LOWELL MACHINE SHOP

COTTON MACHINERY

LOWELL, MASS. U. S. A.

The Lowell Machine Shop.

BUILDERS OF

LOWELL, MASS.

COTTON MACHINERY.

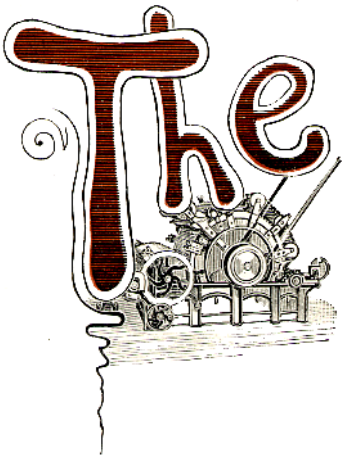
ROBERT H. STEVENSON, TREAS. 28 STATE ST., BOSTON, MASS.

CHARLES L. HILDRETH, SUPFRINTENDENT, LOWELL, MASS.

1893.

PRESS OF
BUTTERFIELD PRINTING & BINDING CO.,
LOWELL, MASS.

INTRODUCTION.



GREAT changes which have taken place in the construction of Cotton Machinery during the past five years is partly shown in the illustrations of machines here represented, but many of the minor alterations in details could not well be shown without special drawings of the parts, which it has not been thought best to illustrate in a catalogue of this sort. Special catalogues of the different machines have been issued, from time to time, giving the various changes, and also the gearing of many of our machines, and will be sent to those using them.

The greater speed and production now demanded of cotton machinery of all kinds has been fully met in the machines we are now building, while in point of design, convenience in running, and accuracy of construction they are not excelled by any heretofore made. It has been our constant aim to bring the construction of cotton machinery to as near perfection as it is possible to make it, and to this end we are making constant additions of new and special tools, besides having a large force of experienced draftsmen employed in designing new features and improvements.

The building of cotton machinery in Lowell was begun by the Merrimack Manufacturing Company, who erected a portion of our No. 1 shop in 1824, to furnish their second mill. They sold the plant the following year to the

Proprietors of Locks and Canals on Merrimack River, a corporation formed to develop the water power and equip mills complete. They continued the business until 1845, when the entire plant was sold to the Lowell Machine Shop, by whom the business has been carried on uninterruptedly ever since.

The shops are situated between two canals, and have ample railroad facilities, one track running directly into the yard, while there are other tracks on each side.

The entire plant, with tenement houses, occupies some thirteen acres of land, and the floor surface of the present shops, foundry, etc., exceeds seven acres, while the setting-up or erecting shops and storage rooms would add nearly as much more.

Some two hundred to three hundred men were at first employed, with a foundry capacity of one hundred tons of castings per month, while at the present time sixteen hundred men may be employed, and over eight hundred tons of castings can be produced per month.

Many changes have been made the past few years. Old buildings have been remodeled and added to, new buildings erected, besides large additions of new and special tools, and every exertion has been made to execute our orders promptly, as well as to keep up the present high standard of work.

CONTENTS.

PATENT REVOLVING FLAT CARDING ENGINE

SCROLL PATTERN.

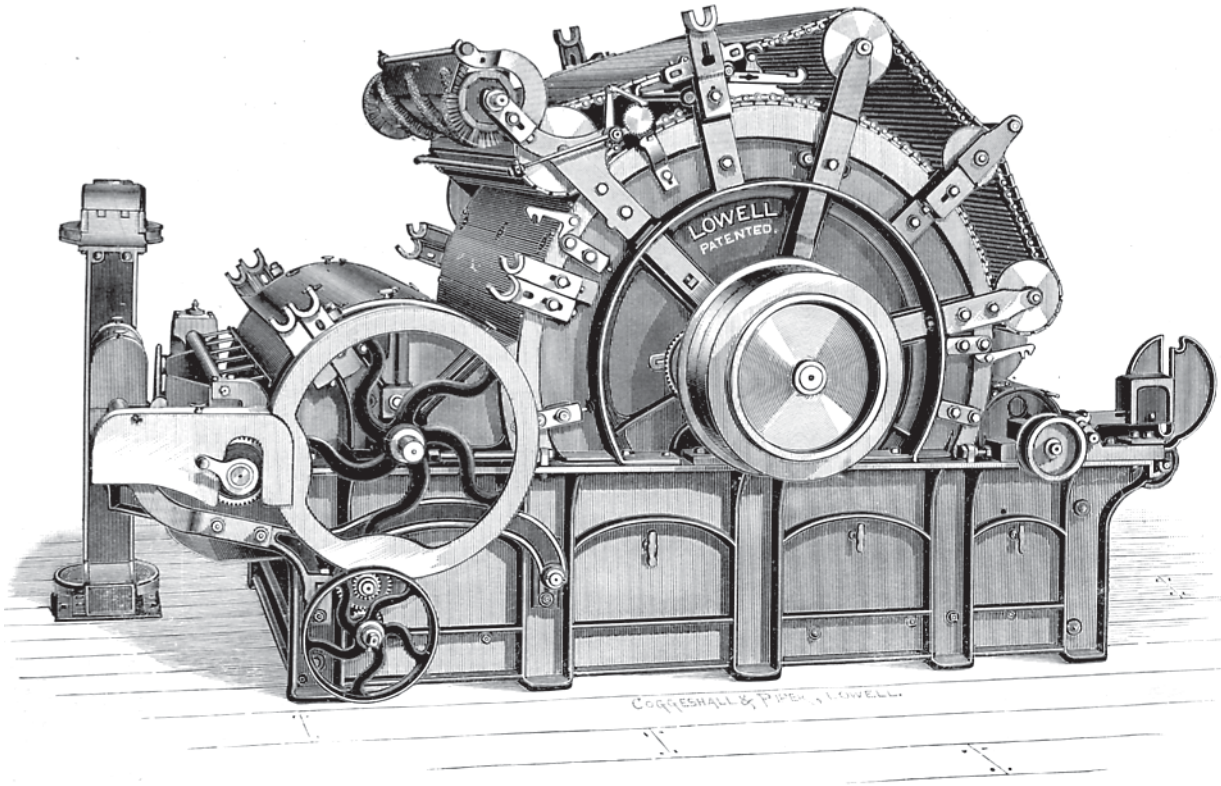
THE attention of our customers is invited to our Scroll pattern of Revolving flat Carding Engine, and we desire to say that it is the **only** Card, of American construction, in which the adjustment of the flats is at **one** point on each side of the Card.

We have adopted only such improvements and conveniences as have proved to be good after several years trial. A complete set of new and accurately constructed tools of special design have been put in, so that the workmanship is not excelled by any similar Card in the market. All parts are made to standard gauges, and tested as to their trueness and accuracy.

CYLINDERS — are 50 inches in diameter and 40 inches wide on face.

DOFFERS — are 24 inches in diameter and 40 inches face. The bonnet is attached to the shroud by hand knobs.

METALLIC LICKER-IN — is 9½ inches diameter, covered with steel garnet wire. The shrouds are in two parts, and the unscrewing of the caps of the box enables one to remove the licker-in without disturbing the setting.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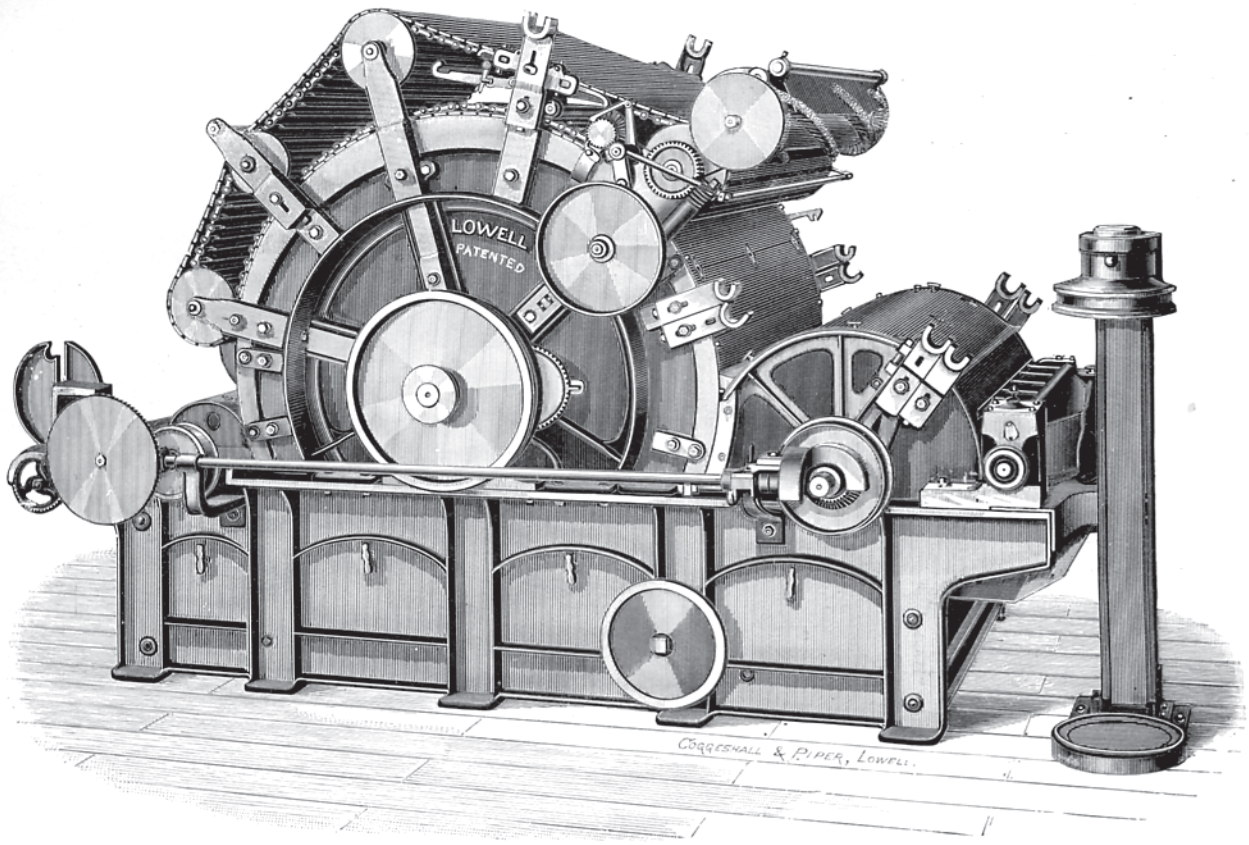
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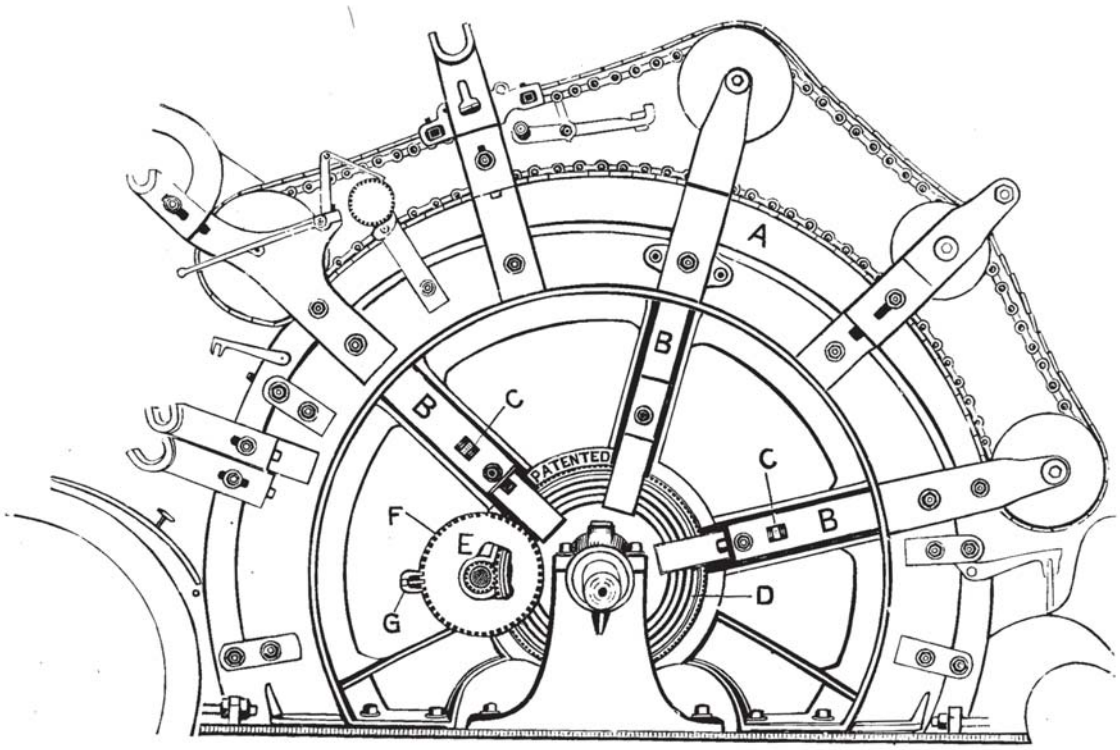

A
B
B
C
PATENTED
C
B
F
E
G
D

THE FLATS—are 106 in number, 39 working at one time. They are 1⅜ inches wide and, clothed to their full length, 15-16 of an inch on face of wire. They are tested and corrected to a 1-1000 part of an inch, both as regards the bevel and the perfect straightness of the wire surface its entire length.

