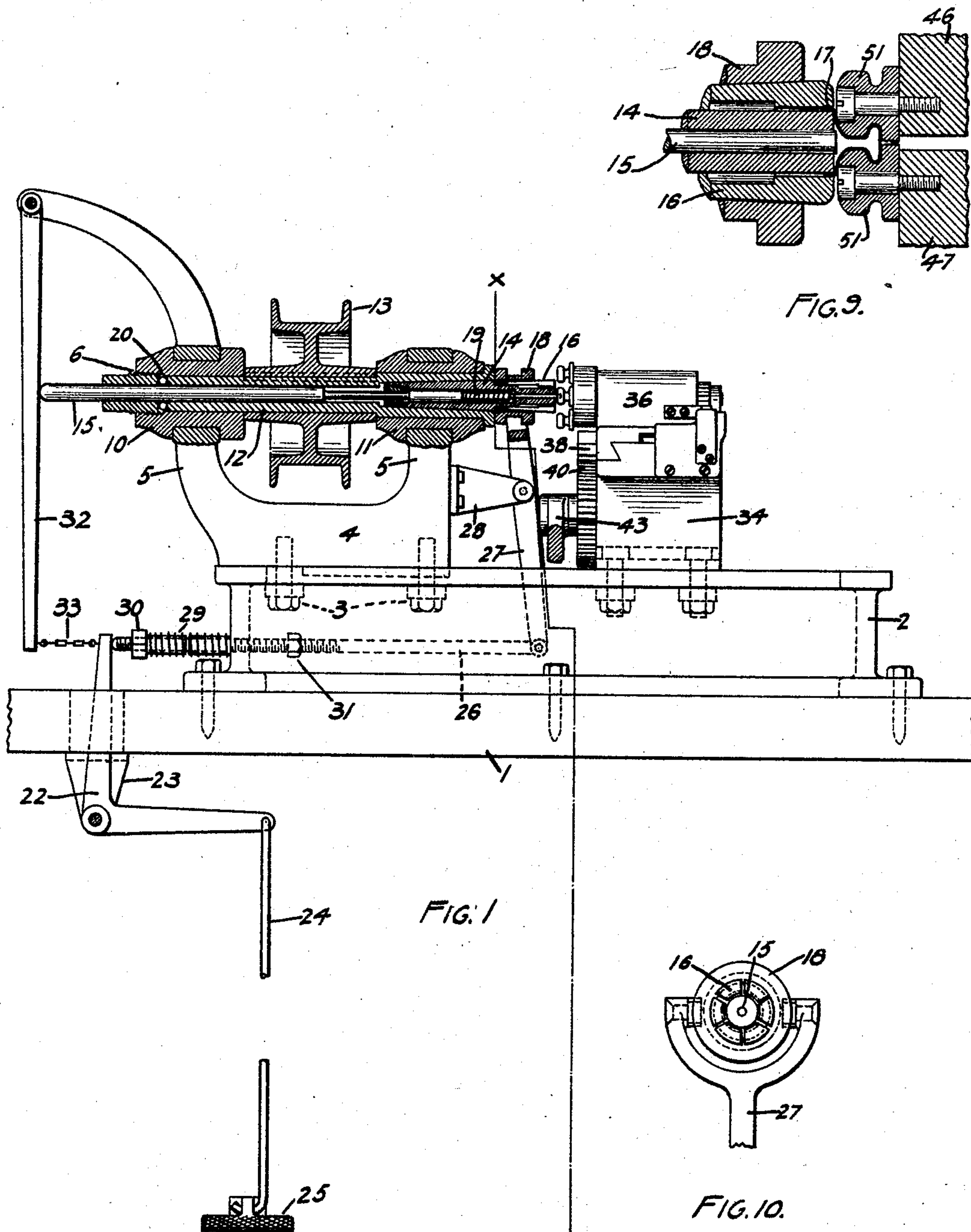


No. 782,309.

PATENTED FEB. 14, 1905.

