

July 5, 1932.

E. LUGINBUHL

1,865,576

MORTISING MACHINE AND SUPPORT THEREFOR

Filed March 24, 1930

4 Sheets-Sheet 1

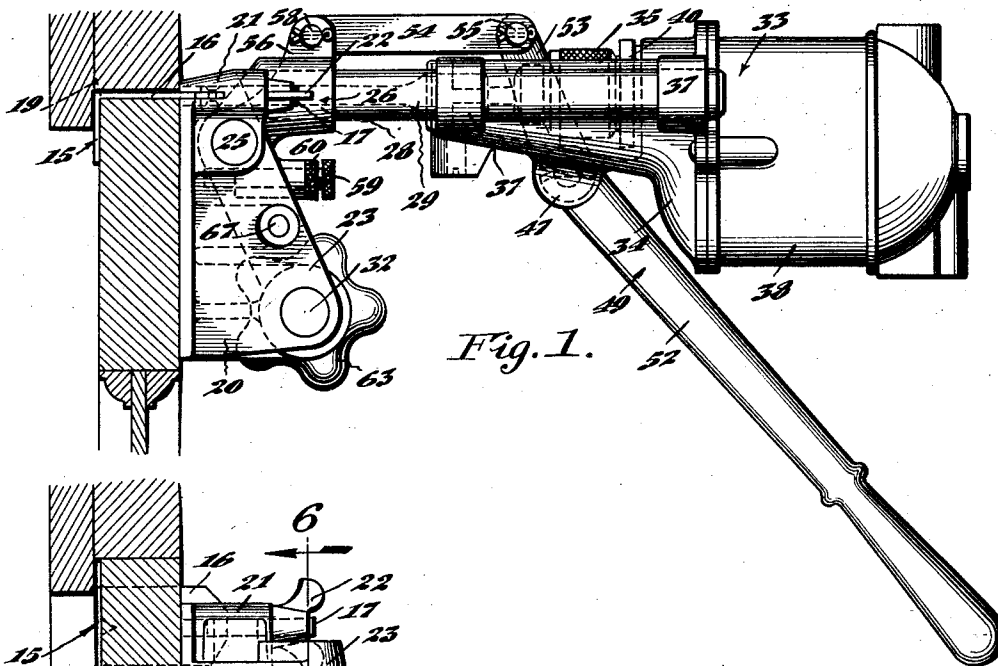


Fig. 1.