THE SCROLL ADJUSTMENT—is the distinguishing feature of this Card, and will commend itself to all manufacturers for its extreme accuracy and simplicity. The sectional cut here shown may be explained as follows:

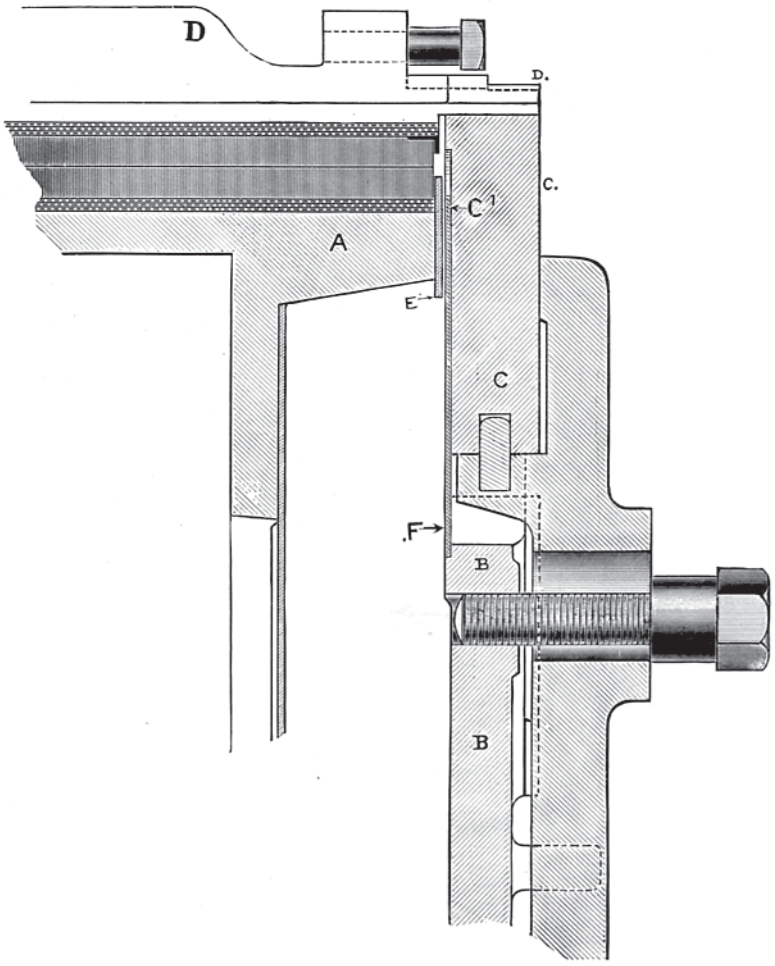
Around the pedestal of the main cylinder shaft, and held in a close-fitting form, is the scroll, D, or, as it is commonly called, a scroll chuck, in which jaws move in and out radially as the scroll is rotated in one direction or the other. These jaws are securely fastened to the arms, B, B, B, which are also attached to the flexible bend, A. The arms, B, B, B, slide respectively in specially planed seats, or runs.

The outside edge of the scroll is a spur gear, into which the pinion, E, engages. On the same shaft is the wheel, F, on the edge of which notches are cut at equal intervals. The latch, G, which moves horizontally on the side, engages in the notches of the wheel, F, acting as a stop to it. This latch has a hole drilled through the back of it, and through it the bow of a padlock may be inserted. This will prevent anyone but the person authorized from interfering with the setting arrangement.

The points, C C, on the arms, B B, are for the purpose of adjusting the extremities of the flexible bend in order to bring them into a position concentric with the middle of the bend. This is only done when the Card is first set up, it being unnecessary to move the bend again, except as a whole, by the wheel, F; for, as all the parts have been made concentric by these adjustable arms, they are constantly kept in position by the scroll, D, which is set absolutely concentric with the cylinder shaft.

The flats can be adjusted to the 1-1000 part of an inch by moving the wheel, F, and the amount of the adjustment is shown on the dial or face of the wheel, F. Absolute certainty is also ensured that every flat is concentric with the cylinder.

GRINDER—for the flats is the Knowles and Tatham (patented) for grinding the flats from their working surface; and, besides being extremely accurate in its working, it is altogether the simplest and easiest to handle of any of the numerous grinders now in the market. We have purchased the sole right for the use in United States, after investigating the merits of a large number.


D
D.
C.
C'
A
E
C
F
B
B

THE ARCH—is so constructed that the flexible is placed close to the cylinder. This flexible is heavier and thicker than any heretofore applied, and overcomes all tendency to buckle. The cut shows a sectional view of the arch, flexible and cut-off plates, and may be described as follows:

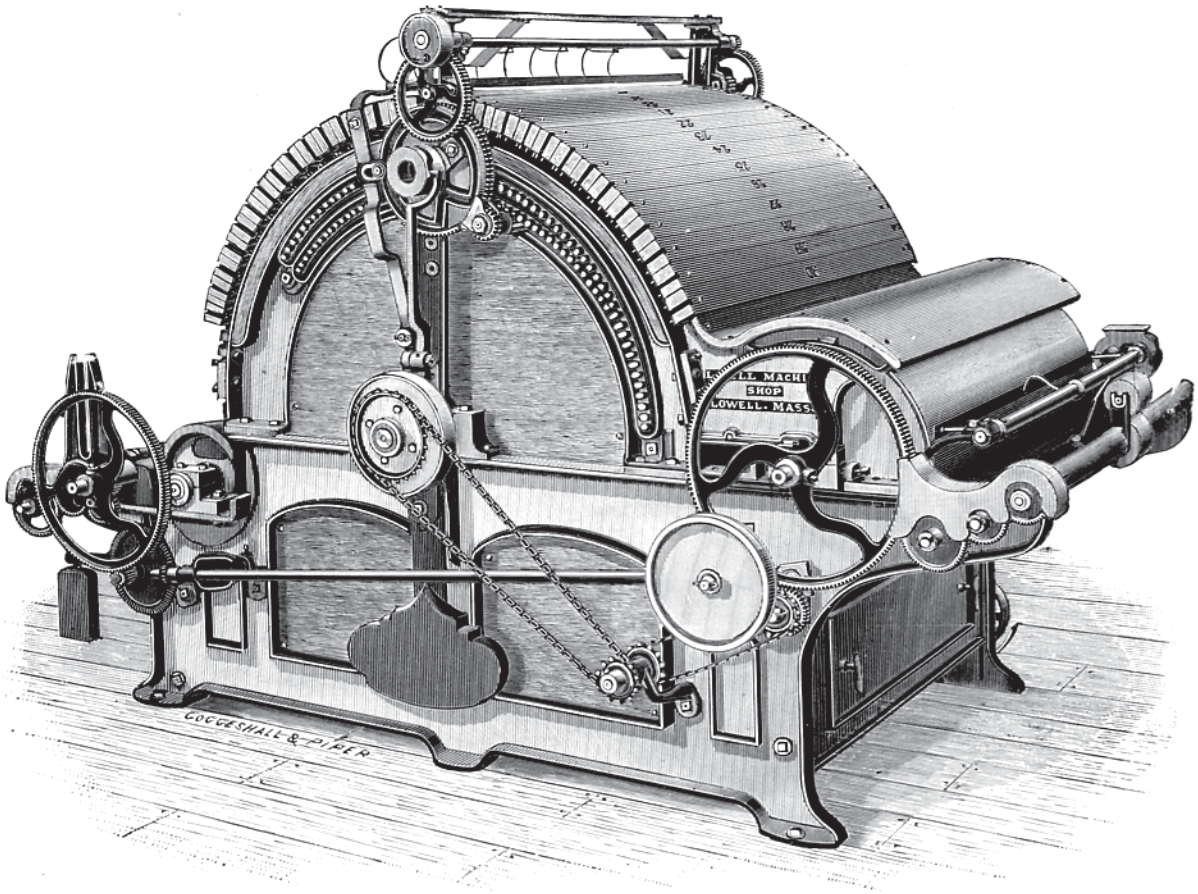
On the upper edge of the arch, B, is fastened a strip of steel plate, F, which extends to the inside upper edge of the flexible bend, C, the bend being countersunk a distance equal to the thickness of the steel plate, F. The object of so placing the plate, F, is to prevent all fly lint, etc., from blowing out over the tops of the arch, B, at the point, F, and by extending, as it does, nearly to the iron surface of the working flats, just clearing the rim facing of the cylinder at the point, E, it effectually prevents any and all accumulations of cotton. It also prevents refuse from falling between the edge of the cylinder and the arch, and gives a clean, smooth selvage to the sliver on the doffer.

OTHER ADVANTAGES ARE—

Double scored pulley on Doffer comb.
Cylinder Casing Plates over doffer and licker-in, adjustable from both top and bottom edges.
Improved Coiler for 9 inch, 10 inch or 12 inch Can.
The self-centering main cylinder bushings, made of gun metal.
Screens that are adjusted outside the Card.
The general convenient arrangements on and about the front calender girt.
The cleanest Card in the market.

DIMENSIONS—

Length over all, 10 feet, 3¾ inches outside, 18 inches lap.
Width over all, 63 inches.
Driving Pulley, 20 inches diameter; 3 inches face.
Speed, 165 revolutions per minute.


SHOP
LOWELL. MASS.
COGGESHALL & PIPER

NEW MODEL TOP-FLAT CARD.

TWO STYLES of this Card are built; one with iron flats, and one with wood flats, and in order to suit the various widths of mills we make them of three sizes, viz.: 48 inch, 42 inch, and 36 inch diameter of cylinder, and either 36 inches or 40 inches wide.

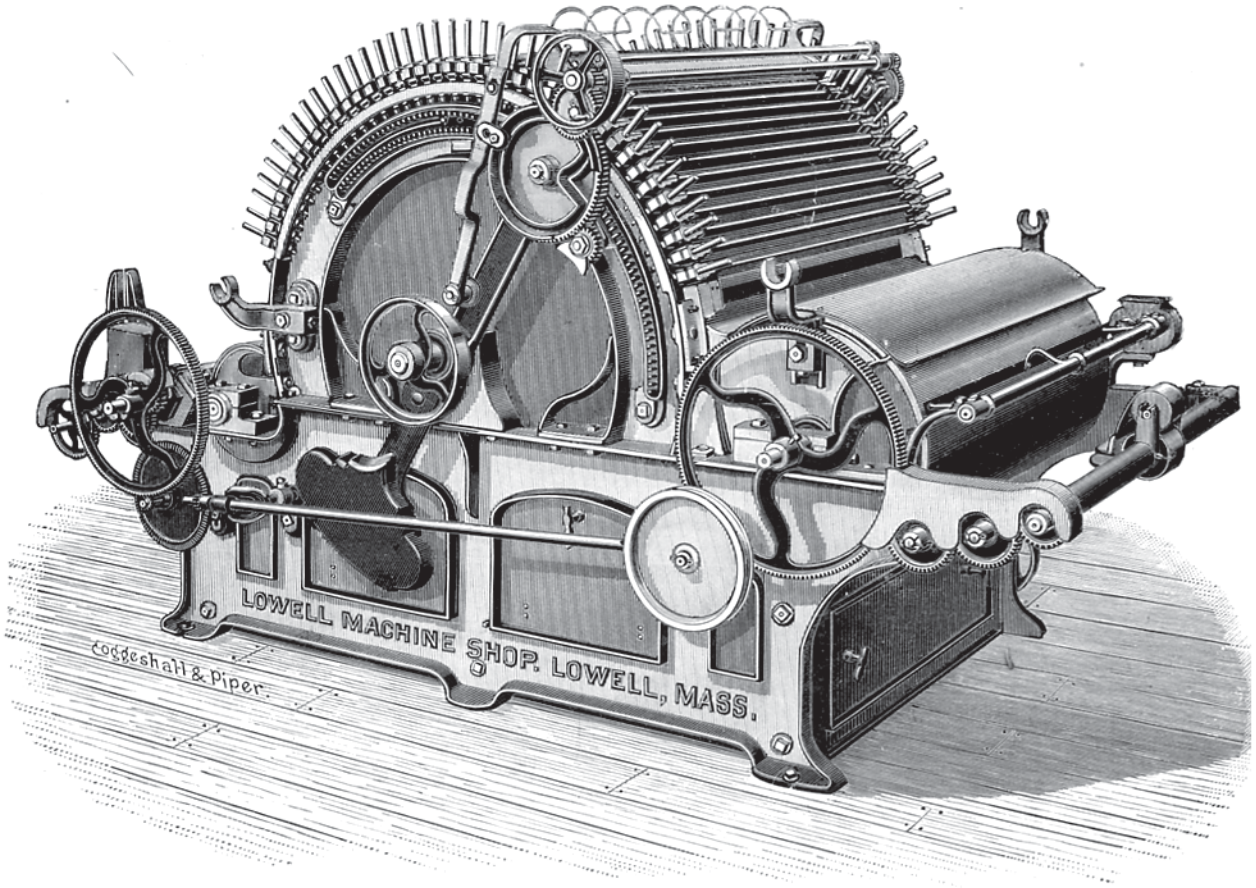
FRAME—is entirely of iron, no wood girts being used, and is of sufficient weight to give firm support to cylinder without bolting to the floor. Stands can be applied for holding spare laps if desired.

CYLINDERS—are from new patterns, extra heavy, and of sufficient thickness to give good bearing for the plugs. Our method of balancing these cylinders in open bearings ensures their running perfectly true. They are also tried, after the card is completed, in their own bearings. Iron heads are also furnished, and the face of cylinder ground.

DOFFERS—15 or 18 inches diameter, extra heavy, balanced in same manner as the cylinders.

LEADERS—7 inches, and 9½ inches diameter, are of extra heavy pattern, arranged for metallic or garnet wire clothing. They are perfectly balanced, with shrouded ends, have improved adjustment, and are covered with a steel bonnet.

FEED—is usually shell, and is proving very popular with most carders. Improved method of weighting arrangement of top roll and simple gearing. A waste roll, covered with cloth, rests upon the top of feed roll to gather up all flyings and dirt which may adhere to the rolls. The weighting and feed rolls can be disconnected and removed without the use of any tools.


LOWELL MACHINE SHOP. LOWELL, MASS.
Coggeshall & Piper.

SPACES — The cotton in passing from the leader to the cylinder goes under a steel back plate, which fills up the space, is circular in shape, and adjustable in all directions, and can easily be removed and replaced without disturbing the adjustment. The space between the last top and doffer is closed up by a similar steel plate and equally adjustable.

