

M. T. DENNE.
MACHINE FOR ATTACHING THE HEELS OF BOOTS AND SHOES.
APPLICATION FILED OCT. 9, 1907.

993,514.

Patented May 30, 1911.

8 SHEETS—SHEET 1.

Fig. 1.

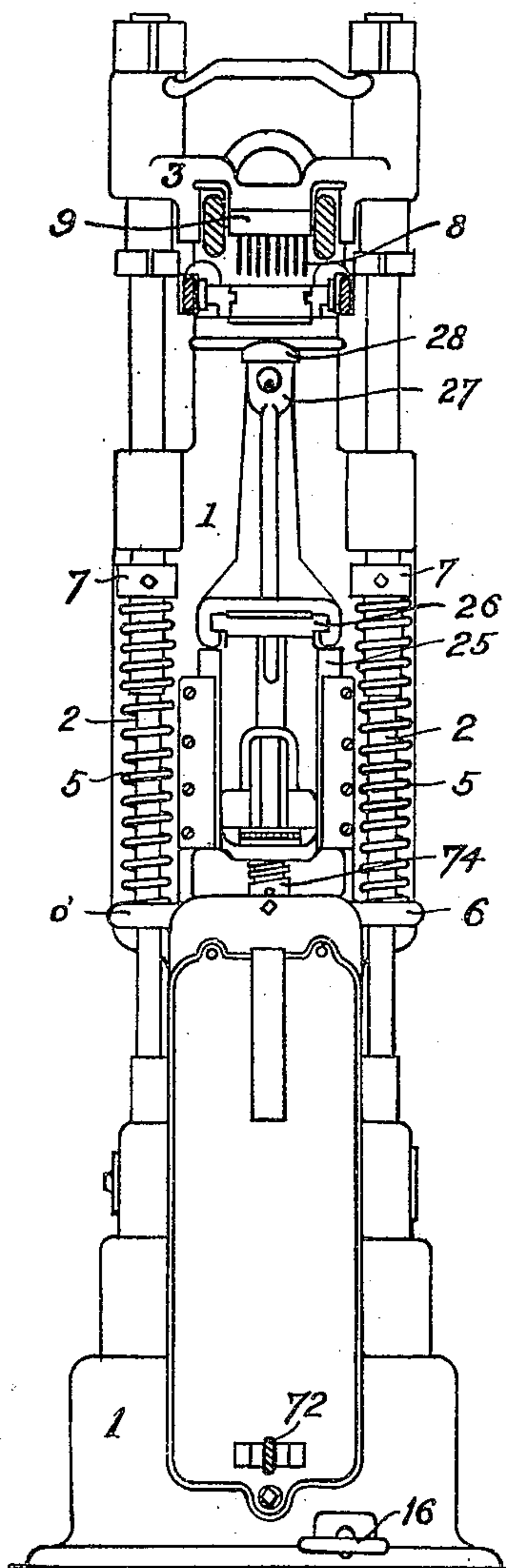
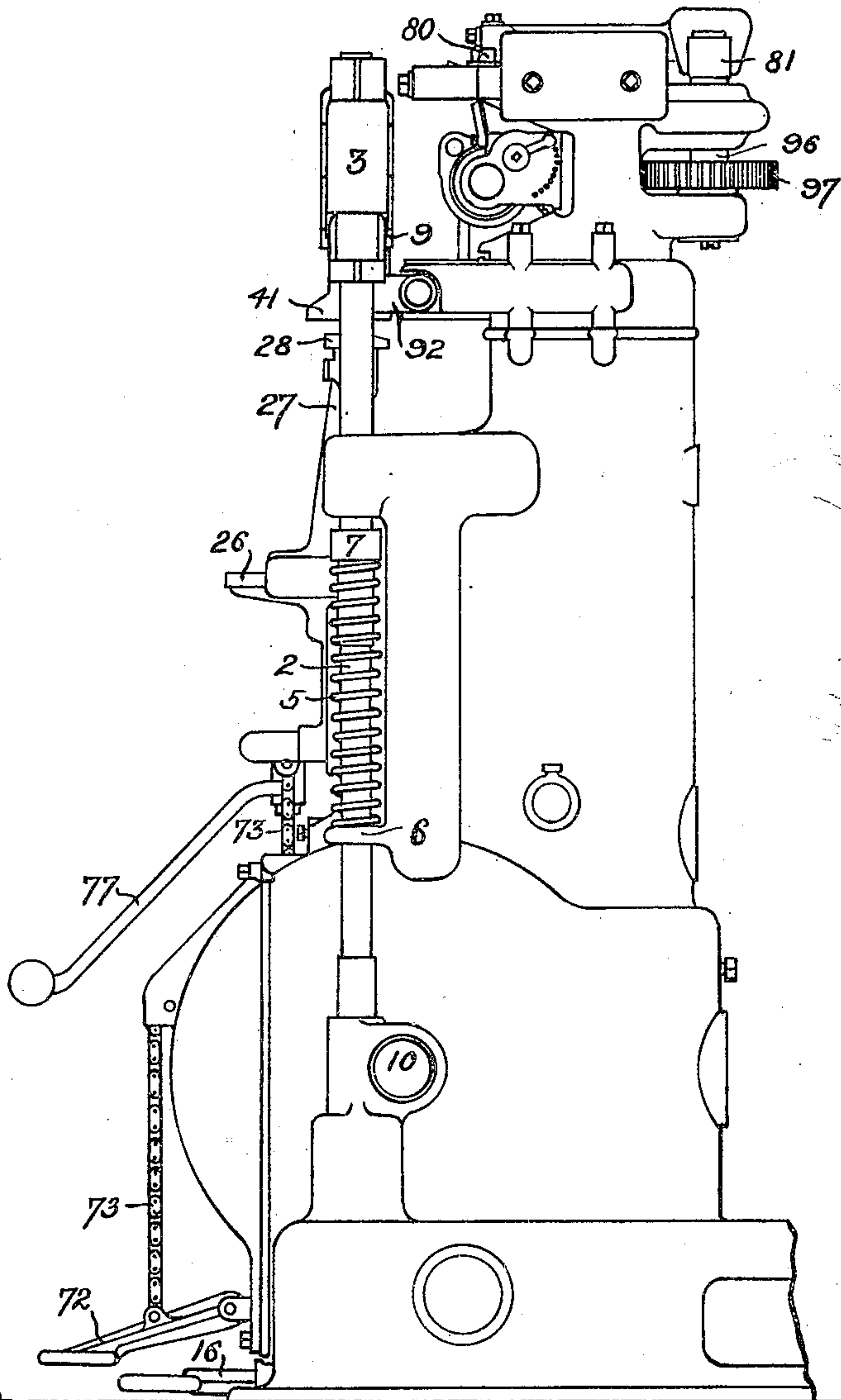


Fig. 2.



