

July 31, 1934.

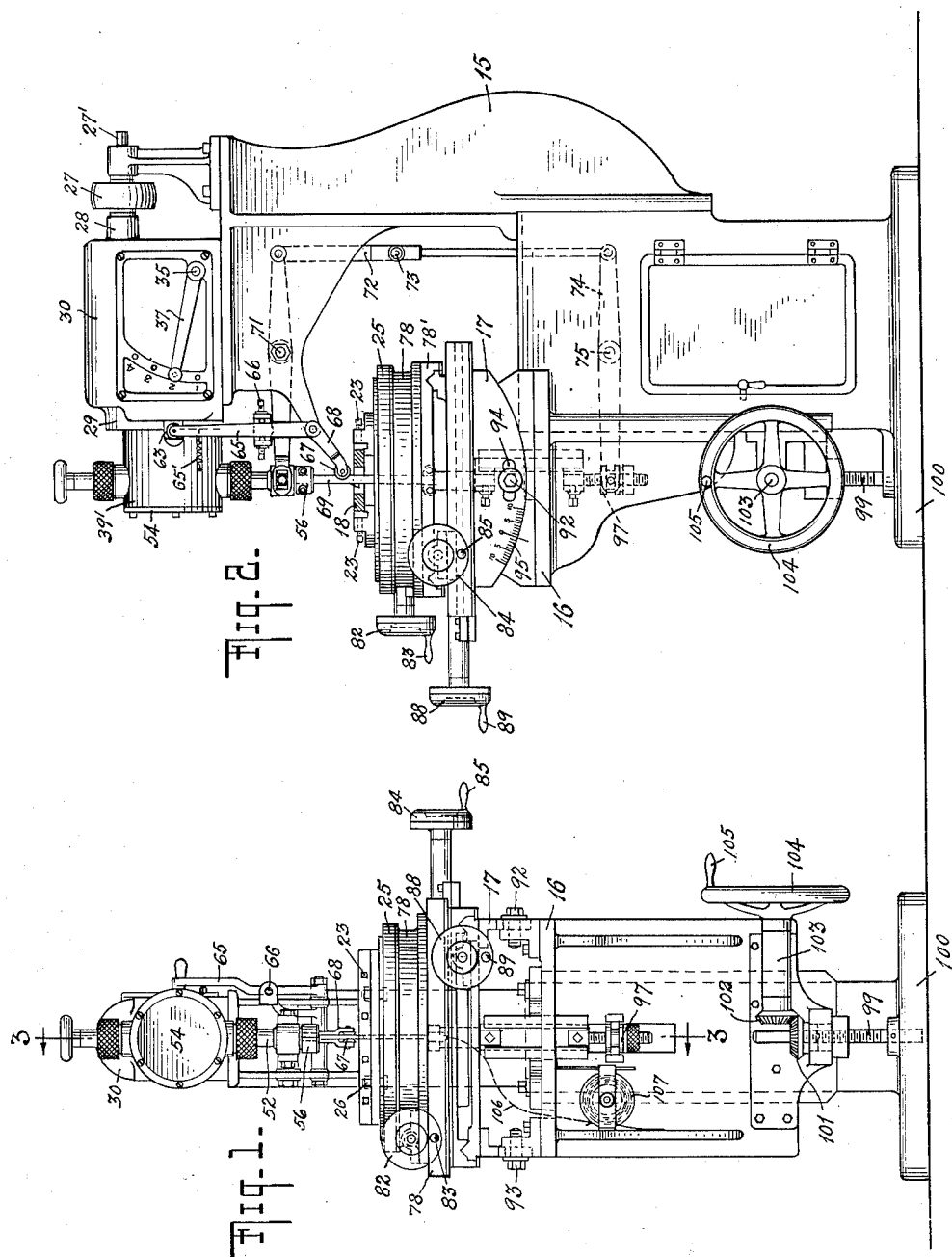
F. BRÜSTLE

1,968,514

DIE SHAPING MACHINE

Filed Sept. 11, 1931

4 Sheets-Sheet 1



WITNESS
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BY

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July 31, 1934.