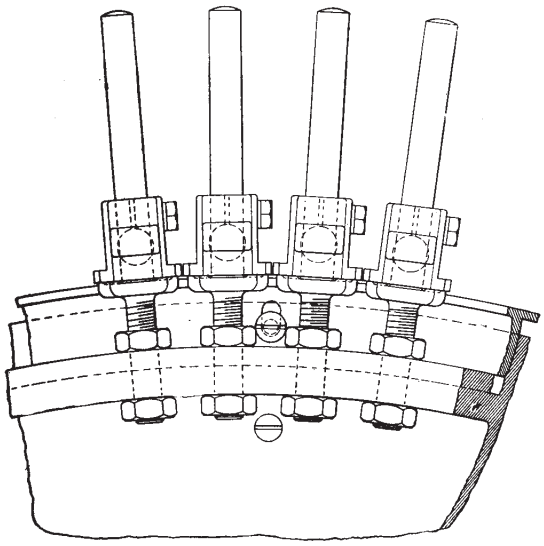
UNDER SCREENS — The leader strikes a downward blow, carrying the stock over the edges of two bars of triangular form, at which point the heavy bunches, seeds, etc., are knocked out; thence over a perforated metal screen, whose openings and arrangement are such as to clean the stock of finer dirt and leaf to the best advantage. This screen approaches closely to the cylinder, is hinged in centre, and is adjustable for distance from either leader or cylinder.

The space from doffer to leader, underneath cylinder, is closed by an adjustable steel faced under-doffer plate, with sharp edge at top where cylinder and doffer approach each other; also by a metallic barred screen so arranged as to prevent the throwing off of anything but the short and useless fibre.

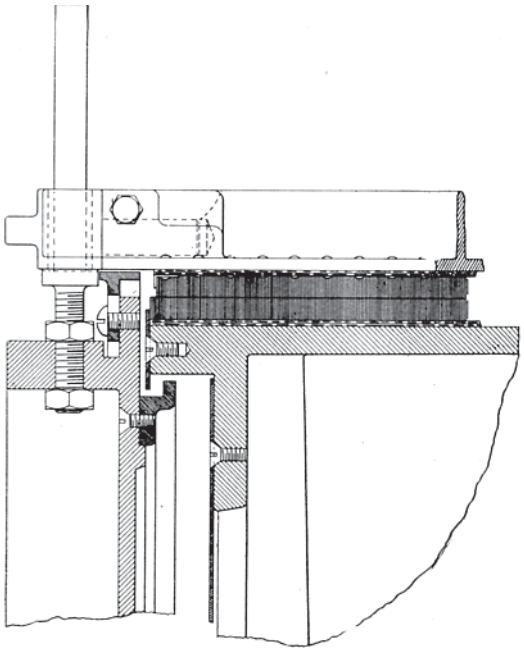
It will be seen that the entire surface of cylinder is closed in by either plates, screens or carding contract, thus confining the available stock to the cylinder and preventing air currents, and enabling the cylinder to run at a higher rate of speed than heretofore possible.

STRIPPER — is Fall's patent quick stripper, the peculiarity of which is that while it moves at a uniform rate of speed in passing from one flat to another, when it reaches the flat to be stripped the speed is so increased that the flat is removed from the cylinder but a very short length of time, thus preventing the gathering of cotton between the flats, as is frequently done by the ordinary Wellman stripper. This stripper is as simple and as little liable to get out of order as the Wellman stripper.

RACK — One of the most ingenious contrivances on this card is Fall's patent double rack. It has always been an object with carders to have the flats nearest the feed rolls stripped oftener than those nearest the doffer, as the greater part of the work comes on these first flats. Hitherto this has been done by complicated mechanism in the stripper, but with the present contrivance it is done entirely on the rack, that part of the rack nearest the feed being made double, and allowing the stripper to go over the first half of the flats twice before stripping those near the doffer.



TOP FLATS—Made of either wood or iron. When of wood, of two pieces of pine, thoroughly seasoned and veneered on the top with cherry. The cut on page 14 represents our 48-inch Card, with 30 wood flats. The iron flats are either 1 5/8 inches or 1 3/8 inches wide, of a shape best adapted for lightness and stiffness. Each flat is independently adjustable for distance and pitch by a new and improved device, as shown in the cuts, which does away with the four set screws that are used with wood flats. The outside surface is filled in with a wood covering to prevent the collecting of fly between the flats. This covering can be readily removed when reclothing. The flats can be removed from the cylinder and replaced again without disturbing their adjustment. The clothing is secured by a Whiteley Clipt, and can be reclothed at the mill with but little more trouble than the wood flats. They can be ground on any ordinary grinder without requiring a pitched surface to rest on. Our 42" Card, with 40 iron flats, is shown on page 16.



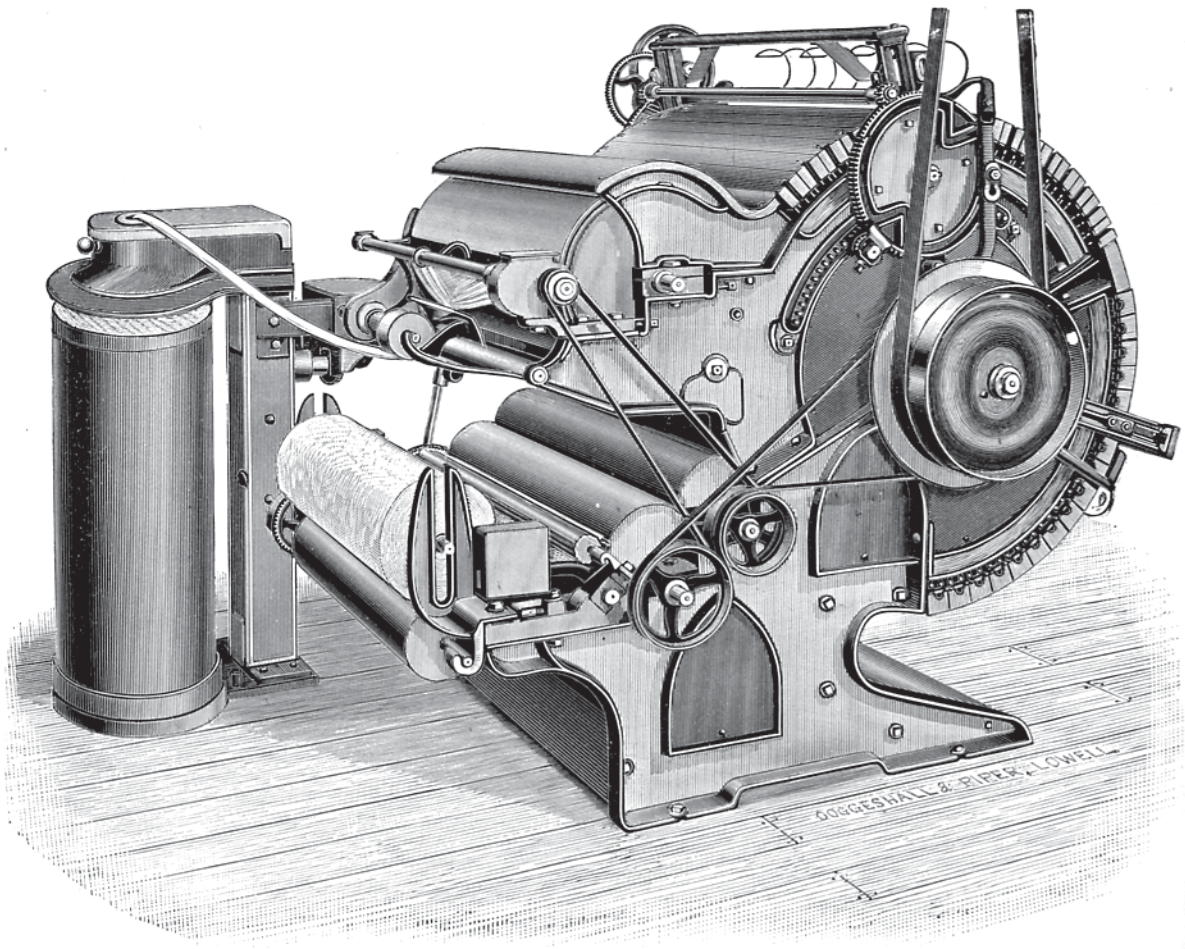
DIMENSIONS —

36 in. Cylinder 7 ft. 10½ in. long.
42 " " 8 " 6 " " } 59¼ inches wide for 36-inch Card.
48 " " 8 " 10½ " "

		1⅝ in. wide.	1⅜ in. wide.
36 in. Card	has 20 wood tops,	25 iron tops, or	30 iron tops.
42 " "	" 28 " "	34 " " "	40 " "
48 " "	" 30 " "	36 " " "	46 " "

PRODUCTION — It is well known that the production varies largely with the stock used, the kind of clothing on the card, and the skill displayed in setting the adjustments. If ordinary skill is used and fair stock, the card being properly clothed with tempered and hardened steel wire, we estimate that these cards will produce the following amounts in ten hours, per card, of as good quality as any other card under similar conditions.

48 inch card, 90 lbs., with wood tops; 110 lbs., with iron tops.
42 " " 80 " " " " 100 " " " "
36 " " 60 " " " " 75 " " " "


GOGGESHALL & PIPER, LOWELL

FOSS & PEVEY CARD.

THIS Card differs from the common top-flat card in having the lap placed under the doffer, and in having two leaders or licker-ins instead of one. The cotton, after being drawn through the feed-roll, is opened thoroughly by the first licker-in, which passes it to an intermediate carrier cylinder, or second licker-in, which in turn conveys it to the main cylinder. In case there are no licker-ins, the feed-roll delivers the cotton direct on the main cylinder. It then passes by seventeen under-flats, where the greater portion of leaf, neps and dirt is removed, and finally is carried forward over the cylinder by seventeen top-flats to the doffer, passing out above the lap to the railway apron or coiler. The first licker-in and main cylinder both strike a downward blow, thus throwing out much dirt and leaf before the cotton is delivered to the under-flats.

There are **two** Wellman self-strippers operated by the same cam arrangement, the under-flats being stripped twice to the top-flats once, or they can be arranged to strip alike.

An adjustable knife-blade is placed under the licker-in to clear it from hard bunches.

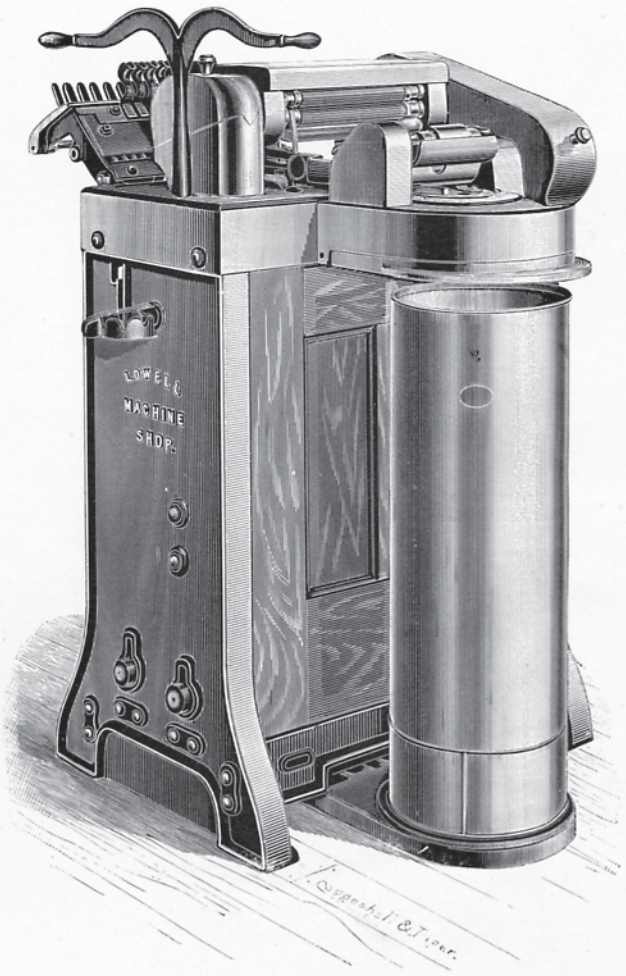
This Card has a capacity for producing 75 lbs. or more per day, and when properly managed and rightly understood will produce superior carding. It has been successfully run on all kinds of work. Changes have been made in this Card so as to bring it into line with the improvements recently made in other Cards. The cut opposite shows the Card with the Shell feed, Coiler, etc., and we are prepared to apply these improvements to old Cards of our own make.

Its general dimensions do not differ materially from our Top-Flat Card, the Cylinder, Doffer, Leaders, Tops, etc., being of the same size.

Width, including Driving Pulleys, 57⅝ inches.

Length, with Leaders and 15-inch Doffer, 7 feet 3¾ inches.

Weight, with Leaders, 2200 pounds.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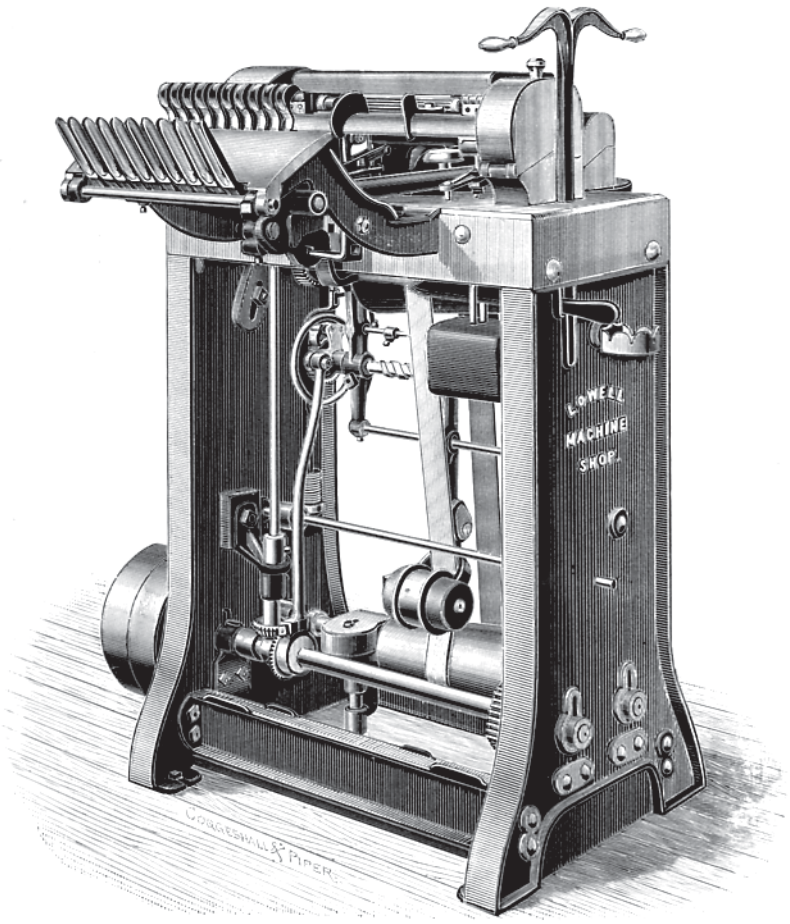

LOWELL
MACHINE
SHOP

RAILWAY HEAD.