E. J. YALE.  
MACHINE FOR FORMING COLLAR BUTTONS.  
APPLICATION FILED MAY 6, 1904.

3 SHEETS—SHEET 1.



WITNESSES,

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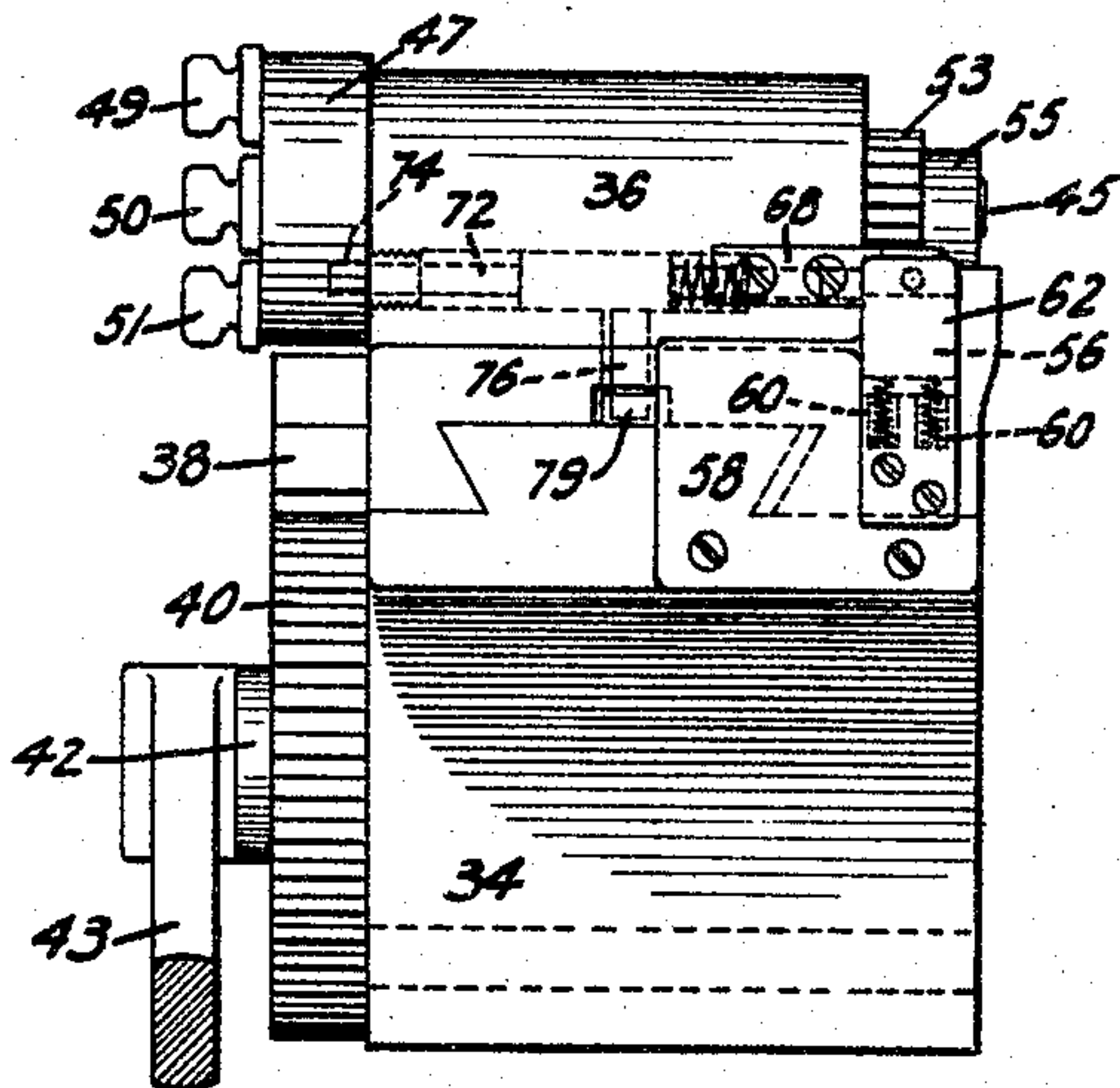


FIG. 6.

