

No. 628,666.

Patented July 11, 1899.

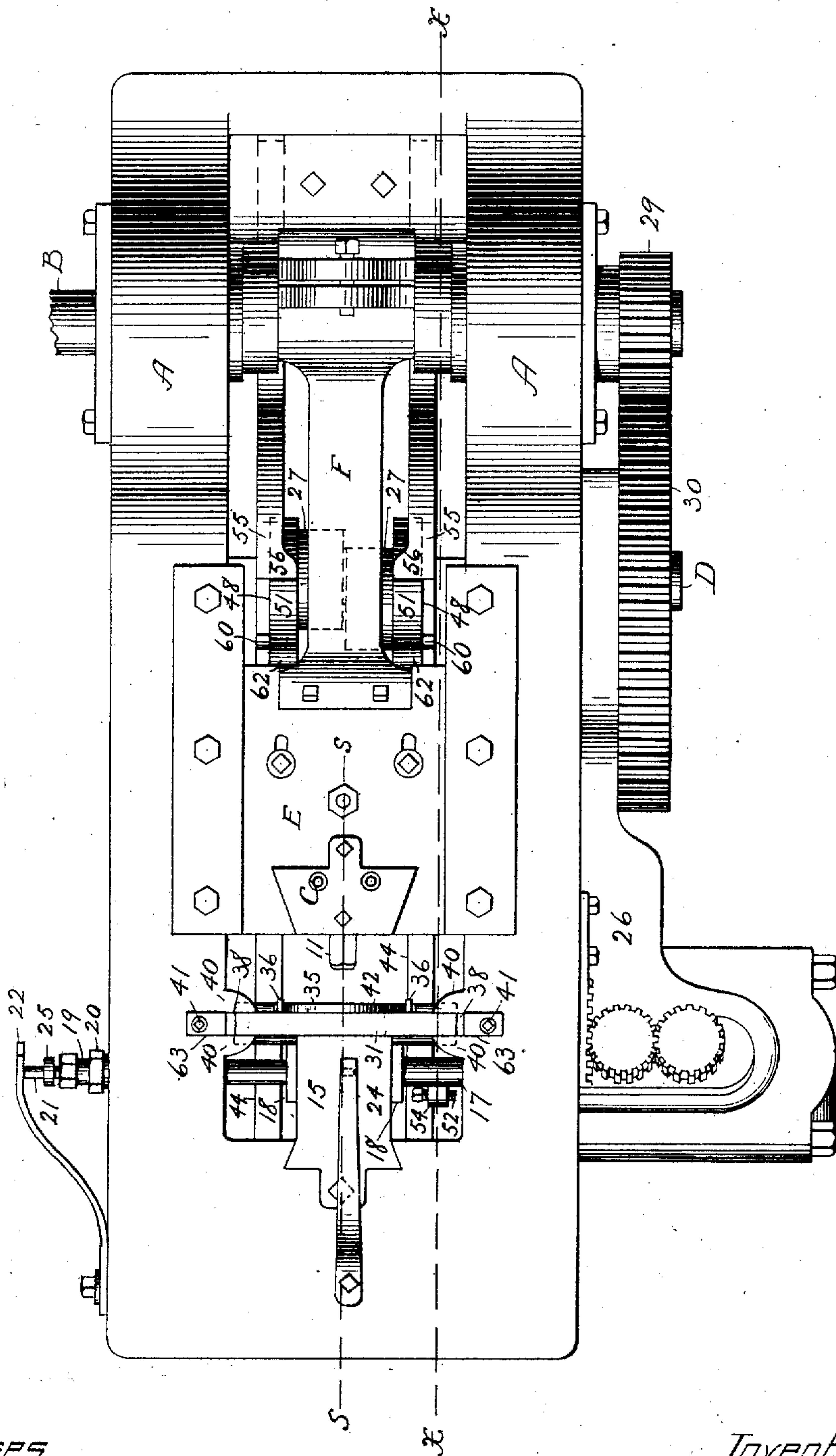
H. K. JONES.
MACHINE FOR HEADING KNOBS.

(Application filed Apr. 29, 1899.)

(No Model.)

5 Sheets—Sheet 1.

Fig. 1.



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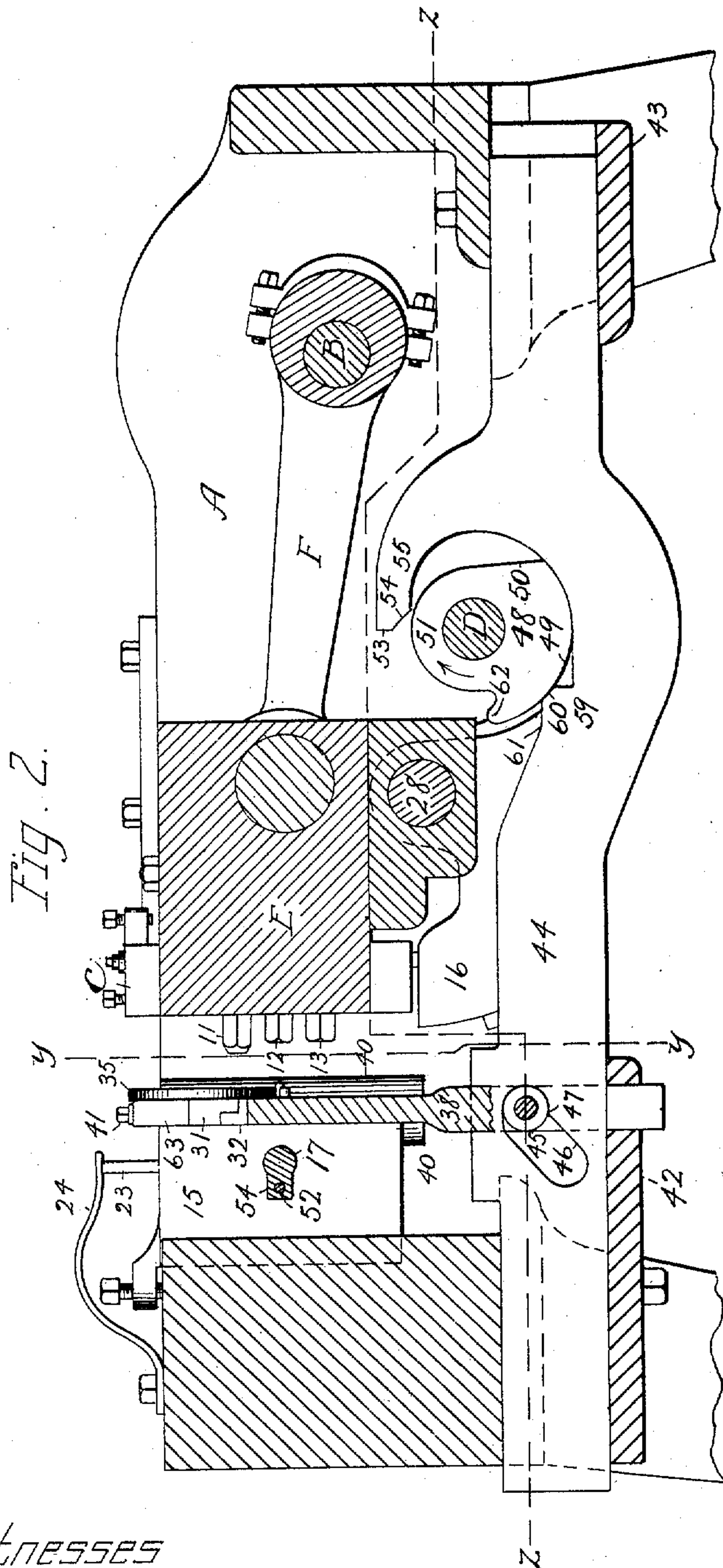


Fig. 2.

