2 Sheets—Sheet 1.

G. B. SELDEN.

MACHINES FOR SHAVING ROUND HOOPS.

No. 175,174. Patented March 21, 1876.

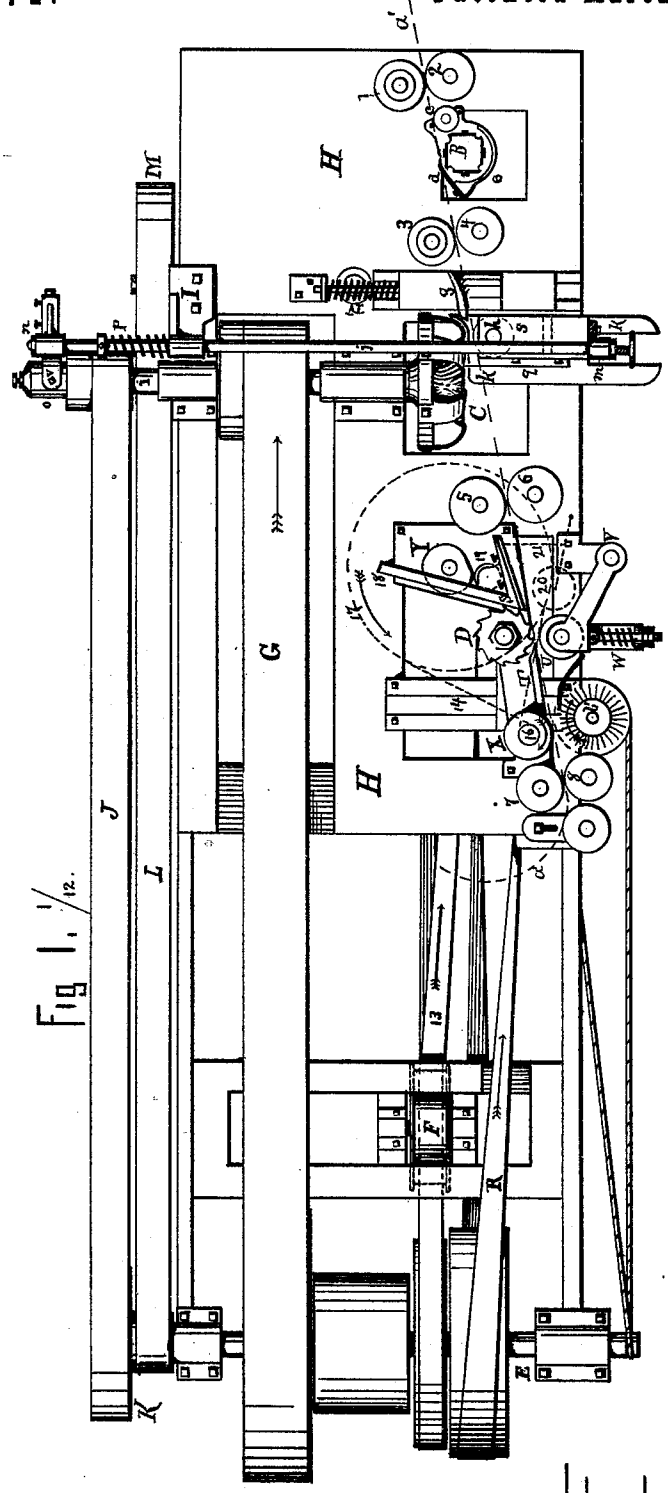

Fig. 1. 1/12.

WITNESSES

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INVENTOR

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2 Sheets—Sheet 2.

