

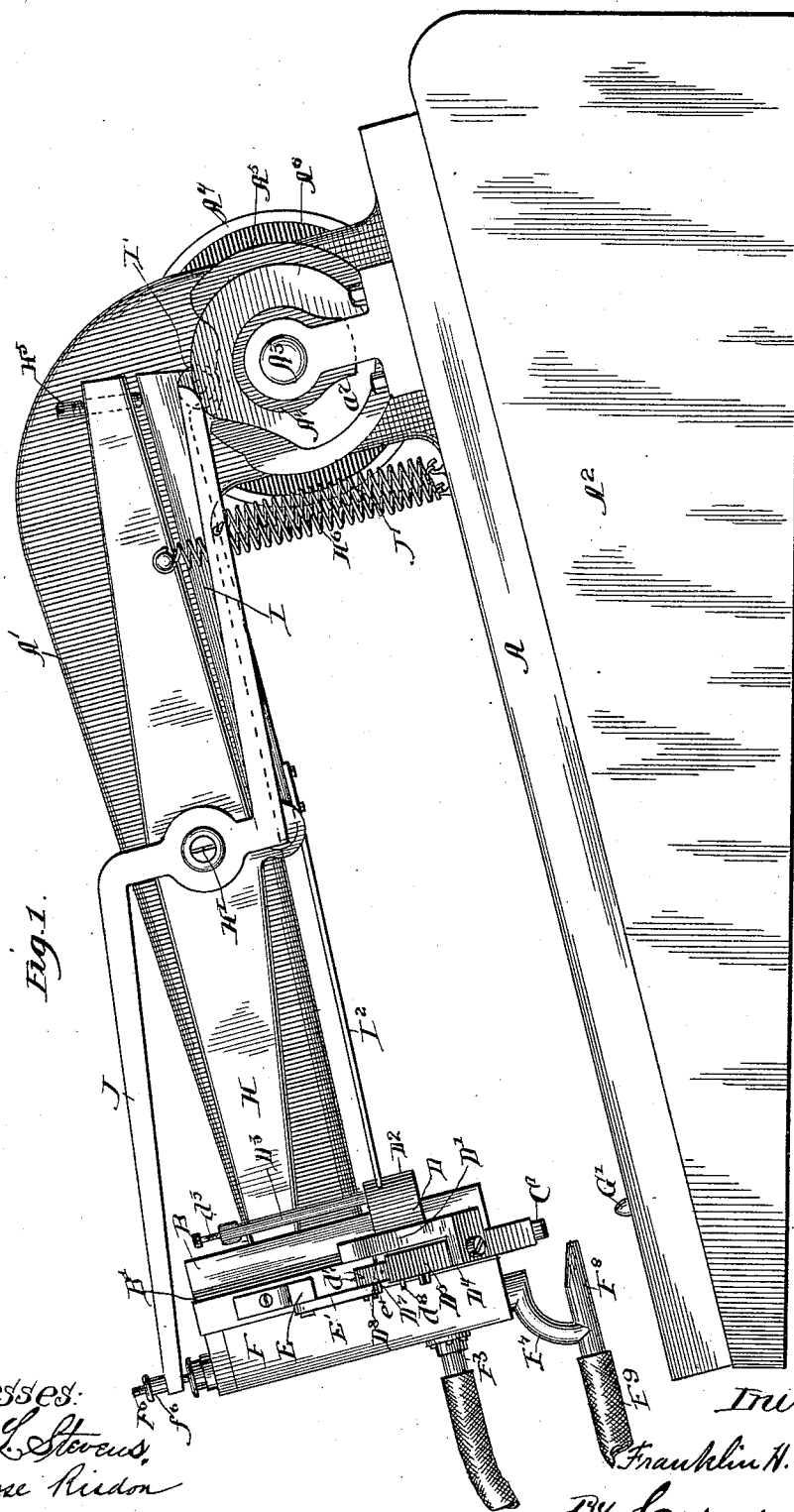
(No Model.)

4 Sheets—Sheet 1.

F. H. WRIGHT.  
MACHINE FOR BUSHING MORTISES.

No. 470,276.

Patented Mar. 8, 1892.



Witnesses:  
Frank L. Stevens.  
Ambrose Riedon

Inventor:  
Franklin H. Wright.  
By Cyrus Kehr.  
Atty.

(No Model.)

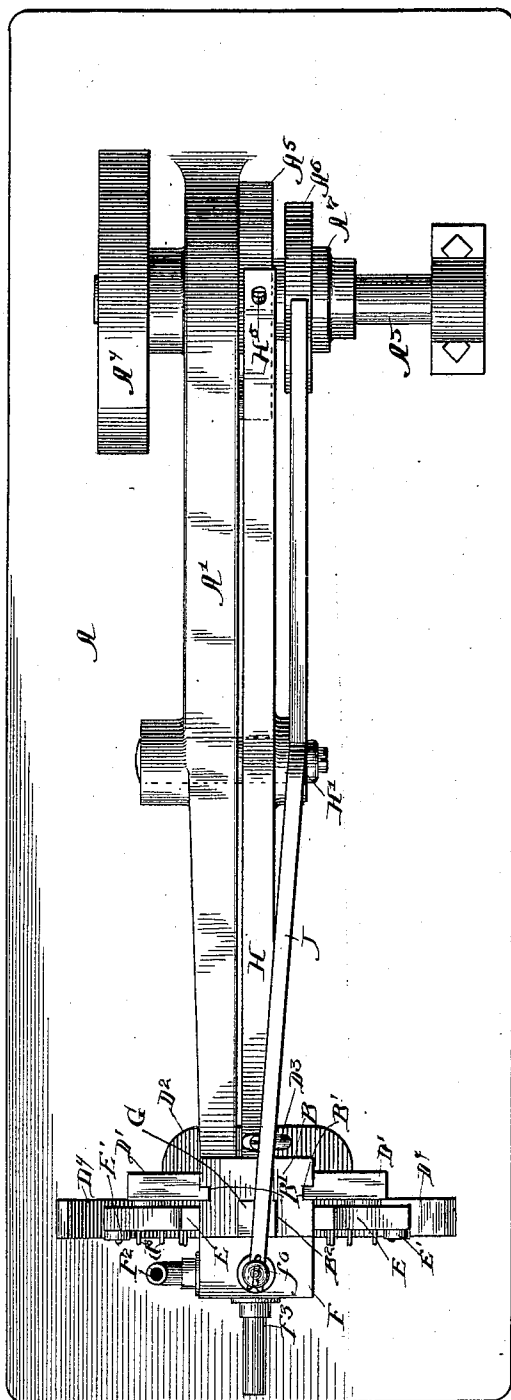
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Fig. 2.