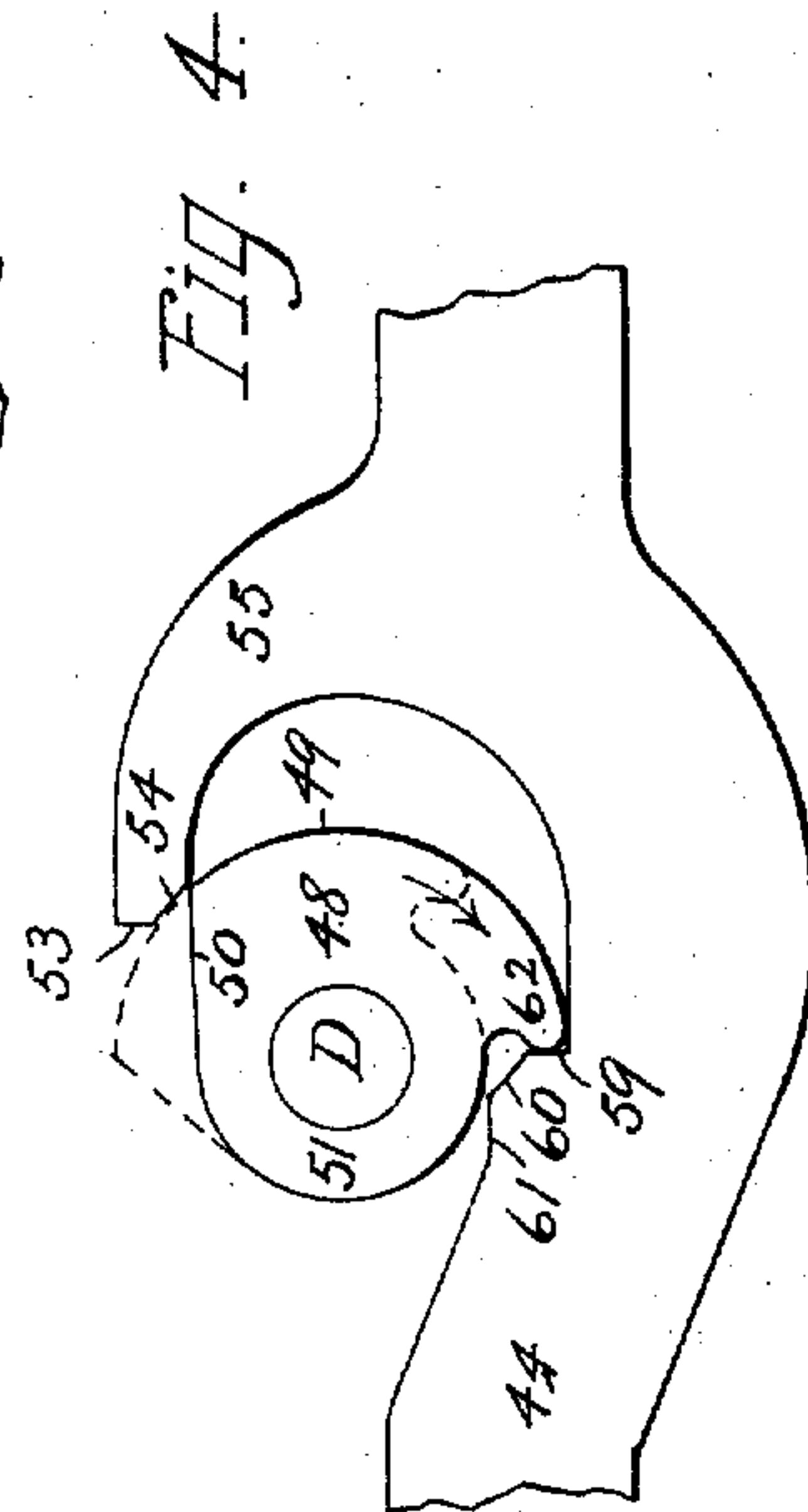


Fig. 4.