OUR Head is substantially made, and has met with favor since its introduction. We build them with or without Coilers, and have improved them in many respects. The running parts are enclosed, so as to keep the dirt and flyings out of the gearing.

The fluted rolls usually have 10-inch bosses, though they are made of other lengths. There are four lines of steel rolls, the front one being 1½ inches diameter, and the others 1⅛ inches diameter. The top rolls are shell, and are weighted by a lever and a weight, so arranged that, when not running, they can be relieved of all pressure. Many of our heads are furnished with the patent metallic drawing roll, and they are said to give excellent results. The top clearers are of iron, handsomely polished.

The Evener works very quickly and rapidly by a ratchet attached to a coarse double-threaded screw.

The Cones are long, and a good distance apart, and the belt is weighted by a binder pulley to take up any slack or stretch.

The Trumpets are of good shape, and we can apply any of the patent trumpets.

The Driving Pulleys are 12 inches diameter, 3 inches face. They are made either right or left hand, facing the calender rolls, and can be belted from above or below.

The Turn Tables are arranged for cans 9 to 20 inches diameter, 36 inches high, and can be driven in one continuous direction, which is the usual way, or can have the reverse motion, if preferred.

The illustrations shown are of our new and improved Coiler Head, which differs in some particulars from the Head used with Apron Troughs. It has been designed for use where the Coiler system on Cards is operated to even the sliver before going to the Drawing Frame.

The Coiler is made for 12 inch, 14 inch or 16 inch cans, and is believed to be unusually compact and exceedingly convenient to get at. The trumpet is so placed that the sliver passes into the Coiler without dragging, and thus working the Evener unnecessarily.

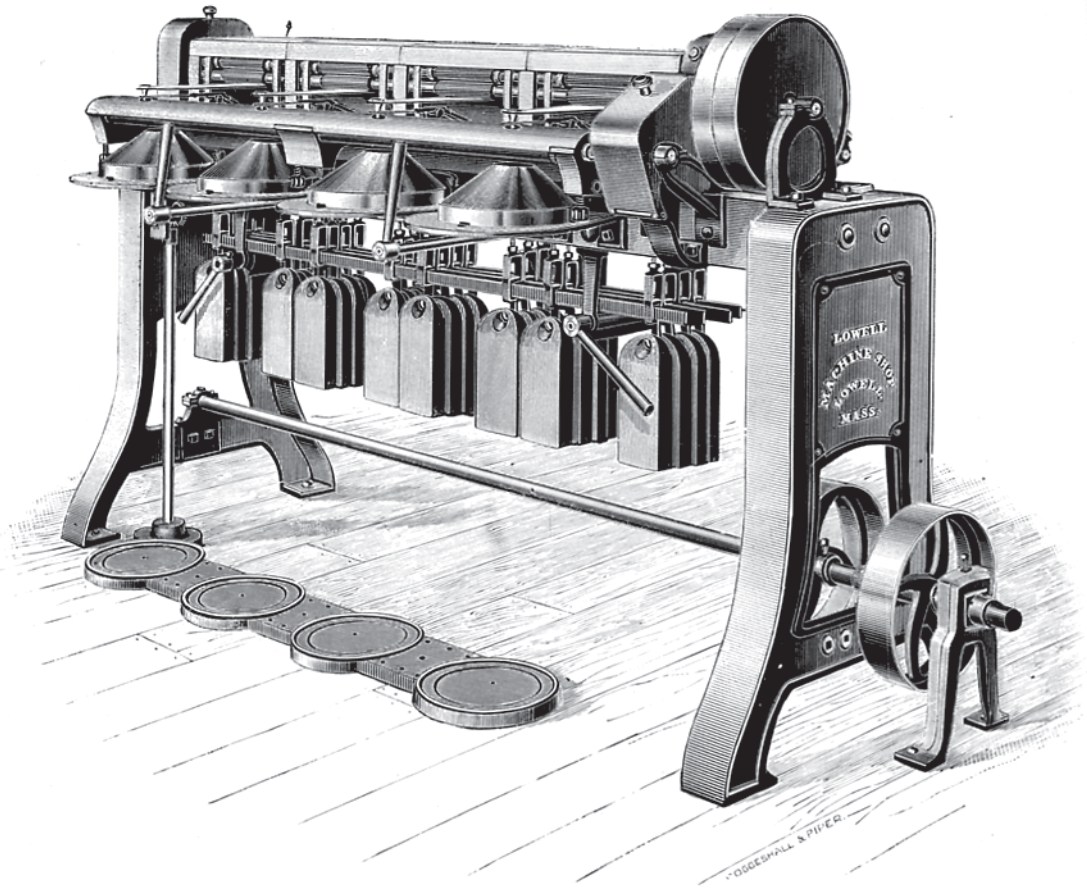
The Coiler Head is from entire new patterns, is substantially built and neatly finished. The running parts, as well as all gears, are completely covered and at the same time easily accessible to make changes.

The entire arrangement is so nicely adjusted that it is almost impossible for any amount of uneven work to pass through the machine.

These Heads are made double, or two deliveries on one table when required.

The Back Stop motions are arranged to double 8 into 1, or more if desired, and are placed sufficiently far from the back roll, so that the frame is stopped before passing through, and at the same time be convenient to piece up. Many of these Heads are now in use and giving excellent satisfaction.

Capacity is about 450 to 500 lbs. per ten hours, although more can be put through if desired.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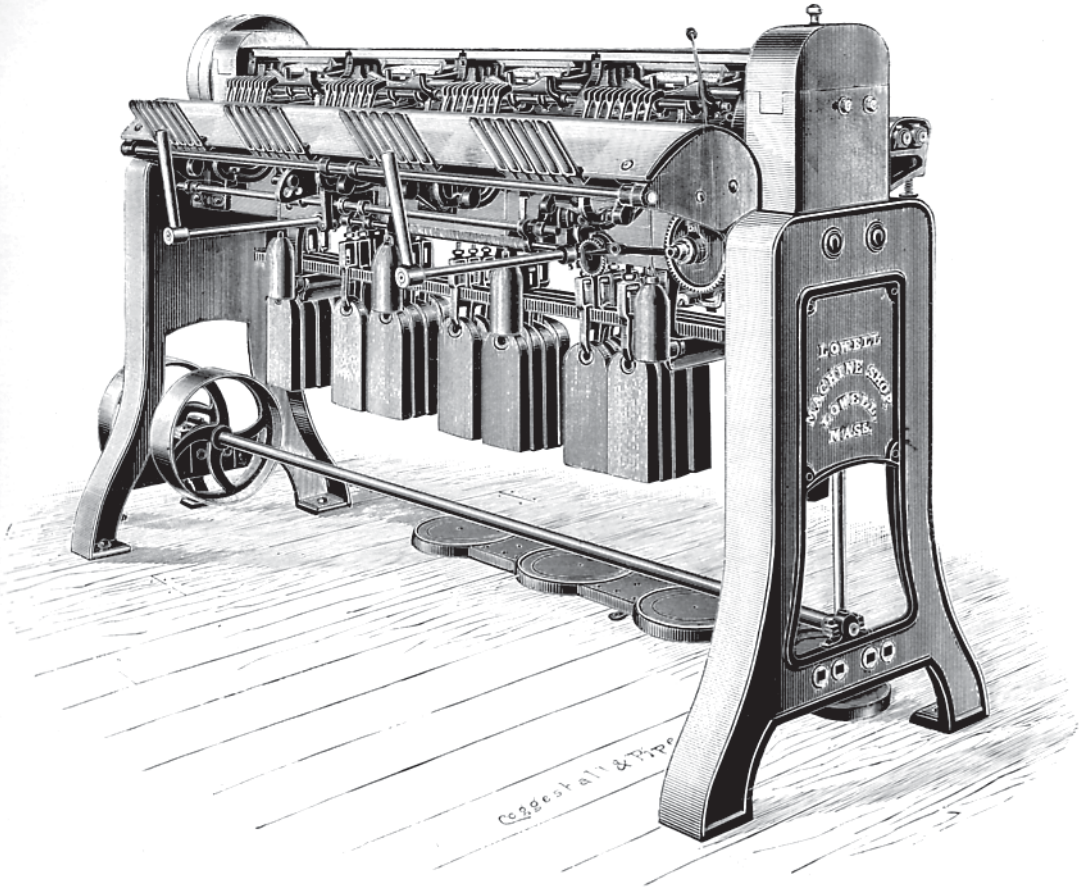
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DRAWING FRAMES.

THE CUTS on the preceding pages illustrate the style of Frames now built, the cut on page 27 shows the style of frame on the back, and that on page 26 the front or coiler side. They are made with rolls 16 inches long, with one boss to a roll, and are arranged to double 6 into 1.

FRAME—is made unusually heavy and substantial, and occupies as little room as is consistent with the good working of the parts.

TOP ROLLS—are shell for all lines, and 20 per cent. of spare shells are sent with each frame. We frequently make the back top rolls fluted when many ends are drawn under one boss. We also apply the patent metallic drawing rolls when called for, and have many frames running with them.

WEIGHTING—is done by levers and weight, arranged so that the top rolls can be relieved from any pressure when the frame is not running, the weights being so arranged that they have a direct pull when in use.

STOP MOTIONS—are easy and effective in their operation, great care being taken to make them as simple as possible without interfering with their effectiveness. We provide all our frames with both front and back stop motions, and would call especial attention to the sensitiveness of the former, which is on a new and patented principle, and on Coiler frames apply a very reliable coiler and can stop motion. The former prevents the winding up of the calender rolls, while the latter prevents the can from filling too full, and can be set so as to stop the machine when any number of yards have been delivered.

COILERS—are made for 10 inch or 12 inch cans, and are made accessible on both sides, a feature that will be appreciated by those using Coilers.

FLUTED ROLLS—are made of best steel, and we make our frames with three or four lines of rolls, either single or long boss rolls. The Calender Rolls are made with condenser grooves or straight faces, as preferred.

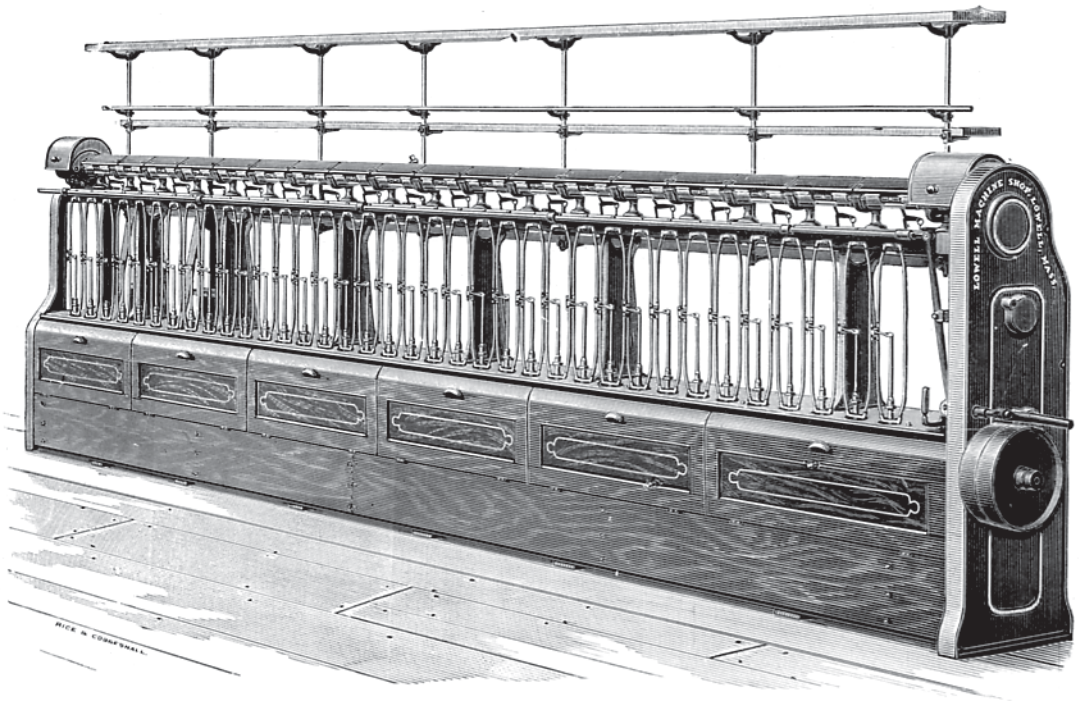
CAN TABLES—are provided for cans 9 inches to 16 inches diameter if of the ordinary pattern.

The driving pulleys are 13½ inches diameter by 2 inch face, and that on the counter-shaft (when furnished) 13½ inches diameter by 3 inch face.

We furnish with each frame 3 change gears. All the gearing is cut, thus ensuring smooth running of rolls.

These frames may be coupled together in any length and are belted either from above or below. They are constructed with the greatest care, and we believe them to be unequaled in the combination of simplicity, convenience and capacity for making the best work.

For lengths and other dimensions see table at end of this catalogue.


LOWELL MACHINE SHOP, LOWELL, MASS.

