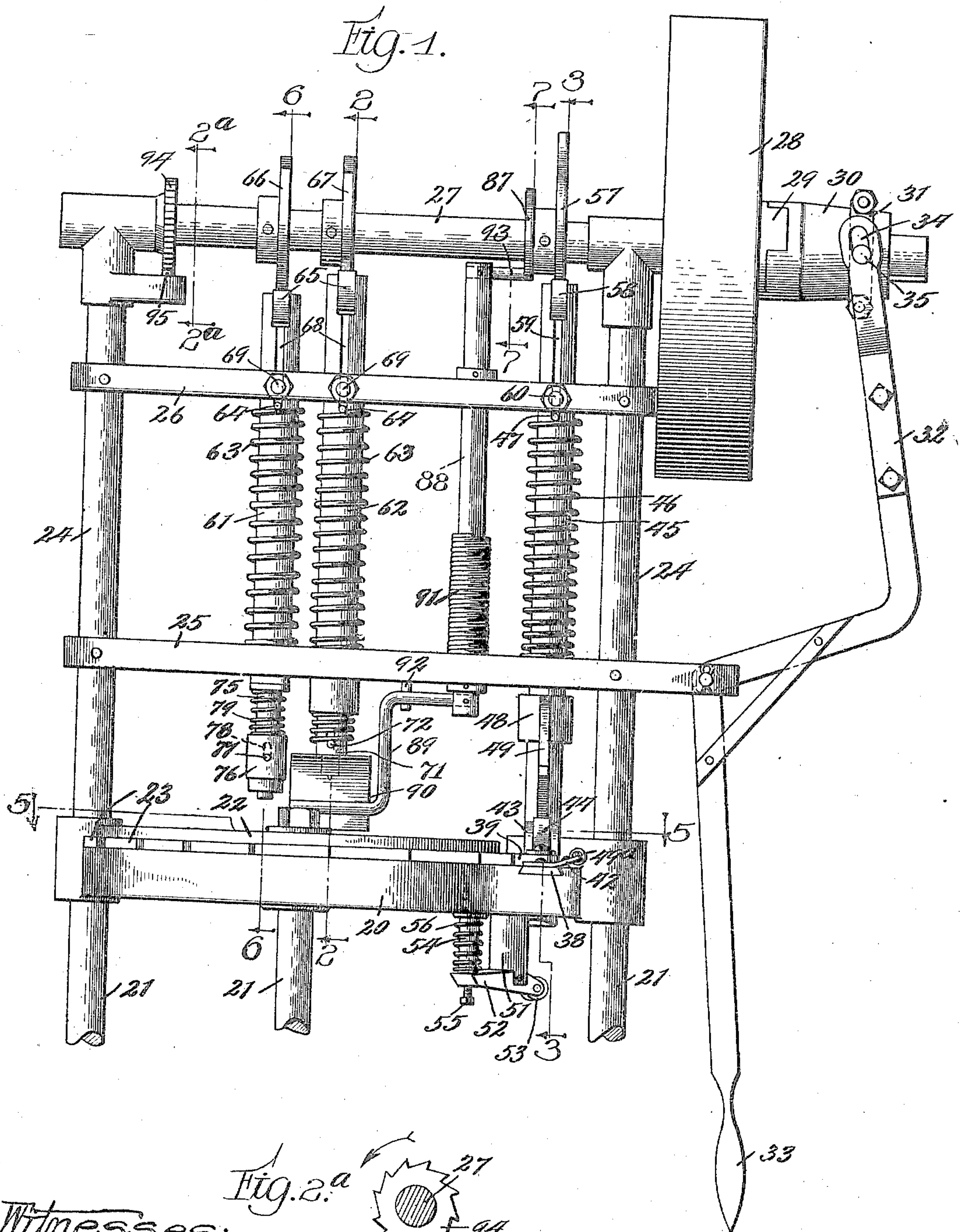


E. F. T. LUNDQUIST.
 BUTTON ASSEMBLING MACHINE.
 APPLICATION FILED APR. 26, 1909.

950,772.

Patented Mar. 1, 1910.
 3 SHEETS—SHEET 1.



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Fig. 2.

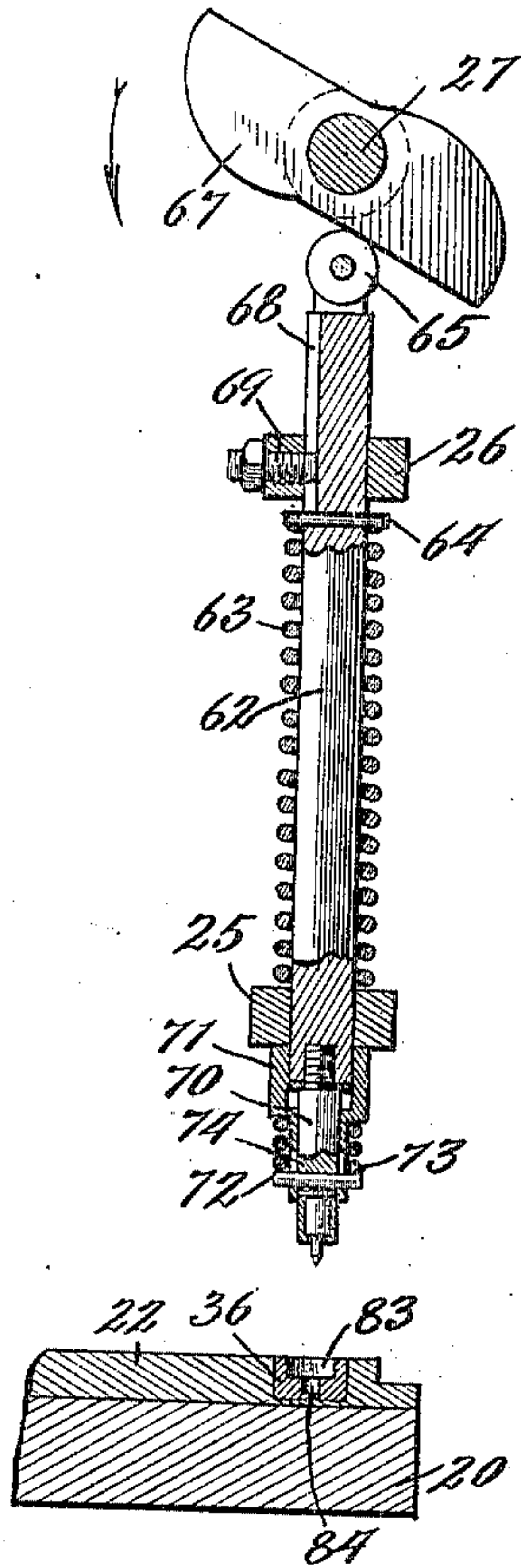


Fig. 3.