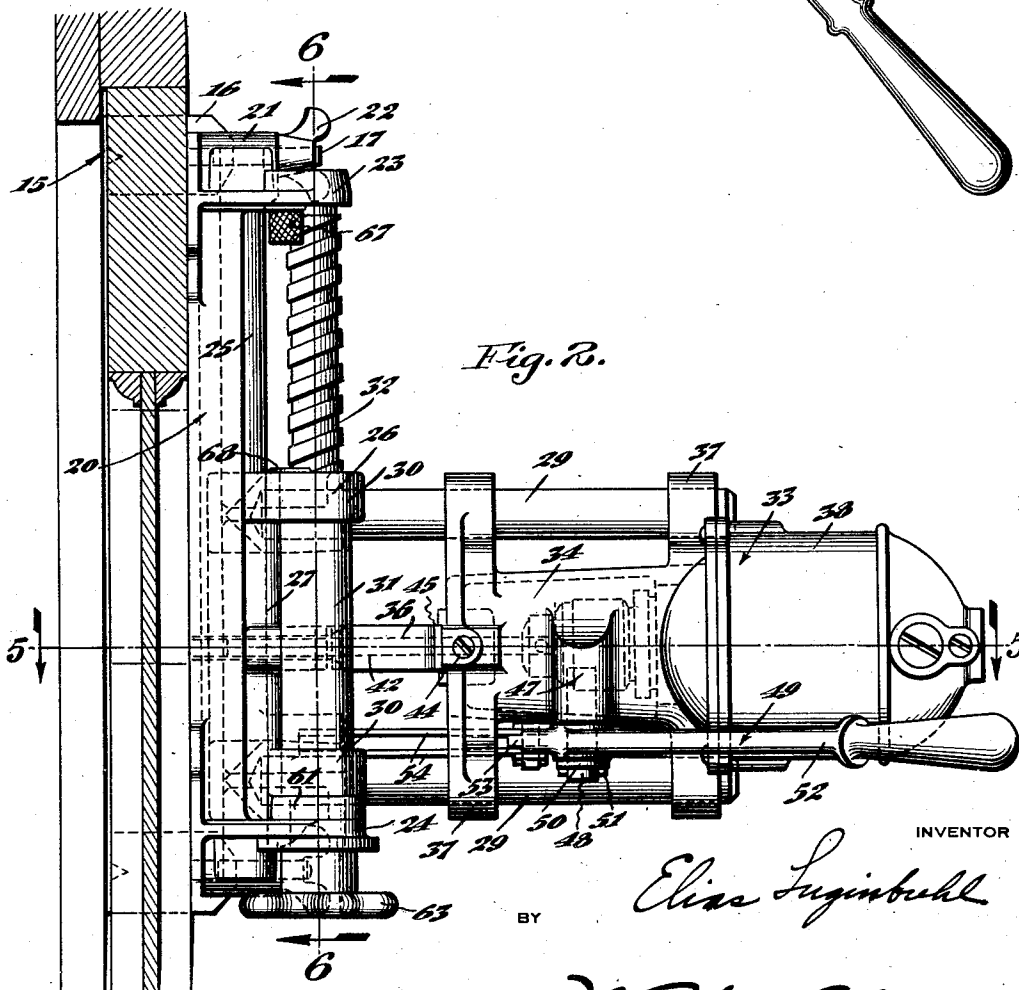


Fig. 2.

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Fig. 3.

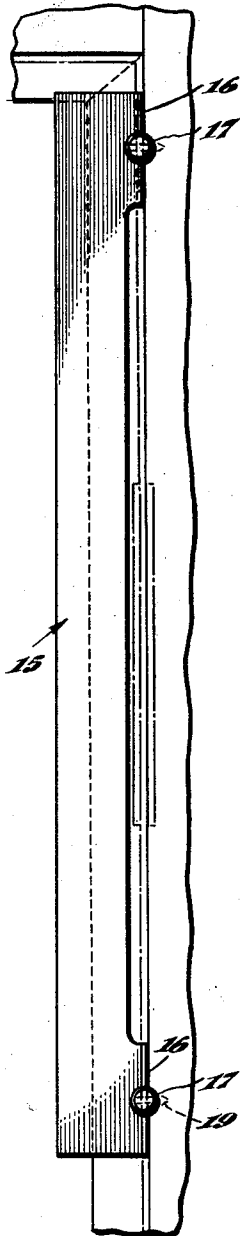
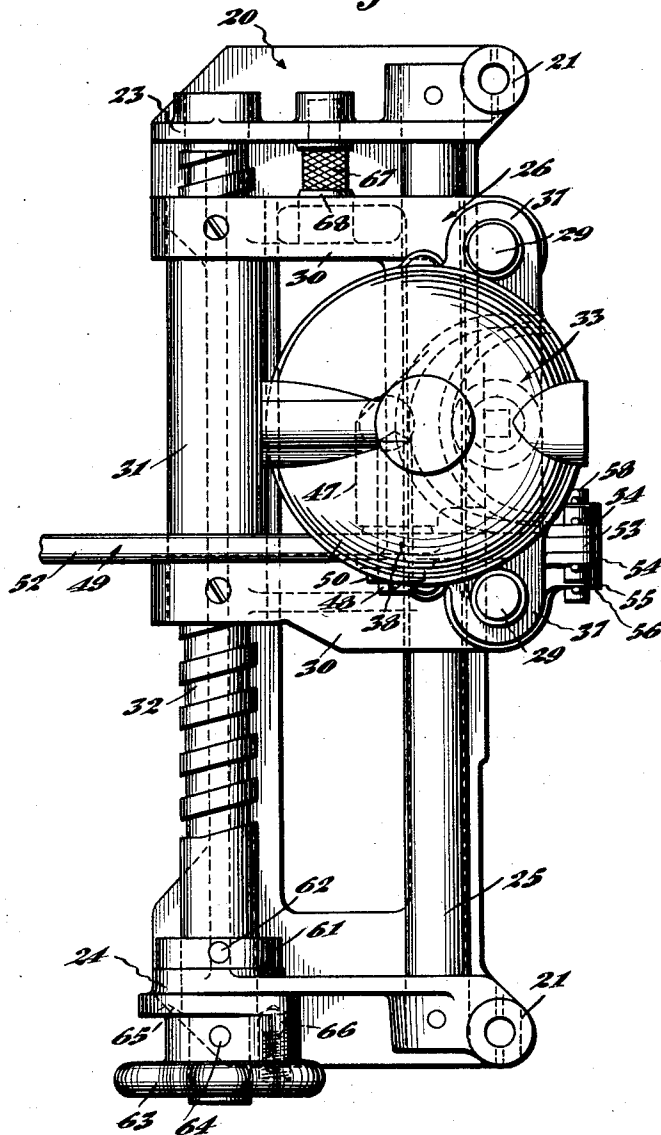


