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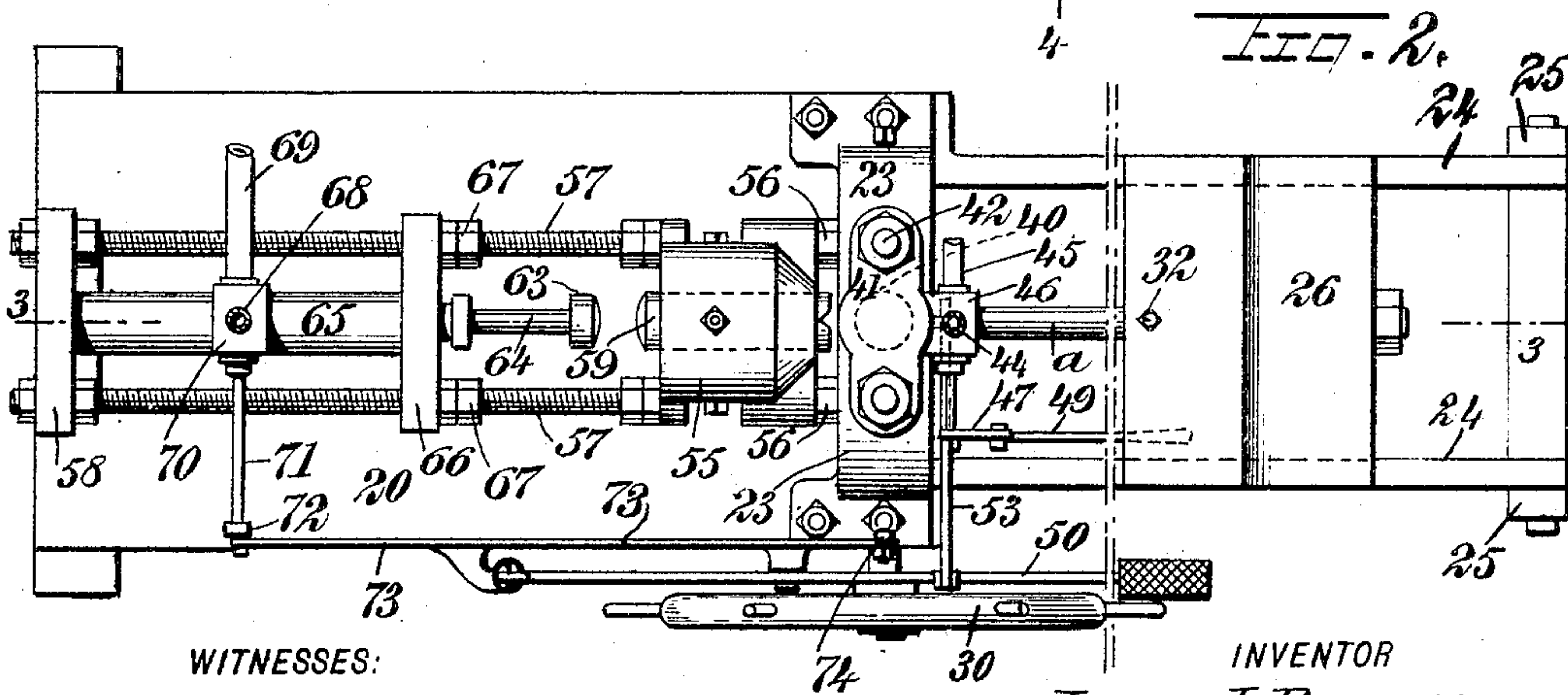
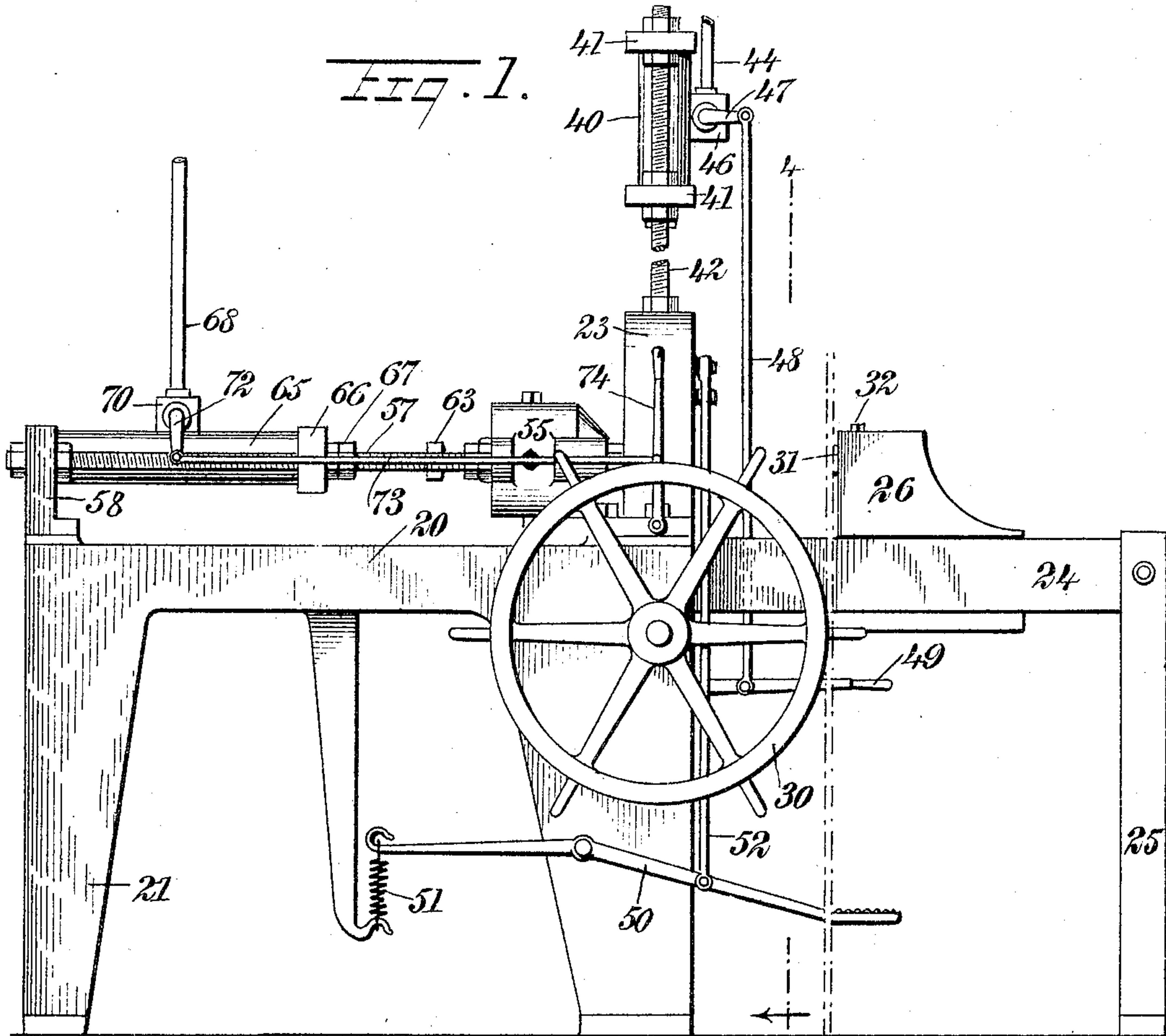
PATENTED JULY 11, 1905.