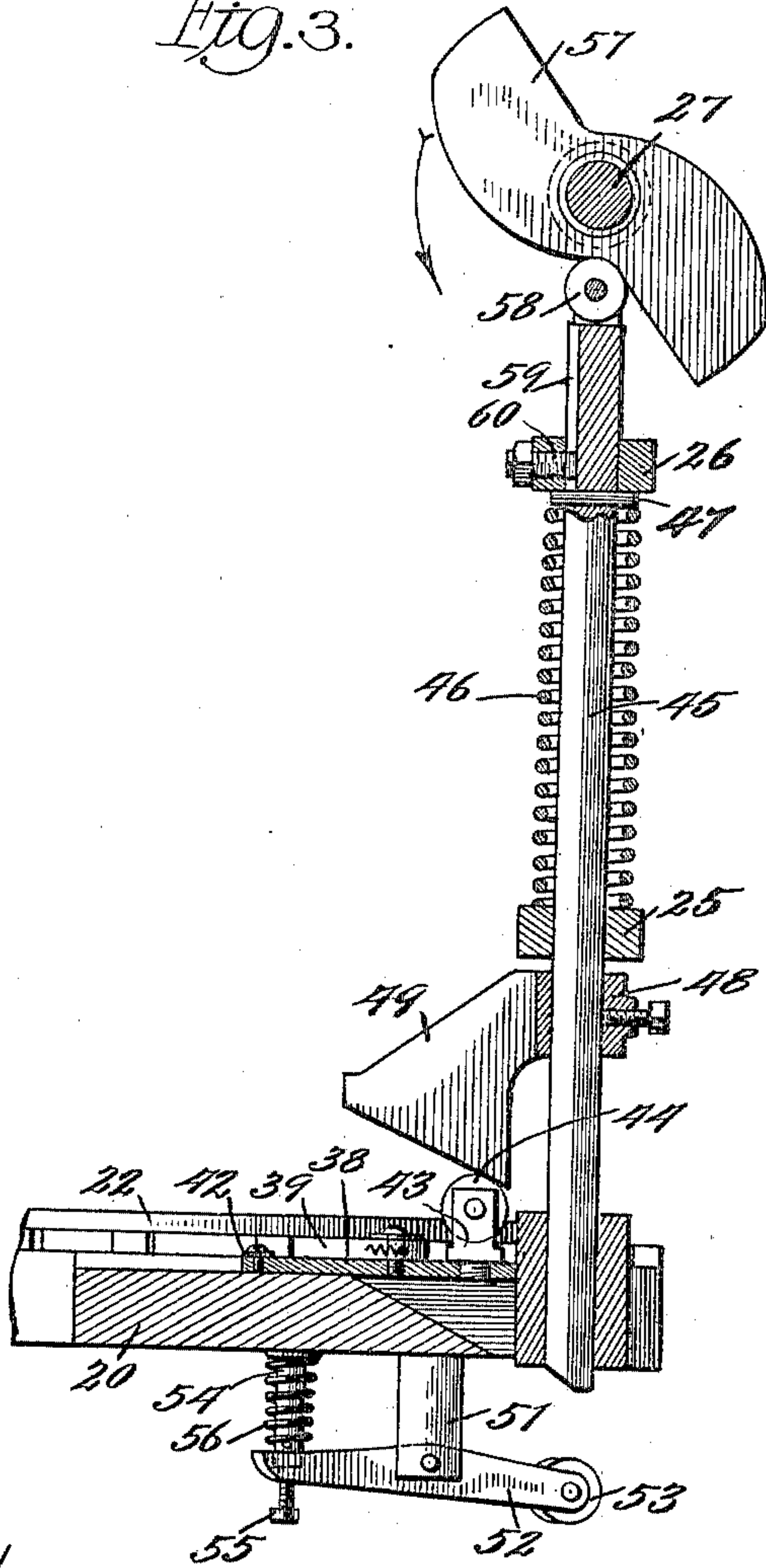
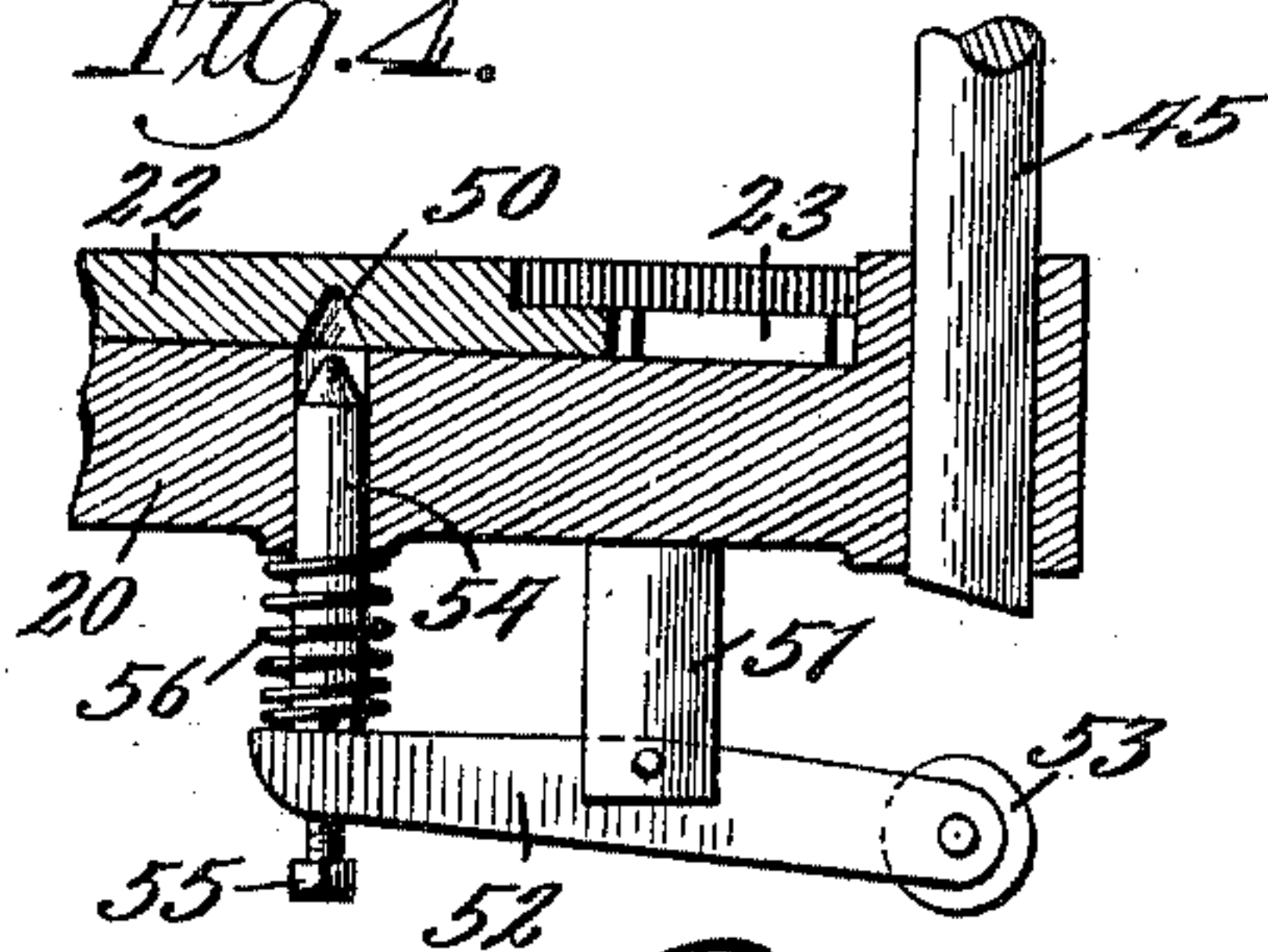


Fig. 4.



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Fig. 5.