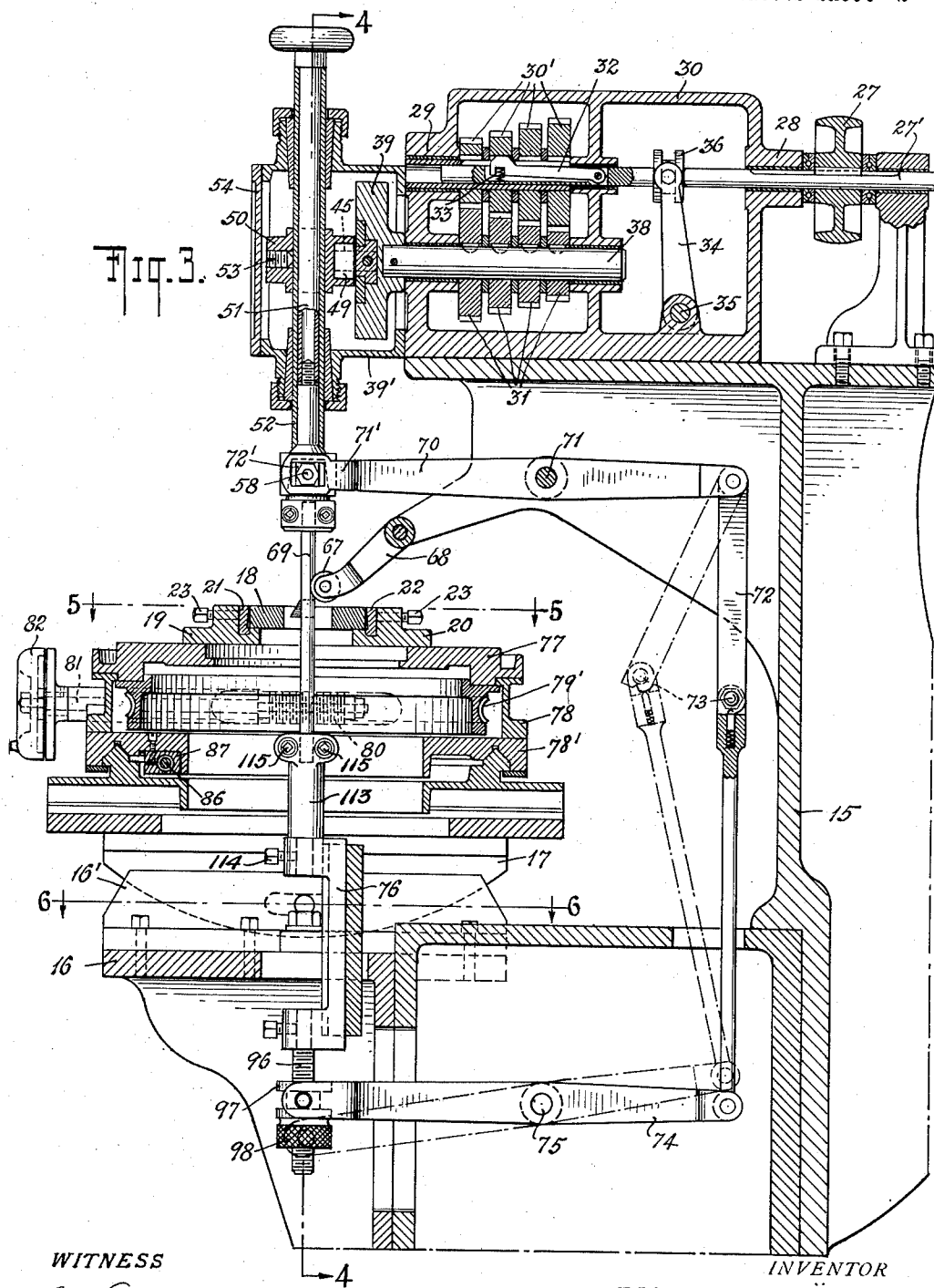
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4 Sheets-Sheet 2