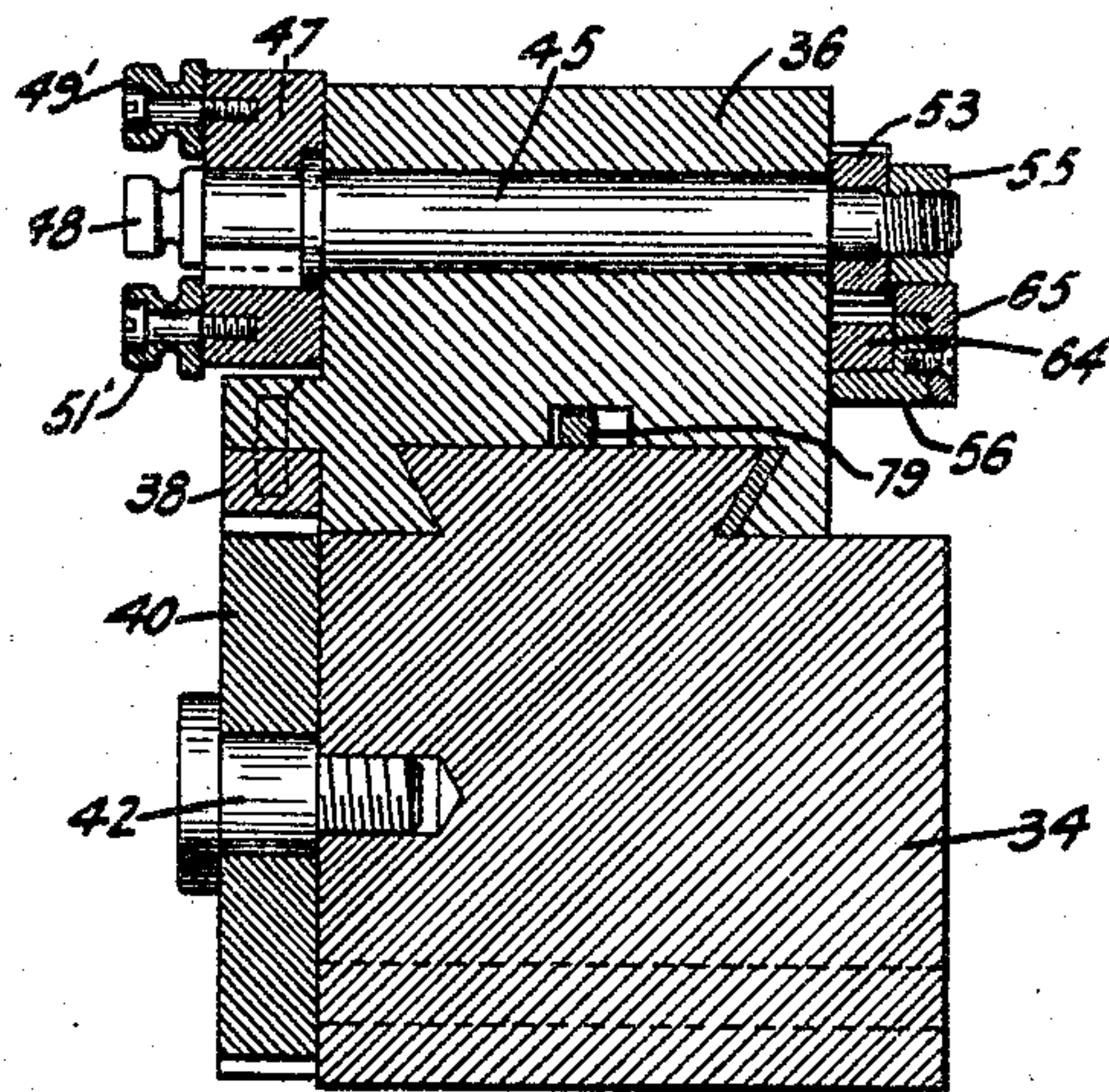


FIG. 7.

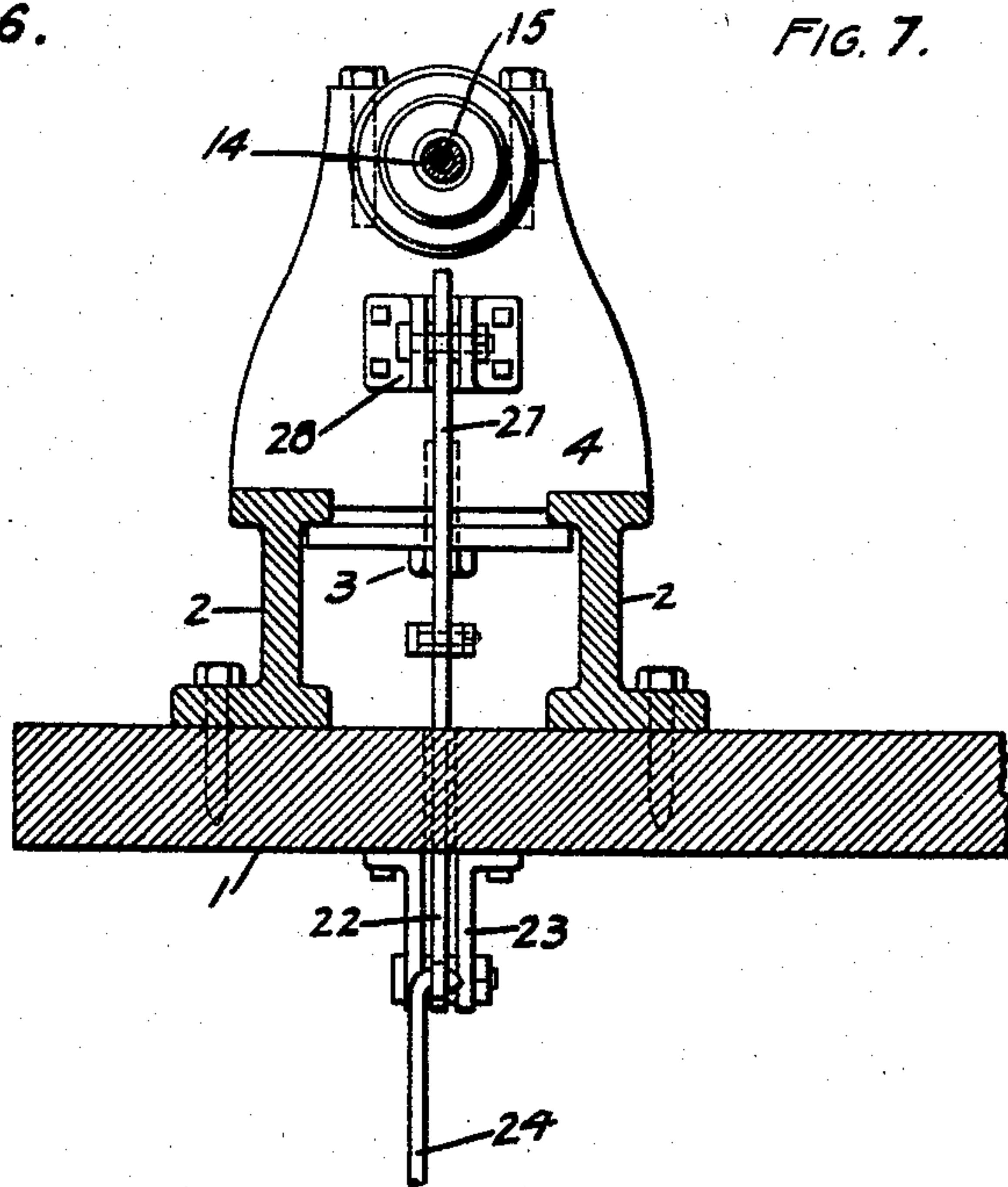


FIG. 2.