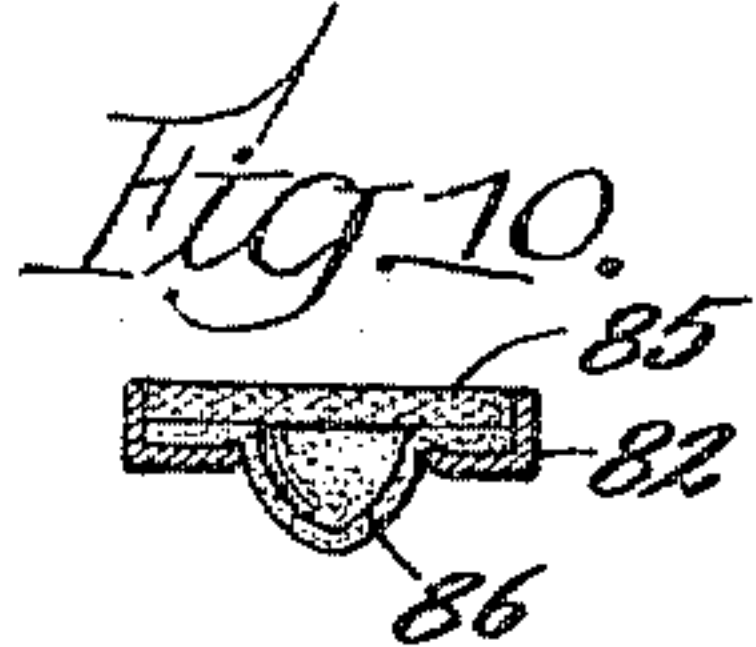
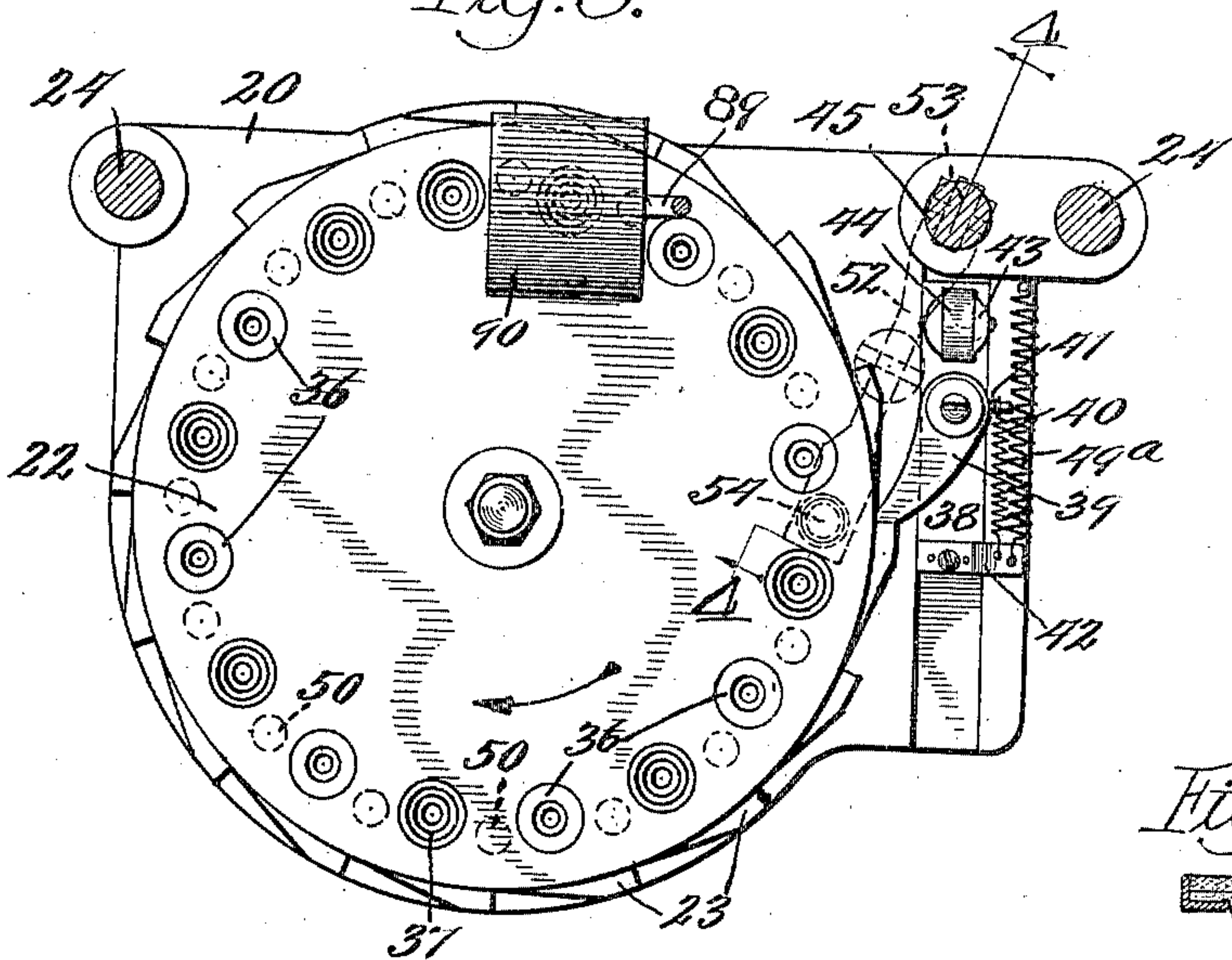


Fig. 8.

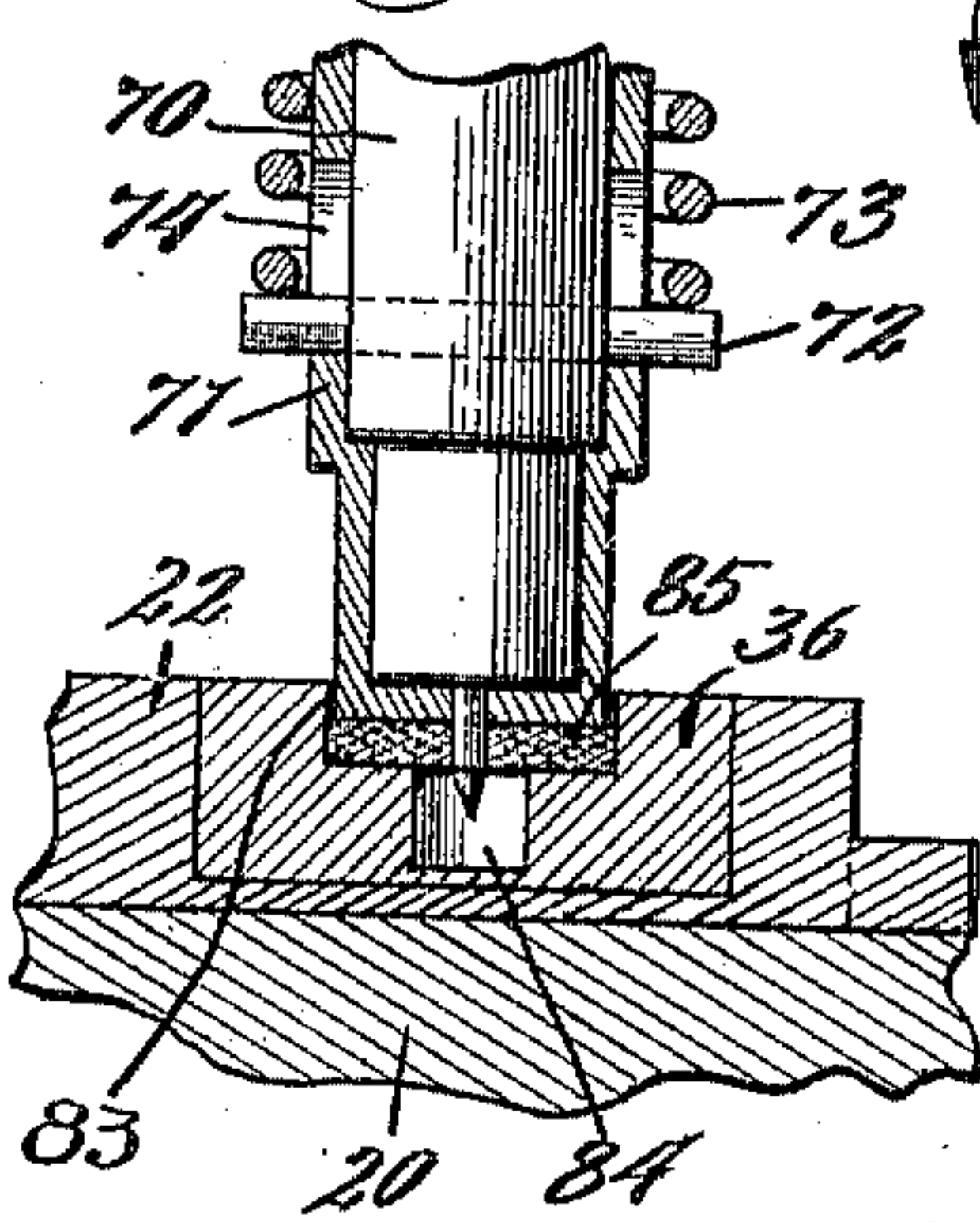


Fig. 7.

