PATENTED NOV 1 1870

J. Penney

Hoop Machine.

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Fig 1

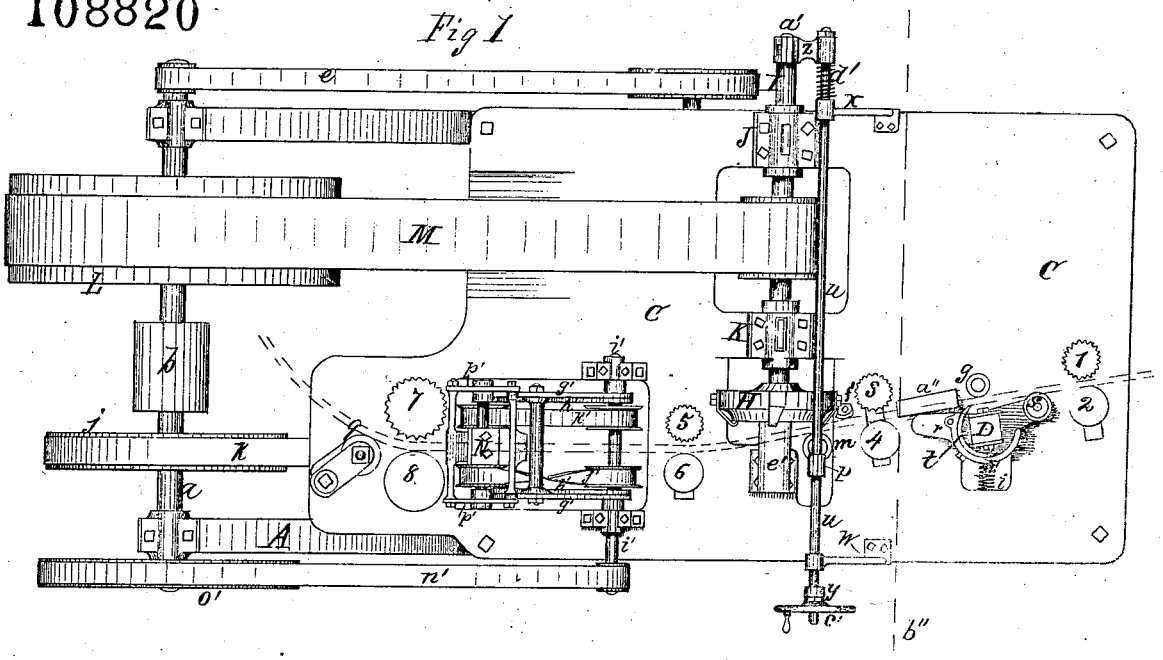

Fig 2.

