

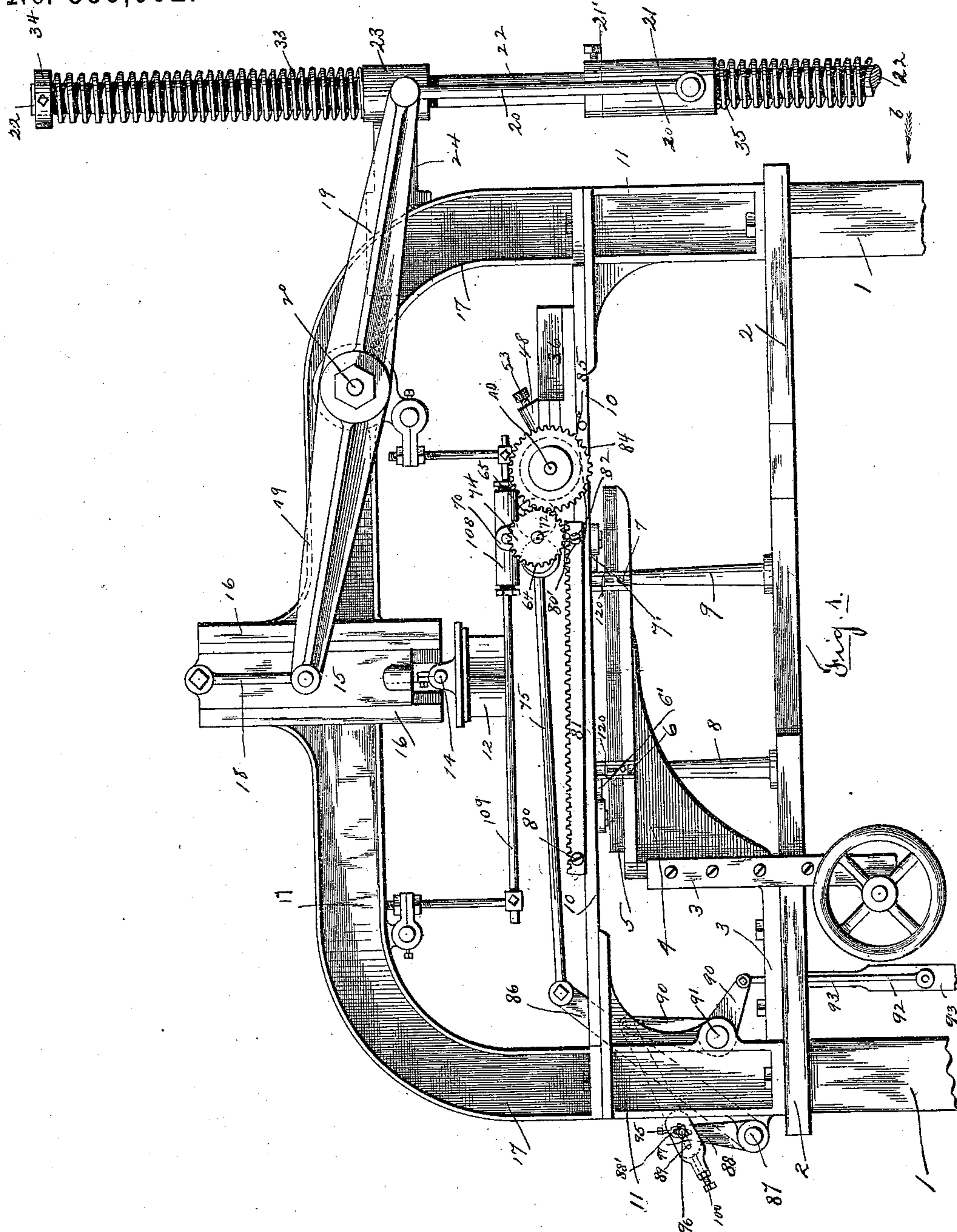
(No Model.)

5 Sheets—Sheet 1.

E. M. LOW.
ENVELOPE MACHINE.

No. 556,062.

Patented Mar. 10, 1896.



Witnesses
Walter S. Bowen
Edmund F. Seymour

Inventor
Everett M. Low
By his Attorney
John C. Devey

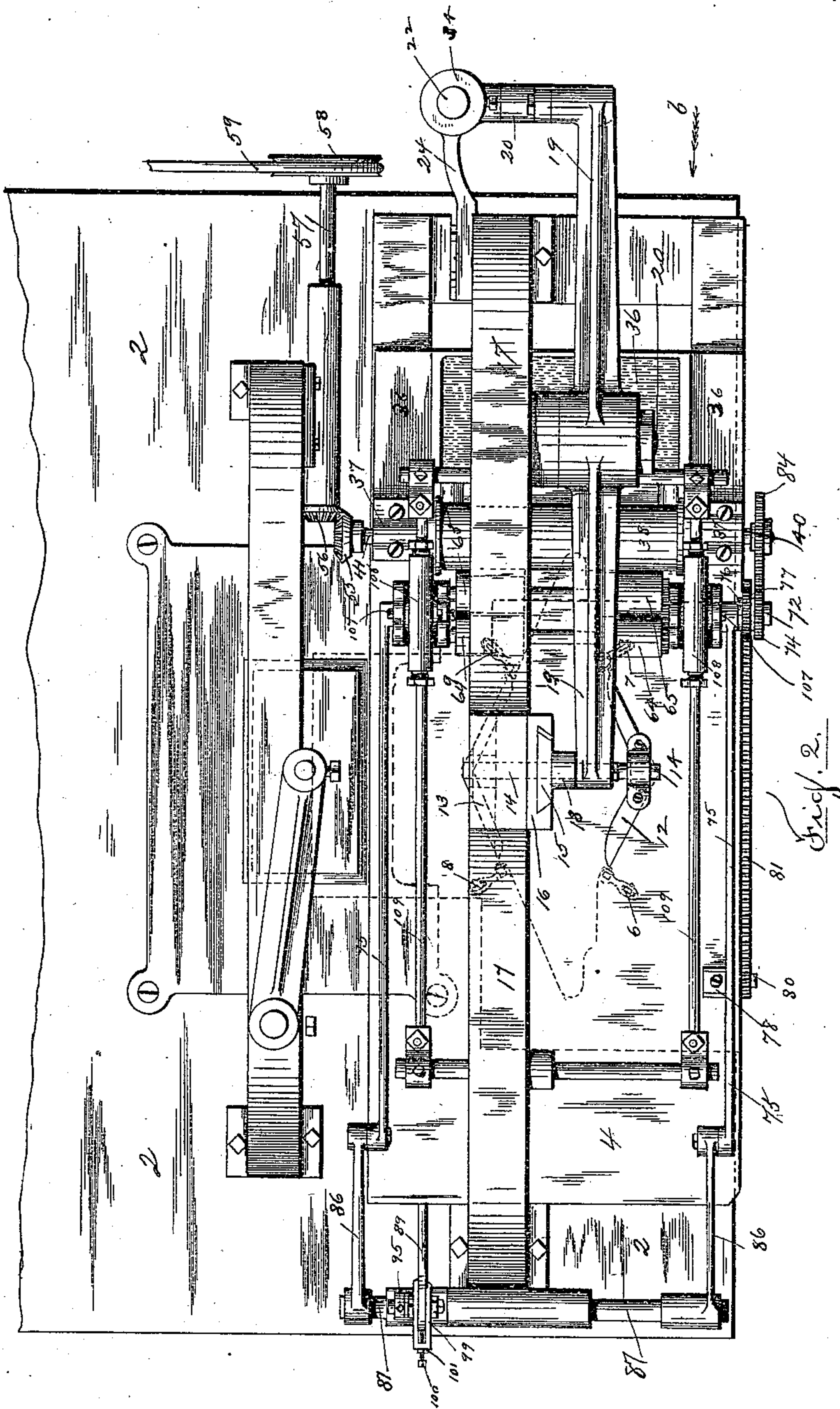
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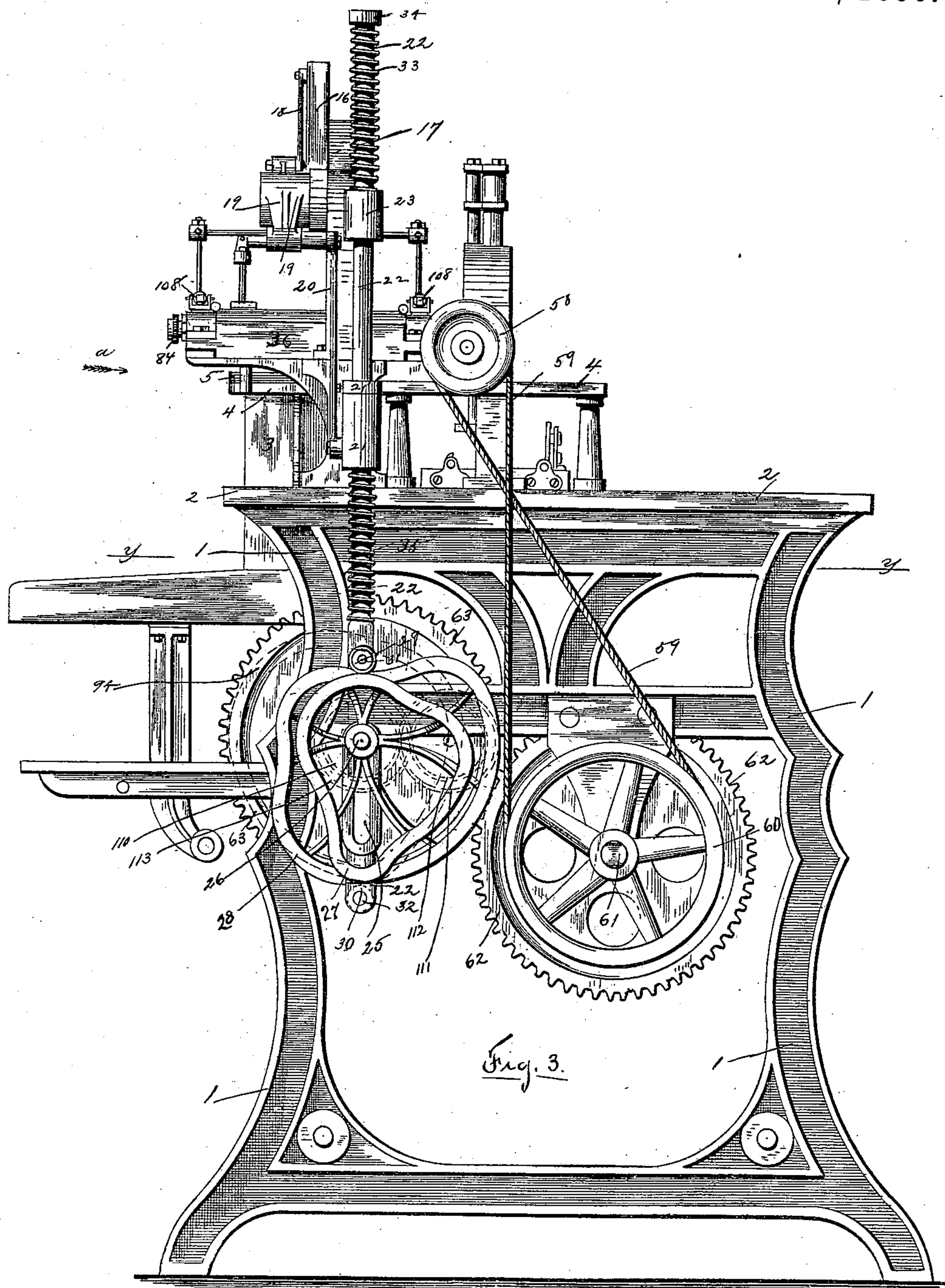