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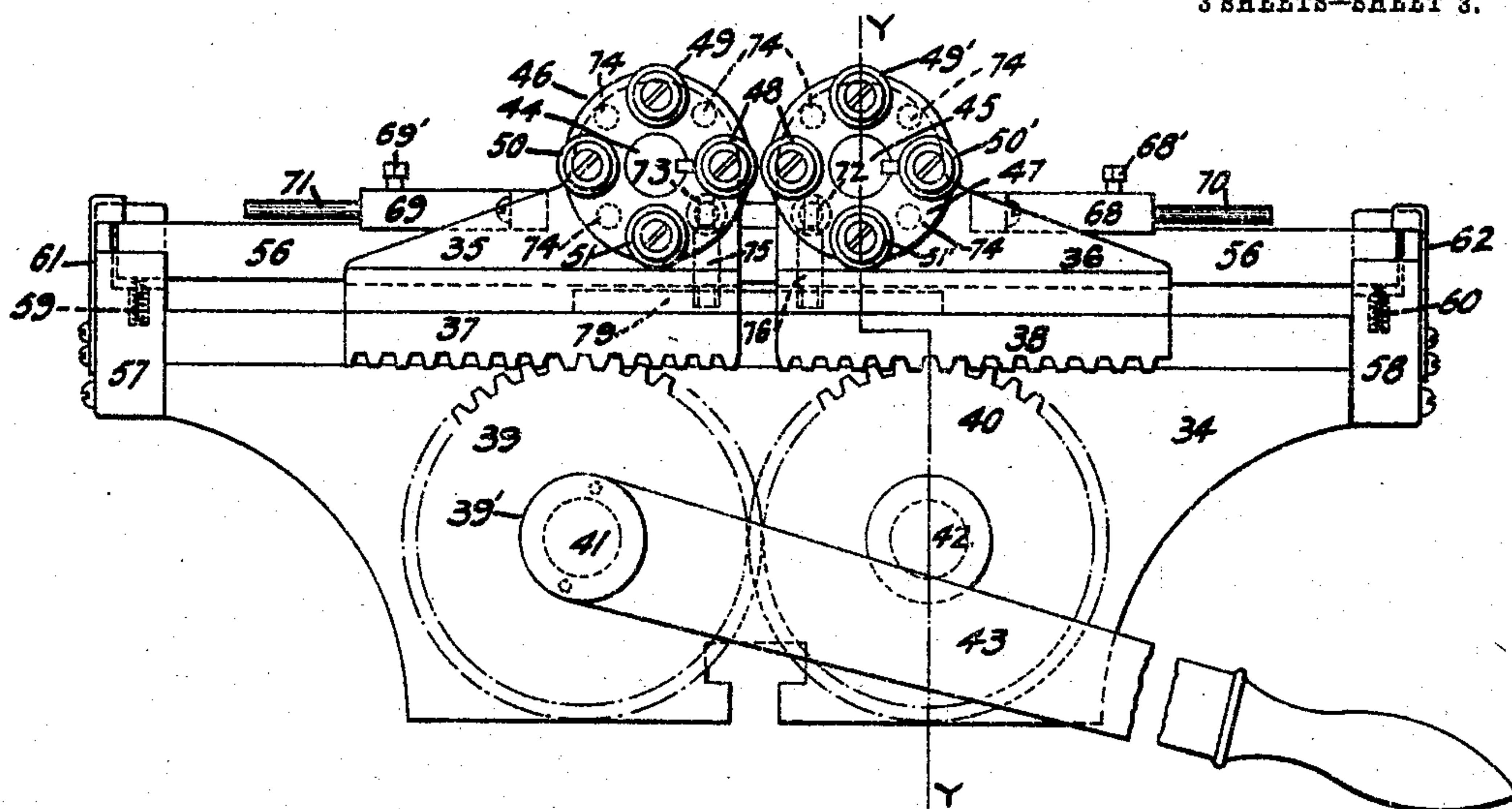


FIG. 3.