WITNESS

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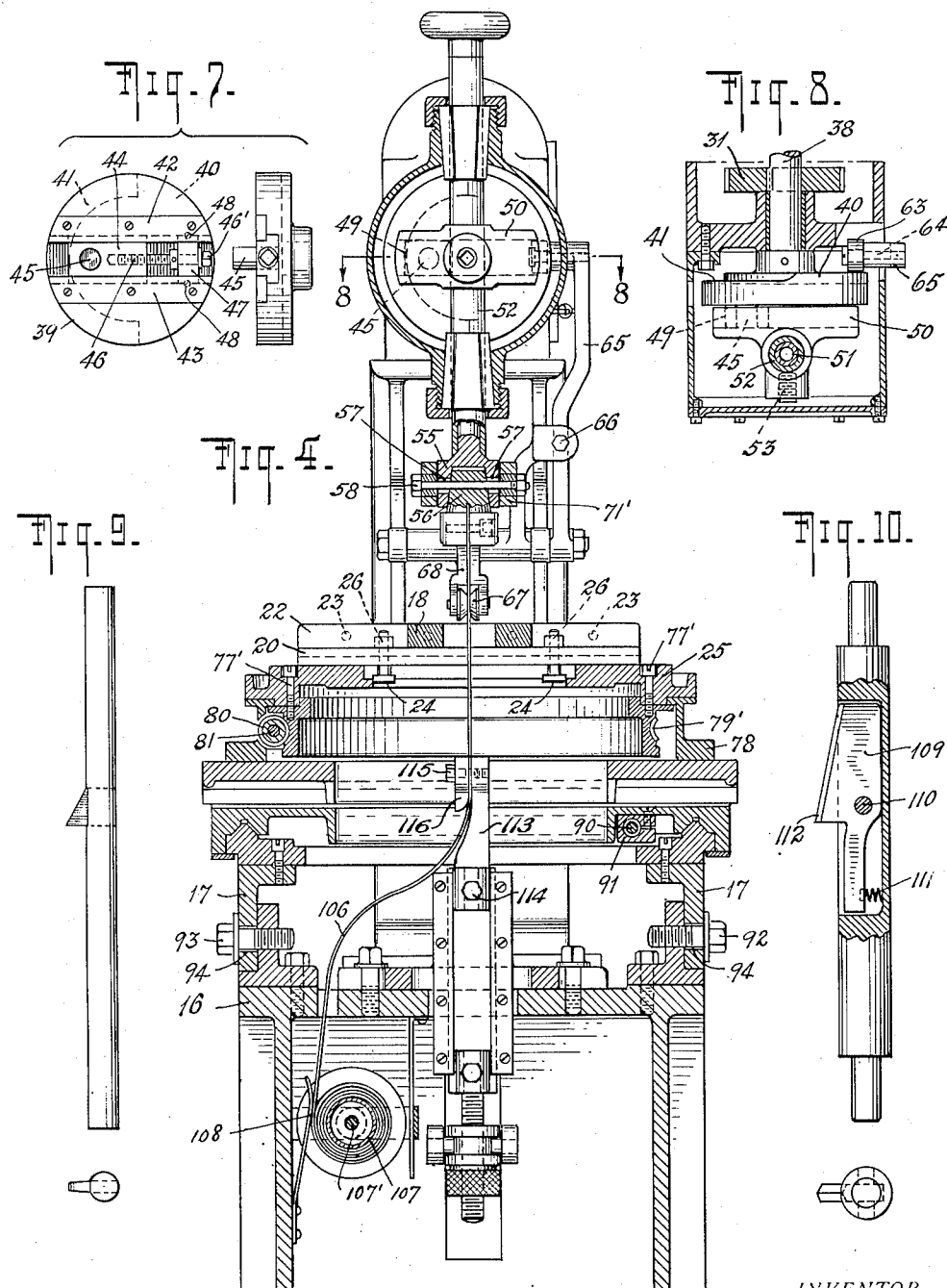
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4 Sheets-Sheet 3



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4 Sheets-Sheet 4

Fig. 5.

