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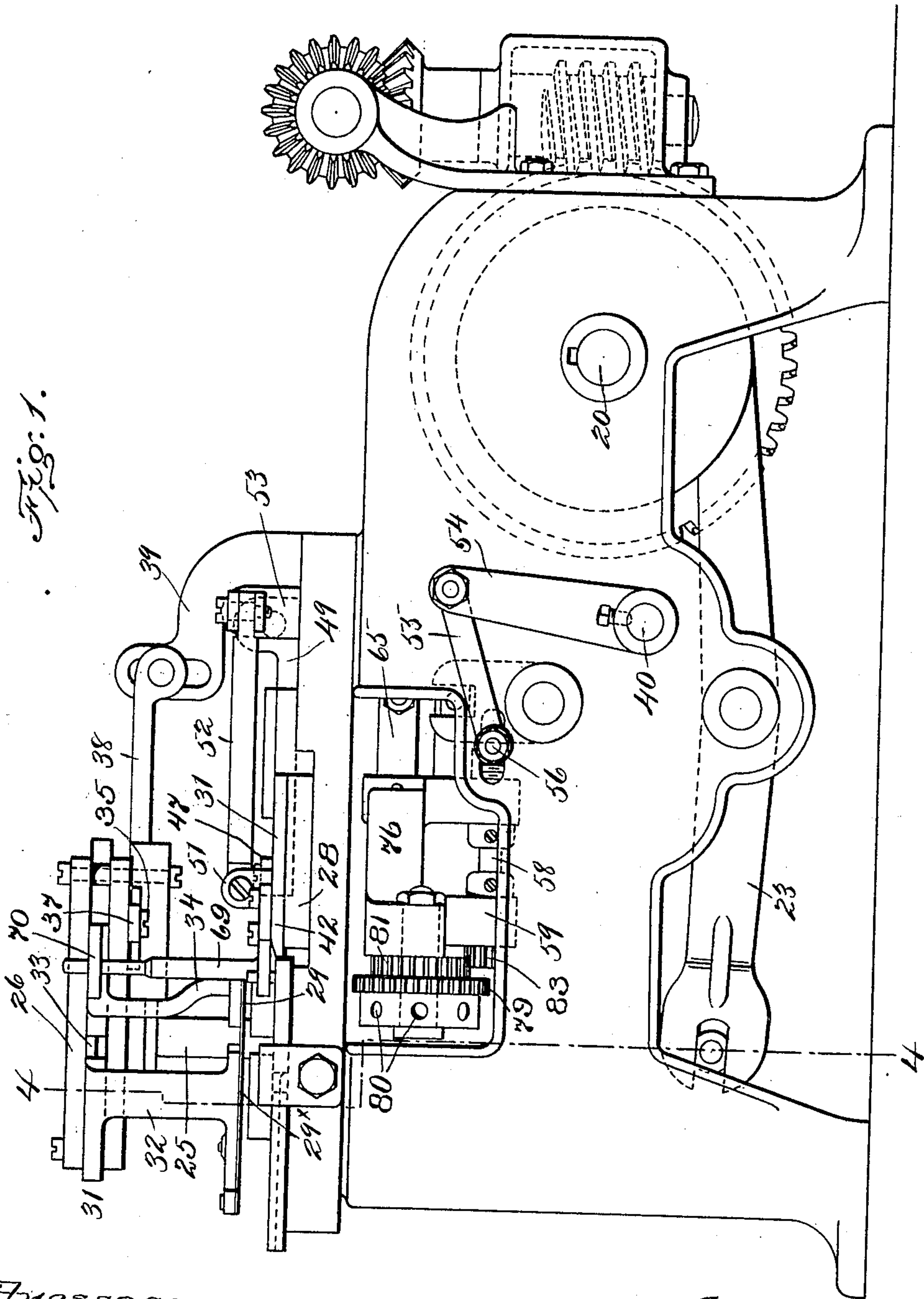
PATENTED MAY 19, 1908.

H. LYON.

VAMP FOLDING MACHINE.

APPLICATION FILED APR. 13, 1903.

7 SHEETS—SHEET 1.



Witnesses:  
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7 SHEETS—SHEET 2

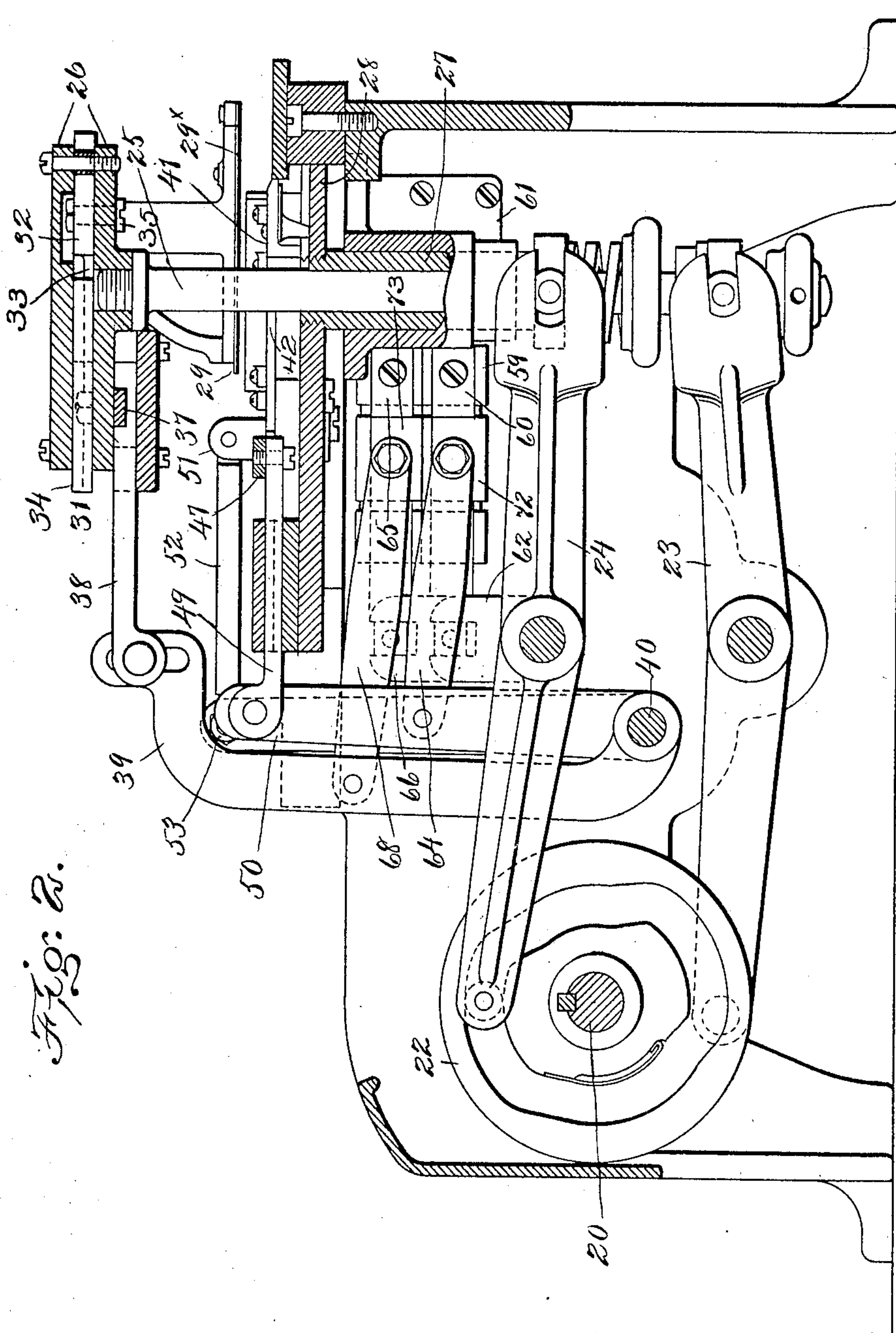


Fig. 2.

