N. ZIERDEN.

Improvement in Circular Saw-Mills.

No. 126,667. Patented May 14, 1872.

Fig: 1.

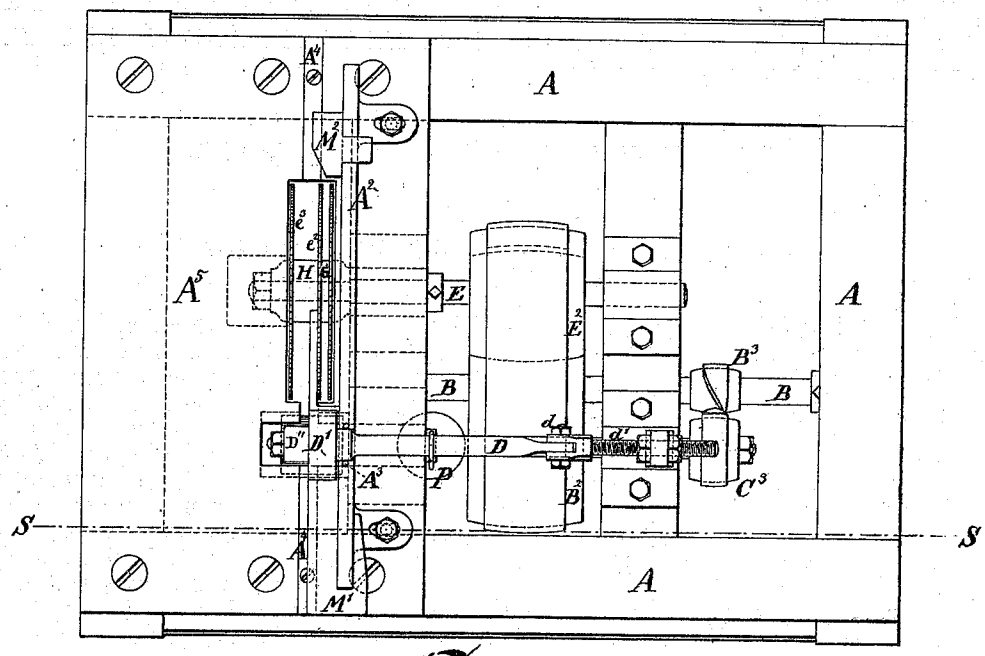
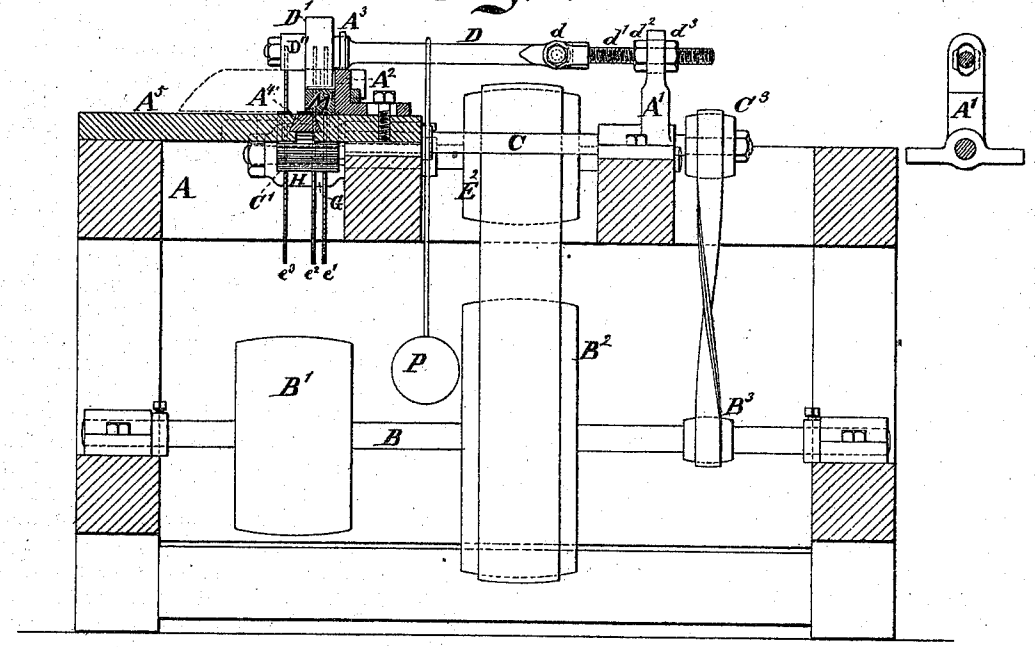


Fig: 2.