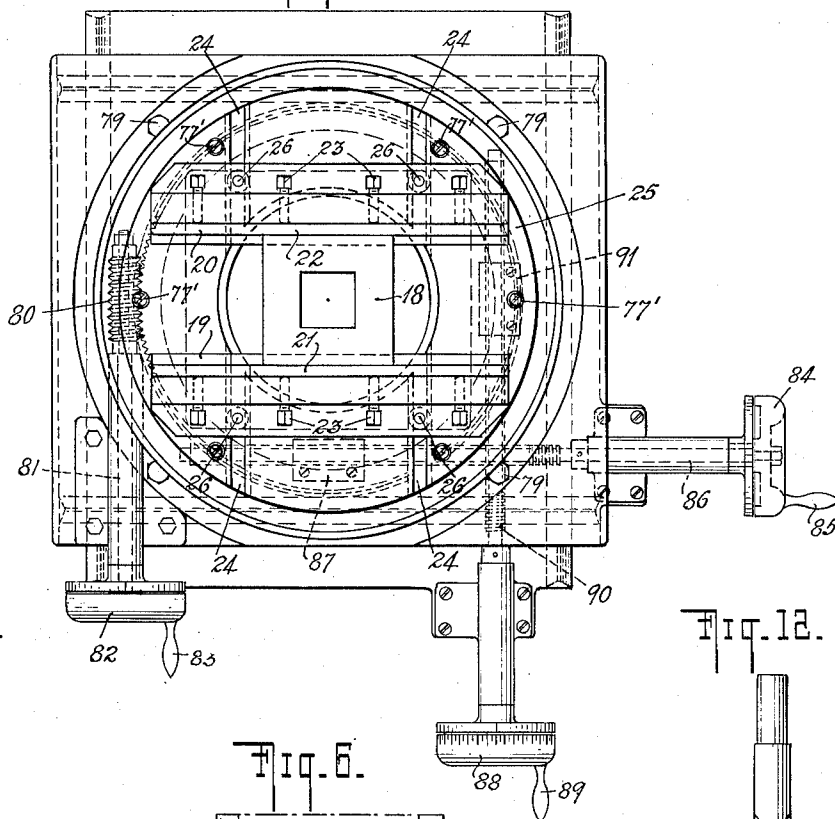
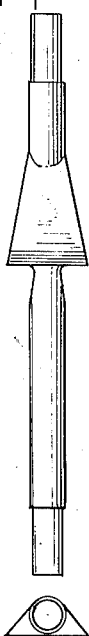


Fig. 11.



WITNESS

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Fig. 6.

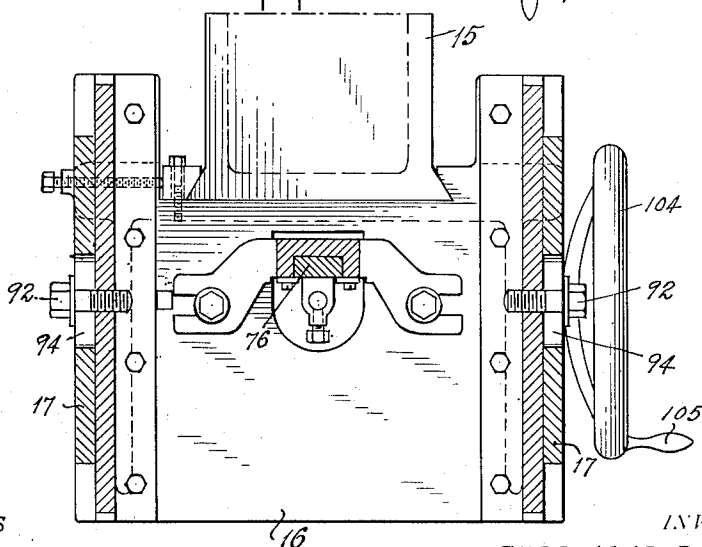


Fig. 12.



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1,968,514

DIE SHAPING MACHINE

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Victor C. Thorne, New York, N. Y.

Application September 11, 1931, Serial No. 562,301

3 Claims. (Cl. 90—44)

My invention relates to a die shaping machine and has for its object to provide a machine of that type which is adapted for cutting and shaping dies more accurately, with greater precision, and more efficiently than has been possible with apparatus known to the prior art. A more specific object of my invention is to provide a construction of die shaping machine in which the work piece is clamped in the anchor pieces in a new and novel manner. A further object of the invention is to provide a new construction of arbor for holding the tool which permits the stroke of such arbor to be adjusted. A still further object of the invention is to provide a novel arrangement for disengaging the tool from the arbor carrying the same, for adjustment or replacement. A still further object of the invention is to provide a novel type of tool for use with my die shaping machine. Further objects of the invention will appear from the description hereinafter.