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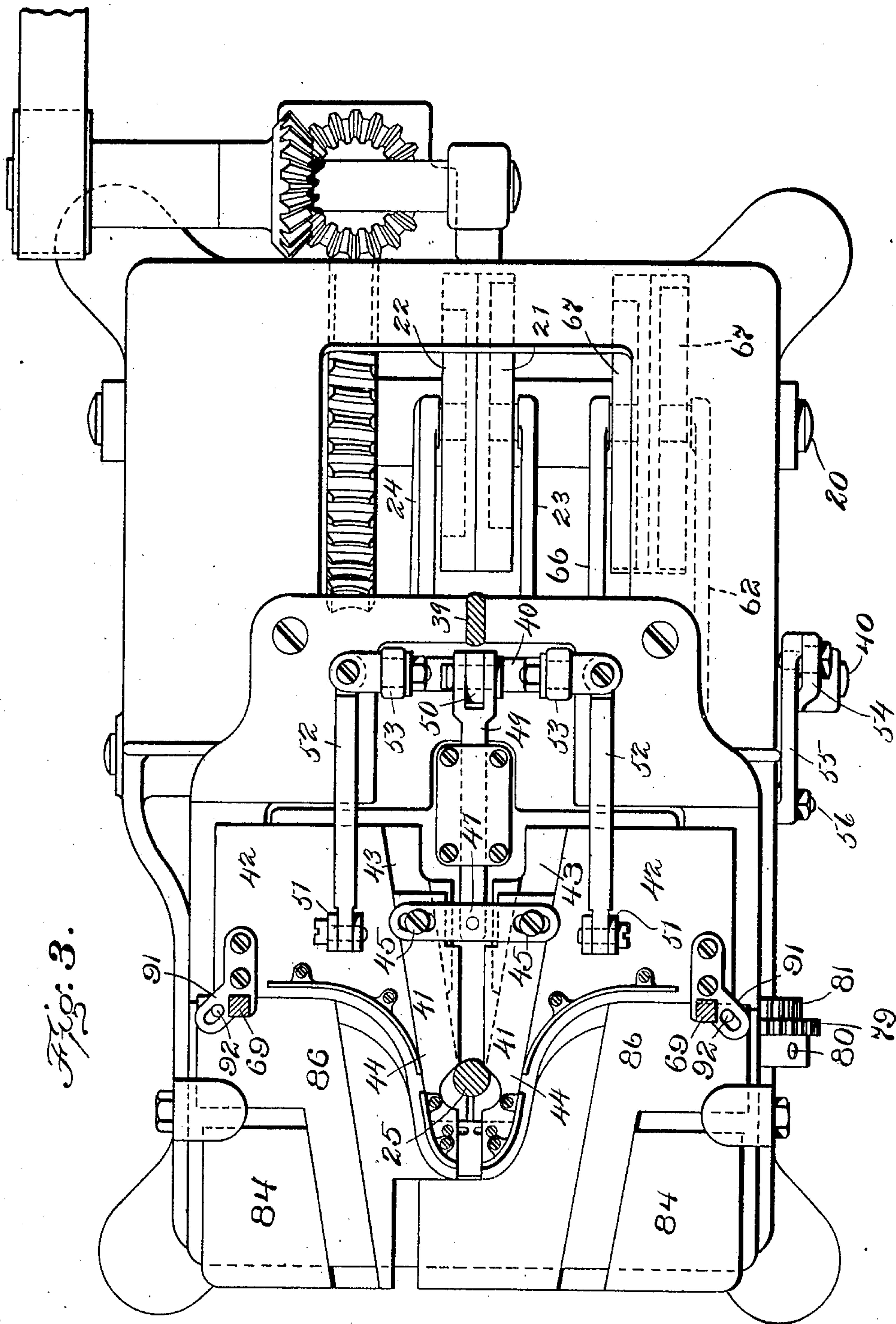
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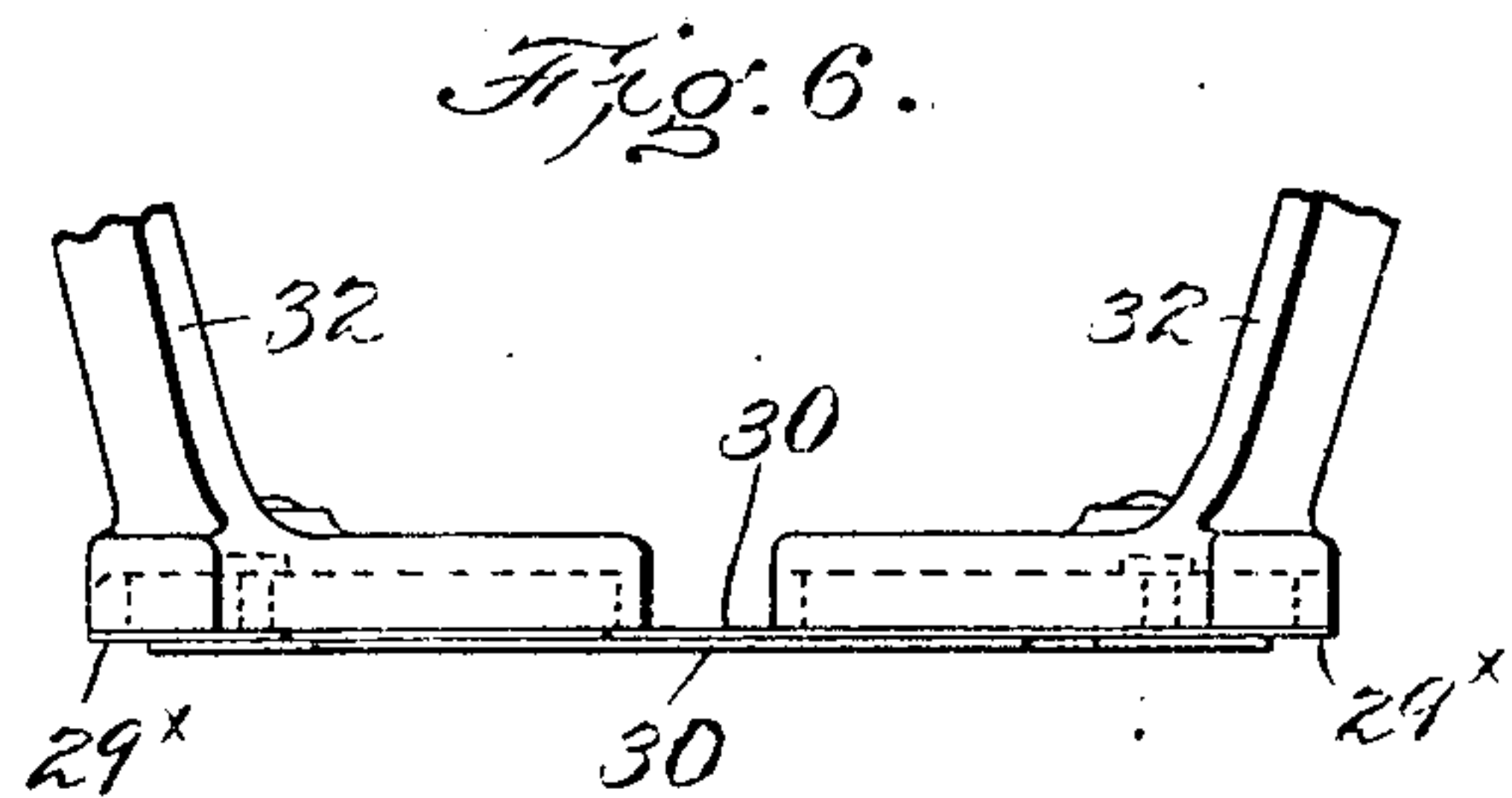