Fig. 3.

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(No Model.)

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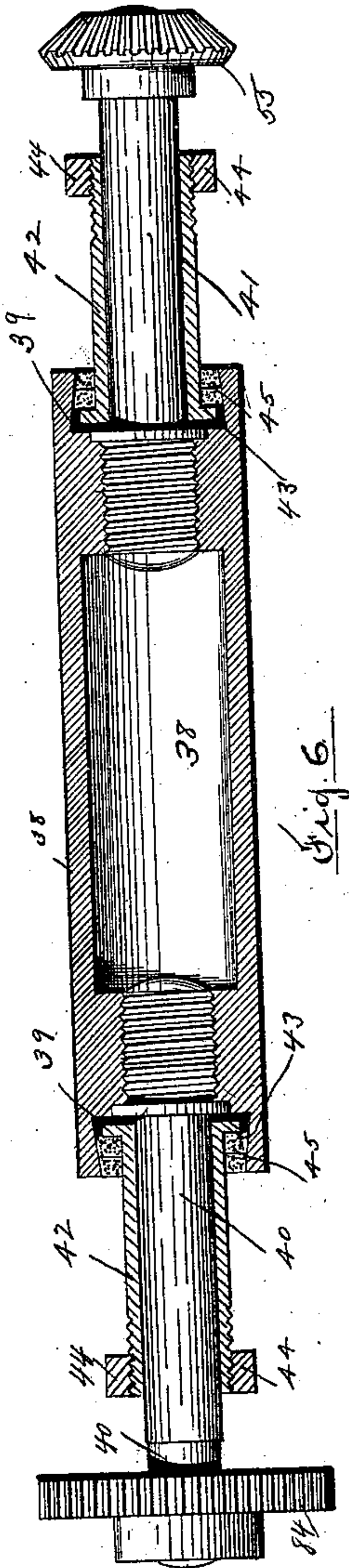


Fig. 6.

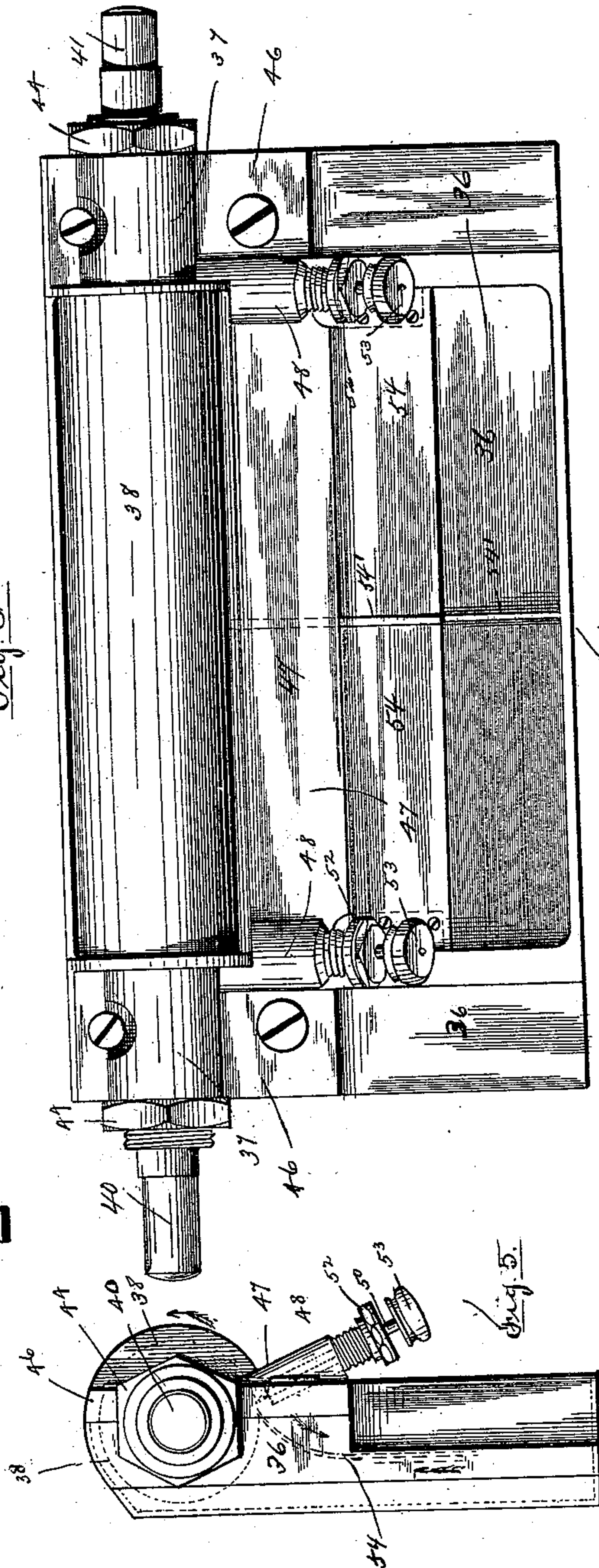


Fig. 5.

