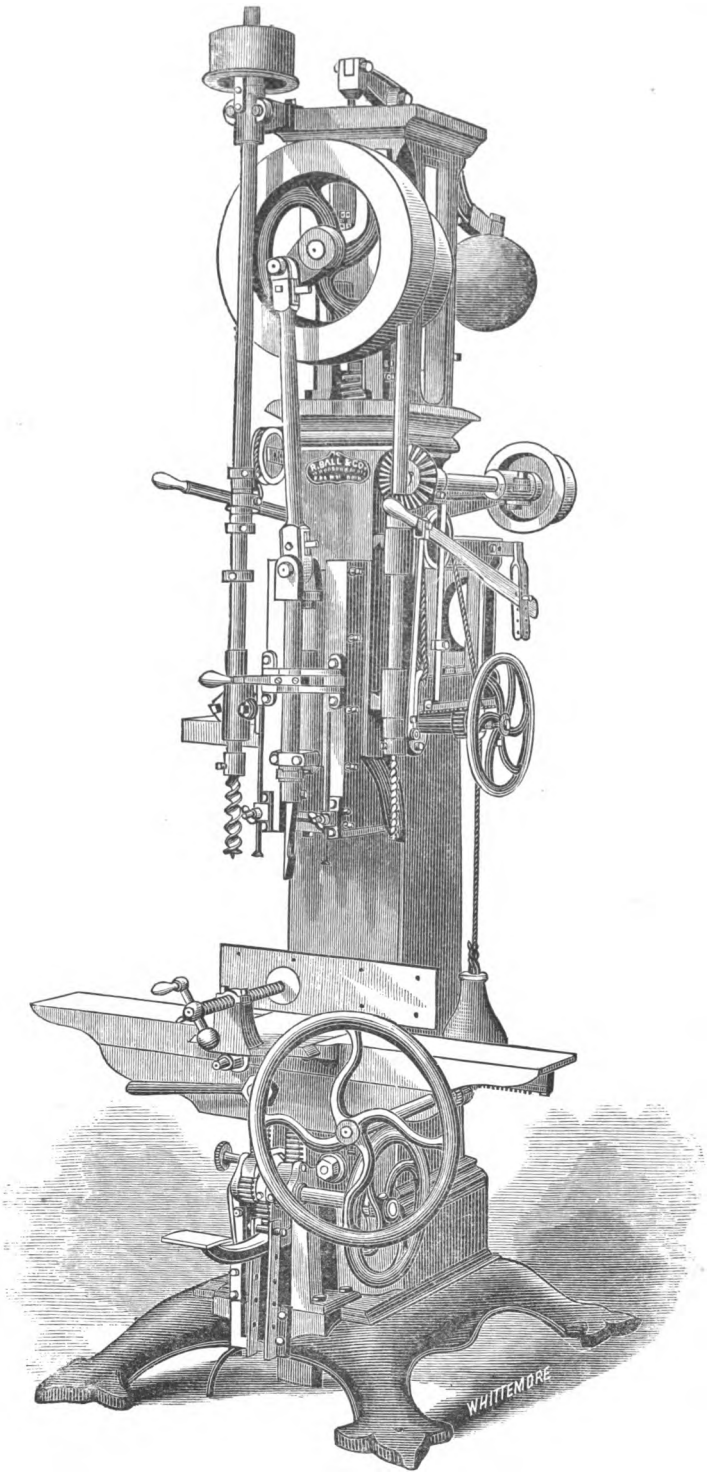
The other working parts of the machine are shown in the cut.

The tight and loose pulleys on the counter-shaft, which we furnish with each machine, are twelve-inch diameter, four-inch face, and should make 300 revolutions per minute.

The belt to run the boring shaft should be three inches, — that to run the Mortiser three and one-half inches wide.

Weight, including counter-shaft, hangers and pulleys, 2000 pounds.

These machines are pronounced, by those using them, the best in the world of the kind, and are capable of making sixty sets of hubs per day.



New Patent Rail Car Mortiser. — Weight 2600.

R. BALL & CO.'S

LARGE PATENT RAIL CAR MORTISING MACHINE,

With Auxiliary Boring Attachment.

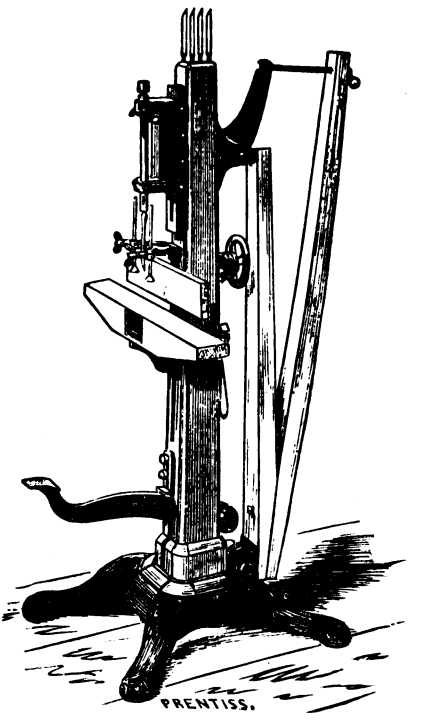
This is a very strong and powerful machine, and executes the work with certainty and dispatch. It is composed wholly of iron and steel, and manufactured from new and improved patterns. The working parts are firmly attached to an iron column, in such a manner as to secure strength and durability, and at the same time afford the greatest convenience to the operator. The balance wheel is very heavy, giving great force to the stroke of the chisel. The shaft is steel, and runs in composition boxes. The chisel arbor is also made of steel, and the reverse apparatus attached to it is arranged in connection with the stop pin over the treadle, so that the treadle can be brought down to any desired point, so as to lessen the motion when making mortises of little depth. The connecting rod is made of wrought iron, with composition boxes, and steel wrist pin. The rest can be raised or lowered instantly, and is arranged so as to mortise any angle required, and of sufficient capacity to mortise timber twelve inches wide and fourteen inches deep. The treadle, when brought to the floor, is held by a latch, so arranged that it can be thrown off by the foot of the operator when required.

The auxiliary boring attachment has a horizontal and vertical adjustment of twelve inches, using augurs of that length. With it all holes needed for bolts or other purposes may be bored whilst the timber is in hand for mortising.

A counter-shaft, hangers and pulleys, are always furnished with this machine. The tight and loose pulleys on the same are twelve-inch diameter, five-inch face, and should make 300 revolutions per minute.

Weight, 2600 pounds.

PORTABLE FOOT MORTISING MACHINE.