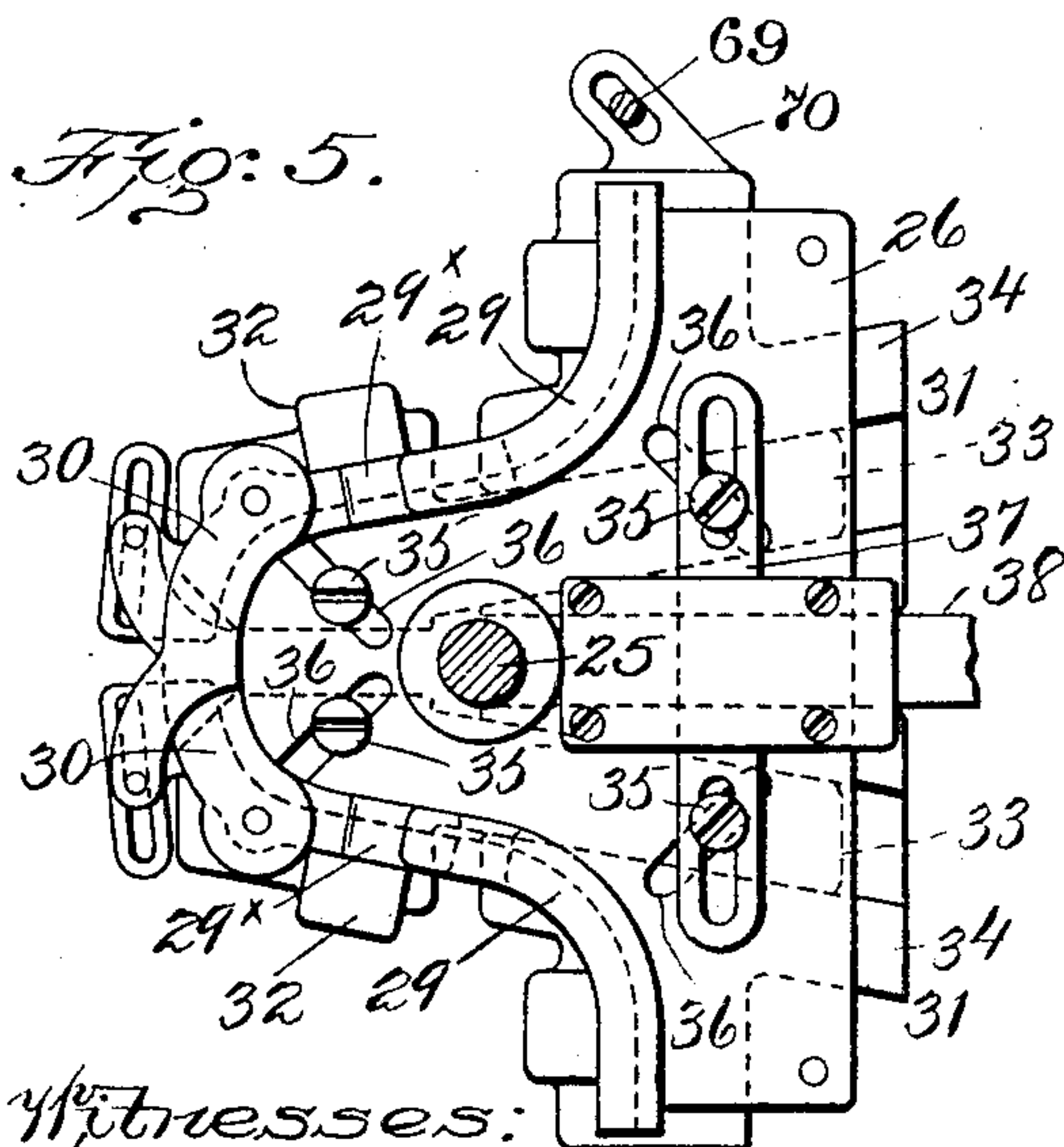
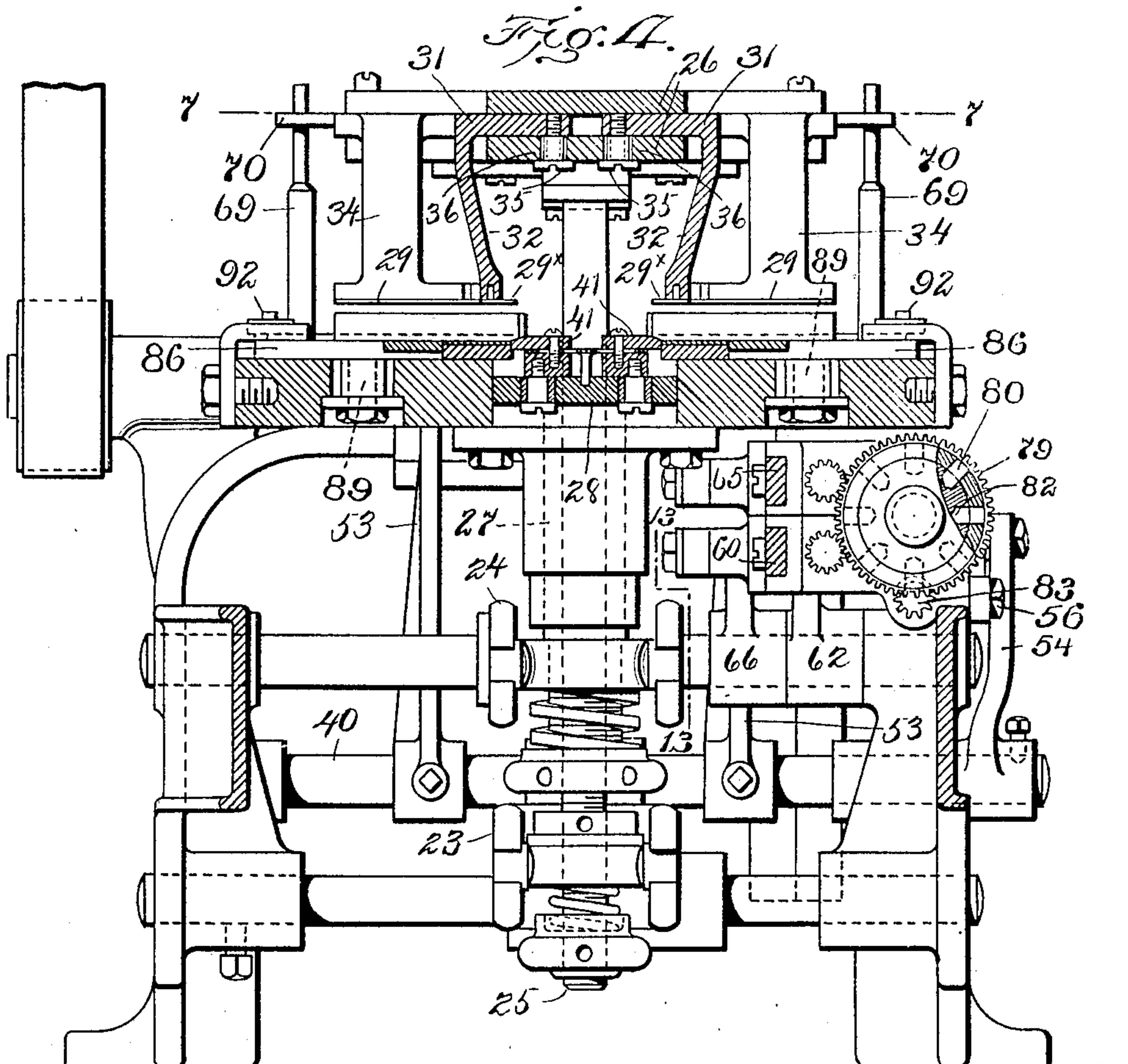
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APPLICATION FILED APR. 13, 1903.