Fig. 4.



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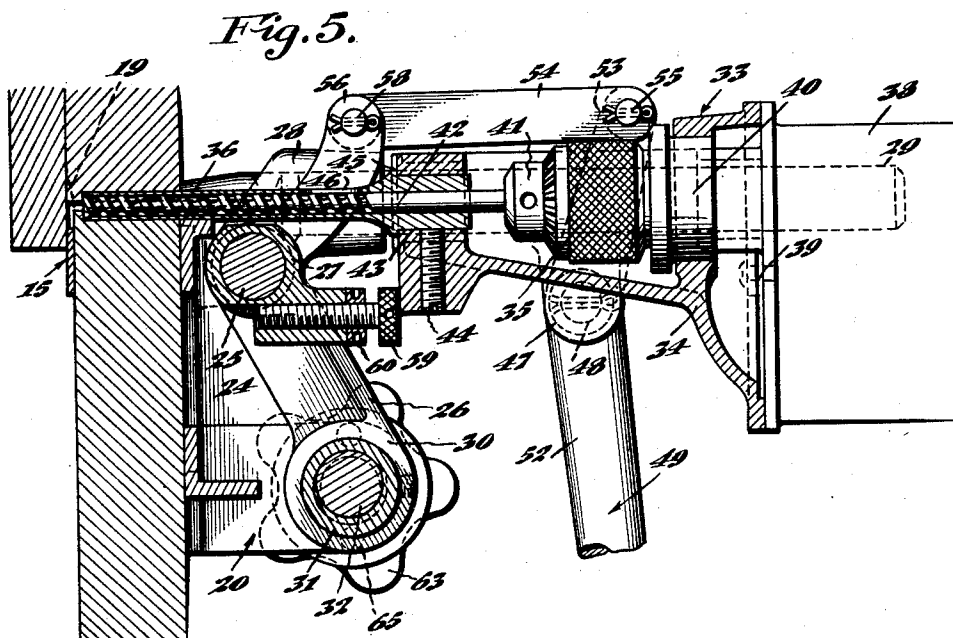
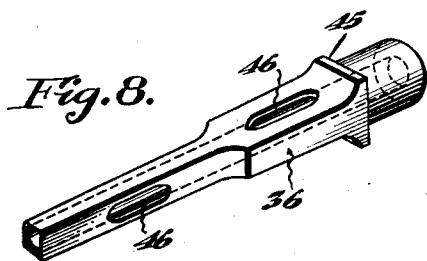
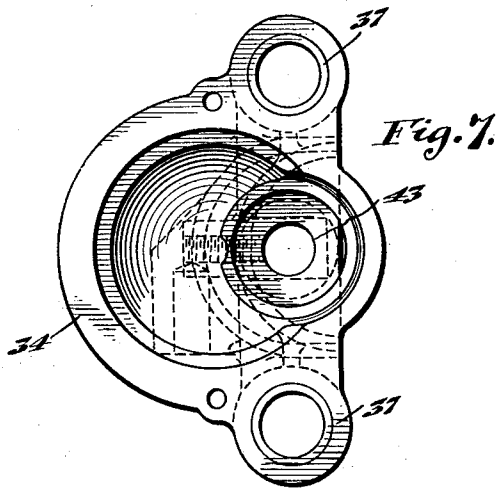
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Fig. 9.