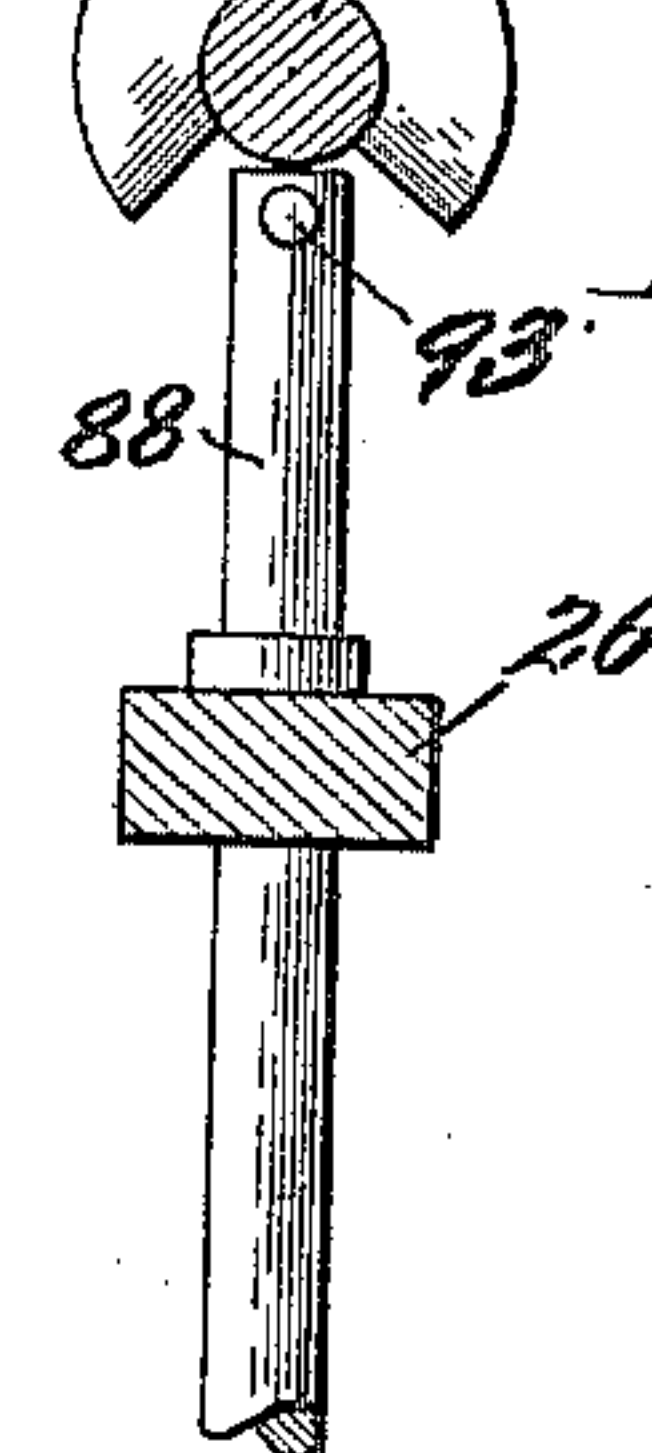


Fig. 6.

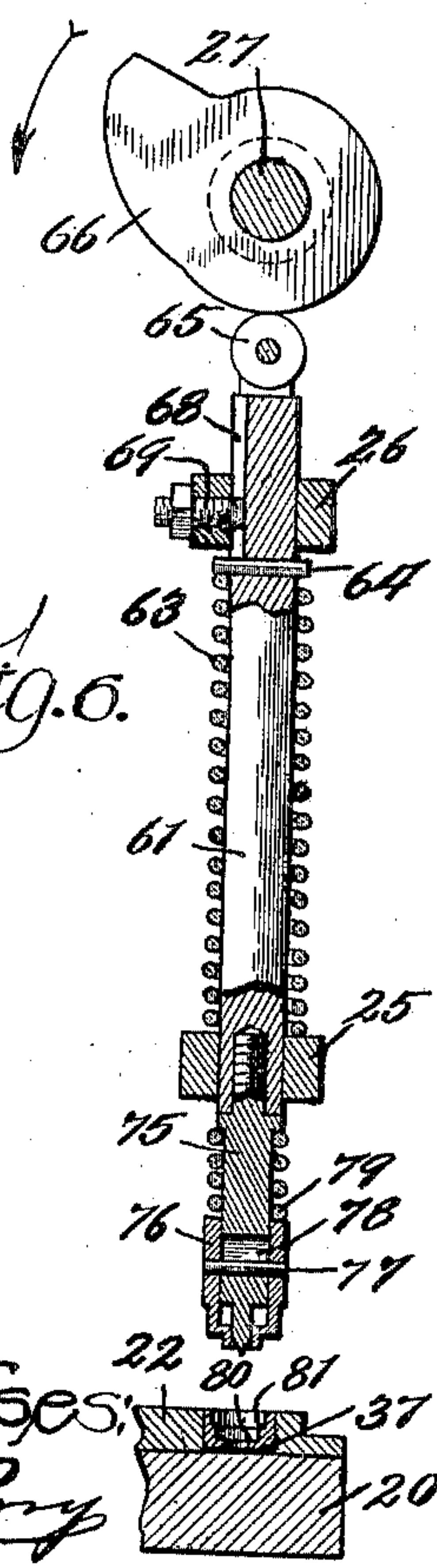
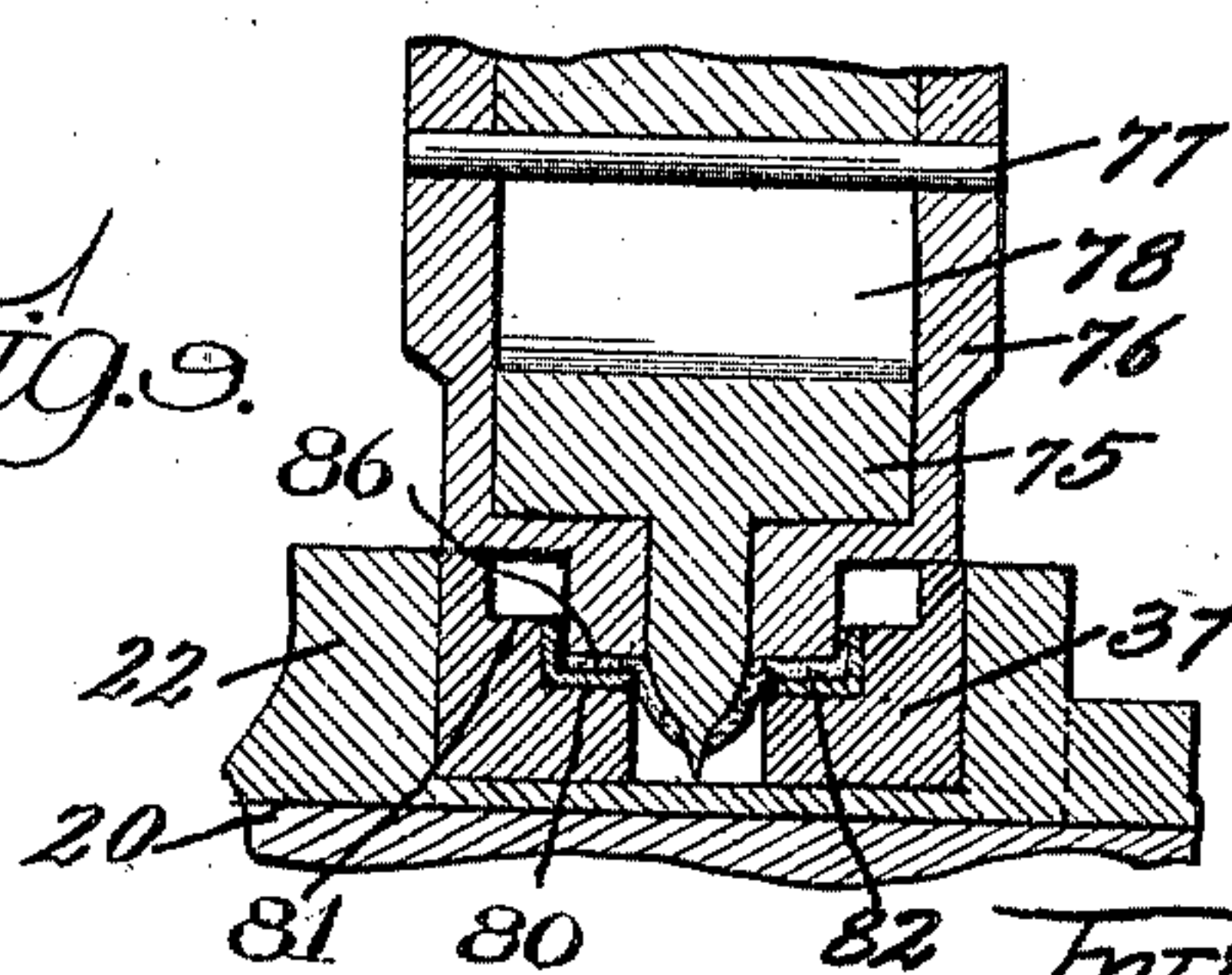