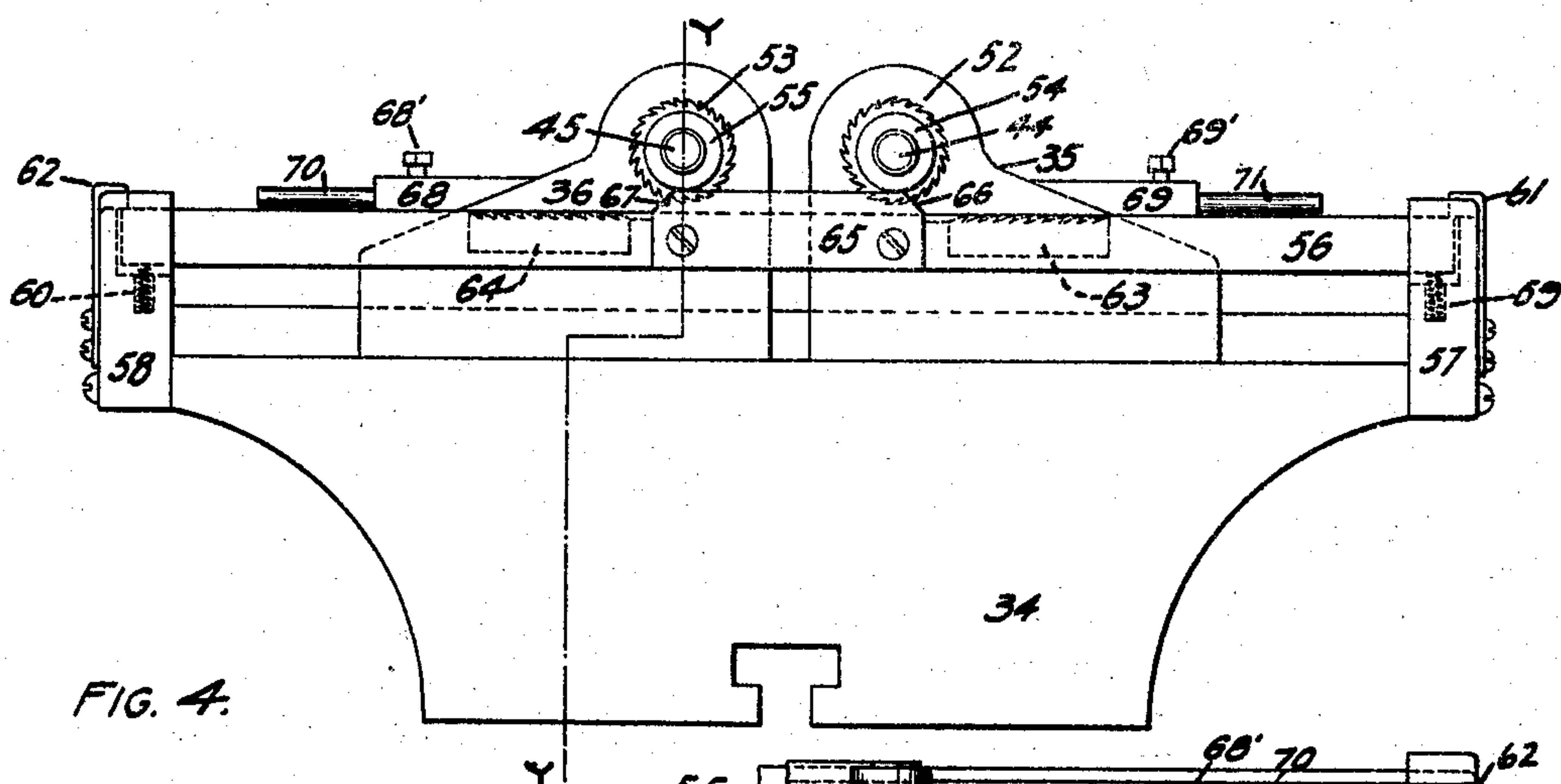


FIG. 4.

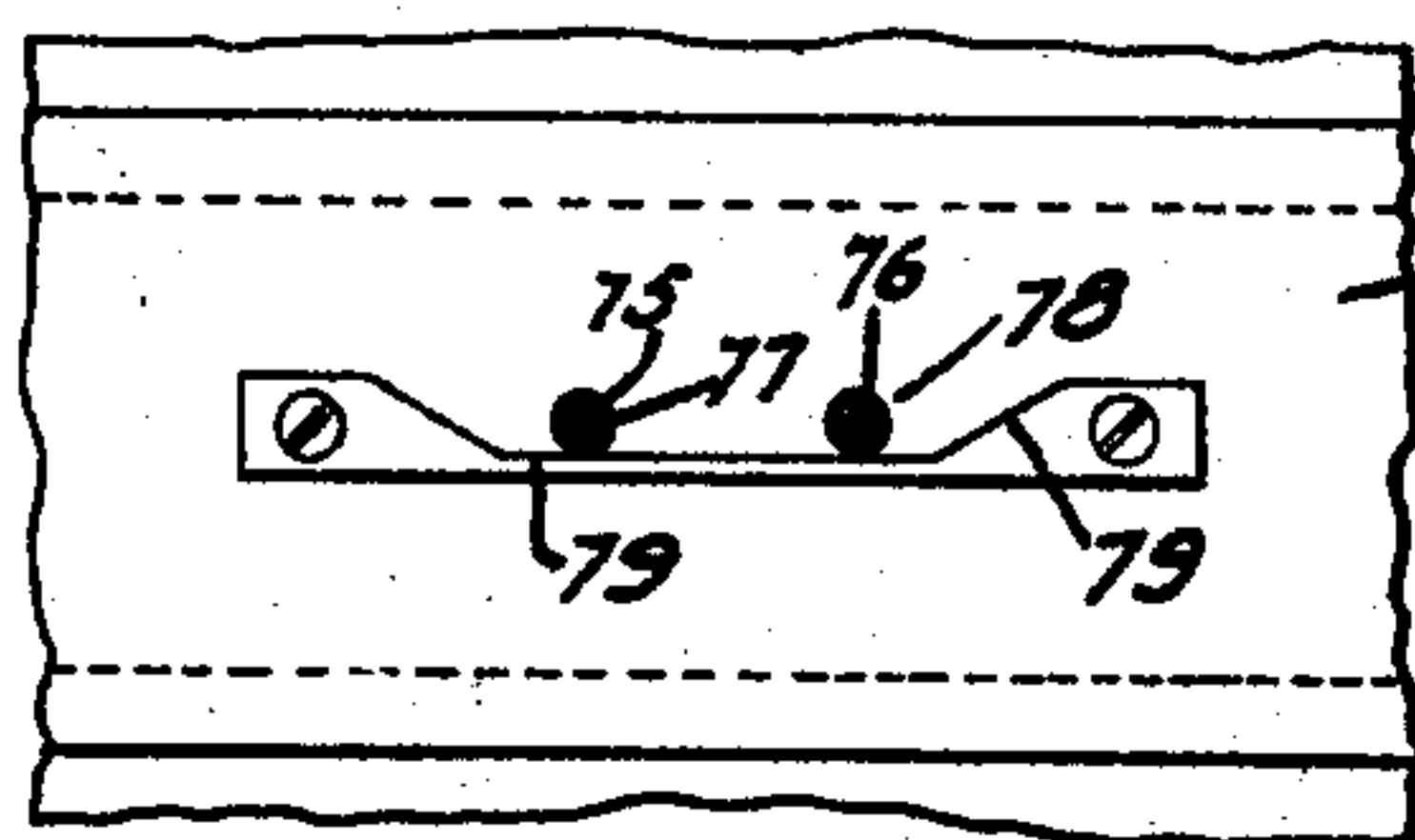


FIG. 6.