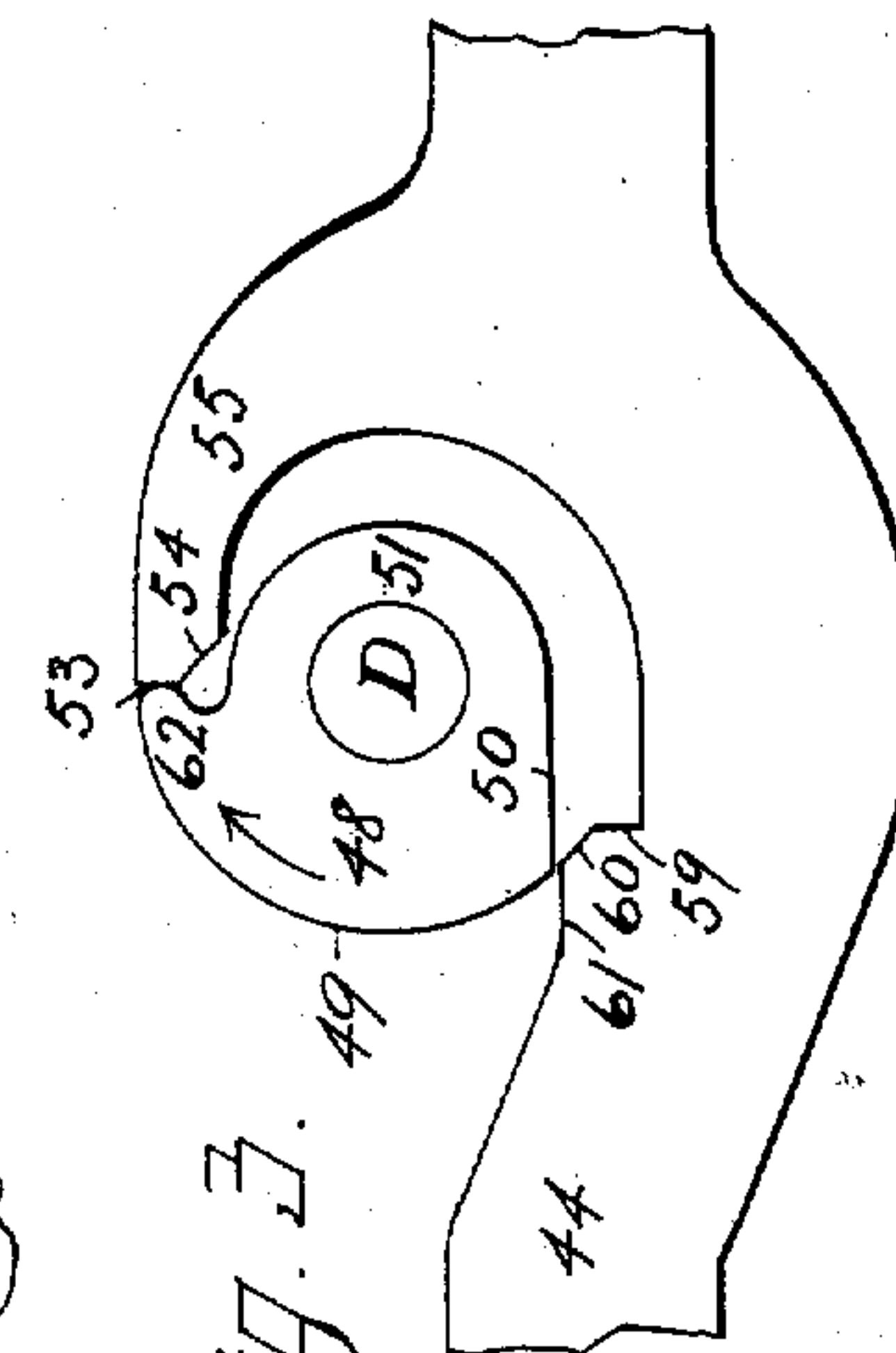


Fig. 3.

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Fig. 