

May 10, 1932.

S. HUNTER

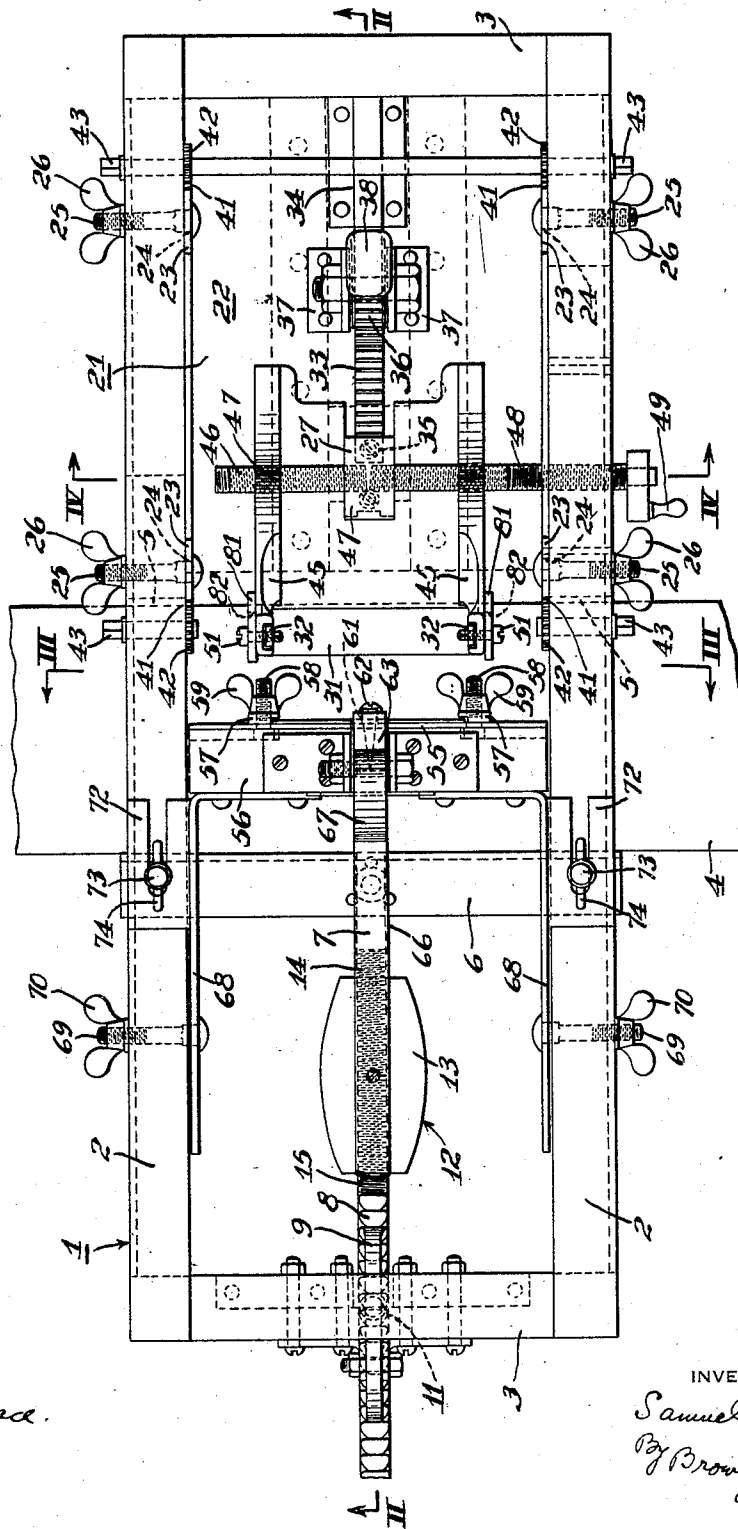
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MORTISING MACHINE

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3 Sheets-Sheet 1

Fig. 1.