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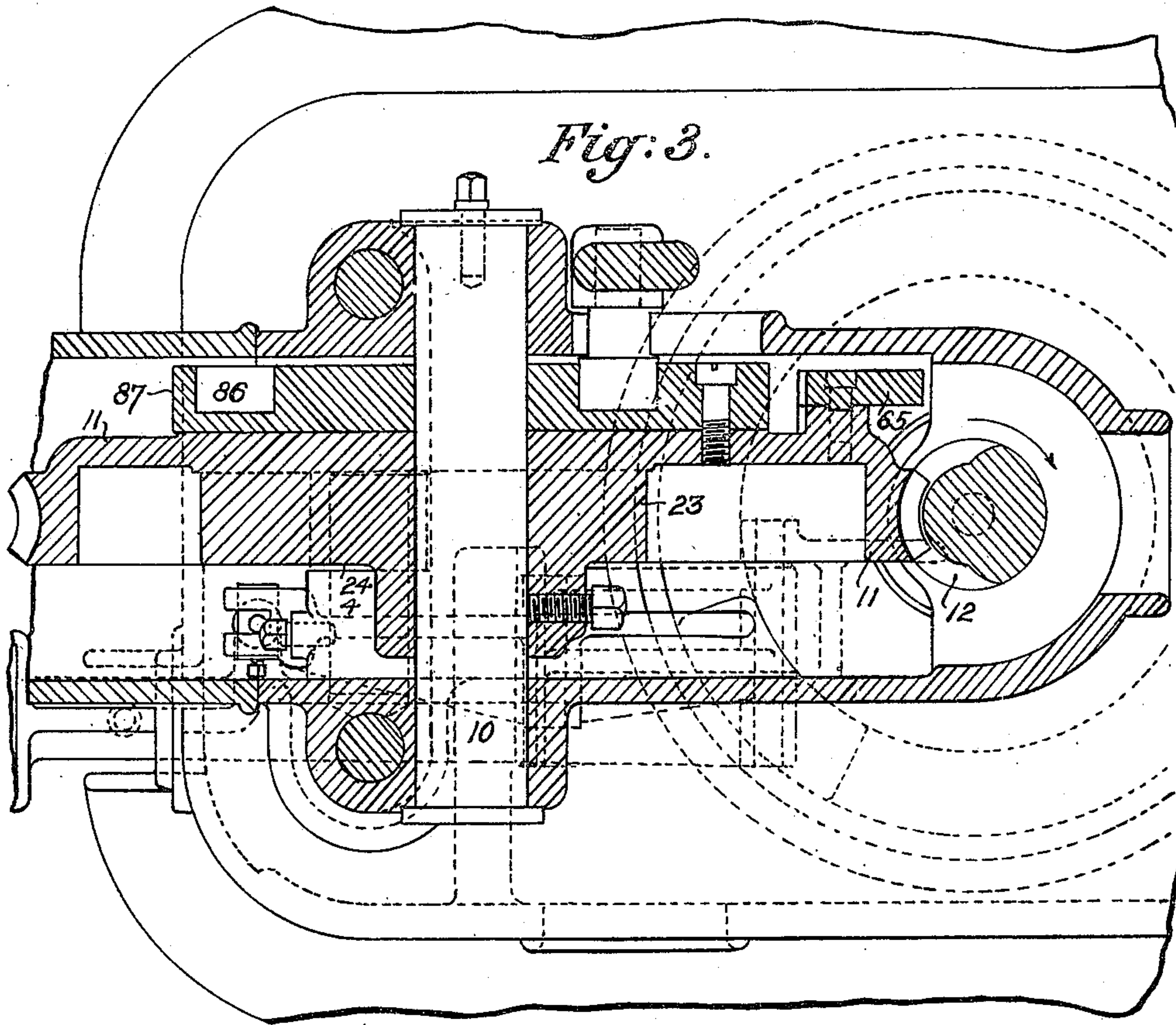
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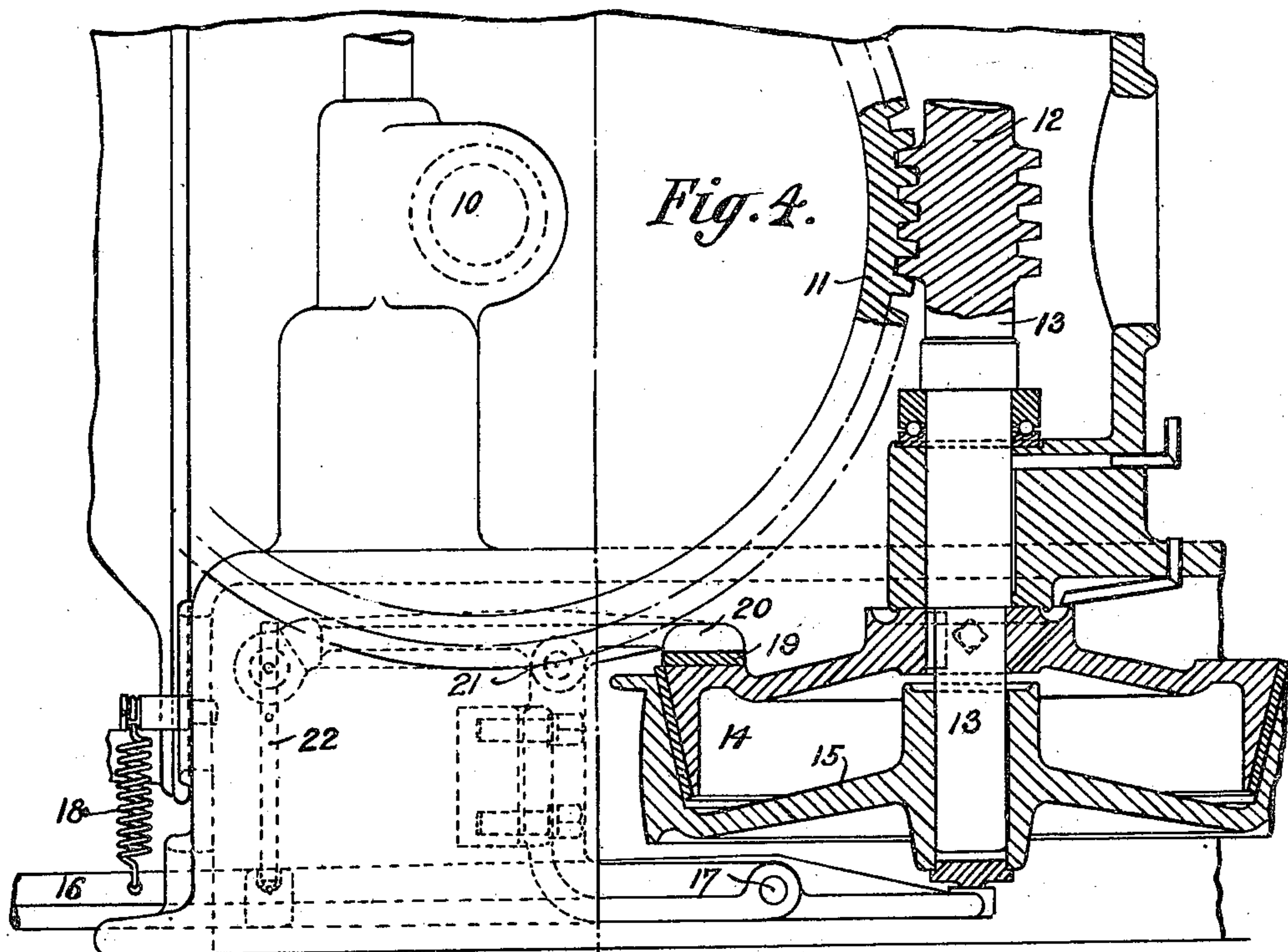
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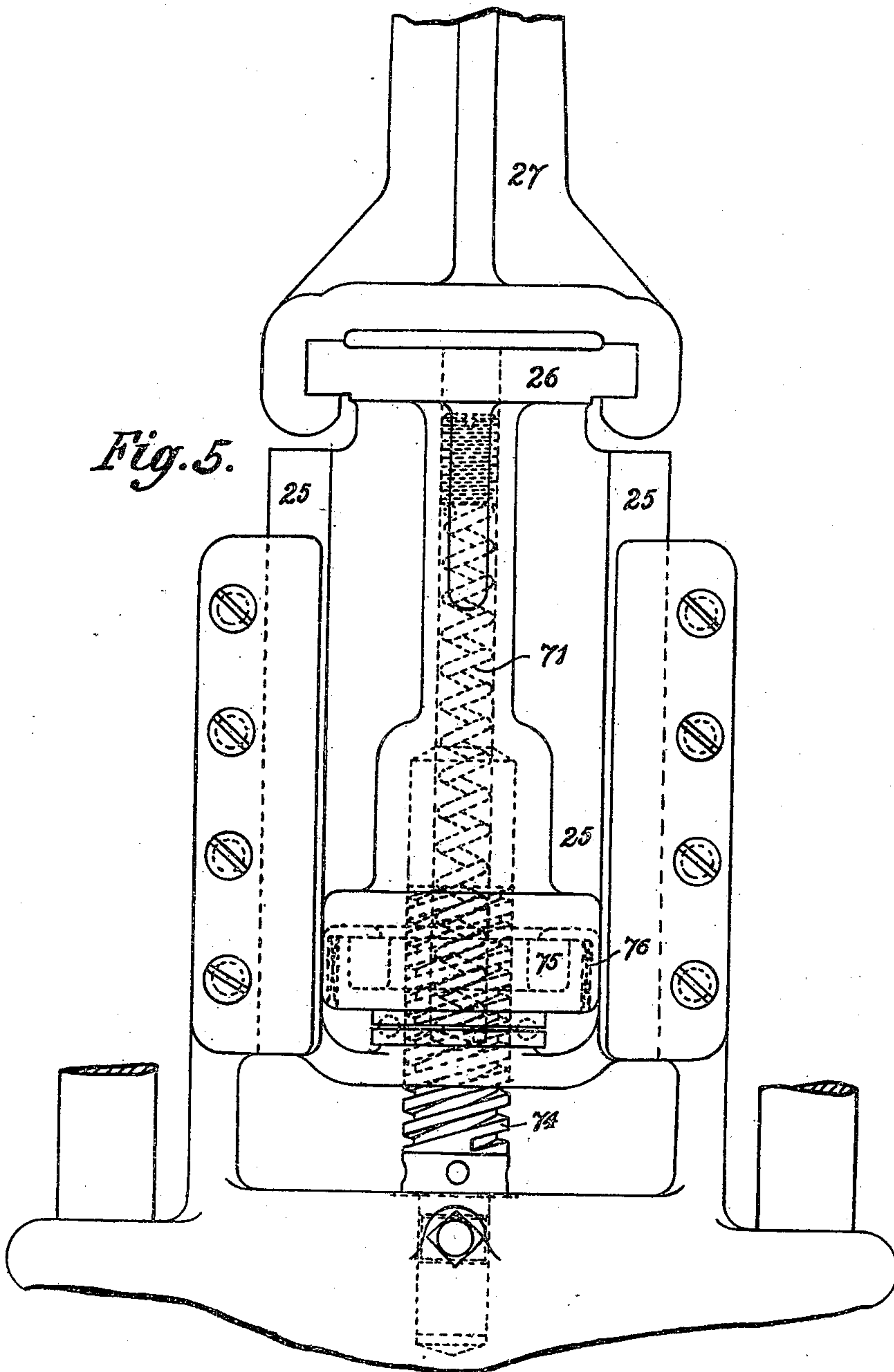
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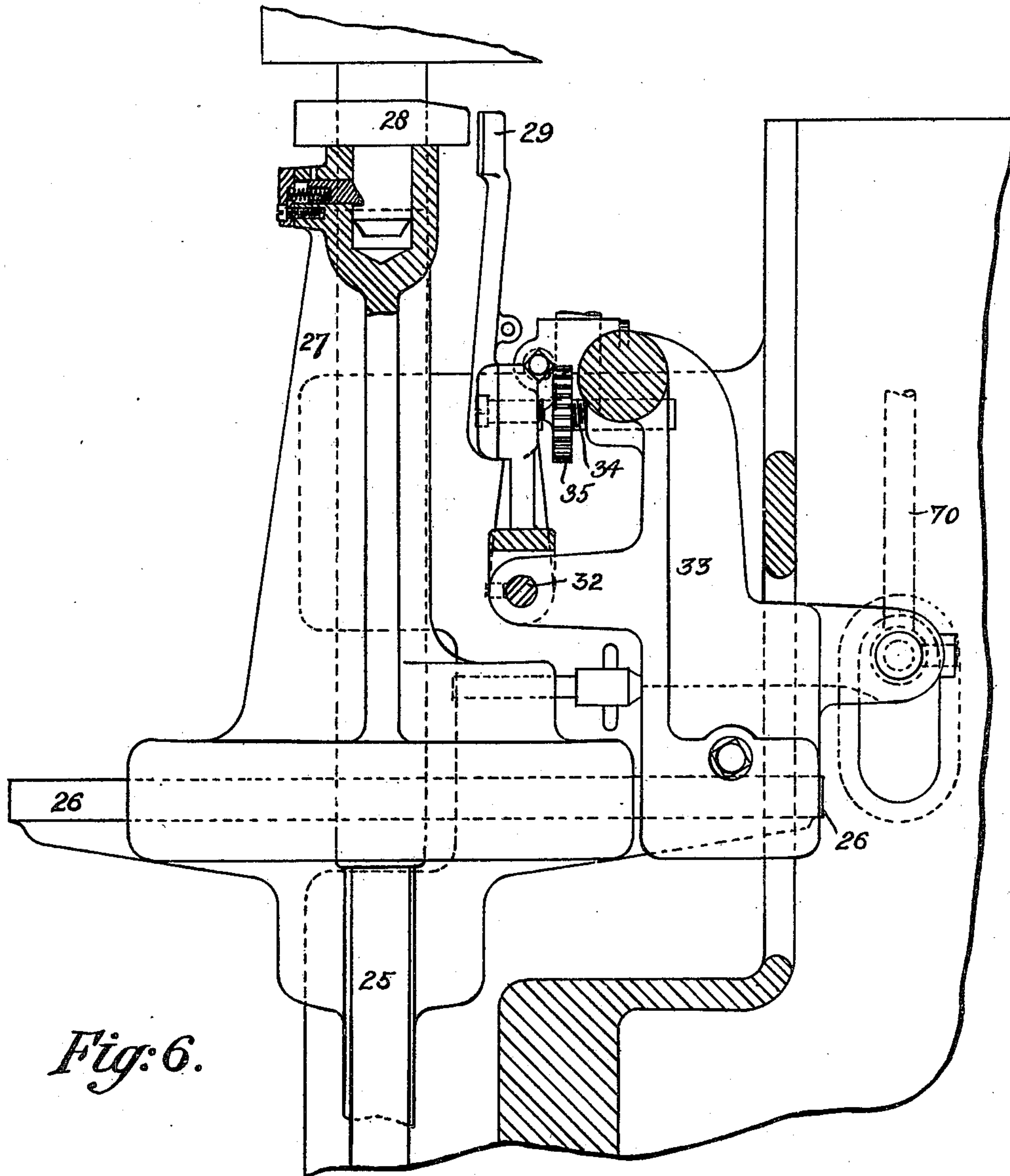