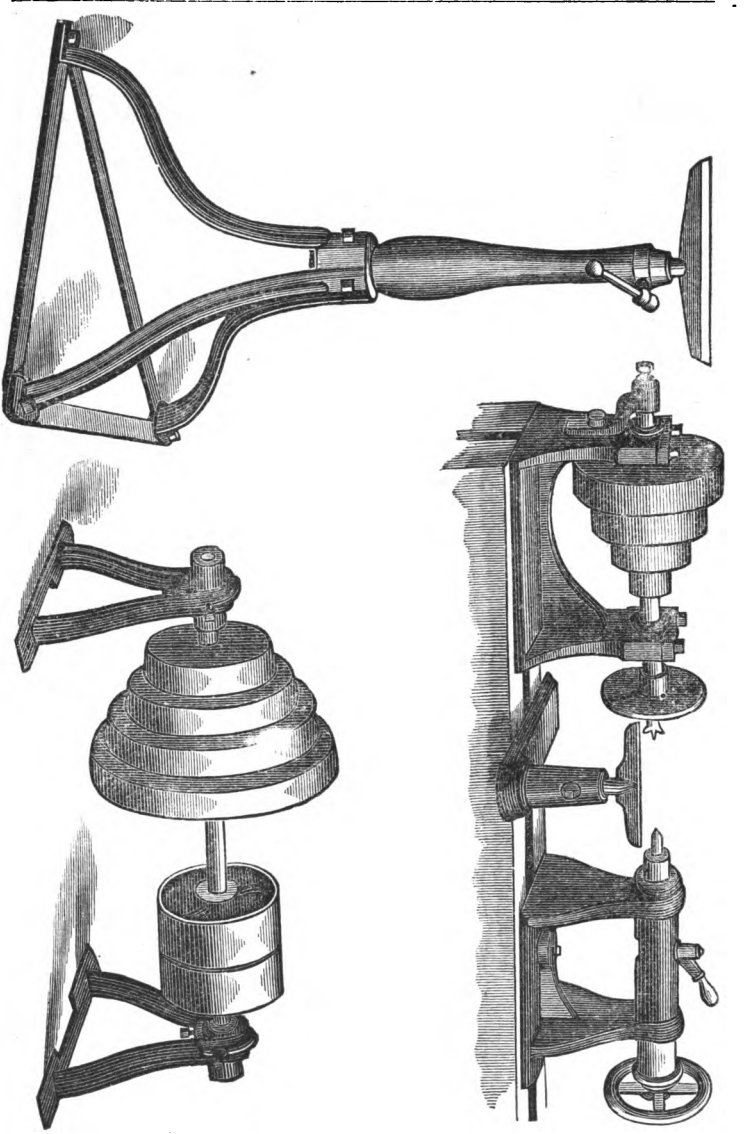


This machine is complete in itself, and can be moved about from place to place in the shop, and is much more convenient than the old kind of machine, which requires to be fastened up in a particular place.

It is a substantial and durable machine, and is well adapted to the manufacture of doors, sash, blinds, and other kinds of light work. It is made principally of iron, in a neat and compact form, and stands firmly on its feet when in use.

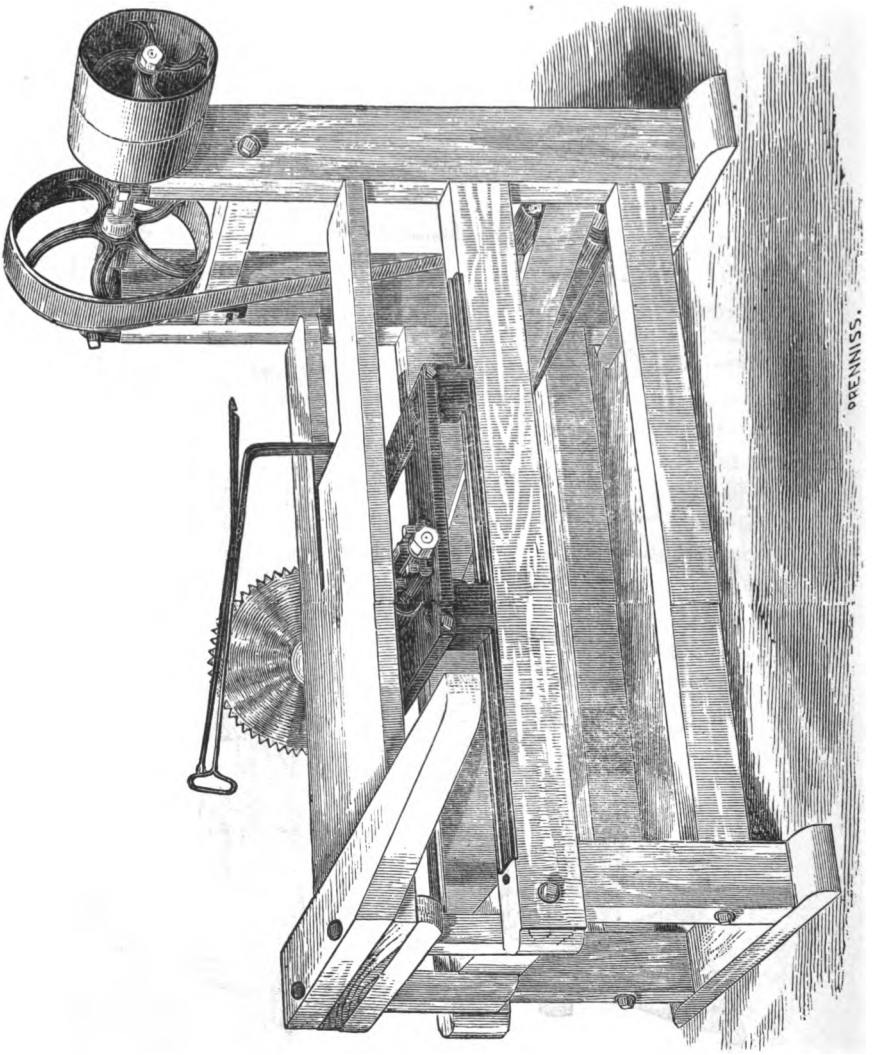
Care should be taken not to strain the spring tighter than is necessary to draw out the chisel when in use, and when not in use the spring may be loosened, so as not to destroy its elasticity.

The loop that connects the treadle with the chisel block may be moved backward or forward, to govern the depth of the mortise or the power of the treadle.



PATTERN MAKERS' LATHE.

These lathes are made from new patterns, in the very best possible style and manner. They have cast steel spindles, two face plates, three T rests, screw, spur, female and round centers, and the necessary bolts with hand wheels to fasten the head block and rest. The live spindle has a left-hand screw at the rear end, with face plate for turning large diameters. They also have a floor rest, which can be readily adjusted to the work required. The tight and loose pulleys to the counter-shaft are twelve-inch diameter and four-inch face. The ways and beams can be furnished, of wood or iron, at reasonable prices, according to size and length. We also make common Wood Turning Lathes, furnished with the usual apparatus for working the same.



RAILWAY CUTTING-OFF SAW.

COMMON SIZE.

RAILWAY CUTTING-OFF SAW.

COMMON SIZE.

This machine is about five feet and six inches long by two feet wide, and is used for cutting off lumber before it is worked. They are used in Door, Sash and Blind Shops, Cabinet and Box Manufactories, etc.

