

No. 112,228.

PATENTED FEB. 28, 1871.

W. DOWNING & W. H. SOLEY.
MORTISING MACHINE.

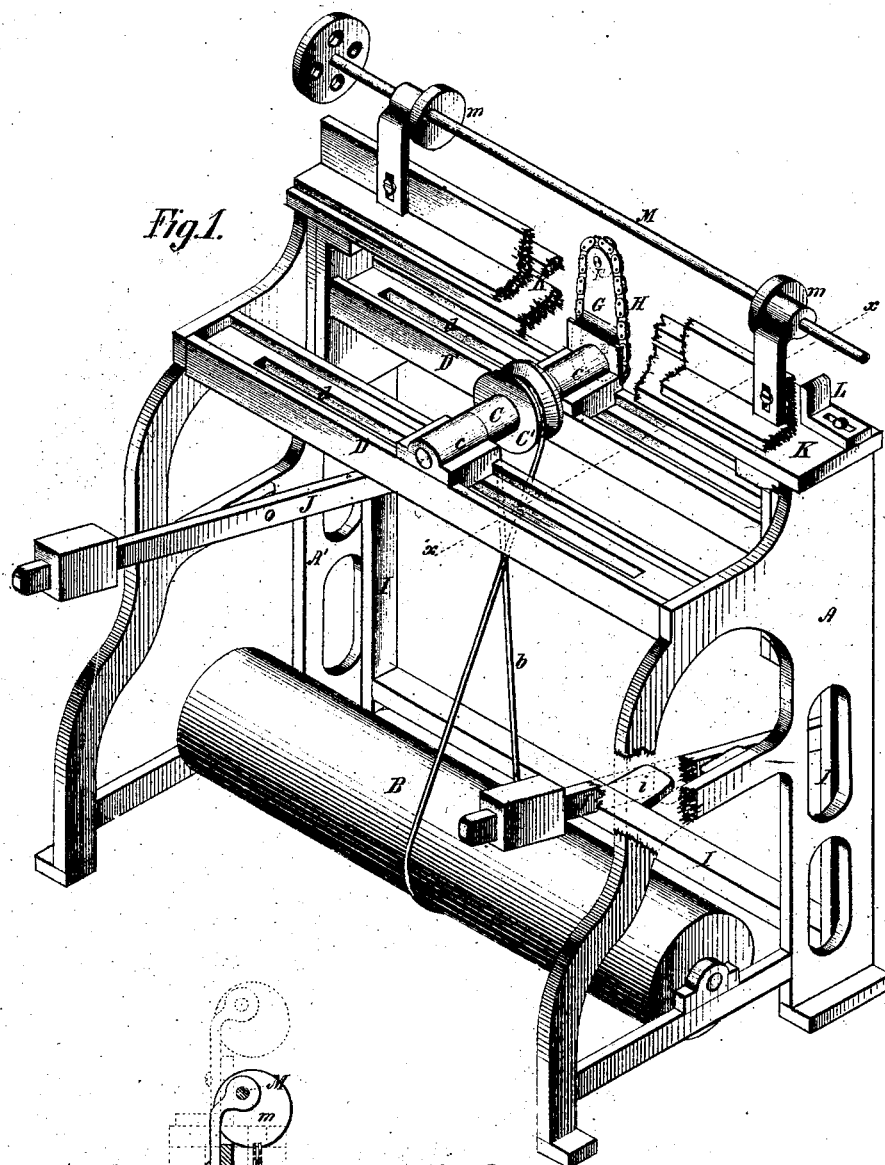


Fig. 2.

