

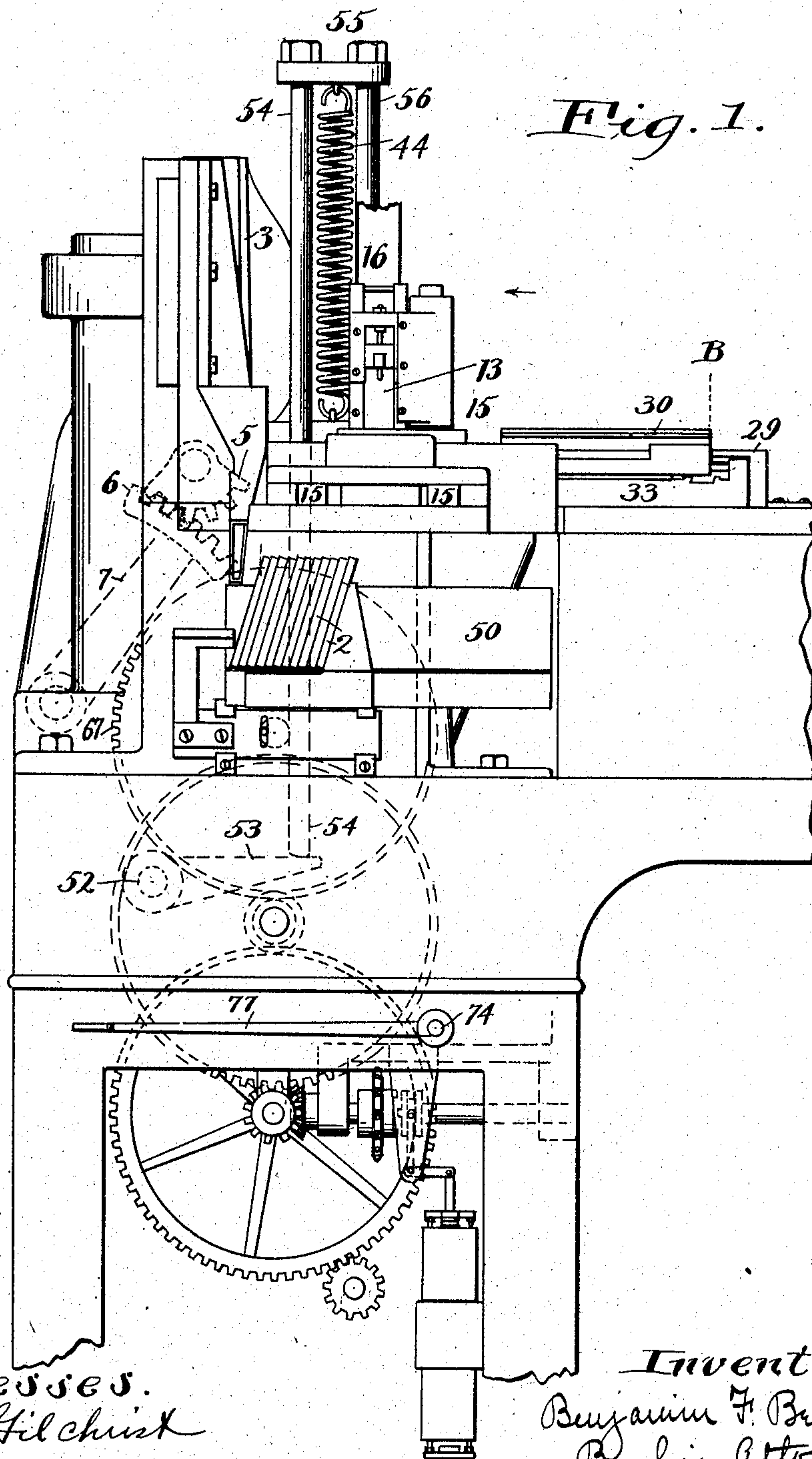
No. 791,747.

PATENTED JUNE 6, 1905.

B. F. BELLOWS.  
LOGOTYPE CASTING MECHANISM.

APPLICATION FILED JULY 11, 1904.

7 SHEETS—SHEET 1.



*Witnesses.*  
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*B. W. Brackett.*