Fig. 4.

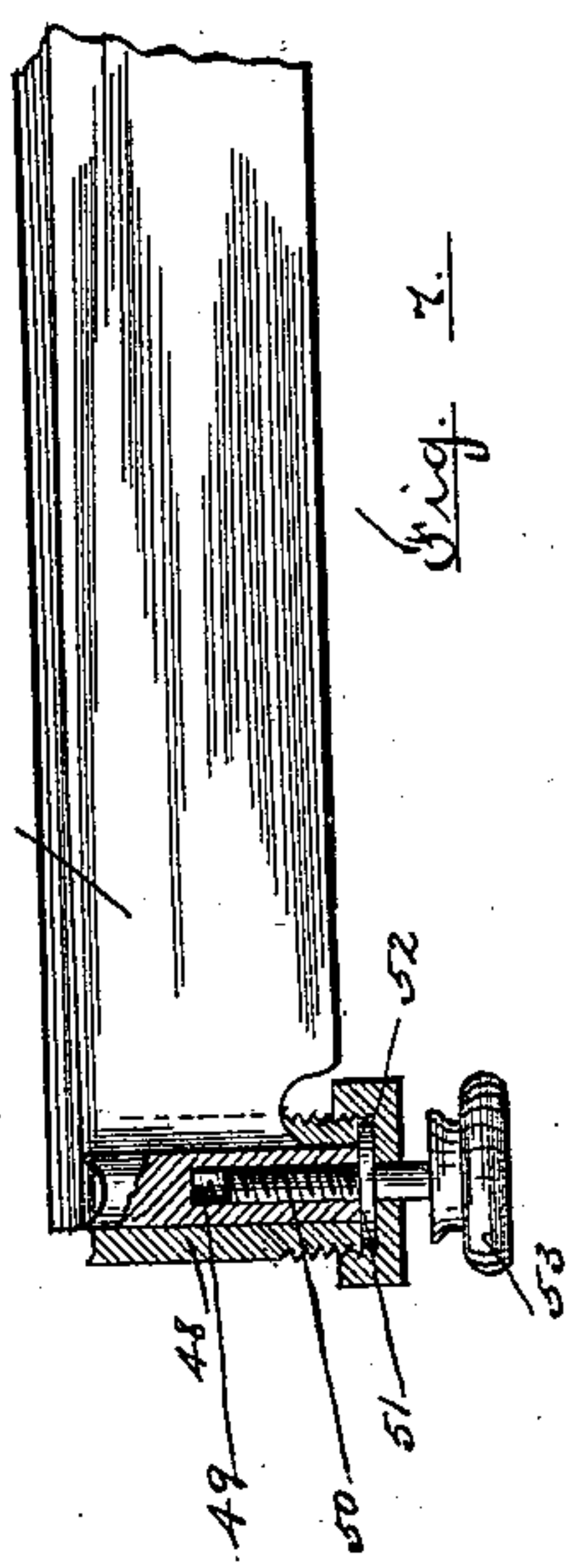


Fig. 7.

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(No Model.)

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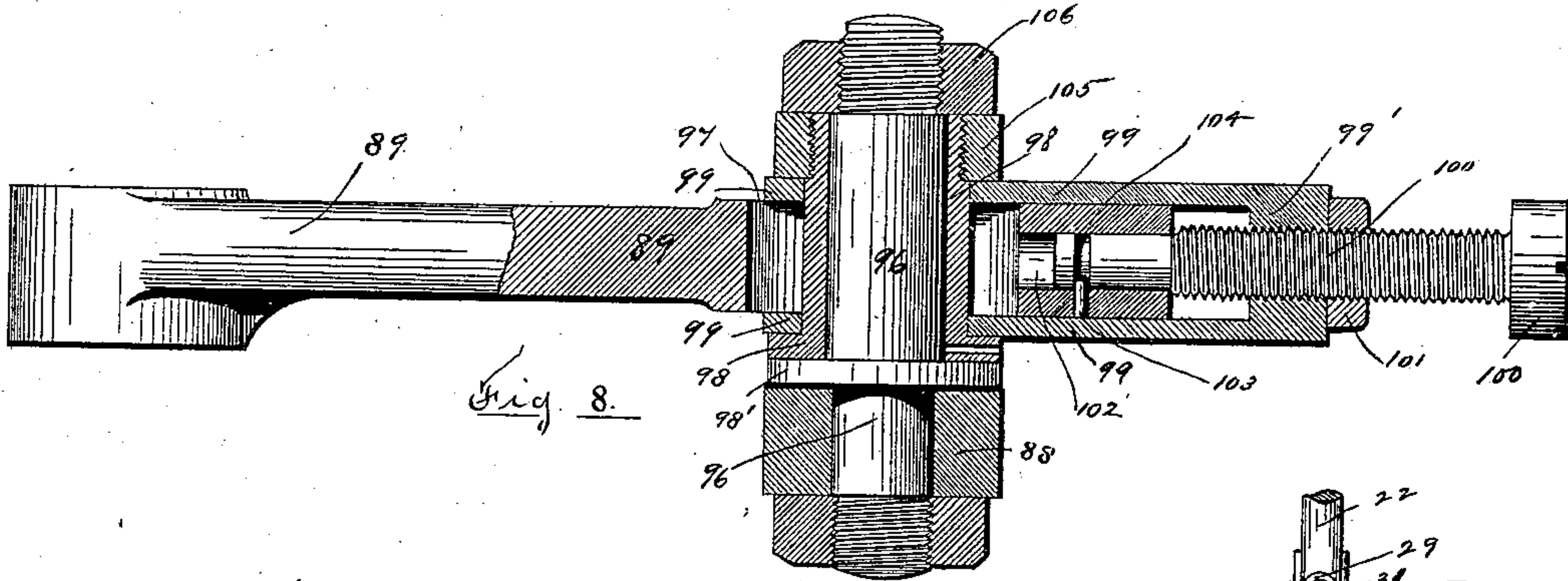


Fig. 8.