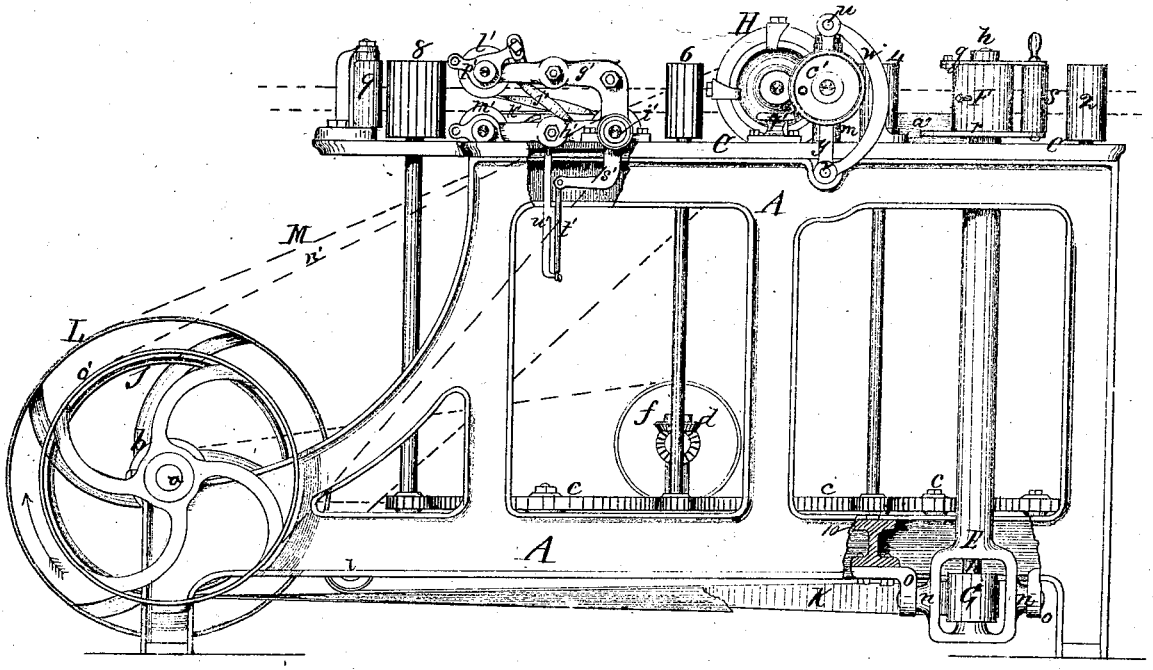

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Fig 3.

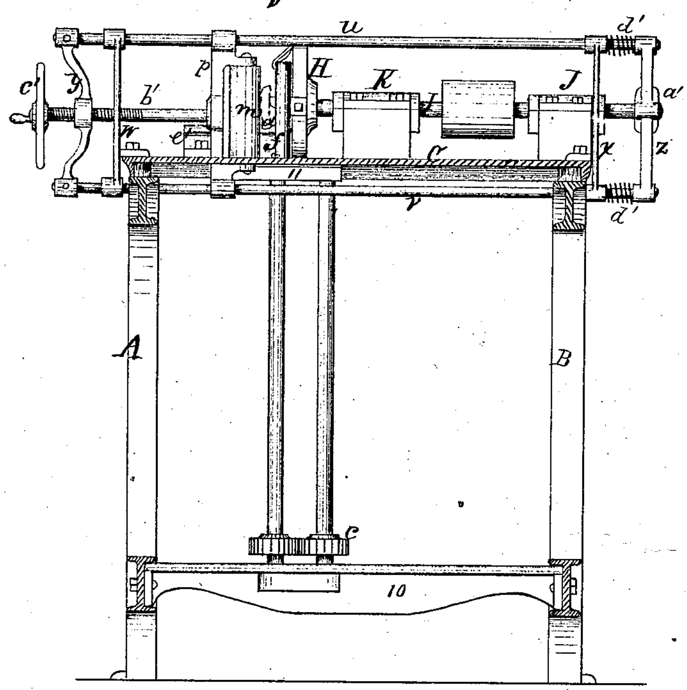


Fig 5

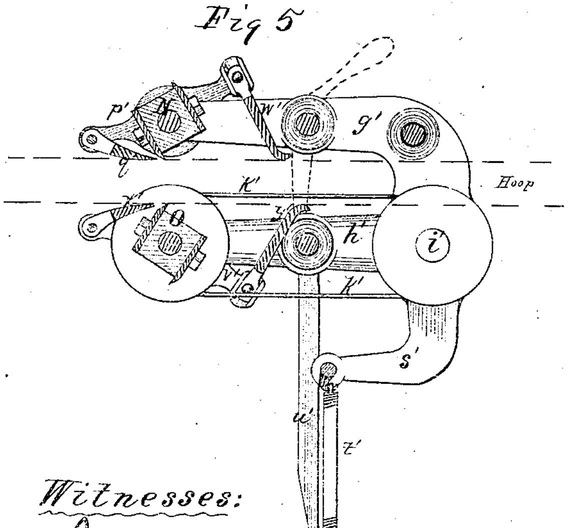
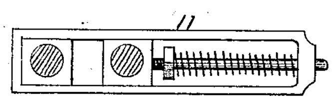


Fig 4.



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Letters Patent No. 108,820, dated November 1, 1870.

IMPROVEMENT IN MACHINES FOR DRESSING HOOPS.

The Schedule referred to in these Letters Patent and making part of the same.

I, JOSEPH PENNEY, of Rochester, Monroe county, New York, have invented certain Improvements in Hoop-Machines, of which the following is a specification.