5.

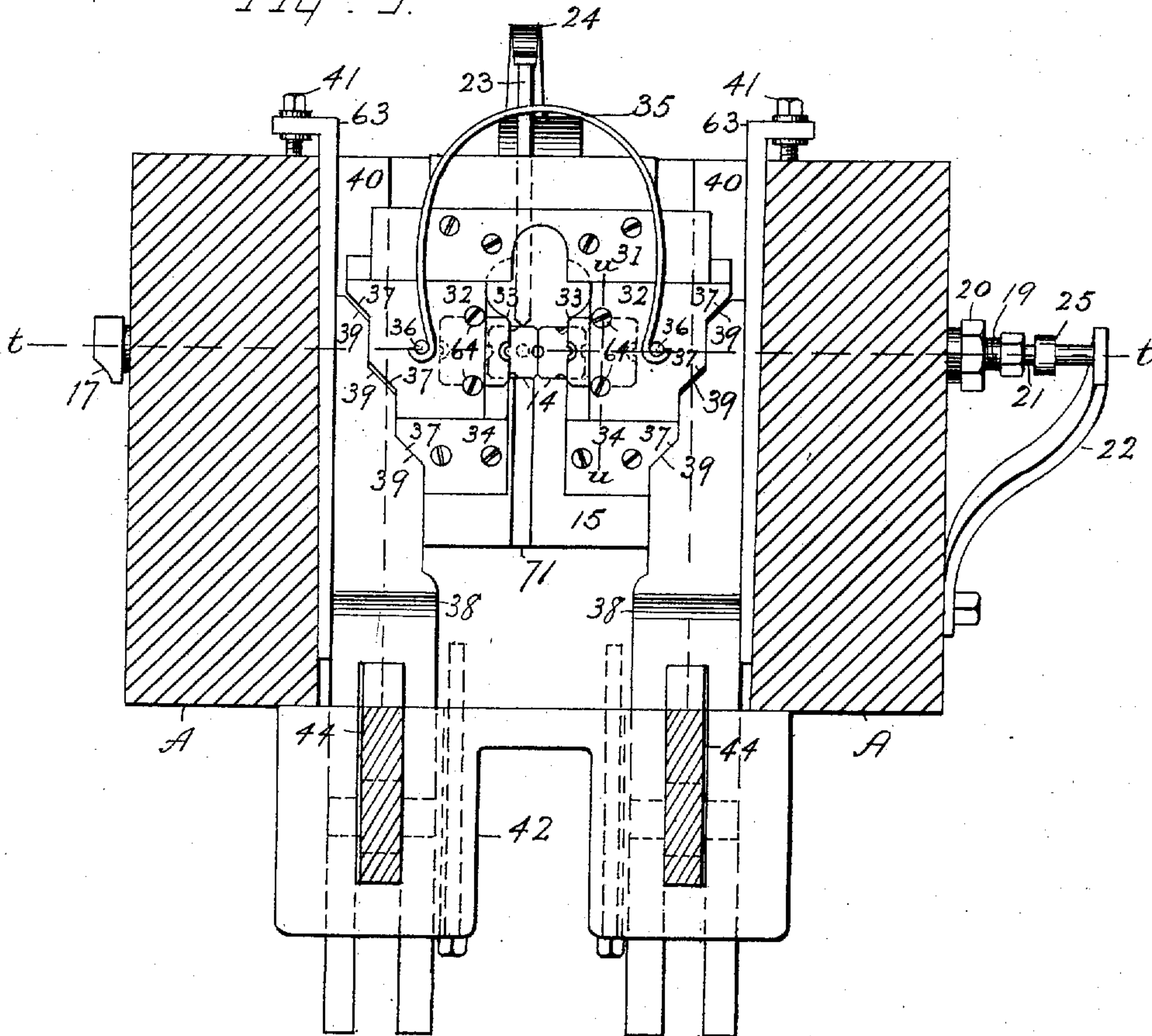
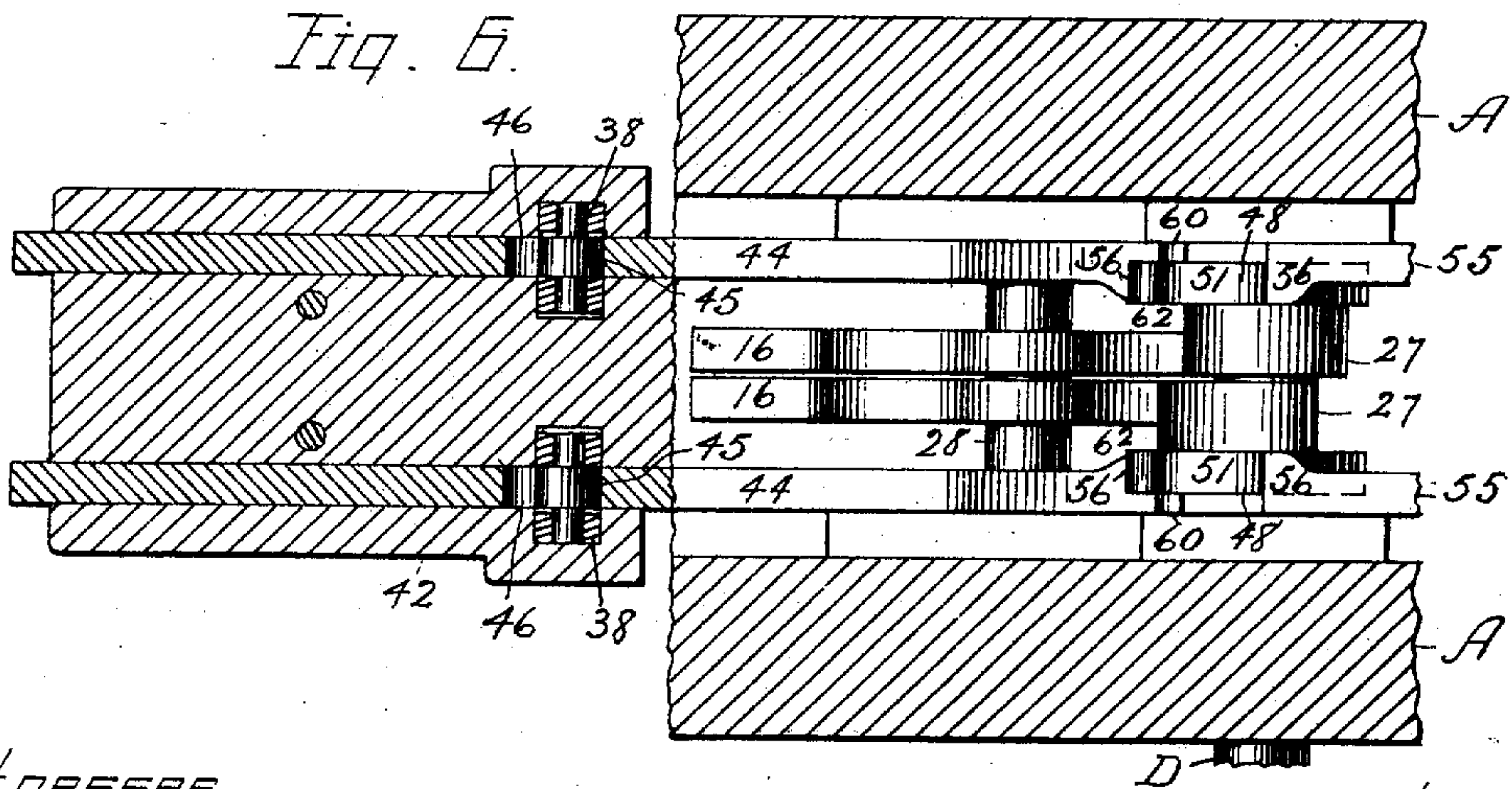