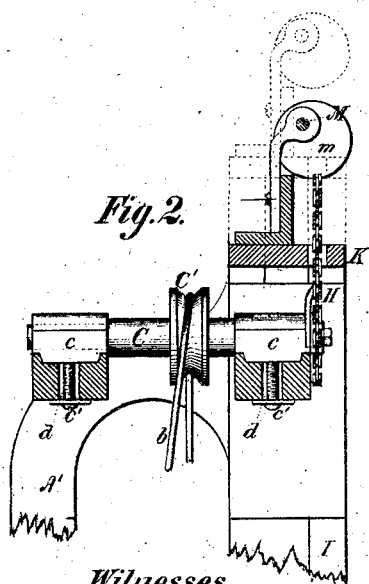


Fig. 3.

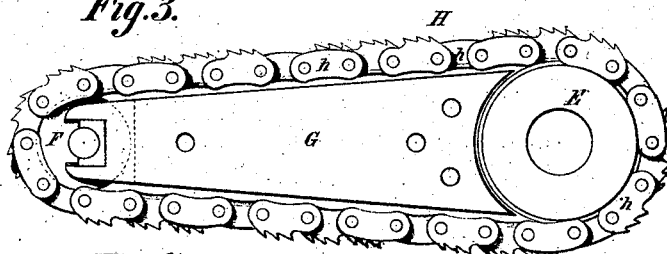
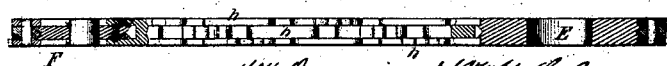


Fig. 4.



Witnesses.
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WILLIAM DOWNING AND WILLIAM H. SOLEY, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNORS TO WESTFORD WARNER, OF SAME PLACE.

Letters Patent No. 112,223, dated February 28, 1871.

IMPROVEMENT IN MORTISING-MACHINES.

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

To all whom it may concern:

Be it known that we, WILLIAM DOWNING and WILLIAM H. SOLEY, both of the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Mortising-Machines, of which the following is a specification, reference being had to the accompanying drawing, in which—

Figure 1 is a view in perspective of our improved mortising-machine, portions of the framing being broken away to show some of the parts more clearly;

Figure 2, a transverse section through the same at the line *xx* of fig. 1, the dotted lines showing the table in position for receiving the stile to be mortised;

Figure 3, a front elevation, detached and on an enlarged scale, of the cutter, the driving pulley, the guide-pulley, and the axle-standard; and

Figure 4, a side view, partly in elevation and partly in section, of the same.

It is the object of our invention to cut and clear a mortise, or a series of mortises, simultaneously, of any desired width and length, and straight or tapering, as required, so that the mortised stile on leaving the machine is ready for use without further finishing.

The first part of our invention relates to the cutting mechanism, and embraces the construction thereof and the combination of its different parts with each other.

The second part of our invention relates to the combination of the cutting mechanism with the other parts of the machine.

The main feature of the first part of our invention consists in an endless chain-cutter, shown most fully in figs. 3 and 4, and hereinafter described.

The second part of our invention consists in a gauge-table for feeding the stile upon the cutter, a clamping device for holding the stile in position, and a provision for cutting a mortise through any part of the length of the stile with one cutter, or cutting a series of mortises simultaneously by using any desired number of cutters.

Our improved mortising-machine is constructed as follows:

The two end-pieces, *A A'*, of the frame afford a firm and steady support to the operating parts.

A drum, *B*, mounted in bearings near the bottom of the frame, is driven by suitable connections with the prime mover.

The cutter-shaft *C* is mounted in bearings *c*, which traverse in guides or ways *D D'* near the top of the frame, and may be secured at any point upon the ways by set-screws *c'*, passing through slots *d* in the ways, so as to bring the cutter under any part of the stile to be mortised, or a series of cutter-shafts may be similarly mounted at different points so as to cut a series of mortises simultaneously.

The cutter-shaft is driven from the drum *B* by a

quarter twist-belt, *b*, passing over a pulley, *C'*, and the length of the drum *B* is such as to allow it to carry a belt for each cutter-shaft, which may be mounted on the ways *D D'*.