A specific embodiment of my novel die shaping machine is illustrated in the accompanying drawings in which Fig. 1 is a front view of the machine; Fig. 2 is a side view thereof; Fig. 3 is a section along line 3—3 of Fig. 1; Fig. 4 is a section along line 4—4 of Fig. 3; Fig. 5 is a plan view of the table taken on the line 5—5 of Fig. 3; Fig. 6 is a section along line 6—6 of Fig. 3; Fig. 7 shows a front and side view of the cam actuating the tool-holding arbor; Fig. 8 is a section along line 8—8 of Fig. 4; Figs. 9, 10, 11 and 12 show various forms of tools adapted for use with my die shaping machine.

Referring more particularly to the drawings, in which similar reference characters identify similar parts in the several views, 15 is the frame supporting the various elements of the machine including the bed plate 16 upon which is mounted the rockable table 17 supporting the work piece carrying parts of the machine.

The work piece 18 (Figs. 2, 3, 4 and 5) is clamped between the jaws 19 and 20 between which and the sides of the work piece are placed tongues 21 and 22, such tongues having on their sides, in contact with the edges of the work piece, roughened surfaces which taper away from the sides of the work piece so that they hold such work piece within the anchor pieces or jaws 19 and 20 only at the top edges of such work piece. By this construction the work piece 18 is clamped between the jaws by means of a plurality of bolts 23, a pressure downwardly being exerted against the sides thereof at all times by the surfaces of the tongues 21 and 22.

The anchor pieces 19 and 20 are adapted to move in slots 24, 24 (Figs. 4 and 5) provided within the plate 25 supporting the same, bolts 26 being provided to clamp the anchor pieces on the plate 25 at the desired positions along the slots 24, 24. In this manner, the anchor pieces may be moved within the slots to provide a wider or narrower seat for the work piece depending upon the size of such work piece. This operation of moving the anchor pieces within their slots is performed by hand.

The drive for my die shaping machine is illustrated in Fig. 3, the pulley 27 receiving its motive force by means of a belt from a motor (not shown). The pulley 27 is keyed on the shaft 27' supported in bearings 28, 29, within the housing 30. Any one of a plurality of gears 30' may be clutched, while in engagement with the corresponding gear of a set of gears 31, to the shaft 27' by means of the latch 32 pivoted on the shaft 27' and having a spring 33. The gear to be engaged by the latch 32 is determined by the movement of the shaft 27' lengthwise by means of the lever 34, pivoted at 35, and engaging the collar 36, fixedly mounted on said shaft. On the outside of the casing 30 and fixed to the shaft 35 is a lever 37 adapted for movement in an arc along the side of the housing 30, such arc being divided into a plurality of segments designated by points 1 to 4 corresponding to positions of the lever 34 whereby the particular gear engaged by the latch 32 is determined (see Fig. 2).

The set of gears 31 is mounted and keyed on the shaft 38 to the end of which is secured a cam 39 housed within the casing 39', extending from the housing 30 and secured thereto.

Turning now to Figs. 4, 7 and 8, the cam 39 has a high dwell 40 and a low dwell 41 on the rear face thereof and is provided with plates 42, 43 on the front side thereof forming a slot within which is secured a slidable block 44 having a crank pin 45 protruding therefrom. The position of the block 44 within the slot formed by plates 42, 43 is maintained by means of an adjustable bolt 46 anchored therein, having journaled at its free end a block 47 secured to the cam 39 by set screws, 48, 48, the extent to which such bolt 46 extends into the block 44 being adjustable by means of the bolt head 46'. The distance of the pin 45 from the center of the cam 39 is thus made adjustable.

The pin 45, protruding from block 44, is journaled in a block 49 adapted to slide within the raceway provided in the crosshead 50, the distance of the pin 45 from the center of said crosshead determining the amount of vertical move-

ment of the arbor 51 which is secured to the shaft 52, by means of the set screw 53. A cover plate 54 is provided on the housing 39', which covered plate is removable to provide access to the interior of said housing.

The arbor 51, internally threaded at its bottom portion, carries a threaded shank member comprising the chuck 55 into which extends the tapered member 56. On the downward movement of the arbor the chuck 55 engages the tapered member 56. During the upward movement of the arbor, it is necessary to clear the workpiece and the tapered tool holder 56 is freed from the chuck holding the same to an extent equivalent to the length of the slot 57 provided in the chuck 55. Running through the slot 55 and the tapered tool holder 56 and extending through blocks 59 and 60 on each side of the chuck 55 is a bolt 58.