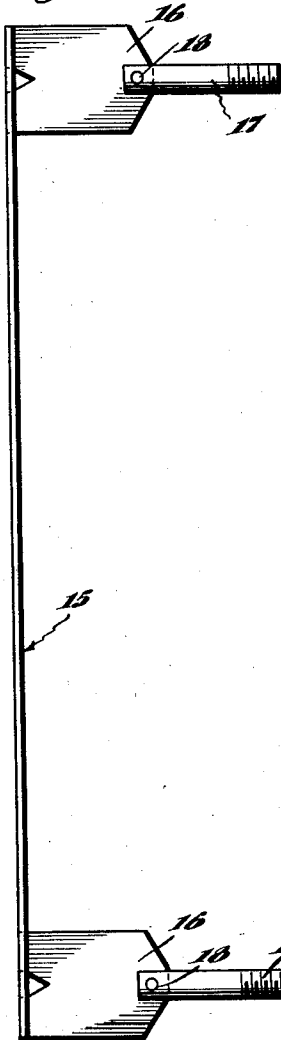
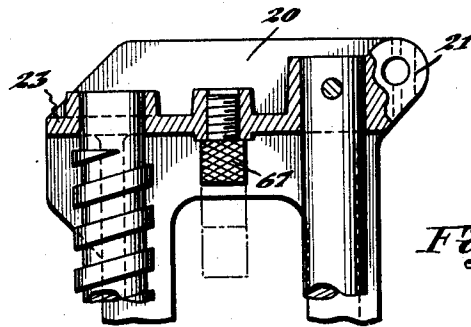


Fig. 6.

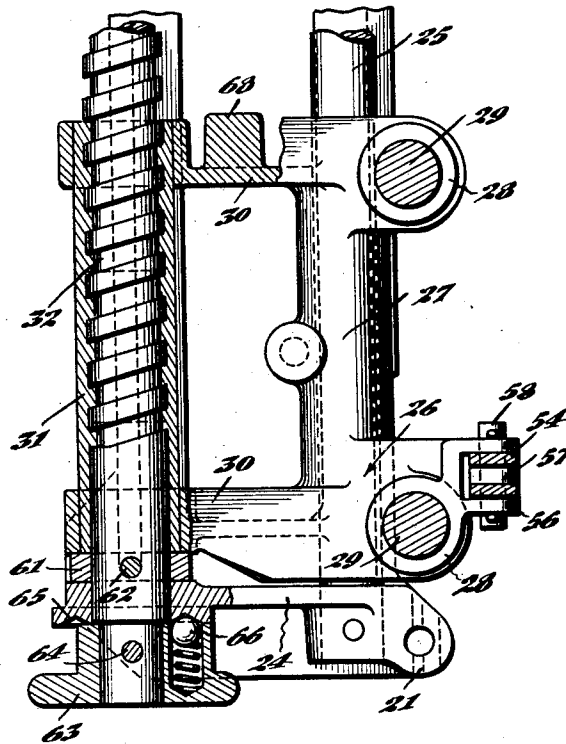
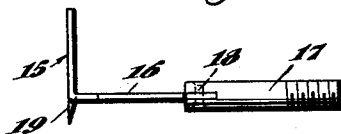


Fig. 10.