Fig. 6.

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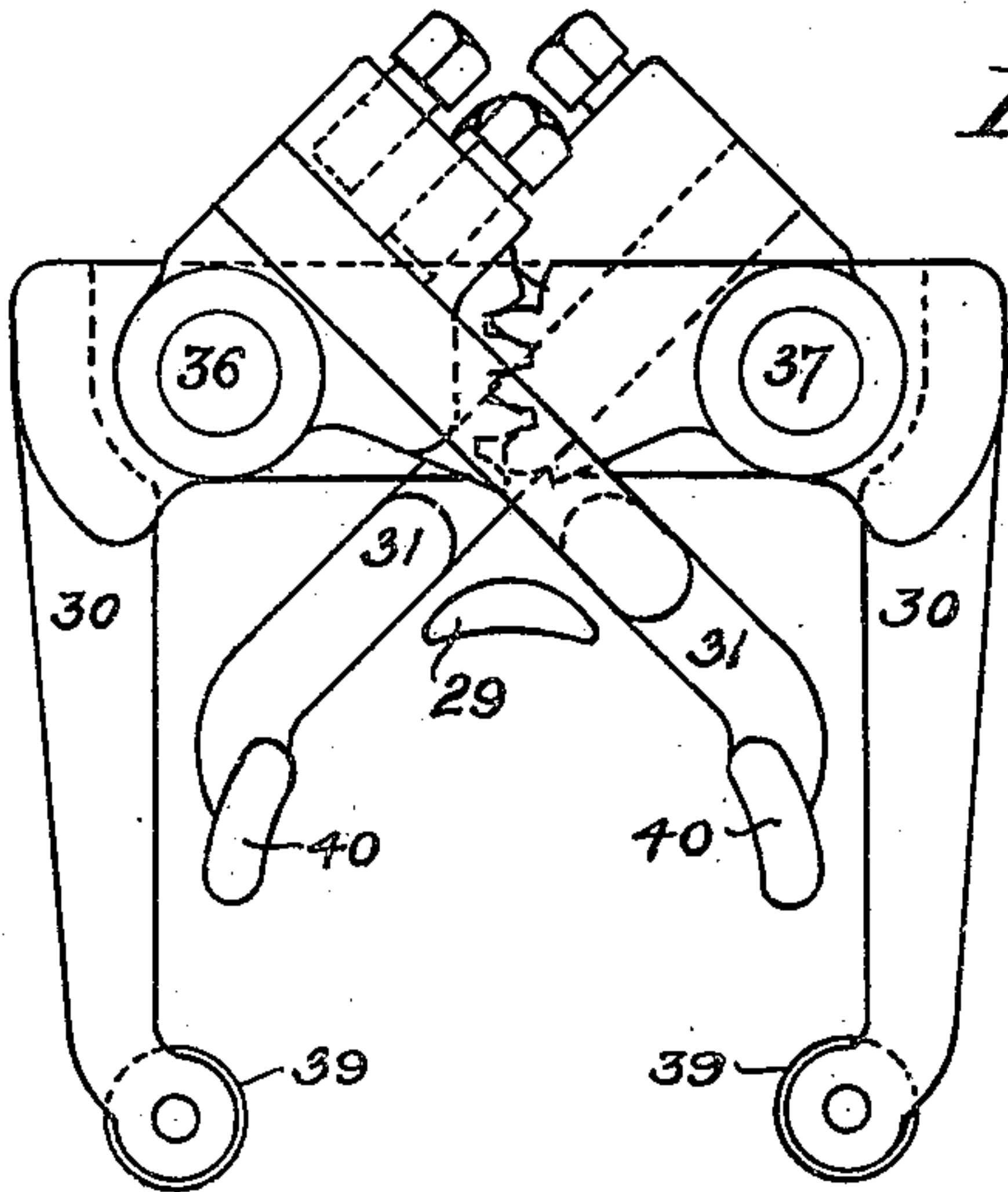


Fig. 7.

Fig. 8.