J. J. BROSSOIT.

MACHINE FOR SHARPENING AND REPAIRING DRILLS.

APPLICATION FILED MAR. 4, 1904.

4 SHEETS—SHEET 1.



WITNESSES:

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Edw. B. Owens

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James J. Brossoit

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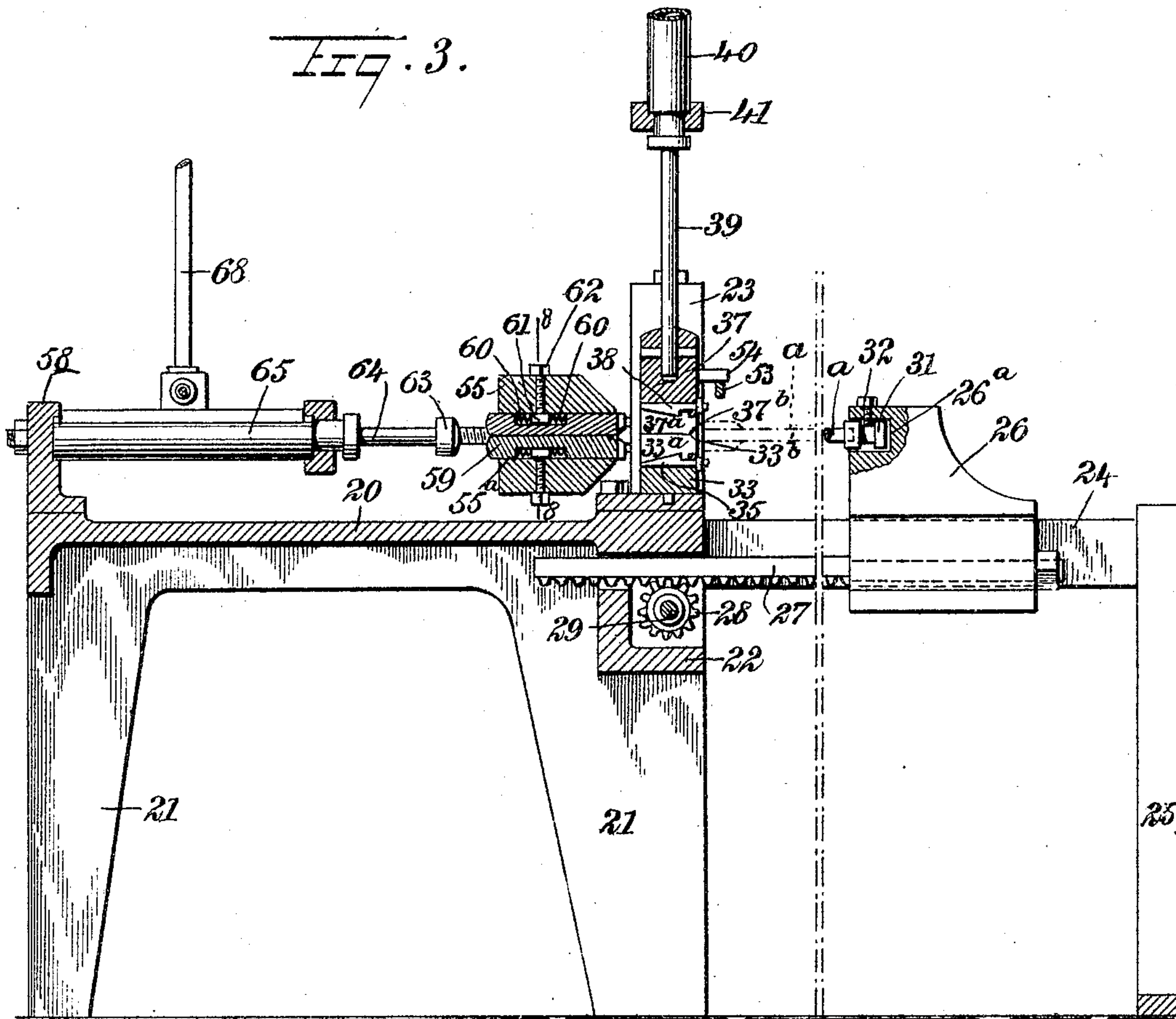
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4 SHEETS—SHEET 3.

Fig. 4.