Fig. 9.



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UNITED STATES PATENT OFFICE.

ERNEST F. T. LUNDQUIST, OF CHICAGO, ILLINOIS.

BUTTON-ASSEMBLING MACHINE.

950,772.

Specification of Letters Patent.

Patented Mar. 1, 1910.

Application filed April 26, 1909. Serial No. 492,372.

To all whom it may concern:

Be it known that I, ERNEST F. T. LUNDQUIST, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Button-Assembling Machines, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to button assembling machines and particularly to that class of machines designed for assembling what are known as button-backs or button-tufts, which consist of collets provided each with a disk of cloth extending through the central opening of the collet to form the shank of the button, the disks of cloth being held in position by means of pads of paper or other suitable material firmly pressed into the collets.

It is the object of my invention to provide a new and improved construction of machine by which these button-tufts may be assembled, the separate parts being simply placed in position on a table and the entire process subsequent thereto being performed by the machine. I accomplish this object by the means illustrated in the drawings and hereinafter specifically described.

That which I believe to be new will be pointed out in the claims.

In the drawings:—Figure 1 is a side elevation of my improved machine. Fig. 2 is a section on line 2—2 of Fig. 1. Fig. 2^a is a section on line 2^a—2^a of Fig. 1. Fig. 3 is a section on line 3—3 of Fig. 1. Fig. 4 is a section on line 4—4 of Fig. 5. Fig. 5 is a section on line 5—5 of Fig. 1. Fig. 6 is a section on line 6—6 of Fig. 1. Fig. 7 is a section on line 7—7 of Fig. 1. Fig. 8 is an enlarged detail, being a view, partly in section, of the lower end of the plunger shown in Fig. 2 and the die which it enters. Fig. 9 is an enlarged detail, being a cross-sectional view of the lower end of the plunger shown in Fig. 6 and the die which it enters. Fig. 10 is a cross sectional view of a completed button-tuft.

Referring to the drawings:—20 indicates a table having legs 21. Revolvably mounted on the upper surface of the table 20 is a turn-table 22 having ratchet-teeth 23 upon its periphery.

24 indicates standards rising from the table 20, and 25—26 indicate crossbars suitably attached to said standards.

27 indicates a shaft journaled upon the upper ends of the standards 24, upon which shaft is revolvably mounted a pulley 28 which is adapted to be clutched positively to the shaft so as to rotate therewith by means of a clutch member 29 formed on the hub of the pulley and a clutch member 30 feathered upon the shaft.

31 indicates a collar revolvably mounted upon the clutch member 30 but secured against movement longitudinally thereof.

32 indicates a lever pivotally connected to the crossbar 25, provided with a handle 23 at its lower end and provided at its upper end with a slot 34 which engages a pin 35 on the collar 31, the lever serving to throw the clutch member 30 into and out of engagement with the clutch member 29.

The turn-table 22 is provided on its upper face with a series of dies 36 and 37, arranged alternately about the periphery of the turn-table, one adjacent to each of the ratchet-teeth 23. In the operation of the machine, the turn-table is rotated intermittently, at each actuation each of the dies occupying the position immediately before held by the next adjacent die. I will now describe the mechanism by which this motion is imparted to the turn-table.

38 indicates a slide-block dove-tailed into the upper surface of the table 20 so as to slide freely therein. 39 indicates a pawl pivotally mounted on the upper surface of said slide-block.

40 indicates a spiral spring connected at one end to a pin 41 projecting from the outer face of the pawl 39 and connected at its other end to an arm 42 carried by the slide-block 38 forward of the pivot point of said pawl. The spring 40 serves to keep the front end of the pawl in contact with one or another of the ratchet-teeth 23 of the turn-table 22.

43 indicates a yoke secured upon the rear end of the slide-block 38, provided with a roller 44 at its upper end pivoted on an axis extending transversely of the slide-block.

45 indicates a plunger rod passing through suitable openings in the crossbars 25 and 26, upon which is located a spiral spring 46, the lower end of which bears upon the crossbar 25, the upper end bearing against a pin 47 passing through the plunger rod, the spring serving to hold the plunger yieldingly up.

48 indicates a collar secured by means of a set-screw upon the plunger 45 below the

cross-bar 25. 49 indicates a vertically-disposed plate carried by said collar 48 and extending out over the slide-block 38 in line with the path traversed by the roller 44 as said slide-block is reciprocated longitudinally of itself. As shown in Fig. 3, the lower edge of the plate 49 is higher toward its forward end, so that when the plunger 45 is caused to descend against the action of the spring 46 the plate 49 coming in contact with the roller 44 causes the roller and consequently the slide-block 38 and pawl 39 to move forward, rotating the turn-table in the direction indicated by the arrow in Fig. 5.

49^a indicates a spiral spring connected at one end to the arm 42 and at its other end to the table 20 so as to cause the slide-block 38 to return to its normal position when the plunger 45 is raised so as to free the roller 44 from the plate 49. In this movement of the slide-block, the pawl 39 slips over the tooth 23 with which it is held in contact by the spring 40 without causing any turning of the turn-table and engages the tooth so as to give the turn-table another limited rotation upon the next succeeding actuation of the plunger 45.

The turn-table is provided with a series of openings 50 on its under side, one between each of the dies 36 and its adjacent die 37.