*Inventor*  
*Benjamin F. Bellows,*  
*By his Attorneys,*  
*Thurston & Bates*

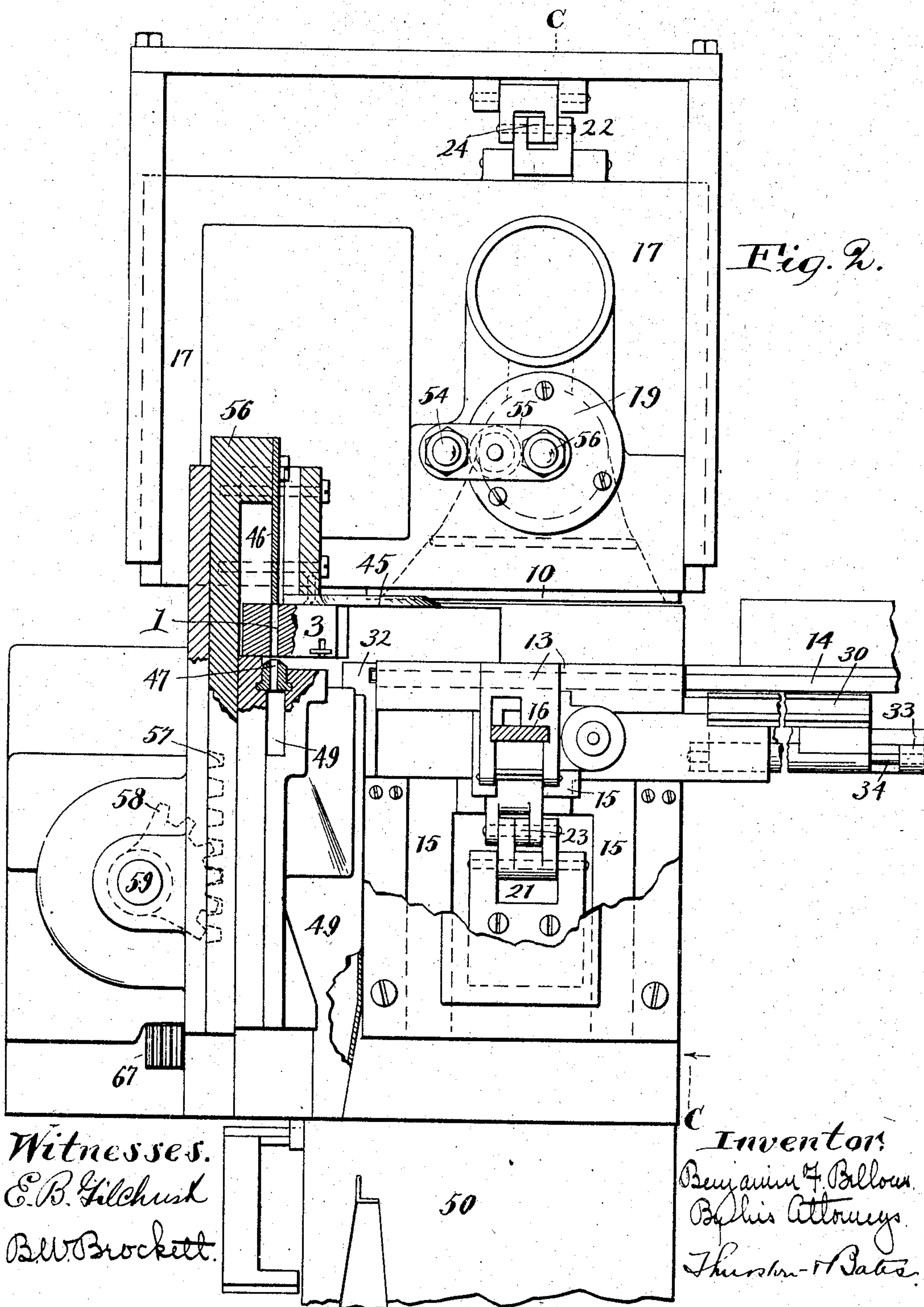
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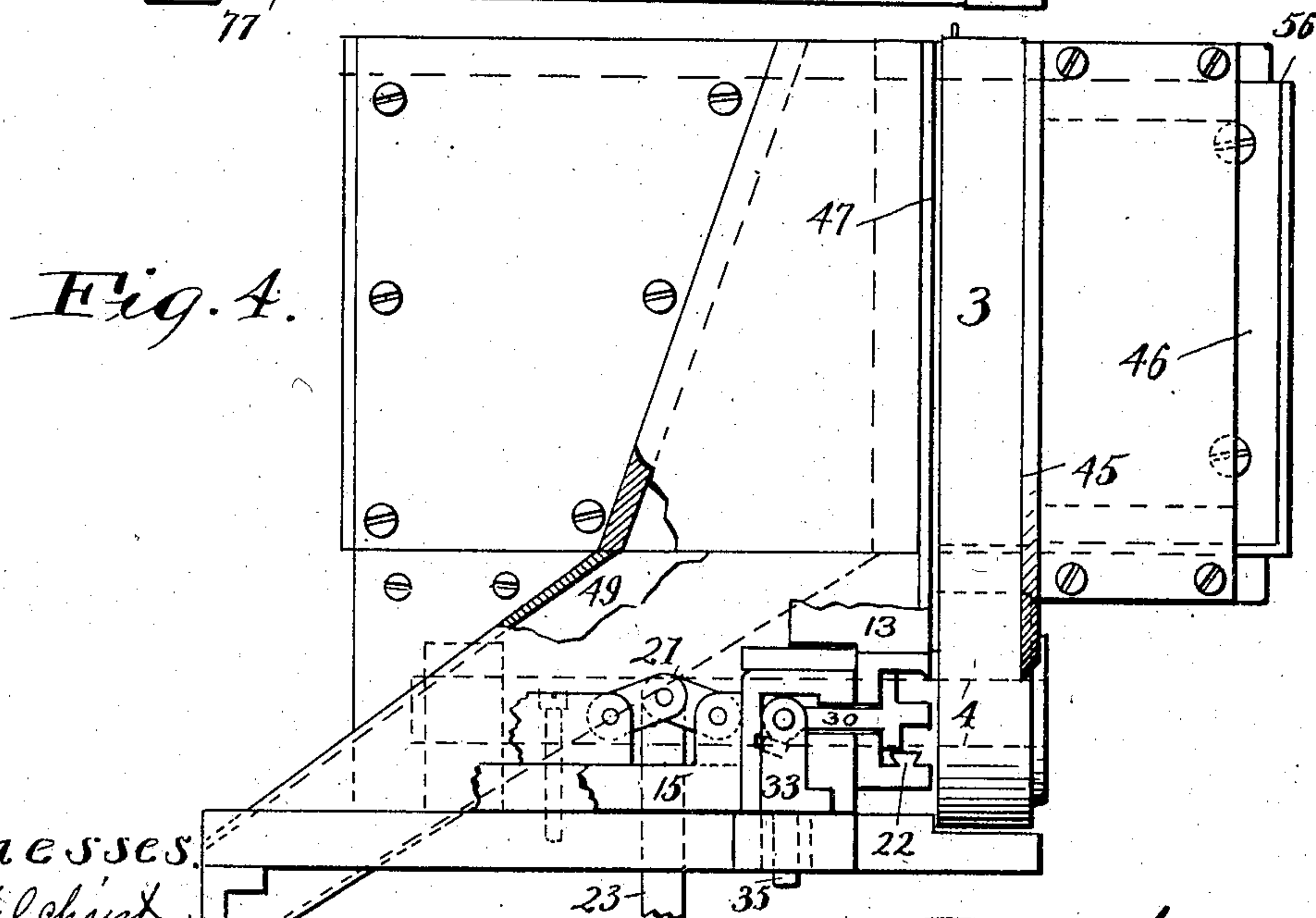
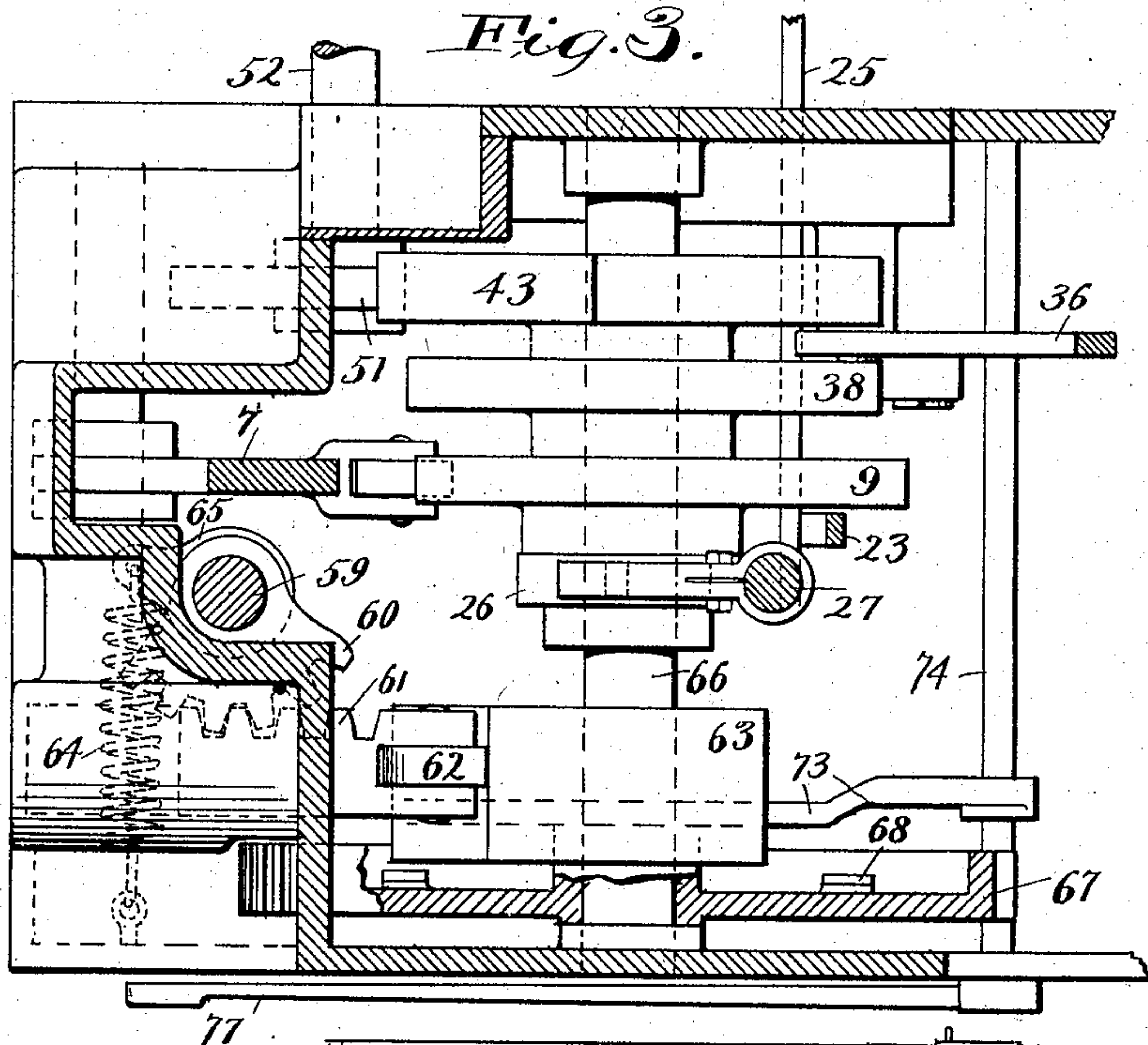
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7 SHEETS—SHEET 3.