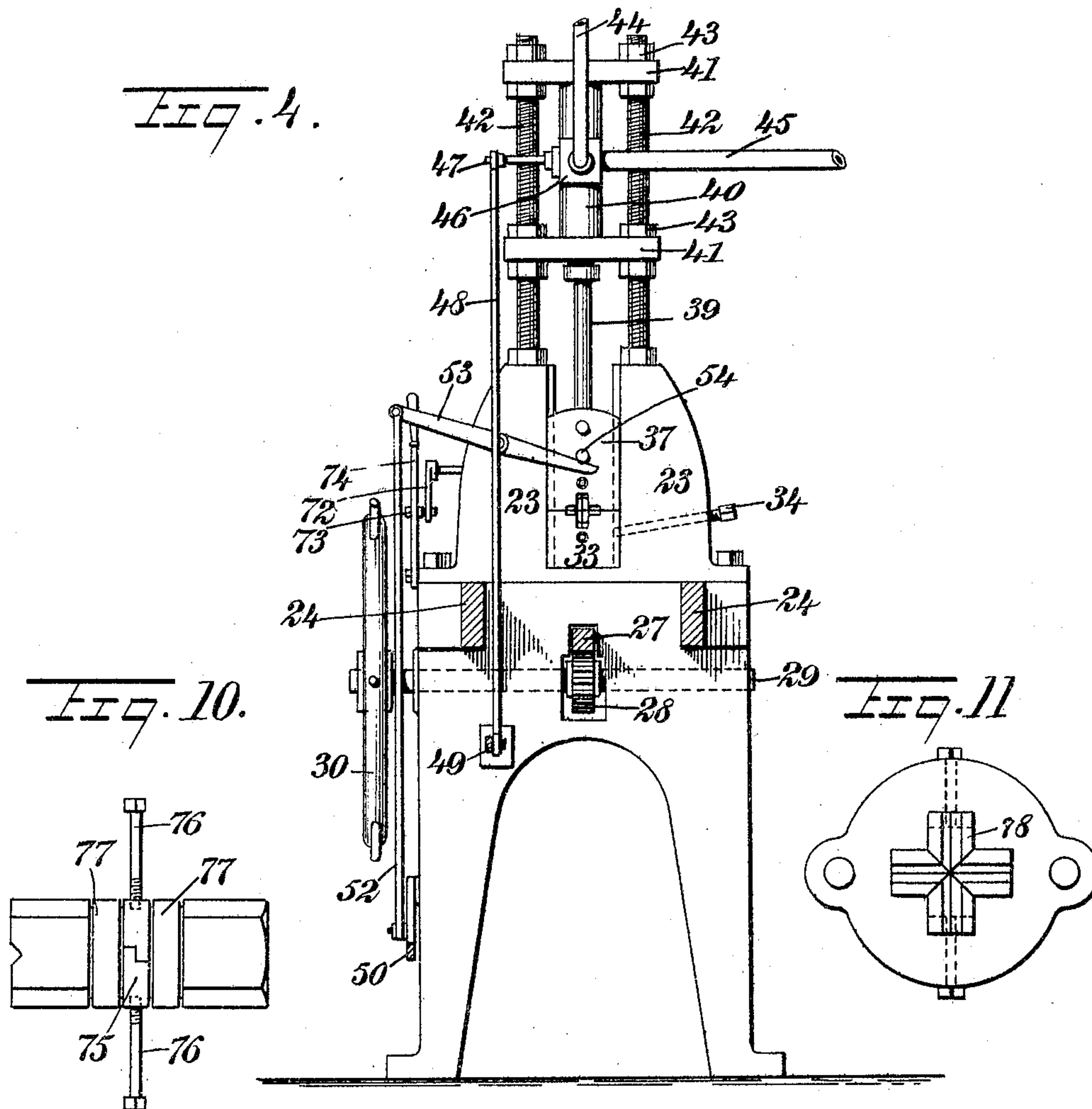


Fig. 10.