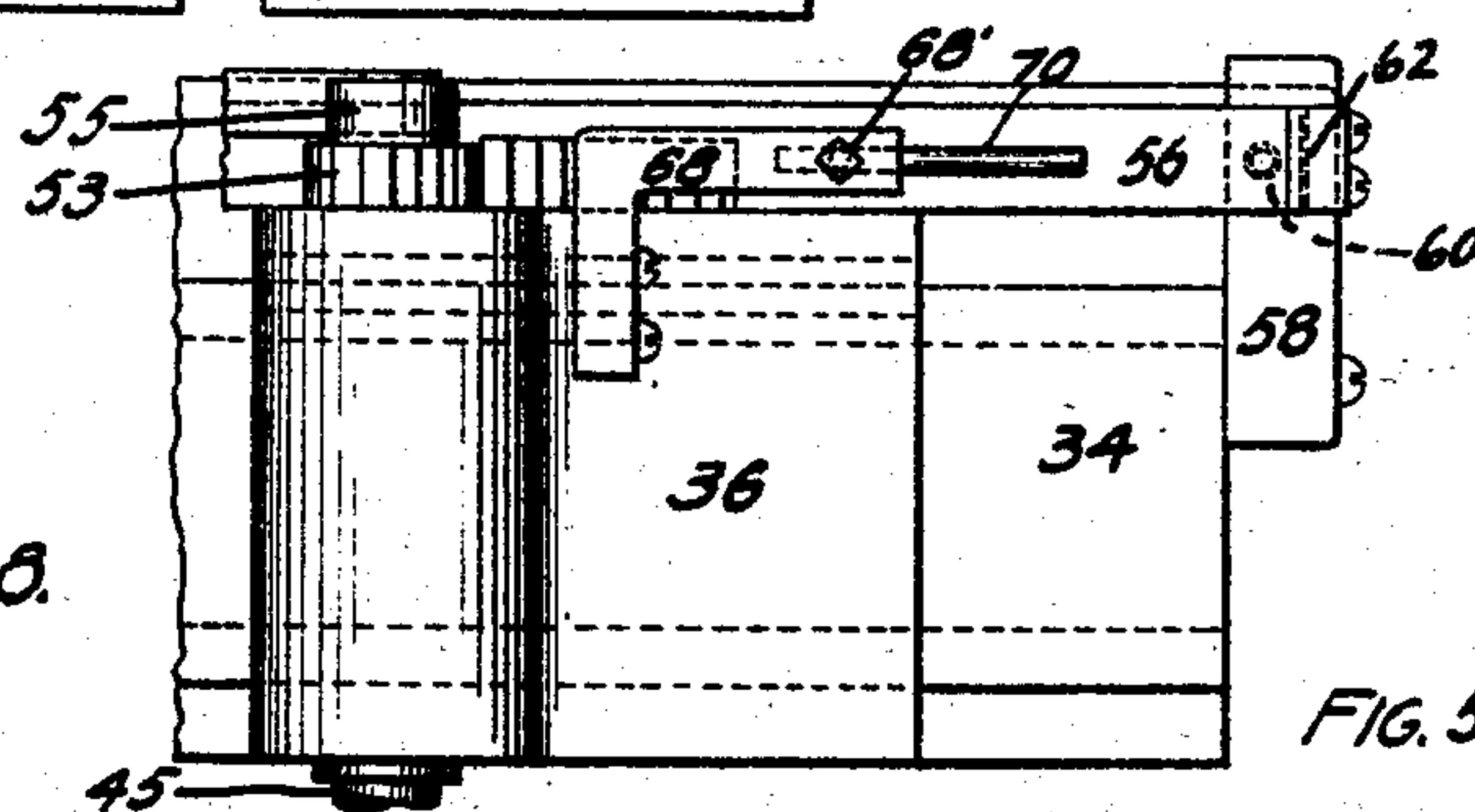


FIG. 5.

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# UNITED STATES PATENT OFFICE.

EDWARD J. YALE, OF NORTH ATTLEBORO, MASSACHUSETTS.

## MACHINE FOR FORMING COLLAR-BUTTONS.

SPECIFICATION forming part of Letters Patent No. 782,309, dated February 14, 1905.

Application filed May 6, 1904. Serial No. 206,702.

*To all whom it may concern:*

Be it known that I, EDWARD J. YALE, a citizen of the United States, residing at North Attleboro, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Machines for Forming Collar-Buttons, of which the following is a specification, reference being had therein to the accompanying drawings.

My machine is adapted to form or spin cup-shaped blanks into buttons, cartridges, and similar articles, and has for its ends the purposes commonly sought in this class of machines.