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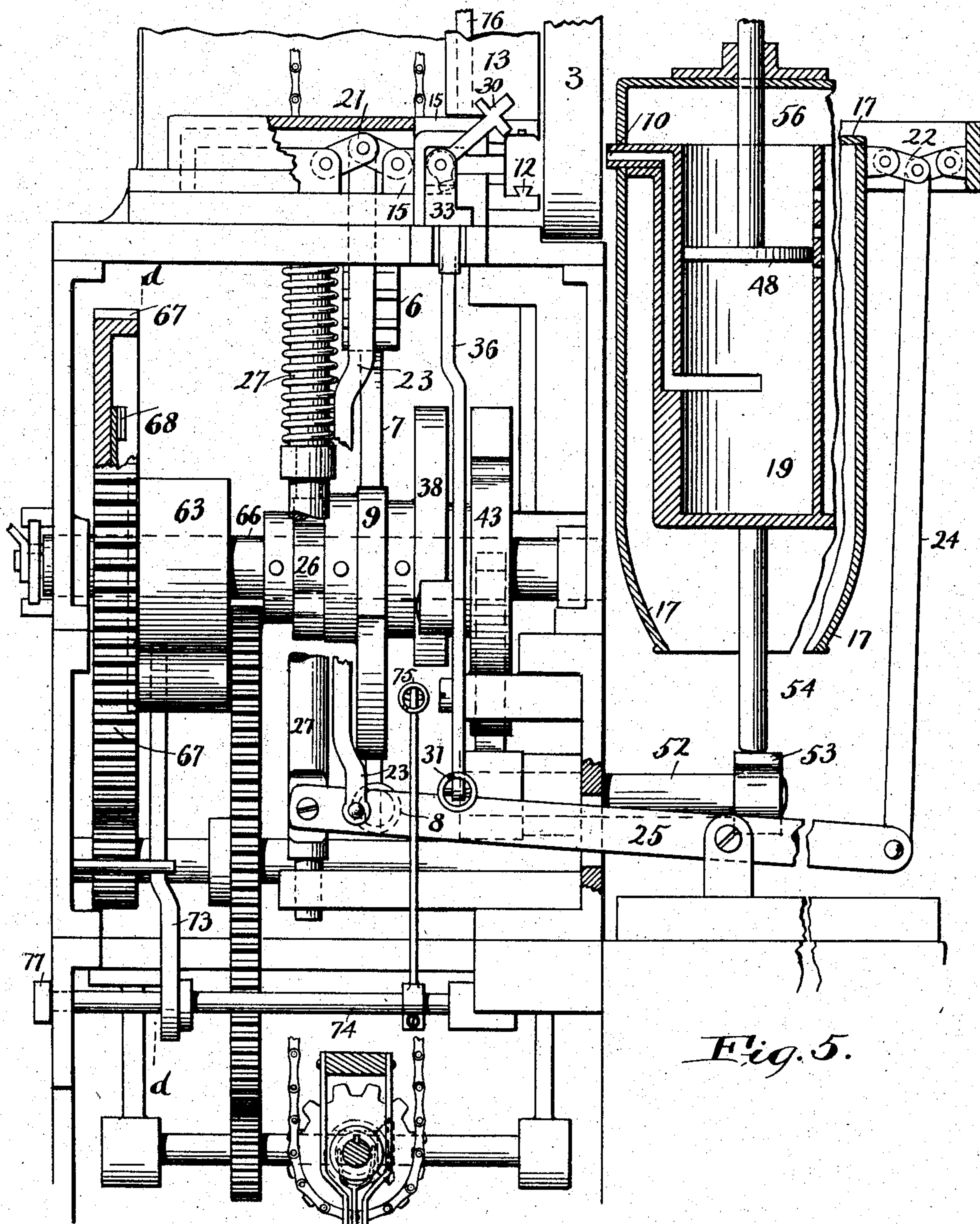
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7 SHEETS—SHEET 4.



*Fig. 5.*

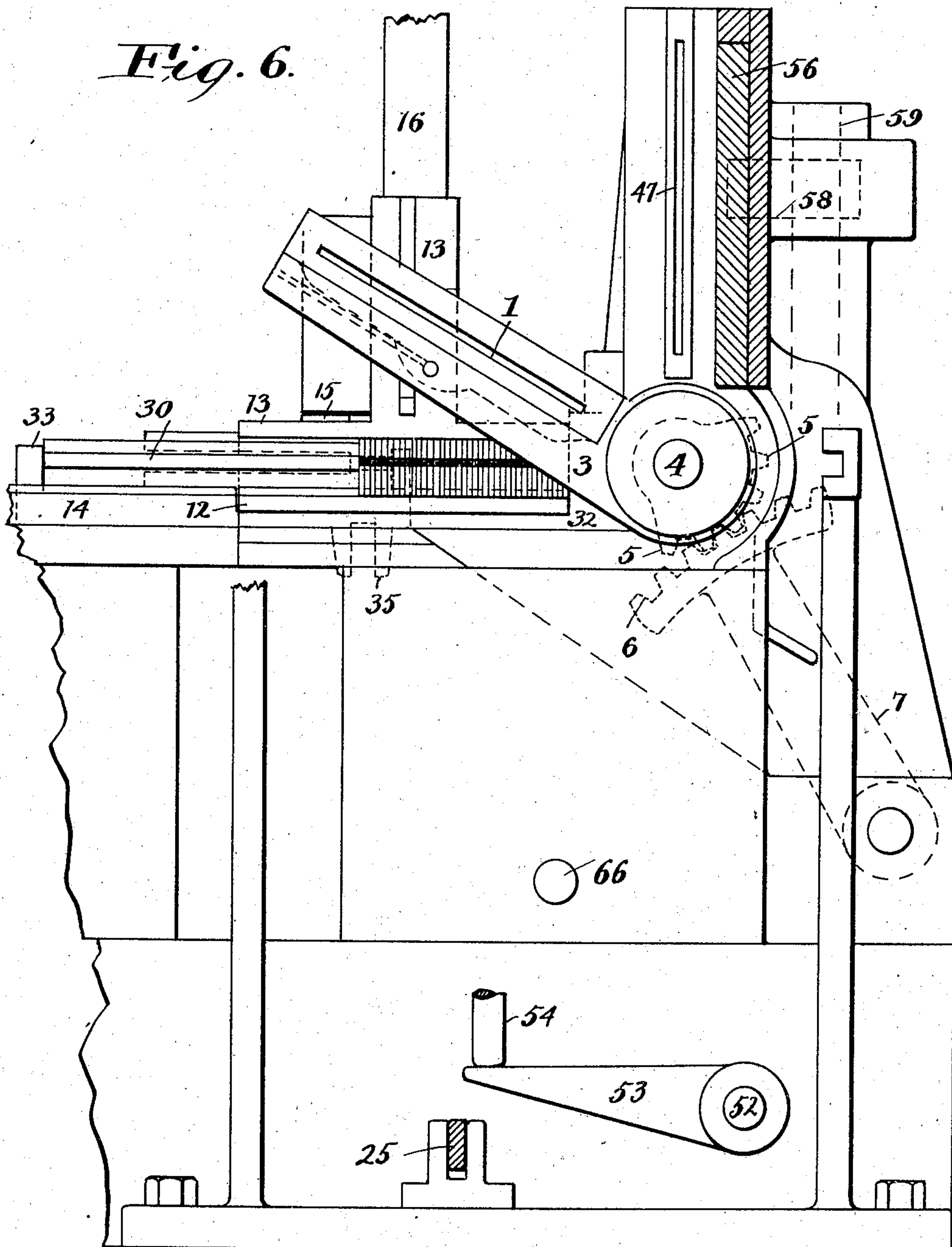
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7 SHEETS—SHEET 5.