7 SHEETS—SHEET 4.



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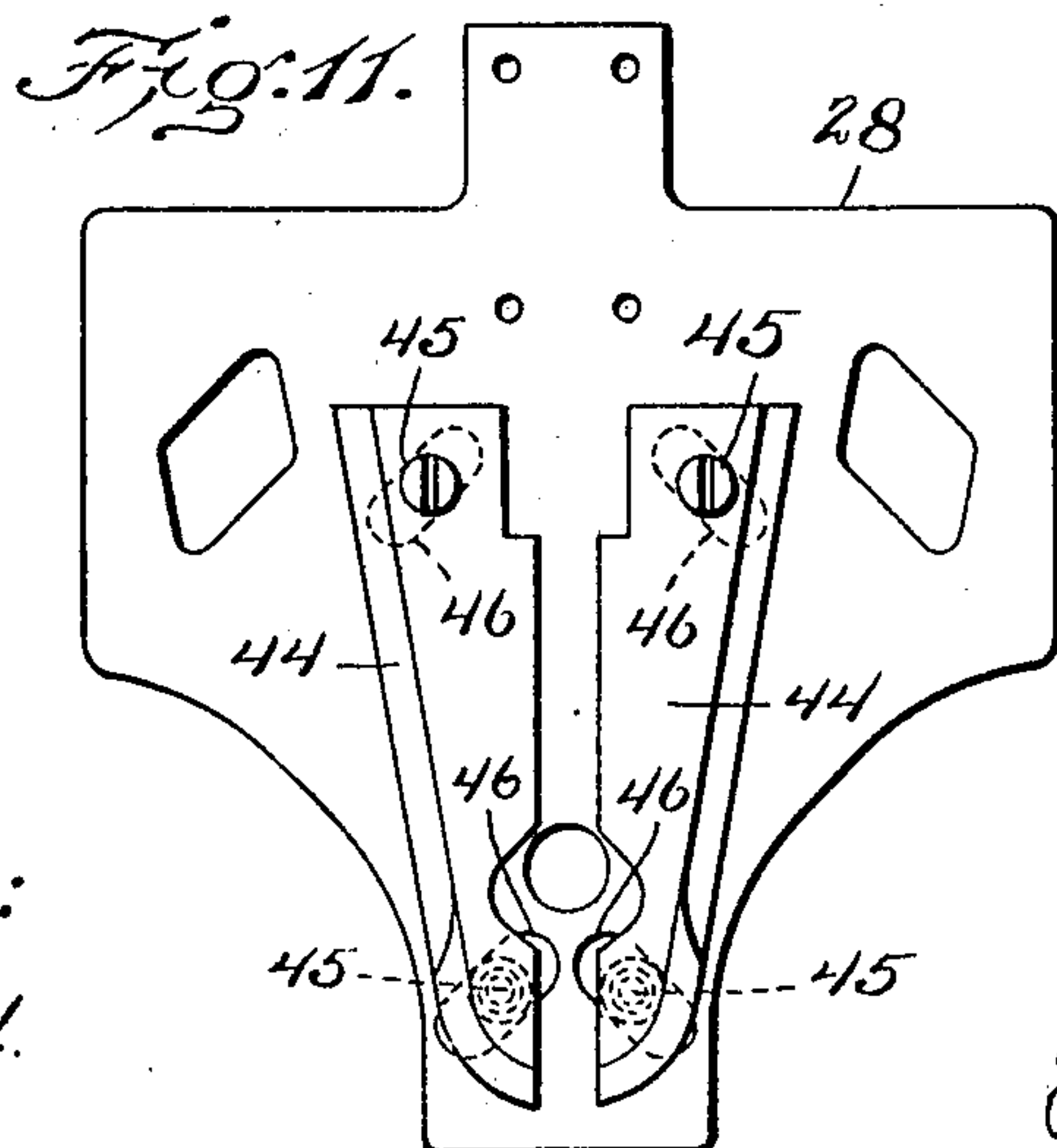
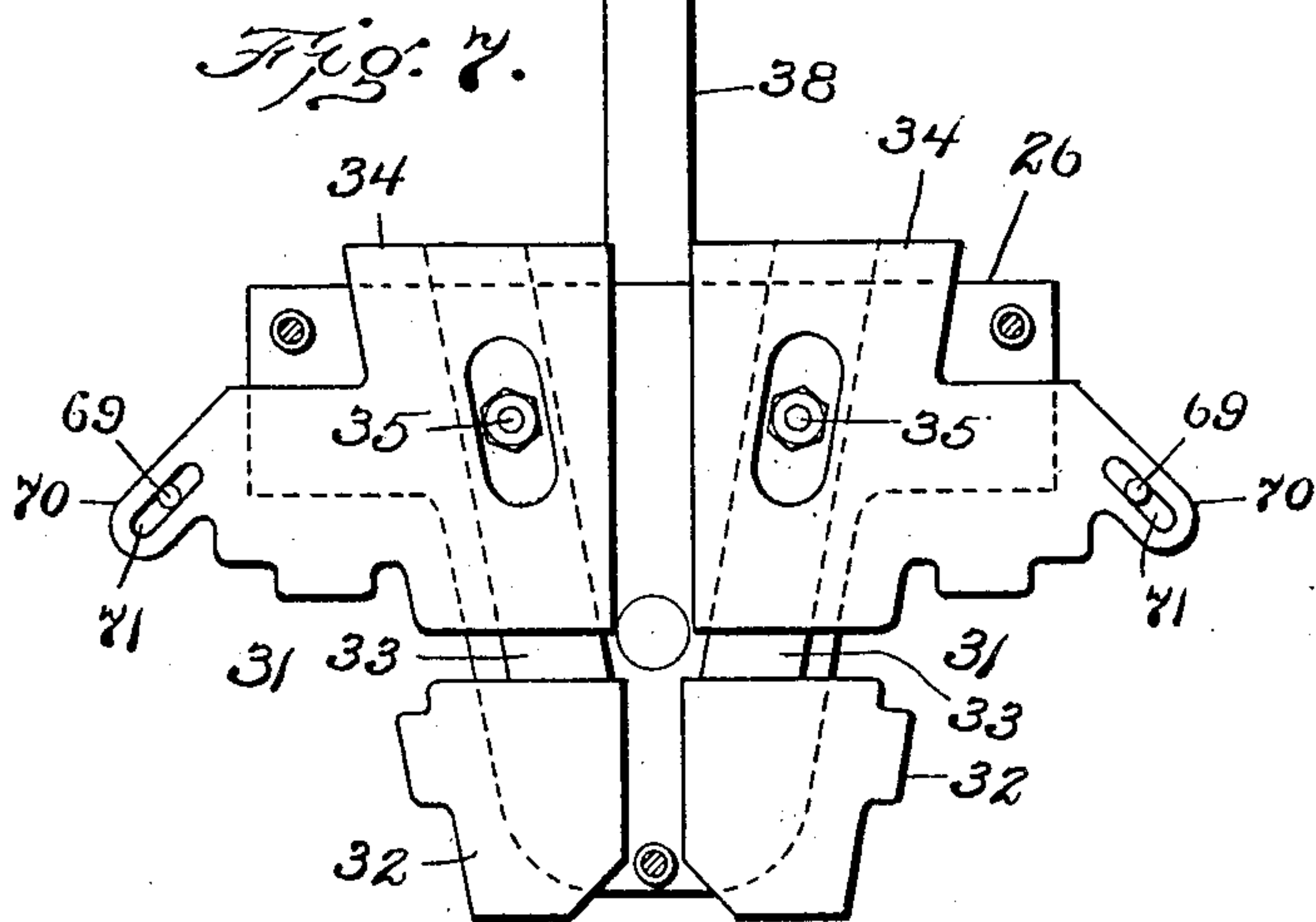
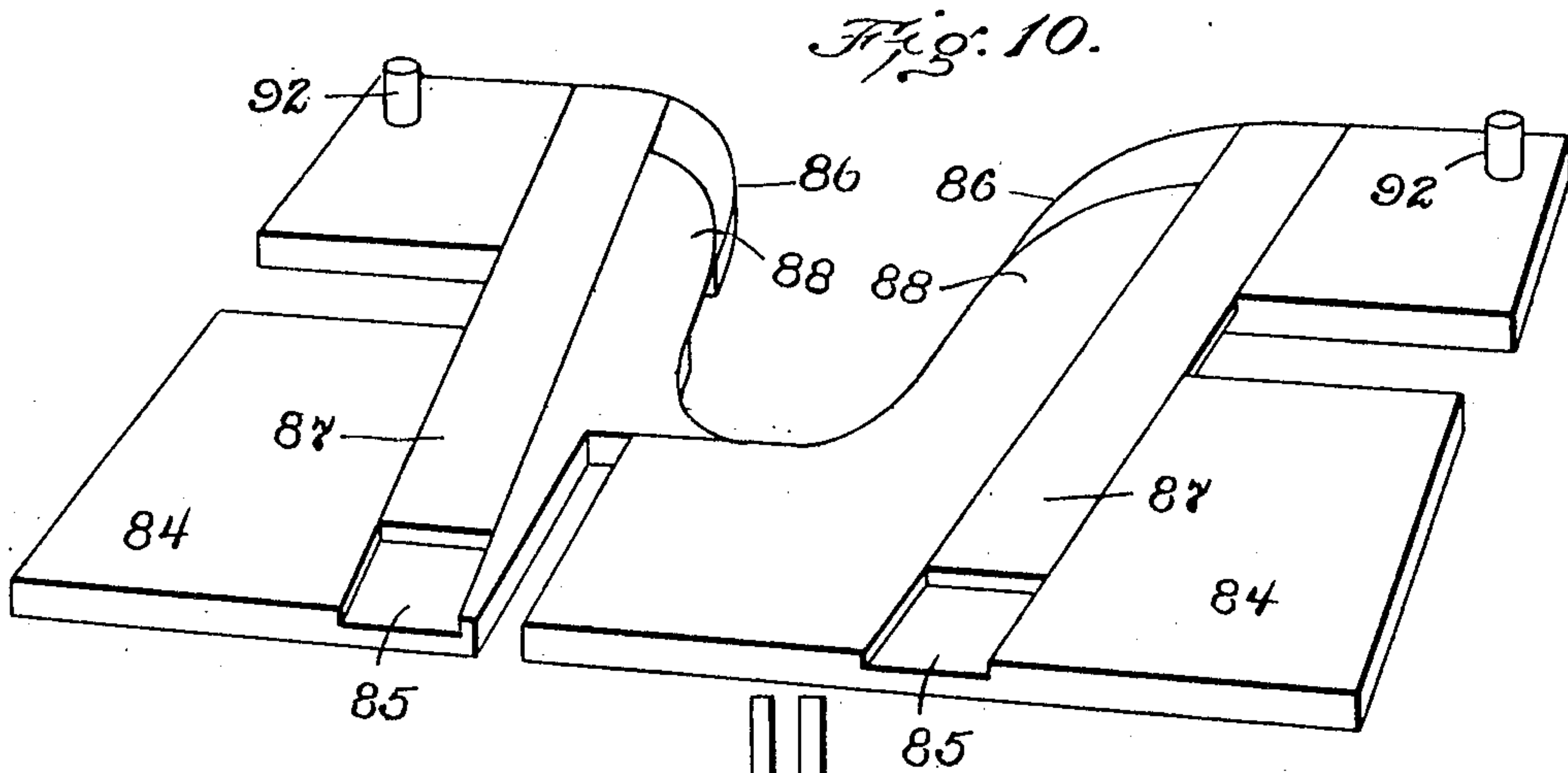
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7 SHEETS—SHEET 5.