Fig. 6.



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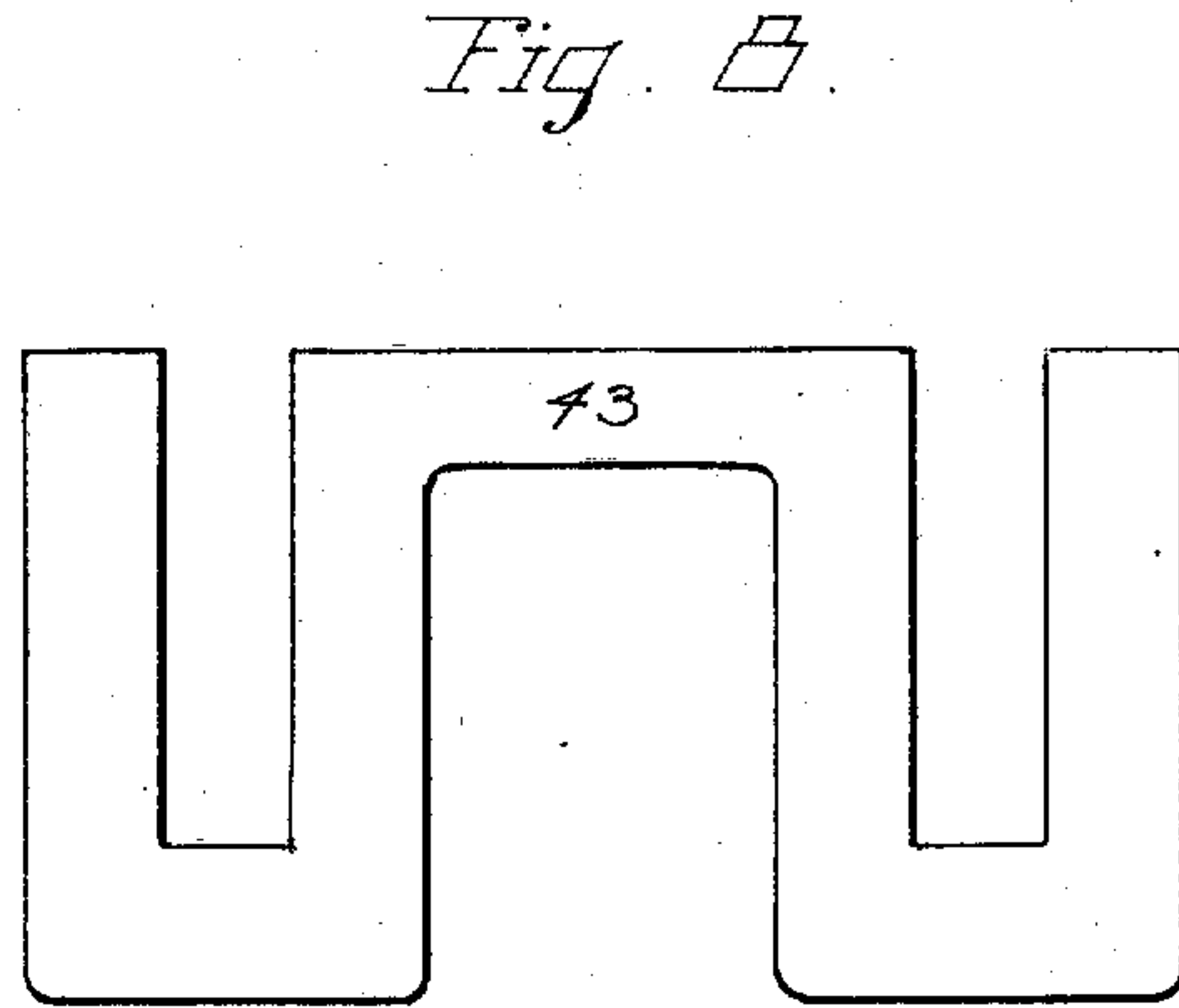
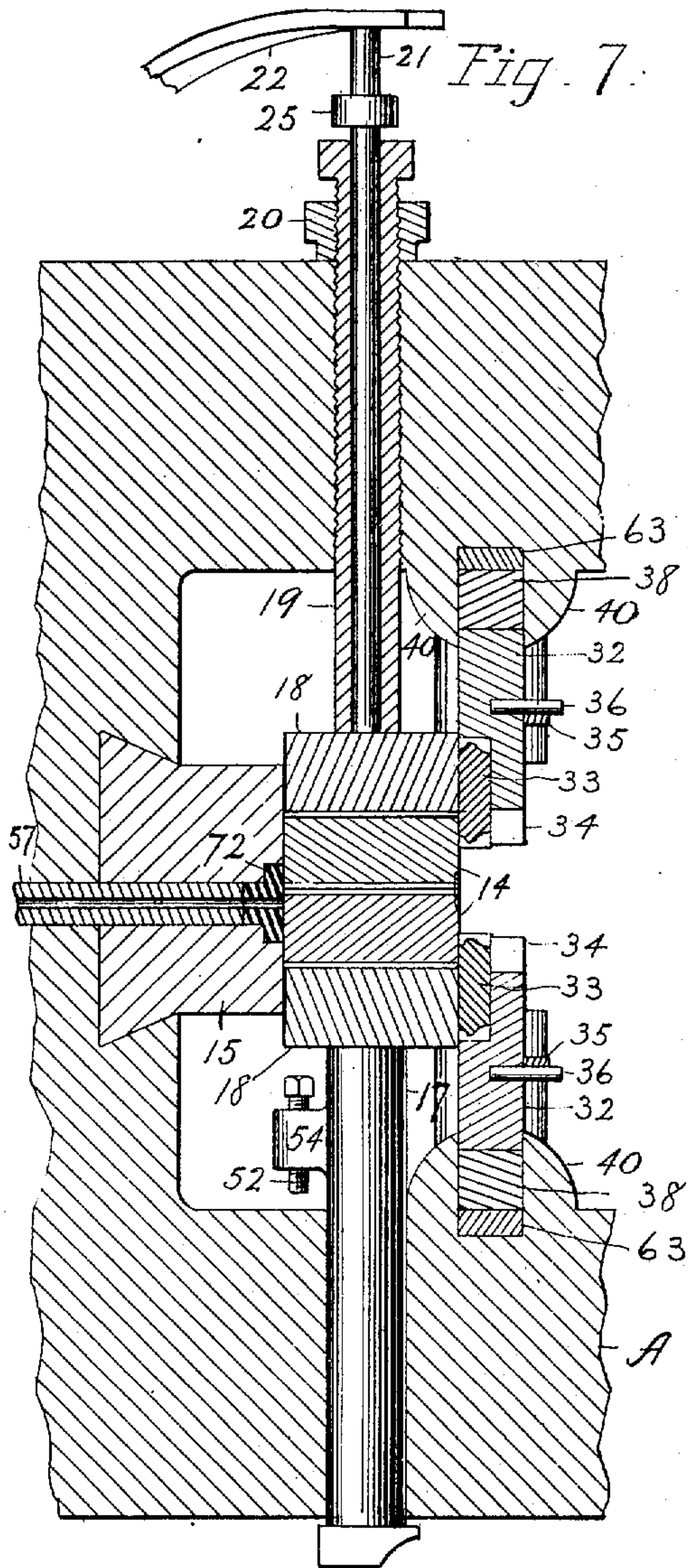
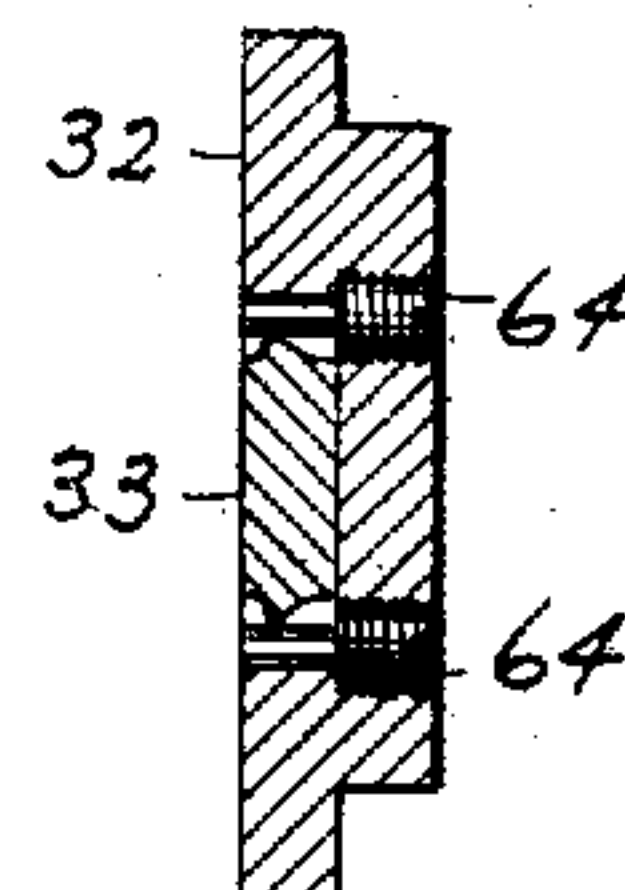


Fig. 9.



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Fig. 10.