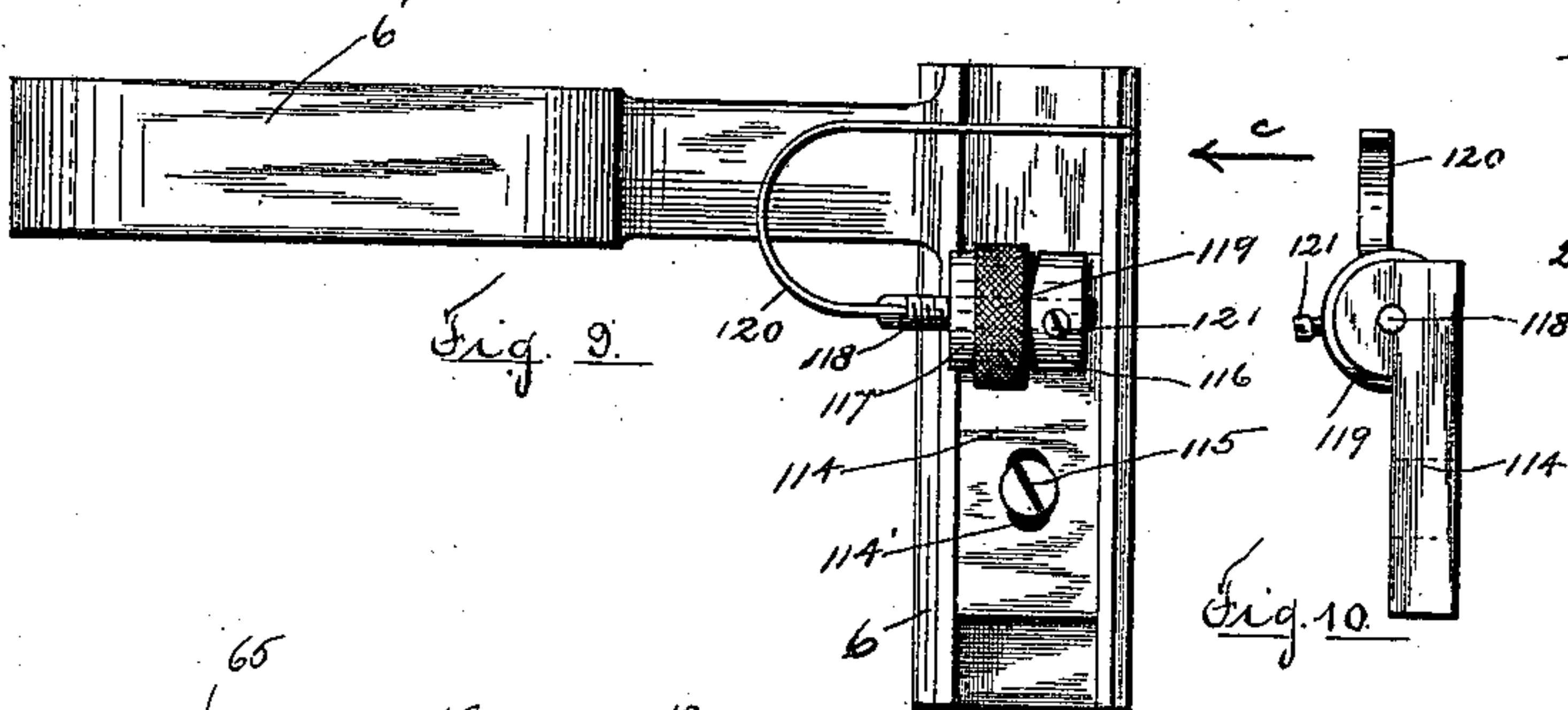


Fig. 9.

Fig. 10.

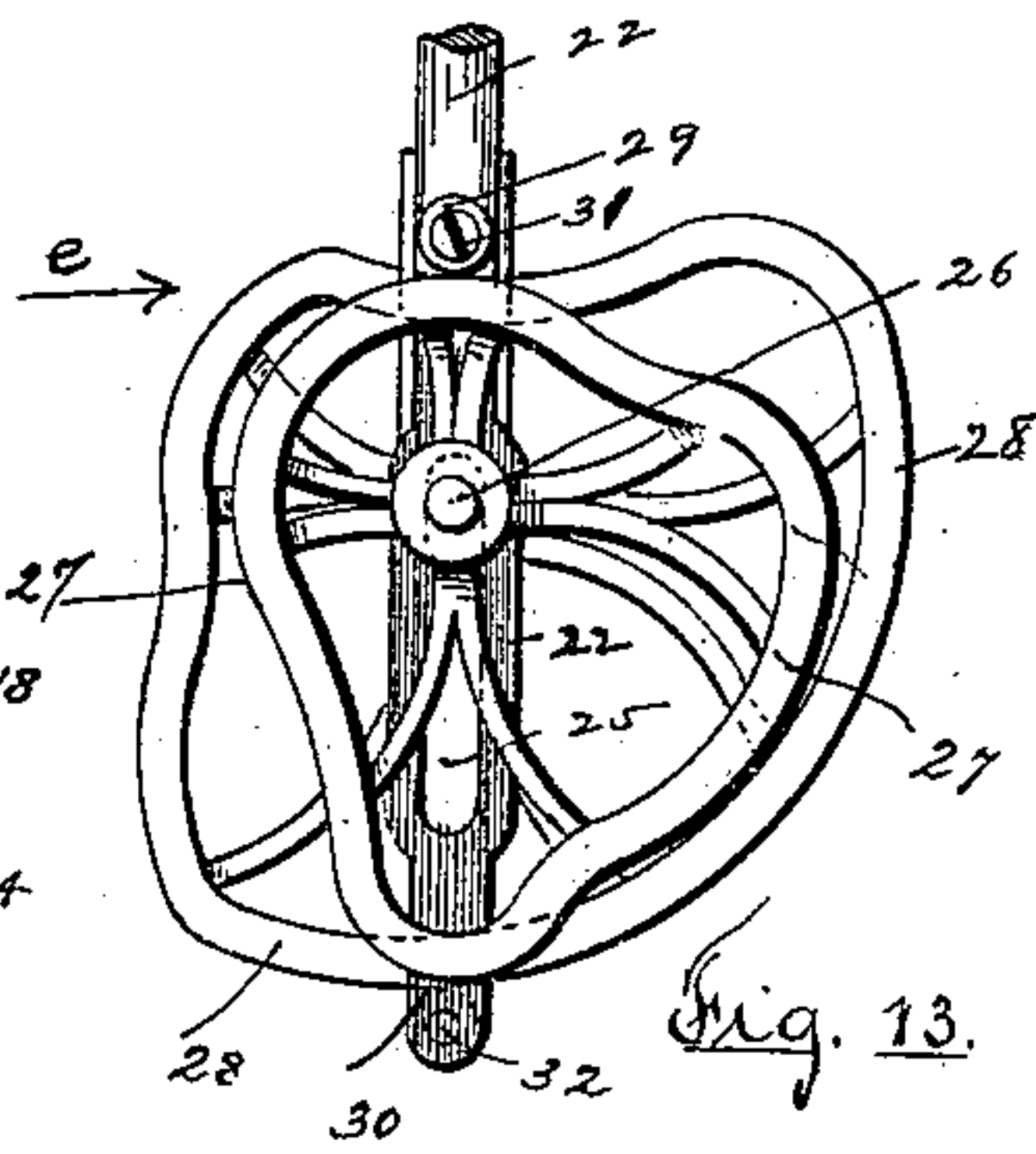


Fig. 13.