The saw arbor is of cast steel, running in boxes lined with Babbitt Metal, and are attached to a sliding carriage, which is drawn up by hand, while the plank or board lays still. It will saw stuff twenty inches wide, four inches thick, and perfectly square.

The tight and loose pulleys are seven and a half inches in diameter, four-inch face, and should make 500 revolutions per minute.

Saws extra, at manufacturers' prices.

RAILWAY CUTTING-OFF SAW.

LARGE SIZE.

This machine is about seven feet long by two feet wide, and is built in the same style as the common sized one, but is much heavier and stronger.

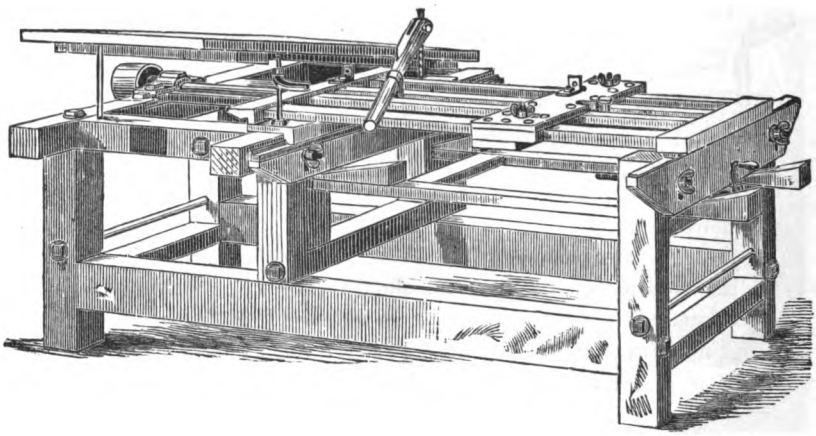
This size is suitable for a saw twenty inches in diameter, and is designed for Car Makers, Millwrights, and for other heavy work, and will saw stuff twenty-four inches wide and five inches thick.

The tight and loose pulleys are twelve inches in diameter, six-inch face, and should make 500 revolutions per minute.

Saws extra, at manufacturers' prices.

CUT-OFF SAWING MACHINE.

FOR SASH AND DOOR WORK.

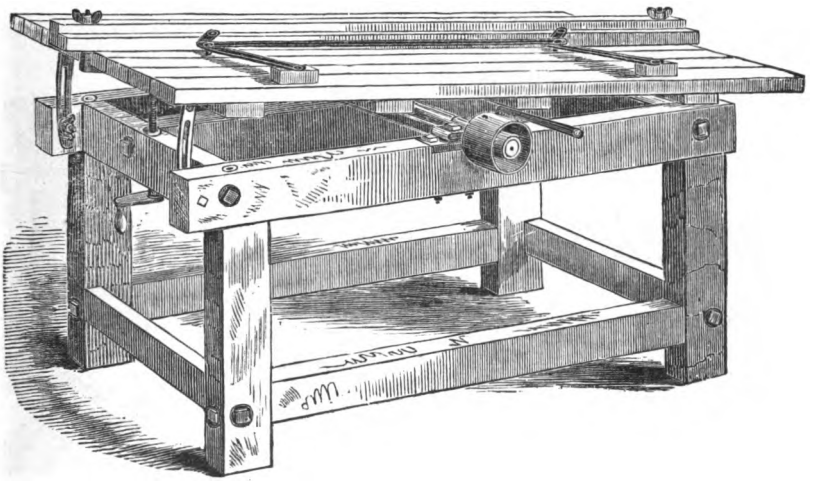


This machine is made like the bottom of the Tenoning Machine, and is arranged with stops and gauges for cutting stuff to a given length; cutting it off square or on an angle. The carriage for the stuff to lay on is raised or lowered by turning a crank screw, and is very handy for cutting gains or grooves across plank or boards, window frames or door stuff, by removing the saw and substituting the grooving head or dado, which is fitted to the same arbor, and is made to cut grooves from five-sixteenths upwards.

The No. 2 Saw Arbor is used on this machine. Size of pulley, four-inch diameter, four and one-half-inch face, and should make 2500 revolutions per minute.

SPLITTING SAW TABLE.

With Cast Steel Arbors, Bed and Boxes.



These machines are made of hard wood, put together with joint bolts, and are well finished up. The tops are sometimes hung at one end, and are so arranged that one end can be elevated to accommodate the work to be done. We make them of three different sizes, viz: —

No. 1 is two feet eight inches wide by four feet long. The No. 2 saw arbor goes on this machine. Size of pulley, four-inch diameter, four and one-half-inch face.

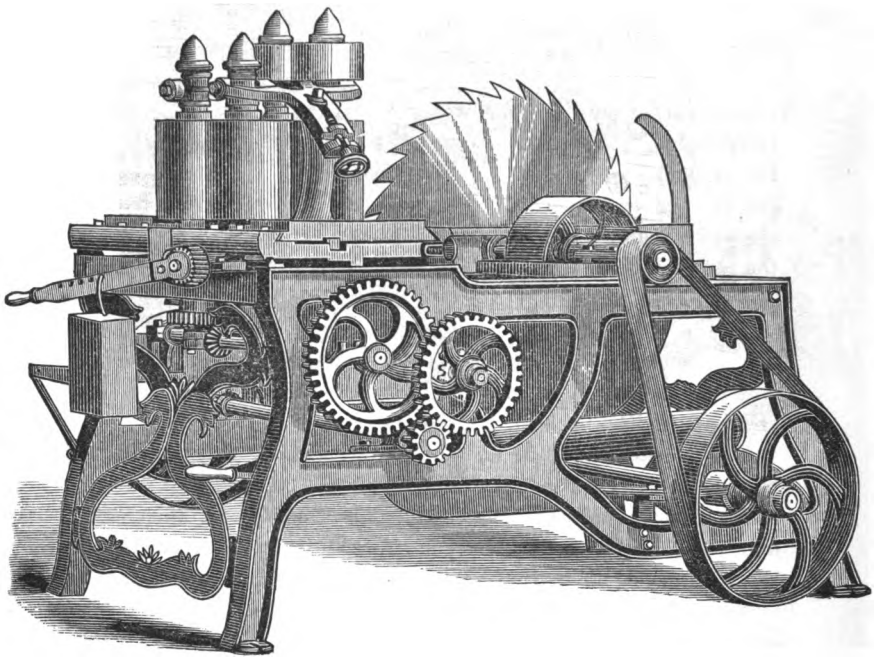
No. 2 is three feet by four feet eight inches. The No. 2 saw arbor goes on this machine. The pulley is four-inch diameter, four and one-half-inch face.

No. 3 is three feet four inches by five feet six inches. The No. 5 saw arbor goes on this size machine. The pulley is six-inch diameter, six-inch face.

Saws extra, at manufacturers' prices.

R. BALL & CO.'S

CIRCULAR RE-SAWING MACHINE.