51 indicates a post depending from the lower face of the table 20, pivoted on the lower end of which is a lever 52. 53 indicates a roller revolvably mounted on one end of said lever, and 54 indicates a pin seated on a set-screw 55 passing through the other end of said lever, said pin passing up into an opening through the table 20, a spiral spring 56 being located on said pin between said lever and the under surface of said table. The lever 52 is so proportioned and positioned that the roller 53 is directly beneath the plunger 45, so that when the plunger 45 is lowered to cause a rotation of the turn-table its lower end comes in contact with the roller 53, rocking the outer end of the lever 52 downward and forcing the pin 54 upward against the force of the spring 56. The parts are so timed that the pin 54 emerges above the table 20 just as one of the openings 50 comes into registry with the pin, the set-screw 55 being adjusted to that end, the result being that so long as the plunger 45 is held down in its lowermost position the turn-table is locked against rotation. Whenever the plunger is released so as to permit the spring 46 to force it upward, the spring 56 immediately acts to retract the pin 54, again permitting rotation of the turn-table.

57 indicates a cam member non-rotatably secured upon the shaft 27 in line with the plunger 45.

58 indicates a roller journaled in the up-

per end of the plunger 45 and adapted to contact with the periphery of said cam member, being prevented from turning out of contact therewith by means of a longitudinal groove 59 in the plunger which is engaged by a pin 60 carried by the crossbar 26.

From the above description, it will be seen that for each rotation of the shaft 27, the plunger 45 will be twice forced downward as the roller 58 travels down the cam surfaces of said cam member 57, being held in its lowermost position at each stroke while the roller traverses one of the circular portions of the cam member, in each instance the plunger being returned to normal position by the spring 46 after the roller 58 reaches the end of the circular portion. It is therefore apparent that upon each rotation of the shaft 27 the turn-table is twice given a limited rotation, after each actuation being locked for a short time in position.

61—62 indicate plungers passing through suitable openings in the crossbars 25 and 26 so as to be movable up and down there-through. These plungers are so positioned that when the turn-table is locked against turning as above described one plunger is in registry with one of the dies while the other plunger is in registry with the die next adjacent thereto. Upon each of these plungers 61—62 is located a spiral spring 63 which bears at its lower end against the crossbar 25 and at its upper end against a pin 64 passing through the plunger. Each of said plungers has revolvably mounted in its upper end a roller 65 which is adapted to bear upon the bearing face of a cam member suitably positioned on the shaft 27 and non-rotatably secured thereon. The cam member with which the roller on the plunger 61 contacts is indicated by 66, and the cam member with which the roller on the plunger 62 contacts is indicated by 67. The plungers are held against rotation and the rollers in contact with the bearing faces of the cams by means of longitudinal grooves 68 in said plungers which are engaged by pins 69 carried by the crossbar 26 and adapted to slide freely in said grooves. As seen from Figs. 2 and 6, the cam member 66 is provided with only one cam surface, while the cam member 67 is provided with two. It therefore follows that the plunger 61 will be given one downward stroke to each revolution of the shaft 27 while the plunger 62 will be given two downward strokes, the springs 63 serving to return the plungers as will be readily understood. The arrangement is such that the plungers 61 and 62 reach their lowermost positions at about the same time that the plunger 45 reaches its lowermost position, at which time the turn-table is locked against turning and the dies are in registry with the plungers 61 and 62. It is therefore

seen that the plunger 61 is forced down into every alternate die, while the plunger 62 descends into each die as it comes into registry with such plunger.

Referring to Figs. 2 and 8 where the parts are best shown, 70 indicates a pin screw-threaded into the lower end of the plunger 62. 71 indicates a cap mounted on the end of the plunger 62 and inclosing the pin 70 so as to slide freely thereon, the lower end of said pin protruding below the cap through a suitable opening therein. The cap 71 is provided with a circumferential shoulder, interposed between which and a small pin 72 passing transversely through said pin 70 is a spiral spring 73. The pin 72 passes also through slots 74 in the sides of the cap 71 in which slots the pin 72 is free to slide, so that the spring 73 holds the cap 71 yieldingly at the uppermost limit of its vertical motion.

Referring to Figs. 6 and 9, 75 indicates a pin screw-threaded into the lower end of the plunger 61. 76 indicates a cap loosely mounted on the lower end of the pin 75 so as to slide freely thereon. 77 indicates a small pin passing through a slot 78 in the pin 75 and through the cap 76, being free to slide in the slot 78. 79 indicates a spiral spring interposed between a circumferential shoulder at the upper end of the pin 75 and the upper end of the cap 76, serving to hold said cap yieldingly in its lowermost position relative to said pin 75.

Each of the dies 37 (see Fig. 6) is stepped toward its lower end, each die being provided with two of such steps or benches 80 and 81. As shown in Fig. 9, the lower end of the cap 76 is of a size to fit loosely within a collet 82 which in turn fits loosely in the die 37 upon the bench or step 80. Referring to Figs. 2 and 8 where one of the dies 36 is shown, it will be seen that such die is provided with a central opening 83 and a smaller concentric opening 84. The opening 83 is of a size to fit loosely about a paper wad 85 which in turn fits loosely within the collet 82.

In operation, a collet such as 82 is placed by an operator in each of the dies 37 upon the stem or bench 80. A disk of cloth, or other suitable material, such as 86, somewhat larger in diameter than the collet 82 is then placed by another operator in position in each die 37 above the collet 82 resting upon the step or bench 81. Still another operator places in each die 36 a paper wad or pad, such as 85. It will be understood that the dies will be provided with parts as described before the machine starts, and that thereafter as the turn-table rotates through power applied to the pulley 28 as already described the operators will continue to supply such parts to the turn-table. When power is thus applied to the shaft

27, the cam 57 forces the plunger 45 down, rotating the turn-table and locking it in position. At the same time the cams 66 and 67 force the plungers 61 and 62 downward, the plunger 61 entering the die 37 and the plunger 62 entering the die 36. The pin 70 descending upon the wad 85 in the die 36 passes through such wad, the lower end of the cap 71 coming in contact with the wad. When the plunger is thereafter raised by the spring 63, the wad of paper is retained on the pin 70. At the same time the pin 75 descends upon the cloth 86 and collet 82 in the die 37. Inasmuch as the spring 79 holds the cap 76 at its lowermost position, the point of the pin merely penetrates the cloth without deflecting it downward to a very great extent before the lower end of the cap comes in contact with the cloth and presses it against the step or bench 80. Thereafter the downward motion of the plunger being continued, the pin 75 descends through the opening in the lower end of the cap and through the opening in the collet, carrying the cloth 86 down with it against the force of the pressure of the spring-seated cap upon the step 80, forming a shank for the button-back, as shown in Fig. 10. When the plunger again rises, the pin 75 is first withdrawn from the cloth while the cap 76 is still holding the cloth in position through the action of the spring 79, whereupon further upward movement of the plunger carries the pin and cap free of the die, the whole process of assembling the parts so far described occupying one-half of the period of one revolution of the shaft 27. When the plunger 45 is again forced downward, the turn-table is given another impulse and locked again in position with the die 37 just previously occupied by the plunger 61 in registry with the plunger 62 which carries the impaled wad 85. The cam member 66 has no effect upon the plunger 61, the roller 65 bearing at this time upon the circular portion of such cam member, but the cam 67 forces the plunger 62 down, the pin 70 carrying the wad 85 entering the die 37 shortly after the turn-table is locked in position. By this operation the wad 85 is caused to descend upon and to enter the collet 82 with the contained cloth 86. As has been said, the wad 85 is somewhat smaller in diameter than the collet, but the pressure of the circumferential shoulder on the pin against the end of the cap which in turn bears against the paper wad is sufficient to spread the wad so as to hold it quite forcibly in the collet. When therefore the plunger 62 again rises, it carries up with it the assembled button-back, as will be understood. Upon each succeeding revolution of the shaft 27 another button-back is in like manner formed.