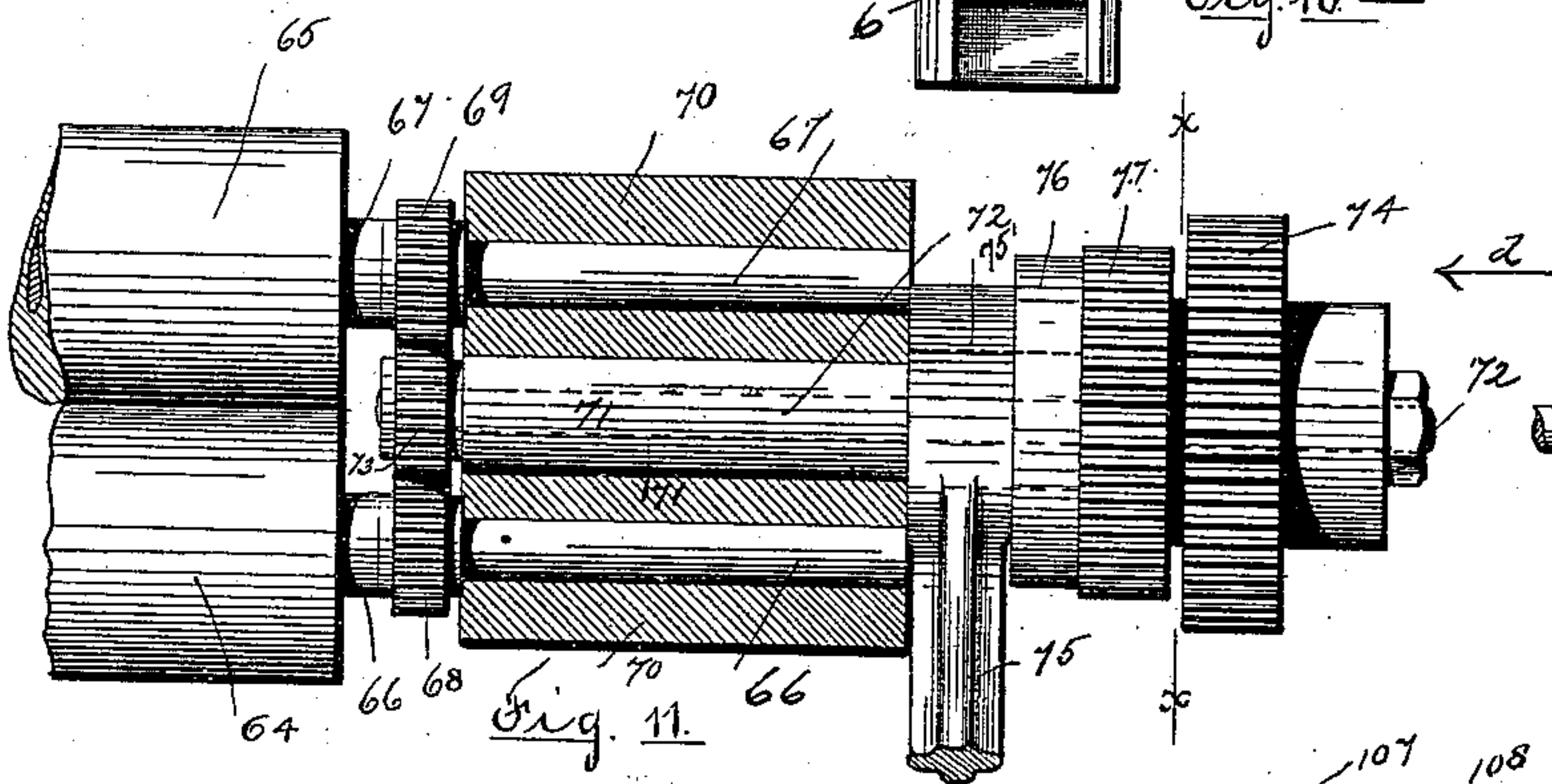


Fig. 11.

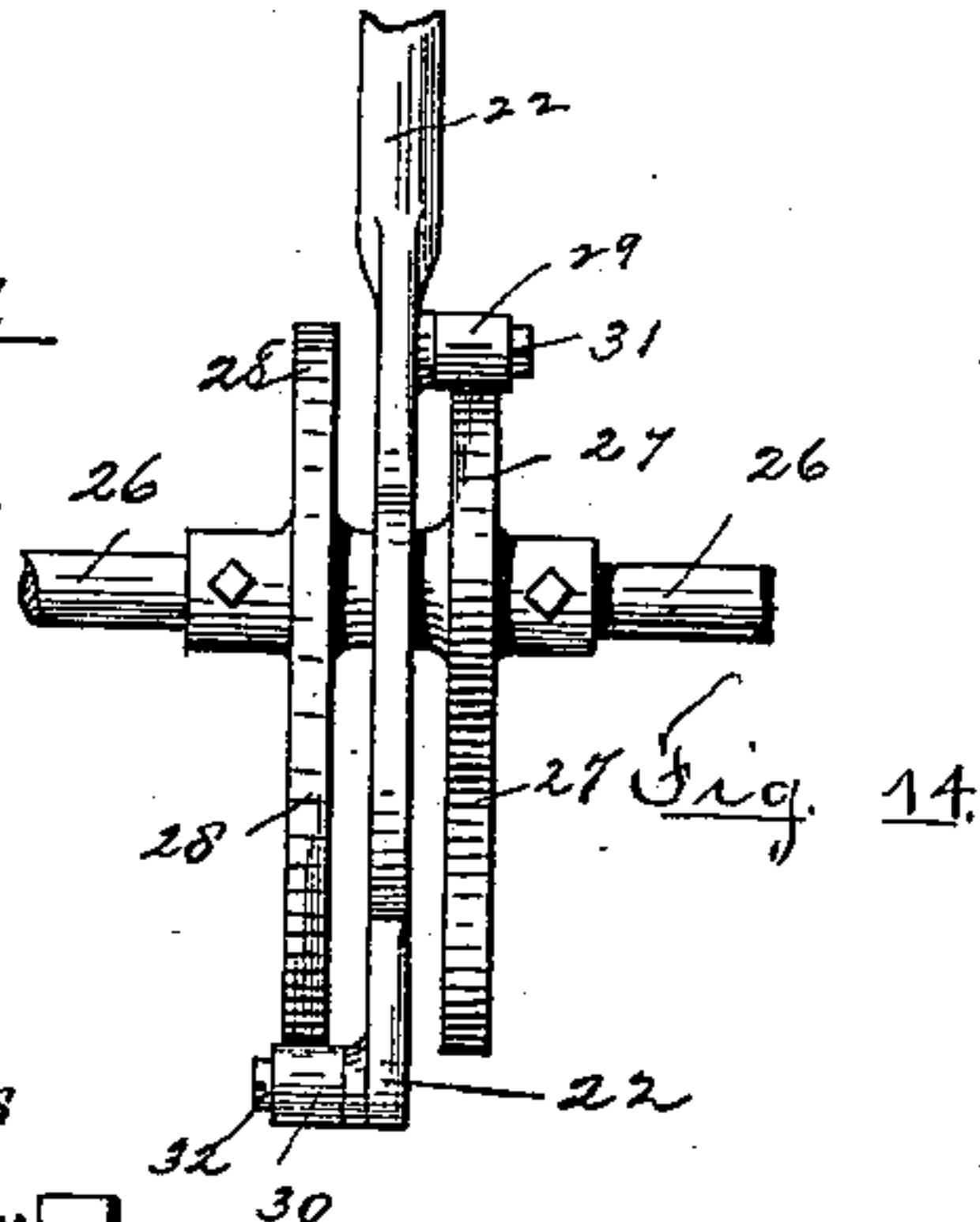


Fig. 14.