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Ambrose Hudson

Fig. 4.

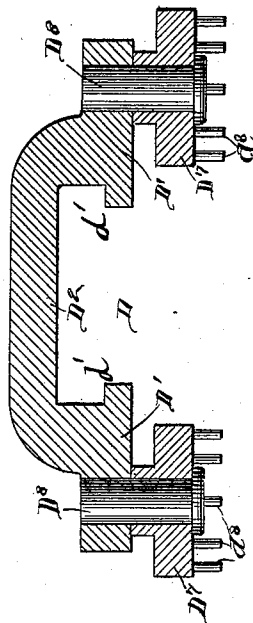
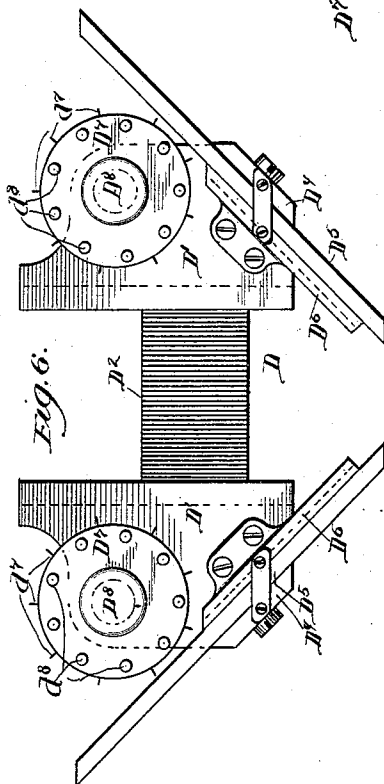


Fig. 6.



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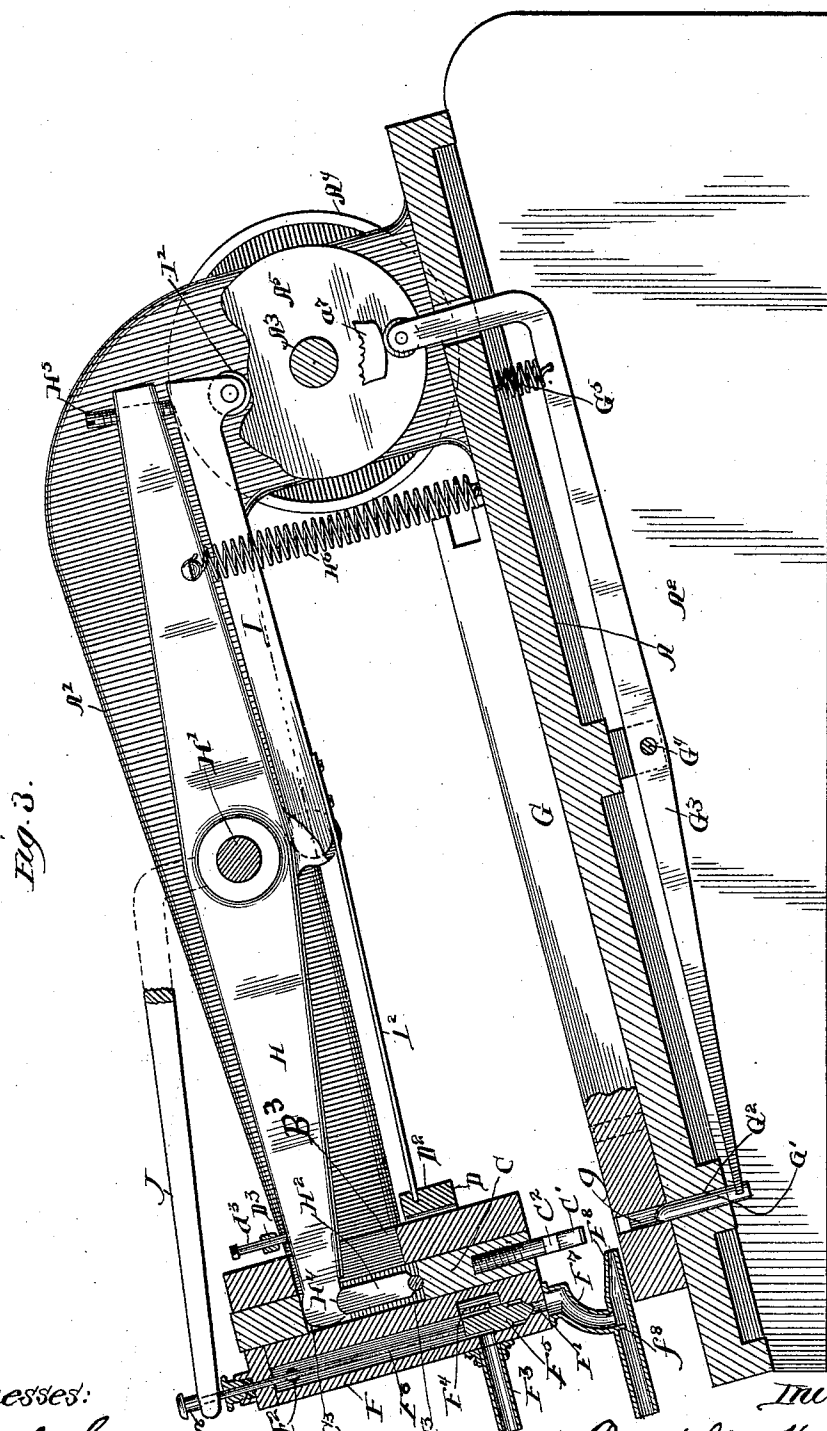
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Ambrose Risdon