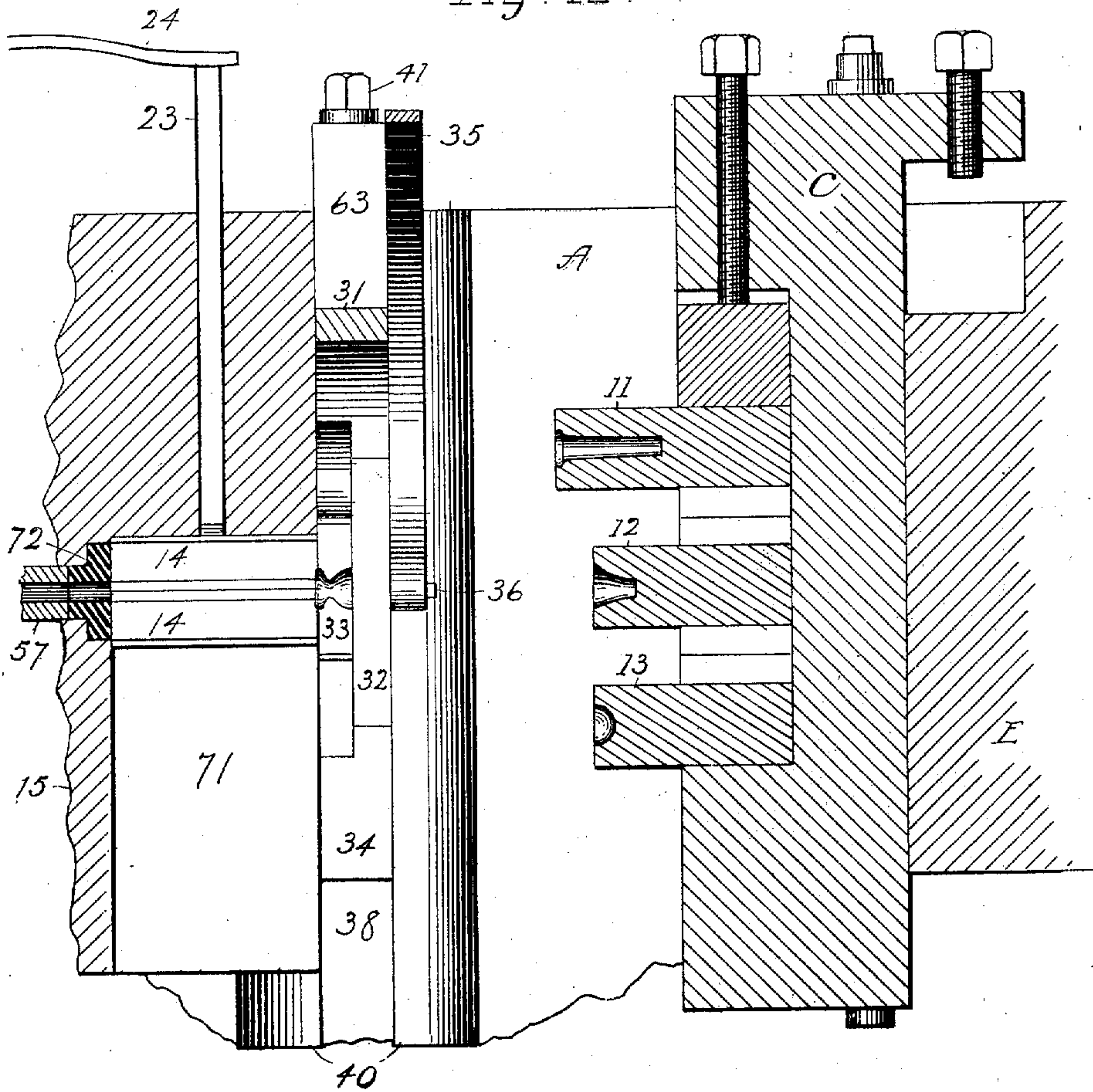


Fig. 11.

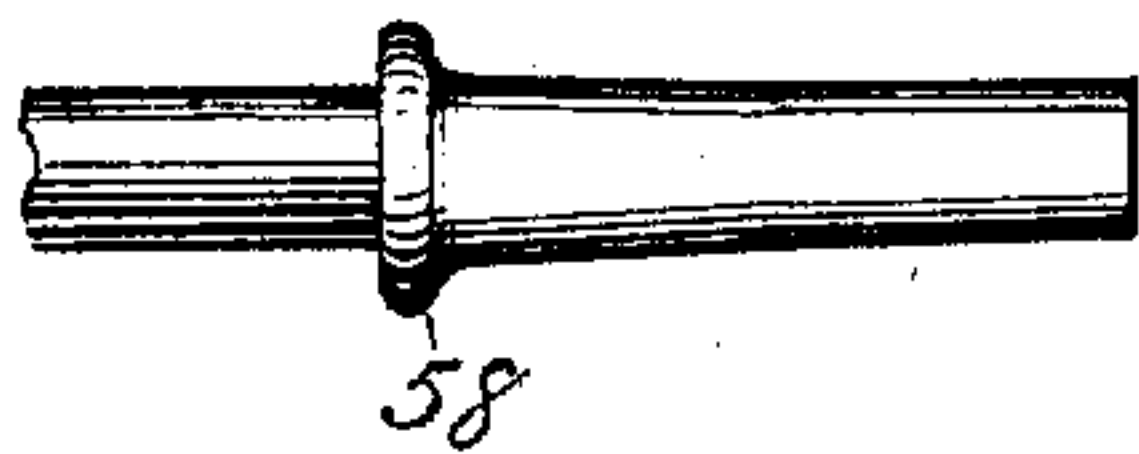


Fig. 12.

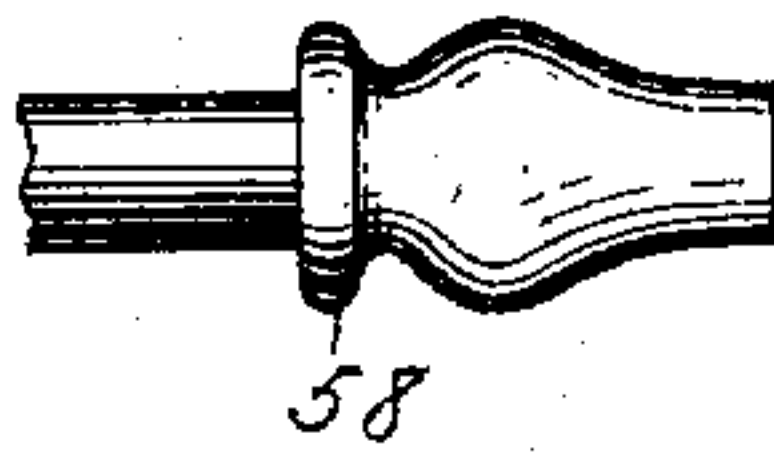
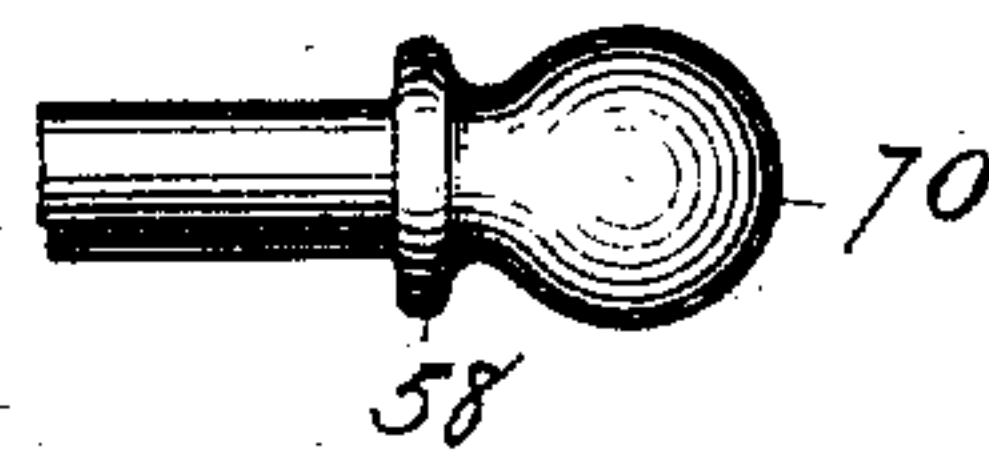


Fig. 13.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR HEADING KNOBS.

SPECIFICATION forming part of Letters Patent No. 628,666, dated July 11, 1899.

Application filed April 29, 1899. Serial No. 714,968. (No model.)

To all whom it may concern:

Be it known that I, HORACE K. JONES, a citizen of the United States, residing in Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Machines for Heading Knobs, of which the following is a specification.