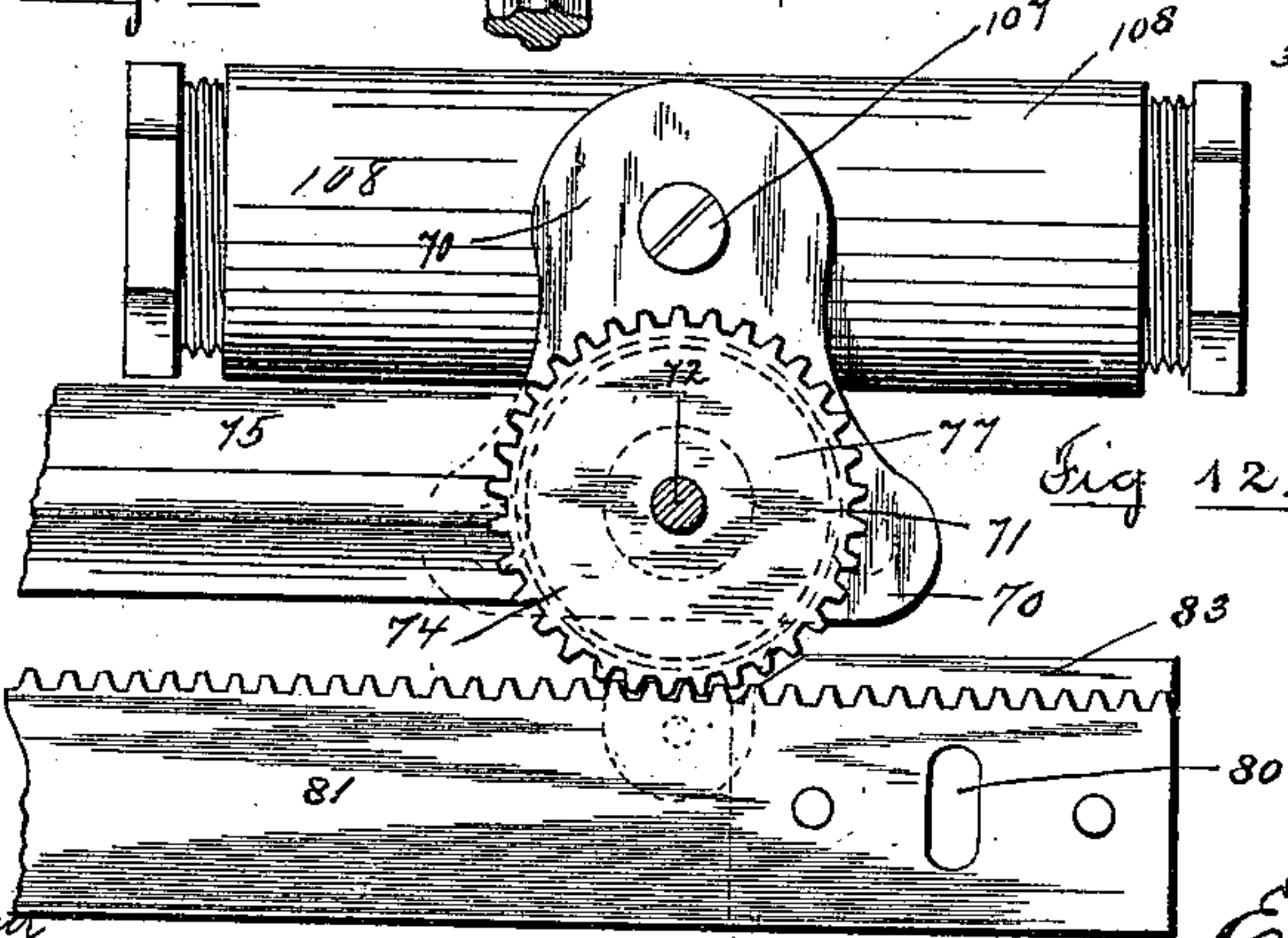


Fig. 12.

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UNITED STATES PATENT OFFICE.

EVERETT M. LOW, OF WORCESTER, MASSACHUSETTS, ASSIGNOR, BY
MESNE ASSIGNMENTS, TO THE WORCESTER ENVELOPE COMPANY,
OF SAME PLACE.

ENVELOPE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 556,062, dated March 10, 1896.

Application filed September 27, 1890. Serial No. 366,334. (No model.)

To all whom it may concern:

Be it known that I, EVERETT M. LOW, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Envelope-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, which, in connection with the drawings making a part of this specification, will enable others skilled in the art to which my invention belongs to make and use the same.

My invention relates to envelope-machines, and more particularly to certain parts of an envelope-machine, to wit: to the pickers or gummers and the operation of the same, to the receptacle or box which contains and supplies the gum solution, to the mechanism by which the gum solution is applied to the pickers or gummers, and to the separators which separate the blank which adheres to the pickers from the pile of blanks on the blank-holding table.

The object of my invention is to improve upon the construction of the parts of an envelope-machine above mentioned as ordinarily constructed and to simplify the construction and operation of said parts and produce better results than heretofore.

My invention consists in certain novel features of construction and operation of the parts of an envelope-machine above referred to, as will be hereinafter fully described.

I have shown in the drawings only so much of an envelope-machine with my improvements applied thereto as will be necessary for a full understanding of the nature of my invention by those skilled in the art; and my several improvements may be applied to and used in connection with any ordinary form of envelope-machine.

Referring to the drawings, Figure 1 is a front elevation of the envelope-machine above the line *y y*, Fig. 3, looking in the direction of arrow *a*, same figure. Fig. 2 is a plan view of the envelope-machine with my improvements applied thereto. Fig. 3 is an end elevation looking in the direction of the arrow *b*, Figs. 1 and 2. Figs. 4 to 12, inclusive, represent, on an enlarged scale, detail views as

follows: Fig. 4 is a plan view of the gum-box. Fig. 5 is an end view of the gum-box shown in Fig. 4. Fig. 6 is a sectional view of the gum-box roll and attached gears. Fig. 7 is a portion of the scraper, showing in section the adjusting-screw. Fig. 8 is a sectional view of the adjusting mechanism for regulating the pressure of the gum-rolls with the gum-box roll. Fig. 9 is a detail of the corner guide-post and separator. Fig. 10 is a detail of the separator, showing the separator detached, looking in the direction of the arrow *c*, Fig. 9. Fig. 11 is a detail, partially in section, of the mechanism for turning the gumming-rolls when receiving gum at the gum-box and when passing under the pickers or gummers. Fig. 12 is a section on line *x x*, Fig. 11, looking in the direction of arrow *d*, same figure. Fig. 13 is a detail side view of the picker-operating cams; and Fig. 14 is an edge view of the cams shown in Fig. 13, looking in the direction of arrow *e*, same figure.

In the accompanying drawings, 1 is the frame of the envelope-machine, upon the top 2 of which is secured the bracket or casting 3, which forms ways in the ordinary manner for the vertically-moving blank-supporting table 4, on which are supported and fed up to the pickers or gummers the envelope-blanks 5. The envelope-blanks 5 are kept in position on the table 4 by means of the corner guide-posts 6, 7, 8, and 9, the guide-posts 6 and 7 extending down from and secured to a plate 10 supported on brackets 11 above the top 2 (see Fig. 1) and the guide-posts 8 and 9 extending up from and supported on the top 2. (See Fig. 1.) Separators for separating the blank which adheres to the gummers from the pile of blanks on the blank-supporting table are carried on the guide-posts 6, 7, 8, and 9, and will be hereinafter described.

I will now describe the gummers or pickers and the mechanism for operating the same.

The seal-flap gummer 12 is located directly in front of the back-flap gummer 13. (See full and dotted lines, Figs. 1 and 2.) They are both supported on a horizontal rod 14, which is attached to the lower end of a vertically-reciprocating slide 15, which moves up and down in ways formed in the block 16, secured on the

arch 17 extending over the top of the machine. (See Figs. 1, 2, and 3.) The reciprocating slide 15, carrying the seal and back flap gummers 12 and 13, which also act as pickers, is actuated through the connecting-rod 18, pivoted to the upper part of the slide 15, by the lever 19, pivoted on a stud 20' on the arch 17. The outer end of the lever 19 is attached, through the rod 20, to the sleeve 21 loose on the vertically-moving rod 22, but prevented from sliding up thereon above a certain point by the collar 21' fast on said rod 22. The rod 22 is supported at its upper end and moves up and down in a hub 23 at the outer end of an arm 24, secured to the arch 17. (See Figs. 1, 2, and 3.) The lower end of the rod 22 is provided with a vertical slot 25, through which extends the shaft 26, carrying the two cams 27 and 28 fast thereon. The rod 22 is actuated to have a vertical reciprocating motion by the cams 27 and 28 through the friction-rolls 29 and 30 supported on pins 31 and 32, extending out on opposite sides of the rod 22 above and below the cams 27 and 28, said rolls 29 and 30 engaging, respectively, the cams 27 and 28. (See Fig. 14.) A spiral spring 33 encircles the rod 22 at its upper end, bearing at its lower end against the hub 23 and at its upper end against a collar 34 fast on said rod 22, and serves to raise the rod 22 and steady the several connecting parts. The spiral spring 33 may be dispensed with. A second spiral spring 35 encircles rod 22 between the sleeve 21 and the enlarged portion of the rod 22 above the slot-
 35 ted end thereof, (see Fig. 3,) for the purpose hereinafter stated.

The cams 27 and 28 for giving a vertical reciprocating motion to the rod 22 and through the lever 19 and other intervening mechanism to the gummers 12 and 13 are of such size and shape relative to each other that as the cam 27 moves the roll 29 and the rod 22, to which it is attached, upward the cam 28 recedes from the roll 30, allowing the rod 22 to move up positively, as if driven by an eccentric, to which it would be equivalent if it were not an irregular motion, incapable of being driven by an eccentric.