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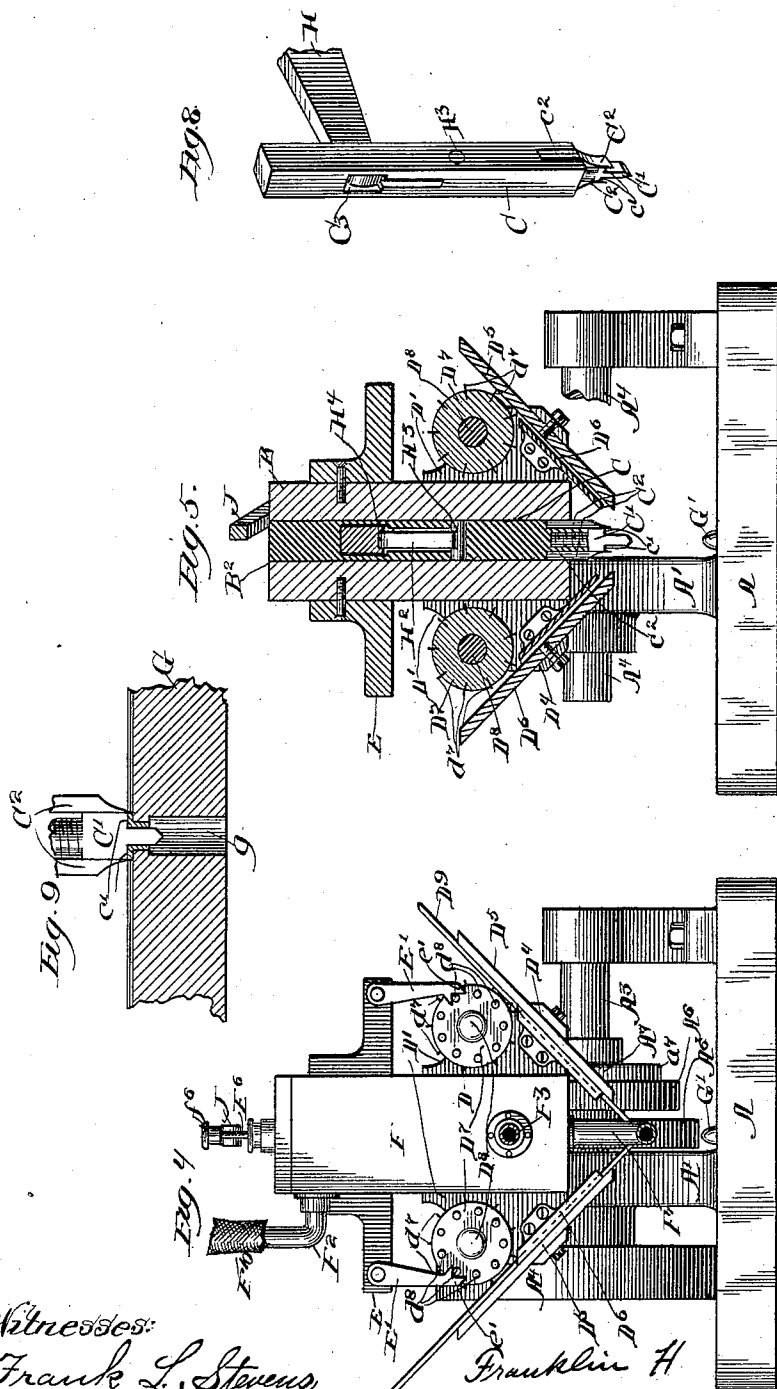
(No Model.)

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Witnesses:  
Frank L. Stevens.  
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Inventor  
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By Cyrus Kehr.  
Silly.

# UNITED STATES PATENT OFFICE.

FRANKLIN H. WRIGHT, OF TORONTO, CANADA.

## MACHINE FOR BUSHING MORTISES.

SPECIFICATION forming part of Letters Patent No. 470,276, dated March 8, 1892.

Application filed January 24, 1891. Serial No. 378,885. (No model.)