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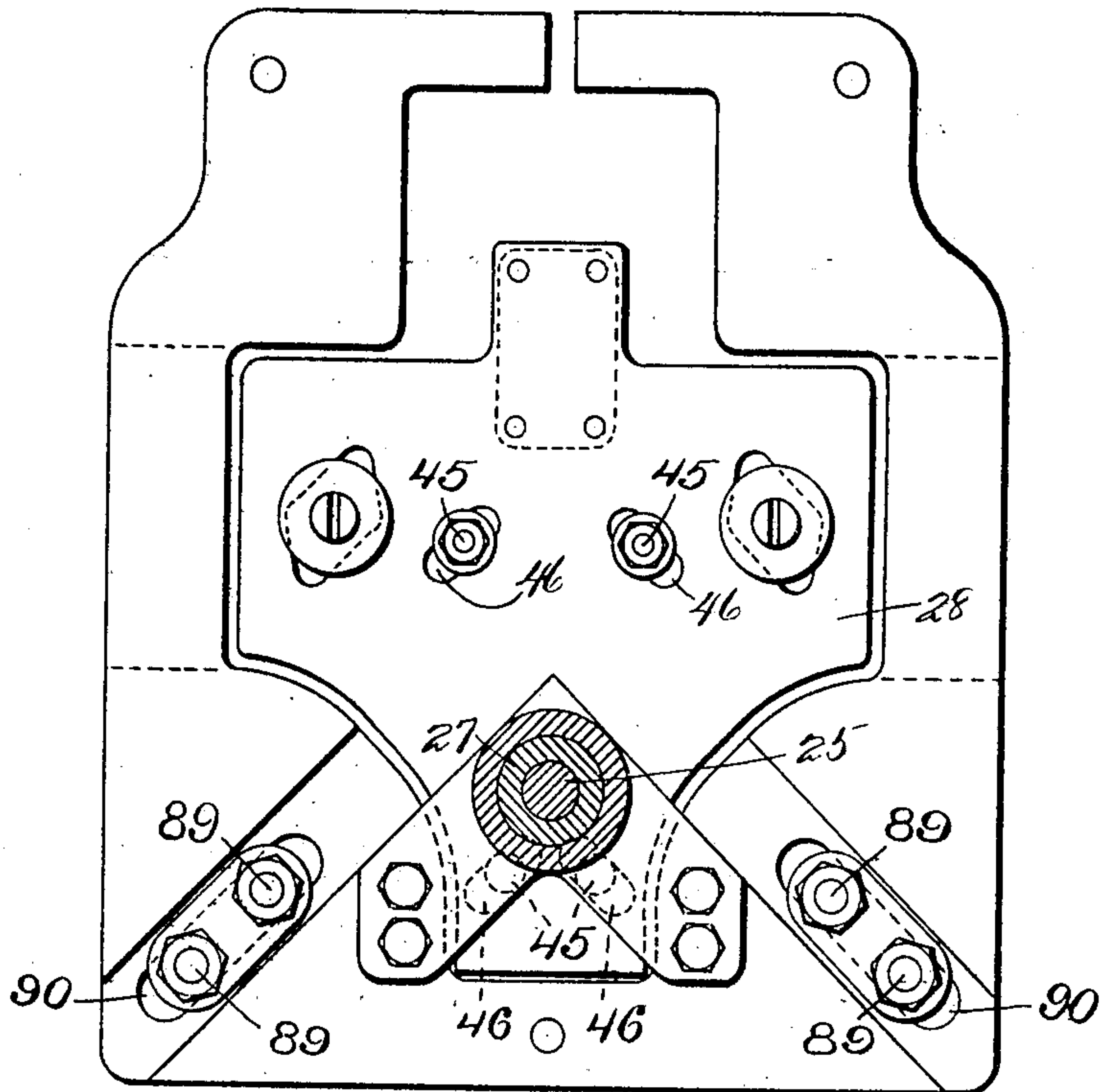
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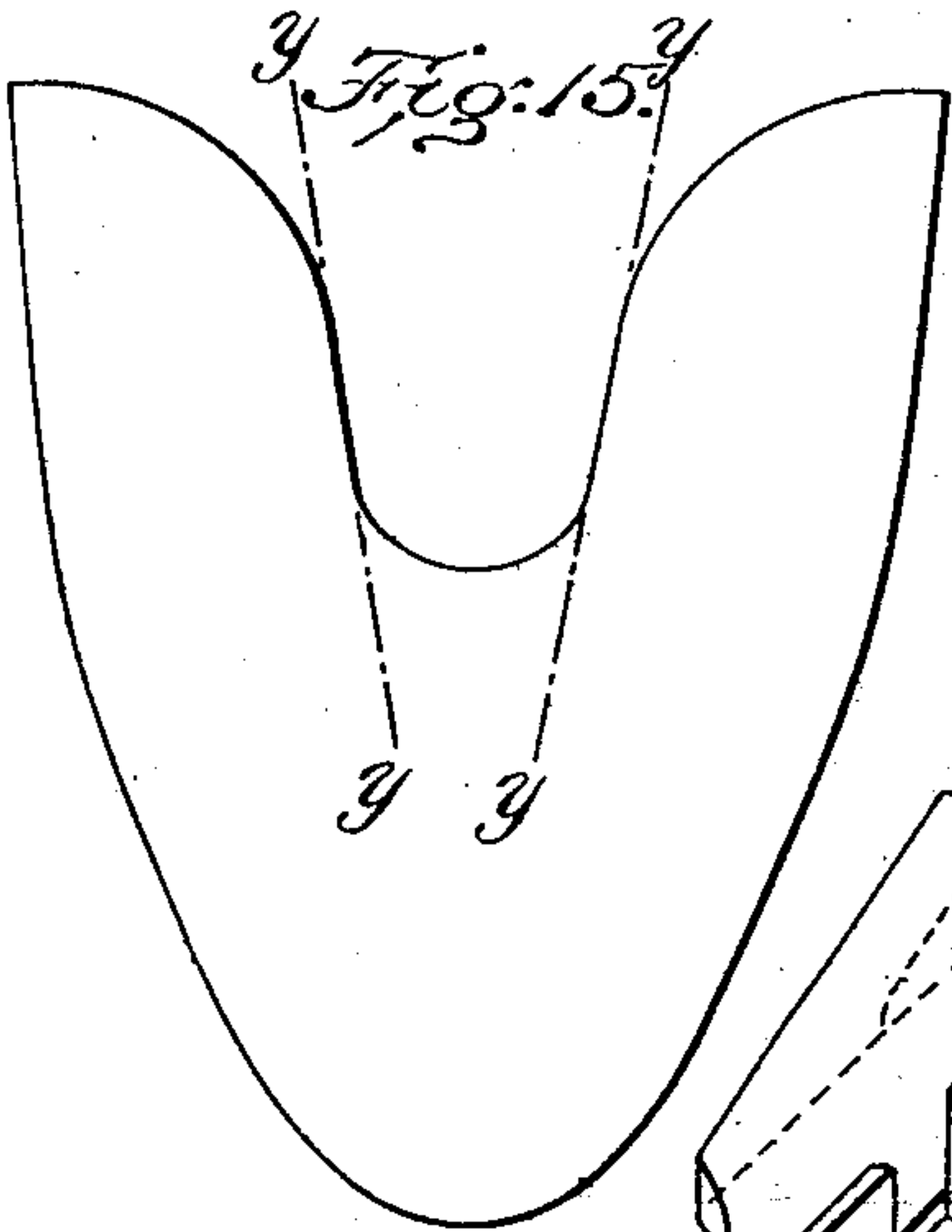
H. LYON.  
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7 SHEETS—SHEET 6.

