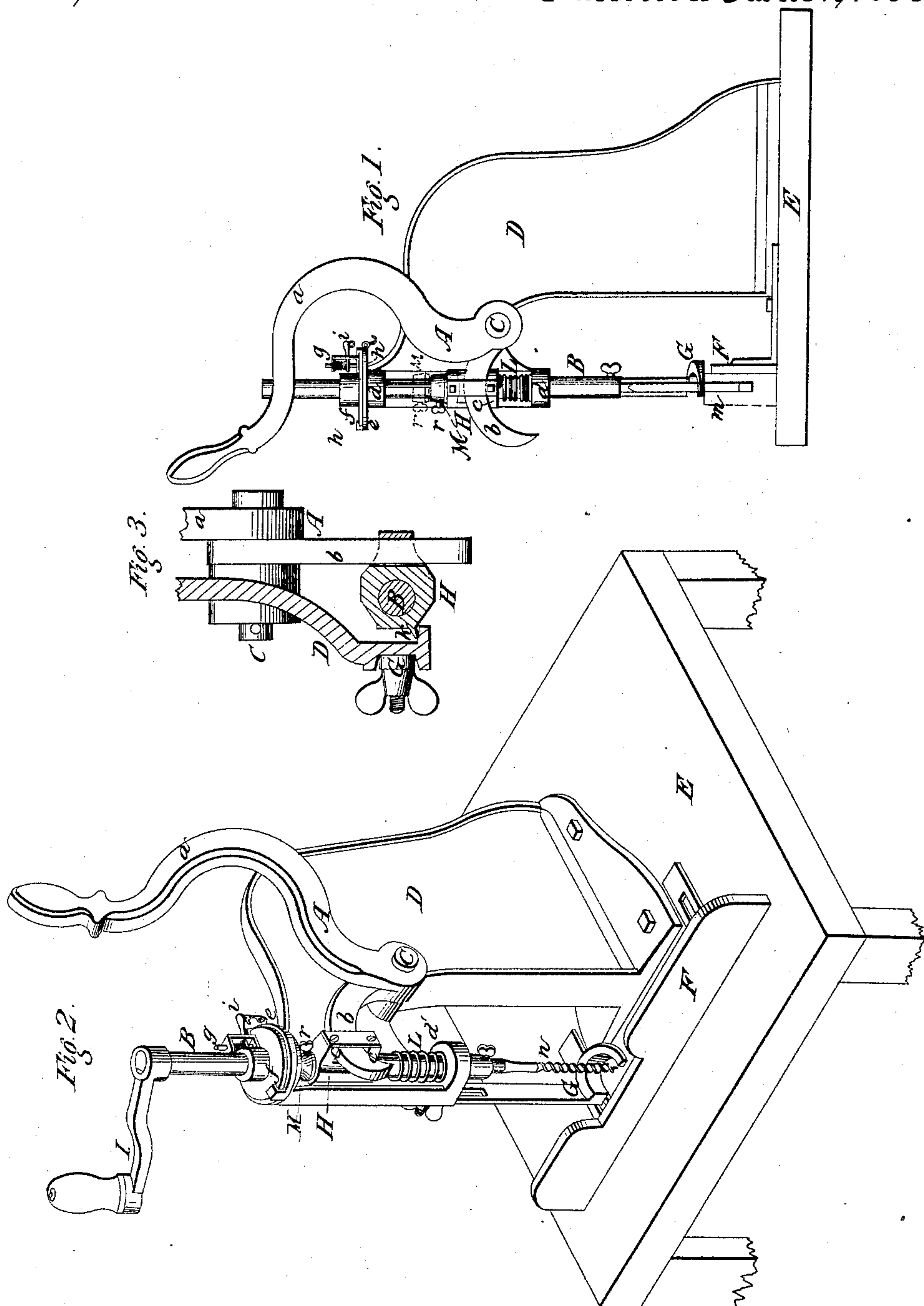


F. H. Harwood,
Mortising Machine.
No. 26,986. Patented Jan. 31, 1860.



UNITED STATES PATENT OFFICE.

F. H. HARWOOD, OF RUSHVILLE, NEW YORK.

MORTISING-MACHINE.

Specification of Letters Patent No. 26,986, dated January 31, 1860.

To all whom it may concern:

Be it known that I, FOREST H. HARWOOD, of Rushville, in the county of Yates and State of New York, make known that I have invented a certain new and useful Improvement in Mortising-Machines, which Machines are also Applicable to Boring Purposes; and I hereby declare the following to be such a full and clear description thereof, as and when taken in connection with the accompanying drawing, to enable others practically acquainted with mortising or combined mortising and boring machines to make and use the same.