This invention relates to improvements in machinery for the manufacture of half-round hoops, and consists, in substance, in the use of movable cutter-heads, which are compelled by guides to adjust themselves to the irregularities of the wood, in such manner as to form the finished hoop.

The operation consists in converting a splint, previously split from a hoop-pole, into a finished hoop by the following general process:

First, the splint is passed horizontally by vertical feed-rollers to a self-adjusting rotary cutter-head on a vertical shaft. The knives of this cutter-head or knot-cutter remove all knots or excrescences from the bark side of the hoop, preparatory (second) to the action of a second self-adjusting rotary cutter-head on a horizontal shaft, which, by shaving the opposite or face side, reduces the hoop to an even thickness throughout its entire length.

Third, from this the splint is fed onward between self-adjusting cutter-heads, one above and one below the hoop, to trim its edges.

Fourth, it is finally passed between crimping-rolls, which render it supple and adapted to take its shape on the barrel.

The machinery for performing these four functions is arranged and operates in detail as follows, reference being had to the drawing accompanying this specification.

Figure 1 is a plan view of the complete machine.

Figure 2 is a side elevation of the complete machine.

Figure 3 is a vertical section of the dotted line *b''*, showing the shaver.

Figure 4 shows the yoke and spring for feed-rolls 2 and 3.

Figure 5 is a sectional view, showing the edger-knives.

The frame of the machine sustains all the working parts referred to hereafter, and consists of the sides A and B, the top-plate C, and the cross-bars, one of which is seen at 10, fig. 3.

The main driving-shaft *a*, from which the various parts of the machine are run, receives power by the pulley *b*.

The feed-rollers are arranged in pairs, 1 2, 3 4, 5 6, 7 8, on vertical shafts, which are all driven at a uniform velocity by the pinions *c c c*, figs. 2 and 3, power being transmitted from the main driving-shaft *a* to the shaft of roll 5 (or any other roll) by the bevel-gear *d* and band and pulley *e* and *f*.

The rolls 2 4 6 8 on the bark side of the hoop are smooth and carried by shafts, which pass through the top plate in yielding boxes. These rolls are pressed, by springs concealed beneath the top plate against the hoop, slots being made in the top plate to allow of this motion.

The rolls on the split or face side of the hoop are fluted and in fixed boxes, with the exception of roll 3, which is free and fastened to roll 4 by a yoke, 11, fig. 3, containing a spring, as shown in fig. 4. The rolls are placed in position to feed the hoop to the cutters, one pair before each cutter-head.

The splint is entered between the first pair of rolls 1 and 2, and passes between the cutter-head D, fig. 1, and the roller *g*, which is sustained by a stud bolted to the top plate, and supports the hoop against the stroke of the knives of the cutter-head. The course of the hoop in passing through the machine is indicated by dotted lines in the drawing.

The vertical shaft *h*, fig. 2, carries the cutter-head D, and is mounted in a standard, E, by a box at top and bottom of the standard.

The shaft is driven from a pulley, *j*, on the main driving-shaft by the twisted belt *k* running under the guide-pulley *l*, fig. 2, and around the pulley G on the shaft.

The standard E is recessed to receive the pulley G, and is swung on pinions *n* and *n*, fig. 2, fitted into ear-pieces *o* and *o*, which are attached to two of the cross-bars, in order to admit of its upper end moving to and from the splint, the top plate C being cut out to admit of this motion, fig. 1.

The centers of the pinions *n n* are in the line of the pull of the driving-belt *k*.

The standard and the shaft and cutter-head which it carries are pressed toward the hoop by the spring *i*, fig. 1, and the cutter-head is controlled in its action upon the hoop by the yoke or bearing-frame seen in figs. 1 and 2, above the top plate of the machine. This yoke is free to turn on the upper end of the standard, independent of the shaft and cutter-head, and is composed of five pieces: the semicircular box F, surrounding the cutter-head D, the upper plate *q*, (which is removed in fig. 1,) the lower plate *r*, the roller or forward rest *s*, and the after-rest *t*. These various parts are shaped and bolted together, as shown in the drawing, the roller *s* turning freely about a bolt, the upper end of which is prolonged into a handle, for convenience of withdrawing the cutter-head when entering the hoop.