SPEEDERS.

THESE well-known machines are received with great favor by many manufacturers, and for the ordinary numbers of roving are unsurpassed in quantity and quality of work produced.

Many improvements have been made during the past few years, which have further increased the quantity of work done, as well as making the frame more convenient. The builder motion has been altered, and is now superior in simplicity and ease of operating to any heretofore applied.

The Flyers are of steel, made from patented designs, and are much lighter and stiffer than the iron flyer. These flyers do not come off in doffing, thus saving much time. The fluted rolls are of steel.

The Roll Gearing has been lately improved and altered, making it very convenient and easy to change, and is neatly covered. Gearing the rolls at both ends has now been adopted on these frames, and the results have been very satisfactory.

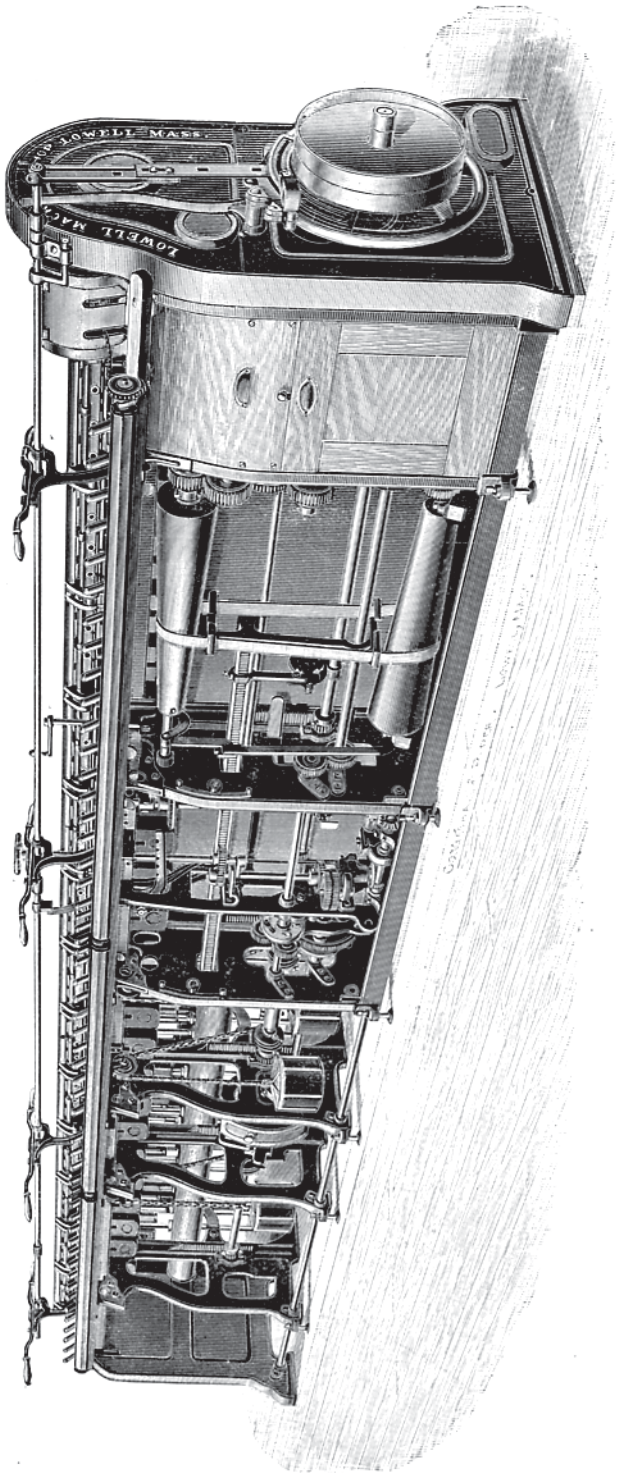
We are prepared to apply our new style ends and double roll gearing to all old frames of our make at a small expense. The increased strength in the yarn made from roving after the frames have been altered is remarkable, and we cannot urge the manufacturers too strongly to have their speeders changed to this method of gearing.

We apply a quick acting and effective stop motion on the coarse frames, or can furnish the back carrying roll if wanted.

The Creels on the fine and intermediate frames are arranged for single or double roving, and are provided with either iron or glass steps. These frames are constructed either right or left hand, and can be belted from above or below. A clock is provided with each frame to show the number of hanks produced.

The Driving Pulleys are 13 or 16 inches diameter, 2¾ inches face. Geared for any draft or hank roving desired.

The running parts are neatly cased to prevent dirt and flyings from injuring them, and no pains have been spared to make these machines the most effective in the market.


LOWELL MASS.

FLY FRAMES.

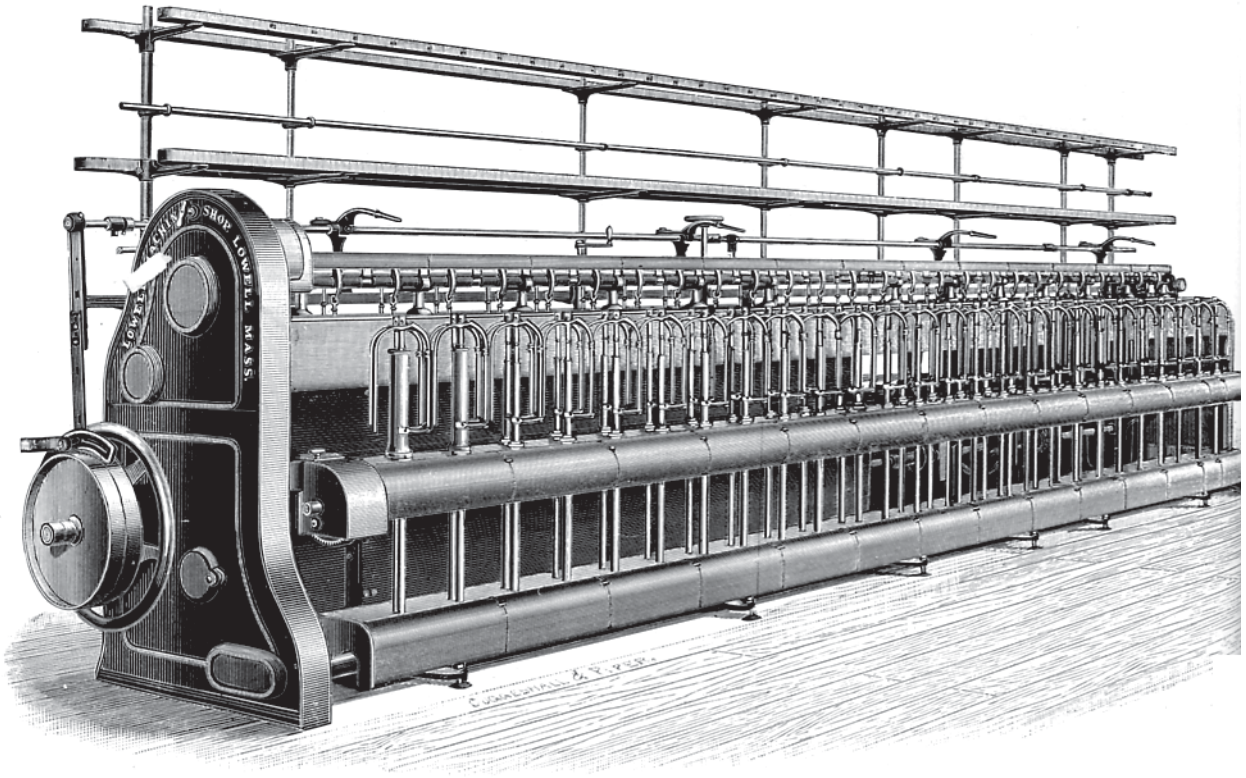
THE DEMAND for our Fly Frames, and their success on all numbers of roving, show that they are well designed for their work, and compared with similar machines are unequaled by any. Within the past two years we have remodeled our frames throughout, and have made radical departures from former practices, wherever the knowledge gained by past experience has made it expedient to do so. We desire particularly to call attention to the very material reduction in height of our frames, which will be found as low as any and lower than most makes.

Each frame is started up and run above speed in all its motions before leaving the shop, thus ensuring satisfactory work.

REVERSE MOTION — is an entire new departure from the ordinary practice, being made with spur gears instead of bevel, thus doing away with the working out of gear of the bevels, caused by slipping of set screws, wear of collars, etc. The motion of reversing is accomplished uniformly and quickly without any jarring of parts.

BUILDER MOTION — consists of the well-known sliding jaws driven by a right and left screw, in connection with vertical dog shaft and gap gear. The builder head (instead of being carried by a crooked arm attached to one of the main racks) slides on an independent guide bar, and is moved by a special gear on the lifting shaft. This construction admits of very easy adjustment of traverse of builder and bolster rail. The same set of builder head and jaws may be used on either a right or left hand frame in case of repairs.

COMPOUND — The Differential Box, commonly known as the "Compound," is justly considered, next to the cones, as the heart of all roving machines. In these frames we have devoted much thought to the mechanical detail of this part; and, after giving due consideration to the advantage obtained by giving to all parts of the compound the same direction of revolution as the main shaft, have adopted a construction giving that effect, and without any complication


LOWELL MACH. SHOP LOWELL MASS.

or increase of number of parts over the compound formerly employed. Cut spur gearing is used exclusively in our new compound, and also in the train leading from that to the bobbin shafts, ensuring steady and quiet running. The radial link is made with much enlarged bearings, and ample provision has been made for thorough lubrication of all the parts, which also are very accessible to inspection and easy of repair.

CENTRE HITCH—The power used for lifting the bobbin rail is applied to the lifting shaft at or near the centre of its length, instead of at one end, as is customary. We have termed this motion the "Centre Hitch," and by its use we do away with the torsion of a long lifting shaft, and prevent the "dwelling" of the bobbin at each end of the traverse.

FLYERS—are of steel, and made by the well-known firm of William Bodden & Son, of Oldham, England, whose reputation for these articles is unsurpassed.

BOLSTERS—The Mayor long tube bolster is applied to all our frames, giving steadiness to the spindles and a reduction in the power required to drive them. We also apply the short bolster when called for.

CONES—We no make both top and bottom cones of iron. They are accurately balanced and securely fastened to their respective shafts at both ends.

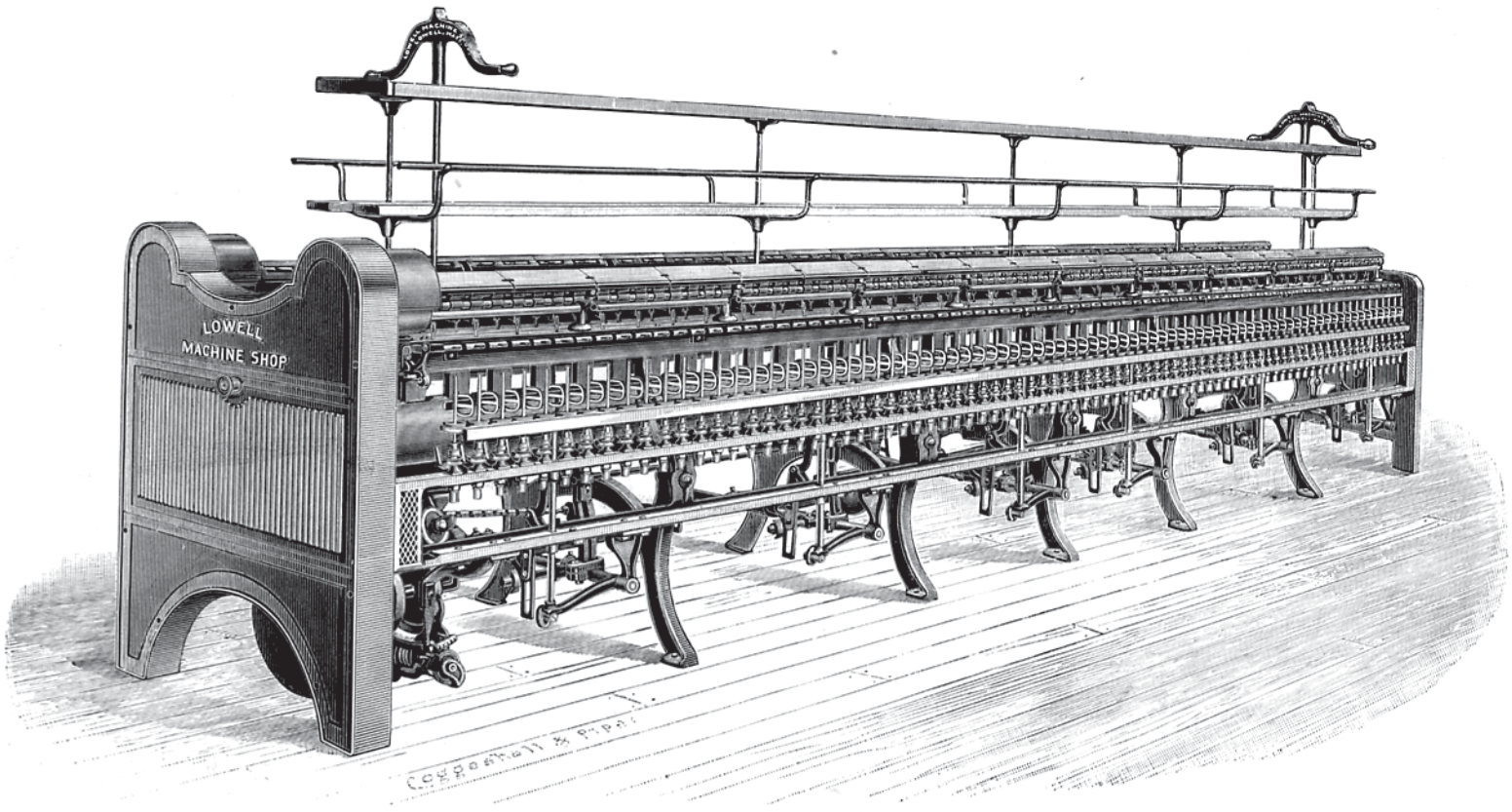
KNOCK-OFF MOTION—is of extreme simplicity, without the use of any gears whatever, and can be set to knock-off at any point of up or down traverse of bobbin.