In the accompanying drawing, Figure 1 represents a side elevation of a mortising machine constructed according to my improvement. Fig. 2 a view in perspective of the same machine when used to operate as a borer; and Fig. 3 a horizontal section through the machine in part, taken a little above the fulcrum of the operating lever or handle, and being drawn on a larger scale than the other figures.

My improvement relates more particularly to that class of mortising machines which are designed to be worked by the hand or foot of the operator, and some of which are convertible so as to be used as boring machines.

The machine represented in the accompanying drawing has its lever (A) which operates the chisel stock or mandrel, and which is a lever of the first kind, hung on a fulcrum (C) to a goose-neck or other suitably shaped standard (D), that may be fastened by screws, for attachment to or use on a carpenter's bench or otherwise, to a base (E) which is provided with an adjustable guiding strip or gage (E) for the stuff to be fed along and to rest against; a vertically adjustable foot or holder (G) serving to keep down the stuff steady on the base and prevent it from being lifted by the cutter in its up stroke.

The lever (A) is so formed as that its longest arm (a), which constitutes or has connected with it the handle proper, is of bow shape and projects in rear of the fulcrum to aid in balancing and raising the mandrel (B) and its cutter as hereinafter more fully set forth, while the hand holding part thereof is by such configuration or arrangement made to occupy a forward position so as to give to it a travel in a curvilinear direction over the fulcrum in a line of mo-

tion most convenient for the arm of the operator as he stands in front of the machine to work it. Said lever (A) has its smaller or operating arm (b) so formed and is so struck as to give it a hooked configuration of such a character as that, in its action on the double beveled or convex jaws or clips (c, c) of the mandrel or stock box (H), it, in raising and lowering the mandrel box and mandrel with cutter attached, will, where it touches the clips, always crop at right angles, or thereabout, the line or plane of motion of the mandrel, thereby doing away with that variable and serious forward and backward thrust or inclined plane action on the mandrel which would attach to a straight construction of the operating arm (b) of the lever. My construction of the operating arm (b) consequently reduces friction and economizes power. A like effect would be gained were the hooked arm (b) to be reversed so as to have its convex edge undermost.

If it be preferred to operate the machine by the foot, or to employ the foot in concert with the hand, a stirrup or treadle may be connected by a rod with the handle portion (a) of the lever and a spring be provided the lever to balance or lift such foot gear.

The stock or mandrel (B) fits through a round hole in the mandrel-box (H) and is made capable of both turning in and sliding up and down through the latter. It also works in and through bearings (d d') projecting from the standard, and through reversing and steadying disks (e, f), the lower one (e) of which is fast to the top of the standard while the other disk (f) is loose so as to freely rest on the lower disk under suitable clips, and so as, by means of a groove and feather in it (the upper disk) and mandrel, the turning of the mandrel causes the upper disk to turn also. This arrangement has a twofold use: firstly, it serves to steady the mandrel and prevent cutting or binding of it in its bearings (d d') by lateral strain or twist thrown on it in the action of the cutter; and, secondly, it forms a reversing device for the chisel, in mortising, by means of a stop (g), furnished the upper disk, and acted on by a spring so as to be self-locking in one or other of two holes (h h), made in the bottom disk, accordingly as the upper disk is turned to reverse the chisel; a small and pivotless or loosely hung lever (i) connected with the

spring stop serving to unlock the upper from the lower disk and to turn the upper disk when it is required to reverse the chisel to cut square (say) the two ends of the mortise. When the machine is used for boring, this lever (*i*) may be hooked or wedged up so as to keep the spring stop raised to permit of the continuous rotation of the upper disk and mandrel by a handle (I) that ships on to and gears with the top of the mandrel.

The mandrel-box (H) should be provided on its exterior, on the side next to the standard, with a feather (*k*) which should be made to work in a vertical slot in, or against a suitable vertical surface on, the standard (D), so as to keep the box in vertical play, when mortising, and prevent its twist or binding on the mandrel.