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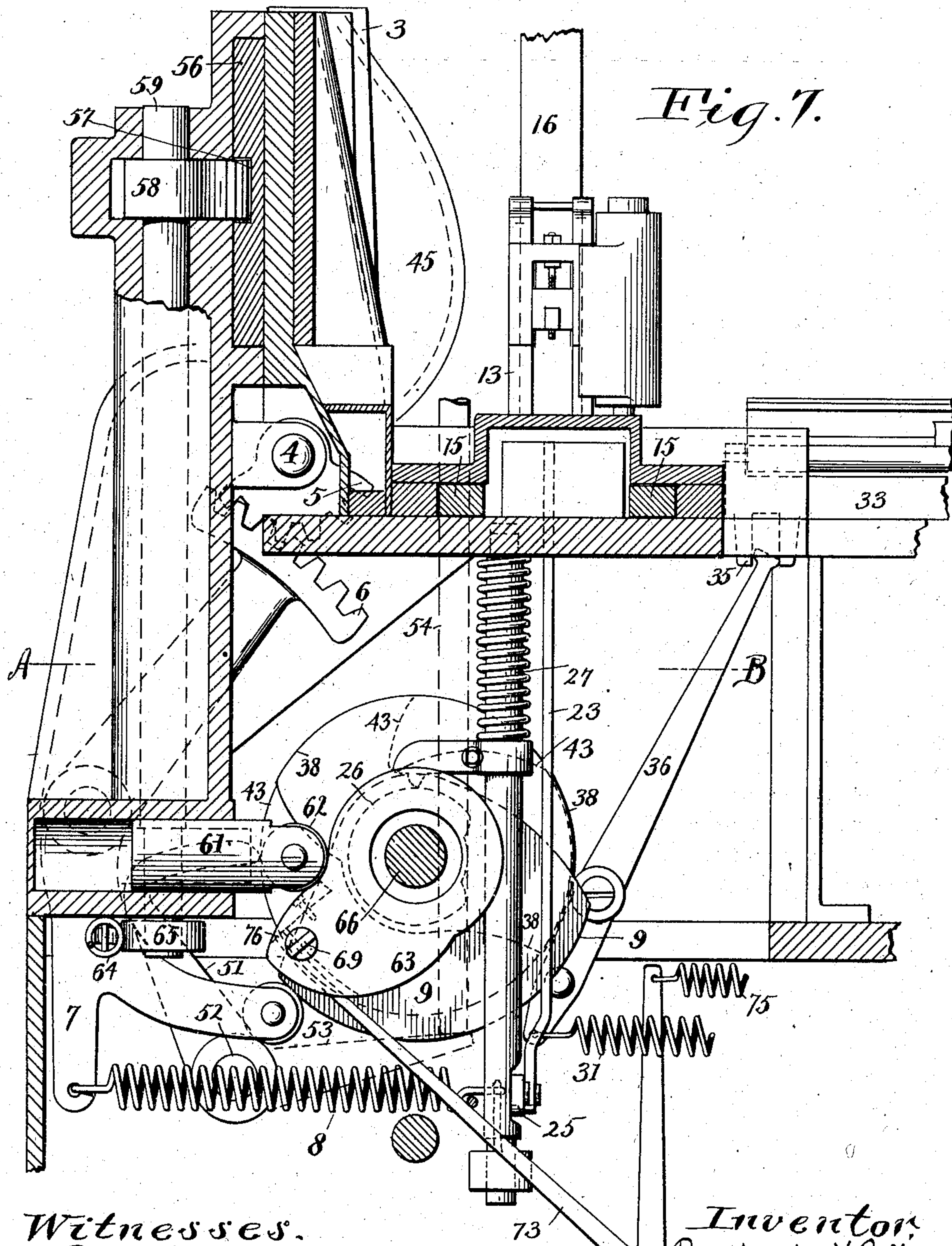
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7 SHEETS—SHEET 6.



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7 SHEETS—SHEET 7.

Fig. 8.

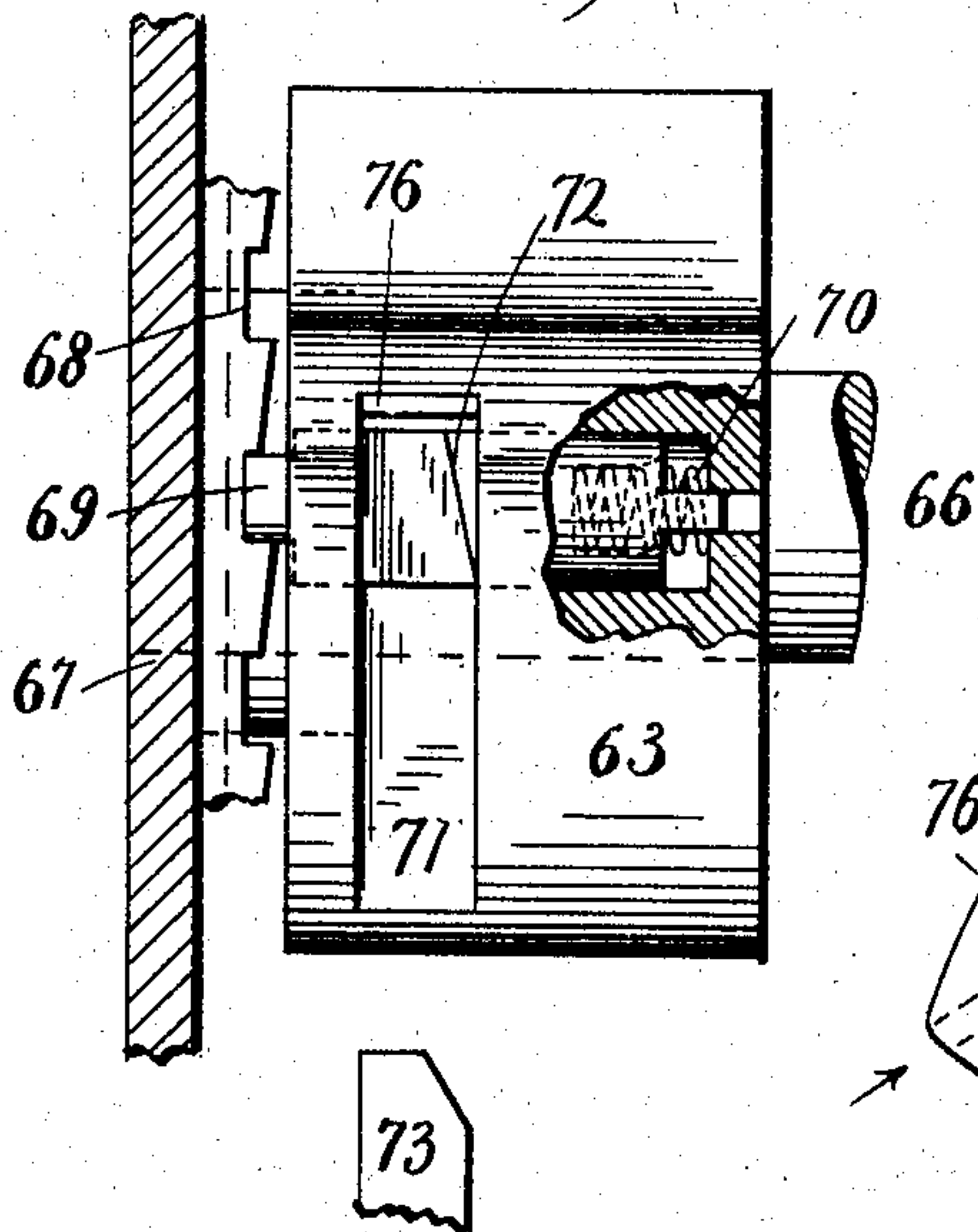


Fig. 9.