*To all whom it may concern:*

Be it known that I, FRANKLIN H. WRIGHT, a citizen of the United States, residing at Toronto, in the county of York, in the Province of Ontario and Dominion of Canada, have invented new and useful Improvements in Machines for Bushing Mortises; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates particularly to a machine for bushing what are termed the "front mortises" of piano and organ keyboards. In the manufacture of these keyboards a wooden blank of the full size of the finished board is first prepared by dressing to the proper thickness and forming all the holes which are to constitute the "mortises." The latter are on the under side of the keyboard, and their function is to receive the front guide-pins rising from the keyboard-frame. As the keys of the finished instrument rise and fall they are confined to the vertical movement by the aforesaid guide-pins. To prevent rattling by the contact made between the keys and said guide-pins, the walls of said mortises are faced with bushing of a soft material. Felt-cloth (a cloth resembling felt, and for convenience hereinafter called "felt") has heretofore been used for this purpose, and the same has been applied to said mortises by hand, the pieces of felt used being smeared with a liquid glue and then inserted into the mortises and there allowed to dry. The use of my machine involves the use of strips of felt-cloth having upon one side a layer of dried glue, which is softened upon being inserted into the mortises, and then allowed to dry after making contact with the walls of the mortises.

In the accompanying drawings, Figure 1 is a side elevation of a machine embodying my improvement. Fig. 2 is a plan of the machine. Fig. 3 is a sectional elevation. Fig. 4 is a front elevation. Fig. 5 is a sectional front elevation. Figs. 6 and 7 are detail views of the mechanism for carrying and feeding the strips of felt. Fig. 8 is a detail view of the plunger concerned in pressing the

pieces of felt against the walls of the mortises. Fig. 9 is a view of a mortise having the plug of the plunger lodged therein. 55

In said drawings, A is the bed of the machine, and A' is an arched arm rising from one end of said bed and then extending horizontally to the other end of said bed in a manner similar to the arched arm of a sewing-machine. Said arm and bed may be of cast-iron and integral. The bed A is shown as seated upon a foundation A<sup>2</sup>, the lower side of the latter being horizontal, while the upper face is inclined, so that the bed A and arm A' are inclined at the free end of said arm. For convenience in description that portion of the machine at the free end of the arm A' is termed the "front end" of the machine, and the side at the right, when the front end is nearest the eye, is called the "right side," and the opposite side is called the "left side" of the machine. 60 65 70

A<sup>3</sup> is a horizontal driving-shaft suitably supported above the bed A, at the rear end of the latter, and having at one end a band-wheel A<sup>4</sup>, by which said shaft is to be driven. Upon said shaft are also located cams A<sup>5</sup>, A<sup>6</sup>, and A<sup>7</sup>, the functions of which will be made apparent hereinafter. 75 80

The free end of the arm A' supports a vertical guide-head B, the union between said arm and guide-head being preferably at the left of the middle of the latter. In each of the right and left vertical faces of said guide-head there is a vertical channel B' B'. In the front vertical face of said guide-head there is another vertical channel B<sup>2</sup>, and from the upper portion of the latter an opening B<sup>3</sup> extends rearward through said head. 85 90

G is the keyboard-blank. This is placed bottom side up on the bed A by the operative, with the mortise to be operated upon in approximately the right position.

G' is a centering-pin provided with a tapering upper end arranged to reciprocate in an opening G<sup>2</sup> in the bed A. The lower end of said centering-pin is secured to one end of a walking-beam G<sup>3</sup>, hinged by its middle at G<sup>4</sup> and having its opposite end arranged in the path of a projection a<sup>7</sup> on the cam A<sup>7</sup>, so that when said projection a<sup>7</sup> is at the lower side of its course it will depress the adjacent end of the walking-beam G<sup>3</sup> and correspondingly 95 100

raise the opposite end thereof and the centering-pin  $G'$ , so that the latter will rise above the upper face of the bed A and enter the mortise  $g$  and adjust the keyboard, so that  
 5 said mortise will stand in the exact position required for the operation of the mechanism located above said mortise. As soon as the projection  $a'$  has passed away from the end of the walking-beam  $G^3$  the latter is reversed  
 10 by a spring  $G^5$ , so that said centering-pin is again drawn downward out of engagement with the keyboard. It is to be understood that the body of said centering-pin is to be of proper size to substantially fill the portion  
 15 of the mortise which is below during the operation of the machine.

C is a plunger located in the channel  $B^2$  and designed to reciprocate in said channel. To the lower end of said plunger is secured  
 20 a plug  $C'$ , whose lower end is of proper dimensions to enter the mortise  $g$  and press the strips of felt against the walls of said mortise. Above the portion of said plug which is to enter the mortise there is at the right  
 25 and left a horizontal face  $c'$ . These faces are to press upon the portion of the felt bushing which is to lie upon the outer face of the keyboard at the sides of the mortise. I prefer to secure said plug to said plunger by screwing  
 30 it into the latter from below, as shown by the drawings, in order that the height of said plug may be adjusted to correspond to the shortening of the knives  $C^2$  occasioned by sharpening. At the right and left sides of said  
 35 plug are located chisel-shaped knives  $C^2$ , whose cutting-edges are directed downward and extend a little below the horizontal faces  $c'$  of the plug  $C'$ . Said knives are seated in recesses  $c^2$  in the right and left sides of said  
 40 plunger and there suitably secured, preferably by dovetailing said channels and knives. In the upper portion of the plunger and opposite the opening  $B^3$  in the guide-head B is an opening  $C^3$ , which receives the front end  
 45 of the arm H, next described.