This machine is designed for re-sawing lumber. It will saw thick lumber into thin, of an equal or an unequal thickness. It has four feed-rolls, all geared, which can be easily adjusted, by screws attached to the curved slide to which the upper roll-boxes are fixed, so as to saw any angle desired. This slide is also provided with an index and scale, showing the inclination of the rolls. While the rolls are thus inclined, the gears which drive them are not thrown out of their proper position.

The frame which holds the feed-rolls and their gears is one solid piece. The gears are so fixed to the lower part of the frame that they are not dependent on the feed-rolls to keep them in their position.

Between the boxes which hold the gears and feed-rolls is an improved ball-joint, which allows the rolls to be inclined. The rolls, with their gearing, are reciprocated by racks attached to the sliding frames, and a pinion fixed to the bed, which are operated by a horizontal lever and weight.

This machine is so constructed that the rolls will press against the lumber equally on each side, in which case it will be split in the centre. When it is desired that the rolls on one side shall remain stationary while the others move, the right-hand rolls can be brought to the position desired, and fixed there by tightening the gib and adjusting the thumb-screw on the right-hand side of the machine so that it will press against the slide. Then remove the screw which holds the rack to the sliding frame. This allows the rack to slide without moving the frame, while the other frame moves as before.

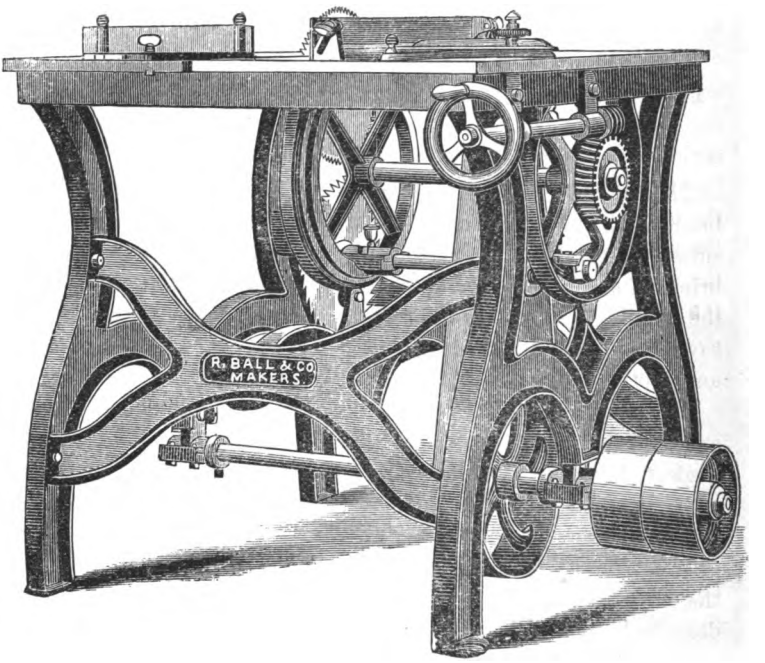
The bed on which the slides stand is adjustable transversely, by a screw on the left. The saw is adjustable longitudinally, so that when a small saw is used it can be brought up close to the feed-rolls, and moved back for a large one.

This machine will be found useful in Door, Sash and Blind Shops, for sawing panels, bevel sidings, etc. The largest size will run a thirty-six-inch saw, and less. The smaller size thirty-inch, and less. They should be run from 1400 to 2000 turns per minute, according to the size of the saw used.

The saw can be taken off without disturbing the arbor, by swinging up the left-hand part of the table and removing the left-hand side of the saw-case. By means of this case the sawdust falls in the rear of the machine.

If a faster feed than can be obtained with the cone-pulleys on the left of the machine is desired, it can be obtained by sliding the pinion on the right of the machine out of the outside gear into the inside one. In this case, an open belt must be used on the cone-pulleys.

We believe this machine the most complete and perfect of the kind in use, and can warrant it, in the hands of a good operator, to give satisfaction.



PATENT DOUBLE-SAW BENCH.

R. BALL & CO.'S

PATENT DOUBLE-SAW BENCH.

This machine is designed for splitting and cross-cutting light lumber. It has a split and cross-cut saw attached to opposite sides of revolving discs, which are revolved by crank and worm, bringing and holding either saw in any position desired. When the splitting saw is in position for use, it may be so adjusted as to saw all its size will allow, or any depth less, so that a groove of any depth may be sawed.

The gauge used with this saw can be inclined so as to saw an angle of forty-five degrees, and can be easily adjusted to a right angle. There is a scale graduated on the table, sixteen inches long, by which to set the gauge. The gauge is moved by rack and pinion.

When the cross-cut saw is wanted, the split saw is removed and the cross-cut brought in the same position, in the manner above described. For the purpose of cross sawing, a part of the table is made to slide, and has a cross rest which can be set on any angle.

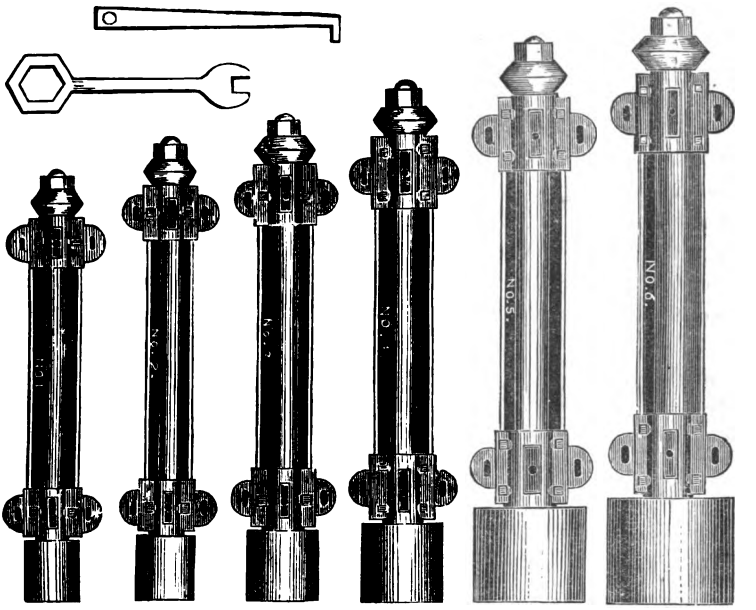
There is on the table a graduated section of a circle, so that the rest can be set on an angle of any degree with no trouble. This sliding table is gibed, so that it cannot be thrown off.

The driving shaft, with tight and loose pulleys, is attached to the machine, and from it both saws are driven, by only one belt. It can therefore be used whether belted from above or below, or horizontally.

This machine is made of iron and steel, and weighs 740 pounds. It will be found useful in any shop where light sawing is done. It is designed to use twelve-inch saws, but thirteen-inch can be used.

CAST STEEL SAW ARBORS.

WITH BED AND BOXES COMBINED.



IMPROVED SAW ARBORS.