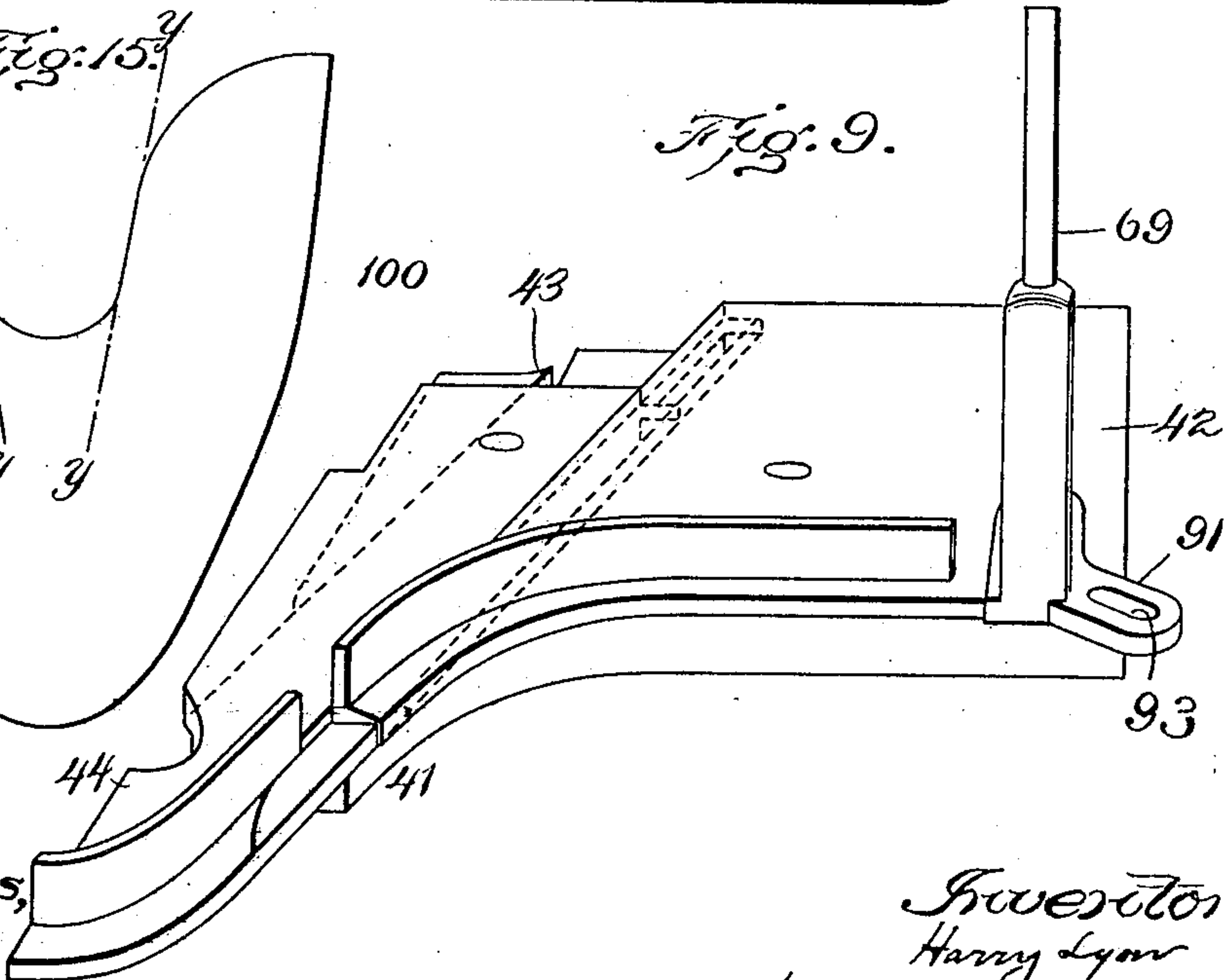
*Fig. 8.*



*Fig. 15.*



*Fig. 9.*



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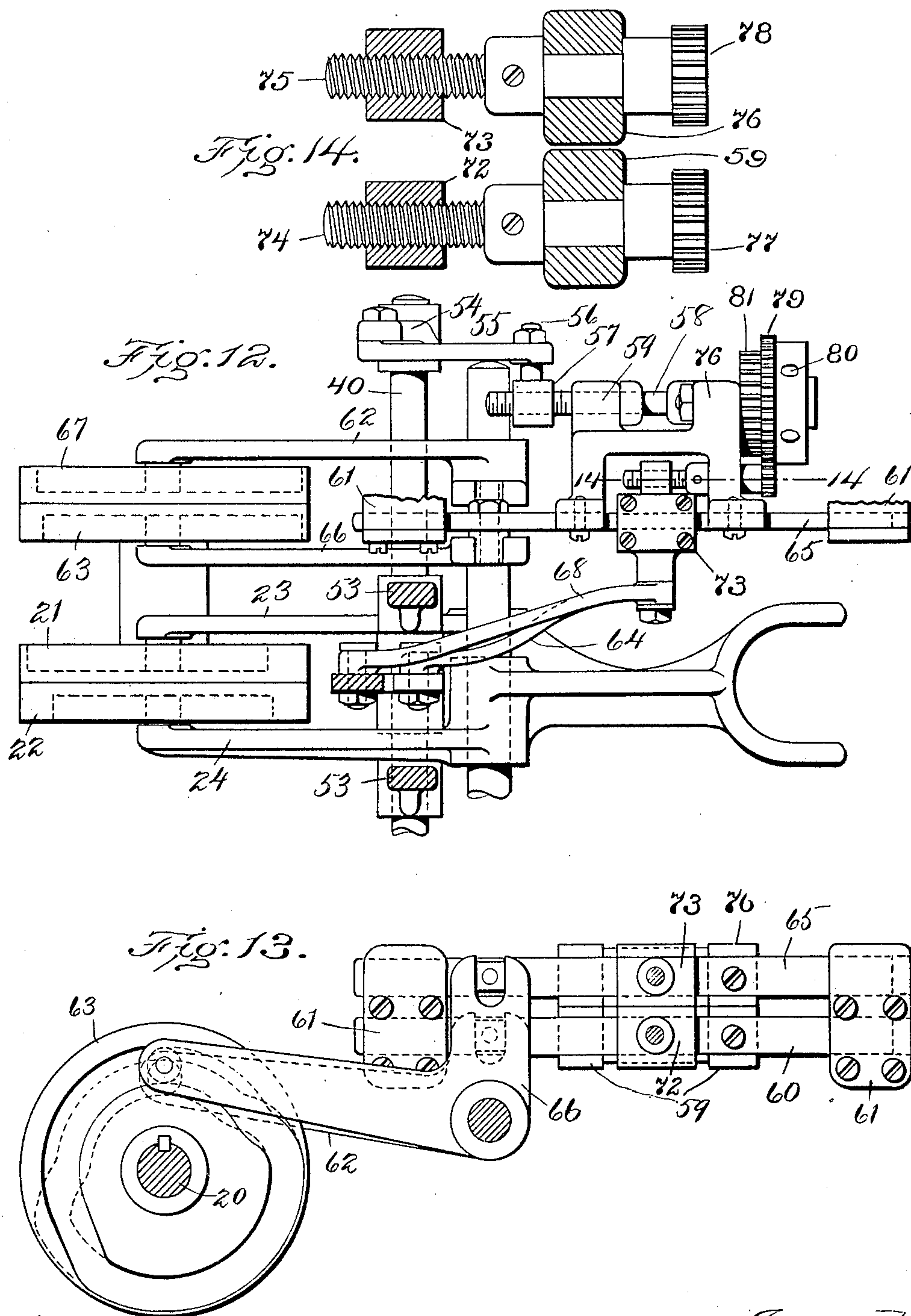
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VAMP FOLDING MACHINE.

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7 SHEETS—SHEET 7.



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# UNITED STATES PATENT OFFICE.

HARRY LYON, OF BROCKTON, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO  
BOSTON MACHINE WORKS COMPANY, OF LYNN, MASSACHUSETTS, A CORPORATION OF  
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## VAMP-FOLDING MACHINE.

No. 888,105.

Specification of Letters Patent.

Patented May 19, 1908.

Application filed April 13, 1903. Serial No. 152,410.

*To all whom it may concern:*

Be it known that I, HARRY LYON, of Brockton, in the county of Plymouth and State of Massachusetts, have invented certain new and useful Improvements in Vamp-Folding Machines, of which the following is a specification.

This invention relates to machines of the general character described in Letters Patent granted to George F. Dunn, No. 651,797, dated June 12, 1900, and No. 677,404, dated July 2, 1901, for folding the inner edges of the vamps of boots and shoes, or articles having a similar edge conformation. In the patents described there is a substantially U-shaped former consisting of overlapping thin blades or sections, which descends upon the vamp supported on a table, and a two-part folder which rises and turns up the edge of the vamp and then expands, folding it over the edge of the former, and finally descends to impart pressure to the fold, the former being withdrawn from the fold as the latter is formed. Diagonal movements are imparted to the sections of the former and the folder to give these elements their expanding and contracting operative movements, and in Patent No. 677,404, an adjusting mechanism is provided for giving the expanding parts different normal or initial positions so as to operate on vamps having different widths of recesses.

The present invention retains the general features of the machines above alluded to, and has for its particular object to operate on short vamps, or those which terminate on the side of the boot or shoe instead of at the back and are commonly curved along the inner edges of the legs or rear ends of the vamp.

To this end the invention consists in certain novel features of construction and arrangement which I shall now proceed to describe and claim.

Of the accompanying drawings,—Figure 1 represents a side elevation of a vamp-folding machine constructed in accordance with my invention. Fig. 2 represents a longitudinal vertical section thereof. Fig. 3 represents a horizontal section taken below the former. Fig. 4 represents a section on line 4—4 of Fig. 1. Fig. 5 represents a reverse plan view of the former and connected parts. Fig. 6 represents a front elevation of the former. Fig. 7 represents a section on line 7—7 of Fig. 4. Fig. 8 represents a reverse plan view of the