H is an arm arranged parallel to the arm  $A'$  and pivoted near its middle to the latter at  $H'$ , so as to permit movement upon said  
 50 pivot in a vertical plane. The front end of said arm H extends through the opening  $B^3$  in the guide-head B and into the opening  $C^3$  in the plunger C and is suitably fitted to said plunger, to the end that the latter shall reciprocate when said end of the arm H rises and  
 55 falls. The drawings show for this purpose a block  $H^2$ , resting by its lower end movably upon a rounding seat  $H^3$  and resting by its upper end in a concavity  $H^4$  in the lower side of the arm H, while the upper face of said  
 60 arm H rests in contact with the upper wall of the opening  $C^3$  in the plunger C. The opposite or rear end of said arm H extends to a point above the cam  $A^5$ .

$H^5$  is a set-bolt extending vertically downward through the rear end of the arm H toward said cam  $A^5$ . Said set-bolt may bear directly upon the periphery of said cam; but for

convenience I arrange it to bear upon the arm I. Said arm I is hinged by its forward end to the bottom of the arm H, near the middle of  
 70 the latter, and extends rearward beneath said arm H and the set-bolt  $H^5$ . Under its rear end it may support an anti-friction roller  $I'$ , arranged to ride upon the periphery of the cam  $A^5$ . A suitably-located spring is to be  
 75 used to keep the rear ends of the arms H and I depressed and in engagement with the cam  $A^5$ . The drawings show for this purpose a contracting coiled spring  $H^6$ , reaching from the rear portion of said arm H downward to  
 80 the bed A.

D is a vertically-reciprocating yoke supported by the guide-head B. Said yoke consists of two blocks  $D'$  and a web  $D^2$ . Said  
 85 blocks are arranged at opposite sides of said guide-head and have tongues  $d'$  extending into the side channels  $B'$  in said guide-head. The web  $D^2$  extends behind the guide-head  $B^2$  from one block  $D'$  to the other.

$D^3$  is an arched arm rising from the yoke  
 90 D to a point higher than the arm H and then extending laterally over said arm, and  $d^3$  is a set-screw extending vertically downward through said arm  $D^3$  to make contact with the upper face of the arm H. Said yoke D is  
 95 thus supported by said arm H. A flat spring  $I^2$  extends from the arm I to the yoke D and is secured to each of these parts. There is normally a space between the lower face of the arm H and the upper edge of the web  $D^2$ ,  
 100 and the spring  $I^2$  is adjusted to constantly draw downward on the yoke D, so that the set-screw  $d^3$  is always in contact with the arm H, and the yoke D and plunger C are unchanged as to their relative positions, unless  
 105 the yoke D is pressed upward while said plunger is stationary or is prevented from descending while said plunger descends. The front faces of the blocks  $D'$  of the yoke D are arranged in a plane a little at the rear of the  
 110 plunger C. Extending forward from the lower outer corner of each block D is an oblique extension  $D^4$ , the upper face of each such extension being at such inclination that if lines be produced from and in the plane of  
 115 said faces and the plunger C they will meet at a point a little below the plug  $C'$  of the plunger C. Upon each such upper face of the extensions  $D^3$  is secured a flat guide-plate  $D^5$ , having one of its outer faces directed upward.  
 120 At a distance above said plates  $D^5$  a little greater than the thickness of the felt bushing-strips  $D^9$  is located another guide-plate  $D^6$ . These plates  $D^6$  are supported by the blocks  $D'$ , and the space between the plates  $D^5$  and  
 125  $D^6$  makes a passage, through which the strip of felt is fed downward to the mortises of the keyboard. The guide-plates  $D^5$  extend upward farther than do the guide-plates  $D^6$ . Above each guide-plate  $D^6$  and opposite the  
 130 upper portion of the guide-plates  $D^5$  each block  $D'$  supports a feed-wheel  $D^7$  upon a stud  $D^8$  in a plane parallel to the front of said blocks and the front of the guide-head B.

Each of said wheels makes contact with the strips of felt D<sup>9</sup>, preferably by small peripheral projections d<sup>7</sup>. On the front side of each of said wheels D<sup>7</sup> are located studs d<sup>8</sup>. Said wheels are idle, excepting when the yoke D and the parts attached thereto are raised.

At a higher level than the wheels D<sup>7</sup> and in front of the channels B' horizontal brackets E are secured immovably to the sides of the guide-head B. A depending dog E' is hinged to the outer end of each bracket E, so as to swing in a plane parallel to the plane of the wheels D<sup>7</sup>. Each of said dogs has at its lower end a laterally and downwardly directed tooth e', extending into the path of the studs d<sup>8</sup>. In Fig. 4 the yoke D and the wheels D<sup>7</sup> are at their lower limit and the dogs E' have swung toward said wheels, so that a tooth e' of each dog is above one of the studs d<sup>8</sup>. It is obvious from an inspection of the drawings that the wheels D<sup>7</sup> cannot now be raised without being partially rotated. The studs d<sup>8</sup> beneath the teeth e' will be held by the latter while the wheel-supporting studs D<sup>8</sup> are raised. This results in turning the wheels D<sup>7</sup>, so that the portion in contact with the felt strips D<sup>9</sup> will move downward along the guide-plate D<sup>5</sup>. When the yoke D and the wheels D<sup>7</sup> are again moved downward, the stud d<sup>8</sup> then above the tooth e' will make contact with the oblique face of and press the latter and the dog E' aside without rotating the wheel. As soon as said stud d<sup>8</sup> has passed said tooth said dog will again swing laterally into its normal position, so that the horizontal tooth e' will be above said stud.