RAIL GEAR COVERS—are of sheet steel, pressed to circular form and polished. The use of this material reduces the bolster rail balance weighting to a minimum; also the wear of lift racks and gears is greatly diminished. The top clearer covers are of iron, handsomely polished and painted, and have long hinges cast on.

GEARING—We use cut gears on all rolls and other parts wherever necessary. Most of our frames have the rolls geared at both ends, and consequently run without jar or vibration. Three sets of gears are furnished with each frame.

SIZES—In addition to the usual sizes given in the list, we make all other sizes, and can match any size flier, spindle or bobbin, so that frames in the same room shall be uniform in these respects.

DRIVING PULLEYS—are 16 inches diameter, and either 1⅝ or 2¼ inch face.


LOWELL
MACHINE SHOP

RING FRAME.

ON the preceding page will be found an illustration of our new style of Ring Frames, and although shown as a one-rail frame, we make them in the same style for two rails or common spindles. The appearance of these frames are an indication of the substantial manner with which they are constructed. Particular attention has been paid to the distribution of the material where it is most needed, so that the frames should not be heavy or clumsy, but at the same time should be sufficiently stiff and strong to allow of very high speed without vibration. The parts are accurately made on special tools so that they are easily put together. These frames are made 39 inches and 36 inches wide, outside measurement, and with any number of spindles desired.

CYLINDERS — are constructed of two thicknesses of tin, making them very stiff and capable of high speed. We rarely make them over 10 feet in length, but make them in four sizes, viz.: 6¼ inches, 7 inches, 8 inches, and 9 inches in diameter, have steel bearings, and are tested at speed and perfectly balanced in the shop.

RINGS — are forged from the very best of stock, are carefully hardened and inspected, and set in the rails perfectly concentric with the spindles. Notwithstanding that so much has been said in favor of the double ring and the advantages that they possess over the ordinary ring, it is still a fact that the latter make less waste of travelers and run smoother than the double. We apply the double ring whenever called for, either the Whitin or the Draper pattern. We also supply the various kinds of traveler clearers with the rings when desired.

SPINDLES — We furnish almost all the varieties of spindles that are made; such as the Common, Sawyer, Rabbeth, Sherman Rabbeth and others. Most of these spindles have been greatly improved within the past few years, and run at a much higher speed than heretofore. All spindles are now tested and run at speed in their bearings before leaving the shop, thus reducing the chances of obtaining imperfect spindles to a minimum.

ROVING TRAVERSE MOTION — is of an entirely new pattern, and avoids any dwell of the trumpet rod at either end of the traverse, thus preventing the liability of the top rolls becoming creased at each end. The trumpet rod is now made of steel, and the trumpets themselves are of brass, so slotted as to allow adjustment. This feature alone will commend itself to all spinners as being an advantage over the wood rod, both in durability and accuracy, and also enabling a longer traverse on the roll.

FLUTED ROLLS — are of the very best of roller steel, usually one inch in diameter, and are irregularly flutted so as to avoid cutting the top rolls. They are made with double or single bosses, are accurately turned for size, and are ground to a 1-1000 of an inch, great pains being taken to have them perfectly round and of uniform size.

WEIGHTING — We have a very large variety of weighting for the top rolls. Either one, two or all the rolls can be weighted, or any combination of them. We supply either wood or iron saddles, or, if preferred, any of the various styles of self-lubricating saddles.

TOP ROLLS — are usually furnished covered. We generally furnish shell front rolls, and 5 per cent. of spare is included with each frame. The waste or scavenger rolls are made either of iron or wood. If of the latter, they can be held to the roll by springs or weights, as preferred. We do not cover them unless ordered.

CREELS — are made one, two or three tiers high, and arranged for any size bobbin, and for double roving whenever desired. The boards can also be made adjustable for different sizes of bobbins. The steps are usually of glass.

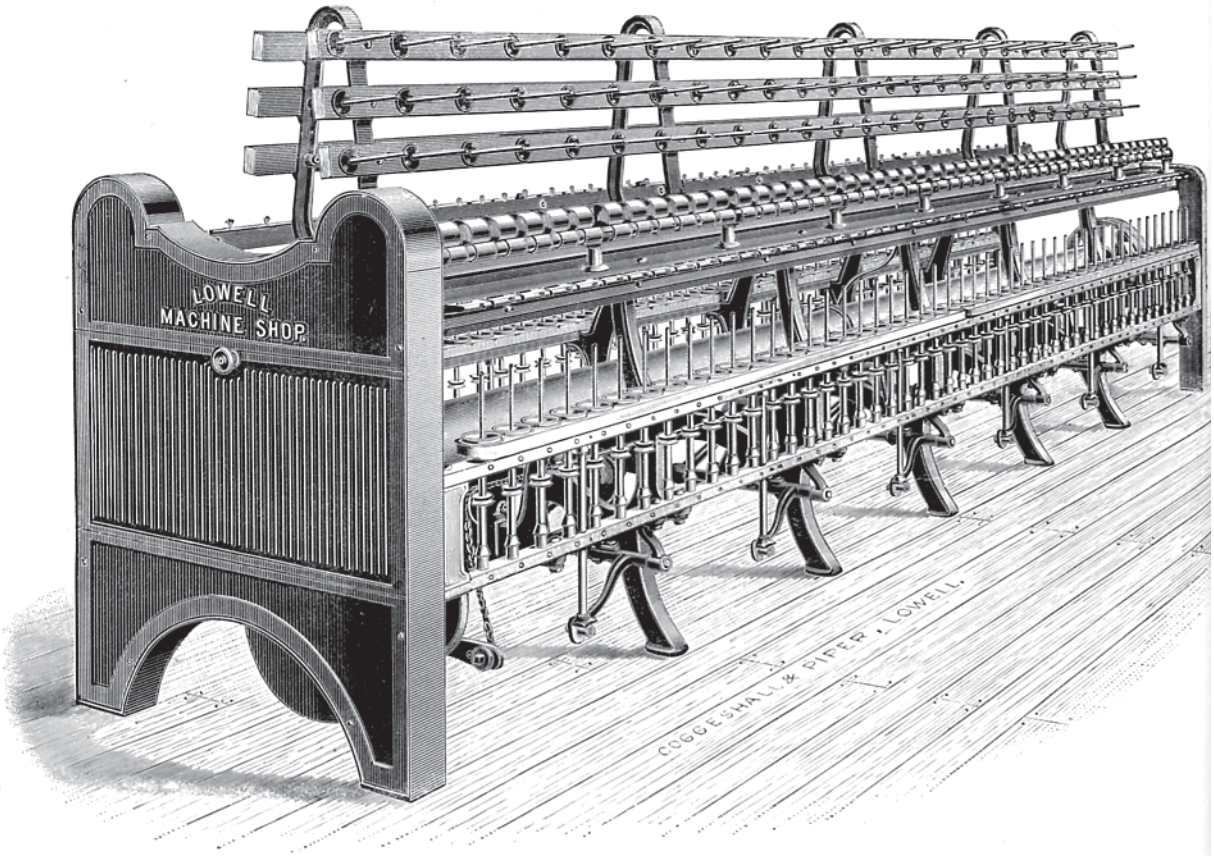
GEARING — Particular attention has been paid to gearing these frames so that there shall be no vibration of the rolls, and at the same time shall be very easy to make changes, and we invite inspection of our frames on these points, as we are confident that they cannot be excelled. All the gearing is enclosed in the head end of the frame, and is so covered that it is impossible for the help to get caught in it except through the grossest carelessness, and it keeps all lint and

flyings out. The gears are all spur from both the drum and builder or traverse motion, there being neither worm, worm gear or upright shaft as formerly. Complete tables of the gearing have been issued in book form, and will be sent to those having charge of our frames upon application.

SEPARATORS — Frames that run at high speed are now usually supplied with separators to obtain the best results. We were the first of the builders to apply them, and we illustrate one of the styles that we apply on one of the following pages.

OUR BUILDER MOTION — has been before the users of our frames for several years. It is one of the most convenient of all builder motions, simple and durable. We have made some changes in it, so that by a slight change of the cams the wind can be altered from warp to filling very quickly. The traverse gearing is arranged very conveniently, so that it can be readily altered when changes are required. The frames now being built are so constructed that a traverse of 5½ inches or 7 inches can be obtained, and at the same time the distance from the top of the bobbin to the thread guide remains the same. This will be appreciated by those who may at any time desire to alter their traverse, as the builder motion and cylinders are, or can be, altered with the spindle rails.

We furnish all the latest improvements; such as traveler clearers, Walmsley's patent thread board lifting device, and it has been our aim to produce the most perfect frame in the market.


LOWELL
MACHINE SHOP
COGGESHALL & PIPER, LOWELL.

RING TWISTER.

THE CUT on the opposite page represents in general style the appearance of our Twister. It will be noticed that they are made in the same substantial manner as our Ring Frames, and possess the same good qualities. We are, however, constantly making changes in the machines to suit different classes of work. We usually make them 36 inches or 39 inches wide, and can arrange them for water or dry twist.

RINGS — are made from the best steel, and are upright or flange, as preferred. They are set in the rings concentric with the spindle, and can be made adjustable if desired.

SPINDLES — For coarse, heavy work we put in the common spindle, as this is better adapted for the speed, and requires but little attention. For fine work and quick running frames we put in our quick running Twister spindle, which is well designed for this class of work.

ROLLS — are made in one or two lines, as may be desired, and the top rolls can be furnished double or single and of any weight wanted.

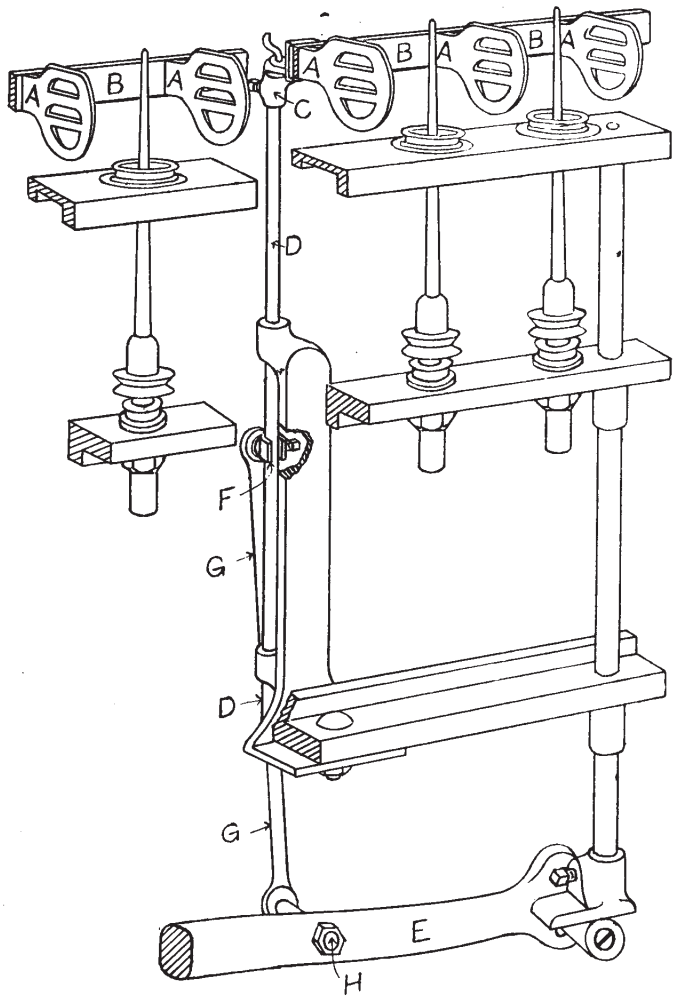
CREELS — We have a large variety of styles of Creels, arranged for twisting from two to eight into one, and they can be constructed with pins, as shown in the cut, or made to hold the spools on standards, with skewers, or to twist from beams.

BUILDER MOTION — In a machine where so many varieties of yarns are used it is important that the builder motion should be easily altered, so as to lay the various numbers of yarn properly on the bobbin. This is fully attained in our builder motion, and the traverse can be easily altered by the changing of a single gear.

TWIST — In no other frames are the arrangements for altering the twist so convenient as in ours, and the combinations for any number of turns per inch are easily attained with but very slight stoppage of the frame. We have prepared printed tables, showing at a glance the proper gears for any usual amount of twist, which we shall be pleased to send to users of our frames.

The drums, or cylinders, are made with the same care as in our Ring Frames, and are of the same diameters.