My invention consists in the novel construction and combination of parts hereinafter disclosed in the specification and illustrated in the accompanying drawings, wherein—

Figure 1 is a side elevation of the entire machine, showing the spindle and its bearings in vertical central section; Fig. 2, a sectional elevation of the same on line *x x* of Fig. 1; Fig. 3, a front elevation of the roll-carriers and their base; Figs. 4, 5, and 6, a rear elevation, partial plan, and side elevation, respectively, of the same; Fig. 7, a longitudinal section of the same on line *y y* of Fig. 3; Fig. 8, a detail plan of the cam which operates the locking-pin; Fig. 9, an enlarged sectional detail of the holding-chuck, and Fig. 10 an end view of the chuck and clamping device.

Like reference-numerals indicate like parts throughout the views.

The framework of my machine may be of any form of construction suitable for carrying the several details of the mechanism. In the form thereof herein shown it consists, essentially, of a bed 1, provided with a standard 2. Fixed upon the rear end of these by screws 3 is a head-stock 4, provided with upright arms 5, in which are mounted bearings 10 and 11 for a spinning-spindle 12. Splined to the spindle is its driving-pulley 13. The spindle is provided with a longitudinally-bored mandrel 14, whose interior is enlarged a portion of its length to accommodate the head of a slidable discharge-pin 15. This pin traverses the spindle and projects beyond the rear extremity of the latter. Secured upon

the end of the mandrel is an exteriorly-tapered split spring-collar 16, intermediate which and the mandrel is placed the blank 17. A collar 18 slides upon the tapered spring-collar 16. Upon a reduced portion of the head of the discharge-pin 15 is a spiral spring 19, which normally tensions the pin rearwardly. Ball-bearings 20 facilitate the rotation of the spindle. A nut 6 in the bearing 10 takes up the thrust of the spindle.

The blank is engaged and released by the reciprocation of the collar 18 upon the spring 16. The mechanism for effecting this is the following: A bell-crank lever 22 is mounted in a bracket 23 upon the bed 1. From one arm of the lever depends a rod 24, engaging a pedal-bar 25, fulcrumed in a bearing 7. The other arm of the bell-crank lever contacts with the rear extremity of a horizontally-disposed bar 26, to whose forward end is connected a lever 27, fulcrumed intermediate its length to a bracket 28 upon the head-stock 4, and whose opposite end engages the collar 18. The bar 26 is tensioned by a spring 29, retained intermediate a nut 30 and the standard 2. A second nut 31 upon the threaded bar 26, upon the opposite side of the wall of the standard, furnishes an adjustable stop to the rearward travel of said bar. The tension on this bar is regulated by the nut 30.

The arm 5 of the head-stock is upwardly and rearwardly extended and has pivoted to its extremity a vertical bar 32, whose lower extremity is connected by a chain 33 to the upper arm of the bell-crank lever 22. The bar 32 is in constant contact with the rear extremity of the discharge-pin 15.

Secured to the standard 2 is a carriage-base 34, which supports the roller mechanism. Mounted to slide transversely in V-shaped ways upon the base 34 are roll-carriers 35 and 36, provided upon their front with racks 37 and 38, engaging gears 39 and 40, respectively, mounted on pins 41 and 42 in the front face of the carriage-base. To the hub 39' of gear 39 is fixed a hand-lever 43. Mounted longitudinally in the carriers 35 and 36 are shafts 44 and 45, having, respectively, on one end disks 46 and 47, which carry rolls in pairs 48 48', 49 49', 50 50', 51 51'. Each successive



pair of rolls varies in shape and diameter from its predecessor. Upon the opposite ends of the shafts 44 and 45 are fastened gears 52 and 53 by means of collars 54 and 55. Fixed to the extremities of the rear end of the carriage-base 34 are guide-blocks 57 and 58, in which rest the ends of a bar 56, which is upwardly tensioned by spiral springs 59 60 and has its upward tendency limited by flat spring-catches 61 and 62, fixed to the guide-blocks. Mounted in the bar 56 are two racks 63 64, adapted to engage in certain positions with gears 52 and 53, respectively. Also fixed to the bar and intermediate the racks is secured a cam-block 65 with beveled ends 66 67. Secured to the carriers 35 36 are angle-bars 68 69, in which are fastened by adjusting-screws 68' 69' pins 70 71, in alignment with the top of spring-catches 61 62. Mounted in the carriers are spring-actuated locking-pins 72 73, adapted to enter holes 74 in the roll-disks 46 47. Depending from the locking-pins are pins 75 76, carrying cam-rolls 77 78, which engage with a cam 79, fixed transversely upon the carrier-base 34, as shown in Fig. 8.

The operation of my machine is as follows: The pedal 25 is depressed, whereby the chuck-collar 18 is retracted, as already described, and the blank inserted intermediate the mandrel 14 and springs 16 in the manner indicated in Fig. 9. The pedal is then released and the action of spring 29 forces the collar 18 forward, thereby clamping the blank to the mandrel. To furnish working space pending the insertion of the blanks the roll-carriers 35 36 are separated by elevating the hand-lever 43, which rotates the intermeshing gears 39 40. When the carriers have reached the extreme of their outward travel, the pins 70 71 contact with and force outwardly the hooked extremities of spring-catches 62 61, thereby releasing bar 56, which is forced upwardly by springs 60 59, and allowing racks 63 64 to engage with gears 52 and 53, respectively. When the blank has been clamped to the mandrel, where it is rotated at great speed by the spindle-pulley 13, the forming operation is performed as follows: The lever-handle 43 is depressed and the carriers 35 36 approach each other. The roll-disks 46 47 revolve, actuated by the gears 52 53, meshing with racks 63 64, thus bringing into proper adjacent relation the roll-couplets, assumed in this instance as 48 48'. The length of the racks is such that the roll-disks are revolved ninety degrees. Immediately this has occurred the spring-actuated locking-pins 72 73 enter holes 74 in the roll-disks and lock the latter against further rotation. The carriers 35 36 continue their advance, and as they approach each other collars 54 55 contact with the beveled surfaces 66 67 on block 65, forcing the bar 56 downward and causing the latter to be locked down by the spring-catches 61 62. The pair of rolls 48 are now in contact with