The lower plate *r* is bored to adapt it to the end of the upper box of the standard E, and the upper plate *q* is boxed on the end of the shaft *h*.

The rest *t* is fitted to the interior of the piece F, to which it is secured by a bolt and slot to make it adjustable.

The knives of the cutter-head D are slightly concave on their cutting-edges, to adapt them, in some

measure, to the shape of the bark side of the hoop, and the bearing-edge of the rest *t* agrees with them in shape, being placed as near as possible to the circle described by them in revolving.

The object of this contrivance being to remove excrescences from the hoop, and leave the bark elsewhere untouched, the roller-rest *s* and the rest *t* are so adjusted that the knives of the cutter-head D cannot reach beyond the line joining the bearing-surfaces of these rests. And since these rests are always held firmly against the hoop by the spring *i*, and the rest *s* is placed far enough away from the cutter-head (in the direction from which the hoop is fed) to admit knots and excrescences between it and the cutter-head, and will act as a guide to indicate the bark line after the knot has passed under it, it is evident that knots or excrescences on the bark side of the hoop will be removed no deeper than the general line of the bark surface.

The freedom of the yoke on the standard and shaft allows the roller *s* to move over knots on the hoop passing under it without lifting the rest *t* off, and the roller *s* refinds the book-line, so as to guide the cutter-head in removing the knot.

It is also evident that the yoke will travel along and adapt itself to the varying curves of the hoop, and that nothing that should be cut away can escape the action of the knives of the cutter-head D.

The lower plate *r* of the yoke-frame is prolonged into an arm, which rests against a block fastened to the top plate *a''*, figs. 1 and 2, in order to facilitate the withdrawal of the cutter-head D from the hoop by means of the handle shown in fig. 2. This block *a''* also supports the hoop in the proper position.

The splint, now free from knots and excrescences on the bark side, passes through the second pair of rollers 3 and 4, and is presented to the cutter-head H, shown in figs. 1, 2, and 3. This cutter-head is intended to shave the face or split side of the hoop, and revolves on a horizontal shaft, I, which is mounted in the boxes J and K, and driven from the wheel L on the shaft *a*, by the belt M.

The shaft I is free to play endwise through its mounting boxes, and the pulley on it can play through the belt. The splint is held against the knives of the cutter-head H by the roller *m*.

This roller is mounted in a frame, *p*, fig. 3, sliding on connecting-rods *u* and *v*, which are supported parallel to the shaft I by standards *w* and *x*, fixed to the top-plate, so that the connecting-rods lie one above and one below the top plate. These rods are connected with each other at each end by ties *y* and *z*, and at the further end of the shaft I are connected with it by a box, *a'*, in the middle of tie *z*.

The shaft I is grooved in the bearing of the box *a'*, and the box is babbited around it, so that the shaft may rotate in it, but not play through it endwise, the object of the box being to compel the shaft and cutter-head to play backward and forward along with the parallel rods *u* and *v*.

A rod, *b'*, fig. 3, screw-threaded through the tie *y*, connects the sliding frame *p*, which carries the roller *m* with the connecting-rods *u* and *v*, and also controls its position on them.

For convenience of adjustment, a wheel and handle, *c'*, are fixed to the end of the rod. By this arrangement the cutter-head H and the roller *m* are coupled together by the connecting-rods *u* and *v*, and the distance between them increased or decreased by turning the rod *b'* in the thread through the tie *y*.

Spiral springs are placed on the connecting-rods *u* and *v* at *d'*, which, pressing against the fixed standard *x*, and acting through the tie *z* and the box *a'*, draw the shaft I and cutter-head H away from the splint.

The face of the cutter-head H is hollowed out, so as to give room for the fixed rest *e'*, which is bolted to the top-plate of the machine, and supports the hoop under the downward stroke of the knives of the cutter-head. The line of the feed of the hoop is slightly changed between the second and third pairs of rollers, as shown by the dotted lines, fig. 1, the object being to prevent the hoop from receiving the upward stroke of the knives of the cutter-head H, and it being necessary, at the same time, that the hoop should pass through the edger-knives parallel to the length of the machine.