folder-carrier and connected parts. Fig. 9 represents a perspective view of one of the two-part halves of the folder. Fig. 10 represents a similar view of the folding-table. Fig. 11 represents a plan of the folder-carrier and part of the folder. Fig. 12 represents a plan view of the levers and lever-adjusting devices detached from the rest of the machine. Fig. 13 represents a section on line 13—13 of Fig. 4. Fig. 14 represents a section on line 14—14 of Fig. 12. Fig. 15 represents a plan of the vamp.

The same reference characters indicate the same parts in all the figures.

In the drawings, 20 is a shaft rotated by suitable means and carrying two sets of path-cams. The cams 21 22 operate upon levers 23 24 to impart the vertical movements to the former and folder, the lever 23 operating to raise and lower a vertical rod carrying a double-plate former-carrier 26 at its upper end, while the lever 24 operates upon a vertically-movable sleeve 27 carrying the folder-carrier 28 at its upper end. The former is composed of thin side-blades 29 29<sup>x</sup> and pivoted front blades 30 30 all overlapping and forming a U-shaped structure with flaring ends or legs, the side-blades being directly supported upon former-bodies 31 31 which reciprocate between the plates of the former-carrier 26. Each former-body is made up of a forward section 32 having a rearwardly-projecting tail or guide 33 extending at an angle corresponding to the lines *y—y* of the vamp (Fig. 15) and a rearward section 34 mounted to slide on said tail or guide. The two former-bodies are each guided to move as a whole by studs 35 35 attached to the section 32 guided in diagonal slots 36 36 in the former-carrier 26. When the former-body is reciprocated by an actuating movement along the longitudinal median line of the machine, the two halves of the former approach and recede at angles of forty-five degrees to said median line. This movement is the operative movement of the former whereby it enters and leaves the fold in the work and is also the adjusting movement whereby the former is varied in width to suit different-sized vamps. It will be noted that the former-sections 29 are mounted upon the rear sections 34 of the former-body, while the former-sections 29<sup>x</sup> are mounted upon the forward sections 32 thereof and carry the front sections 30 of the



former. A longitudinal reciprocating movement is imparted to the forward sections 32 of the former-body, to give the desired operating and width-adjusting movements, by a  
 5 slotted cross-piece 37 engaging the studs 35 and attached to a slide 38, and in their diagonal movements, the forward sections 32 carry with them the rear sections 34. The slide 38 is connected to the slotted upper end  
 10 of a vertical lever 39 loosely pivoted upon a cross-shaft 40 and oscillated in the manner hereinafter described.