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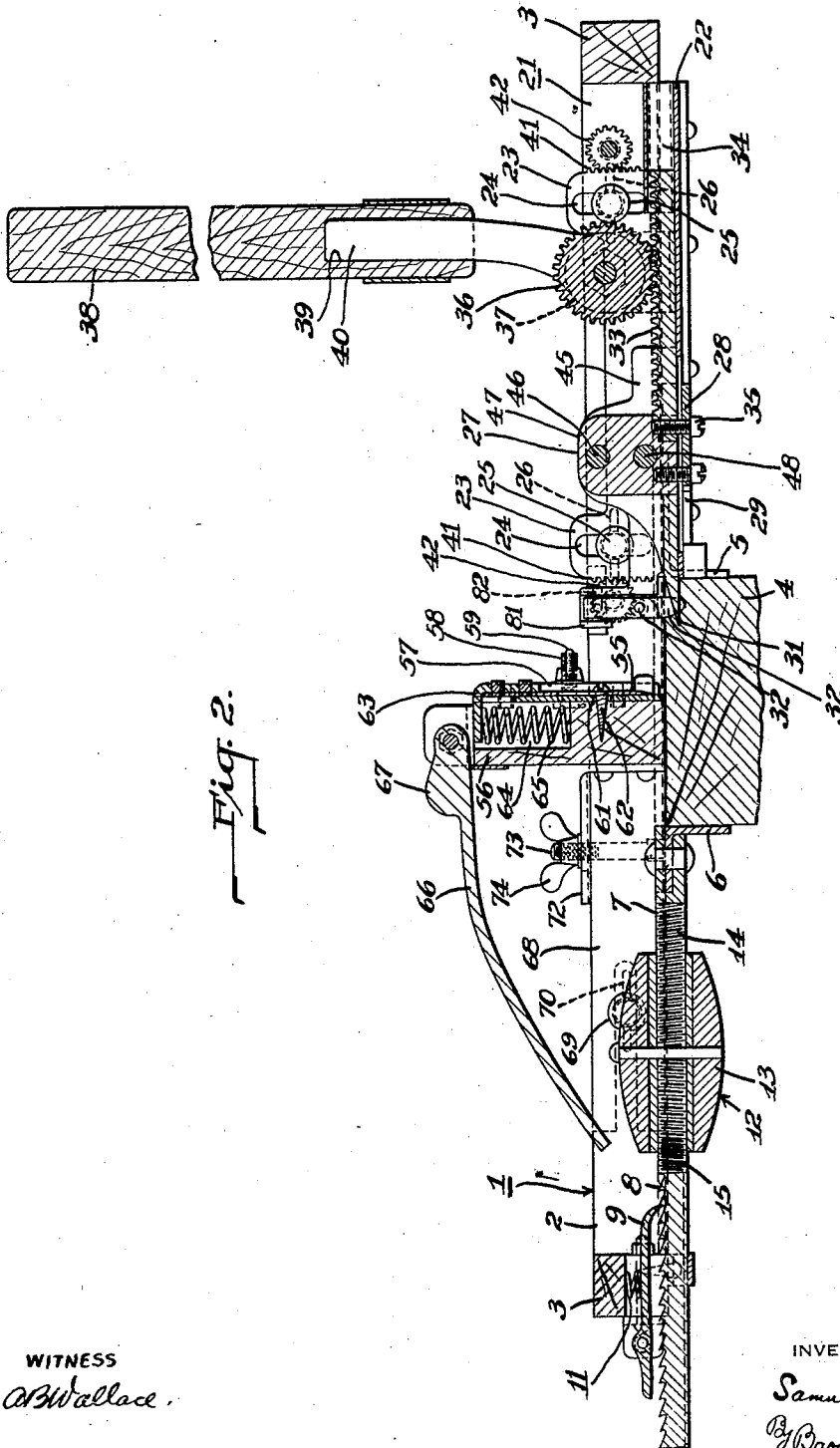
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3 Sheets-Sheet 2