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UNITED STATES PATENT OFFICE

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MORTISING MACHINE AND SUPPORT THEREFOR

Application filed March 24, 1930. Serial No. 438,301.

This invention relates to groove cutting apparatus and more particularly to a portable machine of a character especially designed for cutting mortises in door and door frames for the reception of hinges. The invention is further directed to a hanger device for mounting the machine relative to the door and frame, adjacent the adjoining edges thereof which device serves to accurately align the cutting tool relative to the work and functions as a gauge for properly spacing the door and frame at the hinge side.

Heretofore, the notching out or slotting of the door edge and frame edge, or in other words, the mortising in of the hinges has been an extremely laborious proceeding. It has been necessary to carefully measure and outline the groove on the door and frame and to then remove the door from its position in the frame to subsequently cut the respective grooves separately. Due to the fact that the grooves were cut separately it will readily be seen that a great deal of inaccuracy was attendant. Even though the grooves were laid out as accurately as possible the respective parts of the hinge were often found to be improperly positioned and did not register perfectly for easy insertion of a hinge pin and aligned hanging of the door. Moreover the space between the door edge and frame was not always uniform and of accurate dimensions for proper clearance.

The type of hinge generally applied provides flat leaves or plates attached respectively across the edge of the frame and the door, these plates extending beyond that side of the door toward which the door swings and there connected by a hinge pivot pin.

The present invention, therefore, has for an object the provision of a new and improved machine for cutting the mortises or slots at the respective sides of the door and the frame for securing the respective counter-sunk hinge elements in accurate alignment without necessitating removal of the door after it has been initially set up and its position determined.

It is a further object of this invention to provide a mounting for firmly supporting the tool in the proper location relative to the

door and frame during the mortising operation. This object additionally includes the feature of constituting the support, or anchor as a gauge for determining the spacing of the door edge from the frame edge for appropriate clearance after the hinges have been installed.

Other objects and further advantages relate to the general arrangement of the power unit on the frame of the machine and to the particular means for feeding the tool into the work, which objects along with other objects and advantages will be more fully apparent from the description of the accompanying drawings in which:

Figure 1 is a top plan view of the machine showing it mounted relative to a door and frame and illustrating the mounting or anchoring device functioning as a gauge to properly space the door from the frame and jamb.

Figure 2 is a side view of the machine showing it mounted relative to a door and frame to be mortised and illustrating the contemplated mortise in dot and dash lines, the cutting tool being retracted in this view.

Figure 3 is a front view of the anchor or supporting device for the door showing it disposed relative to the frame and showing the door and groove to be cut in dot and dash lines.

Figure 4 is a front or end view of the machine illustrating the tool resetting device.

Figure 5 is a sectional view taken on line 5—5, Figure 2, showing the driving unit, carrying the cutting tool, at the completion of a cut and showing the adjustable abutment for limiting the inward movement of the tool and driving unit and governing the depth of the mortise.

Figure 6 is a sectional view taken on line 6—6, Figure 2, detailing the resetting device and the exchangeable stop for governing the length of the particular mortise.

Figure 7 is an end view of the transmission casing and journal for the tool of the machine.

Figure 8 is a perspective view of the square cutting element of the tool.

Figure 9 is a side view of the anchor or

gauge showing it apart from the work and the machine which it supports.

Figure 10 is a plan view of the device shown in Figure 9.

5 The machine herein involved is primarily concerned with the mortising of doors and door frames and a particular form of support, readily attachable relative to the frame and door, is included for efficiently supporting
10 the machine. This element constituting the support may also be termed an anchor since it is placed between the door and the door frame and provides means for positive engagement with the frame. Besides its
15 utility as a support or anchor, the above mentioned element additionally functions as a means for locating the groove and as a gauge for governing the spacing of the door from the frame. In its supporting capacity,
20 this element provides attaching portions upon which the machine is hung in a position disposing the machine against the face of the door.