From the foregoing description of parts, the general action of the machine scarcely needs explanation. Thus, for mortising, supposing the mandrel-box (H) to be so geared with the mandrel as to rise and fall with it, will be obvious that the lever (A) readily effects this action: while, for boring, supposing the mandrel-box (H) to be relieved from such rising and falling motion with the mandrel, and the chisel (*m*) replaced by an auger (*n*), and the chisel reversing gear or rather its stop restrained from acting as before described, then, by applying the crank or handle (I), the mandrel and auger may be freely rotated, and moved vertically, to drill or bore as well as or better than by the ordinary bit-stock. But such general description does not make clear certain merits of the machine here referred to. This I shall now proceed to do, and shall commence by describing two simple devices or attachments the uses of which have not yet been explained. The upper half or portion of the mandrel (H) is of smaller diameter than the lower half or portion thereof, and the bottom of the mandrel-box (H) rests, when the machine is used for mortising, upon the collar formed by or at the junction of these two different diameters. Round the larger portion of the mandrel, and between the mandrel-box (H) and lower mandrel bearing (*d'*), and resting on the latter, is coiled a spring (L), against, and compressing which, the mandrel-box, in its descent as effected by the action of the handle or lever in mortising, is brought to bear in such a manner as that, while the spring does not materially impede the cutting or down stroke of the mandrel—and any compression of the spring may (if desired) only take place toward the end of the down stroke,—said spring, or any other spring equivalently acting, serves to start the chisel back out of the wood and obviates that sticking of the chisel which so frequently takes place at the close of the down stroke. But this is not all that such

provision accomplishes. It expedites the work generally, by anticipating, as it were, the change in stroke of the mandrel at close of its descent; likewise prevents injurious shocks and the accidental lowering of the chisel by which it might be injured or do injury; and, if the spring be constructed to act sufficiently early in the down stroke of the mandrel, it, also, will have a tendency to prevent the dulling of the chisel, by making softer or less abrupt the first contact of the chisel with the wood.

The other device, to which I have to refer, is an adjustable sliding collar (M) on the mandrel immediately above the mandrel-box (H). This collar is, in some respects, designed to act in concert with the spring (L) just described. Said collar is provided with a set screw (*r*), so that it may be adjusted either to hold the mandrel-box (H) down on the larger portion of the mandrel, as represented by its position in black lines in Fig. 1; or, such collar may be set on the mandrel (as represented by red lines in the same figure) so as to admit of a little vertical play to the mandrel-box (H) between it and the lower collar formed by or at the junction of the large with the small diameter of the mandrel. The object of this latter—slightly distant—adjustment of the sliding collar (M), in relation to the mandrel-box (H), will be apparent from the consideration of the fact, that said collar (M) forms the lift for the lever or handle (A) to or of the mandrel (B) by means of the mandrel box (H); so that, on starting back the chisel out of the wood, the spring (L) round the mandrel will at first, and for a little time, have but the mandrel-box (H) and operating lever (A) to move back, and these once set in motion, aided by the continued action of the spring, will, on the mandrel-box having risen sufficiently high to strike the upper collar (M), at its raised adjustment as represented by red lines in Fig. 1, more readily and easily lift the mandrel and start the chisel out of the wood than if the spring had to start back at the same time the chisel, mandrel, mandrel-box and operating lever. Advantageously connected with this feature or action is the guided character of the mandrel-box by its feather in or on the standard, and which, by preventing sticking or binding of the mandrel box, makes more prompt and sure the proper action of the spring round the mandrel. Likewise should be considered, in the same connection, the bow form of the handle or lever (A), so as to give weight in rear of the fulcrum of the latter, and whereby once started back by the action of the spring around the mandrel, the weight and impetus of the lever will aid the spring in relieving the chisel from the wood and throwing back the mandrel.

To fix the machine for boring, the adjustable collar (M) should be released from any hold on the mandrel by slackening the screw (r) of the former; and the operating lever (A) thrown back out of the way. This will cause the adjustable collar and mandrel box to be raised to their top limits, where they will remain.

Rollers may be used, if preferred, in place of the double beveled clips (c c).

Having thus described my improvement in mortising or combined mortising and boring machines, what I claim as new and useful herein is:

1. The lever (A) when hung and constructed to act substantially as described; in combination with the mandrel-box (H)

provided with rollers, jaws, or clips (c c) at its one side, for the hooked arm (b) of the lever to gear with, essentially as herein set forth.

2. The combination with the sliding mandrel-box (H), and mandrel raising spring (L); of the adjustable upper mandrel collar (M); for operation in connection with the lever (A), essentially as and for the purposes herein set forth.

In testimony whereof, I have hereunto subscribed my name.

FOREST H. HARWOOD.

Witnesses:

S. S. CUTLIN,
JOHN SAYRE.