Coming now to the means for withdraw-

ing the assembled button-racks from the pin 70 and for delivering them into any suitable receptacle, 87 indicates a disk, partly cut away, located on the shaft 27 and revoluble therewith.

88 indicates a vertical rock-shaft journaled in the crossbars 25 and 26.

89 indicates an arm connected to the lower end of the rock-shaft 88, carrying at its other end a slanting plate or chute 90.

91 indicates a torsion spring located upon the rock-shaft 88 and connected with said rock-shaft and with the crossbar 25, tending to hold said rock-shaft in such a position that the plate 90 will extend under the lower end of the pin 70 when the plunger 62 is in its elevated position.

92 indicates a pin depending from the crossbar 25 against which the arm 89 bears when the plate 90 is in position extending under the end of the pin 70.

93 indicates an arm secured to the upper end of the rock-shaft 88 and extending toward the disk 87, the parts being so positioned that when the cut-away portion of said disk is lowermost the arm 93 is freed from contact therewith and the spring 91 is free to turn said plate into position extending under said pin 70, but as the disk rotates with the shaft 27 the disk forces the arm 93 out of its way against the action of the spring 91, the end of the arm 93 thereupon bearing against one face of the disk and the plate 90 being turned out of the path of the plunger 62 and pin 70 until the pin again comes to the cut-away portion of the disk when the spring immediately returns the plate to its position extending under the plunger. The disk 87 is so proportioned and positioned on the shaft 27 that the plate 90 is swung into position below the end of the pin 70 just as said pin is rising with the assembled button-back upon its lower end.

As will be seen from Fig. 2, one face of the cam member 67 is somewhat nearer to the shaft 27 than the other. When the plunger 62 rises from the stroke by which the wad of paper is secured upon the pin 70, the cam member 67 permits the spring 63 to force the plunger up to a position at which the cap 71 is very lightly if at all in contact with the crossbar 25, but when the plunger rises from the succeeding stroke with the assembled button-back upon the lower end of the pin 70, the opposite side of the cam member 67 is in contact with the roller 65 so that the plunger is forced farther upward by the spring 63. The result is that the cap 71 comes into contact with the crossbar 25 before the end of the upward stroke and the pin 70 is therefore raised relative to the cap against the action of the spring 73, this raising of the pin 70 relative to the cap forcing the button-back

which has been in contact with the lower end of the cap off the end of the pin. As described above, at just this time the plate 90 is in position below the end of the plunger 62, so that the button-back falls onto such plate and is slid to one side into any suitable receptacle.

As has been said above, the plunger 62 descends into each of the dies of the turntable as it rotates, while the plunger 61 descends only into every alternate die,—namely dies 37. In practice it was found that, when the machine was stopped while the turn-table was in motion and before it became locked in position by the pin 54, the weight of the cams and the pressure of the springs 63 and 46 would rotate the shaft 27 backward without a corresponding backward rotation of the turn-table, so that the pawl 39 would engage the next succeeding tooth 23. The result of this of course was that the plunger 61 descended thereafter into dies 36 instead of into dies 37. To prevent this, I have provided a ratchet-wheel 94 (see Fig. 2) keyed or otherwise secured on the shaft 27, and a spring-seated dog 95 engaging the ratchet-wheel to prevent backward movement of the shaft 27 when the clutch members 29 and 30 are disengaged upon stopping the machine.

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

1. In a button assembling machine, the combination with a die adapted to hold a wad of suitable material, of a reciprocatory plunger provided with a pin at its lower end adapted to be lowered upon said wad and to impale the same.

2. In a button assembling machine, the combination with a die adapted to hold a wad of suitable material, a second die adapted to hold a collet provided with a cloth forming a shank therefor, and a reciprocatory plunger provided with a pin at its lower end, of means adapted to lower said plunger into said first die to impale said wad and then to lift the same, and means adapted to lower said plunger and said wad into such second die and to compress said wad into said collet above said cloth to form a button-back and then to lift said button-back.

3. In a button assembling machine, the combination with a die adapted to hold a wad of suitable material, a second die adapted to hold a collet provided with a cloth forming a shank therefor, and a reciprocatory plunger provided with a pin at its lower end, of means adapted to lower said plunger into said first die and to impale said wad on said pin and then lift the plunger and impaled wad, means adapted to lower said plunger and said wad into said second die and to compress said wad into said collet above said cloth to form a button-

back and then to lift said button-back impaled on said pin, and means adapted to remove said button-back from said pin.

4. In a button assembling machine, the combination with a die adapted to hold a wad of suitable material, a second die adapted to hold a collet provided with a cloth forming a shank therefor, and a reciprocatory plunger provided with a pin at its lower end, of means adapted to lower said plunger into said first die and to impale said wad on said pin and then lift the plunger and impaled wad, means adapted to lower said plunger and said wad into said second die and to compress said wad into said collet above said cloth to form a button-back and then to lift said button-back impaled on said pin, means adapted to remove said button-back from said pin, and means adapted to direct said button-back when released into a suitable receptacle.

5. In a button assembling machine, the combination with a die adapted to hold a wad of suitable material, a second die adapted to hold a collet provided with a cloth forming a shank therefor, and a reciprocatory plunger provided with a pin at its lower end, of means adapted to lower said plunger into said first die and to impale said wad on said pin and then lift the plunger and impaled wad, means adapted to move said second die into line with said plunger, and means adapted to lower said plunger into said second die and to compress said wad into said collet above said cloth to form a button-back and then to lift said button-back impaled on said pin.

6. The combination with a turn-table, and a series of dies arranged therein and adapted to contain wads of suitable material, of a reciprocatory plunger provided with a pin at its lower end, means for intermittently rotating said turn-table to bring said dies successively into line with said plunger, and means adapted to lower said plunger successively into said dies and to impale the wads located therein.

7. The combination with a turn-table, and a series of dies arranged therein, of two reciprocatory plungers, means for intermittently rotating said turn-table to bring said dies successively into line with said plungers, means for lowering one of said plungers successively into each of said dies, and means for lowering the other of said plungers successively into each alternate one of said dies.

8. The combination with a turn-table, and a series of dies arranged therein each adapted to hold a perforated collet and a superimposed disk of cloth, of a reciprocatory plunger, means for intermittently rotating said turn-table to bring each of said dies in turn into line with said plunger, means for locking said turn-table successively in such

positions, and means adapted to lower said plunger into said die while said turn-table is thus locked in position and to force the cloth located on the collet in the die through the central hole of the collet to form a shank therefor.

9. The combination with a turn-table, and two sets of dies arranged alternately therein, of two reciprocatory plungers, a shaft, ratchet mechanism actuated by the rotation of said shaft for rotating said turn-table, and adapted to bring said dies successively into line with said plungers, means for locking said turn-table against turning after each rotation to a certain predetermined extent, means actuated by the said rotation of said shaft for lowering one of said plungers into each of said dies in turn, means for lowering the other of said plungers successively into each alternate one of said dies, and means adapted to prevent backward rotation of said shaft whereby said last-named plunger is prevented from being lowered successively into the wrong set of said alternately-arranged dies.

10. The combination with a table, a turn-table revolubly mounted thereon provided with a series of openings in its lower face arranged in a circle about its axis of rotation, a reciprocatory plunger, means for forcing said plunger downward, and means actuated by said plunger during a part of its downward stroke for rotating said turn-table, of a pin located in an opening in said table in line with said series of openings as said turn-table rotates, and means actuated by said plunger at the moment that one of said openings in said turn-table is in alignment with the opening in said table for moving said pin upward to enter said opening in said turn-table to lock the turn-table against rotation.