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IMPROVEMENT IN CIRCULAR-SAW MILLS.

Specification forming part of Letters Patent No. 126,667, dated May 14, 1872.

Specification describing certain Improvements in Sawing-Machines, invented by NICHOLAS ZIERDEN, of Williamsport, Lycoming county, in the State of Pennsylvania.

The slabs or waste stuff produced in the manufacture of boards, joists, and other large lumber is employed with profit in a large way by manufacturing therefrom smaller pieces, among which are fence-pickets and laths. There are two kinds of pickets in general demand, denominated, respectively, square and flat. Laths are usually of a uniform or nearly uniform size, and much smaller than the smallest of the fence-pickets. To save cost and space, it is desirable to employ the smallest number of machines, and to adapt them with facility for sawing the different sizes of small stuff. I designate the material, of whatever form, by the general term "bolt," and have succeeded in adapting a single machine of moderate size to be rapidly and conveniently changed to produce the several varieties of small wooden pieces. It will be understood that when the bolt is capable of producing one or two large pieces it may be run through the mill to accomplish this, and then the remainder thrown in a pile, to be subsequently worked through when the machine is adjusted for the smaller size.

I will proceed to describe what I consider the best means of carrying out the invention.

The accompanying drawing forms a part of this specification.

Figure 1 is a plan view, with the machine in the proper condition for sawing one flat picket at each passage of the material, yet ready to be instantly changed, by the simple lifting off of two removable pieces, so as to be in the condition for sawing two laths. Fig. 2 is a corresponding vertical section.

Similar letters of reference indicate like parts in all the figures.

A is a fixed frame-work of firm timber. B is the main driving-shaft, receiving motion from a belt (not represented) running on a pulley, B^1, and giving motion to the mechanism above by means of belts to pulleys B^2 and B^3. The shaft above, marked C, carries a pulley, C^3, which receives a cross-belt from the pulley B^3, and carries on its other end a fluted or suitable roller, C″, which is mounted on the top of the frame-work so as to act on the under surface of the bolt and feed it slowly forward. D is a self-adjusting bar or axis, which carries a pressure-roller, D^1 D^2, and is loaded by a weight, P, so as to press constantly on the bolt, and induce a proper action of the rough feed-roller C′ below. The press-bar D swings slightly on a pivot, *d*, which is adjustable by means of a stout screw, d^1, and the nuts d^2 d^3, which take hold of the rigid upright A^1, and, by adjusting these nuts d^2 d^3 on the bolt d^1, the shaft D and, consequently, the feed-roller D^1 D^2 may be adjusted to the right or left, as required. The roller D^1 D^2 may be removed when required, and another of a different form applied, as will be explained further on. On the table or upper surface of the fixed frame-work A is an adjustable gauge, A^2, held by screw-bolts standing in slots, as shown in Fig. 1, so that it may be shifted to the right and left, analogous to the gauges in ordinary sawing-machines, to allow the bolt to be placed laterally against it, and thus to determine its position as it is fed forward to the saw or saws. On the upper edge of the gauge A^2 is a yoke, A^3, which embraces the shaft D of the pressure-roll, and properly confines it to prevent its moving horizontally. I employ circular saws, mounting several with collars on a single shaft, when required. The saw-shaft is marked E. It receives rapid motion by a belt from the pulley B running on the pulley E^2. The saws are marked e^1 e^2 e^3. There are changeable collars fitted on the shaft E, which apply on each side of the several saws, and hold them firmly by means of a nut. The collars are of different thicknesses, as will appear from the drawing.

I will first describe the work as it is represented in the figures, and will afterward describe some of the varieties of adjustment.

The saws e^1 e^2 are near together, and the saw e^3 is at a considerable distance therefrom. The saws e^1 e^2 are turning idly or without effect, and only the saw e^3 is effective. This condition is attained by means of pieces M^1 M^2, which are capable of being fitted rapidly and

perfectly in place on the gauge-piece A^2. They are each of a hook form, and will be referred to as hook-pieces. Their width is sufficient to reach out beyond the two saws e^1 e^2, and the length of the front hook-piece M^1, is sufficient to extend a little across a portion of the face of the saws, as shown.