25 The machine provides a drilling unit slidably mounted on a carriage for movement laterally of the crevice between the door and frame. The carriage is slidably mounted for resetting longitudinally of the crevice to move the tool laterally after each passage of
30 the tool into the work for a groove cut of any length.

A lever mechanism is provided for manually reciprocating the tool into the work. Also on the carriage and associated with the frame,
35 a device is provided for resetting the drill to make successive cuts in the formation of a mortise or groove. Included with this manual resetting means, an exchangeable stop is provided for governing the extent of
40 resetting to definitely automatically measure the length of the groove. Likewise, associated with the drilling unit an abutment is disposed in its path for uniformly controlling the depth of the successive mortising
45 cuts.

Referring to Figures 9 and 10 of the drawings, the anchor or supporting element 15 comprises an elongated plate strip providing
50 angular extensions 16 at each end. Each extension has a further extension in the form of a stud 17 slotted and fitted over the end of the particular angular extension and held in place by means of a rivet 18. The outer ends
55 of the studs are screw threaded for receiving the machine attaching devices which maintain the machine on the studs. At the intersection of the angular portions of this element and medially of the width of the angular extension spurs or claws 19 are struck out from
60 the body of the angular extensions and disposed laterally outwardly from the longitudinal strip, these spurs being sharpened with the bevel arranged toward the studs.

65 As illustrated in Figures 1 and 2, this anchor element 15 is inserted between the door

edge and the frame. The elongated plate strip lies along the back margin of the door between the door and rabbet strip and the angular extensions are disposed between the door edge and the frame or jamb to protrude
70 slightly and to dispose the studs outwardly laterally of the crevice between the door and jamb. As shown in Figure 2, the spurs are inserted or driven between the adjoining faces of the frame and rabbet strip. The location
75 of this element along the door edge governs the location of the groove. The distance of the initial position of the tool of the machine from the ends of the anchor being known, the anchor is set accordingly and the door then
80 braced or wedged into position (means not shown). After the application of this anchor or supporting device between the door and frame, the machine is inserted over the extending studs and properly attached.
85

As illustrated in Figure 4, the main frame 20 of the machine provides upper and lower bosses 21, 21 having bores therethrough corresponding in diameter to the studs with appropriate clearance and properly located for
90 perfect registry therewith.

The frame includes a plain flush outer surface for engagement with the door when disposed on the studs and its held against the door by means of wing nuts 22 screwed on the
95 respective studs against the frame. Upper and lower journal webs 23, 24 respectively extend horizontally from the frame and a slide support rod 25 is stationarily mounted in a vertical position between these webs. This
100 post or rod has a carriage 26 slidably mounted thereon. The carriage includes a cylindrical portion 27 about the rod from which a pair of spaced bosses 28, 28 extend outwardly relative to the door and from which bosses
105 extend guide rods or rails 29. Adjacent each boss, angularly relative thereto, arms 30 extend to the other side of the frame to support a sleeve nut 31 traversed by a screw 32 rotatively journaled at its upper and lower ends
110 in the webs of the frame.

The reciprocating power unit 33 is mounted on the rails 29, 29 and the location of the cutting tool carried on the unit is definitely fixed
115 relative to the carriage. Resetting of the tool is obtained by vertically adjusting the carriage through a controlling device operating the screw.

As best shown in Figure 5, the power unit 33 is of the following construction. A casing 34
120 which supports the tool driving spindle 35 and the square tool 36 provides a pair of broed lugs 37, 37 extending from each side. These pairs of lugs include plain bearings and are adapted to fit over the respective slide
125 rods extending from the frame of the machine (see Figure 2). The power source, as a motor 38, is attached to the casing by means of screws 39 and the tool driving spindle 35 extends from the motor and is journaled in a
130

bearing 40 secured in the casing. A tool socket 41 is mounted on the end of the spindle which tool socket may be of any desired form for receiving a drill 42. An outer web of the casing is provided with a bore in alignment with the spindle providing a socket 43 for receiving the shank of the square cutting tool 36. A set screw 44 in the casing extending into the socket maintains the square cutting tool in place. The drill extends in the conventional manner through the square tool.