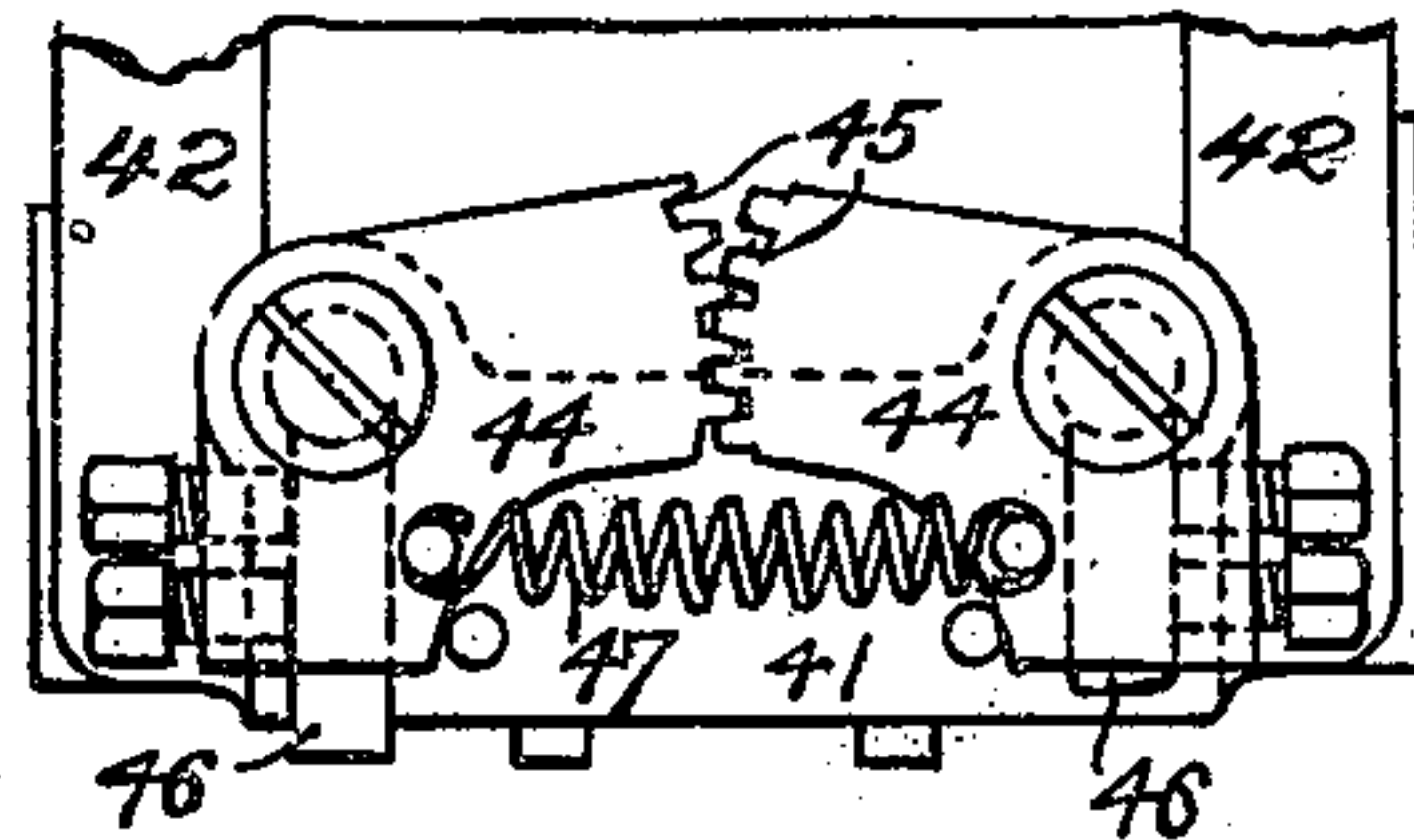


Fig. 9.

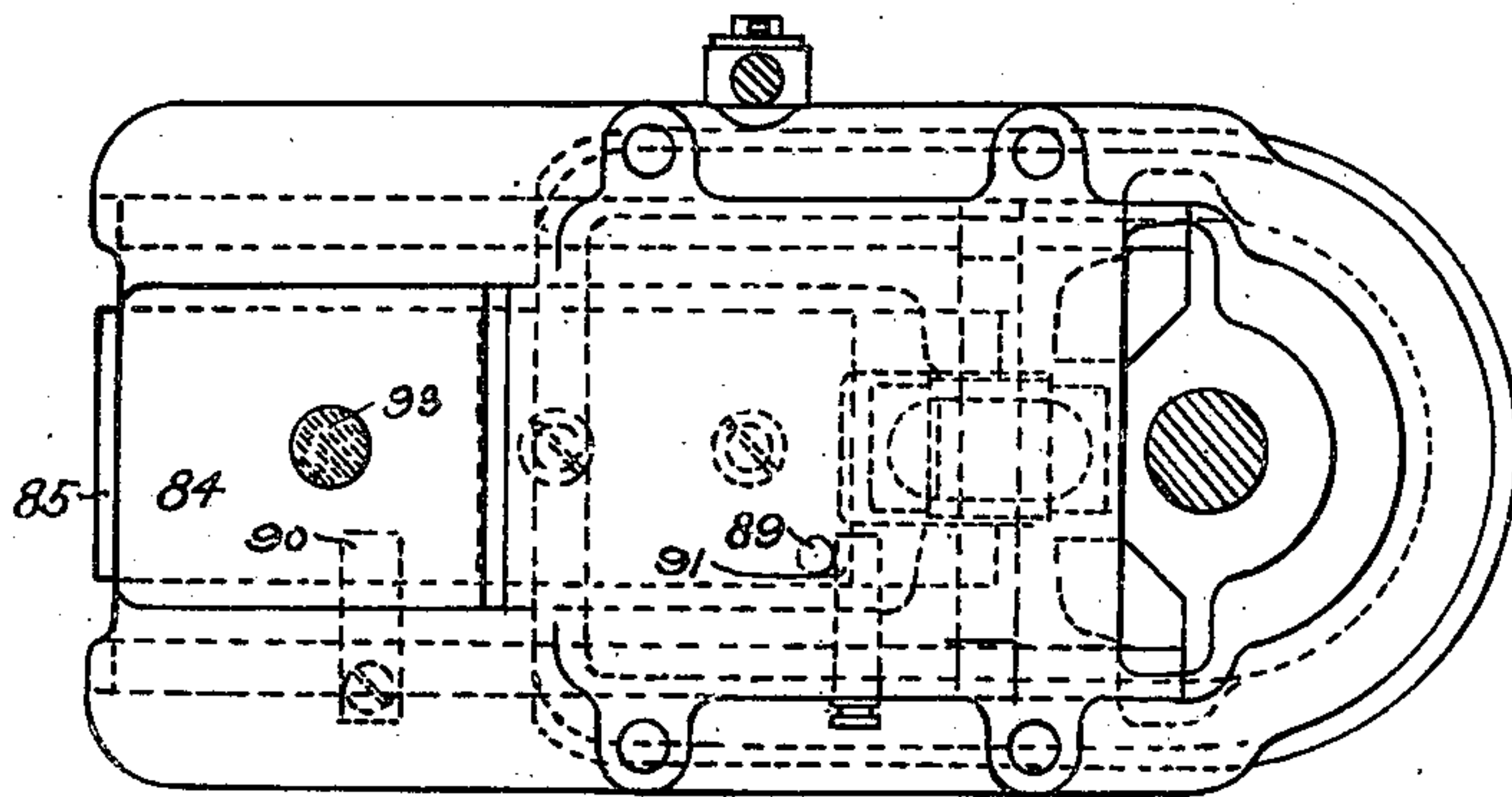
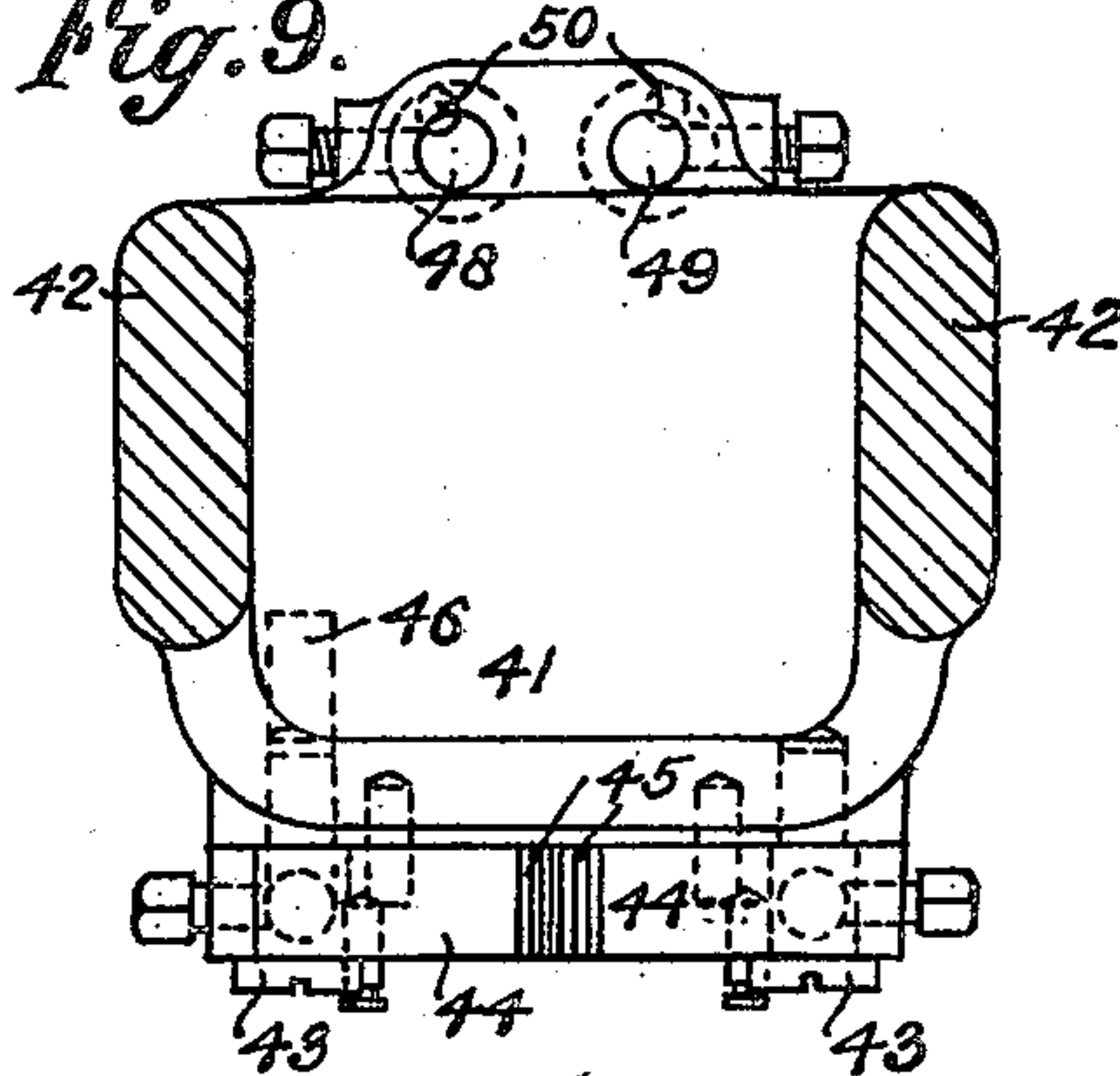