The effect of the introduction of the hook pieces M^1 M^2 is practically to carry the gauge surface out beyond the saws e^1 e^2, and compel the bolt to move in a new plane so far out that the saw e^3 will be effective in the proper relation thereto. By removing the hook pieces M^1 M^2, which can be done immediately, and laying them aside, the machine is instantly ready to receive a bolt differently, and to allow the saws e^1 e^2 to act and produce laths.

I will designate the collars between the several saws by distinct letters, G and H, and may have occasion sometimes to refer to the thickness of the space between the saws, in which case I may use the same letter.

Operation.

Flat pickets are usually made two and a half inches wide. For their production the bolts require to be first sawed by the same or a different machine, in pieces two and a half inches thick. This having been previously done the machine, as represented in Figs. 1 and 2, is ready for their reception and the manufacture of the pickets. In feeding the prepared stuff through the machine in contact with the hooks M^1 M^2 the material is first pressed gently against the hook M^1, and on being moved forward is taken hold of by the feed-roller and by the small part of the roller above it, which may be made in a separate piece or core, if preferred, is fed forward properly, and acted on by the saw R^3. The space between the plane of the outer faces of the hooks M^1 M^2 and the saw e^3, is just equal to the thickness of a flat picket, and the bolt is fed through, returned, and fed through again until it is consumed or reduced to a size too small for the further production of this particular kind of work. The end of the guide M^1, extending between the saws, past the saw-teeth, as shown, gives the bolt a substantial guide at each thrust until the sawing is fully completed.

Square pickets are usually made only one and a half inch square. This work requires the removal of some of the saws.

Laths can be made from the waste stuff after the flat pickets are made, without any further preparation of the machine. Laths are ordinarily sawed only one and a half inch wide. The waste stuff requires first to be sawn to that thickness. Now, by simply removing the hooks M^1 M^2, my machine is ready without any further alteration, to receive the waste stuff, and to produce two laths at each operation by the saws e^1 e^2. One lath is produced between the face of the gauge A^2 and the saw e^1. The second lath is produced between the saw e^1 and the saw e^2. If there is stock enough for another set, the same piece may be passed through again, and two more laths thus produced, when the rest is rejected as ultimate waste, or used only for supplying steam to the boilers.

In this operation the saw e^3 is idle, or under some possible circumstances may saw through a thin outer edge of the stuff; but that is of no importance. In this change of the machine from the sawing of flat pickets two and a half inches wide, with the use of the hooks M^1 M^2 to the sawing of finer stuff after the hooks are removed, the large part of the press-roller D becomes important. While the thick stuff was being used only the small part or core of the press-roller pressed on the work, and the large part was idle. Now, in the manufacture of the narrower pieces, using thinner stuff, the large part of the roller presses thereon. Thus the pressing-roller and the feeding mechanism generally are all the time ready for either condition of the machine—that is to say, for the use of the thick stuff with the hooks M^1 M^2, or for use of the thinner stuff without the hooks.

Square pickets are, as before intimated, made of stuff previously sawn to the thickness of one and a half inch. For this work the saw e^3 is removed altogether, and the saws e^1 e^2 are adjusted further apart, and the gauge piece A^2 is set further back. The thin collar C, which separated these saws, is removed, and the thicker collar H is substituted in its place. The outer saw e^3 being discarded altogether and the work again properly tightened, with the gauge A^2 set back properly, we are now ready to produce two square pickets at each feed of the material through the machine; one picket one and a half inch square being produced between the saw e^1 and the gauge A^2, and the next of a similar thickness between the saws e^1 and e^2.

Where the material is not likely to often given more than one square picket the second saw may be discarded and only one used; or, if desired, the other saws may be added with thin collars between them, so as as to produce one or more laths in addition to the single square picket. The press-roller D^1 D^2 may be adjusted laterally by the nuts d^2 d^3, to correspond to the new position of the bolt in sawing square pickets.

When sawing two square pickets at once, the core or slender part of the press-roller is removed, and a plain roller, of the full diameter, corresponding to the larger size of the press-roller, is substituted. The press-bar D can be adjusted for height at its back and end by changing the position of the bolt d^1 up and down in the post A^1. The hole which receives the bolt is elongated up and down to allow of a considerable adjustment in this direction.