These Saw Arbors are made of cast steel. The pulley is made to slip on the arbor, to take up the lateral motion caused by wearing.

The bed and boxes are cast together, and are therefore not affected by any change in the frame to which they are bolted. They are each furnished with a wrench to turn the nut, and a hold-fast to keep the arbor from turning.

These arbors are made on an improved plan, the steel is left full size the entire length, and are the most firm and durable of any now in use.

Self-oiling boxes used if preferred.

We manufacture six different sizes of these Saw Arbors, suitable for any saw up to twenty-eight inches.

The groovers are fitted to No. 2 and No. 3 Saw Arbors, and are made to run in the place of the saw and loose collar, the nut turning up against the groover head, instead of the loose collar, when needed, thus saving the cost of an extra frame and arbor, and the room it occupies.

LENGTH OF THE ARBORS.

No. 1 is 21½ inches between the pulley and the place for the saw.
No. 2 is 23 " " " "
No. 3 is 24¾ " " " "
No. 4 is 26 " " " "
No. 5 is 27 " " " "
No. 6 is 28 " " " "

Improved Saw Arbors, No. 1, made 1 inch steel.
" " No. 2, " 1⅛ "
" " No. 3, " 1¼ "
" " No. 4, " 1⅜ "
" " No. 5, " 1½ "
" " No. 6, " 1¾ "

Size of Arbors where the saw goes on: — No. 1 is ⅞ inch.
" " " No. 2 is 1 "
" " " No. 3 is 1 "
" " " No. 4 is 1⅛ "
" " " No. 5 is 1¼ "
" " " No. 6 is 1⅜ "

Groovers or Dado Heads, to fit No. 2 or 3 Saw Arbor, with double spurs for each side, and 5-16, ⅜, 7-16, ½ and ⅝ inch cutters.

Wide spurs and collars may be fitted if desired.

Patent Blind Slat Tenoning Machine.

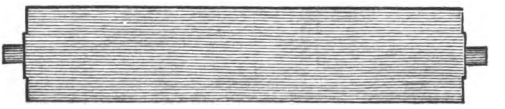
This machine works both ends of the shade, cutting the shoulder, rounding the tenon, and cutting it to a length, at one operation, *in the most perfect manner*, and has cut, on trial, 2000 *slats in fifty-five minutes.*

We have applied R. Ball & Co.'s New Patent Cutter Head to this machine, in place of the saws formerly used. This head cuts an offset or shoulder on the slat, which prevents it from rubbing against the style when painted, as shown by the cut on the opposite page.

We have no hesitation in saying that this is the best machine in use for working blind shades, and will warrant it to give entire satisfaction.

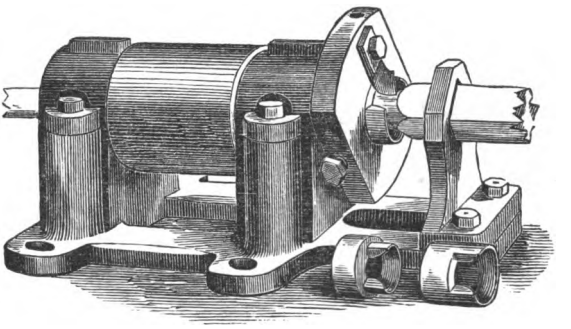
R. BALL & CO.'S

NEW PATENT BLIND SLAT.

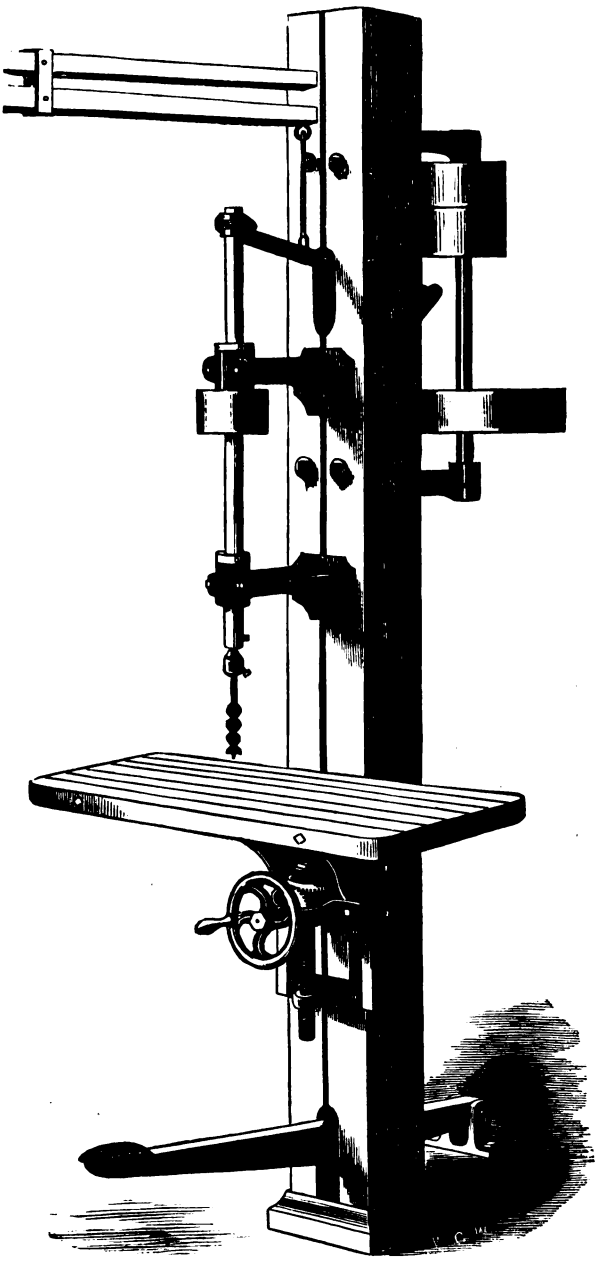


This slat is a new article of manufacture, and possesses advantages over any slat in use, and can only be made by the use of R. Ball & Co.'s Patent Blind Slat Tenoning Head, shown on the opposite page.

DOWEL PIN AND ROD MACHINE.



These machines are used for rounding dowel pins or rods of any kind, working them straight and smooth, and of different lengths and sizes. They are made in the form of a hollow arbor or mandrel, running in an iron frame, while the stuff is pushed through by hand. Each machine cuts three sizes of rods, by changing the thimbles, which are furnished with the machine.



Upright Boring Machine.

UPRIGHT BORING MACHINE.

This machine is suitable for most kinds of boring, when only one augur is required, and is convenient for heavy or light work.

The bit-shaft is attached to an upright post, and is brought down to the work by a rod connecting with the treadle.