G. B. SELDEN.

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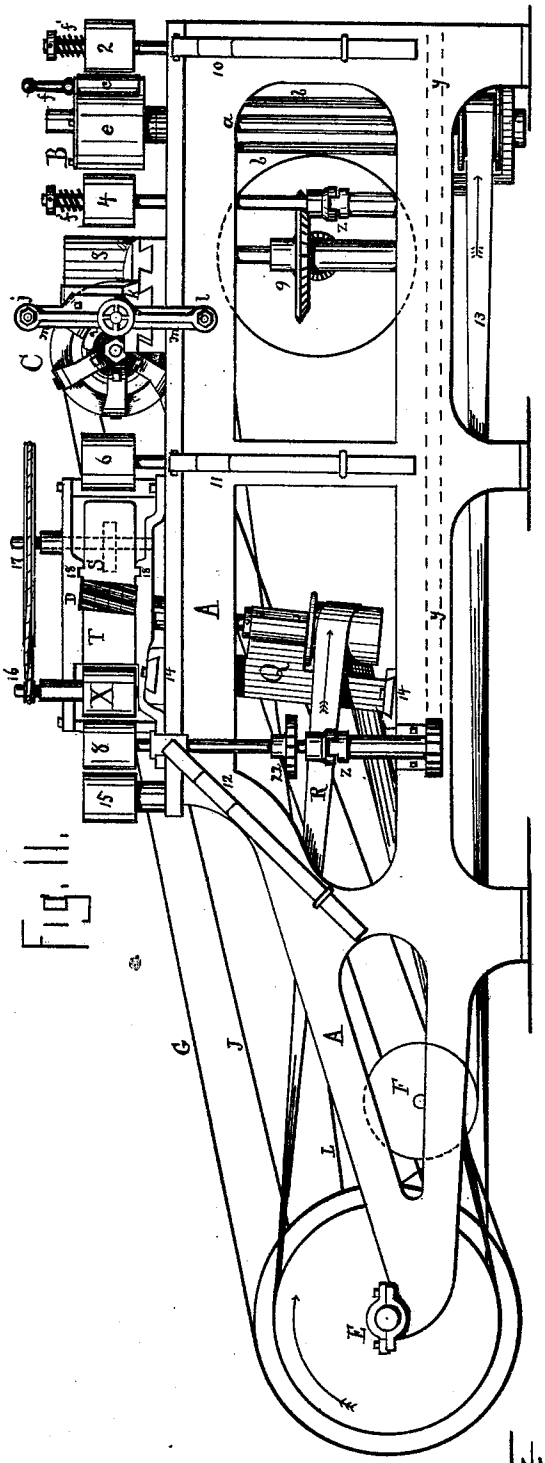

Fig. III.

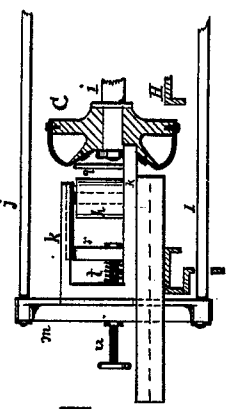

Fig VI

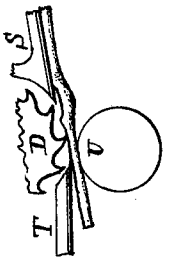

Fig V

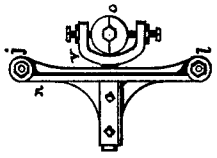

Fig IV

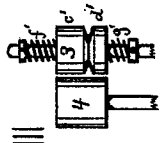

Fig III

WITNESSES

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UNITED STATES PATENT OFFICE.

GEORGE B. SELDEN, OF ROCHESTER, NEW YORK.

IMPROVEMENT IN MACHINES FOR SHAVING ROUND HOOPS.

Specification forming part of Letters Patent No. **175,174**, dated March 21, 1876; application filed February 15, 1875.

To all whom it may concern:

Be it known that I, GEORGE B. SELDEN, of the city of Rochester, in the State of New York, have invented an Improvement in Machines for Shaving Round Hoops, of which the following is a specification:

This invention relates to an improved machine for shaving half-round hoops; and it consists, in substance, in the application of two rotary cutter-heads to shaving splints made from poles, by the first of which the stock is reduced to substantial parallelism with the bark, and by the second of which any irregularities produced by the action of the first cutter are removed. It also consists in automatic devices for tapering and lapping the hoops, in the application to the machine of a rotary brush for cleaning the bark, and in devices for so presenting splints of different cross-sections to the cutters that they will be shaved on the proper line.

Figure 1 is a plan view, and Fig. 2 an elevation, of a machine embodying my invention. Figs. 3, 4, 5, and 6 represent details.

A A is the frame of the machine, and E the driving-shaft, from which motion is transmitted to the various working parts. The splints are fed through the machine, as represented by the dotted line *a'*, Fig. 1, by the feed-rollers 1 2, 3 4, 5 6, and 7 8. These rollers are carried by vertical shafts, and motion is transmitted to them from the bevel-gear 9, Fig. 2, by means of a train of gears beneath the lower plate of the machine, represented by dotted lines *y*, Fig. 2. Rollers 1, 5, and 7 revolve in stationary boxes, and the shafts of their corresponding rolls 2, 6, and 8, are provided with universal joints *z*, Fig. 2, and held up to their work by springs 10, 11, and 12. The shafts of rolls 3 and 4 are each of them provided with universal joints, so that the rolls, which are clamped together by a spring beneath the top plate H, may travel across the line of feed. The roll 7 is driven from the shaft of roll 8 by a gear, 22, Fig. 2, or by a finger-gear placed above the rolls.