For lengths of Twisters and tables of twist see end of this catalogue.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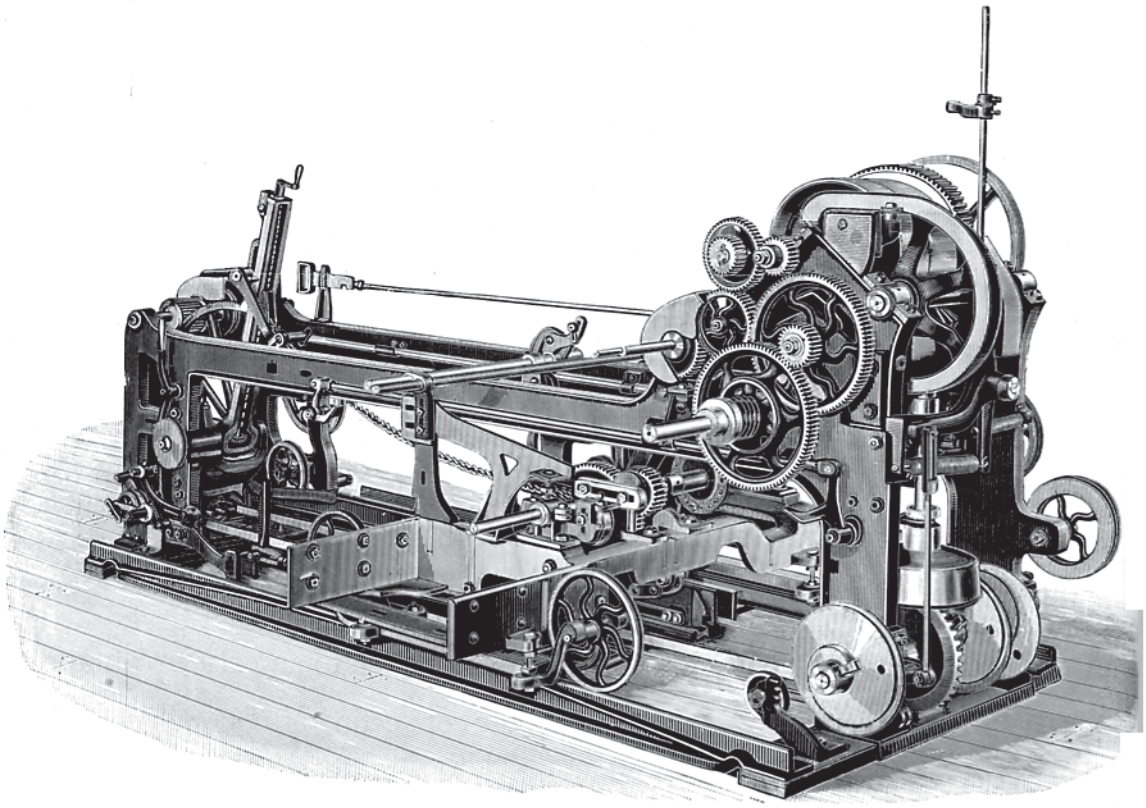
L. M. S. NEW SEPARATOR.

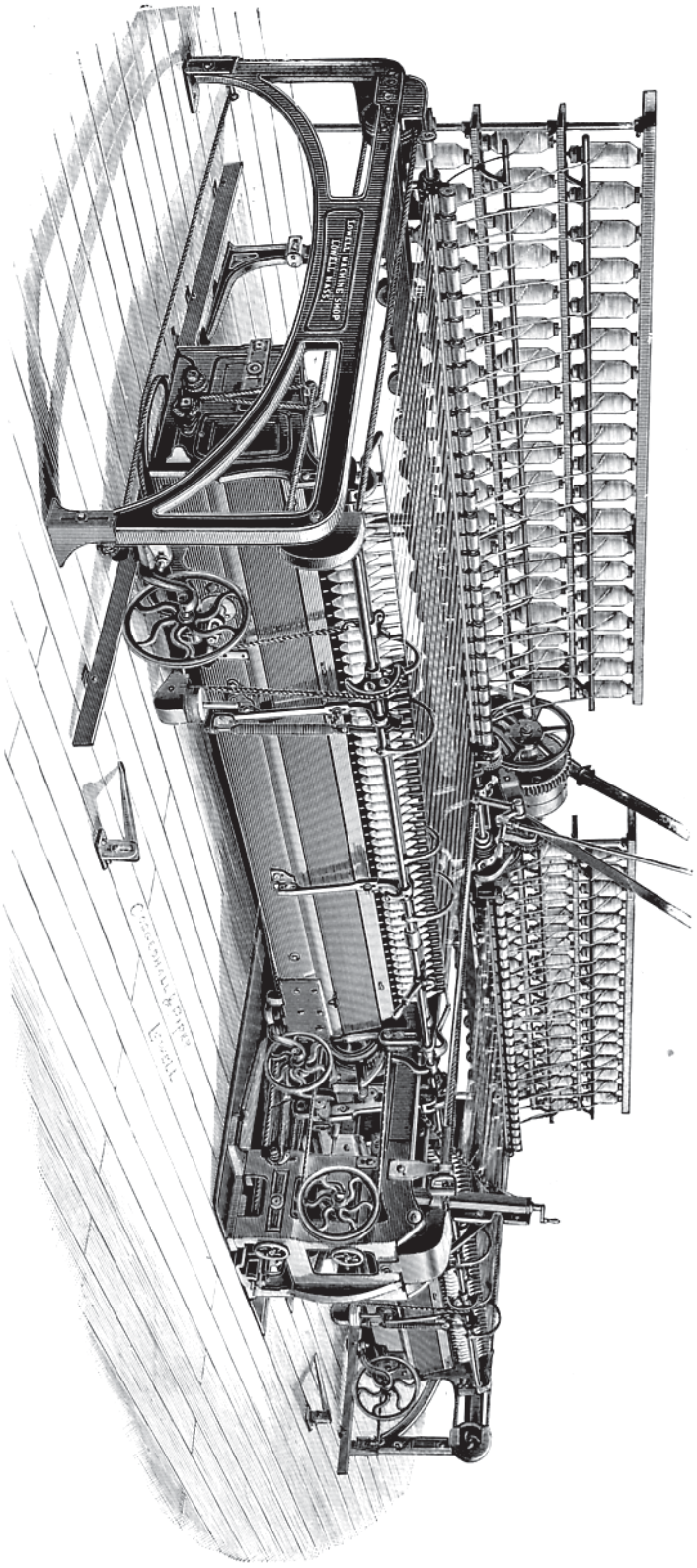
THE use of Separators has become so general that very few frames are now made without them. We were the first of all builders to apply these useful articles, and having had experience with all the various kinds that have been put upon the market, we think that we are warranted in saying that the Separator here illustrated possesses more good points and fewer bad ones than any separator that has yet been offered to manufacturers. It may be explained as follows:

The blades, A, are attached to the rail, B, in the usual manner, this rail is hung to the rod, D, at the curved point, C, which allows the rail, B, to be turned back or taken off if necessary. The rod, D, passes through the stand that is attached to the spindle rails of the frame, and which can be easily bolted to any style of frame.

At the point, F, on the rod, D, is attached the connecting arm, G, which in turn is fastened to the lifting shaft of the frame at the point, H. This point, H, is supposed to be half way between the two ends of the lifting shaft, viz.: half way from the point where it swings in its bearings and the point where it lifts the Ring Rail. This being the case the blades must traverse just one-half as fast as the ring rail, consequently the blade is **always** half way between the top of the spindle and the ring rail. This has never been accomplished before except through more or less complicated mechanism.

The arrangement of the parts are such that any size blade can be used, so that at very high speed the yarn will not whip round the blades as formerly. The extreme simplicity of the parts will commend itself to all spinners, and we shall be pleased to explain it and show it to anyone who will visit us for that purpose.





LOWELL SELF-ACTING MULE.

WE WOULD ask the careful consideration of manufacturers to the merits of our Mule, as being simple in construction, strongly and substantially built, and taking much less power to operate than many similar machines. The increased speed and lengths of the present Mules requires a greater stiffness in the carriages and proportionate strength to drive them. This we have accomplished with but little, if any, increased power per spindle.

THE HEADSTOCK—stands on strong foundation plates, which carry the main slip, copping motion, quadrant support and drawing-up scroll bearings. The back part is cast in one piece, by which all joints are dispensed with; all bearings are bored to templates, and on a special machine, ensuring the greatest accuracy and rigidity, so that bearings once bored cannot get out of line.

CARRIAGES—are built in the most substantial manner, heavily braced with extra large rods, and extremely stiff, thus allowing high speed without vibration.

DRUMS—are made of two thicknesses of tin, have steel bearings, and are tested at speed and perfectly balanced in shop.

SPINDLES—are furnished in all the various styles and lengths, they are made of the very finest selected steel, are tempered partly or throughout, as may be desired, and capable of the highest known speed. Every spindle is run at speed before sending out.

FLUTED ROLLS—are of the very best of roller steel, irregularly fluted to avoid cutting the top rolls, are made with double or single bosses, and accurately guaged for size. The roll stands for front rolls are bushed with brass.

TOP ROLLS—are usually furnished covered, and generally we make the front rolls shell. Five per cent. of spare rolls are sent with each Mule. The cap bars are most accurately finished on special machinery, and are of the most modern patterns.

GEARING—is all at one end, particular attention being paid to this matter, so that there shall be no vibration of the rolls, and at the same time be easy to make changes in the gears. We invite inspection to our Mules in this respect, and are confident that they cannot be excelled.

CREELS—are set as low as possible, and arranged for any size bobbin, and for double or single roving. We supply iron or glass steps, as preferred.

THE DRAWING-OUT, TAKING-IN AND BACKING-OFF MOTIONS—are of the most approved designs, and the stopping motion prevents any accident in case anything gets in the way during their outward run.

The back shaft and faller shafts are of extra size. The stretch can be made from 63 to 66 inches, and gearing for coarse, medium or fine numbers.

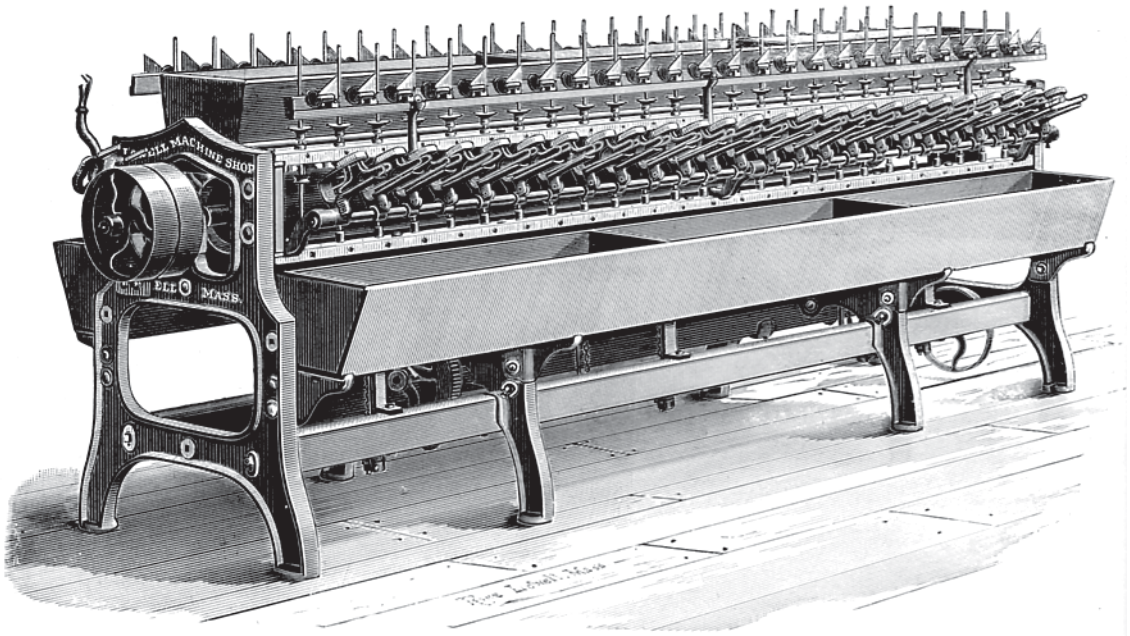
PRODUCTION—of our Mule is equal to that of any imported machine. It is estimated that when the Roller Motion is applied that there is an increase in production of at least 6 per cent.

Driving Pulleys 15 inches diameter, 3 inch face.

Overhead counters are furnished with each Mule.

Three changes of twist pulleys and gears.

Speed 600 revolutions per minute.


MASS.

SPOOLER.

OUR Spoolers are made with any number of spindles above sixty to a frame. They are constructed in a thorough and workmanlike manner, are carefully adjusted, and have an iron frame. They are easy in their operation, and no machine of this description is built that gives so universal satisfaction and so little trouble. The upright spindles are made as light as is consistent with strength, and are placed from three to six inches apart. Having so few parts to wear, and running at so little speed, this form of spindle is found to give better satisfaction than any other, besides costing less for repairs.

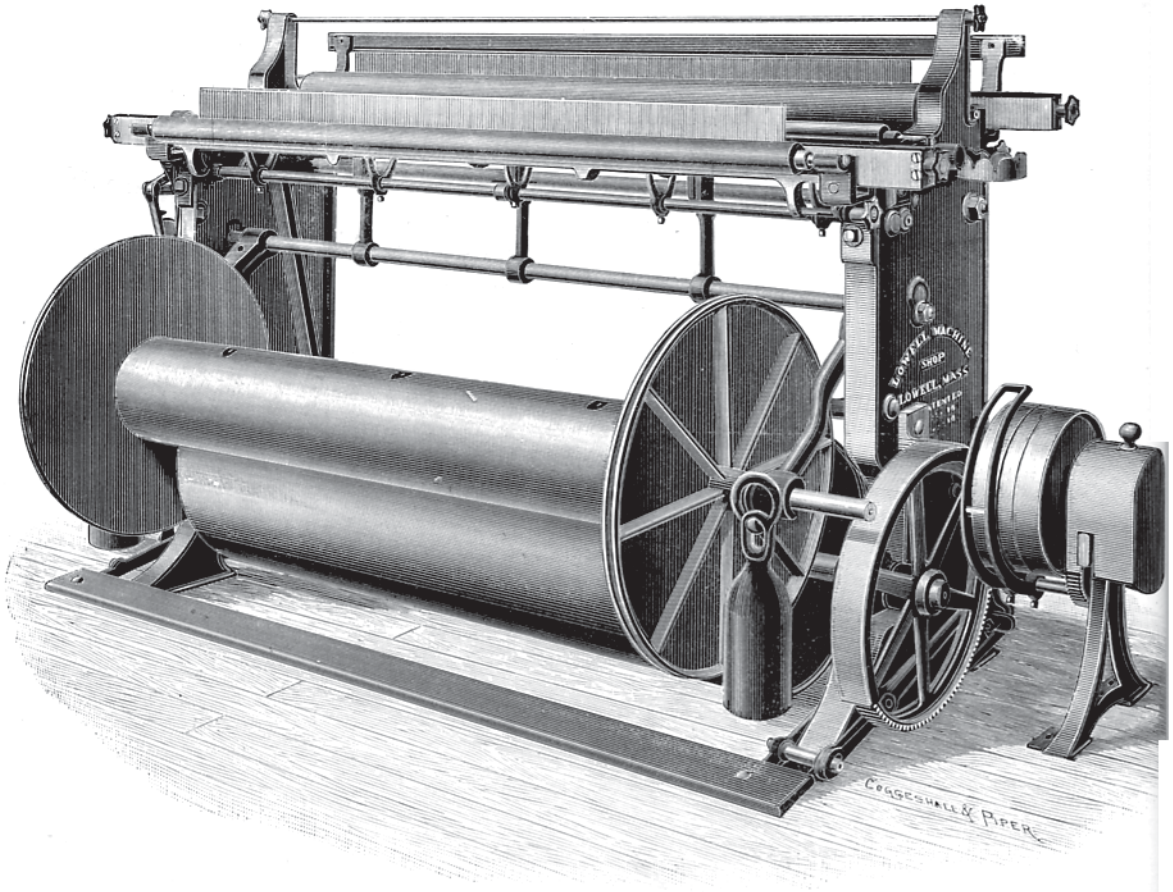
Our positive traverse motion is a very simple and convenient arrangement of the mangle wheel, so arranged that the distance traversed can be altered by changing a gear. It builds a straight spool, slightly rounded at the ends.