Another fixed rest is placed on the top plate at *f'*, figs. 1 and 3. The splint passes in front of the rest *f'* and between the roller *m* and the cutter-head H, the space between which, being defined as described by the rod *b'*, is the thickness of the shaved hoop. The tendency of the springs *d'* being to withdraw the cutter-head H from the splint, the roller *m* bearing against the splint, holds the knives to it, and the fixed rest *f'* resists the pressure.

As the splint passes through, it is thus not only reduced to the definite thickness fixed by the distance between the roller *m* and the cutter-head H, but the roller acts as a guide and bearing against the bark, follows all its varied curvatures, keeping the cutter-head obedient to it and parallel to the bark surface, pulling the cutter-head to it or allowing it to fall away from it in accordance with such surface, however varied or crooked.

The lap is cut on the hoop by the operator turning the wheel *c'*, so as gradually to reduce the distance between the roller *m* and the cutter-head H, as the end of the hoop passes between them.

The hoop, now freed from knots and shaved throughout to an even thickness with the line of the bark, passes between the feed-rolls 5 and 6, and is immediately subjected to the action of the edger-knives N and O, figs. 1 and 5, which are intended to remove excrescences from its edge.

These knives are also self-adjusting, being held against the hoop by a spring, and controlled in their action upon its edge by a movable yoke, thereby forming a combination of parts which operates in a manner substantially similar to the knot-cutter already described as forming part of this machine.

The edger-knives are two in number, and consist of rotary cutter-heads N and O, fig. 5, mounted horizontally in double swinging frames *g' h'*, fig. 1, which turn independently of each other on the horizontal axis *i'*, and are placed one above and one below the hoop.

The lower cutter and frame swings in an opening made for it in the top-plate C.

The cutter-heads rotate on shafts placed near the free ends of the swinging frames, and are driven by belts *j' k'*, figs. 1 and 2, running over flanged pulleys *l' m'*, fig. 2, on the cutter-head shafts and corresponding pulleys on the shaft *i'*.

By this arrangement, the belts being radial, their tension is not altered by the movement of the swinging frames.

The belt *j'* is twisted, in order to give motion in the proper direction to the upper cutter-head N.

The small shaft *i'* is driven directly from the main driving-shaft by the belt *n'*, and pulley *o'*.

Outside the free end of the upper swinging frame is a double yoke, *p'*, figs. 1, 2, and 5, which is free to turn about the center on which the edger-knives rotate.

The two sides of this yoke extend beyond the cutter-head N, and are joined at their ends by cross-bolts, carrying rests *q'* and *w'*, which bear against the edge of the hoop when the machine is in operation, in front of and behind the knives, and prevent their cutting into the hoop beyond a straight line joining the bearing edges of the rests.

The forward rest, *w'*, is adjustable by a slot in he side-frame of the yoke, and the after one, *q'*, is simply

a flat and curved iron, placed as near as possible to the knives of the cutter-head N.

The upper swinging frame has a bent arm, *s'*, attached to it, which projects below the top plate and forms a point of action for the rubber spring *t'*, which, being connected with the lower swinging frame *h'* by the stiff rod *u'*, draws them together, the upper one downward, and the lower one upward.

The lower swinging frame *h'* is provided with a yoke, differing from the one on the upper frame only in that its action is reversed, and controls, in their cutting action, the lower knives, which are pressed upward against the hoop by the spring *i'*. Thus a combination of parts is formed, substantially resembling in the parts of each half, above and below the hoop, the knot-cutter already described.

The longer arm of the yokes in each case is toward the direction from which the hoop is fed, and the forward rests of the yokes controlling the edger-knives are so bent and shaped as to form a mouth to insure the entrance of the hoop between the upper and lower cutter-heads.

The edger-knives N and O being free to move up and down with the swinging frames, and pressed against the upper and lower edges of the hoop by the spring *i'*, and controlled in their action upon it by their respective yokes, adapt themselves to the slight curves of the edge of the hoop, moving either reciprocally or independently, and only remove such knots and excrescences from it as the yokes will allow.