11. In a button assembling machine, the combination with a die adapted to hold a button-part comprising a wad of suitable material, a reciprocatory plunger, and means for lowering said plunger into said die, of a pin fixedly carried by said plunger at its lower end, and adapted to impale the wad in said die, a cap located on said pin and movable longitudinally thereof, against which cap when in a raised position on said pin said impaled wad bears, and a stop adapted to engage said cap just before said plunger reaches its uppermost position and adapted by the further movement of said plunger and pin to free said wad from said pin.

12. In a button assembling machine, the combination with a die adapted to hold a button-part comprising a wad of suitable material, a reciprocatory plunger, and means for lowering said plunger into said die, of a pin fixedly carried by said plunger at its lower end and adapted to impale the wad in

said die, a cap located on said pin and movable longitudinally thereof, against which cap when in a raised position on said pin said impaled wad bears, a spring tending
5 to hold said cap in its raised position relative to said pin, and a stop adapted to engage said cap just before said plunger reaches its uppermost position and adapted by the further movement of said plunger
10 and pin to free said wad from said pin.

13. In a button assembling machine, the combination with a die adapted to hold a button-part comprising a wad of suitable material, a shaft, means for rotating the
15 same, a reciprocatory plunger, means actuated by said shaft for lowering said plunger into said die, a pin fixedly carried by said plunger at its lower end and adapted to impale the wad in said die, and means for releasing said impaled wad from said pin
20 as said plunger reaches its uppermost position, of a vertically-disposed rock-shaft adapted to be rocked between two positions, an inclined plate connected to the lower end of said rock-shaft and adapted at one of
25 the said positions of said rock-shaft to extend under said plunger when said plunger is in its raised position, yielding means tending to hold said rock-shaft in one of its
30 said positions, and means actuated by said shaft for holding said rock-shaft in the other of its said two positions.

14. In a button assembling machine, the combination with a die adapted to hold a
35 button-part comprising a wad of suitable material, a shaft, means for rotating the same, a reciprocatory plunger, means actuated by said shaft for lowering said plunger into said die, a pin fixedly carried by said
40 plunger at its lower end and adapted to impale the wad in said die, and means for releasing said impaled wad from said pin as said plunger reaches its uppermost position, of a vertically-disposed rock-shaft, an inclined
45 plate connected to the lower end of said rock-shaft, a spring tending to hold said rock-shaft in turned position so that said plate shall extend under said plunger, a disk fixedly secured on said first-mentioned
50 shaft, said disk being partially cut away, and a pin carried by said rock-shaft adapted to bear against one face of said disk where not cut away to hold said plate from under said plunger.

55 15. In a button assembling machine, the combination with a die adapted to hold a wad of suitable material, a second die adapted to hold a collet provided with a cloth forming a shank therefor, a shaft, means
60 for rotating the same, a plunger mounted below said shaft, a cam member fixedly secured on said shaft, a cam face on said cam member adapted to engage said plunger to force it downward into the die containing
65 said wad, a pin fixedly carried by said

plunger at its lower end and adapted to impale the wad in said die at said downward stroke, a cap located on said pin and movable longitudinally thereof, against
70 which cap when in a raised position on said pin said impaled wad bears, and a spring adapted to raise said plunger and to maintain it in contact with said cam member, of means adapted to move said second die
75 with the contained collet and cloth into line with said plunger, a second cam face on said cam member adapted to engage said plunger to force it with its impaled wad downward into the die containing the said collet and
80 cloth and to compress said wad firmly in said collet above said cloth to form a button-back, said wad being still impaled on said pin, and a stop against which said cap bears shortly before said plunger reaches its
85 uppermost position on being raised by said spring with the completed button-back impaled on said pin, said cam member being so formed that on said second upward stroke of the plunger the spring is enabled
90 to lift the plunger higher than upon its said first upward stroke, said stop serving to hold said cap against such further upward movement with the plunger whereby the button-back is freed from the pin.

16. In a button assembling machine, the
95 combination with a die adapted to hold a wad of suitable material, a second die adapted to hold a collet provided with a cloth forming a shank therefor, a shaft, means for rotating the same, a plunger
100 mounted below said shaft, a cam member fixedly secured on said shaft, a cam face on said cam member adapted to engage said plunger to force it downward into the die containing said wad, a pin fixedly carried
105 by said plunger at its lower end and adapted to impale the wad in said die at said downward stroke, a cap located on said pin and movable longitudinally thereof, against which cap when in a raised position on said
110 pin said impaled wad bears, and a spring adapted to raise said plunger and to maintain it in contact with said cam member, of means adapted to move said second die with the contained collet and cloth into line with
115 said plunger, a second cam face on said cam member adapted to engage said plunger to force it with its impaled wad downward into the die containing the said collet and cloth and to compress said wad firmly in
120 said collet above said cloth to form a button-back, said wad being still impaled on said pin, a stop against which said cap bears shortly before said plunger reaches its uppermost position on being raised by
125 said spring with the completed button-back impaled on said pin, said cam member being so formed that on said second upward stroke of the plunger the spring is enabled
130 to lift the plunger higher than upon its

said first upward stroke, said stop serving to hold said cap against such further upward movement with the plunger whereby the button-back is freed from the pin, a vertical rock-shaft, an inclined plate carried thereby, and means adapted to rock said rock-shaft to move said inclined plate into position extending under said plunger at about the end of the said second upward stroke of said plunger whereby said plate directs said button-back into a suitable receptacle when freed from the pin.

17. In a button assembling machine, the combination with a turn-table, a set of dies each adapted to hold a collet with a superimposed disk of cloth arranged in the upper face of said turn-table, a second set of dies each adapted to hold a wad of suitable material arranged in the upper face of said turn-table alternating with the dies of said first set, a shaft, a reciprocatory plunger actuated by said shaft to descend into a die containing said collet and cloth and to force said cloth down into said collet to form a shank therefor, a second reciprocatory plunger actuated by said shaft to descend into a die containing one of said wads and to impale and pick up said wad, means for turning said turn-table to bring the die containing said collet and cloth just acted upon into line with said second plunger, means actuated by said shaft to lower said second plunger and impaled wad into the die containing said collet and cloth and to compress said wad firmly into said collet above said cloth to form a button-back, means for raising said plunger with the impaled button-back, means for freeing said button-back from said plunger, and means for turning said turn-table to bring another die containing one of said wads into line with said last-mentioned plunger.

18. In a button assembling machine, the combination with a die adapted to contain a centrally-perforated collet and a superimposed disk of cloth, of a reciprocatory plunger provided with a pin at its lower end, a cap located on the lower end of said pin and movable longitudinally thereof, and a spring tending to hold said cap in its lowermost position relative to said pin, said plunger being adapted to be lowered into said die so that said cap will bear against said cloth and hold said cloth with the force of the said spring against said die while said pin descends farther into said die and forces said cloth firmly through the central hole in said collet to form a shank therefor.

19. The combination with a plunger provided with a pin at its lower end, of a cap slidably mounted on said pin, and means adapted to hold said cap yieldingly in its uppermost position relative to said pin.

20. The combination with a plunger provided with a pin at its lower end, of a cap slidably mounted on said pin having a circumferential flange at its upper end, a key passing through said pin and through longitudinal slots in said cap, and a spring mounted on said cap between said key and said flange tending to hold said cap in its uppermost position.

21. In a button-assembling machine, the combination with a die adapted to hold a wad of suitable material, of a reciprocatory plunger provided with a pin at its lower end adapted to be lowered upon said wad and to impale the same, and automatically-operating means for freeing said wad from said pin.

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Witnesses:

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