D. L. Gibbs,

Mortising Machine,

No. 68,298, Patented Aug. 27, 1867.

Witnesses.
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A.M. PHOTO-LITHO. CO. N.Y. (OSBORNE'S PROCESS)

United States Patent Office.

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Letters Patent No. 68,298, *dated August* 27, 1867.

IMPROVEMENT IN MORTISING MACHINES.

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

KNOW ALL MEN BY THESE PRESENTS:

That I, D. L. GIBBS, of the city and county of Worcester, and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Hub and other Mortising Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a front view of my improved machine.

Figure 2 represents a side view.

Figure 3 represents a longitudinal central section on line A B, fig. 1; and

Figures 4, 5, 6, and 7 represent sections and views of detached parts to be hereafter referred to.

To enable those skilled in the art to which my invention belongs to make and use the same, I will proceed to describe it more in detail.

In the drawings, the part marked A is the main frame, which I prefer to make of cast iron, the inside being cored out, as shown in the drawings.

The front of frame A is provided with two dove-tailed projections *a a*, which fit into similarly-shaped recesses or grooves in the sliding-plate B, (see fig. 5,) which is a cross-section on line C D, fig. 1.

To the bottom of the sliding-plate B is fastened the bearing-piece C, in which the hub 1 of gear *b* is fitted to turn. A screw-shaft or spindle *c* is fastened by a set-screw, 2, in the stand *d* fastened to the frame A.

The upper end of the screw-spindle *c* passes through a hole in gear *b* and its hub 1, and works in a female-screw thread cut therein, so that the operator, by turning shaft D, upon the end of which is fastened the gear *e*, which meshes into gear *b*, can run the latter up and down upon the screw-spindle *c*. When gear *b* is run up, it presses against the under side of the bearing-piece C, and forces up the latter, together with the sliding-piece B, and when gear *b* is run down, the weight of the parts causes slide-piece B and bearing-piece C to follow the gear down, so that the bearing-piece C and sliding-piece B always maintain the same relative position as respects gear *b*.

To the sliding-piece B is fastened the bed-spindle *f*, which extends through a hole in the back of the bed E, the hole being made large enough to receive the thimble 3, which is slipped on to spindle *f*, so that its head 4 fits a slot or groove, 5. The thimble 3 is long enough to strike the slide-piece B before its head 4 strikes the bed E, whereby, when quill 6 and the end of brace 7 are placed upon spindle *f*, and nut *g* screwed up, there will be sufficient play between the head 4 and the bed E, to enable the latter to be rocked back and forth upon the thimble 3 to give the proper inclination to the bed, as indicated in red and blue lines, fig. 1. The front part 8 of the bed E is united to the back by end ribs 9 9, while braces 10 10 unite the two parts near the centre, as fully shown in the drawings.

The back of bed E is made V-shaped, to fit a V-shaped groove in the bottom of table F, which is provided at the front right-hand corner with a rack-bar, 11, into which the gear 12 of shaft 13 works. Shaft 13 is supported in suitable bearings in the end of the bed-piece E, and is operated by the hand-wheel 14. The object of this arrangement of rack and gear is to enable the operator to move the table either to the right or left, as the case may be, to adjust the material to the desired position under the chisel, which is to be inserted in an arbor working in proper guides, fastened to the front of the main frame in any well-known manner. The chisel-arbor is operated by a connection attached to a wrist-pin inserted in a hole, 15, in the balance-wheel 16 upon one end of shaft 17, which has its bearings in the sliding-frame 18.

In hub-mortising machines it is important to have some device for readily determining the distance the table is to be moved in either direction to bring the hub into the proper position to cut the mortises. For this purpose I have devised an entirely new arrangement, which I will now describe.