As detailed in Figure 8, the square tool provides an intermediate abutment shoulder 45 adapted to lie against the forward face of the casing and provides discharge slots 46 radially disposed relative to the bore containing the drill. These openings provide for the discharge of the chips drawn into the square cutting tool from the work.

The power unit is moved toward and from the work by means of a lever and linkage connection of the following nature. A boss 47 is provided on the casing into which boss a stud 48 is screwed which stud is in vertical position when the machine is mounted at the side of a door. A bell crank lever 49 is pivoted on the stud and maintained thereon by means of a washer 50 and cotter pin 51. One of the arms of the bell crank lever is formed to provide a handle 52 which may be manually grasped for swinging the lever. The other arm 53 extends to the opposite side of the machine and has adjacent ends of a pair of links 54 attached against opposite sides of its extreme end. A pin 55 accomplishes this connection, the pin being maintained in position by means of a cotter pin at each end. The opposite ends of the links are secured between the arms of a bifurcated lug 56 extending from the main frame of the machine, a washer 57 being placed between the adjacent ends of the links and a pin 58 traversing the arms of the lug, the links and the washer and maintained in position by means of a cotter pin at each end. Therefore, the pivotal connection of the bell crank lever to the power unit is a swinging connection and the outer end of the short arm of the bell crank lever is flexibly pivoted relative to the main frame of the machine.

The two positions of the power unit operating mechanism are respectively illustrated in Figures 1 and 5. The cutting tools are so related to the frame of the machine that rearward movement of the handle completely extracts the tool from the work moving it back beyond the flush face of the machine frame. Inward movement of the tools as obtained by moving the power unit through the lever 49 is governed for an exact depth cut beyond the face of the frame by means of an adjustable abutment screw 59 screwed into the frame and locked in set position by means of a lock nut 60 on the screw and engaging the frame. After each reciprocation of the power unit

achieving a drilling operation, the power unit and carriage carrying the same are moved vertically the appropriate distance to make another cut in the formation of a groove. This exact and constant resetting of the tool is accomplished by means of the device controlling rotation of the feed screw 32, best detailed in Figure 6.

The screw is supported in its bearings, against vertical displacement, by means of a collar 61 lying upon the lower web of the frame and secured to the screw by means of a pin 62. The extending lower end of the screw is counter turned and an adjusting knob 63 is pinned thereon by means of a diametrically disposed pin 64. Upon the lower face of the web of the face abutted by the knob, a pair of circular depressions 65 are provided located on equal radii from the axis of rotation of the screw. A detent 66 is located on the same radius within the knob, this detent including the conventional spring and ball, the ball seating in a respective depression when brought into registry therewith. When the carriage is in the lowermost position as shown in Figure 6, or otherwise described as the initial or starting position for a groove cut, the detent is seated in one of the depressions.

The stationary sleeve nut 31 extends between the arms of the carriage being stationarily attached thereto by any convenient means. The lead of the screw has been so arranged that a half turn of the nut, as to move the detent from one depression to another, accomplishes a movement of the carriage sufficient to reset the tool laterally substantially the gauge of the tool so that successive cuts may be made to form a groove.

In the upper web of the frame an adjustable abutment is provided for limiting the upward movement of the carriage. The abutment located in the frame is interchangeable with others and in each instance comprise a headed screw 67 engaged by a boss 68 of the carriage. The length of the head is varied to achieve variation in the length of the groove as shown in dot and dash lines in Figure 6. It will be appreciated that the interchangeable stop could be located at the lower end of the frame equally as well as at the top in those instances where it is best to start the cut at its upper end and work the tool to the lower end.