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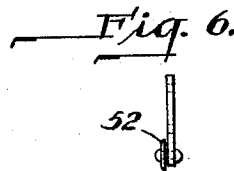
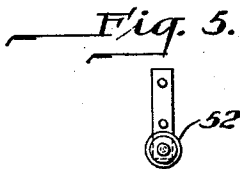
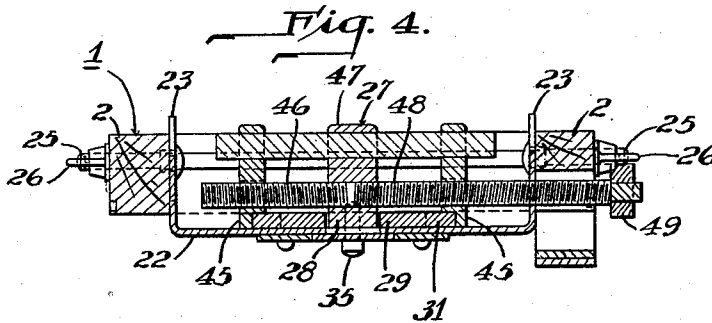
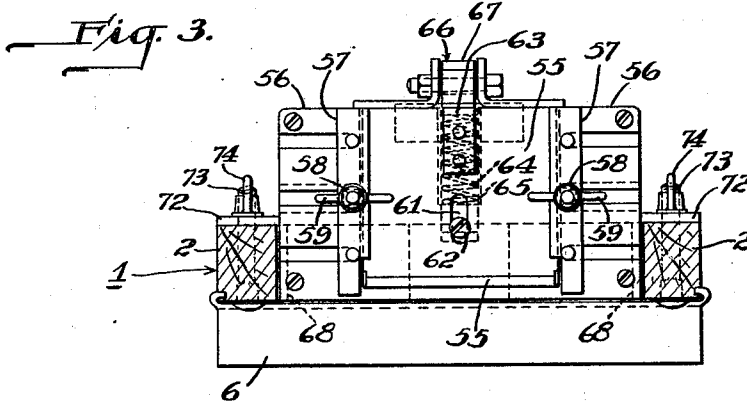
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MORTISING MACHINE

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3 Sheets-Sheet 3



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MORTISING MACHINE

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This invention relates, generally, to wood working machines and particularly to machines for cutting gains or mortises in door jambs and doors for receiving the leaves of hinges.

The cutting of hinge mortises by means of hand tools, as is ordinarily done, is a laborious process and requires the exercise of considerable skill and care on the part of the workman to insure a neat and accurate job. In this operation a number of separate tools including a hammer, chisels, gauges and a square are necessary. In manipulating these various separate tools considerable time is necessarily consumed in cutting each mortise, and in the construction of a large building the total time consumed in cutting mortises for doors and doorways by hand may be a large item.

An object of the invention, therefore, is to provide a machine for quickly and accurately cutting mortises in doors and door jambs.

Another object of the invention is to provide a mortising machine which may be quickly adjusted, by moving or exchanging the cutting tools, to adapt it to cut mortises of various sizes and shapes.

A further object of the invention is to provide a mortising machine in which the cutting knives can be easily removed for sharpening and quickly adjusted to their proper operating positions.

The foregoing and other objects, which will appear as the details of the invention are better understood, may be attained by means of the specific structure shown in the accompanying drawings in which Fig. 1 is a plan view of a mortising machine constructed in accordance with the present invention; Fig. 2 is a view in longitudinal section, taken on a plane represented by the line II—II of Fig. 1, of the mortising machine; Fig. 3 is a view in cross section taken on the plane represented by the line III—III of Fig. 1, showing more plainly the vertically disposed cutter; Fig. 4 is a view in cross section taken on the plane represented by the line IV—IV of Fig. 1 showing the details of the mechanism for clamping the horizontal cutter; Fig. 5 is a view in side elevation of a side cutting knife

which may be utilized in the mortising machine; and Fig. 6 is a view in end elevation of the modified side cutting knife.