As the arbor 51 moves upwardly it will carry it the tool holding tapered member 56 until the bolt 58 engages the lower surface of the slot 57. By this arrangement the sudden pull on the tool when the arbor begins its upward travel, is avoided. Furthermore, as the cutting operation is accomplished on the downward movement of the arbor, the tool has been already placed in an exact centralized position by the engagement of the tapered tool holding member 56 by the correspondingly tapered inner surface of the chuck 55.

The cam 39 works against a roller 63 mounted on a shaft 64 connected to the upper end of a lever 65 (Fig. 2) adjustable by means of screws 66, 66, to bring the roller 67, mounted at the end of the arm 68 of the lever 65, tightly against the tool 69 to keep the same steady. When the cam roller 63 falls onto the low dwell 41 of the cam 39, the roller 67 is pulled away from the tool, freeing the same. The roller 67 is brought against the tool by the mechanism just described on the downward movement of the arbor 51 and is pulled away from the tool when the arbor is moving upwardly.

In Fig. 3, I have illustrated a novel mechanism by means of which the tool 69 may be removed from the machine. A lever 70 having a forked-shaped end 71' secured within bearing block 72' is connected to the chuck 55 and is pivoted on the frame 15 at 71, a joint connecting rod 72 being connected to the outer end of the lever 70. The connecting rod 72 has a toggle joint 73 and transmits motion to the lever 74 pivoted at 75 and connected with the slide 76. When the tool 69 is to be removed, the clamping screws in the jaws of the slide 76 and tool holder are loosened, and the connecting rod 72 is then pushed to the left so that, it, and the lever 74, will assume the position shown in dotted lines in Fig. 3. This will lower the slide 76 and disengage the tool 69 from the tapered holder 56 so that it may be removed therefrom and be replaced by another tool.

Coming now to the description of the work-piece supporting table, such table 77 comprises two circular members secured together by a plurality of screws 77'. The table is rotatably mounted on a circular track member 78 supported on a table 78' and secured to the same by a plurality of screws 79. The lower member of the turn table is provided throughout its periphery with teeth 79' meshing with worm 80 whereby a rotary motion to such turn table is imparted. (See Fig. 5.) The worm 80 is mounted on a shaft 81 actuated by the wheel 82 provided with a handle 83. The turn table 77 is movable side-

wise by means of wheel 84 provided with a handle 85, the wheel 84 being mounted to actuate shaft 86 threaded for engagement with the nut 87 screwed to the upper table. Turning the handle 85 moves the nut 87 back and forth, thereby moving the upper table sidewise. The forward and backward movement of the turn table is accomplished by means of the wheel 88 provided with handle 89, the wheel 88 being mounted on a threaded shaft 90 engaging the nut 91. As the handle 89 is turned, the nut 91, screwed on the upper table, is moved backward and forward, thereby actuating the upper table.

The turn table 77 and associated parts are also adapted for rocking movement by reason of their mounting on the arcuate base member 16, the center of whose arc is on the upper edge of the work piece. By having the center of the arc of the arcuate base on the upper edge of the work piece, the exact position of such work piece is not altered by the rocking of the turn table 77. This advantage is obtained by a construction in which the center of the arc of the base is within the boundaries of the work piece, the least amount of movement of the work piece out of its original position occurring when the center of the arc of the base is in the center of the upper edge of the work piece. To adjust the turn table for rocking movement on its base, I provide two set screws 92 and 93, one on each side of the table supporting members 17, which screws are adapted for movement within the slot 94 provided in the members 17. On one of the table members 17 is also provided a graduated scale 95 on which may be determined the amount of rocking movement given to the turn table. In order to make the rocking adjustment, the screws 92 and 93 are loosened and moved within the slot 94, the desired amount as indicated by the scale 95, after which the screws 92 and 93 are again tightened. This rocking adjustment of the table of my apparatus makes possible the cutting or shaping of a work piece at angles to the vertical.