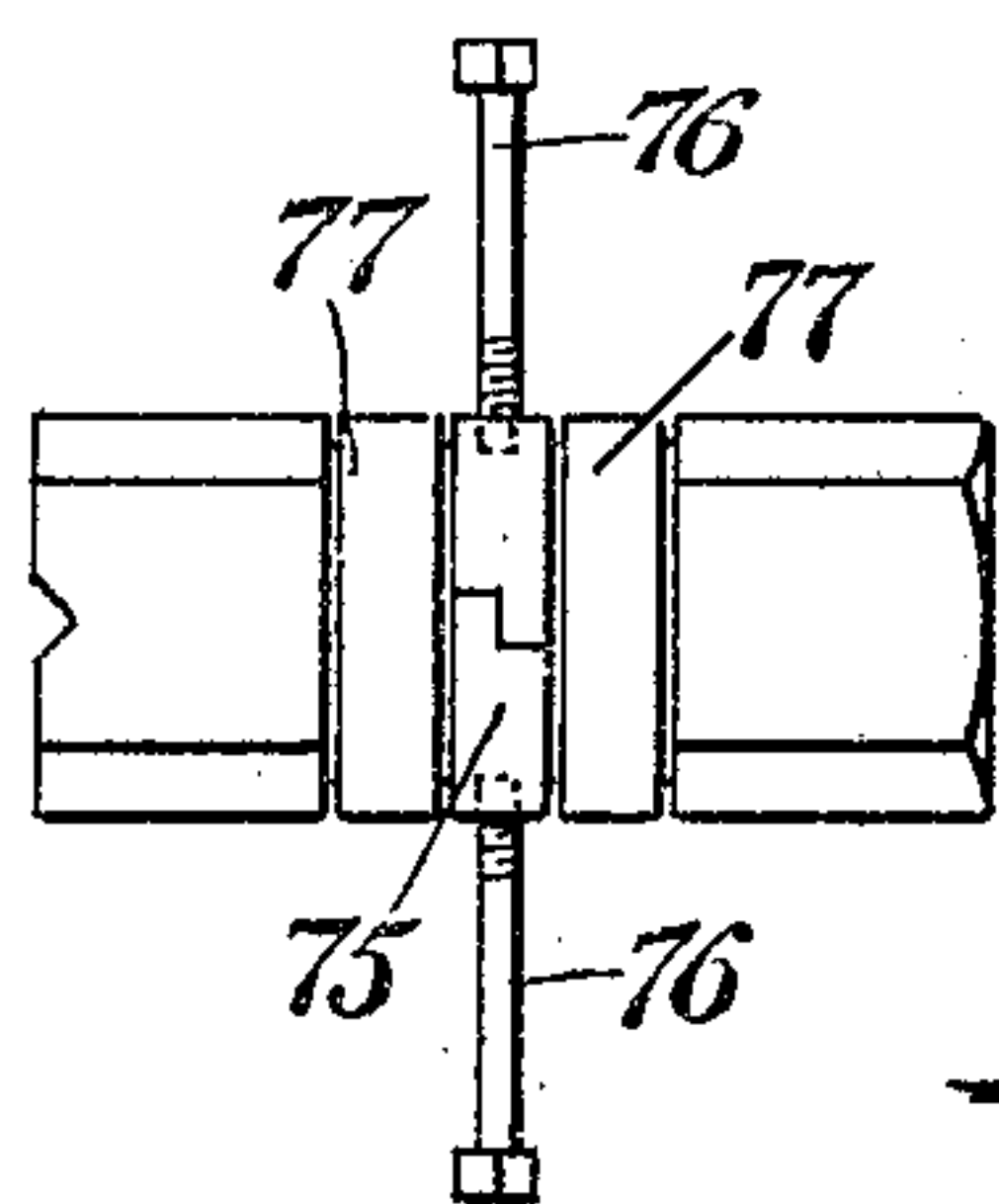


Fig. 11

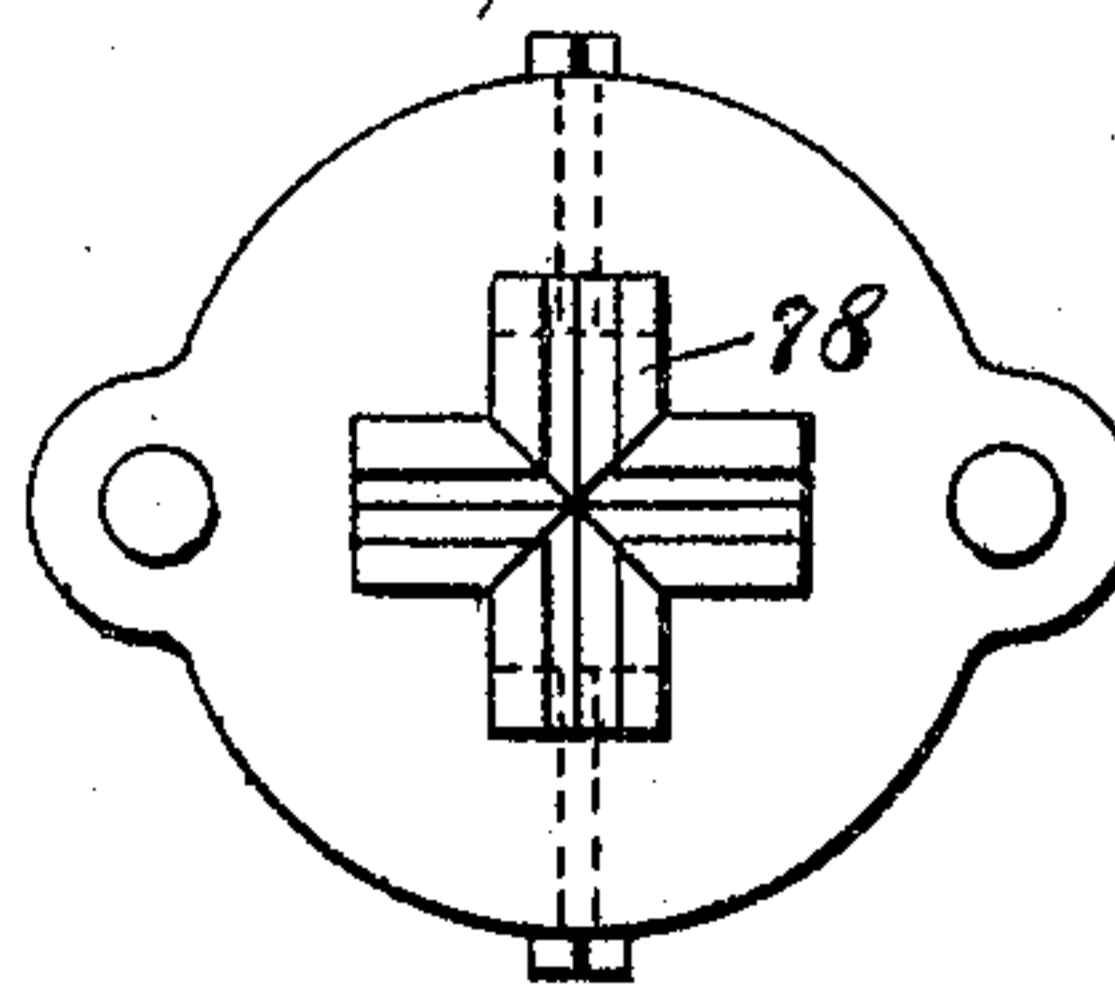


Fig. 7.