Fig. 13.

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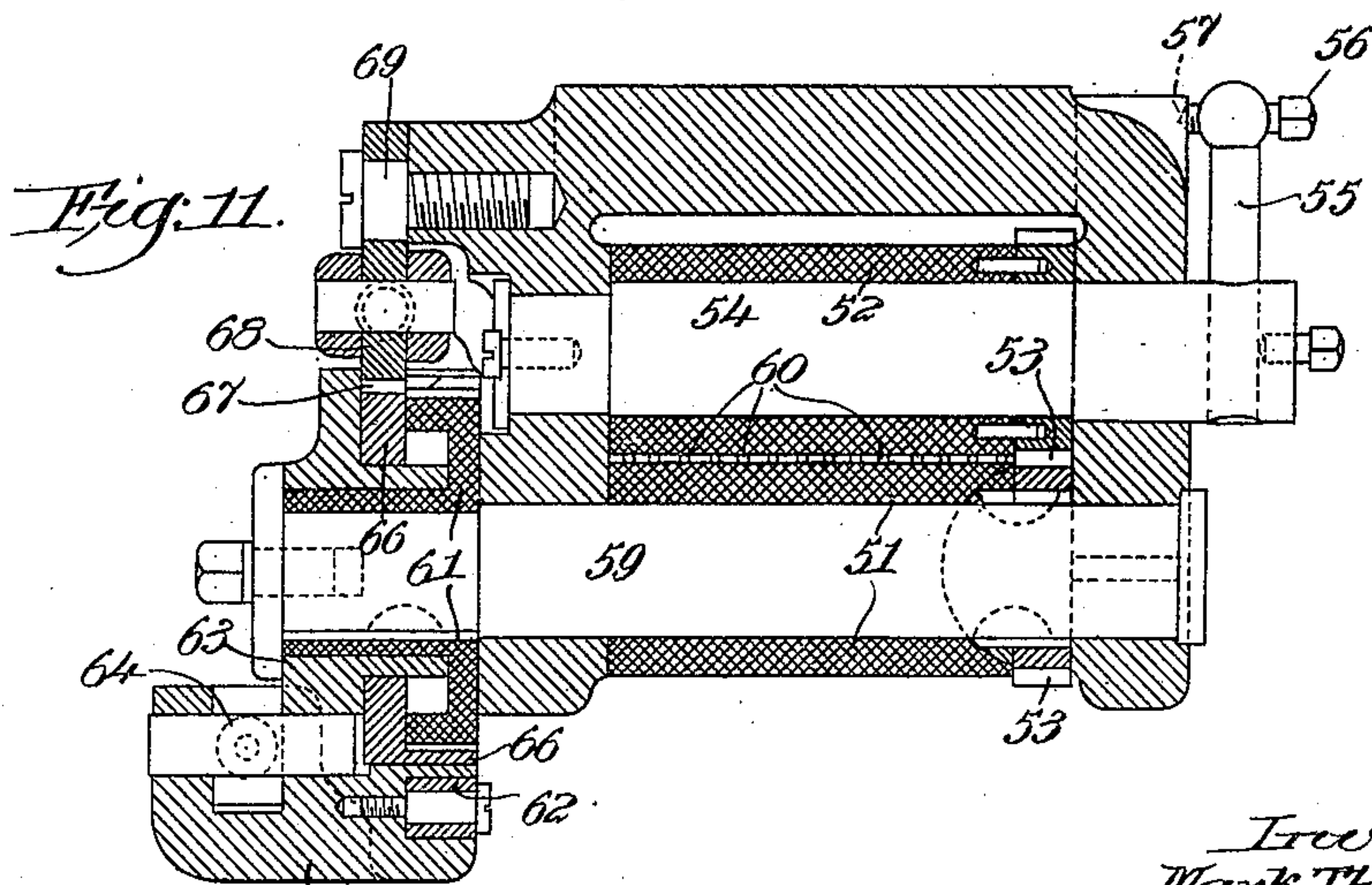
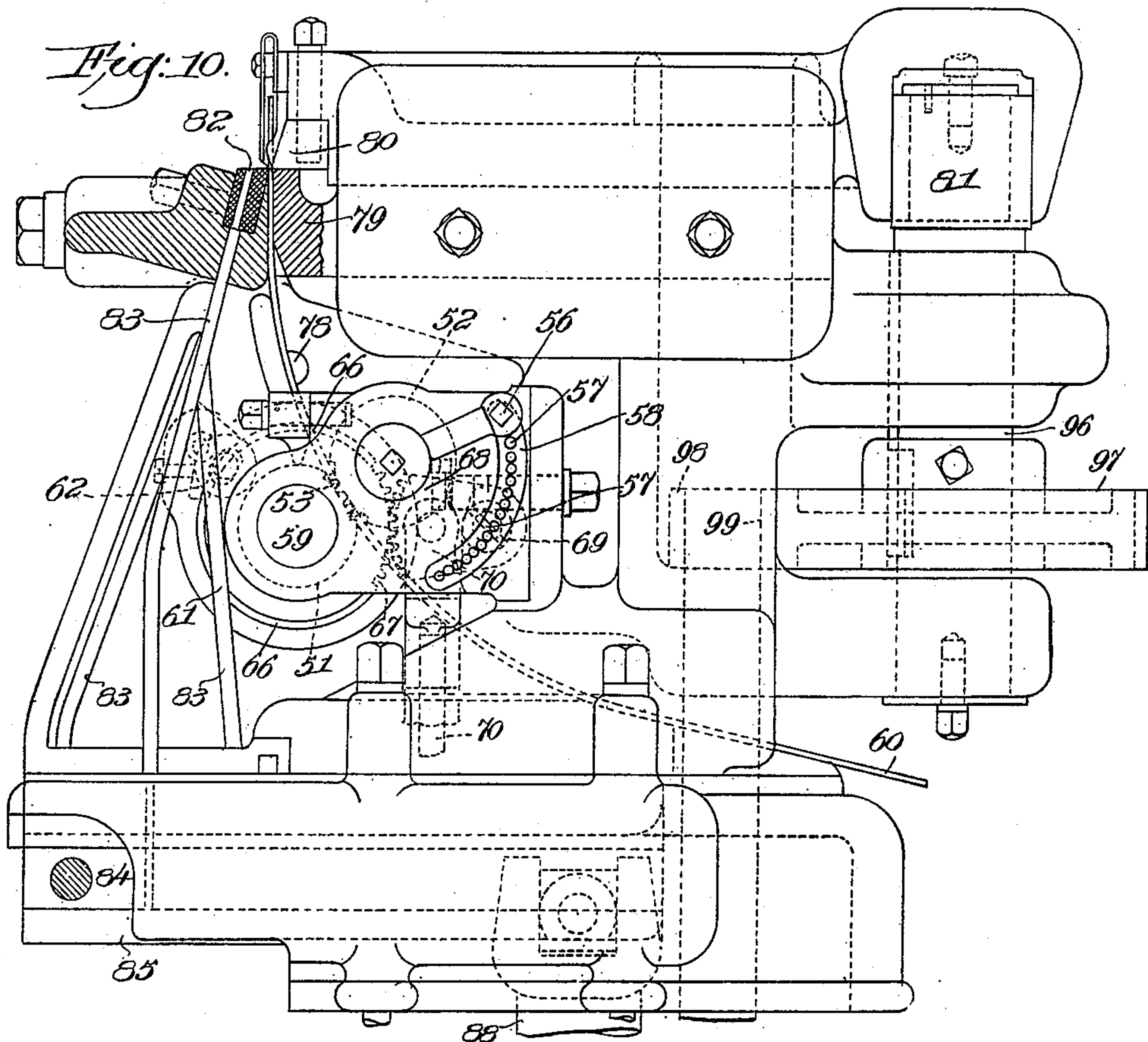
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APPLICATION FILED OCT. 9, 1907.