In practicing the present invention a supporting frame is utilized for carrying a horizontally disposed cutting chisel and a vertically disposed knife which are adapted to form respectively the bottom and back of a mortise. The horizontally disposed chisel is carried on a slidable member by means of two clamps, each of which carries a side cutting knife that may be adjusted relative to the horizontal chisel for cutting the ends of the mortise. These various cutters are all so mounted that they may be readily removed for sharpening or replacement, and they are readily adjustable relative to each other to permit the machine to be used for cutting mortises of the different widths, lengths and depths which are ordinarily met with in applying hinges to doors.

Although the particular structure shown in the drawings is merely illustrative of the invention and may be modified in practice, it constitutes a practical embodiment of the invention and will be particularly referred to in the following portions of the specification.

As clearly shown in Fig. 1, the mortising machine comprises a frame 1, of elongated rectangular shape, that is made up of parallelly disposed side rails 2 which are connected at their ends by end pieces 3. Although the side rails and the end pieces are shown as constructed of wood and of square section, it is obvious that the frame 1 may be made entirely of metal or other material of channel or other suitable shape, and that the general outline of the frame may be departed from without changing the functioning of the apparatus.

In Figs. 1 and 2 the mortising machine is shown disposed in operating position on the edge of a wooden piece 4 that may be taken to represent a portion of a door which is to be mortised for receiving a leaf of a hinge. As shown, the machine is held in operating position by means of a clamping mechanism that comprises stationary clamping abutments 5 depending from each of the side rails 2 and a cooperating movable clamping mem-

ber 6 that is disposed transversely of the frame 1 and slidably mounted on the side rails 2. For adjusting the position of the movable clamping member 6 to accommodate work pieces 4 of various widths, an adjusting bar or rod 7 is attached to the center of the clamping member and passes through the end piece 3 of the frame 1. As shown, the adjusting bar 7 is provided with ratchet notches 8 which constitute a rack that is slidably mounted in the end piece 3 and disposed to be engaged by a ratchet pawl 9 thereon that functions to hold the clamping member 6 against the work piece 4.

In clamping a work piece 4 the ratchet pawl 9 is first moved out of engagement with the ratchet notches 8 to permit the movable clamping member 6 to be separated from the stationary clamping abutments 5. The machine may then be placed on the work piece 4 with the stationary clamping abutments 5 in engagement with one side thereof, and the movable clamping members 6 may be moved into engagement with the other side by permitting the ratchet rack 8 to slide through the end piece 3. During this movement the ratchet pawl 9 may be released and will be held in contact with the ratchet teeth 8 by means of a suitable spring 11, but it will permit the clamp 6 to move into closed position by reason of the fact that it will ride over the sloping faces of the ratchet teeth 8. However, after the clamping member 6 has been moved to a position adjacent the work piece 4 the pawl 9 will engage one of the ratchet notches 8 and will prevent movement of the clamp in the other direction.

To effect the final clamping operation, the adjusting bar 7 is provided with a turnbuckle mechanism 12 that comprises a handle member or grip 13 having right and left-hand internal threads in its respective ends which engage complementary threads on the ends of two separate members 14 and 15 which make up the adjusting bar 7. In accordance with the well known operation of turnbuckles it is clear that the movable clamping member 6 may be moved to engage the work piece 4 with considerable force, by turning the operating handle 13 in the proper direction.

The cutting portion of the mortising machine includes a horizontal cutting mechanism 21 that is mounted in the end of the frame 1 opposite that which is occupied by the movable clamping member 6. The horizontal cutting mechanism 21 comprises a plate or base portion 22 of substantially rectangular shape disposed between the side rails 2 of the frame 1 and adjacent the end piece 3. The base 22 is adjustably supported within the frame 1 by means of upstruck lugs or ears 23 at its corners, which are provided with vertically disposed slots 24 that engage bolts 25 extending through the side rails 2

and provided at their outer ends with wing nuts 26.