When the rod 22 moves downward and the gummers 12 and 13 are raised through the intervening mechanism, consisting of the slide 15, connecting-rod 18, lever 19, connecting-rod 20, sleeve 21, and collar 21', the movement is positive, the collar 21' on the top of the sleeve 21 being fast on rod 22; but when the reverse movement of the rod 22 takes place and it is raised up and through the intervening mechanism the gummers 12 and 13 are lowered into contact with the envelope-blanks 5 the rod 22 slides through the sleeve 21, loose on said rod, leaving a space between the collar 21', fast on said rod, and the top of sleeve 21, and compressing the spiral spring 35 so as to make a yielding pressure of the gummers upon the blank to make up for the slightly-varying heights of the top of the pile of envelope-blanks.

The mechanism above described for operating the gummers so that they will be raised by a fixed positive motion and lowered by a yielding motion is one of the features of my improvements, and produces very satisfactory practical results.

I will now describe the receptacle or box for holding the gum solution, detail views of which are shown in Figs. 4, 5, 6, and 7.

The gum-receptacle consists of a shallow box or pan 36, having bearings 37, in which is journaled the metallic gum-box roll 38. The gum-box roll 38 has its ends recessed, as shown at 39, (see Fig. 6,) and the journals of the rolls are formed by screwing short shafts 40 and 41 into the threaded holes in the ends of the roll beyond the recesses 39. On the shafts 40 and 41 are bushings 42, having on one end flanges 43 extending within the recesses 39, and the size of the outer end of said recesses, and on the other end a screw-thread on which is fitted a nut 44. Between the flanges 43 of the bushings 42 and ends of the roll 38 are elastic washers 45, preferably made of leather, which extend within the recesses 39 at the ends of the gum-roll. When the gum-roll 38 is placed in the bearings 37 on the gum-box 36, the caps 46 are screwed down lightly and the nuts 44 on the ends of the bushings 42 are screwed against the ends of the bearings 37 on the gum-box, drawing the bushings 42 out and pressing the washers 45 against the inside of the gum-box. The caps 46 are then screwed down, tightly binding the bushings 42, so as to prevent them from turning, the washers 45 being held tightly against the inside end of the gum-box by the flange 43 on the bushings 42, making a tight joint, which prevents any gum or water from leaking by the end of the gum-box roll 38 and getting into the bearings, as is the case with gum-box rolls of the ordinary construction.

The gum-box 36 is provided with a doctor or scraper 47, (see Figs. 4, 5, and 7,) which regulates the amount of gum which is taken up by the gum-box roll 38. The scraper 47 is made of a sheet of metal with a beveled edge, which extends lengthwise of the roll 38 and at an angle thereto. The scraper 47 slides in slots in the projecting bosses 48 on the caps 46, and the ends of the scraper have a screw-threaded hole 49, into which extends a screw 50. On said screw 50 is a fixed collar 51, held between the ends of the projecting bosses 48, which are made screw-threaded, and a nut 52, which is screwed onto the projecting end of the bosses. The screw 50 is turned in and out by means of thumb-nuts 53 to adjust the scraper 47 and move it toward and away from the gum-box roll 38. The screw 50 is held from longitudinal movement by the collar 51.

I prefer to combine with the gum receptacle or box 36 a division-plate 54, extending horizontally therein at the rear of the gum-roll 38, with its inner edge toward the roll 38 curved upwardly, as shown by dotted lines,

Fig. 5, and said edge is set out a slight distance from the roll 38, so as to allow the gum on the roll 38 to be carried up by the edge of the plate 54 to be scraped off by the edge of the scraper 47.

The purpose of the division-plate 54 is to make a circulation of the gum solution. As the roll 38 revolves, it takes up more gum than can pass the edge of the scraper 47 and the gum flows back over the top of the division-plate 54 and under the bottom of said plate to again be taken up by the roll 38, as indicated by the arrows, Fig. 5, thus keeping up a continual circulation of the gum and preventing its hardening on the bottom and sides of the gum-box. I may also employ a vertical division-plate 54' to separate two kinds of gum, (see Fig. 4,) one kind being applied to the seal-flap and another to the back-flap of the blank.

I will now describe the mechanism for operating the gum-box roll 38 and the gumming-rolls which receive the gum from said roll.

The gum-box roll 38 has a bevel-gear 55 on the end of journal 40, (see Fig. 6,) which meshes with and is driven by a bevel-gear 56 on the shaft 57, having at its outer end a grooved pulley 58, driven by a belt 59 passing around a grooved pulley 60 on the main shaft 61. (See Figs. 2 and 3.) Said shaft 61 is driven by belt-and-pulley connection (not shown) in any ordinary way, and is geared through spur-gears 62 and 63 to the shaft 26, carrying the cams 27 and 28.

The gum-rolls 64 and 65, which take the gum from the gum-box roll 38, are in this instance made in two pairs, one pair to gum the seal-flap gummer and the other pair the back-flap gummer. (See Fig. 2.)

My present improvement relates more particularly to the mechanism for causing the gum-rolls 64 and 65 to revolve as they pass under the gummers.

It has been found in practice that the mere contact of the gum-rolls with the gummers is not sufficient to insure a smooth coating of the surface of the gummers with the gum, as the rolls are liable to slip instead of turning, leaving the gum streaked on the gummers, and the same when applied to the flaps of the envelope. To overcome this objection I provide the present mechanism shown in the drawings to give a positive revolution to the gum-rolls while applying the gum.

On one end of the shafts 66 and 67 of the gum-rolls 64 and 65 (see Fig. 11) are fast pinions 68 and 69. In the bearing 70 which carries the shafts 66 and 67 of the gum-rolls 64 and 65 and midway between said shafts is a shell 71, having a shaft 72 journaled therein. Fast on one end of said shaft is a pinion 73 meshing with pinions 68 and 69, and fast on the other end of said shaft 72 is a gear 74. A connection 75 is supported on the shell 71, and between the hub 75' of said connection and the gear 74, fast on the outer end of shaft 72, are mounted loosely on the

shell 71 the roll 76 and the gear 77. Said gear 77 is connected to and turns with gear 74.

I will now describe the mechanism for operating the gum-rolls 64 and 65. On plate 10 is secured a box 78. To box 78 is pivoted on a stud 80 one end of a rack 81. (See Figs. 1 and 2.) The other end of said rack has a slot 80' therein, as shown in Fig. 12, allowing a slight vertical movement on a stud 82. Upon the inner edge of the racks 81 is a plate 83 having an inclined end, as shown in Fig. 12. During the time in which the gum-rolls 64 and 65 are passing under the gummers 12 and 13 the gear 77 on shell 71 and rack 81 are in engagement, and the gum-rolls 64 and 65 are turned by the passage of said gear 77 over said rack 81. When the gum-rolls pass from under the gummers at the end where the gum-box is located and are brought in position to receive the gum, gear 74 on shaft 72 is brought into engagement with the gear 84, fast on the end of the gum-box roll opposite from the beveled gear 55 on said roll, and the gum-rolls are turned thereby. Consequently the gear 77 and rack 81 must be thrown out of engagement, and in order to throw said gear 77 and rack 81 out of engagement without shock the roll 76 on the shell 71 (see Figs. 11 and 12) is adapted to roll up onto the inclined plate 83 and press the inner end of the rack 81 out of engagement with the gear 77 against the action of a spring 85, (see Fig. 1,) which tends to keep the inner end of the rack 81 in its elevated position and in engagement with the gear 77. When the rack 81 is moved out of engagement with the gear 77, as above described, the gear 84 on the gum-box roll will cause the gear 74, the pinion 73, the pinions 68 and 69, and the gum-rolls 66 and 67 to be revolved until the gum-rolls are drawn away from the gum-box roll and the gear 74 disengaged from the gear 84. The roll 76 will be moved off of the inclined plate 83, and the gear 77 will engage with the rack 81, causing the gum-rolls to be revolved as they are moved back and forth under the gummers.