The splints are usually fed point or small end first, and, in their passage through the machine, they are subjected to the action of three cutters—a knot-cutter, B, which removes as much as is desired of the knots; a coring-head, C, which planes the split side of the stock parallel, or nearly so, with the bark, and a finishing-head, D, which finishes the stock down to gage thickness.

The cutter-head B of the knot-cutter is carried by a shaft, *a*, Fig. 2, which is boxed in a suitable sustaining-frame, *b*. The shaft *a* is driven from the main shaft E by the belt 13 running under the corner pulley F. The frame *b* is pivoted near its lower end opposite the center of the pulley on the shaft *a*, and its upper end is free to travel to and from the line of feed in an opening in the top plate H. A spring, attached to the frame *b*, presses the head B toward the stock, and the head is controlled in its operation on the stock by the two rests *c* and *d*, one before and one after the head. The forward rest *c* is a roller and the after rest *d* prevents the knives of the head B from coming in contact with the bark. The two rests *c* and *d* are attached to a frame or box, *e*, which swivels freely about the head B and causes it to adjust itself to the curves of the stock passing by it. By adjusting the roller *c* in a slot through the upper and lower plates of the box *e*, the trimming of the knots is regulated. A small roller may be used instead of the after rest *d*, but for small and crooked stock the rest should bear on the stock as near the cutter-head B as possible.

A less satisfactory modification of this device consists in dispensing with the forward rest entirely and fastening the rest *d* rigidly to the frame *b*. A handle, *f*, Fig. 2, enables the operator to control the action of the head on entering a splint.

From the knotter the splints pass in front of the rest *g*, and between the guide-roller *h*, Fig. 1, and the cutter-head C, by which it is roughed or cored on a line parallel with the bark. The coring-head C is carried by the horizontal shaft *i*, Fig. 1, and is driven from the shaft E by the belt G. The shaft *i* has end play through its boxes, and is connected with the guide-roll *h* on the bark side of the splint by a sliding frame consisting of the upper and lower rods *j* and *l* and cross-bars *m* and *n* at each side of the machine. The cross-bar *n*, at the back side of the machine, is connected with the shaft *i* by the box *o*, and the cross-bar *m* is bolted to a frame, *k*,

which slides in suitable guides on the top plate of the machine, and supports the guide-roller *h*. A standard, I, Fig. 1, supports the rods *j* and *l* at the back of the machine, and a spring, *p*, draws the sliding frame, guide-roller *h*, and head C toward the back side of the machine. A splint passing the rest *g* enters between the guide-roller *h* and the cutter head C, and is by it reduced to parallelism, the roller *h*, drawn against the bark by the spring *p*, following all its curves, and compelling the head C to cut always at the same distance from the bark. The shaft *i* plays to and fro through the belt G, allowing the head C, under the control of the guide-roller *h*, which follows the curves of the bark, to adjust itself to the shape of the stock passing by it. The slide *k* projects under the path of the splint between the roller *h* and the head C, conforming as closely as possible to the shape of the knives, and supporting the splint under their cutting action.

If the knotter is set so as to cut the knots down to within one-fourth of an inch of the bark, each knot so left is represented by a corresponding gouge opposite it on the flat side of the cored splint, and in this case the cored splint must be at least a quarter-inch heavier than the finished hoop in order to admit of the removal of sufficient wood by the finisher D to shave out the gouges.

The rest *q* consists of a bar of steel bolted to the slide *k*, and reaching under the splint and turning up inside the head C, so as to bear upon the shaved side of the splint immediately behind the cutting-point of the knives. It is made adjustable parallel to the shaft *i* in any convenient manner. It is especially useful in preventing a heavy butt-end, crooked, as they frequently are, from springing into or being pulled into the knives after it has passed the rest *g*, and it also assists in compelling the head to follow curves.