To the front of the guide-head B is secured a vertical steam-chest F. At the lower end thereof is a port F'. At the upper end of said chest is an inlet-pipe F<sup>2</sup>. At a short distance above the lower end of said chest is another port F<sup>3</sup>. Opposite said port F<sup>3</sup> is a by-pass F<sup>4</sup>. Within said steam-chest and opposite said port and inlet is a slide F<sup>5</sup>. When said slide is at its lower limit, it closes the port F' and opens the port F<sup>3</sup>, and when said slide is moved upward it opens said port F' and closes the port F<sup>3</sup> and allows communication between the inlet-pipe F<sup>2</sup> and the port F' by way of the by-pass F<sup>4</sup>. From the slide F<sup>5</sup> a stem F<sup>6</sup> rises through the upper wall of the chest and beyond the latter is joined to an arm J. This connection is preferably made by extending said stem through said arm and applying to the end above said arm an adjusting-nut f<sup>6</sup>. The arm J extends rearward along the arms H and A' and is hinged to the latter, so as to allow movement in a vertical plane. Said arm is extended rearwardly into contact with the upper portion of the periphery of the cam A<sup>6</sup>. The rear end of said arm is held down in engagement with said cam by a contracting spring J', extending from said arm downward to the bed A. From the port F' a pipe F<sup>7</sup> extends forward and downward and supports a nozzle F<sup>8</sup> a little above and parallel to the uppermost face of the key-

board, the former being directed to a point at which the mortise to be operated upon is to stand. The end of the nozzle opposite its mouth is extended a short distance and open. At the side of the junction of the pipe F<sup>7</sup> and the nozzle F<sup>8</sup>, opposite the mouth of the latter, is a wall f<sup>8</sup>, extending downward from the upper wall almost to the lower wall of said nozzle. Any suitable pipe F<sup>9</sup> may be connected with the front end of the nozzle-pipe F<sup>8</sup>, and any pipe F<sup>10</sup> suitable for conveying steam may be connected with the inlet-pipe F<sup>2</sup>. Said pipes, chest, and nozzle constitute a conductor for the steam. The projections of the cam-wheels A<sup>5</sup>, A<sup>6</sup>, and A<sup>7</sup> are so adjusted that the plunger C and yoke D will move downward and the slide F<sup>5</sup> thereafter upward and that the centering-pin G' shall be raised upon the expiration of a short interval after the ascent of the plunger and yoke.

The operation is as follows: Supposing the plunger C and yoke D to be up and the slide F<sup>5</sup> and the centering-pin G' down, then the operative places the keyboard-blank with its bottom directed upward upon the upper face of the bed, the first hole to be mortised being above the centering-pin G'. It is difficult for the operative to always place said mortise into the exact position required for the insertion of the felt strips and the operation of the plug C' and knives C<sup>2</sup>. The centering-pin now rises through the bed A into the mortise and slightly shifts the keyboard in the required direction to bring the mortise into the exact position required for the work. The plunger C and yoke D and the feeding mechanism supported by the latter now descend, said yoke and feeding mechanism being in advance of said plunger. The lower ends of the felt strips D<sup>9</sup> which were fed downward by the last ascent of said feeding mechanism enter the mortise to the required distance, and then the downward movement of said strips and the feed mechanism is arrested by the contact of the guide-plates D<sup>5</sup> with the upper face of the keyboard. Simultaneous with this downward movement the slide F<sup>5</sup> is being drawn upward, so that by the time the felt strips are fed downward as far as required the valve formed by the slide F<sup>5</sup>, port F', inlet F<sup>2</sup>, and by-pass F<sup>4</sup> is reversed and the steam delivered through the inlet F<sup>2</sup> will descend through the port F' and pipe F<sup>7</sup> and pass out through the nozzle F<sup>8</sup> upon the dry glue of the felt strips D<sup>9</sup>, so that said glue is softened. By the time the glue is softened the plunger C will have descended so far that the plug C' will enter the mortise between the two felt strips and force the glue-covered faces of said strips against the walls of the mortise. When, owing to the further descent of said plunger, the knives C<sup>2</sup> bear upon the felt strips, the latter are bent downward upon the horizontal face of the keyboard and then cut off by said knives. Immediately thereafter the horizontal faces c' of the plug C' press the portions of felt which extend above

the mortise into contact with the horizontal face of the keyboard. The plunger C and yoke D and the feed mechanism supported thereby then again ascend, and the slide F<sup>5</sup> and the centering-pin G' descend, so that the steam is shut off and the keyboard may be moved so that another mortise is in position for work. The front end of the nozzle F<sup>8</sup> is left open for the escape of water of condensation, and the depending wall f<sup>8</sup> is used to partially close the outlet toward the front, so as to retard the flow of water sufficiently to prevent the escape of steam in that direction. This wall or partition is in the nature of a trap. The bed A of the machine is inclined toward the front, in order that the front end of said nozzle shall be lower than the rear end and the water of condensation will flow by gravity from the front end of said nozzle. The purpose of the set-bolt H<sup>5</sup> in the arm H and the set-screw d<sup>3</sup> on the arched arm D<sup>3</sup> is to provide means for adjusting the relation between the arm H on the one hand and the arm I, spring I<sup>2</sup>, and yoke D on the other hand. The purpose of the adjusting-nut f<sup>6</sup> on the stem F<sup>6</sup> is to adjust the distance between the slide F<sup>5</sup> and the arm J. It will be understood that the peripheral length of the projections on the cam-wheels A<sup>5</sup>, A<sup>6</sup>, and A<sup>7</sup> is to be in proportion to the time the mechanism operated by each is to be held to its work.

I claim as my invention—

1. In a machine for bushing mortises, the combination of intermittent mechanism for feeding felt into the mortises and a conductor for delivering steam upon the said felt, substantially as shown and described.

2. In a machine for bushing mortises, the combination of intermittent mechanism for feeding a felt strip into a mortise and reciprocating mechanism for thereafter cutting from said strip the portion in said mortise, substantially as shown and described.