One end of the cutter-shaft projects beyond the guide *D'*, and carries a driving-pulley, *E*, fig. 3, and a carrying-pulley, *F*, is mounted above in line therewith in a standard, *G*, secured to the adjacent bearing of the cutter-shaft. Any lost motion or wear of the cutters upon the pulleys may be taken up by set-screws or other simple devices.

When straight mortises are to be cut the driving-pulley and the carrying-pulley are of equal diameters, or the carrying-pulley is larger than the driving-pulley.

When a tapering mortise is to be cut the carrying-pulley is of less diameter than the driving-pulley, the taper of the mortise being increased as the diameter of the carrying-pulley is diminished. It is, therefore, obvious that, these conditions being observed, where a series of mortises are cut simultaneously they may be all straight or all tapering, or some straight and some tapering, or some tapering more and some less, in proportion to the relative differences of diameter between the carrying-pulleys and their respective driving-pulleys.

The cutter *H* consists of an endless chain, composed of links *h*, the length of the links being adapted to the circle or circles described by the chain in passing over the pulleys *E F*, so as to insure its perfect flexibility, as represented in figs. 3 and 4.

Each link is also adapted to the circumference of the pulleys over which it travels, and with which the chain is continuously in contact by being curved on its inner side in the segment of a circle, the diameter of which is equal to that of the driving-pulley, and the chain is kept upon the pulleys and held firm and true in the line of cut by grooves in the pulleys, into which tongues on the links enter, or *vice versa*, the links being alternately single and double, as shown in the drawing, and the chain being driven only by its frictional contact with the driving-pulley *E*.

The thickness of the chain is equal to the width of the mortise which is to be cut, and the cutting-teeth are so disposed along its outer surface as to make a following cut from edge to edge of the mortise, (see figs. 3 and 4,) that is to say, we deem it essential, and have found it so in the practical operation of this cutter, that there should not be at any part of the chain a directly transverse line of teeth, the respective toothed and blank members which compose the links of the chain being so arranged relatively to each other that a transverse line passing through any three adjacent and similar members, whether the same be toothed or blank, will be inclined to the longitudinal center line of the chain, as shown most clearly in fig.

4, from which arrangement of the teeth it is obvious that the cut is commenced by one member of a double link, continued by a single link, and completed by the opposite member of another double link, instead of having the teeth to act simultaneously across the whole width of the mortise cut.

The standard and pulleys must in no case project beyond the chain, as otherwise the passage of the cutter through the mortise would be obstructed by such projection.

A sliding frame, I, traveling up and down in the side-pieces A A' of the main frame, and counterbalanced by weighted levers J J', carries a slotted table, K, through which the cutter projects a distance equal to the depth of the mortise to be cut.

At one end of this table is a knee-piece, L, adjustable toward or from the cutter or cutters by means of a slot and set-screw, which, when fixed in position, serves as a gauge and determines exactly and uniformly the point at which the mortise is cut.

A shaft, M, is supported in proper bearings above the table K, and is provided with clamping-cams *m*, which, when turned or screwed down upon the stile, hold it in position against the upward pressure of the cutter-teeth.

By means of a treadle, *i*, the operator with his foot depresses the sliding frame, thus feeding the adjusted stile down upon the cutter.

The sliding frame being raised as shown in dotted lines in fig. 2, and the knee-piece and cutter adjusted in position, the stile is clamped upon the table K, resting against the knee-piece L, and motion being communicated to the cutter-shaft, the operator feeds the stile to the cutter, which cuts and clears a mortise, the dimensions of which depend upon the thickness of the cutter and the diameters of the pulleys, as hereinbefore described.

We do not wish to be understood as claiming a flexible chain-cutter of whatever form or however mounted, as we are aware that certain constructions of such a device have heretofore been made; but

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The flexible endless chain-cutter H, constructed and arranged as shown and described, and for the purpose specified.

2. The combination of the flexible endless chain-cutter, the sliding feed-table, the gauge, and the clamp, these members being constructed and operating as described.

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