In order to prevent too much resistance to the feed when this interior rest is used, it is necessary to construct the roller *h* so that it can, in certain cases, yield back over a knot. This is done, as shown in Fig. 6, by supporting the roller *h* in an inner frame, *r*, which slides to and from the head C in the outer frame *k*. A spring, *t*, is interposed between the inner and outer frame sufficiently strong to hold *h* up to its work, and to control the spring *p* without yielding; but when a knot comes against the roll *h*, the splint bearing on the rest *g* and the rest *q*, inside the head, the spring *t* is compelled to yield back and allow the roll *h* to pass over the knot, but immediately thereafter closes the roll *h* up to its proper position. By means of the threaded rod *u*, Fig. 6, the distance between the roll *h* and the head C, and consequently the thickness of the cored splint, may be varied. The box *o* is adjustably connected with the cross-bar *n* by a yoked arm, *v*, Figs. 1 and 4, which is fitted into a boss on the bar *n*. By this means the wear of the shaft *i* in its boxes is prevented from binding the sliding rods. The feed-train *y y*, Fig. 2, is driven from the coring-shaft *i* by means of the belt J, cone-pulley K, which runs loose on the outer end of the shaft E, belt L, and pulley M, the shaft of which carries a pinion which meshes into the bevel-gear 9, Fig. 2. By this means the feed is proportioned to the speed of the coring-head C. The rest *g* in front of the head C is so arranged that it may be moved backward and forward across the line of feed on suitable guides provided for it on the top plate of the machine. For light and crooked stock the rest *g* should be secured in a position slightly in front of the highest cutting-point of the knives, in order to prevent a sharp curve, concave on the bark side, from running in on the knife; but for heavy work, in which the curves are usually less acute, the rest may be set a half inch or more back of the knives, thereby materially relieving the friction of the splints on it. The splint, now cored parallel with the bark, and with gouges on the flat side corresponding more or less closely with the knots, passes through the feed-rollers 5 and 6, and is presented to the finishing cutter D, by which it is reduced to gage thickness. The head D is carried by a shaft which runs in boxes on a suitable supporting-frame, Q, and is driven from the shaft E by the belt R. The splint is supported, during the action of the finishing-cutter, by rests S and T on the cored side, placed immediately before and after the head. The head projects beyond the forward rest S the amount of the desired finishing cut, and both rests approach the head as near as possible, Fig. 5. The splint is pressed against the head D and its rests by the roller U, which is carried by an arm swinging about the stud V, and held up to its work by the spring W. This roller straightens out the cored splint as it passes by the head, keeping its inner surface in contact with the rests, and yields back over the knots.

In order to keep the increased pressure caused by the compression of the spring W by a knot from springing the splint into the head D, the roller U is placed opposite the forward part of the after-rest T. The piece which supports the stud V is made adjustable lengthwise of the machine. The spring W is made adjustable in tension, as the cutter D is found to drive the stock away from it with more force when dull than when freshly sharpened. The shaft carrying the head D may be set at right angles with the horizontal line of feed, but is preferably inclined at an angle of from five to fifteen degrees with this line, and the oblique cutting consequent therefrom is further increased by making the cutting-edges at an angle with the axis of revolution. This is not essential, but assists to prevent clogging by giving the chips a tendency to drive downward out of the throats. In case a solid cutter be used it is necessary to adjust the shaft forward as the cutter is worn back by grinding. This is done by means of the

slides 14, in which the upper and lower arms of the frame Q may be moved. It is necessary that the forward rest S should be straight, or nearly so, with the line of feed for a short distance in front of the cutter, as if it turned off at an angle it would fail to support the splint on both sides of the gouges, opposite knots left by the corer, and the splint would therefore be allowed to run in on the finisher under the pressure of the roll U. (See Fig. 5, where the after-edge of a corer-gouge is represented as bearing on the rest S, while the forward edge is being removed by the head D.) The finishing-head removes enough wood to take out the gouges at the knots caused by the coring-head, and shaves the hoop straight, or nearly so, opposite the knots. At the same time it removes other irregularities inseparable from a heavy single cut.