the revolving blank, which is spun and partially reduced in cross-section in accordance with the cross-sectional contour of the rolls. The lever-handle is again elevated, the roll-carriers drawn apart, the locking-pins 72 73 withdrawn from disks 47 46 by the action of cam 79 upon the pins 75 76, and the pins 70 71 disengage the spring-catches from the ends of the bar 56, thus allowing the gears 52 53 to mesh with racks 63 64. The lever-handle 43 is again depressed, advancing the carriages and rotating the roll-disks ninety degrees, thus bringing the pair of rolls 49 49' into juxtaposition and in contact with the blank to further reduce and shape the latter. The carriers are again retracted and the above operation repeated until the entire roll series, including 51 51', have acted upon the blank. Thereupon the pedal 25 is again depressed, throwing back the collar 18 to release the blank 17 and advancing the pin 15 to discharge the finished product from the chuck.

It will be noted that the pins 70 71 are capable of adjustment to the end that the bar 56 may be released at a certain time, thereby enabling the gears 52 53 to mesh with their respective racks in such position that the roll-disks may be revolved exactly ninety degrees and in proper relation to each other.

Having described my invention, what I claim is—

1. In a machine of the class described, the combination with the base of carriers mounted upon the base, means in the base for actuating the carriers toward and away from each other, disks mounted in the carriers, rolls upon the disks, and means for rotating the disks.

2. In a machine of the class described, the combination with the base of carriers mounted upon the base, means in the base for actuating the carriers toward and away from each other, disks mounted in the carriers, a graduated series of rolls upon the disks, and means for rotating the disks.

3. In a machine of the class described, the combination with the base of carriers mounted upon the base, means in the base for actuating the carriers toward and away from each other, disks mounted in the carriers, rolls mounted upon the disks adapted to coact with each other upon the work when the disks revolve, and means for rotating the disks.

4. In a machine of the class described, the combination with the base of carriers mounted upon the base provided with marginal racks, disks mounted in the carriers, rolls upon the disks, shafts in the base, gears upon the shafts meshing with the marginal racks and with each other, and means for rotating one of the gears.

5. In a machine of the class described, the combination with the base of carriers mounted upon the base provided with marginal racks, disks mounted in the carriers, rolls upon the disks, shafts in the base, gears upon the shafts meshing with the marginal racks and with



each other, and an operating-lever fixed to one of said gears.

6. In a machine of the class described, the combination with the base of slidable carriers mounted upon the base, adapted to approach and recede from each other, shafts mounted in the carriers, disks upon the ends of the shafts, rolls upon the disks, and means for actuating the carriers actuating means for revolving the shafts.

7. In a machine of the class described, the combination with the base of carriers mounted upon the base adapted to slide toward and away from each other, shafts mounted in the carriers, disks mounted upon the shafts, means in the carriers for intermittently locking the disks against rotation, and means for reciprocating the carriers actuating means for revolving the shafts.

8. In a machine of the class described, the combination with the base of carriers mounted upon the base adapted to slide toward and away from each other, shafts mounted in the carriers, disks mounted upon one end of the shafts, rolls upon the disks, gears upon the shafts, vertical guides upon the sides of the base, a bar mounted in the guides, means for elevating the bar, racks mounted in the bar and adapted to engage the gears when the bar is elevated, and means for reciprocating the carriers.

9. In a machine of the class described, the combination with the base of carriers mounted upon the base adapted to slide toward and away from each other, shafts mounted in the carriers, disks mounted upon the shafts and provided with rolls, gears upon the shafts, collars upon the shafts vertical guide-blocks upon the sides of the base, a bar slidably mounted in the guide-blocks, a cam-block intermediate the ends of the bar, and adapted

to contact with the collars, means in the guide-blocks for upwardly tensioning the bar, racks mounted in the bar upon either side of the cam-block and adapted to engage the gears when the bar is elevated, and means for reciprocating the carriers.

10. In a machine of the class described, the combination with the base of carriers mounted upon the base adapted to slide toward and away from each other, shafts mounted in the carriers, disks mounted upon the shafts and provided with rolls, gears upon the shafts, collars upon the shafts, vertical guide-blocks upon the sides of the base, a bar slidably mounted in the guide-blocks, spring-catches upon the guide, blocks for retaining the bar against upward movement, means in said blocks for upwardly tensioning said bar, a cam-block midway the bar adapted to contact with the collars, racks mounted in the bar on either side of the cam-block and adapted to engage the gears when the bar is raised, adjustable pins upon the carriers adapted to release the catches, and means for reciprocating the carriers.

11. In a machine of the class described, the combination with the base of a head-stock upon the base, a spinning-spindle mounted in the head-stock, carriers also mounted upon the base in alinement with the spindle, means in the base for actuating the carriers, toward and away from each other, disks mounted in the carriers, rolls upon the disks, and means for rotating the disks.

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

EDWARD J. YALE.

Witnesses:

HORATIO E. BELLOWS,  
WILLIAM E. BROWN.