Lever G is hinged at *h* to the front side of table F, and is also provided with two oblong holes, through which are passed the screws or pins *i i*, which enter the sliding-pieces *j j*, the backs of which are made in dove-tailed form, to work up and down in dove-tailed grooves cut in the front of table F. The lower ends of the sliding-pieces *j j* project forward, as shown at *k k*, the lower sides of projections *k k* being grooved or cut out

in circular form, to prevent their striking against the check and stop-nuts *l l'* upon the stationary screw-shaft *m*, which is supported in bearings attached to the front of bed E. The projections *k k* on the pieces *j j* are provided with screws *m' m'*. The ends or heads of the screws projecting form the outsides of the projections, as fully shown in fig. 1. The rear end of lever G is provided with a stop-pin, *n*, to fit the holes *n'* in the stand *o*, which is fastened to the front of table F. The rear end of lever G is provided with a thumb or finger-piece, *p*, by which the lever can be operated or the rear end moved up and down, there being spring enough in lever G to enable the operator to spring pin *n* out of the holes *n'* when he desires to change the position of the lever and the sliding-pieces *j j*.

The operation of this part of my machine is as follows: The hub being placed upon table F, and supported properly under the chisel, the operator adjusts the nuts *l l'* on the screw-shaft *m*, so that when the end of lever G is raised so as to allow pin *n* to slip into the second holes *n'* from the top of stand *o*, the projection *k* will strike against the nuts *l'*, when table F is run to the left, and thus stop the latter and determine the right-hand end of one of the mortises in the hub; and when it is desired to finish or cut the other end of the mortise, lever G is moved so that its pin *n* will slip into the bottom hole in stand *o*, and table F is then run to the right, when the end of the screw *m'*, in the right-hand projection *k*, will strike against the nuts *l* and stop the table in the proper position to determine and fix the left-hand mortise. The operator now, by means of hand-wheel H, turns forward shaft H', upon the right-hand end of which is the gauge-wheel H'', to which the end of the hub is to be fastened in any proper manner, until the point *o''* in the spring-bar A' falls into the next notch *o'* in the face of the wheel H''. He then raises lever G so that its pin *n* will slip into the top hole in stand *o*, and then runs table F to the left until it is stopped by the screw *m'* in the left-hand projection *k* striking against the nuts *l'* and thus determines or fixes the right-hand end of the next mortise. Lever G is now moved so that its pin *n* will slip into the second hole from the bottom of stand *o*, when table F is run to the right until the right-hand projection *k* strikes against nut *l* and stops the table, and thus determines the left-hand end of the second mortise. The operation above described is repeated until all of the mortises are cut.

It will be noticed that a hub mortised in the manner above described will have mortises cut irregular, that is, every other mortise, or one-half of them, will be cut further towards one end of the hub than the other, the variations depending upon the distance which the screws *m' m'* project out from the projections *k k*.

If it is desired to cut mortises regular, it is only necessary to properly adjust the parts, and then only move lever G sufficiently at each time to bring the projections *k k* down to stop the table at each end. The same result would also be accomplished by properly adjusting the parts, and then move lever G so that the screws *m' m'* will stop the table at each back-and-forth motion, as above described.

The nuts *l l'* on the screw-shaft *m* may be turned so as to permit of more or less back-and-forth motion to the table F for cutting mortises of different lengths. By the use of two nuts, *l*, and two nuts, *l'*, as shown in the drawings, they are not liable to become displaced by use after they have been adjusted. By simply moving lever G, so that its pin *n* will slip into the middle hole in the stand *o*, as seen in fig. 1, table F may be run back and forth freely, the projections *k k* passing over the tops of the nuts *l l'* without striking.

In fig. 7 the various positions which the sliding-pieces *j j* and their projections *k k* can be made to assume, as respects screw-shaft *m* and its nuts *l l'*, are shown in black, red, blue, and yellow colors.

As before stated, the hub is to be supported by suitable supports fastened upon the table F, one end of the hub being fastened, by jaws or otherwise, to the end of shaft H', or in a central position to the side of the catch-wheel H'', so that when the latter is revolved the hub is revolved with it, for the purpose of bringing the same into proper position for the cutting of the next mortise.