3. In a machine for bushing mortises, the combination of intermittent mechanism for feeding a felt strip into a mortise, a conductor for delivering steam upon said felt, and reciprocating mechanism for cutting from said strip the portion in said mortise, substantially as shown and described.

4. In a machine for bushing mortises, the combination of intermittent mechanism for feeding felt into a mortise and a valved conductor suitably timed for delivering steam upon the said felt after it has entered the mortise, substantially as shown and described.

5. In a machine for bushing mortises, the combination of intermittent mechanism for feeding a strip of felt into a mortise, a valved conductor suitably timed for delivering steam upon the said felt after it has entered the mortise, and reciprocating mechanism suitably timed for thereafter cutting from said strip the portion in said mortise, substantially as shown and described.

6. In a machine for bushing mortises, the combination of intermittent mechanism for

feeding felt into a mortise and reciprocating mechanism for pressing said felt against the wall of the mortise, substantially as shown and described.

7. In a machine for bushing mortises, the combination of intermittent mechanism for feeding a strip of felt into a mortise and reciprocating mechanism for cutting from said strip the portion in said mortise and pressing said portion against the wall of said mortise, substantially as shown and described.

8. In a machine for bushing mortises, the combination of intermittent mechanism for feeding felt into a mortise, a conductor for delivering steam upon the said felt, and reciprocating mechanism for pressing the said felt against the wall of the mortise, substantially as shown and described.

9. In a machine for bushing mortises, the combination of intermittent mechanism for feeding a felt strip into a mortise, a conductor for delivering steam upon the said felt strip, and reciprocating mechanism for cutting from said strip the portion in said mortise and pressing said portion against the wall of said mortise, substantially as shown and described.

10. In a machine for bushing mortises, the combination of intermittent mechanism for feeding felt into the mortises, a conductor for delivering steam upon the said felt, and a centering-pin for centering said mortises, substantially as shown and described.

11. In a machine for bushing mortises, the combination of intermittent mechanism for feeding a felt strip into a mortise, reciprocating mechanism for thereafter cutting from said strip the portion in said mortise, and a centering-pin for centering said mortise, substantially as shown and described.

12. In a machine for bushing mortises, the combination of intermittent mechanism for feeding a felt strip into a mortise, a conductor for delivering steam upon said felt, reciprocating mechanism for cutting from said strip the portion in said mortise, and a centering-pin for centering said mortise, substantially as shown and described.

13. In a machine for bushing mortises, the combination of intermittent mechanism for feeding felt into a mortise, a conductor suitably timed for delivering steam upon the said felt after it has entered the mortise, and a centering-pin for centering said mortise, substantially as shown and described.

14. In a machine for bushing mortises, the combination of intermittent mechanism for feeding a strip of felt into a mortise, a conductor suitably timed for delivering steam upon the said felt after it has entered the mortise, reciprocating mechanism for thereafter cutting from said strip the portion in said mortise, and a centering-pin for centering said mortise, substantially as shown and described.

15. In a machine for bushing mortises, the combination of intermittent mechanism for feeding felt into a mortise, reciprocating mech-

anism for pressing said felt against the walls of the mortise, and a centering-pin for centering said mortise, substantially as shown and described.

16. In a machine for bushing mortises, the combination of intermittent mechanism for feeding a felt strip into a mortise, reciprocating mechanism for cutting from said strip the portion in said mortise and pressing said portion against the walls of said mortise, and a centering-pin for centering said mortise, substantially as shown and described.

17. In a machine for bushing mortises, the combination of intermittent mechanism for feeding felt into a mortise, a conductor for delivering steam upon the said felt, reciprocating mechanism for pressing the said felt against the walls of the mortise, and a centering-pin for centering said mortise, substantially as shown and described.

18. In a machine for bushing mortises, the combination of intermittent mechanism for feeding a felt strip into a mortise, a conductor for delivering steam upon the said felt strip, reciprocating mechanism for cutting from said strip the portion in said mortise and pressing said portion against the walls of said mortise, and a centering-pin for centering said mortise, substantially as shown and described.

19. In a machine for bushing mortises, the combination of duplex intermittent mechanism for feeding felt into a mortise and a conductor for delivering steam upon the said felt, substantially as shown and described.

20. In a machine for bushing mortises, the combination of duplex intermittent mechanism for feeding the ends of felt strips into a mortise and reciprocating mechanism for cutting from said strip the portions thereof in said mortise, substantially as shown and described.

21. In a machine for bushing mortises, the combination of duplex mechanism for feeding the ends of felt strips into a mortise and a reciprocating plug for entering said mortise between said strips to press the latter against the walls of said mortise, substantially as shown and described.

22. In a machine for bushing mortises, the combination, with means for feeding felt into a mortise, of an inclined bed for supporting the article containing the mortise and an inclined nozzle having a steam-outlet at its higher end and a water-outlet at its lower end, substantially as and for the purposes specified.

23. In a machine for bushing mortises, the combination, with means for feeding felt into a mortise, of an inclined bed for supporting the article containing the mortise, an inclined nozzle having a steam-outlet at its higher end and a water-outlet at its lower end, and means for centering said mortise, substantially as shown and described.

24. In a machine for bushing mortises, the

combination of the inclined bed A, arched arm A', rising from said bed, the felt-feeding mechanism supported by said arm, and the inclined double-ended steam-nozzle arranged with its higher end directed toward the position of the mortise to be bushed, substantially as shown and described.