In the center of the base member 22 there is slidably mounted a cutter carriage 27 provided with a centrally disposed depending guide 28 which engages a longitudinal slot 29 in the base 22 for permitting the carriage 27 to reciprocate along the longitudinal axis of the frame 1. The carriage 27 serves as the supporting member for a bottom cutting knife or main chisel 31 and for a pair of vertical side wall forming knives 32.

These knives may be moved to engage the work piece 4 and to cut the bottom and sides of a mortise by means of a reciprocating mechanism that comprises a rack 33 slidably mounted in a guideway or bracket 34 on the base plate 22 and connected at its forward end to the carriage 27 by suitable means such as a screw 35. The carriage 27 may be propelled by means of a pinion 36 that is journaled on a pair of wing-like brackets 37 secured to the base plate 22 and that is provided with an operating handle 38. By means of the handle 38 the pinion 36 may be oscillated to transmit to the rack 33 and the carriage 27 a reciprocating motion whereby the bottom cutting chisel 31 and the side cutting knives 32 may be caused to engage the work piece 4.

As shown, the handle 38 is provided with a socket 39 that engages a stub lever 40 on the pinion 36 in such manner that it may be readily removed to substitute a handle of different length. Such construction is desirable in the event that the mortising machine is to be used on different kinds of wood, as a longer handle may be used when cutting hard wood than the handle ordinarily utilized in cutting soft material.

To adjust the depth of the cut which is to be taken by the bottom cutting chisel 31, it is simply necessary to adjust the position of the cutting mechanism base 22 relative to the frame 1. As shown, the lugs 23 on the base 22 are provided at their edges with rack teeth 41 which engage small pinions 42 that are journaled in the side rails 2. When it is desired to adjust the position of the base 22, it is released from the frame 1 by unscrewing the wing nuts 26, whereupon it may be readily raised or lowered by turning pinions 42 by means of a suitable wrench or key (not shown) which may be applied to the square ends 43 of the journals which carry the pinions. This adjustment may be made to adapt the machine to cut mortises for light or heavy hinges as the case may be, and it is apparent that one end of the base 22 may be set at a different level than the other end to cause the chisel 31 to be tilted in such manner that it will cut at an angle to the upper surface of the work piece.

In the event that it is desired to cut a mortise in what is known as a rabbeted jamb or casing having a raised portion, it is simply

necessary to move the base 22 downwardly relative to the frame 1 a sufficient distance to bring the cutting edge of the chisel 31 below the edge of the jamb, whereupon it may be adjusted to cut a mortise of the desired depth.

For adjusting the width of the mortise, the carriage 27 is provided with two clamping members 45 that are disposed to clamp between them, cutting chisels 31 of different widths. As shown, the clamping members 45 are slidably mounted on a transverse guide bar 46 that is secured near the top of an upwardly projecting boss 47 in the center of the carriage 27. For moving the clamping members 45 in such manner that they will be disposed symmetrically relative to the center of the carriage 27, a threaded operating rod 48 is journaled in the boss 47 beneath the rod 46. The threads on the rod 48 at one side of the bracket 47 are right-hand threads, and those at the other side of the bracket 47 are left-hand threads. These right and left-hand threads engage complementary threaded openings in the clamping members 45 in such manner that when the rod 48 is turned, as by a crank 49, the clamping members 45 will be adjusted from or toward each other as the case may be.

To apply a bottom cutting chisel 31, it is simply necessary to turn the rod 48 by crank 49 until the clamping members 45 have been separated the required amount. The chisel 31 may then be placed in position and the rod 48 turned in the opposite direction to clamp it in place.