To facilitate the operation, and enable the operator to properly adjust the hub with one hand, the catch-wheel H'' is made with a series of holes or notches, *o'*, the sides of which holes or notches being so made that they will catch upon the pin *o''* in the spring-lever A', the lower end of which is fastened to the stand, which supports shaft H' and the parts connected thereto, while the opposite sides of the holes are made inclined or recessed back, as fully shown in fig. 6 of the drawings.

The operation of this part of the machine is as follows: The operator stands in front of the machine, with his left hand upon the hand-wheel H, and, after one mortise has been cut, he draws the wheel forward towards him, thus causing the inclined side of the notch *o'* in the catch-wheel H'' to bear against the inclined side of pin *o''*, which is forced out of the notch, thus permitting shaft H' to be turned until another notch comes opposite the pin *o''*, when the latter slips into the notch, and the operator, pressing the hand-wheel from him, brings the straight side of the hole against the straight side of the pin *o''*, whereby shaft H' and the hub are held securely in place until the mortise is cut, when the operation of turning shaft H' and the hub for another mortise is repeated.

While the operator adjusts or turns the hub with his left hand, he can also at the same time, and without moving his feet, adjust the hub longitudinally with his right hand by means of the hand-wheel 14 and rack and pinion, as before explained. A part of the hand-wheel 14 is shown broken away, in fig. 1, to expose to view some other parts of the machine more fully.

It is often desired to cut mortises in hubs and other articles upon an incline, or bevelling, and in which case the bed E and table F must be set and held in an inclined position, and for which purpose I have devised some very convenient mechanism, the operation of which will now be explained.

The bent piece I is fastened by one arm or end to the right-hand end of the sliding-piece B, while the other end or arm extends back by the side of the frame A, where the right-angled lever I' is hinged to it, the short arm I'' of the lever being hinged to the lower end of the half-twisted flat spring I''', while the upper end of said spring is hinged to the back of the bed E.

The inner side of the upper end of lever I' is provided with a thin fin, 20, to fit the slots 21 in the catch-

pieces 22, the necks of which fit in a long slot in the adjustable piece K fastened to the side of frame A by screws or bolts 23, which pass through elongated holes in its ears 24 24. The catch-pieces are held in place by screws 25, washers being placed upon the screws before they are inserted.

When the fin on the hand-lever I′ is in the notch in the centre-piece 22, as shown in fig. 2, the bed and table will be level, as shown in dark lines, fig. 1, when in the notch in the back piece the positions of the bed and table will be changed, as shown in red lines, same figure, and when in the slot in the front piece, the positions of the parts will be as shown in blue lines. As the catch-pieces 22 can be easily adjusted back and forth, they can be set to give the table any desired angle. Again, when the bed and table are raised, by raising the sliding-piece B, as before explained, lever I′ is raised too, so that the said parts always remain in the same relative position, which facilitates the cutting of bevel-mortises very much. Should it be necessary to have the adjustment very accurate, when the table and bed are raised the piece K can be set up or down, so as to occupy the same relative position as respects lever I′. By means of the adjustable catch-pieces 22 a degree of accuracy can be attained in the cutting of mortises never accomplished where a notched bar or plate is used to hold the lever.

The relative arrangement of lever I′, as respects wheel 14, is such that the operator can conveniently reach both with his right hand from his position in front of the machine. Then, again, by the use of the half-twisted plat spring, which yields in two directions, the various motions of the lever I′ and the bed E are obtained in an easy manner, and that, too, without swivel-joints, as will be fully understood by those skilled in the art.

The rear end of the foot-lever K′ is hinged to ears inside of frame A, and extends out in front of the machine, as shown in the drawings. To the middle of lever K′ is hinged the lower end of rod L, the upper end of which is fastened to the bottom of the sliding-frame 18, in which the driving-shaft 17 is supported.

With the top of the frame 18 is combined a rod, 26, the upper end of which extends up through the cap-piece of the frame A, and is hinged to the front end of lever L′, fulcrumed between the ears 27 on the stand 28. The rear end of lever L′ is slotted out, and a weight, L″, connected thereto, as shown in the drawings.