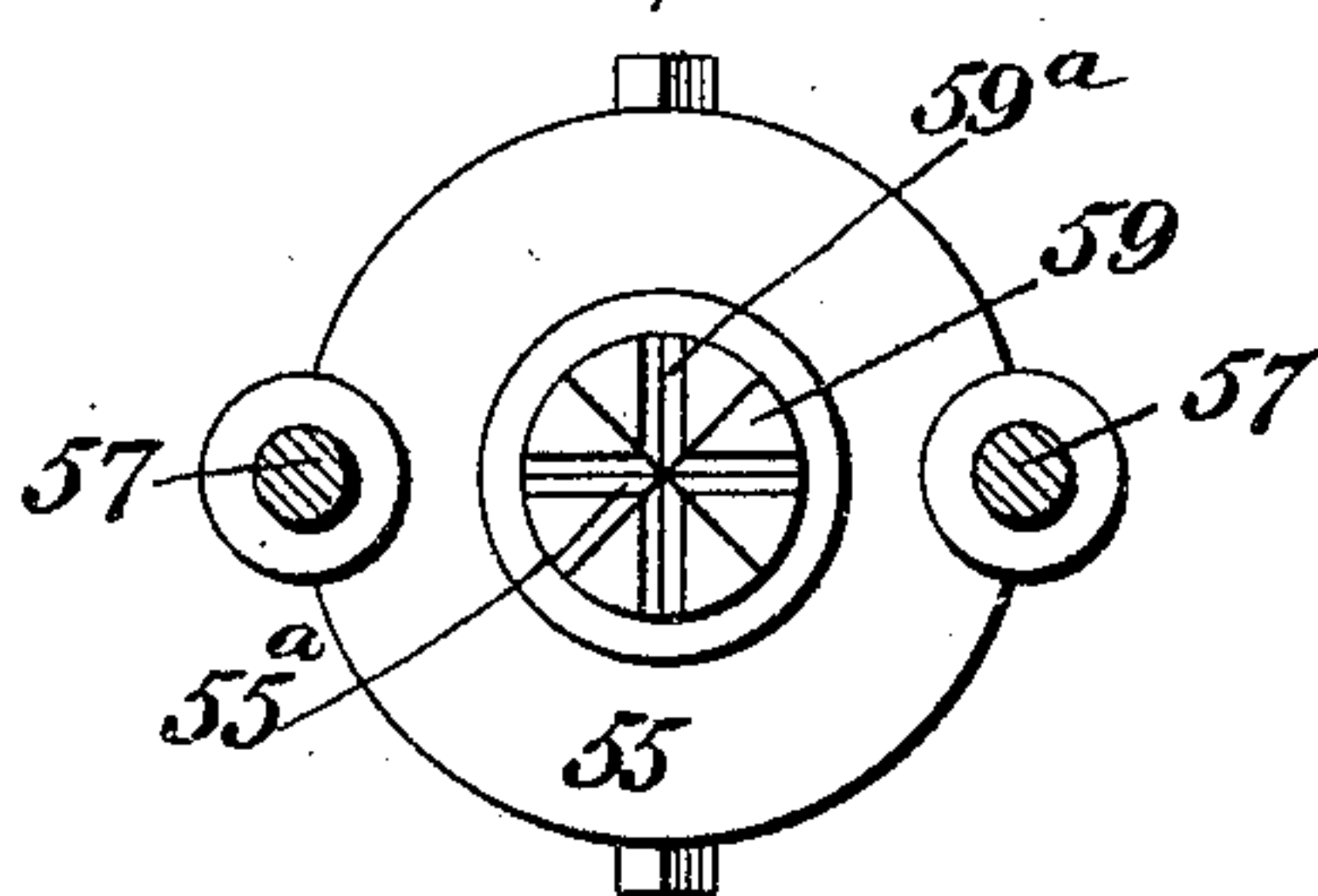
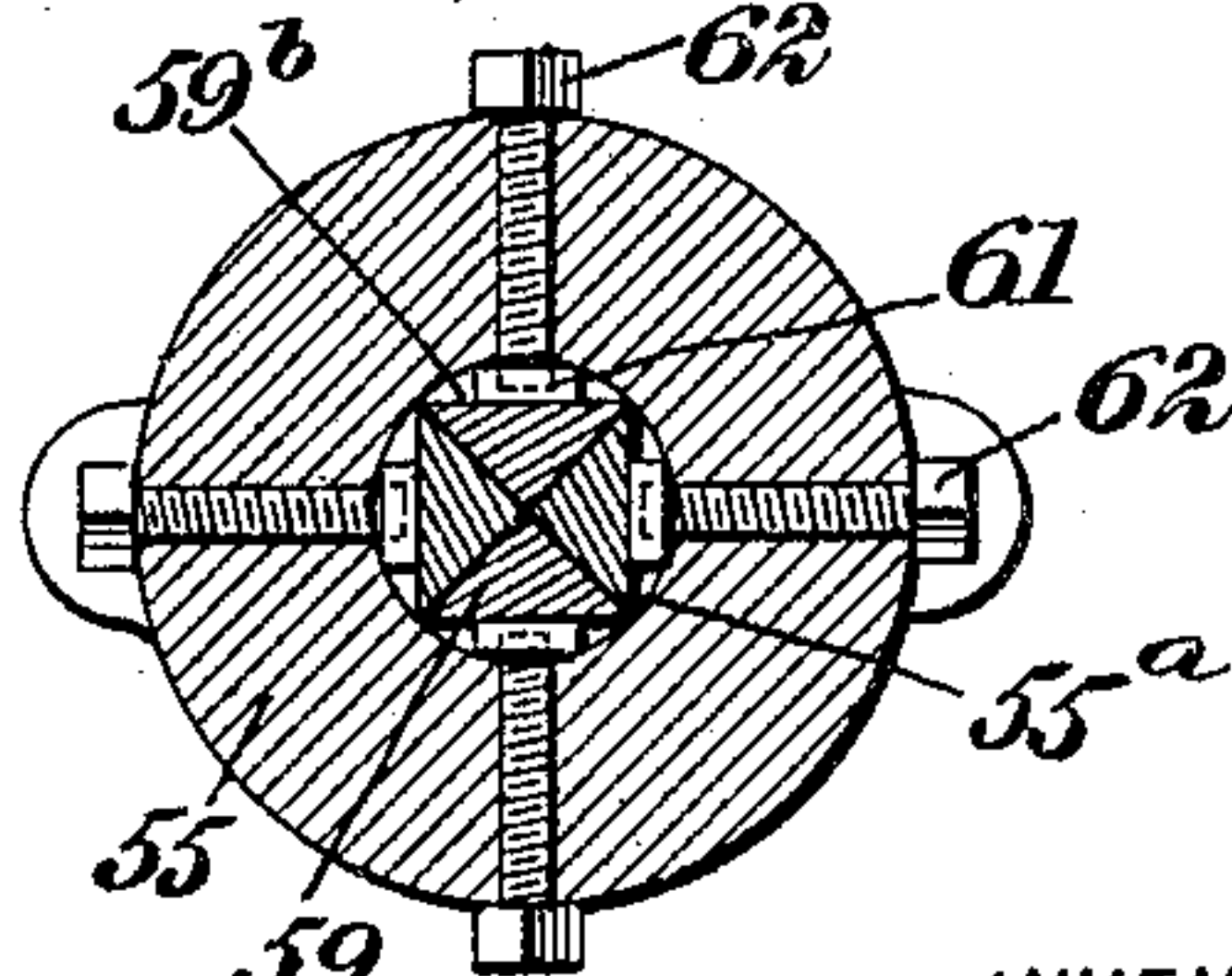


Fig. 8.

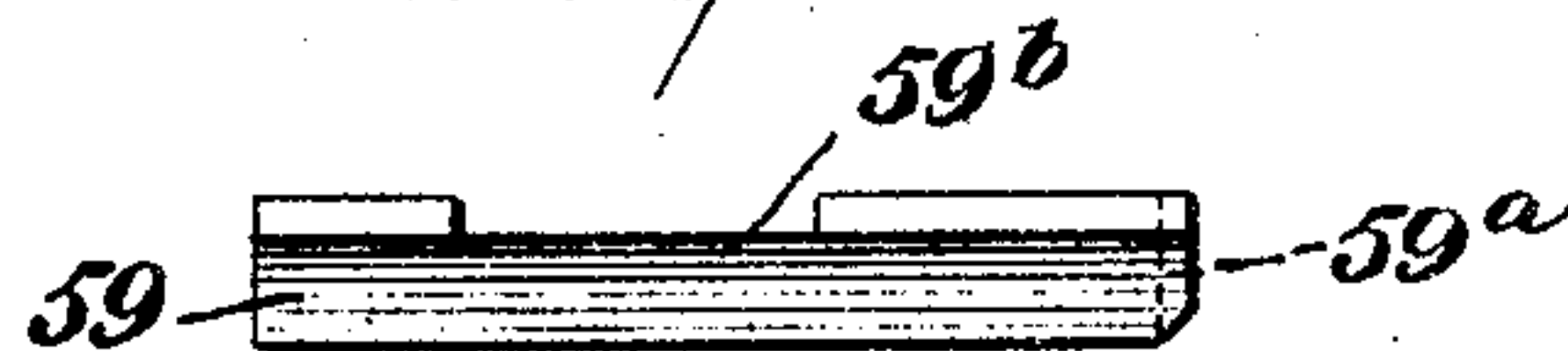


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Fig. 9.