993,514.

Patented May 30, 1911.

8 SHEETS—SHEET 7.



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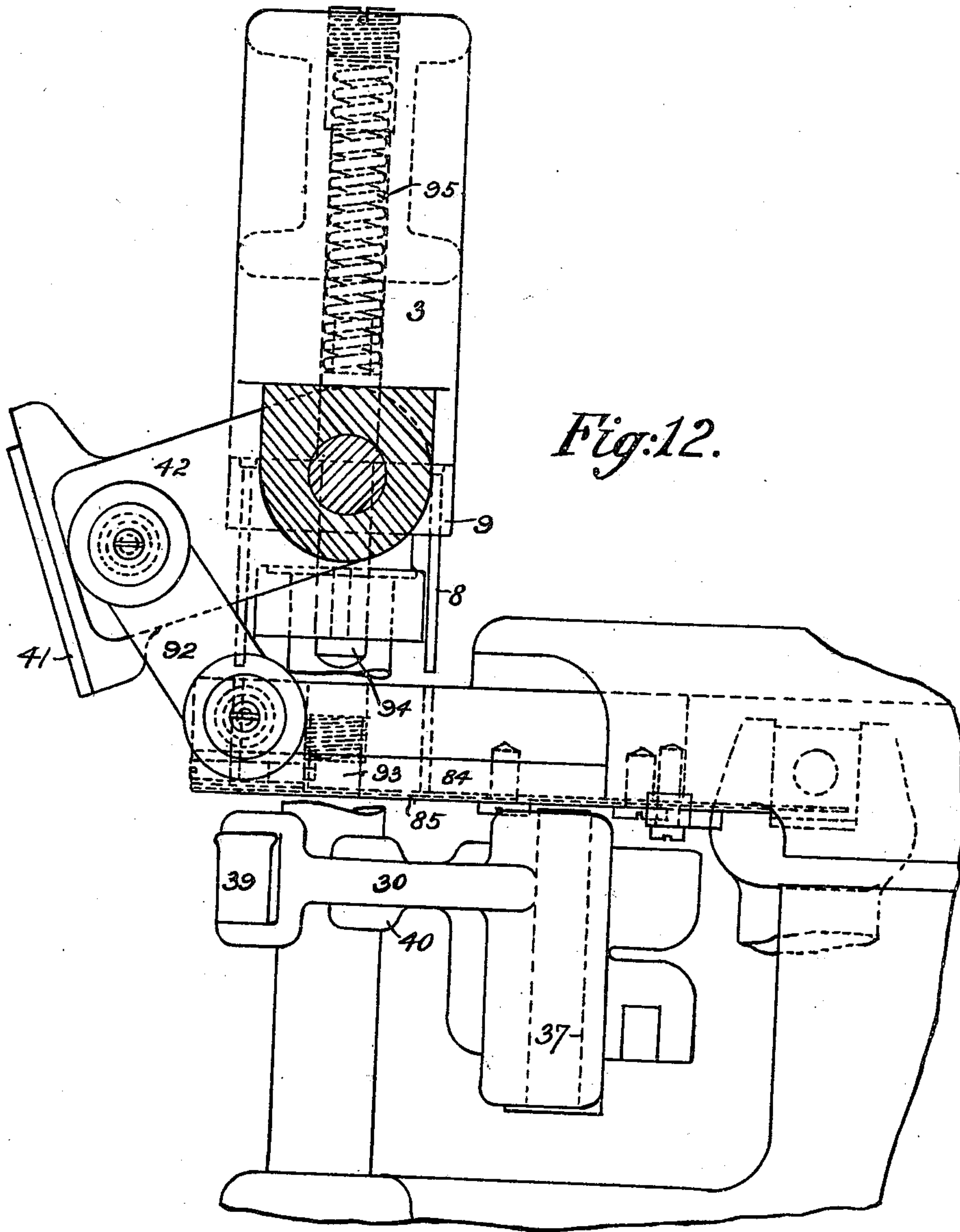
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8 SHEETS—SHEET 8.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR ATTACHING THE HEELS OF BOOTS AND SHOES.

993,514.

Specification of Letters Patent. Patented May 30, 1911.

Application filed October 9, 1907. Serial No. 396,558.

To all whom it may concern:

Be it known that I, MARK THOMAS DENNE, a subject of the King of Great Britain and Ireland, residing at Rushden, Northamptonshire, England, have invented new and useful Improvements in Machines for Attaching the Heels of Boots and Shoes, of which the following is a specification.

This invention has reference to improvements in machines for attaching the heels of boots and shoes, which improvements comprise *inter alia* the automatic positioning of the seat of the shoe and the top piece of the heel; the automatic feeding and measuring of the wires to form the nails; the automatic distribution of the nails ready to be driven; the application of a top piece after the main part of the heel has been nailed on; and the means for effecting these all substantially as hereinafter described.

A machine embodying my invention is illustrated in the accompanying drawings in which like numerals of reference indicate corresponding parts throughout the several figures and in which:

Figure 1 is a front elevation and Fig. 2 a side elevation of the machine, parts being shown in section. Fig. 3 is a sectional plan view of the main cams and a worm wheel and worm for driving same. Fig. 4 is a sectional side elevation of the driving mechanism and also the brake mechanism hereinafter referred to. Fig. 5 is a front elevation of the horn carrying slide. Fig. 6 is a side elevation, partly in section, of the horn and the stop to assist in correctly placing the work. Fig. 7 is a plan view of the means for positioning the work laterally. Figs. 8 and 9 are a front view and a plan respectively of the means for positioning and holding the top piece of the heel. Fig. 10 is a side elevation showing the wire feed mechanism and also the cutting off mechanism and the distributing mechanism. Fig. 11 is a sectional plan view, on an enlarged scale, of the wire feed mechanism. Fig. 12 is a side elevation showing the nail carrier in position for the nails to be driven and also showing, in side elevation, the means for securing the lateral positioning of the work, and Fig. 13 is a plan view showing the nail carrier and the means for retaining and releasing the nail carrier.

In the said drawings 1 indicates the frame of the machine which is made of suitable

shape and supports the working parts in any suitable and usual manner.

2, 2, are slidable rods guided to move in a vertical direction and carrying at their upper ends a vertically movable cross-head 3 and at their lower ends a cross-head 4. Said rods and consequently the cross-heads are normally maintained in their highest position by springs 5 acting at one end against a fixed part 6 of the frame and at their other ends against collars 7 on the rods 2.

The downward movement of the cross-head 3 is utilized to drive the nails for which purpose the lower face of said cross-head is provided with drivers 8 attached to the cross-head by a plate 9 having apertures through which the drivers pass so that the drivers are properly positioned and distributed according to the shape and size of heel to be attached and which plate may be changed when required, to suit any other size and shape of heel.