My invention relates to improvements in machines for heading knobs; and the main object of my improvement is to enable a heading-machine that gives a plurality of blows on one blank to automatically form knobs that have a narrow neck between their base and end.

In the accompanying drawings, Figure 1 is a plan view of my machine. Fig. 2 is a vertical section of the same on the line xx of Fig. 1. Fig. 3 is a detached side elevation of a portion of one of the slides and its cam ready to move said slide to the right. Fig. 4 is a like view of the same with the cam ready to move the slide to the left and with the cam contour in broken lines at about the middle of its idle movement. Fig. 5 is an enlarged vertical section on the line yy of Fig. 2, but with the slides moved back so as to lower the wedges for opening the knob-forming dies, which are represented as closed in the preceding figures. Fig. 6 is a sectional plan on the line zz of Fig. 2 and on the same scale as said Fig. 2. Fig. 7 is a sectional view of a portion of the machine on the line tt , Fig. 5, on a larger scale than Fig. 5. Fig. 8 is a detached view of the rear slide-bracket. Fig. 9 is a vertical section of the knob-die holder and one of the knob-dies, the holding-screws being shown in elevation. Fig. 10 is a sectional view of a portion of my machine on the line ss of Fig. 1, on a scale about three times as large; and Figs. 11, 12, and 13 are enlarged side elevations showing the result of the respective punches under three successive blows of the heading-ram.

The main portion of the machine illustrated in the accompanying drawings is the same as the machine for heading screw-blanks patented to me January 5, 1897, Patent No. 574,609; and the present invention is mainly

in the nature of additions thereto whereby the same three-blow header may produce heads or knobs having a narrow neck between their base and tip.

A designates the frame of the machine, B the main shaft, and D the cam-shaft. The main shaft will be provided with any suitable driving-pulley (not shown) and is provided with the usual crank for reciprocating the ram E, connected with said crank by means of the pitman F. In the front of the ram E is the punch-holder C, carrying the three punches 11, 12, and 13, and opposite said punches are the gripping-dies 14 in the die-holder 15. When the punch-holder is left free, it falls so as to bring the upper or first punch 11 in alinement with the stock or wire in the gripping-dies 14, and it is elevated so as to present the other punches successively to the same position by means of the cams 27 and levers 16 on the shaft 28. The driving-shaft B and cam-shaft D are connected by means of the gear-wheel 29 on shaft B and gear-wheel 30 on shaft D with the teeth in the proportion of one to three, whereby the driving-shaft makes three revolutions for every revolution of the cam-shaft, so that the ram makes three strokes in heading one blank.

The gripping-dies 14 when released may slide laterally in the die-holder, and I prefer to place filling-blocks 18 on each side of the said dies to fill out the recess in the die-holder. Upon one side of these blocks and dies is the die-closing slide 17, that is operated to close the dies by means of the roller-slide 26, connected with the cam-shaft, as in my aforesaid patent. The outward movement of the said closing-slide may be adjusted by means of the stop-screw 52 in the lug 54 on said slide, as best shown in Fig. 7. Upon the other side of said dies there is a tubular adjusting-screw 19, provided with a set-nut 20, within which tubular screw is a holding-rod 21, that is pressed upon by a spring 22 and provided with a stop 25 to limit its inward movement. In the die-block in the central line of the feeding-tube for the stock is a vertical sliding wedge 23, that is pressed upon by a spring 24. The corners of the blocks in

which the dies 14 are formed are truncated or beveled slightly in the ordinary manner of such dies. Extending through the frame to the end of the gripping-dies is the feed-tube 5 57, through which the wire or stock is fed to said dies. This feed-tube is made in two or more parts, the front end 72 being enlarged, as shown in Figs. 7 and 10, to prevent it from being driven back during the cutting-off and heading operation. When the dies are in 10 their central position with reference to the heading-punches, this feed-tube is a little more than the diameter of the wire to one side of the holding-faces of the gripping-dies, as shown in Fig. 7. I have not shown any feed- 15 ing mechanism, as any feed that will carry the stock forward once for every revolution of the cam-shaft D or once for every three revolutions of the main shaft B may be employed. The feed mechanism in my afore- 20 said patent is suitable for this machine.

The parts thus far described, with properly-shaped dies and punches, may be used for heading screw-blanks. I will now describe 25 the additions or attachments that adapt said machine for use in heading knobs having a neck.

Upon the front of the die-holder 15 and in front of the gripping-dies 14 I secure a cap 30 or guide 31 near the top and two similar caps 34 near the bottom to form guides or ways for the laterally-moving knob-die holders 32 and knob-dies 33, mounted therein. These dies for convenience are made in square 35 blocks with die-recesses on the four sides thereof and truncated corners in the usual manner of making heading-dies for screw-machines. The under or back side of the knob-die holders 32 are recessed to receive 40 the dies 33, which, as shown, are about half the thickness of said die-holders. Screws 64 extend through threaded holes in the die-holders, with an unthreaded portion extending into the idle die-recesses on the top and 45 bottom edges of the knob-dies 33. The said knob-dies and their holders are thrown open by means of the spring 35, the ends of which bear on the pins 36 in the said die-holders 32. The outer edges of said die-holders are pro- 50 vided with inclines 37 for being acted upon by similar inclines 39 on the vertically-reciprocating wedges 38 for closing the dies 33. These wedges are guided mainly by means of ribs 40 on the frame A. Between the said 55 ribs and bearing on the straight edge of the wedges 38 is a tapering key made adjustable vertically on the frame by means of the adjusting-screws 41, whereby the wedges may be adjusted so as properly close the knob- 60 forming dies 33.

The wedges 38 are reciprocated by the following mechanism: Upon the under side of the frame A, at its opposite ends, are the slide-brackets 42 and 43, within which are the re- 65 ciprocating slides 44. The lower end of each wedge 38 is bifurcated or slotted to pass the

slides, and its lower end passes down through the slide-bracket 42. Pivoted in said wedges is a roller 45 within an oblique slot 46 of the slide, whereby a reciprocating movement of 70 the slide imparts a like movement to the wedges. The oblique slot 46 is provided with a slight offset 47 at its upper end, so that when the roller in the slide enters said offset the slide positively locks the wedge in its up- 75 permost position, as shown in Fig. 2.