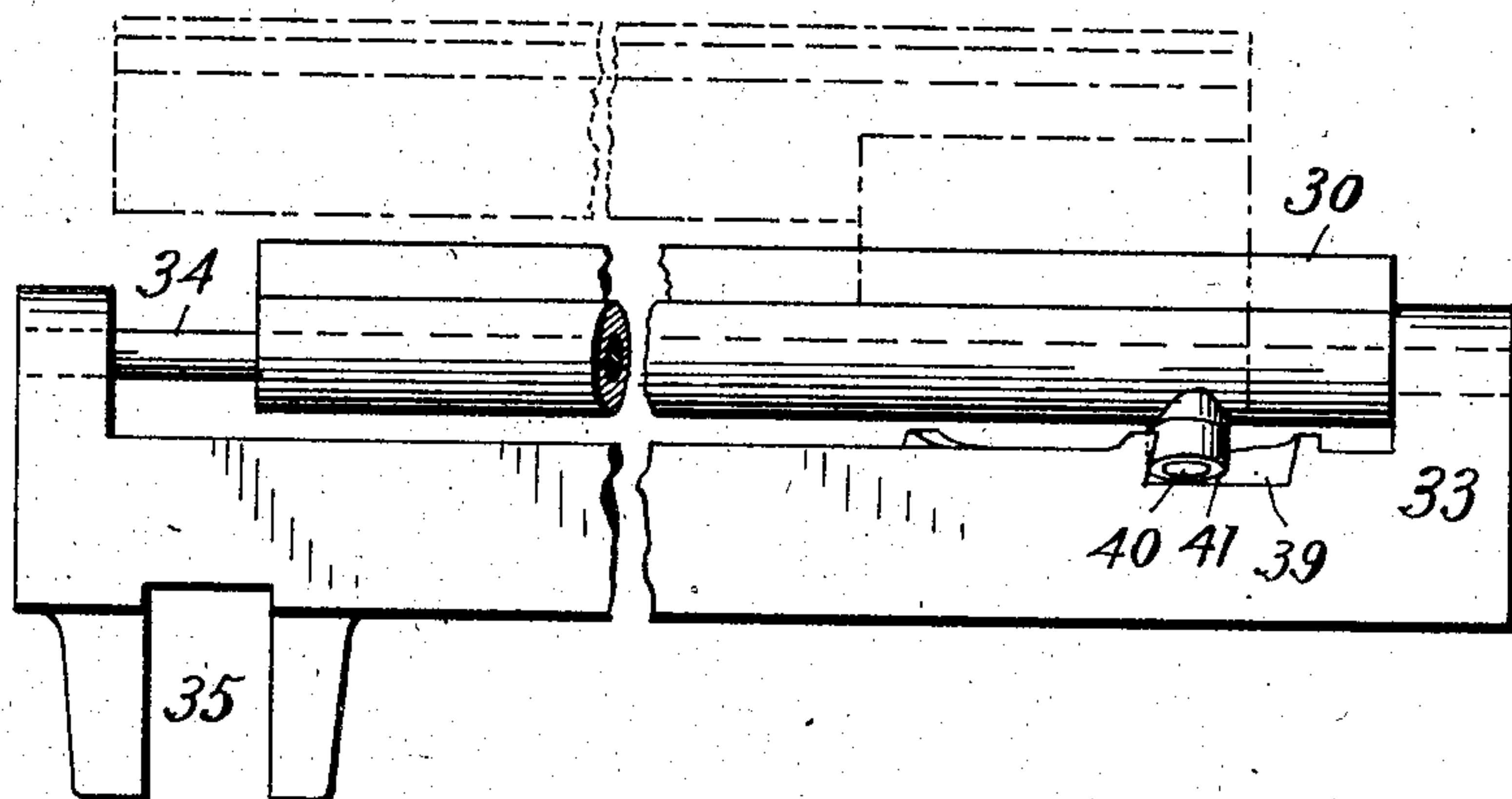
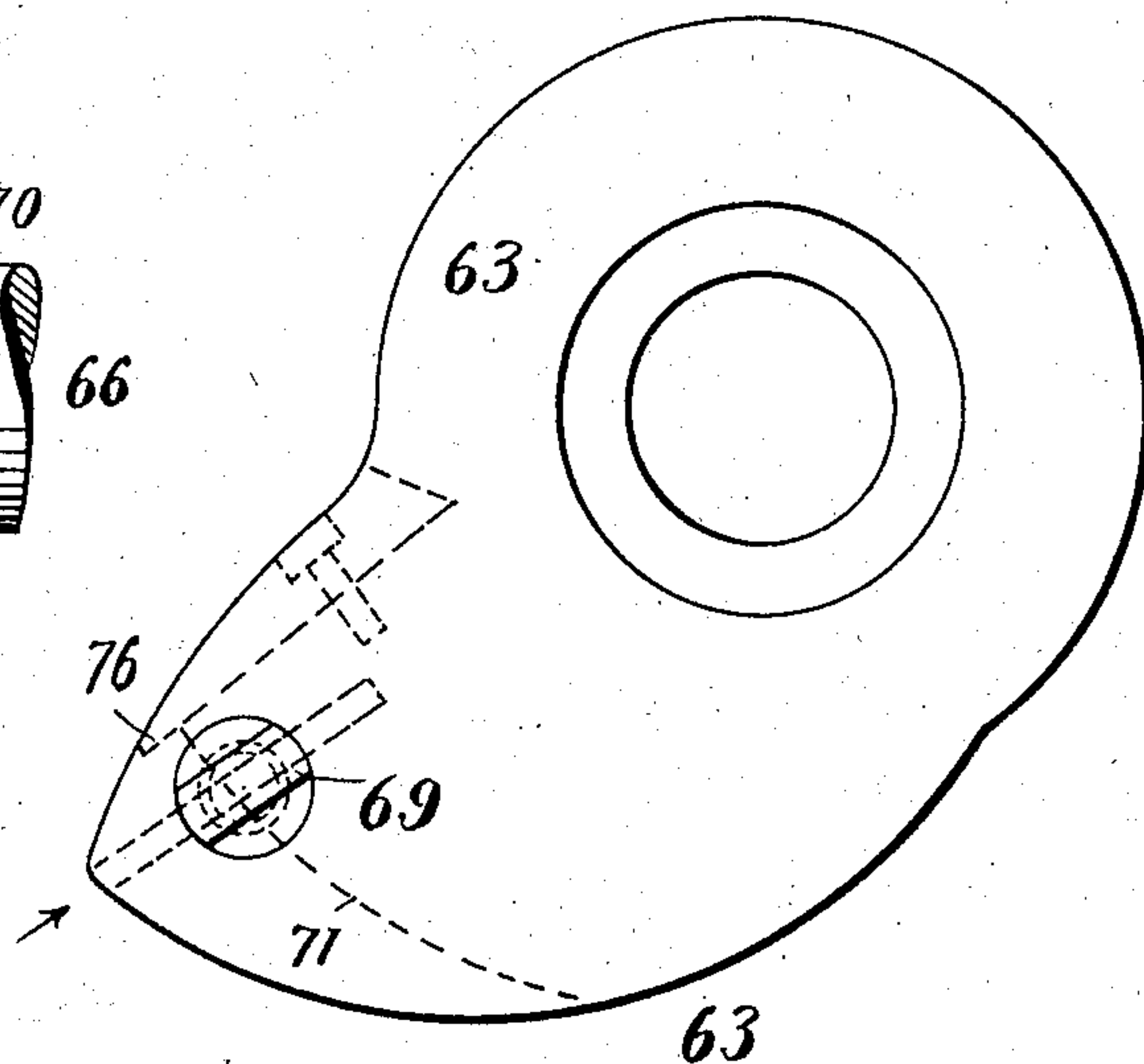