In order that the side cutting knives 32 may automatically assume their proper lateral positions relative to the chisel 31, they are carried on upwardly extending portions at the forward ends of the clamping members 45. As shown, the knives 32 are disposed in vertical guideways and are held by screws 51 that pass through vertical slots in the clamping members 45 to permit the knives 32 to be adjusted vertically. For cutting some materials, it may be found desirable to utilize rotatable side cutting knives or discs 52, as shown in Figs. 5 and 6, in place of the plain knives 32. To permit the forward edge of the chisel 31 to assume the proper position relative to the vertical side cutting knives 32, the chisel may be moved longitudinally of the carriage 27, after loosening the clamping members 45 to bring it to the desired position.

In starting to cut a mortise the entire carriage 27 may be retracted by means of the rack 33 and the pinion 36 to a position in which the edge of the chisel 31 will be back of the forward edge of the base plate 22 which is normally in engagement with the edge of the work piece 4. The carriage 27 may then be moved forward to cut the bottom and sides of a mortise as hereinbefore described.

To cut the back of the mortise and to detach the chip formed by the chisel 31 and the side cutting knives 32, a vertically disposed plunger knife or end cutting knife 55 is provided. The knife 55 is of width substantially equal to that of the chisel 31 and is slidably mounted in a vertical guideway in a guide block 56 that is mounted transversely of the frame 1. At each edge of the knife 55 there is disposed a vertical guide lug 57 which is slidably mounted on the face of the guide block 56 in such manner that it may be moved relative thereto for adjusting the guideway to receive knives of different widths. As shown, each guide lug 57 may be held in position by a bolt 58 and wing nut 59.

The blade 55 is provided at its center with a vertically disposed slot 61 through which a screw 62 is inserted for retaining the blade in position and limiting its vertical movement. At the top of the blade 55 there is secured an operating lug 63 that is bent horizontally over a chamber 64 in the guide block 56. To force the knife 55 in the upward direction a helical spring 65, of the compression resisting type, is disposed within the chamber 64 and in engagement with the lower surface of the lug 63. The knife 55 may be forced downwardly to perform the cutting operation by means of an operating handle or plunger actuating lever 66 that is pivotally mounted in brackets at the top of the guide block 56 in such manner that it may be turned to bring a cam lug 67 thereon into engagement with the upper surface of the operating lug 63 on the knife 55.

To provide for adjusting the machine to cut a mortise of predetermined width, the guide block 56 is disposed to be adjustable longitudinally of the frame 1. As shown in Fig. 1, the guide block is provided with a pair of arms or brackets 68 which are attached to the side opposite to that occupied by the knife 55 and extend along the inner sides of the side rails 2 of the frame 1. At their ends, the brackets 68 are provided with elongated longitudinal slots that engage bolts 69 extending through the side rails 2 and provided at their outer ends with wing nuts 70. Another pair of brackets 72 extend from the arms 68 and engage the tops of the side rails 2 near the back of the block 56. These brackets 72 are provided with slots that are somewhat shorter than the slots in the arms 68 and extend in the opposite direction. These slots receive bolts 73 that extend vertically through the side rails 2 and that are provided with wing nuts 74. It is apparent that, when the wing nuts 70 and 74 are loosened, the guide block 56 may be moved longitudinally of the frame 1 to the proper position for cutting the back of a mortise, where it may be secured by tightening the wing nuts.

When it is desired to change the knife 55, it

this may be readily accomplished by moving the guide block 56 to the left, as shown in Figs. 1 and 2, such distance that the slots in the brackets 72 will become entirely disengaged from the bolts 73. When in this position the guide block 56 may be pivoted about the bolts 69 to permit it to move upwardly and towards the end of the frame 1. When thus pivoted out of its normal position the guide block 56 may be conveniently adjusted or, if desired, it may be completely removed by simply lifting it in such manner that the slots in the arms 68 will be disengaged from the bolts 69.