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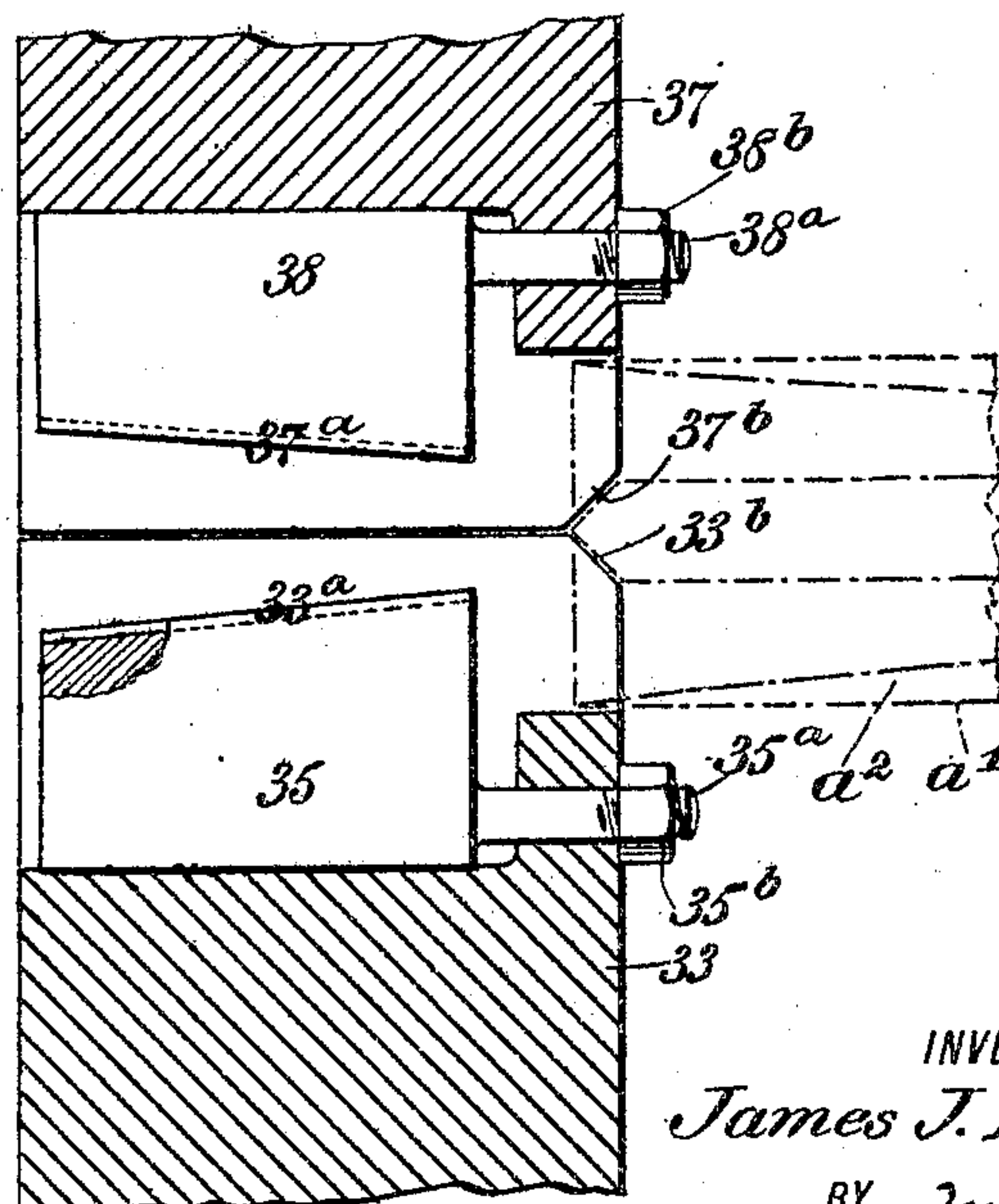
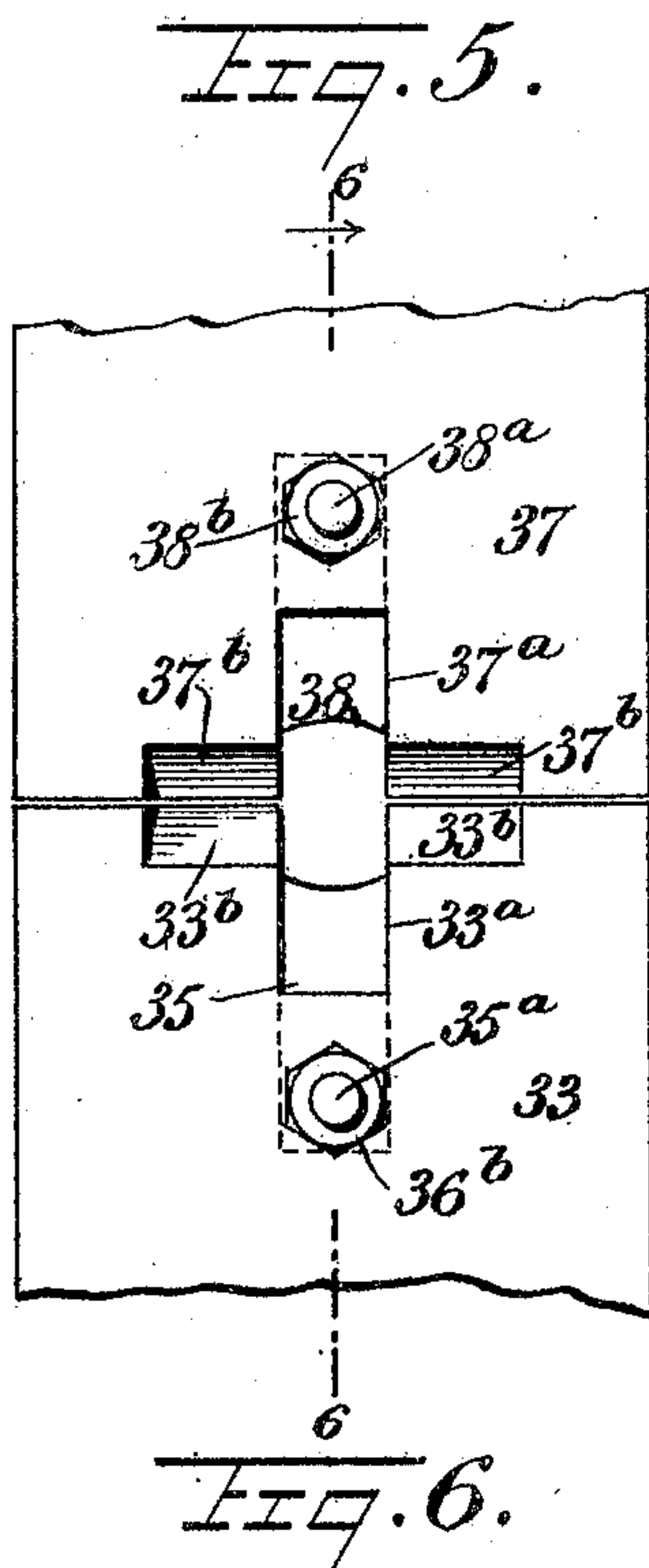
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# UNITED STATES PATENT OFFICE.

JAMES J. BROSSOIT, OF GRAND RAPIDS, WISCONSIN.

## MACHINE FOR SHARPENING AND REPAIRING DRILLS.

SPECIFICATION forming part of Letters Patent No. 794,584, dated July 11, 1905.

Application filed March 4, 1904. Serial No. 196,591.