Fig. 10.

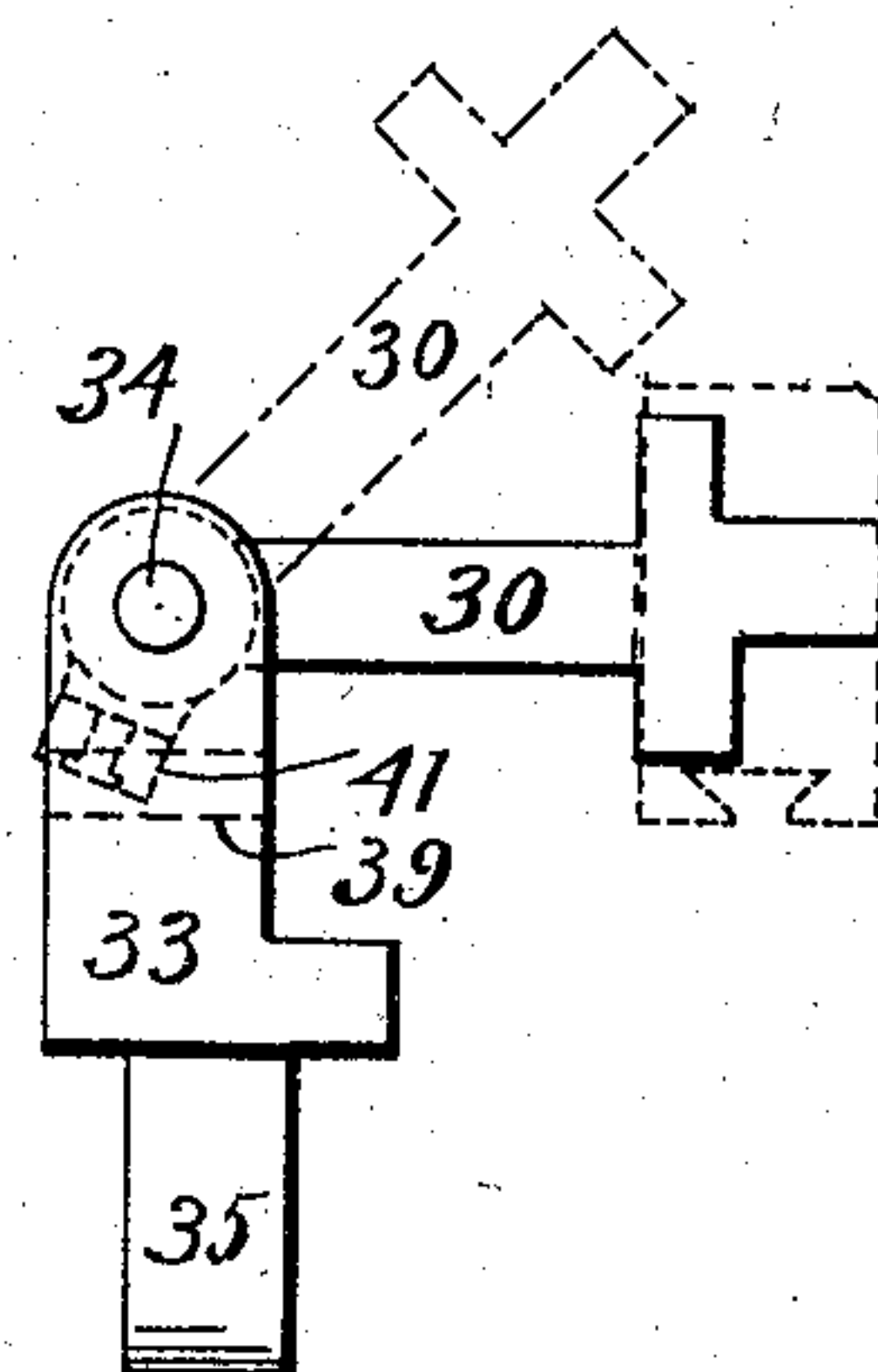


Fig. 11.

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# UNITED STATES PATENT OFFICE.

BENJAMIN F. BELLOWS, OF CLEVELAND, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO ELECTRIC COMPOSITOR COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

## LOGOTYPE-CASTING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 791,747, dated June 6, 1905.

Application filed July 11, 1904. Serial No. 216,045.

*To all whom it may concern:*

Be it known that I, BENJAMIN F. BELLOWS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Logotype-Casting Mechanism, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention in the form shown is adapted to be a part of a machine in which matrices normally stored in magazines are by the operation of finger-keys and associated mechanism assembled in line and a logotype is cast from the assembled matrix-line and the matrices are returned to their respective magazines. The greater part of the mechanism, however, is capable of being used as an independent machine for casting logotypes from an assembled matrix-line.

The novel features of the mechanism include the manner of mounting and moving the mold and of clamping the mold between the casting mechanism and the matrix-line, the end clamp for the matrix-line, the means for ejecting the slug from the mold and for trimming it, the mechanism for imparting properly-synchronized movement to the various parts, and the means for starting and stopping the mechanism.

The invention may be here summarized as consisting of the construction and combination of parts hereinafter described, and pointed out in the claims.

In the drawings, Figure 1 is a front elevation of so much of a type-bar-making machine as includes the present invention. Fig. 2 is a plan view of the same mechanism. Fig. 3 is a sectional plan in the plane indicated by line A B on Fig. 7, the rear part of the mechanism including the melting-pot and metal-pump, and the supports therefor being broken away. Fig. 4 is a side view looking in the direction of the arrow on Fig. 1 and showing the mechanism at the left of the line B and in front of the melting-pot and its adjuncts. Fig. 5 is a view, partly in section, in the plane indicated by the line C of Fig. 2. Fig. 6 is a rear elevation of

the mechanism in front of the melting-pot and its adjuncts. Fig. 7 is a sectional front elevation in the plane indicated by line D of Fig. 5. Fig. 8 is a side view, partly in section, of the means for connecting the cam-shaft with the rotating member, by which it is turned. Fig. 9 is a front view of the cam shown in Fig. 8. Fig. 10 is a front view, and Fig. 11 is a side view, of the end clamp for the matrix-line.