For sawing laths from stuff properly prepared, and wide enough to make three or four at a single operation, the machine may be provided with three, four, or other number of saws, with their collars G between them; and mounting a large feed-roller, D^1, of sufficient

width, on the press-bar D, the machine may be made to serve as a regular gang. This mode of working for sawing either kind of wood is obvious. A portion of the table or top of the fixed frame-work A is removable, as usual, to allow removing and replacing the saws on the shaft. The provisions for this purpose are of the ordinary kind. But there is a removable piece, A^4, which fills up a certain portion of the top of the frame-work, fitting in a dovetailed seat, as shown in Fig. 2, and which, by its removal, allows the main body of the table A^5 to be moved bodily nearer to the gauge A^2 than is here represented. This change of position may be adopted at pleasure, when required, to facilitate the several stages of the work.

Although I have above remarked that, in the sawing of small square pickets, the saws should usually be changed in position, it will be evident that one such picket may be sawn from each bolt by simply setting back the gauge A^2 to a sufficient extent.

I have represented but a single machine, and have referred to the advantage of being able to change such a machine rapidly from one kind of work to another. It will be obvious that the machine may be made, in the same manner, double and triple, if desired, with the same features, and with the same facility of changes. I have worked experimentally with a double machine, and like it; the necessity for changing being, of course, reduced by such arrangement. As I have operated, one part was made with but a single saw and ordinary attachments, and was used for preparing the bolts for subsequent sawing on the part represented. Both parts might, however, have been made with the attachments, as shown.

One point of very great importance remains to be described among the advantages due to my peculiar construction and arrangement. This is the capacity for feeding the bolt by power and by hand, at will, or in combination, The lower roller C′ is fluted, and the upper roller D^1 D^2 is smooth, the part D^2 being smaller in diameter than the part D^1, as shown. Their speed is adapted for feeding at a rapid rate, due to clear stuff. While the bolts are clear, I let them feed as fast as the rolls require. But when a bolt is introduced that has a large knot, I keep the hand on it the same as with a clear bolt, but operate differently, and so as to retard its feed. I do this by both holding back and lifting. The holding back produces the obvious effect. The lifting conduces greatly to this effect by taking the pressure off the lower and only active roller. The upper roller being smooth and yielding, and only the lower being fluted and driven by power, the lifting causes the upper roll to lift a little, and to that extent relaxes the hold of the lower roller on the stuff. A little practice enables a workman to do this almost instinctively when the eye or ear informs him that a hard place has been reached by the saw.

Hand feeding, by its well-known facility, thus allowing for inequalities, can do more sawing without injury to the saws than any simple and ordinary automatic feed, because the automatic feed is uniform, and must be made slow to allow for the knots. My invention, by its peculiar combination, realizes the ease of operation, due to the automatic feed, with, to a great extent, the control, at will, due to the hand feed.

The difference in the diameter of the parts D^2 and D^1 is very important in this arrangement, for reasons readily seen. When the hook-pieces M^1 M^2 are in use, the large part D^1 is out of use, and the small part D^2 is ready to act on thick stuff. Then, when the hook-pieces M^1 M^2 are removed, the machine is instantly ready, by its large part D^1 of the upper feed-roll, to act properly on the thinner stuff then to be presented. Rolls which are plain cylinders may be introduced in place of D^1 D^2, when required by any different work; but the peculiar rolls D^1 D^2 are essential for the best performance of the work, as above described.

I claim as my improvement in sawing-machines—

1. The removable guides M^1 M^2, adapted to match the saws, and to the gauge A^2, and to allow the instantaneous change of the machine from one condition to another, as specified.

2. The loaded pressure-bar D and pressure-roller D^1 D^2, formed of two diameters, and adjusted in the several directions relatively to the saw or saws, as specified herein.

3. The removable pieces A^4, in combination with the gang of saws e^1 e^2 e^3, &c., the movable table end A^5, the changeable hooks M^1 M^2, and suitable feed mechanism C′ D^1, adapted for joint operation, as specified.

In testimony whereof I have hereunto set my name in presence of two subscribing witnesses.

NICHOLAS ZIERDEN.

Witnesses:
H. D. HEISER,
T. C. ROGERS.