The slides 44 are reciprocated by means of the cams 48 on the cam-shaft D, the said slide being provided with an arm or horn 55, so as to inclose about two-thirds of the periphery 80 of the cam. The cams are slightly offset from the line of the slides, and therefore the parts subject to the most wear under the action of the cams are thickened somewhat, as at 56, Figs. 1 and 6. The cam is provided with a 85 concentric locking-face 49 at its greatest radius and with a driving-nose 62 at the forward end of said concentric face. The rear end of the concentric face 49 is connected with the hub 51 of the cam by a straight face 90 50. The slide is provided in its cam-recess with a shoulder or driving-face 59 for being acted upon by the nose 62 of the cam to drive the slide forward to the left, which shoulder terminates in the clearance and locking face 95 60, which is curved on a radius of about the same as the concentric face 49 of the cam and then with a straight clearance-face 61. The end of the horn 55 on the slide is provided with a straight driving-face 53 for the nose of 100 the cam to act on in driving the slide back toward the right, which is followed by a clearance-face 54, curved to correspond with the face 60. From the end of the face 54 the slide-recess extends straight inwardly in the 105 longitudinal direction a short distance, is then curved abruptly on a short curve and then on a longer curve of about the same radius as the concentric face 49 of the cam, and from that it extends longitudinally straight 110 to the driving shoulder or face 59; but the shape of the cam-recess in the slide between the faces 54 and 59 is immaterial so long as it is cut away sufficiently to clear the cam. Figs. 2 and 3 show the slide at the forward 115 limit of its movement, the cam in Fig. 2 having its concentric face 49 in engagement with the face 60 of the slide, whereby the cam may move on, while the slide is stationary, and, further, the slide is positively locked by the 120 cam against moving backwardly to the right so long as the concentric face 49 is opposite the face 60. In Fig. 3 the cam is ready to drive the slide back, the nose 62 being about to act on the face 53 of the slide, while at the 125 same time the straight face 50 of the cam is substantially in alinement with the straight clearance-face 61 of the slide, so that the slide is now free to be moved from the position shown in Figs. 2 and 3 to that shown in Fig. 4. 130 When the cam has thus returned the slide to this position, its concentric face 49 passes

along by the face 54 of the slide without moving said slide until the nose 62 engages the face 59 of the slide, as shown by the full lines in Fig. 4, an intermediate position of the cam being indicated by the cam contour in broken lines. The continued movement of the cam now moves the slide forward again and the cam passes on to lock the slide in its forward position, as shown in Fig. 2, as before described, and so on repeatedly for every revolution of the cam-shaft D.

When the cam-shaft acts to withdraw the roller-slide 26 to release the die-closing slide 17, the spring 22 acts on the die-holding rod 21 to move the filling-blocks 18 and dies 14 bodily to one side until the movement of said rod is arrested by the stop-collar 25. The vertically-sliding wedge 23, under the influence of the spring 24, enters between the beveled corners of the dies 14 and acts to separate them, the spring 24 being strong enough to overcome the force of the spring 21. The outward movement of the die-closing slide 17 is limited by the stop-screw 52. The dies are now wide open, so that the proper length of a rod or wire may be fed through the feed-tube 57 between said dies and with the proper length projecting beyond the face of said dies. The die-closing slide is now acted upon to close the gripping-dies together on the wire and carry them to one side, thereby cutting off the proper length by the shear-like action of the dies and the enlarged end 72 of the feeding-tube, and then the dies are forced firmly together between the tubular screw on one side and the die-closing slide on the other. The slides 44 at this time are back, so that the wedges are down and the knob-forming dies are open to leave the face of the dies 14 free for the action of the first punch 11, the punch-holder at this time being down, so as to bring said first punch 11 into proper alignment with the gripping-dies and wire. The result of this first punch is illustrated in Fig. 11, in which it will be seen that the flange 58 is upset on the wire at the point which is to form the base of the knob. As the first punch recedes the slides 44 are driven forward by the cams 48 to elevate the wedges 38 and close the knob-forming dies around the flange 58, the said cams acting to lock the slides, wedges, and dies in this position. The second punch 12 is shorter than the first punch by about the thickness of the knob-forming dies, and after being raised to the proper height now comes forward and up to the face of said dies to throw the stock from the form shown in Fig. 11 to that shown in Fig. 12. With the holding-dies, wedges, and slides in the same position the punch-holder is again raised and the third punch 13 strikes the stock and completes the formation of the knob by rounding its end 70, as shown in Fig. 13. The roller-slide 26 again releases the die-closing slide 17, and the wedges 38 are dropped, so as to open the dies and let the work fall through the slot 71, ready to receive another

length of stock for heading other knobs in the same manner.

While I have shown and described the wedges and their operating mechanism as the best mode in which I contemplate applying the principle of my invention, it is evident that for some purposes other means for closing the knob-forming dies may be employed as an equivalent of the said wedges. While I prefer a three-blow header carrying three successively-acting punches, the second or middle punch might be omitted and have the third punch 13 do substantially the work of the two punches 12 and 13. I have made and used a heading-machine that gives four blows to one blank, and in so far as my invention is applicable thereto I desire to claim it in connection with a header giving a plurality of blows to one blank, whether it be two blows or any desired number more than two.

It is apparent that some changes from the specific construction herein disclosed may be made, and therefore I do not wish to be understood as limiting myself to the precise form of construction shown and described, but desire the liberty to make such changes in working my invention as may fairly come within the spirit and scope of the same.

I claim as my invention—

1. The combination of the die-holder and gripping-dies of a heading-machine, with the knob-forming dies mounted on the front of the said gripping-dies, a heading-ram carrying a plurality of successively-acting punches and means for opening said knob-forming dies for the action of one of said punches and closing them for a subsequent action of said ram and punches, substantially as described.

2. The combination of the die-holder and gripping-dies with knob-die holders 32 mounted to slide laterally thereon, the knob-forming dies mounted in said holders 32, and reciprocating wedges for forcing said knob-forming dies together, substantially as described.

3. The combination of the die-holders 32 and dies 33, with the wedges 38, slides 44, having oblique slots 46 with offset 47, rollers 45 mounted on the said wedges within the said slots, and mechanism for reciprocating the said slides and permitting said slides to remain at rest for a while at the forward limit of their movement, substantially as described.

4. The combination of the knob-die holders and dies, with the wedges 38, the slides 44 for reciprocating the said wedges, and the cams for reciprocating said slides, the said cams having a concentric face acting on a face of the slides to positively lock the slides in place at the limit of their forward movement, substantially as described.

5. The combination of the die-holder and gripping-dies of a heading-machine, with the knob-forming dies and holders mounted to slide on the front of said gripping-dies, a heading-ram carrying a plurality of punches for successively acting on the stock held in said gripping-dies, and means for closing the

said knob-forming dies after the action of a punch of the said ram, substantially as described.

6. The combination of the die-holder 15, the gripping-dies mounted therein, mechanism for opening and closing said dies, the knob-forming dies mounted upon the front of said gripping-dies, mechanism for opening and closing said knob-forming dies, and a heading-ram carrying a plurality of successively-acting punches, all combined for having the gripping-dies closed during the action of one punch, then closing the knob-forming dies, while the gripping-dies remain closed for the action of another punch, and finally opening both the gripping and knob-forming

dies to release the work, substantially as described.

7. The combination of the knob-die holder and dies, with the wedges 38 carrying the roller 45, the slides 44 having the oblique slot to receive said roller, the cams 48 having nose 62, concentric face 49, hub 51, and straight face 50, with the driving-faces 59 and 53 and following curved faces 60 and 54, on the cam-recess of the slide, substantially as described.

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