In utilizing the mortising machine to cut a gain for a hinge, in a door for example, it is first applied to the work piece in the desired position and clamped in place by tightening the turnbuckle 12. The operating handle 66 is left in the position shown in Fig. 2 and the handle 38 is moved to the left, from the position there shown, to withdraw the horizontal cutting carriage 27. After the necessary adjustments have been made to adapt the machine to cut a mortise of the desired dimensions, the handle 38 is pulled to the right, as shown in Fig. 2, to force the chisel 31 and side cutting knives 32 into the wood.

As hereinbefore explained, the width of the mortise is governed by the position of the guide block 56, and means are provided on the carriage 27 for engaging the guide block 56 to stop the movement of the chisel 31 and the knives 32 when their cutting edges arrive at the back of the mortise. As shown, the upwardly extending portions at the forward ends of the clamping members 45 are provided with adjustable stop members 81 having longitudinal slots 82 by means of which they are held in position by the screws 51. The stop members 81 are disposed to engage the face of the guide block 56 and they may be adjusted, by reason of the slots 82, to stop the edge of the chisel 31 at the desired position relative to the plunger knife 55.

After the bottom and sides of the mortise have been formed, the carriage 27 may be withdrawn, leaving the resulting chip of wood in its original position. To detach the chip and to form the back of the mortise, the plunger actuating lever 66 is thrown over to the right, as shown in Fig. 2, to bring the cam lug 67 into contact with the operating lug 63 on the knife 55. The operating handle 38 may then be moved to the left to engage the lever 66 and force exerted upon it to move the knife 55 downward thereby completing the mortise.

From the foregoing description of the illustrated mortising machine and explanation of its operation, it is apparent that by this invention I have provided a mortising machine which is convenient to utilize and effective in cutting mortises in doors or door jambs. It is further apparent that this mortising

machine is capable of being adjusted to adapt it to cut mortises of various lengths, widths and thicknesses, and for use on different types of structures, as well as on different materials.

Although I have described in detail a specific embodiment of the invention, it will be apparent to those skilled in the art of wood working that various modifications may be made in the general layout of this mortising machine and in the details of construction without departing from the spirit and scope of my invention as defined in the appended claims.

I claim:

1. In a mortising machine, in combination a frame, a cutter-carrying base adjustably mounted on the frame, a carriage slidably mounted on the base, clamping means on the carriage, a bottom cutting chisel held by the clamping means, and side cutting knives carried by the clamping means.

2. A mortising machine comprising a frame, a knife-carrying mechanism adjustably mounted on the frame, a carriage slidably mounted on the mechanism, a pair of clamping members mounted on the carriage and adapted to clamp bottom cutting chisels of different widths, a chisel disposed between the clamping members, and side cutting knives carried by the clamping members.

3. A mortising machine comprising a frame, a cutter carriage slidably mounted in the frame, a bottom cutting chisel, means on the carriage for clamping the bottom cutting chisel, said clamping means being adjustable to clamp chisels of different widths, and side cutting knives carried by the clamping means whereby the knives are adjustable to correspond to the width of the chisel clamped therein.

4. A mortising machine comprising a frame, a cutter mechanism adjustably mounted on the frame, means for operating the cutter mechanism, a plunger knife carried by the frame, and a guide member for said plunger knife, said guide member being adjustable relative to the frame and pivoted thereto to provide for easily adjusting the knife.

5. A mortising machine comprising a frame, means for clamping the frame to the work, a knife-carrying mechanism including a carriage slidably mounted in the frame, a plurality of side cutting knives adjustably mounted on the carriage, a bottom cutting knife removably and adjustably mounted in the carriage, means for adjusting the carriage vertically and angularly relative to the frame, and means for moving the carriage to form the sides and bottom of a mortise.