*To all whom it may concern:*

Be it known that I, JAMES J. BROSSOIT, a citizen of the United States, and a resident of Grand Rapids, in the county of Wood and State of Wisconsin, have invented a new and Improved Machine for Sharpening and Repairing Drills, of which the following is a full, clear, and exact description.

This invention relates to an apparatus for operating on rock-drills, particularly the usual cruciform drills, by which to sharpen, reshape, and otherwise repair the drills.

The apparatus as here illustrated comprises means for mounting and moving the drill toward and from the tools of the apparatus, these tools furnishing means for reshaping the drill and acting on the edges thereof to sharpen the same. Preferably the shaping-tools are in the form of an anvil and hammer, between which the point of the drill is introduced, the hammer being operated by a suitable power, so as to compress and shape the drill, and one or more dies mounted in position to strike the edge of the drill and driven by a suitable power, so as to give the drills the usual V-shaped edge.

The invention resides in certain novel features of structure and organization which will be fully set forth hereinafter and pointed out in the claims.

This specification is an exact description of one example of my invention, while the claims define the actual scope thereof.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the machine with parts broken out to shorten the drawing. Fig. 2 is a corresponding plan view thereof. Fig. 3 is a longitudinal section on the line 3 3 of Fig. 2, also with parts broken out to shorten the drawing. Fig. 4 is a cross-section on the line 4 4 of Fig. 1. Fig. 5 is a right-hand end view of the hammer and anvil. Fig. 6 is a vertical section of said parts on the line 6 6 of Fig. 5. Fig. 7 is a front end view of the edging-tools. Fig. 8 is a section on the line 8 8 of Fig. 3, showing the manner of mount-

ing the edging-tools. Fig. 9 is a side elevation of one of the edging-tools. Fig. 10 is a view illustrating a modification in the manner of cushioning the edging-tools. Fig. 11 is a front elevation of a modification in the form of the edging-tools.

The rigid framing of the apparatus comprises a table 20, supported by legs 21. Said table carries at its right-hand end a housing 22, and above the housing are located vertical guides 23. Suitably fastened to each side of the right-hand end of the table 20 are horizontal guide-rails 24, supported at their outer ends by legs 25.

The rails 24 suitably support the drill-carriage 26, so that the same may move horizontally longitudinally of the machine. To said carriage 26 is attached a rack 27, meshed with a pinion 28, located within the housing 22. Said pinion is mounted on a rotary shaft 29, extending transversely through the frame of the machine and carrying at its front end a hand-wheel 30. By this train of gearing the drill-carriage may be moved in the manner explained. Said carriage is formed with a cavity 26<sup>a</sup>, in which is located an annular grooved bushing 31, held by a set-screw 32, so that the bushing may turn freely in the drill-carriage. The bushing 31 is formed with a socket in its outer end to receive the shank of the drill, which is indicated in the drawings by the letter *a*. By this device the drill is mounted on the carriage to turn independently thereof, but to move with the carriage.

Seated between the bases of the guides 23 is an anvil 33, removably held by a set-screw 34. The anvil 33 is formed with a vertically-widened cavity 33<sup>a</sup>, running through and opening at the upper side thereof, and in the right-hand side of the anvil at each side of the cavity 33<sup>a</sup> horizontal cavities 33<sup>b</sup> are formed, these latter cavities having their bottom walls extending diagonally upward from the right side surface of the anvil. Above the anvil is the hammer 37, which is movable vertically between the guides 23. The hammer has a cavity 37<sup>a</sup> in its bottom or working face similar to and matching with the cavity 33<sup>a</sup> and side cavities 37<sup>b</sup> similar to and matching with



the cavities 33<sup>b</sup>. This structure forms at the right-hand side (see Fig. 5) a cruciform chamber to receive the cruciform end of the drill, and by holding the drill as shown by the dotted lines  $a'$  the operation of the hammer will cause the walls of the cavities 33<sup>b</sup> and 37<sup>b</sup> to draw out into approximate V shape the edges of the horizontally-disposed wings of the drill. Then by withdrawing the drill and giving it a quarter-turn the other two previously vertical wings of the drill will be placed in horizontal position and entered into the cavities 33<sup>b</sup> and 37<sup>b</sup> and the operation of the hammer repeated, thus finishing the work of approximately shaping the edges of the drill. The finishing or actual sharpening of these edges is performed by the edging-tools, which will be hereinafter fully set forth. The finished drills have flared wings, as indicated by the dotted lines  $a^2$  in Fig. 6; but when broken off they frequently take the shape indicated by the dotted lines  $a'$  in said view. To reshape the drill in this respect, I employ the dies 35 and 38, which are respectively set in the cavities 33<sup>a</sup> and 37<sup>a</sup> and adjustably held, respectively, by threaded shanks 35<sup>a</sup> and 38<sup>a</sup> and nuts 35<sup>b</sup> and 38<sup>b</sup>. After the sharpening of the edges has been completed the hammer should be sufficiently elevated to allow the drill-point to be entered between the dies 35 and 38, and then by operating the hammer the flare may be impressed on the vertical wings of the drill, after which a quarter-turn on the drill will place the other two wings in position for action on them by the dies, thus giving the drill the final finished form shown by the dotted lines  $a^2$ . The dies 35 and 38 are removable and may be made in various sizes to suit various-sized drills.

The hammer 37 may be operated by any desired means. I prefer steam or hot air and to apply the same by means of a rod 39, connected with the hammer and carrying a piston working in a power-cylinder 40. Said cylinder is disposed vertically above the hammer and is clamped between two cross-bars 41, forming the cylinder-heads. The cross-bars are in turn supported on threaded standards 42, mounted, respectively, on the guides 23 and having nuts 43 applied thereto, whereby the necessary pressure on the cross-bars or heads 41 may be exerted.

44 and 45 indicate, respectively, the motive-fluid feed and exhaust pipes leading to and from the valve-chest 46.

To the valve-stem 47 is connected a rod 48, which leads down to a hand-lever 49, suitably located on the framing of the machine and by means of which the valve controlling the motor-cylinder 40 may be operated. In order to raise the hammer when the motor is not in operation, I provide a treadle-lever 50, actuated at one end by a spring 51 and having its opposite arm connected to a rod 52, which passes

up to a lever 53, fulcrumed on one of the guides 23 and engaging a pin 54 on the hammer.