In order to adapt my die shaping machine for use with a shorter or longer tool, I provide a slide 76 with a threaded shaft 96 depending therefrom and carrying a collar 97 engaged by the end of the lever 74. The collar 97 may be adjusted to any position along the threaded shaft 96 by means of the knurled nut 98 integral therewith.

In order to adapt my die shaping machine for use on working pieces of varying thicknesses, I provide my machine with means for raising or lowering the work supporting table. (See Figs. 2 and 3.) This is accomplished by means of the threaded spindle 99, anchored in the base 100 of the machine and carrying the mitre gear 101 in engagement with the mitre gear 102 mounted on shaft 103, actuated by wheel 104 provided with a handle 105. By turning the wheel 104, the entire work piece supporting table mounted upon the bed plate 16 may be moved in a vertical direction.

When my new and novel die shaping machine is used with a tool such as a saw, I provide means of continuously feeding a tool portion to the machine, for instance, by having the saw 106 wound upon a reel 107 mounted upon a shaft 107' (Fig. 4) supported from the frame of the machine, the saw being fed upwardly through the turn table and anchored in the tapered tool supports 56. A leaf spring 108 may be used to retain the unwound portion of the tool against the supply roller. Thus, if the tool, for instance, a saw, becomes dull or is broken, new section of the tool

unwound from the source of supply may be inserted into the tool holding element 56.

The lower fastening means for the saw blade and shaping tool comprises an anchoring piece 5 113 mounted on the slide 76 by means of set screw 114. The anchor piece 113 is provided with two screws 115, 115 by means of which the clamping element 116 is pressed against the body of the anchor piece, clamping the saw blade or the 10 shaping tool between such clamping element and anchor body. The anchor body has a configuration, clearly shown in Fig. 4, which permits the saw blade 106 to be bent away therefrom after being clamped in the manner described.

15 In Figs. 9 to 12, I have illustrated various forms of tools which may be used with my machine. Fig. 9 shows a tool with one operative face. Figs. 11 and 12 show modifications of tools having two operative faces.

20 In Fig. 10, I have illustrated a tool, the operative element 109 of which is pivoted at 110, the tool being provided with a spring 111, serving to return the tool to its operative position when the cutting edge 112 thereof has passed the work 25 piece.

While I have described a particular embodiment of my invention, it is obvious that various modifications therein, particularly in the arrangement of the parts, may be made without departing from my invention.

30 I claim:

1. In a die shaping machine, the combination of a frame, a housing extending from said frame, an arbor mounted for vertical movement within 35 said housing, a tool supporting member at the end of said arbor for supporting the upper end of the tool, a tool anchoring member for securing the lower end of the tool, a lever, connected to the tool supporting member and pivoted on the frame, 40 a connecting rod connected to the outer end of said lever and having a toggle joint intermediate its ends, a second lever connected to the other end of said connecting rod and pivoted on said

frame, whereby the tool anchoring member may be lowered so as to disengage the tool from its anchor at the lower end of the arbor.

2. In a die shaping machine, the combination 80 claimed in claim 1 in which the tool supporting member at the end of the arbor comprises a chuck having a tapered recess therein and a horizontal slot therethrough, a tool holding tapered member retained in said chuck for vertical movement 85 therein, and a bolt running through the slot within said chuck and through said tapered tool holding member adapted to engage the lower surface of the slot within said chuck when the arbor is at the beginning of its upward movement.

3. In a die shaping machine, the combination of 90 a work piece supporting table, an arbor mounted for vertical movement above said table, a tool passing vertically through said work piece supporting table, a tool supporting member at the end of said arbor for supporting the upper end of the 95 tool, a tool anchoring member below said work piece supporting table for securing the lower end of the tool, said work piece supporting table being capable of movement sidewise, backward and forward, and rocking movement from a horizontal 100 plane while the tool is in operative position and passing therethrough, said tool supporting member being effective to retain the tool in rigid position during the downward operative movement thereof and in loose po- 105 sition during the upward inoperative movement thereof, and in which said tool supporting member comprises a chuck having a tapered recess therein and a horizontal slot therethrough, a tool holding tapered member retained in said chuck for vertical 110 movement therein, and a bolt running through the slot within said chuck and through said tapered tool holding member adapted to engage the lower surface of the slot within said chuck when the arbor is at the beginning of its upward move- 115 ment.

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