The frame 18 works in proper guides, and the back guide-pieces M M can be adjusted up, to compensate for any wear, by means of the screws or bolts 29 which pass through the elongated slots 30 in the cross-pieces N. Bolts 29 may have large heads, or washers may be used, as shown in the drawings.

As before explained, the chisel-arbor is operated by a connection attached to the balance-wheel 16, and it will therefore be seen that when the foot-lever K′ is depressed, as shown in red lines, the chisel will be driven farther down into the material being mortised. As soon as the foot is removed from lever K′, the weight L″ falls, and draws the parts back into the position shown in dark lines, fig. 3.

The guide-pieces 31 31, between which lever K′ works, may be provided with a series of holes, so that a pin, 32, can be inserted to prevent lever K′ from being raised higher than a given point, as fully indicated in the drawings.

With a view to give the chisel-arbor a quick up-motion, as soon as the foot of the operator is taken from lever K′, without the use of a very heavy weight, L″, a spiral spring, O, is placed upon the rod L, between the stand P, fastened to the frame A, and the collar Q, fast on rod L, so that when rod L is drawn down, spring O will be compressed, as shown in red lines, fig. 3, and will thus aid in throwing up rod L when the foot of the operator is removed.

By the use of a spring, in combination with the rod L, as described, a smaller weight, L″, can be used, thus enabling the treadle or lever K′ to be operated easier and with less fatigue than it could be without the spring.

In lieu of a spiral spring, O, a flat bow or other spring may be employed with good effect.

For common mortising, table F and the parts connected therewith may be removed, and an ordinary table fitted to the bed E, or both the table F and bed E may be removed, and others substituted.

Lever I′ can be sprung out from the slots in the catch-piece 22 by a slight motion of the hand.

Having described my improved machine for cutting mortises in hubs, and for other purposes, what I claim therein as new and of my invention, and desire to secure by Letters Patent, is—

1. The combination, with the sliding-frame 18 and rod L, of levers K′ L′ and weight L″, said parts being arranged to operate, in relation to each other, substantially as and for the purposes set forth.

2. The combination, with the sliding-frame 18, of the adjustable pieces M M, slotted cross-pieces N N, adjusting-bolts 29, as and for the purposes set forth.

3. The combination, with the weighted sliding-frame, and levers and connecting-rod for actuating the same, of a spring attached to said connecting-rod, under the arrangement and for operation as herein described.

4. The combination of stand *d*, stationary screw *e*, gears *a b*, shaft D, with the sliding-piece B, substantially as and for the purposes set forth.

5. The combination, with the sliding-plate B, of the bed E, carrying the bearing C and stay-brace 7, in the manner and for the purposes herein described.

6. The combination, with the table of a mortising machine, of the vertically sliding pieces *j* and lever G, substantially as and for the purposes set forth.

7. The combination, with the table F, of the vertically sliding pieces *j*, provided with projections *k* and screws *m′*, and the lever G or its equivalent, and perforated plate or stand *o*, under the arrangement and for operation as herein shown and described.

8. The combination, in a machine as described, with the sliding-piece *j* and lever G, of the stationary screw *m* and adjusting or stop-nuts *l l′*, the whole being arranged and operated as herein specified, so that mortises may be cut either in or out of line, as desired.

9. The combination, with the catch-wheel H″, provided with bevelled recesses, of the spring-lever A′ and bevelled pin *o″*, arranged for operation in a hub-mortising machine as and for the purposes stated.

10. The combination, with the sliding-piece B and bed E, of the lever I′, in the manner herein described, so that the lever will be raised and lowered with the bed, substantially as and for the purposes set forth.

11. The combination, with the bed E and the lever I′, of the flat, half-twisted spring I‴, substantially as and for the purposes set forth.

12. The combination of slotted stop-pieces 22 or their equivalents with slotted piece K, substantially as and for the purposes set forth.

13. The combination of the slotted piece K and adjustable catch-pieces 22, with frame A and lever I′, for the purposes set forth.

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Witnesses:

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