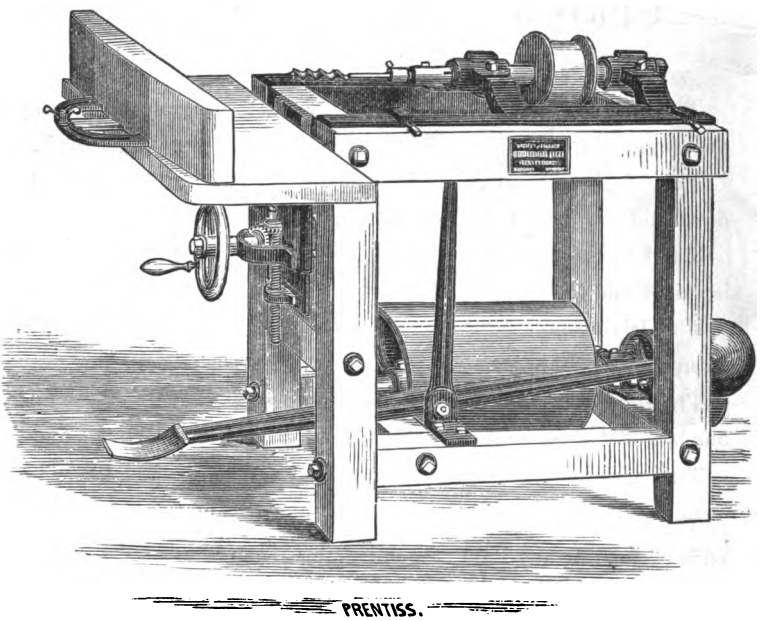
The table is about three feet long and fifteen inches wide, and is raised and lowered by a screw.

The driving pulleys are placed on the back side of the post, in an upright position, like the pulleys on a Daniels' Planer.

The tight and loose pulley is eight inches in diameter, three and one-half-inch face, and should make 400 revolutions per minute.

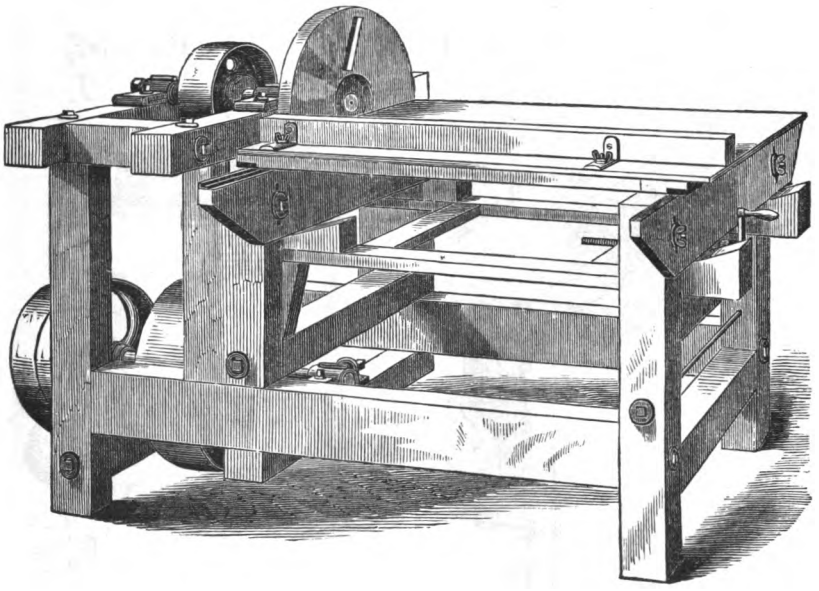
This machine is arranged for common machine augurs, with round shanks, and is also provided with a socket for holding the common augur bits, with square shanks. The augurs that belong to this machine are three-eighth, seven-sixteenth, one-half, five-eighth, three-fourth, and one-inch. If other sizes are wanted, we charge extra for them.

HORIZONTAL BORING MACHINE.



This machine is used for boring car work, bedstead rails, etc., and does a variety of boring without the necessity of setting out. The carriage on which the stuff is laid is raised and lowered by a hand wheel, to accommodate the different size stuff, and so arranged as to bore any angle required.

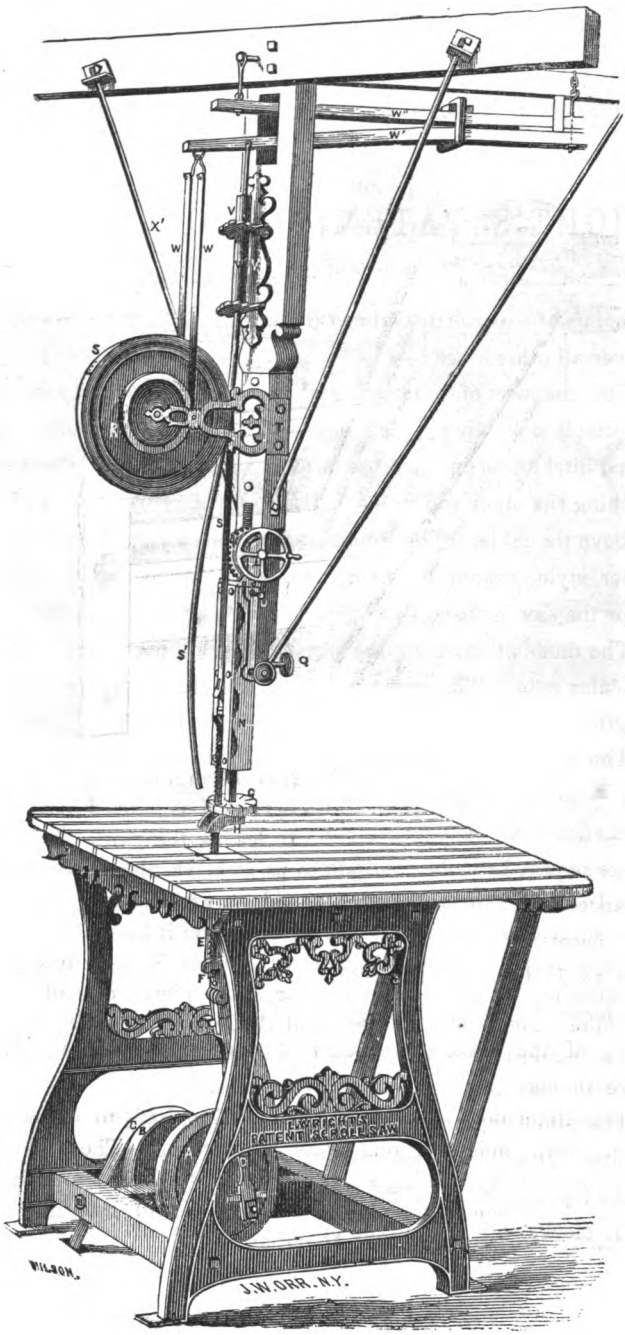
BUTTING MACHINE.



This machine is used for smoothing, cornering, or rounding the ends of joist or any kind of small timber, such as is used in manufacturing agricultural implements. It leaves the work perfectly smooth, and in a suitable condition to paint or varnish. No Agricultural Implement Manufacturer should be without one. It will do more work of its kind than four men, and do it better.