25. In a machine for bushing mortises, the combination of the inclined bed A, arched arm A', rising from said bed, the felt-feeding mechanism supported by said arm, the inclined double-ended steam-nozzle arranged with its higher end directed toward the position of the mortise to be bushed, and means for centering said mortises, substantially as shown and described.

26. In a machine for bushing mortises, the combination of the inclined bed A, arched arm A', rising from said bed, the felt-feeding mechanism supported by said arm, the inclined double-ended steam-nozzle arranged with its higher end directed toward the position of the mortise to be bushed, and a centering-pin for entering the lower end of said mortise, substantially as shown and described.

27. In a machine for bushing mortises, the combination of the inclined bed A, arched arm A', rising from said bed, the felt-feeding mechanism supported by said arm, the inclined double-ended steam-nozzle arranged with its higher end directed toward the position of the mortise to be bushed, and a reciprocating centering-pin, substantially as shown and described.

28. In a machine for bushing mortises, the combination, with a suitable support for the article containing the mortise, of feeding mechanism containing guides and feed-wheels for intermittently moving the strips of felt along said guides into the mortise, substantially as shown and described.

29. In a machine for bushing mortises, the combination of means for supporting the article containing the mortises, a driving-shaft, and intermittent felt-feeding mechanism suitably connected with said driving-shaft, substantially as shown and described.

30. In a machine for bushing mortises, the combination of means for supporting the article containing the mortises, a driving-shaft, intermittent felt-feeding mechanism suitably connected with said driving-shaft, and a plunger arranged to follow said felt and also suitably connected with said driving-shaft, substantially as shown and described.

31. In a machine for bushing mortises, means for supporting the article containing the mortises, a driving-shaft, intermittent felt-feeding mechanism suitably connected with said driving-shaft, and a reciprocating centering-pin, also suitably connected with said driving-shaft, substantially as shown and described.

32. In a machine for bushing mortises, means for supporting the article containing the mortises, a driving-shaft, intermittent

felt-feeding mechanism suitably connected with said driving-shaft, a reciprocating centering-pin, also suitably connected with said driving-shaft, and a plunger arranged to follow said felt and also suitably connected with said driving-shaft, substantially as shown and described.

33. In a machine for bushing mortises, the combination of means for supporting the article containing the mortises, a driving-shaft, intermittent felt-feeding mechanism suitably connected with said driving-shaft, and a valved steam-delivering mechanism having its valve suitably connected with said driving-shaft, substantially as shown and described.

34. In a machine for bushing mortises, means for supporting the article to be mortised, a driving-shaft, intermittent felt-feeding mechanism, valved steam-delivery mechanism having its valve suitably connected with said driving-shaft, and a plunger arranged to follow said felt and being also suitably connected with said driving-shaft, substantially as shown and described.

35. In a machine for bushing mortises, the combination of the bed A, arched arm A', rising from said bed, driving-shaft A<sup>3</sup>, supported by said bed and having cams, intermittent felt-feeding mechanism supported by said arm A', and suitable parts leading from said feeding mechanism to said cams, substantially as shown and described.

36. In a machine for bushing mortises, the combination of the bed A, arched arm A', rising from said bed, driving-shaft A<sup>3</sup>, supported by said bed and having cams, intermittent felt-feeding mechanism supported by said arm A', suitable parts leading from said feeding mechanism to said cams, a plunger arranged to follow the felt, and suitable parts connecting said plunger with said cams, substantially as shown and described.

37. In a machine for bushing mortises, the combination of the bed A, arched arm A', rising from said bed, driving-shaft A<sup>3</sup>, supported by said bed and having cams, intermittent felt-feeding mechanism supported by said arm A', suitable parts leading from said feeding mechanism to said cams, a plunger arranged to follow the felt, suitable parts connecting said plunger with said cams, valved steam-delivery mechanism supported by said arm, and suitable parts connecting the valve

of said steam-delivery mechanism with said cams, substantially as shown and described.

38. In a machine for bushing mortises, the combination of the bed A, shaft A<sup>3</sup>, supported by said bed and having cams, intermittent felt-feeding mechanism supported by said bed, suitable parts connecting said felt-feeding mechanism with said cams, a reciprocating centering-pin, and suitable parts connecting said centering-pin with said cams, substantially as shown and described.

39. In a machine for bushing mortises, the combination of means for supporting the article containing the mortises, guide-plates directed toward the position for the mortise to be operated upon, a feed-wheel leading into the path formed by said guides, and means for intermittently turning said wheel, substantially as shown and described.

40. In a machine for bushing mortises, the combination of the reciprocating guides and feed-wheels and stationary dogs for intermittently turning said feed-wheels, substantially as shown and described.

41. In a machine for bushing mortises, the combination, with the arm A', of a reciprocating yoke D, feed mechanism supported by said yoke, and stationary dogs for intermittently operating said feed mechanism, substantially as shown and described.

42. In a machine for bushing mortises, the reciprocating feed mechanism having a yielding connection with the driving mechanism and a plunger having an unyielding connection with the driving mechanism, substantially as shown and described.

43. In a machine for bushing mortises, the combination, with suitable driving mechanism, of a plunger C, supporting knives C<sup>2</sup>, and a plug C', located between said knives, substantially as shown and described.

44. In a machine for bushing mortises, a plunger C, embodying knives C<sup>2</sup>, and an adjustable plug C', located between said knives, substantially as shown and described.

In testimony whereof I affix my signature, in the presence of two witnesses, this 7th day of January, 1891.

FRANKLIN H. WRIGHT.

Witnesses:

J. HEIGHINGTON,  
JAMES STEELE.