55 indicates the case of the edging-tools. Said case is open at each end and is supported horizontally by means of suitable fastenings 56, connecting it with the guides 23, and by horizontally-extending rods 57, connecting it with a vertical bracket 58, mounted on the left-hand end of the table 20. As illustrated in Figs. 3, 7, 8, and 9, the case 55 is formed with a cylindrical bore 55<sup>a</sup>, disposed horizontally and carrying the four edging-tools 59. Said tools are quadrantal shape in cross-section, so as to form when assembled a cylindrical body, and their front or working ends are provided with radially-disposed grooves 59<sup>a</sup>, registering to correspond to the cruciform shape of the drill-point. (See Fig. 7.) Each edger 59 is formed in its outer side with a cavity 59<sup>b</sup>, and in said cavities are located spiral springs 60, constituting buffers or cushions, and a nut 61, bearing between the springs. By these means the edgers are held in the case 55 and allowed a limited independent movement. They are also capable of movement as a unit, as will be apparent. The nuts 61 are held by set-screws 62 passing radially through the walls of the case. (See Figs. 3 and 8.) The edging-tools are operated longitudinally, so as to strike the point of the drill as it is held between the hammer and anvil, the parts being adjusted so that the said edge or point of the drill will be received within the grooves 59<sup>a</sup>, and in this manner the drill will be given the usual V-point, and, further, the end of the drill will be crowded up into the approximate flare shown by the dotted lines  $a^2$  in Fig. 6.

Any desired mechanism may be provided for operating the edging-tools; but I prefer to employ a hammer 63, carried on a rod 64. Said rod has a piston working within a motive-fluid cylinder 65. Said cylinder has its left-hand end seated in the bracket 58, which thereby forms the outer cylinder-head. The inner cylinder-head is formed by a cross-bar 66, bearing against the inner cylinder-head and supported on the rods 57, nuts 67 being provided to admit of exerting the necessary pressure on the said cross-bar. 68 and 69 represent, respectively, the feed and exhaust pipes which lead to the valve-chest 70 of the motor. The valve-stem 71 has a crank 72 thereon, to which is connected a rod 73, leading to an operating-lever 74, suitably mounted on the frame of the machine adjacent to the operating elements 30 and 49 before described.

In the organized operation of the apparatus the shank of the drill is engaged in the socket of the bushing 31, and the hand-wheel 30 is operated to advance the drill, which should have been previously properly heated, until its point enters the matching cavities 33<sup>b</sup> and 37<sup>b</sup> of the anvil and hammer. The hand-



lever 49 is then operated to start the operation of the hammer, which may be made to descend the requisite number of times on the point of the drill to draw out the edge thereof preparatory to the final edging or sharpening operation. The drill should then be further advanced until it lies opposite the edging-tools 59, the hammer 37 being raised to admit of this advance of the drill. Then the motor 65 should be operated, causing the edging-tools to be driven against the edge of the drill-point and in this manner to finish the operation of sharpening or edging the drill and also to back or crowd up the metal, giving the drill approximately its flare. (See dotted lines  $a^2$  in Fig. 6.) Finally the drill is returned to its position under the hammer 37 and said hammer is operated, as before explained, to cause the dies 35 and 38 to give the drill its correct flaring shape. The hammer 37 may be elevated at will by the operation of the treadle 50, and the carriage 26 may be backed off whenever desired, so as to disengage the drill from the anvil and hammer and permit the rotation thereof, thus presenting all of its sides to the action of the hammer and securing uniform and effective operation.

Fig. 10 shows a modification of the cushioning means of the edging-tools. In the construction previously described each of the four tools is provided with an independent cushioning means. In the construction shown in Fig. 10; however, the edging-tools are provided with a split ring 75, with which screws 76 are engaged, this ring lying in the cavities in the tools. Annular cushions 77 of any suitable material are provided at each side of the ring and extend completely around the group of tools. It will be seen that the modified arrangement has essentially the same operation as that before described.

The edging-tools as hereinbefore described are quadrantal in sectional form and matched within to produce a cylindrical body. In Fig. 11 I have illustrated a modification in which the tools 78 are formed with square outer portions and with V-shaped inner edges set together, so as to give the group of tools a cruciform arrangement. In other respects the construction is the same as that shown in Figs. 7, 8, and 9.

Various changes in the form, proportions, and minor details of my invention may be resorted to at will without departing from the spirit and scope thereof. Hence I consider myself entitled to all such variations as may lie within the intent of my claims.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination with a frame or support having guides thereon, of two members mounted in the guides, one of the members being movable therein, a piston-rod having connec-

tion with the movable member, a cylinder in which the rod operates, cross-bars engaged with the cylinder ends and forming the cylinder-heads, and means for holding the cross-bars in such engagement and for mounting them on the said guides.

2. The combination with a frame or support having guides thereon, of two members mounted in the guides, one of the members being movable therein, a piston-rod having connection with the movable member, a cylinder in which the rod operates, cross-bars engaged with the cylinder ends and forming the cylinder-heads, and means for holding the cross-bars in such engagement and for mounting them on the said guides, such means comprising threaded rods attached to the guides and projecting therefrom and nuts on the rods engaged with the cross-bars.

3. The combination of a cylinder, transverse bars engaged with the cylinder ends and forming the cylinder-heads, means for clamping said bars into position and for sustaining the bars and cylinder, and a piston-rod operating in the cylinder.

4. The combination of a cylinder, transverse bars engaged with the cylinder ends and forming the cylinder-heads, means for clamping said bars into position and for sustaining the bars and cylinder, and a piston-rod operating in the cylinder, said means for clamping the bars in position comprising threaded rods passed through the bars and nuts working on the rods and engaging the bars.

5. A machine for repairing drills, comprising a case, a plurality of edging-tools grouped together and movably mounted in the case, means for yieldingly holding the edging-tools against movement, and means for operating the edging-tools against the action of the first-named means, said means for yieldingly holding the edging-tools comprising springs and stops projecting into cavities in the edging-tools and engaged by the springs.

6. In a machine for repairing drills, the combination of a frame or support and with means for holding the drill, of a case mounted on the frame or support, an edging-tool movably mounted in the case, rods attached to the case and to the frame or support, a motor for operating the edging-tool, the motor-cylinder having one end engaged with a part of the frame or support, and means for holding the other end of the motor-cylinder, said means being sustained by the said rods.

7. A machine for repairing drills comprising the casing, an edging-tool slidably supported therein, means for stopping the movement of said edging-tool in extreme positions, means for resiliently maintaining said edging-tool in an intermediate position, means for supporting a drill adjacent to said edging-tool and a hammer actuating said edging-tool.

8. An edging-tool for repairing drills com-

prising a casing, a plurality of edgers slidably  
mounted in said casing and adapted to abut the  
extremities of a drill, said edgers having re-  
cesses in the faces thereof, stops projecting  
5 from said casing into said recesses, and springs  
located in said recesses on opposite sides of said  
stops and resiliently retaining said edgers.

In testimony whereof I have signed my name  
to this specification in the presence of two sub-  
scribing witnesses.

JAMES J. BROSSOIT.

Witnesses:

HENRY LUCIER,  
HENRY MARK.