6. A mortising machine comprising a frame, means for clamping the frame to the piece to be mortised, a cutter carriage slid-

ingly mounted in the frame, side cutting knives adjustably mounted in said carriage for cutting the side walls of the mortise, a bottom wall cutting chisel also mounted in the carriage, means for adjusting the carriage relative to the frame, means for operating the carriage to form the sides and bottom of a mortise, and a plunger knife slidably mounted in the frame for forming the rear wall of the mortise and for detaching the chip.

7. A gaining machine comprising a frame, means for clamping the frame on a work piece, a vertically disposed cutter slidably mounted in the frame for cutting the back side of a mortise, a carriage slidably mounted in the frame for movement longitudinally thereof, a bottom cutter mounted in the carriage, individual side cutters adjustably mounted on the carriage, means for adjusting the carriage relative to the frame, and means for operating the cutters to cut the sides and bottom of a mortise.

8. A mortising machine comprising a frame, a bottom cutting chisel slidably carried by the frame, a plunger knife disposed on the frame at substantially right angles to the chisel, means for operating the chisel and knife, a fixed clamping member carried by the frame, a movable clamping member slidably mounted on the frame, a bar having means for exerting force on the movable clamping member, a ratchet rack on the bar, and a ratchet pawl on the frame for engaging the rack to adjust the position of the movable clamping member.

9. In a gaining machine, a rectangular frame comprising side rails and end pieces, stationary clamping means secured to the side rails, movable clamping means slidably mounted on the side rails for cooperating with the stationary means to clamp a work piece, a ratchet pawl mounted in an end piece of the frame, a bar having ratchet notches slidably mounted in the end piece in working relation to the pawl and connected to the movable clamping means for adjusting it, mechanism in the bar for operating the clamping means, a horizontal cutter carried by the frame, vertical cutters disposed in cooperative relation to the horizontal cutter, and means for operating the cutters.

10. A mortising machine comprising a frame having side sills and end pieces, a stationary clamping member secured to the frame, a movable clamping member slidably mounted on the frame, a ratchet device disposed to adjust the position of the movable member, and means for clamping the movable member against a work piece.

11. A mortising machine comprising a frame having side sills and end pieces, a stationary clamping member secured to the frame, a movable clamping member slidably

mounted on the frame, a ratchet device disposed to adjust the position of the movable member, means for clamping the movable member against a work piece, a cutter-carrying base adjustably mounted in the frame, a carriage slidably mounted on the base, clamping members on the carriage for holding cutters, a bottom cutting chisel disposed between the clamping members, side cutting chisels carried by the clamping members, and means for reciprocating the carriage to form the bottom and sides of a mortise.

12. A mortising machine comprising a frame having side sills and end pieces, a stationary clamping member secured to the frame, a movable clamping member slidably mounted on the frame, a ratchet device disposed to adjust the position of the movable member, a turnbuckle for clamping the movable member against a work piece, a cutter-carrying base adjustably mounted in the frame, a carriage slidably mounted on the base, clamping members on the carriage for holding cutters, a bottom cutting chisel disposed between the clamping members, side cutting chisels carried by the clamping members, means for reciprocating the carriage to form the bottom and sides of a mortise, a guide block adjustably carried by the frame, a plunger knife slidably mounted in the guide block at substantially right angles to the chisel knife, and means for actuating the plunger knife to form the back side of the mortise.

13. A mortising machine comprising a frame, means on the frame for clamping the machine to a work piece, a knife-carrying mechanism slidably mounted on the frame, bottom cutting and side cutting knives on said mechanism, means for reciprocating the mechanism for cutting the bottom and sides of a mortise, a plunger knife device for cutting the back of the mortise, said device comprising a guide block, supporting arms on the guide block pivotally and slidably connected to the frame whereby the block may be adjusted relative thereto or rotated therefrom for inserting a knife, a plunger knife slidably mounted in the guide block, detachable means for securing the guide block in operating position on the frame, and means for actuating the plunger knife to detach the chip formed by the first-mentioned knife-carrying mechanism.

In testimony whereof, I sign my name.

SAMUEL HUNTER.