The logotype 2 is cast in a slot 1 in a mold-block 3, attached to a rock-shaft 4. The thickness of this block from front to back is equal to the height of the logotype less the height of the projecting characters thereon. By moving the rock-shaft 4 the mold may be moved back and forth between a horizontal position, which it occupies when the logotype is being cast, and the vertical position, which it occupies when the logotype is being ejected. A gear-segment 5 is secured to this rock-shaft in mesh with a gear-segment 6 on the end of the pivoted rocker 7, which rocker is moved in that direction which will cause the movement of the mold into a horizontal position by a spring 8, while it is moved in a contrary direction by a cam 9. When the mold is in a horizontal position, it is between the nozzle 10 and matrix-line. The matrix-line is supported upon a shelf 12 of the vertically-movable elevator 13, which shelf when the elevator is down occupies a position in the line with the assembling-rail 14 of the machine from which the matrices are pushed onto the elevator-shelf by any appropriate mechanism. The elevator at that time rests upon a slide 15, to which is attached the lower end of a vertical bar 16, which passes through the elevator and by which the elevator is guided in its vertical travel. When the mold is in the horizontal position, this slide, with the elevator resting thereon, is moved toward the mold-block, so as to bring the matrix-line against one side thereof with the characters on the matrices in line with slot 1. At the same time a hollow slide 17, which serves as a support for the melting-pot and supports the pump 19 and the nozzle 10, connected therewith, is moved to bring the nozzle against opposite side of the mold. The



movements of this slide 17 and of the slide 15 are only about one thirty-second of an inch each; but as they move toward each other they tightly squeeze the mold-block between the matrix-line and nozzle, as stated. These two slides 15 and 17 are moved backward and forward by means of two toggles 21 22, whose joints are respectively connected by links 23 24 to the single rocker-lever 25. This lever is moved in the unclamping direction by the action of the cam 26 on an arm on the vertically-movable bar 27, attached to said rocker, and it is moved in the clamping direction by the action of a spring 28 on said bar 27. Before the mold has been so clamped the end clamp 30 for the matrix-line has been moved by the action of a spring 31 against the end matrix of said line, thereby forcing the matrices tightly against one another or rather thereby clamping the matrix-line between itself (the end clamp) and a fixed abutment 32 at the end of the elevator-rail. The end clamp 30 is pivoted to a sliding end-clamp base 33 upon a horizontal axis parallel with its path of travel, and it is to this base portion that the force is applied to move it, (the end clamp.) The clamp is pivoted to the base by being loosely mounted on shaft 34, whereon it may move lengthwise one-half an inch, more or less. In the under side of this end-clamp base is a notch 35, which loosely receives the upper end of a pivoted lever 36. A spring 31 exerts its force to move this lever in one direction, while a cam 38 moves it in the opposite direction. It is the spring 31 which moves it in the direction which moves the end clamp in the clamping direction, wherefore the end clamp will perform its function whether the matrix-line be long or short. When the end clamp is not in-use, it is necessary that it shall not occupy such a position overhanging the assembling-rail 14 that it would interfere with the free movement of matrices along said rail onto the elevator-rail, while it is equally necessary that it shall overhang the elevator-rail when it is clamping a matrix-line, because it must then occupy a position in which its rear face shall be in contact with the mold-block, covering so much of the mold-slot as is not covered by a short matrix-line. To get the end clamp to move from one of these positions to the other as it moves to or from its clamping position, the base member has in its top face a diagonal slot 39, and a pin 40, fixed to the end clamp and carrying a friction-roller 41, enters this slot. When the base member moves back—that is to say, away from the matrix-line—the clamping member maintains its horizontal position until the right-hand end of the clamp comes into contact with a fixed stop 29. This prevents further endwise movement of the end clamp, but permits further endwise movement of the base member, the result of which is that the inclined slot in the base member, by its action on the pin

40 secured to the clamp, causes said end clamp to be turned up into substantially the position indicated by dotted lines in Fig. 11. When the base member moves to the left, the end clamp being permitted to do so falls under the influence of gravity to the position shown by full lines in Fig. 11. It must occupy this position when it is clamping a matrix-line, because at that time the right-hand shoulder on the base member is engaging with the right-hand end of the end clamp. When the matrix-line has been clamped and the mold has been squeezed, a cam 43 has lifted the pump-plunger and then suddenly releases it, whereupon a spring 44 moves the pump-plunger 48 downward and causes the injection of molten metal through the nozzle 10 into the mold-slot. The cam 43 acts directly on an arm 51, attached to a rock-shaft 52, there being another arm 53 attached to this rock-shaft, which engages with the lower end of a rod 54 to lift the same. This rod is attached by a yoke 55 to the pump plunger-rod 56. When the pump-plunger has descended and molten metal has thereby been injected into the mold, the two slides 15 and 17 are moved in opposite directions away from the mold by the action of cam 26, the end clamp is withdrawn, and the mold is rocked to a vertical position by the action of the mechanism described. In passing to this vertical position its rear edge slides against the face of a shearing-knife 45, by which the bottom of the logotype is sheared off smooth and square. When the mold reaches the vertical position, the slot containing the logotype lies between an ejector 46, by which the logotype is pushed from the mold, and trimming knives 47, between which the logotype is pushed and by which its sides and ends are trimmed off smoothly. The logotype after passing between said trimming-knives falls into an inclined chute 49, through which it slides by gravity onto the galley 50.

The ejector-slide 56 moves in a guided horizontal path forward and backward, and the blade-like ejector 46, attached thereto, is placed so that when the mold-block is in a vertical position the ejector may enter and substantially fill the mold-slot 1, thereby pushing the logotype out and between the trimming-knives 47. The ejector-slide has rack-teeth 57 on its outer face for the engagement of the gear-segment 58, secured to a vertical shaft 59. This shaft carries a gear-segment 60 near its lower end, which engages with a rack-slide 61, and said slide carries a friction-roller 62 in engagement with the cam 63. This cam, acting through the described mechanism, moves the ejector-slide in the direction to eject the logotype from the mold. A spring 64, acting on an arm 65, secured to said vertical shaft, moves the shaft, and consequently the ejector-slide, in the contrary direction.

The described cams are all secured to the



same cam-shaft 66, and they are of such character and are so placed that during one revolution of said shaft the described mechanisms will be caused to go through their cycles of movement in proper sequence, as follows: When the matrix-line has been placed upon the elevator-rail, the mold is in its vertical position. The descent of the mold to the horizontal position and the clamping movement of the end clamp are substantially synchronous. Then the two slides 15 and 17 are moved to squeeze the mold between the matrix-line and nozzle, and then the pump-piston, which has been raised in the meantime, descends and injects the molten metal into the mold-slot 1, thereby forming the logotype. Then the slides 15 and 17 are separated, the end clamp is withdrawn, and the mold is swung up to its vertical position. Then the ejector moves forward, pushing the logotype from the mold-slot and between the trimming-knives, and then moves back to its normal position. This completes the cycle of the described mechanism, except this: that if this mechanism is used as a part of a logotype-making machine the elevator will, as soon as the slides 15 and 17 are retracted, begin its upward movement toward a point at which the matrices are removed from the elevator-rail. The mechanism for so moving the elevator is not, however, any part of the present invention. Normally the cam-shaft 66 is at rest; but a gear 67 is loosely mounted thereon, and this gear has on its inner face an annular row of ratchet-notches 68 for the engagement of a clutching-pin 69, which occupies a recess in the proximate end of the cam 63. This locking-pin is under the influence of a spring 70, tending to move it out of the cam and into engagement with one of said notches. In the face of said cam 63, however, there is a groove 71, which intersects said locking-pin, and the locking-pin has an inclined shoulder 72 upon it, as shown in Fig. 8. An arm 73 bears upon the surface of this cam in the plane of this groove and is of such size that it may enter the groove. The end thereof which does so enter said groove is beveled slightly for engagement with the beveled shoulder on the locking-pin. This arm is attached to a rock-shaft 74, which is under the influence of a spring 75, which causes the arm to press strongly against the face of said cam. As the cam 63 rotates said groove 71 is brought around to a point where said arm 73 enters it and by engaging with the inclined shoulder on the locking-pin withdraws the pin, and thereby disconnects the cam-shaft from driving-gear, wherefore there is no further tendency toward rotating said cam-shaft. In order, however, that the cam-shaft may not by reason of inertia carry beyond the desired point, there is at the end of said groove 71 a shoulder 76, with which the end of the arm 73 engages, and thereby positively stops the further rotation of the cam-shaft.