The gum-rolls 64 and 65 are moved back and forth under the gummers 12 and 13 by the connections 75 and rocking arms 86, rigidly fastened on shaft 87, having fixed thereon a crank-arm 88, adjustably connected by a connection 89 with a bell-crank 90 on a shaft 91. The other end of the bell-crank 90 is connected by a rod 92 with vertically-sliding bar 93, slotted at its lower end, corresponding to the rod 22 above described, through which slot the shaft 26 passes, carrying the cam 94, (shown by dotted lines, Fig. 3,) which gives to the bar 93 a reciprocating motion up and down and causes the gum-rolls, through the intervening mechanism, to be moved back and forth under the gummers.

In order to regulate the pressure of the inner gum-roll 65 on the gum-box roll 38, the bell-crank 90 is adjustably connected with the crank-arm 88 in the manner shown in Figs. 1 and 8. The crank-arm 88 has a slot 88' in its

outer end and a holding-screw 95 and a stud 96. The connection 89 has a slot 97 at its outer end free to slide on a bushing 98, said bushing extending through said slot and being free to turn on stud 96 on crank-arm 88. Fitted to bushing 98 is the forked piece 99, and into the end 99' thereof is tapped a screw 100, having a check-nut 101, and its end fitted to a hole 102 in the outer end of the connection 89, (see Figs. 1 and 8,) and retained in said hole by a pin 103 extending into a groove 104 in the end of said screw 100, so that said screw will be free to turn, but cannot be drawn out, as it is held by pin 103. When the screw 100 is turned in or out, the connection 89 is moved along on stud 96 extending through the slot 97 in said connection and secured in the crank-arm 88, thus lengthening or shortening the connection 89 as desired, and adjusting the gum-roll 65 into proper contact with the gum-box roll 38. When the connection 89 is adjusted, as desired, a nut 105 on the bushing 98 is screwed up, binding the forked piece 99 and the connection 89 against the flange 98' of bushing 98. A nut 106 is screwed on the end of stud 96 to prevent end motion of bushing 98, while leaving it free to turn on said stud.

The gum-roll shafts 66 and 67 are supported in the blocks 70, which are pivoted by a screw 107 onto the sleeve 108 at each side of the machine, (see Figs. 2 and 12,) so that said blocks 70 and the gum-rolls which have their bearings in said blocks will have a rocking motion. The sleeves 108 carrying the blocks 70 are supported and moved back and forth on the rods 109, supported above the plate 10, all as fully described in the application for a patent before referred to.

The gum-rolls 64 and 65 receive gum at the gum-box 36 from the gum-box roll 38, and as they are moved under the gummers 12 and 13 they apply the gum to the same. The gum-rolls dwell just beyond the gummers, while the gummers 12 and 13 descend to gum and pick up a blank. After the gummers 12 and 13 have picked up a blank the gum-rolls 64 and 65 are moved back under the gummers to the gum-box and again apply the gum to the gummers, and while the gum-rolls are receiving gum from the gum-box roll the gummers are again lowered to gum and pick up a blank, so that each supply of gum on the gum-rolls gums the gummers twice, and for two blanks as said rolls are moved under the gummers and then back again to the gum-box. Consequently the gum-rolls 64 and 65 must be geared so that the actuating-cam 94 will make one-half a revolution while the cams actuating the gummers 12 and 13 are making a complete revolution. This is accomplished by the train of gears shown by dotted lines, Fig. 3. The gear 110 is fast on the shaft 26 and meshes with and drives the larger gear 111 supported on a stud turning loosely in a box (not shown) on the frame of the machine. On the other end of said stud is fixed a pinion

112 which meshes with a larger gear 113 secured to the face of the cam 94, and said gear 113 and cam 94 revolve together loosely on the shaft 26. It will thus be seen that the cam 94 is geared to make one-half a revolution while the shaft 26 is making a complete revolution.

I will now describe the separators or mechanism which separates the envelope-blank which adheres to the gummers and is raised from the pile of envelope-blanks.

The separators are shown on the front guide-posts 6 and 7 in Fig. 1 and in detail in Figs. 9 and 10. The guide-posts 6 and 7 are secured to the under side of the top plate 10 by means of the horizontal arms 6' and 7', extending out from said guide-posts, which are provided with ways in which is held the block 114 adjustable vertically therein by means of a slot 114' and a screw 115 secured in the guide-posts. (See Fig. 9.) The block 114 has the two bosses 116 and 117 at its upper end, and a threaded pin 118 extends loosely into holes in said bosses, and a turning or adjusting nut 119 is supported on said pin 115 between the bosses 116 and 117. Into the outer end of the pin 118 is secured one end of a spring-blade 120 bent yoke-shaped, as shown in Fig. 9. The free end of said spring 120 is adapted to extend over and rest upon the edge of the top envelope-blank, as shown in Fig. 1. By means of the nut 119 the pin 118 may be turned in or out, so as to cause the free end of spring 120 to be moved on or off the edge of the blank, as desired. When the separator or spring 120 has been properly adjusted, a screw 121 in the boss 117 is turned in to hold the pin 118 in position.

The envelope-machine is shown with the folding mechanism in Figs. 2 and 3 of the drawings, but the same forms no part of my present invention, and therefore is not described herein.

It will be understood that I do not limit myself to the details of construction of the several mechanisms shown and described in carrying out my invention.

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

1. The combination with a gum-box roll, provided with recesses in its ends, and journals extending out from said ends, of bushings supported on said journals, and having a screw-thread, and nut at their outer ends, and a flange at their inner ends, and elastic washers extending within the recessed ends of the gum-box roll on the flanged ends of the bushing, for the purpose stated, substantially as set forth.

2. In a gum-box roll, the combination with the roll having recesses in its ends, and journals extending out from said ends of bushings supported on said journals, and elastic washers supported on said bushings, within said recesses, for the purpose stated, substantially as set forth.

3. The combination with the gum-rolls, and a system of gears for revolving the same, of a rack pivoted at one end and adapted to engage with and drive the system of gears to give a positive revolution to the gum-rolls when applying the gum to the gummers, and to be disengaged from the system of gears, when the gum-rolls are taking gum from the gum-box roll, substantially as set forth.

10 4. In an envelope-machine, the combination with the gum-rolls, of means for operating the same, to cause them to have a reciprocating motion back and forth under the gummers, consisting of a connector to a rocking arm fast on a rocking shaft, a crank-arm also fast on said shaft, a connector from said crank-arm to a bell-crank, said connector adjustably connected at one end with said crank-arm, and said bell-crank, on a second shaft, and a connector to a vertically-moving bar, and means for operating said bar, substantially as set forth.

5. In an envelope-machine, the combination with the gummers having a vertical reciprocating motion, of means for operating said gummers, consisting of two cams fast on a shaft, a vertical moving rod slotted at its lower end, and encircling said shaft, and carrying two cam-rolls thereon, one above, and one below the shaft for engagement with their respective cams, a collar fast on said rod, a sleeve loose on said rod below said collar, a spiral spring extending between said sleeve and a bearing-point on said rod above the upper cam-roll, a connection pivoted to said sleeve and to one end of a lever, and said lever,

and a connection pivoted to the other end thereof and to the vertical sliding block carrying the gummers, substantially as set forth.

6. In an envelope-machine, the combination with the gummers having a vertical reciprocating motion, of means for operating the same, consisting of a lever and connections, a vertical moving rod carrying a fixed collar, and a loose sleeve below said collar, said sleeve connected with said lever and a spiral spring interposed between said lever and a bearing-point on the lower part of said rod, and two cam-rolls on said rod extending above and below the shaft carrying the cams, for actuating said rod and said cams, substantially as shown and described.

7. In a blank-separator, the combination with a vertical adjustable slide, having supporting-bosses thereon, of a threaded pin adapted to be moved in and out in said bosses, and having secured in its outer end a curved spring-blade, for the purpose stated, substantially as set forth.

8. The combination with the guide-posts, and a slide adjustable vertically thereon, and means for adjusting said slide, of a threaded pin supported on the slide, and carrying a nut for moving the same in or out, and a curved spring-blade with one end secured in the outer end of said pin, and the other free end extending over the edge of the envelope-blank, substantially as set forth.

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Witnesses:

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PHOEBE SYKES.