It is necessary on some kinds of stock to make the hoops thinner toward the large end, thereby compensating for their increased stiffness resulting from their greater width toward that end. A method of accomplishing this tapering is shown in Figs. 1 and 2. X is a fluted roll placed after the finishing-head D, and driven by the hoop itself in its passage through the machine. The forward rest S can yield back on suitable ways 18, to give the finishing-head an increased cut. The position of the rest S with reference to the head D is controlled by a rotating cam, Y, which is in its turn controlled by the roller X, with which it is so connected as to make one revolution while a splint goes through the machine. A friction-roller, 19, is interposed between the cam Y and the rest S, which is held against the cam by a spring. On feeding a splint through the machine the roller X is set in motion by the splint, and by means of suitably-proportioned gearing or a belt and pulleys, 16 and 17, Fig. 1, rotates the cam Y, which allows the rest S to yield back gradually as the splint passes through, and, consequently, the head D to remove an increased amount of wood from its interior surface. The cam continues to rotate after the hoop passes the head D, until its end reaches the roller X, and during this time the rest S is returned to its position by an incline on the cam, preparatory to repeating the operation on the next splint.

By altering the proportions of the connections between the roller X and the cam Y, the apparatus may be adopted to any length of hoop. By varying the shape of the cam Y, any desired variety of tapering can be done. Lapping, either with or without tapering, may be done by a cam cut away at the end of its revolution, so as to allow the rest S to recede while the last ten or twelve inches of the hoop is passing the cutter D. In lapping, it is necessary to prevent an outward-bent butt-end from crowding away from the head D after it has left the rolls 5 and 6, by a pressure-roll shown in dotted lines 20, Fig. 1. This roll is prevented from bearing on the hoop continuously by a bar, 21, projecting forward from the rest S against the supporting-arm of the roller 20. When the rest S goes back to allow a lap to be cut the roller 20 is allowed to bear on the hoop. In machines not intended to taper or lap the rest S is attached to a suitable supporting-plate bolted to the top plate H. A rotary brush, b', Fig. 1, supported on a vertical shaft and driven from the shaft E, is used on some kinds of stock—birch, for instance—to clean the book. When placed between the finisher-head D and the last pair of feed-rolls, a guard-plate keeps the brushings out of the cutter D. The brush may revolve either in stationary or movable bearings. In the latter case it must be held up to its work by a spring. If the brush be not used its place is supplied by a pressure-roll, which keeps the hoop all the time in contact with the roller X. The hoop is discharged from the machine by the pulling-rollers 7 and 8. It is crimped or rendered more pliable by the adjustable crimping-roller 15.

In order to enable the machine to handle splints of different cross-sections, the grooved feed-rollers shown in Fig. 3 are used. The feed-rollers on the split side of the stock before the coring-head consist of an upper and lower section, c' and d', Fig. 3, each splined on the shaft, with an angular groove between them. The angular splint made by splitting poles into three or more parts enters between the upper and lower sections of the feed-roll 3, forcing them apart against the springs f' and g', and is presented to the corer C so as to be shaved on the proper line. Once entered beyond the interior rest g, it is by it prevented from being twisted over by the coring-head. The angular groove between the upper and lower sections of the roll 3 is made small enough for the smallest angular splint designed to be shaved by the machine, and it is enlarged by the separation of the two sections for larger stock. One of the sctions of the roller, 3, may be fixed rigidly to the shaft, but vertical curves are best accommodated by allowing both sections to play up and down. The head D should be placed a short distance in front of the line joining the faces of the third and fourth pairs of feed-rolls. By this means the cored splint is caused to bend backward about the rests S and T, and the contact of its inner surface with the rests S and T is insured.

I claim—

1. The combination of the movable coring-head C, controlled from the bark side of the hoop by the roller h, with the finishing-head D, rests T and S, and pressure-roller U, operating substantially as and for the purposes set forth.

2. The combination of the knot-cutter B, movable coring-head C, controlled from the bark side by the roller h, with the finishing-

head D, rests T and S, and pressure-roller U, operating substantially as and for the purposes set forth.

3. The combination of the movable coring-head C, controlled from the bark side by the roller *h*, and the finishing-head D, rests T and S, and pressure-roller U, with the angular feed rolls 1 and 3, either or both, operating substantially as and for the purposes set forth.

4. In combination with the finisher-head D and the pressure-roll U, the movable rest S, and the roll X, placed after the head D, and controlling the cam Y, substantially as and for the purposes set forth.

5. In combination with the head D and the pressure-roll U, the movable rest S and the cam Y, operating substantially as and for the purposes set forth.

6. The corer-head C and finishing-head D, in combination with the rotary brush *b'*.

7. In combination with the head C, controlled from the bark side by the elastic roller *h*, frame *j*, the adjustable arm V, and box *o*, operating substantially as and for the purposes set forth.

GEO. B. SELDEN.

Witnesses:
M. H. BRIGGS,
H. S. WARD.