It will be understood, of course, that the driving-gear 67 is being constantly rotated. To set this casting mechanism into operation, it is only necessary to withdraw the arm 73 from its engagement with said locking-pin 69, whereupon the pin under the influence of its spring flies out into engagement with a notch in the inner face of said gear. This arm may be so withdrawn either automatically by mechanism (not shown) or by means of another arm 77, also attached to said rock-shaft, to be depressed by the operator.

I claim—

1. In logotype-casting mechanism, the combination of a horizontal movable support for a matrix-line, a metal-pump, a nozzle connected therewith, a horizontal movable support for said nozzle, and mechanism for moving said two supports toward and from each other, with a mold movable in a vertical plane into and out of the position between the matrix-line and nozzle, substantially as and for the purpose specified.

2. In logotype-casting mechanism, the combination of a horizontally-movable support for a matrix-line, a metal-pump, a nozzle connected therewith, a horizontally-movable support for said nozzle, a toggle connected with said matrix-support, another toggle connected with the nozzle-support, and mechanism for simultaneously operating said toggles to move said supports toward and from each other, and a mold movable in a vertical plane into and out of operative position between the matrix-support and nozzle, substantially as specified.

3. The combination of a vertically-movable elevator having a shelf for supporting a matrix-line, a mold movable in a vertical plane to and from a position when the mold-slot is in the same horizontal plane with characters on the matrix-line which is on said shelf, a metal-pump, and a nozzle therefor which is connected therewith and has its discharge-opening in substantially the same horizontal plane with said characters, said nozzle and elevator being movable horizontally toward and from the interposed mold, and mechanism for so moving said elevator and nozzle, and mechanism for moving the mold, substantially as specified.

4. In a logotype-casting mechanism, the combination of a movable support for a matrix-line, a metal-pump, a nozzle connected therewith, a movable support for said nozzle, mechanism for moving said two supports toward and from each other, and an ejector with a pivoted mold, and mechanism for rocking said mold on its pivot, trimming-knives between which the logotype is pushed by said ejector, a galley, and an inclined chute into which logotypes fall as they pass between said trimming-knives and by which they are discharged onto the galley, substantially as and for the purpose specified.

5. In logotype-casting mechanism, the com-



5 combination of a movable support for a matrix-line, a melting-pot, a metal-pump, a nozzle, and a slide whereon the last three elements are supported, with a toggle connected with said slide, another toggle connected with the support for the matrix-line, a rocking lever, links connecting the same with said two toggles, and mechanism for rocking said lever, substantially as and for the purpose specified.

10 6. In logotype-casting mechanism, the combination of a movable support for a matrix-line, a melting-pot, a metal-pump, a nozzle, and a slide whereon the last three elements are supported, with a toggle connected with said slide, and another toggle connected with the support for the matrix-line, a rocking lever, links connecting said lever in one direction, and a cam for rocking it in the opposite direction, substantially as and for the purpose specified.

20 7. In logotype-casting mechanism, the combination of a vertically-movable elevator having a rail adapted to support a line of matrices, a movable slide whereon said elevator is supported, a movable nozzle and connected metal-pump, and mechanism for moving said nozzle and slide toward and from each other, with a movable mold, and mechanism for moving it into operative position between said nozzle and elevator and for moving it out of said position, substantially as and for the purpose specified.

30 8. In logotype-casting mechanism, the combination of a mold, a melting-pot nozzle, and a support for the matrix-line, said parts being capable of relative movement to bring the nozzle into engagement with the rear side of the mold, and the matrix-line into contact with the front side of the mold, with a fixed abutment for one end of the matrix-line resting upon said support, a movable end clamp adapted to be moved against the other end of said matrix-line and to compress said line and to close so much of the mold-slot as is not closed by said matrices, a spring for moving said movable end clamp in the compressing direction, and mechanism for withdrawing said end clamp in opposition to its spring.

50 9. In logotype-casting mechanism, the combination of a mold, a nozzle suitably connected with the melting-pump and adapted to be moved into engagement with the rear side of said mold, a support for the matrix-line which is adapted to close the front side of the mold, a fixed abutment for one end of said line, and a spring-actuated end clamp adapted to compress the line of matrices and to close so much of the mold-slot as is not closed by said matrices, said end clamp consisting of a sliding base portion having a diagonal slot and a clamping portion pivoted to said base portion on an axis parallel with the path of said base portion and capable of moving independently of the base portion in a parallel

65 path, a pin secured to the clamping portion and entering said diagonal slot, and a stop adapted to engage with said clamping portion, substantially as and for the purpose specified.

70 10. In logotype-casting mechanism, an end clamp for the matrices line consisting of a sliding base portion having a diagonal slot and carrying a fixed shaft, and a clamping portion rotatable upon said shaft and capable of moving lengthwise thereon and having a stud which enters said diagonal slot, operating mechanism engaging with the base portion, a spring actuating said operating mechanism in one direction, a cam actuating it in the other direction, and a stop for engagement with the clamping portion of said end clamp, substantially as and for the purpose specified.

80 11. In logotype-casting mechanism, the combination of a movable mold, a movable support for a line of matrices, a movable nozzle, a movable end clamp, and a movable ejector, with a single cam-shaft, a plurality of cams secured thereon, mechanism intermediate of said cams and the movable parts mentioned whereby said parts are moved in one direction, and springs severally moving said parts in the opposite direction, with a concentrically-mounted constantly-rotating wheel having a plurality of ratchet-notches, a spring-actuated pin carried by a disk attached to said shaft for engagement with said notches, said disk having a slot which intersects said pin, a spring-actuated arm engaging with the face of said cam and adapted to enter said slot and engage with said pin, which pin has an inclined shoulder which, by engagement with said arm, draws the pin out of the path of said ratchet-notches, substantially as and for the purpose specified.

90 12. In logotype-casting mechanism, the combination of a movable mold, a movable support for a line of matrices, a movable nozzle, and a movable ejector, with a single rotatable shaft, and mechanism for transmitting motion from said shaft to the previously-named parts, a wheel mounted concentrically with respect to said shaft and capable of being continually rotated, a clutch for connecting said shaft and wheel, and means for withdrawing said clutch automatically when the shaft has completed one revolution, substantially as and for the purpose specified.

100 13. In logotype-casting mechanism, the combination of a movable mold, a movable support for a line of matrices, a movable nozzle, and a movable ejector, with a rotatable shaft, mechanism whereby said shaft will operate the previously-named parts, a wheel concentric with said shaft and capable of being constantly rotated, which wheel is provided with an annular series of ratchet-notches, a disk secured to said shaft, a spring-actuated pin carried by said disk for engaging into said

notches, said disk having a slot which intersects said pin, and said pin having an inclined shoulder which lies in said slot, a spring-actuated arm engaging with the face of said  
5 disk and adapted to enter said slot and engage with the inclined shoulder of said pin, substantially as and for the purpose specified.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

BENJAMIN F. BELLOWS.

Witnesses:

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ALBERT H. BATES.