At the lower part of the frame 1, I provide a horizontal shaft 10 on which I mount a worm wheel 11 which is driven by a worm 12 carried on a vertical shaft 13 whose lower end is provided with one member 14 of a cone or friction clutch, see Fig. 4, the other member 15 of which also forms the driving pulley of the machine and is capable of being raised on the shaft 13 into frictional engagement with the part 14 by depressing a treadle 16 fulcrumed at 17 and normally held raised by a spring 18. By releasing the treadle 16 the driving pulley 15 will disconnect from the part 14 and in order to insure a rapid stopping of the said part 14 when the treadle is so released I provide a brake 19 carried on a brake bar 20 pivotally mounted at 21 and having a thrust rod 22 adjustably secured to the free end of said bar 20 which rod 22 rests on the treadle bar 16 the arrangement being such that if the treadle be depressed for the purpose of starting the machine by causing the parts 14, 15, to engage the rod 22 will follow the treadle and the bar 20 will rock on its pivot 21 and remove the brake 19 from the rotary member 14, but when the treadle is released to disconnect the parts 14, 15, the upwardly moving part of the treadle will thrust the rod 22 upward and thereby rock the bar 20 and apply the brake 19.

The worm wheel 11 is formed or provided with a cam 23, see Fig. 3, and the

cross-head 4 has a cam roll 24 engaging and held pressed against the said cam by the action of the springs 5 the said cam, as the worm wheel 11 rotates serving to depress the cross-head 3 at the proper time to drive the nails.

At a convenient part of the frame I provide a vertical slide 25, Figs. 1 and 5, carrying a horizontal and frontwardly extended plate or slide 26 on which I slidably mount the horn 27 which is provided with the usual heel support 28, Figs. 1 and 6, said heel support or block being removable so that it may be changed when necessary for one of a different size or shape. When a boot or shoe is to be operated on the horn is slid outward toward the operator and clear of the mechanism, the boot or shoe is put on and the horn is slid back to a position beneath the nail driving mechanism and to insure the correct placing of the heel seat I provide an adjustable stop 29 against which the work is pushed and I also provide two pairs of levers 30, 31, Fig. 7, whose free ends act as lateral stops all as now to be described.

The stop 29 is pivotally carried at 32 by a column 33 which is adjustably fixed to the slide 26 so that the column 33 and stop 29 move vertically with the slide 25. The column 33 is provided with an adjusting screw 34 which will project more or less accordingly as its head 35 is rotated in one or other direction and the shank of the stop is pulled or pushed back against the screw 34 by a spring not shown thereby determining the distance back that the boot or shoe can be moved.

The levers 30, 31, whereby the lateral adjustment of the work is to be effected are shown in Fig. 7. The levers 30 are pivotally mounted on studs 36, 37 and one limb of each lever is formed with teeth which are in engagement so that both levers move in unison. The free ends of the levers are drawn toward each other by a spring not shown and they may be provided with rollers 39 to fit against the vamp. The levers 31 are also pivotally mounted on the studs 36, 37, but they are made to cross each other and they are geared together in a similar manner to the levers 30 and consequently also move in unison, and their free ends, which are formed or provided with pads 40, are also made to move toward each other by a spring—not shown.

It will be evident that when a shoe has been put on the block 28 and the horn 27 is pushed back until the extreme back of the vamp is against the stop 29, the side parts of the vamp will have forced the free ends of the levers apart to an extent to accommodate the work but as each lever moves to the same extent relatively to a line drawn centrally between them it follows that the

heel seat of the shoe will be properly centered. The block 28 may be adjustable on the horn in any desired manner to accommodate itself as necessary.

The reason that the levers 31 are mounted so as to cross each other is to enable the pads 40 to move not only in a sidewise direction (which is sufficient for the rollers 39 as these only move to adapt themselves to the width of the shoe) but also in a rearward direction, as these pads bear against the curved portion of the vamp between the sides of the shoe and its extreme rear, and must consequently adapt themselves to various curvatures or shapes and sizes. The springs drawing the pairs of levers 30 and 31 respectively together are made sufficiently strong that the rollers 39 and pads 40 will press on the vamp with sufficient force to prevent spreading when the heel is being nailed.

In my improved machine I first attach a heel minus the top piece, leaving a sufficient length of the nails projecting above the heel that the top piece will be secured thereby when pressed thereon, but without the nails coming through. I further intend that the top piece shall form the guide for the heel trimming or paring tool whereby the heel will eventually be properly shaped. It is necessary therefore that the top piece be correctly positioned with respect to the heel seat and irrespective of the heel proper. To enable this to be effected in a simple and expeditious manner I provide a carrier adapted to receive and lightly hold a top piece in proper relation to the heel seat and which carrier is automatically moved clear to enable the nails to be driven when the heel is to be attached and is automatically moved into its proper position relatively to the heel seat and over the heel immediately after the heel proper has been attached, so as to be itself attached on said heel.

In the preferred embodiment of my invention the carrier consists of a platen 41 pivotally connected by arms 42 to the cross-head 3. On the front end of said platen I provide studs 43 on which I mount bell-crank levers 44 one limb of each of which is formed with teeth 45 which are in engagement so that both levers must move in unison. To the other limb of each of the levers 44 I attach a clip or holder 46 and I provide a spring 47 to draw the limbs carrying the holders 45 together so that said holders will engage with the opposite edges of a top piece and hold it in proper position laterally and central with the heel seat when the platen is in the position over said seat. To insure the proper positioning of the top piece in its longitudinal direction I provide the platen with two rotatable studs 48, 49 each having a pin 50 projecting below the surface of the platen said pins being eccen-

tric to the studs. The top piece is pushed between the holders 46 until it comes in contact with the pins 50.

To adjust the pins 50 according to the particular shape and size of the top piece to be used, it is only necessary to rotate the pins 48, 49, as will be readily understood from the drawings. The movement in and out of position of the platen 41 is attained by means to be hereinafter described.

The nails to be used for securing the heel are cut from continuous wires, a number (corresponding to the number of nails to be driven simultaneously) of coils of which are suitably supported at the back of the machine. The wires 60 are fed between a pair of feed rolls 51, 52, provided with gears 53 so as to rotate together. One of the feed rolls (52) is carried on a spindle 54 which is made to be slightly eccentric to its ends where said spindle is supported in bearings so that by rotating said spindle the roller 52 will be moved closer to or farther from the other roller. This adjustment of the rollers 51, 52 is to enable them to properly grip the particular size of wire about to be used. One end of the spindle 54 has an arm 55 whose free end is provided with a screw pin 56 or equivalent, the pointed end of which may be engaged with any of the counter-sinks 57 on a segment 58 to secure and retain the roller 52 the desired distance from the other roller.

The spindle 59 on which the roller 51 is secured has intermittent rotary motion imparted to it, each such rotary movement serving to feed forward a sufficient length of wires. For this purpose said spindle has at one end a ratchet wheel 61 fixed to it with which a spring pressed pawl 62 is adapted to engage. Said pawl is carried on a carrier 63 mounted loosely on a sleeve-like extension of the ratchet wheel 61 and connected to an arm or lug on said carrier is a rod 64 which is operated at its other end by a wiper 65 fixed to one side of the worm wheel 11. By this means the pawl is caused to move through a given arc for every complete revolution of the worm wheel 11 and would, except for the means to be hereinafter described, rotate the feed rolls 51, 52, to a constant or equal extent and thus feed a constant or equal length of wires for each such revolution of the worm wheel. As it is desirable however to be able to vary the length of the wire to be cut off to adapt the machine for use when heels of various or different thicknesses are to be fixed I so proportion the parts that when the pawl has free access to the ratchet wheel 61 the feed rolls will feed the greatest length of wires that will at any time be required. To enable any shorter length of wires to be fed, I provide a shield or the like 66 to cover or surround the ratchet wheel 61 but having a

slot in its periphery for the passage there-through of the pawl 62 to engage and rotate the ratchet wheel 61. Said shield is rotatably mounted on a sleeve-like extension of the carrier 63 and it is formed at a suitable part with teeth 67 with which a toothed segment 68, pivotally mounted at 69, engages. By moving the segment 68, in one direction, the shield 66 will cover some of the teeth which would otherwise be engaged by the pawl, with the result that said pawl will move or rotate the ratchet wheel a less distance and consequently the feed rolls will feed forward a shorter length of wires.