For holding the bobbins we arrange them with either the usual style creel spindles, with a friction to regulate the tension, or we apply the Wade bobbin holder, usually attaching them to a round rod. We also arrange them to wind from cops or a quill, with a filling wind.

Among all the various forms of Spooler guides the Curtice patent thread guide has proved to be the most satisfactory, many thousands having been sold. The yarn is carried from the bobbin or skein over a polished iron surface, which forms the lower part of the guide. The upper part of the guide is adjusted by a screw for different numbers of yarn. A self-balancing catch prevents the yarn from coming out.

Side and top boxes are provided, and we put on a creel when desired. The driving pulleys are made from 8 inches to 14 inches diameter, and 1 ½ inches to 3 inches face. Speed of pulleys about 200 revolutions per minute.

The attention of manufacturers is especially invited to these Spoolers, as we are convinced that they cannot be excelled for simplicity and durability, and they have no attachments upon them to get out of order and give trouble.


LOWELL MACHINE SHOP
LOWELL, MASS.
CONGDON, HALL & PIPER

WARPER.

GOOD warping is very essential for the satisfactory running of the warp in the loom. Some years ago we introduced a new and improved machine for this work, which contained improvements not found in any similar machine. The success of this machine is well established, and the work done by it is so satisfactory that we are pleased to recommend it to parties wanting a **reliable** Warper.

EXPANSION COMB—is made in the usual manner of two strips of iron or wood bolted together and hollowed out to receive the springs and dents.

DROP WIRES—are very simple and effective. The wires and brackets which hold them are placed upon an iron tube, over which is fitted a cap to prevent them from falling out. By removing this cap any one of the wires can be removed without taking the whole arrangement apart. This cap also prevents the dirt and flyings from interfering with their operation. These wires are arranged in two or three rows, according to the number of ends.

STOP MOTION—acts instantly upon the breaking of a thread, and is the most sensitive motion ever contrived for the purpose. It is simple, durable, easy of adjustment, and when once set impossible to get out of order. In connection with the stop motion we apply the drop roll to take up the slack.

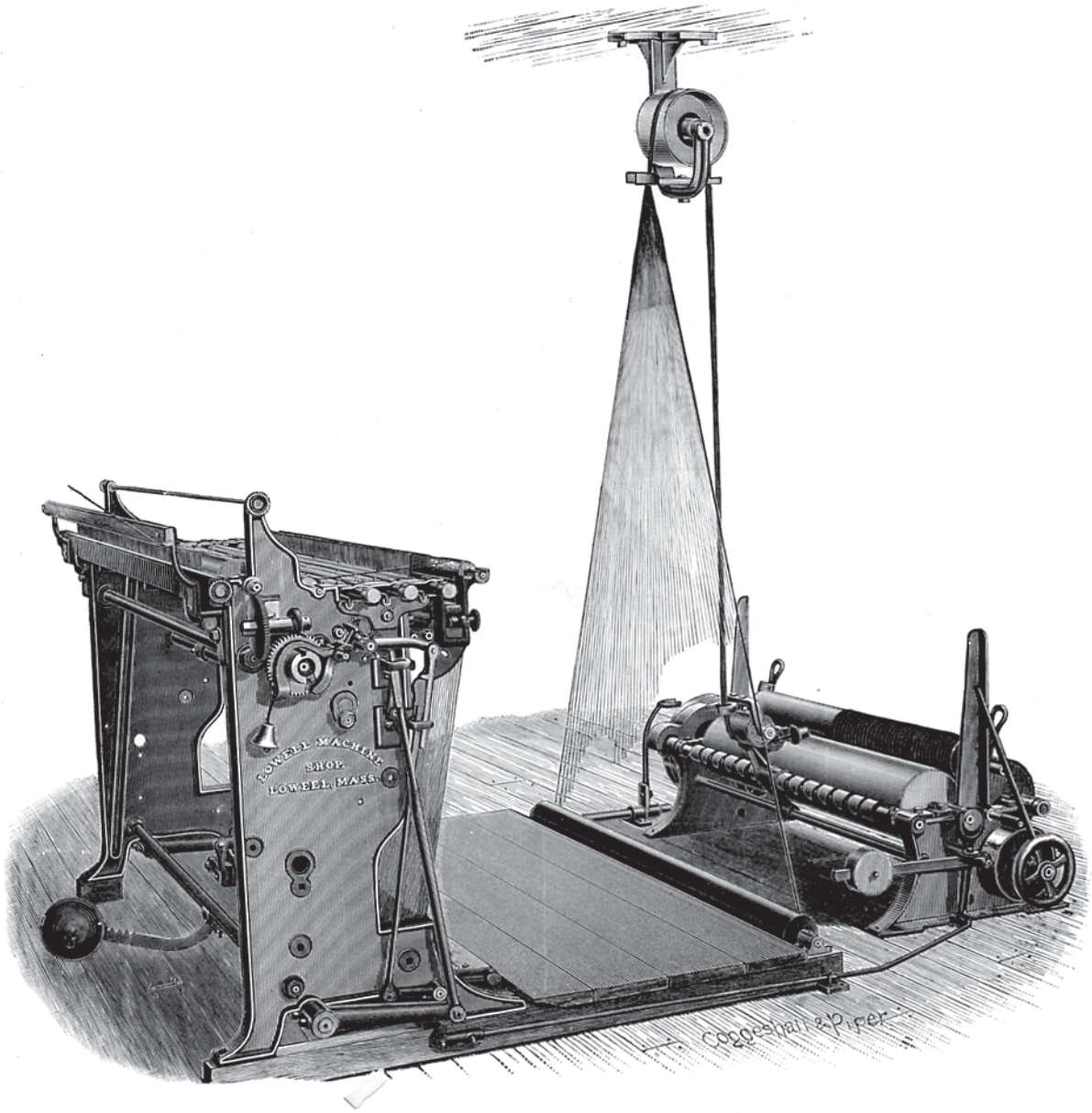
SLOW MOTION—is attached to all our Warpers, and as the gearing is attached to the stands that support the driving shaft it is easily inspected, besides not liable to get out of order, and we claim for this motion that it is the best ever applied to a Warper. The shipping arrangement in connection with the stop motion starts the machine very easily and brings the threads to an even tension before arriving at full speed, thus avoiding breaking of the ends.

CYLINDERS—are made of cast iron, and are usually 18 inches in diameter, and 54¼ inches long, but other sizes can be furnished if desired. The driving pulleys are 11 inches diameter and 1½ inch face. Five revolutions of pulley make one of the cylinder. Speed of pulley about 180 revolutions per minute.

Length, including driving pulleys, 7 feet 6 inches.

Width from outside of 24-inch full beam to back comb 40¾ inches.

Weight about 1200 pounds.


LOWELL MACHINE
SHOP
LOWELL, MASS.

LEESE WARPER.

THIS machine is designed to take the yarn from spools and put it into chains for dyeing, and is arranged to make chains having from 400 to 800 ends.

The spools are placed in a Creel (not shown in cut), and the threads run to the Warper, each thread passing through a drop wire, so that when an end breaks the machine stops and allows the attendant to piece it up. It then passes through a thread leese reed, where by the raising of a lever the threads are separated and allow a leese to be taken as often as desired. A pin leese reed can also be supplied in addition. The yarn is then passed over the pulley shown attached to the ceiling, and then goes to the Balling Machine, where it is wound into a large ball, 28 to 36 inches long and about 28 inches diameter, or one or more balls can be wound at the same time on the same beam.

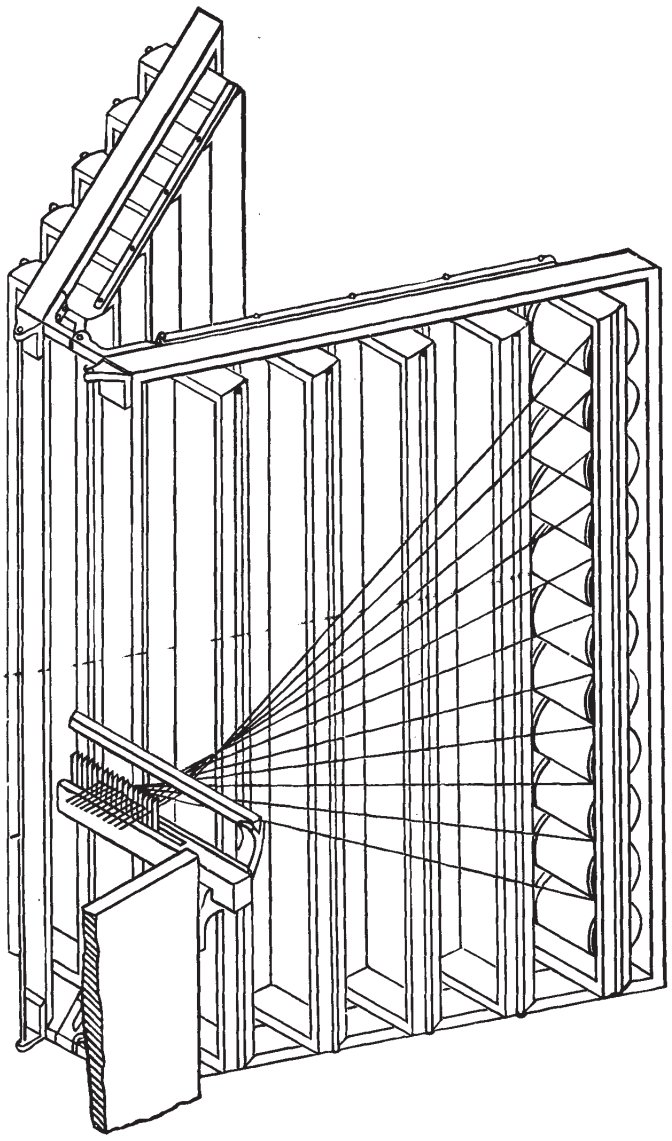
The method of delivering the yarn to the Balling Machines varies in different mills, but the one shown in the cut commends itself as being convenient and taking up very little room. In this arrangement the yarn, after going through the leese reed, passes over rolls under a platform, upon which the attendant can walk, then up and over the small pulley, where the threads are collected into a chain, and then down to the trumpet of the Balling Machine, where it is wound up into a large ball.

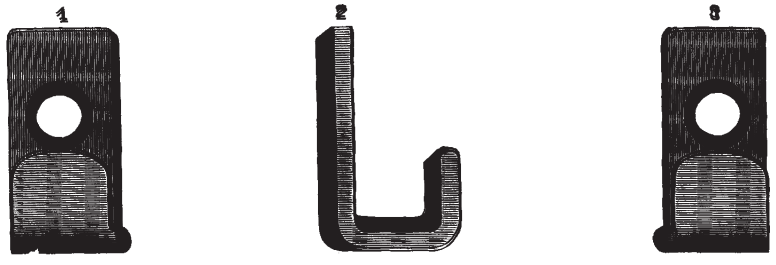
By another method the Balling Machine is placed where the drum usually runs in a common Warper, the pulley is then placed upon a stand some 6 to 8 feet from it, and the yarn passes from the reed to the pulley, and then back to the Balling Machine.

The Balling Machine has a trumpet which traverses lengthwise upon a double screw similar to that used in a traverse Grinder, and the tension upon the ball is secured by a friction pulley and weight, so that the ball is wound very hard.

The Warper is provided with a clock to show the number of cuts, leeses or warps, and can be arranged to ring a bell at the end of each and stop the machine. We also furnish a cut marker to mark each cut if wanted.

This method of chaining warps has many advantages over any other system: in the length of warps; in convenience in handling the warps for shipment, and in the dye house; in production, as by running fewer ends there is less liability of ends breaking, and a much greater speed can be obtained by this system than any other.

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CREELS.

IN CONNECTION with our Warpers we build Patrick's patent Swivel Creels. When the warper is running the spools stand in the same position as in ordinary V Creels; but when tying-in the stiles holding the spools are revolved and brought so as to face the operative, thus making it much easier to take out and put back the spools, and also enables her to tie-in in about two-thirds the time that is possible with the common Creel. The stiles, or standards, in this Creel, instead of being held rigid, as is usual, are made together, and pivoted at the top and bottom. These stiles are then connected by a rod at the top.

We also make the ordinary Creel when wanted.

For holding the skewers we supply a wrought iron Creel step, which is much preferable to glass, being equally as smooth and hard, and not clumsy and liable to be broken, as glass steps are. We also cut in the standards when desired, although we do not recommend it for durability.

Weight of Creel for 500 spools 500 pounds.

IRON CREEL BEARINGS.

THE advantage of having the yarn run freely from the spools in the Warper Creel is well known; for, if the spool sticks or runs hard, the thread breaks and the machine stops, and consequently less work is done. These bearings are made of wrought iron, case-hardened, and are as hard and smooth as glass. We have sold many thousands for old creels, and are prepared to supply them in any quantity.

Figure 1 represents a left-hand bearing.

Figure 2 represents a side view.

Figure 3 represents a right-hand bearing.

A slight projection on the inside of the bearing prevents the rubbing of the spool on the large diameter of its head.