It is also very useful for a Cabinet or Pattern Maker, for trimming, squaring, or smoothing large or small pieces of stuff. It has a sliding table, and is so arranged that pieces of joist, plank, boards, or patterns may be trimmed up perfectly square, or on an angle, or rounded in the most perfect manner.

We sometimes bore a hole in the end of the shaft, to insert an augur for boring holes for joint bolts or mortises. The table is raised or lowered by turning a screw to regulate the distance from the centre of the hole to the edge or side of the stuff, thus making a very handy Horizontal Boring Machine.



WRIGHT'S PATENT SCROLL SAW.

WRIGHT'S PATENT SCROLL SAW.

The points of superiority claimed in WRIGHT'S PATENT SCROLL SAW, over all others, are: —

1. The manner of connecting the saws with the machine. This is simply done by slipping one end of the saw through the table, and hitching it on the cross-head at the top of the Pitman, and hitching the other end to the bottom of the cross-head in the slides above the table. The time saved in this arrangement, over any other style, cannot be estimated, especially in sawing open work, for the saw is instantly changed from one place to another.

2. The mode of straining the saw by a spring above, is worthy of particular note. This gives a clear table for sawing work of any length.

3. The saw and spring being attached to different sizes of pulleys, — the saw to the large one in the centre, and the spring to the smaller ones on each side, — permits the saw to have all the stroke required, while the spring only moves about one-third the distance. On this account, the spring may have any degree of strength necessary, and vibrate much more rapidly than it could be made to do if it was required to traverse the whole distance the saw moves. Again, the slight motion of the spring saves the trembling of the building, which is so unpleasant where other saws are in use.

4. The simplicity and compactness of the head is a valuable peculiarity. It embraces the foot, raised or lowered by the gearing at the top, for holding different thicknesses of stuff; the revolving guide block, with slots in the outer edge, in which the saws of

any width are held steady while in operation; the slide, hung on a pivot at the upper end of the shoe, and held by a set screw near the bottom, in which slide the cross-head, to which the saw is attached, is made to move. If the bottom of the slide is thrown forward, the saw, in passing down the plane, strikes ahead; thus, for sawing fast, any desirable amount of rake is given the saw. The whole head may be raised or lowered, for saws of any length, by loosening a set screw in the back of the post.

5. The saws are not liable to be broken by the pin in either end giving way; for, if the upper pin fails, the saw drops through under the table. If the lower one breaks, the saw is drawn up by the spring above the table, and receives no other injury.

These machines are made in two sizes, according as the majority of the work is heavy or light. But either size is readily adapted to coarse or fine work, for persons doing a general business, by merely changing the saws.

Besides the above-named advantages, the saws are got up in the *very best style*, and may be run with not more than *one dollar a year expense for repairs*. The space occupied is not more than three or four feet square.

DIRECTIONS FOR PUTTING UP

WRIGHT'S PATENT SCROLL SAW.

1. Locate the frame as near as may be where it is required to stand.

2. Fasten the iron and wood parts of the post together.

3. Secure the head, N, to the iron post, by the set-screw in the back of the post; have the lower part of the shoe even with the bottom of the post, as shown in the drawing. If desired to use an eighteen-inch saw for the shortest length, run the foot, H, if the stroke of the saw is eight inches, down six and one-half inches from the bottom of the head.

4. Find the height of the ceiling from the top of the table, which will be the length from the foot to the upper end of the wood post. Make the upper end of the wood post secure to some reliable timber.

5. Attach the braces, X′ X′, to each side of the post. They may be made of half-inch rod iron, and the lower end secured in the holes of the iron post, with a small key through the end. Cut a screw three or four inches on the top end of the brace, which passes through a bracket, and is held firmly by a nut on the upper side of the bracket. By the action of the nut on either brace, the post and head is placed and kept in its perpendicular position, which must be done before the frame is made secure. The back brace, X‴, may be of iron or wood, to be attached to the bottom of the iron post.

6. Move the table to its proper place; remove the guide block, G, by unscrewing the foot from the rod, 1; take a narrow saw, with a pin secured in each end one-fourth of an inch long; attach the saw to the lower cross-head, and to the back slot of the brass

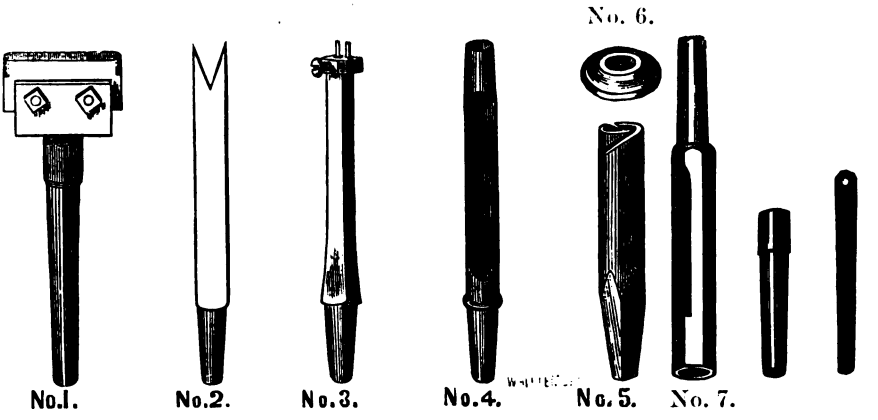
cross-head above the table; move the table and level it up, so that the saw is perpendicular each way, and fasten it to the floor by tacking pieces about the feet.

7. The spring may be hung up in front, instead of running through the post, as shown in the cut. The blower, in case the spring is put in front, may be arranged as there shown, except that the iron rod should be bent two inches at the top, at right angles, and run through the side of the spring. When it is desired to saw greater thickness of stuff, the head may be raised by loosening the set-screw in the back. A longer saw can be used by hooking up the cross-head along the strap, S, in holes made at distances to suit. Never use the saw without having the guide block in its place, and when using a narrow saw, the back of the saw should strike the bottom of the crease in the guide block. For a wide and coarse saw, the guide block should be turned round, so that the saw will pass into a deep slot, and the lower end of the head may be thrown forward, to give rake to the saw for cutting faster. This is one of the great improvements of the machine. When it is desired to strain the saw more, the cross-head may be hooked up along the strap, or the iron strap on the springs may be moved forward. File the saws very hooking, and a little on a bevel or fleming. Coarse rip saws not so much fleming, but very hooking. When the guide block is worn so that it will not hold the saw steady, have a new one put in its place, as it is very important, especially for fine saws, to have them kept steady.

The above machines are warranted to run with less power and less expense than any other scroll saw in use; and if put up according to directions, are warranted to give perfect satisfaction.

The common size has tight and loose pulley ten-inch diameter and three and one-quarter-inch face. Large size, twelve-inch diameter, four-inch face, and should make 350 turns per minute.

SASH, BLIND AND PIN TOOLS.



No. 1. — Blind Slat Chisel, with one set of cutters.

No. 2. — Double Chisel, for mortising sash bars.