In using the machine, the operator having inserted the anchor device as previously described hangs the machine on the protruding studs thus aligning the tool with the crevice between the door and frame, the anchoring device having previously been set to align the tool with the lower end of the groove to be cut. The power unit is reciprocated to drill a square hole which is the first operation in cutting the groove. The depth of this cut has previously been governed by properly

setting the limiting stop on the frame. After the retraction of the tool, the knob is manually rotated a half turn resetting the tool longitudinally of the crevice or the proposed groove. The power unit reciprocation lever is again moved to perform a slightly overlapping drilling cut in the work. This stepping up proceeds until the stationary abutment is engaged, at which time the desired groove has been completed.

It will readily be seen by the use of an anchoring device of the nature described, the machine is accurately and firmly supported relative to the work. Due to the fact that the tool is accurately aligned with the crevice, grooves or mortises of uniform depth are cut in the door edge and the frame edge respectively. In other words, the total thickness of the two leaves of the hinge is substantially or very slightly less than the thickness of the square cutting tool. The result is that a perfect fit is automatically mechanically accomplished and there can be no inaccurate cut made.

Having described my invention, I claim:

1. In a mortising machine and support therefor, an anchor, comprising, thin gauge plate portions insertable between the door edge and the jamb and a strip portion at an angle to the plate portions extending along the back edge of the door, a drilling machine hung on the extending ends of the plate portions, and a vertically and laterally movable cutting tool mounted in said drilling machine.

2. An anchor device of the class described adapted to be used in combination with a door and jamb, comprising, a strip of metal adapted to lie along the rear margin of the door between the door and rabbet strip and angular extensions extending between the edge of the door and the jamb, and means on said extensions for attaching a machine thereto.

3. In a mortising machine and support therefor, an anchor attachable between a door and frame, a machine hung on said anchor, a drilling tool mounted in said machine in alignment with the crevice between the door and frame, means for feeding the drilling tool into the crevice, and a resetting device for moving the tool longitudinally of the crevice after each drilling operation.

4. A mortising machine, comprising, a support for mounting the machine relative to a door and frame, a frame attachable to said support, a carriage vertically slidably mounted on said frame, a tool driving unit horizontally slidable on said carriage, a cutting tool in said unit disposed in alignment with the crevice between the door and frame, means for reciprocating said tool into the crevice, an elevating screw traversing said carriage, a knob for rotating said screw, depressions in the frame adjacent said knob, a

detent in said knob cooperating with the depressions in the adjacent portion of the frame for definitely resetting the tool longitudinally of the crevice after each operation.

5. A supporting device of the class described adapted to be used in combination with a door and jamb, comprising, a length of angle iron, one flange of which is adapted to lie along the rear margin of the door against the rabbet strip of the jamb and the other flange of which is adapted to lie between the door edge and the jamb, and means for attaching a machine to said support.

6. A mortising machine and support therefor, comprising, means for hanging the machine relative to the adjoining edges of the door and jamb, a slidable element mounted in said machine, a cutting tool mounted on said element and disposed in alignment with the crevice between the door and jamb, means for reciprocating said tool into the crevice, an elevating screw journaled in said machine and traversing said carriage, a manually movable knob attached to the end of said screw, and means between the knob and frame for enabling the operator to move said knob a determinable amount.

7. In a mortising machine, a frame, means for supporting said frame, a carriage slidably mounted on said frame, said carriage having a pair of rails extending outwardly therefrom at right angles to the direction of movement of the carriage, a tool carrying and driving unit mounted on said rails, a lever fulcrumed to said power unit and having a flexible pivotal connection to said frame for reciprocating said unit, a screw journaled in the frame and traversing the carriage, means for rotating said screw, and means for indicating a predetermined amount of rotation of said screw.

In witness whereof, I hereunto subscribe my name.

ELIAS LUGINBUHL.

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