The folder is mounted upon the folder-carrier 28 and is made up of two halves 41 together making a U-shaped edge on the folder  
 15 corresponding to the shape of the inner edge of the former, and each half of the folder is composed of a rear section 42 having a guide 43 set at the angle of the lines  $y-y$  of the  
 20 vamp 100 (Fig. 15) and a forward section 44 mounted to slide on said guide. The folder-halves are guided as a whole on the carrier 28 by studs 45 45 attached to the folder sections  
 25 42 and operating in diagonal slots 46 set at the same angle as the slots 36, whereby the folder-halves receive an operating and width-adjusting movement toward and from each other when longitudinally reciprocated. The  
 30 forward sections of the folder-halves are reciprocated by a slotted cross-piece 47 engaging studs 45, 45, (see Fig. 3) attached to the sections 44, said cross-piece being connected to a slide 49 attached to the slotted upper  
 35 end of a vertical lever 50 which oscillates loosely on the rock-shaft 40, and in their diagonal movement they carry with them the rear sections 42, both sections 42 44 moving diagonally substantially as one piece.

Lugs 51 51 on the folder-sections 42 are  
 40 connected by links 52 52 to the upper ends of vertical arms 53 53 fast on the rock shaft 40. At one end of the rock-shaft 40 is an arm 54 fixed thereto and connected by a link  
 45 55 with a pin 56 attached to a nut 57 (Fig. 12.) This nut engages a screw 58 held against axial movement on a block 59 secured to a slide 60 which is mounted in  
 50 guides 61 61. A horizontal movement is imparted to this slide by a bell-crank lever 62 having one arm engaged with the slide and the other with a path-cam 63 fast to the  
 55 shaft 20. Whenever the slide 60 is reciprocated, as it is at every rotation of shaft 20, it is apparent that shaft 40 and the arms 53 will be oscillated. The movement of the  
 plates 42, due to this oscillation, is by construction made equal to that which is imparted to them by the folder-sections 44, so  
 60 that the diagonal expanding and contracting movements of the folder-halves take place as though these halves were each in one piece. The lever 50 whereby the folder-sections 44 are reciprocated, receives its motion from  
 65 the slide 60 through a link 64, as best seen in Fig. 2.

65 is a slide mounted above the slide 60 in the guides 61 and reciprocated by a connection with one arm of a bell-crank lever 66 whose other arm is oscillated by a cam 67 on  
 shaft 20. The slide 65 connects through a  
 70 link 68 with the lever 39, whereby the forward sections 32 of the former-body are reciprocated.

Longitudinal adjusting movements of the plates 42 with respect to the folder-sections  
 75 41 along the lines of the guides 43 are transmitted to the rear sections 34 of the former-bodies so as to take place along the lines of the guide-pieces 33 by means of pins 69 on  
 80 the plates 42 engaging brackets or ears 70 on the sections 34, but these ears are slotted at 71 at angles of forty-five degrees so that the diagonal operating and width-adjusting  
 movements of the plates 42 in a direction parallel to these slots are not communicated  
 85 to the former-bodies.

The links 64 68 for oscillating the levers 50 39 from the slides 60 65 are pivoted to pieces  
 72 73 having sliding adjusting movements on said slides and controlled by screws 74 75.  
 90 The lower screw is held against axial movement on the block 59 and threads into the sliding piece 72, while the upper screw is similarly held in a block 76 attached to the  
 slide 65 and threads into the sliding piece 73.  
 95 Gear-pinions 77 78 on the screws mesh into an adjusting gear-wheel 79 mounted on the slide 76 and having a series of holes 80 in its hub for the insertion of a suitable tool to rotate the wheel. A gear 81 concentric with  
 100 gear 79 has its hub fitted within the hub of gear 79 and provided with holes 82 (Fig. 4) spaced similarly to the holes 80. By inserting the rotating tool to the proper depth  
 either the outer gear 79 or both the outer and  
 105 inner gears 79 81 may be rotated. The gear 81 meshes with the teeth of a pinion 83 fixed to the end of the screw 58.

The table for supporting the vamp is made in two halves as shown in Fig. 10, each half  
 110 comprising a forward section 84 having a guide-groove 85 and a rearward section 86 having an extension or guide-piece 87 guided in said groove, the grooves being parallel to the lines  $y-y$  of the vamp. The forward  
 115 sections 84 also have thin plates 88 overlapping the rear sections, to preserve the continuity of the upper surface of the table. The inner edge of the table has a U-shape  
 120 corresponding to the shape of the former and folder. The forward sections 88 of the table are provided with guide-studs 89 89 (Fig. 8) guided in forty-five-degree slots 90 parallel to the guiding slots of the former and folder. The longitudinal adjusting movements of the  
 125 plates or folder-sections 42 along the lines  $y-y$  of the vamp are transmitted to the table-sections 86 by means of brackets or ears 91 (Fig. 3) on the plates 42 engaging  
 pins 92 on table sections 86, but the ears 91  
 130



are formed with forty-five-degree slots 93 permitting the expanding movements of the folder without moving the table.

The operation is as follows:—The operating movements of the folder and former are already known in the machines of the aforesaid Patents Nos. 651,797 and 677,404, and a brief description will answer. The folder being down and the former up, the work is inserted and adjusted to gage. The former descends while in its contracted state and the folder ascends in a contracted state until it is above the level of the former, causing the edge of the vamp to be turned up. The folder then expands and descends upon the work, forming the fold, and the former expands to withdraw from the fold and is finally elevated, the folder descending further to press the fold. The folder is finally raised slightly and contracted and then descends to its initial position. Should a wider or narrower vamp be worked upon, the former and folder have to receive an expanding or contracting adjusting movement so as to start at a new initial position, and this is done by rotating the wheel 79 so as to shift the positions of the sliding pieces 72 73 on their slides 60 65, thereby swinging the levers 39 50 to different initial or starting positions and expanding and contracting the former and folder by movements of their halves, at angles of forty-five degrees. An expanding movement of this character imparted to the folder while it coincides with the plane of the work-supporting table will be communicated to said table, causing the latter to correspondingly expand. To contract the table for a narrower vamp the outer ends of the slots 93 abut against the pins 92 and move the table-halves toward each other at the forty-five-degree angles, their edges following the edges of the folder-halves as the folder is contracted to a smaller size. For a longer or shorter vamp, the rearward sections of the former, folder and work-supporting table are adjusted on the forward sections of said parts in a direction parallel to the lines  $y-y$  of the vamp. This is effected by rotating the gear-wheel 81, and through the screw 59 and nut 57, oscillating the arms 53 and shifting the plates 42, which through the connections 69 70 and 91 92 correspondingly shift the rearward sections 29

and 86 of the former and work-supporting table respectively. The operating movements of the former and folder then take place as before, but with these parts in a longer or shorter condition. In adjusting the folder, former and table for length alone as just described, the tool for rotating wheels 79 81 is inserted into a hole 80 82 in each wheel, to give the wheel 81 its adjusting movement, but in taking a fresh hole 82 in wheel 81, the tool is withdrawn from the hole 82 only but is left in the hole 80, thereby giving the wheel 79 a backward movement equal to the forward movement given to it. If it is desired to make the adjustment for both width and length of the described folding parts simultaneously, the tool is fully withdrawn from both wheels 78 81 and the wheel 79 is not given a return movement.

I claim:—

1. In a vamp-folding machine, a vamp-edge-engaging member having a working movement and provided with a sliding adjustable section, a reciprocating slide connected to impart said working movement, a block mounted on said slide and having connection with said sliding section, and screw-threaded adjusting means connecting said slide and block for varying the position of the block on the slide.

2. In a vamp-folding machine, a vamp-edge-engaging device having width-adjusting and length-adjusting movements, and adjusting mechanism including members for imparting said movements separately or individually, said members having respectively adjacent tool-engaging divisions for securing simultaneous operation of both members by the same tool.

3. In a vamp-folding machine, a vamp-edge-engaging device having width-adjusting and length-adjusting movements, length-adjusting means, width-adjusting means, and provisions whereby either or both of said adjustments can be effected by the operations solely of said means.

In testimony whereof I have affixed my signature, in presence of two witnesses.

HARRY LYON.

Witnesses:

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