It is not contemplated to dress the edge of the hoop uniformly throughout its entire length, but simply to remove such knots and excrescences, and straighten such irregularities in its outline as would otherwise, in some measure, mar its appearance or detract from its usefulness.

It is evident, however, that if it be desired, the cutter-heads N and O can be made to act continuously upon both edges of the hoop, or one of them only can be made to act in this manner by a proper adjustment of the rests attached to the yoke-frames.

When the lower arm of the bent lever, shown in dotted lines, fig. 5, is vertical, the swinging frames *g'* and *h'* are held apart, and the edger-knives are separated and out of use; but on depressing the handle which forms the upper part of this lever, the knives are at once allowed to act on the hoop.

The edger-knives must be counterpoised, either by a rod and weight attached, extending beneath the table and balancing them about the shaft *i'*, or by a lever and weight attached to the rod *u'*, or by a spring.

From the edger-knives the hoop passes between the crimping-rolls 7, 8, and 9, figs. 1 and 2, by the action of which it is rendered supple, and bent nearly into the shape it is to assume on the barrel, and finally discharged from the machine over the pulley L, in the direction indicated by the dotted lines in fig. 1.

The roll 7 is fluted and turns in a fixed box, while the roll 8 is smooth, and held firmly against the hoop by a spring concealed under the top plate.

The roll 9 is smooth, and placed in such a position as to crimp the hoop about the fluted roll 7, is not driven, and is adjustable in its distance from the roll 7 by means of a bolt passing through the foot, which carries it and a slot in the top-plate C.

When the machine is employed to shave box-straps, the crimping-roll 9 may be removed entirely.

This arrangement of the crimping-rolls is not original with the patentee, having been used on the hoop-machine patented by S. F. Atherton, November 13, 1860, No. 30,609.

A throat may be placed before each pair of feed-rolls, to insure the passage of the hoops between them.

If the hoops are fed immediately after each other, their passage through the machine is regular and certain, and the cutter-head D is prevented from acting on the hoop after its end has passed by the forward rest *s* of the yoke-frame, on the knot-cutter.

Claims.

I claim—

1. The movable cutter-head D, when its adjustment is controlled by a swivelled yoke, F, having two points of bearing upon the hoop, substantially as set forth.

2. The combination, with the cutter-head H, and its controlling-rest *m*, and its connection, of the springs *d'*, which shall operate to force the cutter-head away from the hoop, and at the same time draw the rest against it, for the purposes set forth.

3. The combination of the swinging-standard E, the shaft *h*, cutter-head D, swiveled yoke F, with its rests *t* and *s*, and the spring *i*, operating substantially as and for the purposes set forth.

4. In combination with the adjustable cutter-head H, its shaft I, and the controlling-rest *m*, the tie-rod or rods *u v*, connected to said shaft by an arm, *z*, the parts being arranged to operate substantially as set forth.

5. The combination of the automatically-adjustable cutter-head D, upon the bark side of the hoop, with the automatically adjustable cutter-head H, upon the face side of the hoop, operating substantially as described.

6. In combination with the movable cutter-head H, the rest *m*, when made adjustable to and from said cutter-head, as and for the purposes set forth.

7. In combination with the automatically-adjustable cutter-head H, the fixed rests *e'* and *f'*, arranged to operate substantially as set forth.

8. The combination of the automatically-adjustable cutter-heads N and O, operating conjointly to dress the edges of the hoop, substantially as described.

9. In combination with the cutter-head N, the swinging sustaining-frame *g'*, the center of whose movement is the center of the driving-shaft *i'*, operating substantially as set forth.

10. In combination with the swinging frames *g' h'* and cutter-heads N and O, a spring, *t'*, operating to force the cutter-heads against the edges of the hoop, for the purposes set forth.

11. The combination of the self-adjusting cutter-heads N and O for trimming the edges of the hoop, the self-adjusting cutter-head H for shaving the hoop, and the self-adjusting cutter-head D for removing knots, operating substantially as described.

12. For the purpose of forming the finished hoop, the combination of the crimping-rolls 7, 8, and 9, with the automatically-adjustable cutter-heads H and D, and N and O, arranged to operate substantially as and for the purposes set forth.

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