In order that the length of wires fed by the feed rollers shall automatically be varied accordingly as the thickness of the seat, heel and top piece together, varies, I pivotally attach a rod 70 to the toothed segment 68 and the other end of said rod I pivotally attach to a lug on the standard 33 whereby the segment 68 and consequently also the shield 66 will be partially rotated every time the slide 25 is moved up or down and the extent of such partial rotation will be in proportion to the amount of the vertical movement of the slide 25. To get the correct amount of such movement I position a boot or shoe with its seat on the block 28 and place a heel on said seat and having placed a top piece on the platen 41 and moved the latter into its operative position *i. e.* vertically above the block 28 I cause the slide 25 to move upward until the block 28 firmly presses the heel seat, heel and top piece together against the platen. The extent of movement of the slide 25 is of course determined by the thickness of the particular seat, heel and top piece and as a result the length of wires fed by the feed rolls will also thereby be determined, it being borne in mind that the dimensions of the various parts described are to be such that the actual length of the wires or pins cut off must be a little less than the thickness of the seat and heel and top piece combined if the wires are not to pass completely through said top piece. The slide 25 is constantly pressed upward by a spring 71 said slide being adapted to be depressed—to permit the work to be put on or taken off the horn—by a treadle 72 to which said slide is connected by a chain 73 or equivalent.

As it will be necessary, when the nails are to be driven to attach the heel to the seat and also when the top piece is to be pressed on the nails projecting above the heel when nailed that the horn or the slide carrying the horn be locked so as to withstand the pressure, I mount the slide 25 on a fixed or non-rotatable screw 74 the slide being provided with or carrying a nut 75 which is engaged with said screw. The thread of the screw has such a pitch that the slide 25 can be slid up and down as required, the nut, if free

during such movements of the slide, being merely rotated by the screw. It will be obvious that if the nut be prevented from rotating the slide will be locked, and to effect this I form the outer periphery of the nut with ratchet teeth 76 and at a suitable position I provide any suitable known mechanism or means (not shown) which by moving a knee-lever 77 or a treadle or other equivalent, will effect the locking of the nut 75. The number of teeth on the periphery of the nut being considerable, a very fine adjustment of the position of the horn may be attained.

The wires 60 after leaving the feed rolls 51, 52, pass through a comb or the like 78 whereby said wires will be held their proper distances apart prior to their entering a die block 79 and through which the proper length of wire (obtained or measured as already described) projects, a cutter 80 operated by a cam or eccentric 81 cutting off the said projecting ends to form the nails and pushing these latter forward to cause them to drop down apertures 82 in the die block and thence into tubes 83 of a nail distributor whose upper ends are in alinement to receive the nails but which tubes are bent so that the nails will be delivered from their lower ends into a slide or carrier 84 forming part of the distributor and having apertures corresponding in position with those at which the nails are to be driven into the heel. At the bottom of the slide or carrier 84 is a plate 85 having similar holes and which plate is slidable along the carrier to a sufficient extent to cover the apertures in said carrier to prevent the nails falling out while these latter are being carried to the position under the drivers 8. Said drivers are of course fixed in such positions that they will enter the apertures in the carrier 84 and—the plate 85 having at the proper time been moved to open the lower ends of the apertures in said carrier—drive the nails through the heel and seat of the shoe.

The sliding motion of the carrier 84 is obtained from a cam race 86 in the cam 87 fixed to or forming part of the worm wheel 11 through the instrumentality of a lever 88, and in order to cause the plate 85 to, at the proper times, open and close the apertures in the carrier 84, I fix a pin 89 to said plate which pin contacts at or about each end of the stroke of the carrier with one or other of the pins 90, 91 carried by a stationary part of the machine or frame. The platen 41 must of course be moved out of the way to permit the carrier 84 to be brought under the drivers and to enable the heel to be attached, and to effect this I connect said platen to the carrier by links 92 so that the movement forward of the carrier will cause the platen to swing on its pivot to the extent necessary. In order to prevent the

movement sidewise of the heel or top piece as it is about to be nailed or attached, I provide a presser 93 which is acted on by a spring 95 and pin 94, and which presser is serrated on its lower face so as to have a firm grip of the heel or the top piece.

The machine operates as follows:—The knee lever 77 is pushed to one side and the treadle 72 depressed to lower the horn. The latter is pulled out and a boot or shoe placed in position thereon and the horn returned. A heel is placed on the seat of the shoe and a top piece on the underside of the platen. The treadle 72 is released whereby the seat, heel and top piece will be compressed, and the proper length of wires to be cut, measured. Said wires are then cut off and brought under the drivers by the distributor, the platen with the top piece being moved away. The cam operates the cross-head, the drivers on which drive the nails whereby the heel is attached to the seat of the shoe, a short length of the nails being left projecting above the heel. The cross-head then lifts, the slide is moved back, and the platen brought into position over the heel. The cross-head again descends and presses the top piece on to the projecting ends of the nails. The operator then releases the horn by means of the knee lever and depresses the slide, pulls out the horn to remove the boot or shoe and repeats the operations.

The cam races are of course made of suitable shapes according to the dimensions of the various parts and the amount of movement required.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In a machine for attaching heels to boots and shoes, in combination, a frame, driving mechanism to operate the working parts of the machine, a vertically and horizontally movable horn, a vertically reciprocating cross-head, drivers carried thereby and located over said horn, a platen normally located between and movable relatively to said horn and said drivers, arms pivotally connecting the platen and the cross-head, a carrier, means to reciprocate it horizontally and automatically for positioning nails below the drivers after the platen is moved out of its normal position between the horn and drivers, and a link connecting the carrier with said platen, reciprocation of the carrier swinging the platen with relation to the cross-head and drivers.

2. In a machine for attaching heels to boots and shoes, in combination, a frame, driving mechanism to operate the working parts of the machine, a vertically and horizontally movable horn, a vertically reciprocating cross-head, drivers carried thereby, and located over said horn, a platen normally located between and movable relatively to said horn and said drivers swing-

ing supports for the platen, connected with and depending from the cross-head, to suspend the platen therefrom, a carrier for positioning nails below the drivers when the platen is moved out of its normal position below the drivers, and between them and the horn, a link connecting the carrier with said platen and automatic means to reciprocate the carrier horizontally to thereby move it intermittently to a position between the drivers and the horn, such movement of the carrier acting through the link to swing the platen forward out of the path of the drivers when the cross-head descends and the carrier is beneath the drivers.

3. In a machine for attaching heels to boots and shoes, in combination, a frame, driving mechanism to operate the working parts of the machine, a vertically and horizontally movable horn, drivers located over said horn, a vertically reciprocating member with which said drivers are connected, a platen normally located between and movable relatively to said horn and drivers, swinging suspending means for the platen, pivotally connected with said reciprocating member, a carrier for positioning nails below the drivers after the platen is moved out of its normal position between the horn and drivers, a link pivotally connecting the carrier with said platen to swing the latter into and out of operative position, means to reciprocate the carrier horizontally to intermittently position it between the drivers and the horn, a plate on the lower face of and supported by said carrier to support the nails while the carrier is being moved into position below the drivers, said plate being movable bodily with the carrier and also relatively thereto, and means to cooperate with the said plate and stop the movement thereof before the movement of the carrier is completed on its stroke.

4. In a machine for attaching heels to boots and shoes, in combination, a frame, driving mechanism to operate the working parts of the machine, nail driving mechanism, a vertically and horizontally movable horn thereunder and automatically acting means to cooperate with and position the shoe on the horn, said means comprising a back stop for the work, two pairs of pivotally mounted levers, the levers of one pair being movable laterally and adapted to cooperate with the vamp at the sides of the shoe, the levers of the other pair acting against the curved portion of the vamp adjacent the back of the shoe, and having a backward movement, and also a lateral

movement, and positive connections between the levers of each pair to cause them to move equally and oppositely with relation to a central line between them, to correctly position the heel seat with relation to the nail driving mechanism.

5. In a machine for attaching heels to boots and shoes, in combination, a frame, driving mechanism to operate the working parts of the machine, a vertically and horizontally movable horn, drivers located over said horn, a carrier for positioning nails below the drivers, means to reciprocate the carrier horizontally to move it intermittently to a position between the drivers and the horn, a die block having two sets of apertures therein, means to feed forward and upward through one set of apertures a number of wires to a cutter, a cutter movable across the upper ends of both sets of apertures, to cut off lengths of wire to form nails, and to feed such nails into the second set of apertures, a distributor connected with the bottoms of the second set of apertures, to distribute the nails therefrom into the carrier, and means whereby the forward feed of the wire is governed as to the extent of its movement by the amount of the vertical movement of the horn.

6. In a machine for attaching heels to boots and shoes, in combination, a frame, driving mechanism to operate the working parts of the machine, a vertically and horizontally movable horn, a vertically reciprocating cross-head, nail drivers mounted thereon over the horn, an intermittently movable nail carrier to position the nails between the drivers and the horn, a platen pivotally suspended from the cross-head and movable into and out of position below the drivers, pivoted connections between the platen and nail carrier, to effect such swinging movement of the platen into and out of position between the drivers and the horn, said platen when operatively positioned rising and falling with the drivers immediately below the same, adjustable stops on the platen to longitudinally position the top piece thereon, and laterally movable spring retracted holders to engage and position the top piece laterally.

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

MARK THOMAS DENNE.

Witnesses:

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