No. 3. — Staple Punches, for swivel blinds.

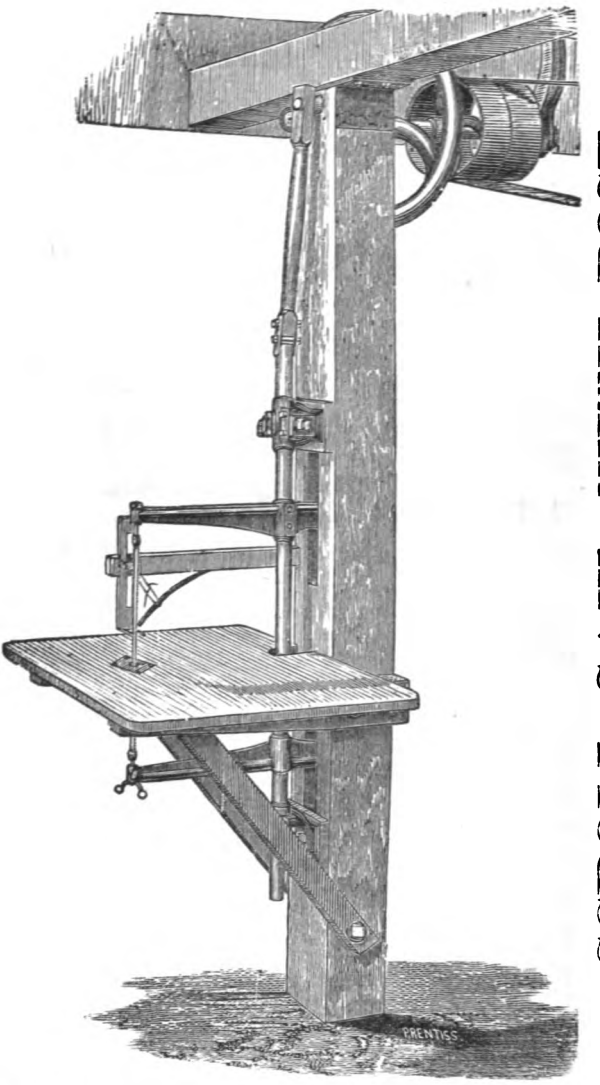
No. 4. — Pin Tool, for making pins.

No. 5. — Hollow Cutter, for rounding blind-slat tenons.

No. 6. — Tool for pointing pins.

No. 7. — R. Ball & Co.'s Patent Pin Tool, made of steel, with two sized tips.

Nos. 1, 2, 3, 4 and 7 may be used in our Foot Mortising Machine. No. 5 is made with a square shank, to use in the boring shaft to Tenoning Machines, or may be made with a round shank, to use in the small Boring Machine.



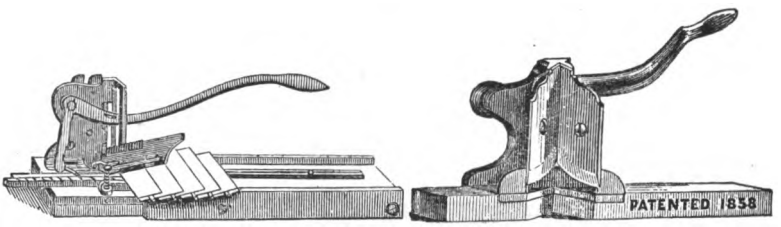
SCROLL SAW, WITH POST.

This is a strong and well-arranged machine for common **sawing,** where the post is no objection. The shaft is made of gas **pipe,** and slides up and down in swivel boxes, lined with Babbitt **Metal.** The arms that hold the saw are malleable iron, of **sufficient** strength for all ordinary purposes.

Crosby's Blind, Lath and Rod Wiring Machine,

AND

S. W. HALL'S PATENT MITRE MACHINE.



Crosby's Blind Wiring Machine. **Hall's Mitreing Machine.**

Permit us to call your attention to the above machines, as we know they are articles that it is for the interest of all persons engaged in the manufacture of doors and blinds to have. In proof of this assertion, we refer to *all* persons having these machines in use, as they have kindly given us their opinions in writing.

Crosby's Patent Wiring Machine, for Pivot Blinds, is for driving the wires or staples into *either* or *both* the lath and rods. It saves the necessity of marking or pricking either, and drives the wires accurately in the centre or at an angle, as may be required, in each lath or slat. It spaces the rod and drives the wires any given distance apart, and, if desired, attaches the two together; all this without the necessity of handling the wires, as they are taken from the box with a simple instrument which we provide for the purpose, which takes up a number of staples at once, and they are easily slipped upon the rack of the machine, from which it feeds itself, driving one wire at each motion of the lever or handle. The amount of work this machine will do is only limited by the rapidity with which the laths and rods can be handled. It can be worked by boys as well as men.

The durability and simplicity of this machine makes it desirable for all large manufacturers, and the price brings it within the reach of the carpenter who only makes blinds for his own business, and journeymen who work by the piece.

The Mitre Machine, S. W. Hall's patent, is so simple it hardly needs a description. It consists of two knives, set at right angles, so arranged that by one motion of the lever the moulding is cut and both angles of the mitre made. Thus it will be seen that this machine will do the work more than twice as fast as it can be done with a saw and box. Its greatest merit consists in its accuracy, *always* cutting a true mitre, doing away entirely with the trouble and expense of continually making mitre boxes. Car Builders and others, using hard wood or gilt moulding, will find this a very useful machine, as it cuts so smoothly that the gilt is not broken.

RULES FOR CALCULATING

THE

SPEED OF DRUMS OR PULLEYS.

PROBLEM I.

The diameter of the Driven being given, to find its number of revolutions.

RULE: Multiply the diameter of the Driver by its number of revolutions, and divide the product by the diameter of the Driven; the quotient will be the number of revolutions of the Driven.

PROBLEM II.

The diameter and revolutions of the Driver being given, to find the diameter of the Driven, that shall make any given number of revolutions in the same time.

RULE: Multiply the diameter of the Driver by its number of revolutions, and divide the product by the number of revolutions of the Driven; the quotient will be its diameter.

PROBLEM III.

To ascertain the size of the Driver.

RULE: Multiply the diameter of the Driven by the number of revolutions you wish it to make, and divide the product by the revolutions of the Driver; the quotient will be the size of the Driver.

PATENTED AUGUST 14, 1867, AND MARCH 24, 1868.

HAVING purchased the Patents of the Monitor we are prepared to receive orders for this new and improved Moulding Machine, which we confidently recommend to be the best in market for universal work.

For particulars send for circular, or call at our place of business, and witness the working of the machine.

We also manufacture Daniels' Dimension, and Woodworth Improved Patent Planers and Matchers, Sash Sticking and Moulding Machines, Patent Hub, Door, and Rail Car Mortising Machines, Scroll Saws, Saw Arbors, and a variety of other machines for working wood.

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RUSS' PATENT

MONITOR MOULDING MACHINE.