

No. 622,103.

Patented Mar. 28, 1899.

S. BERARD.
WINDING MACHINE.

(Application filed Apr. 27, 1898.)

(No Model.)

4 Sheets—Sheet 1.

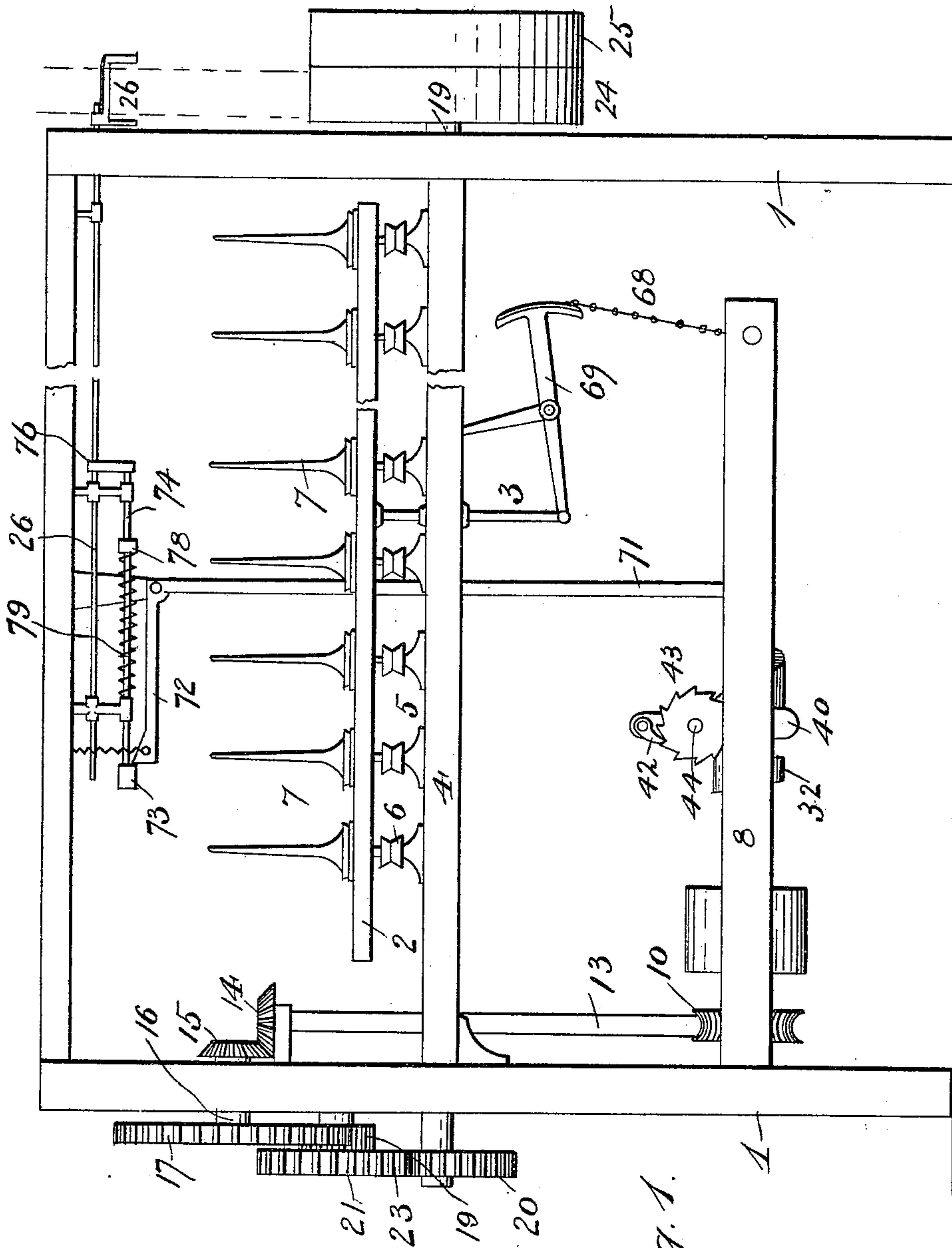


Fig. 1.

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Fig. 2.

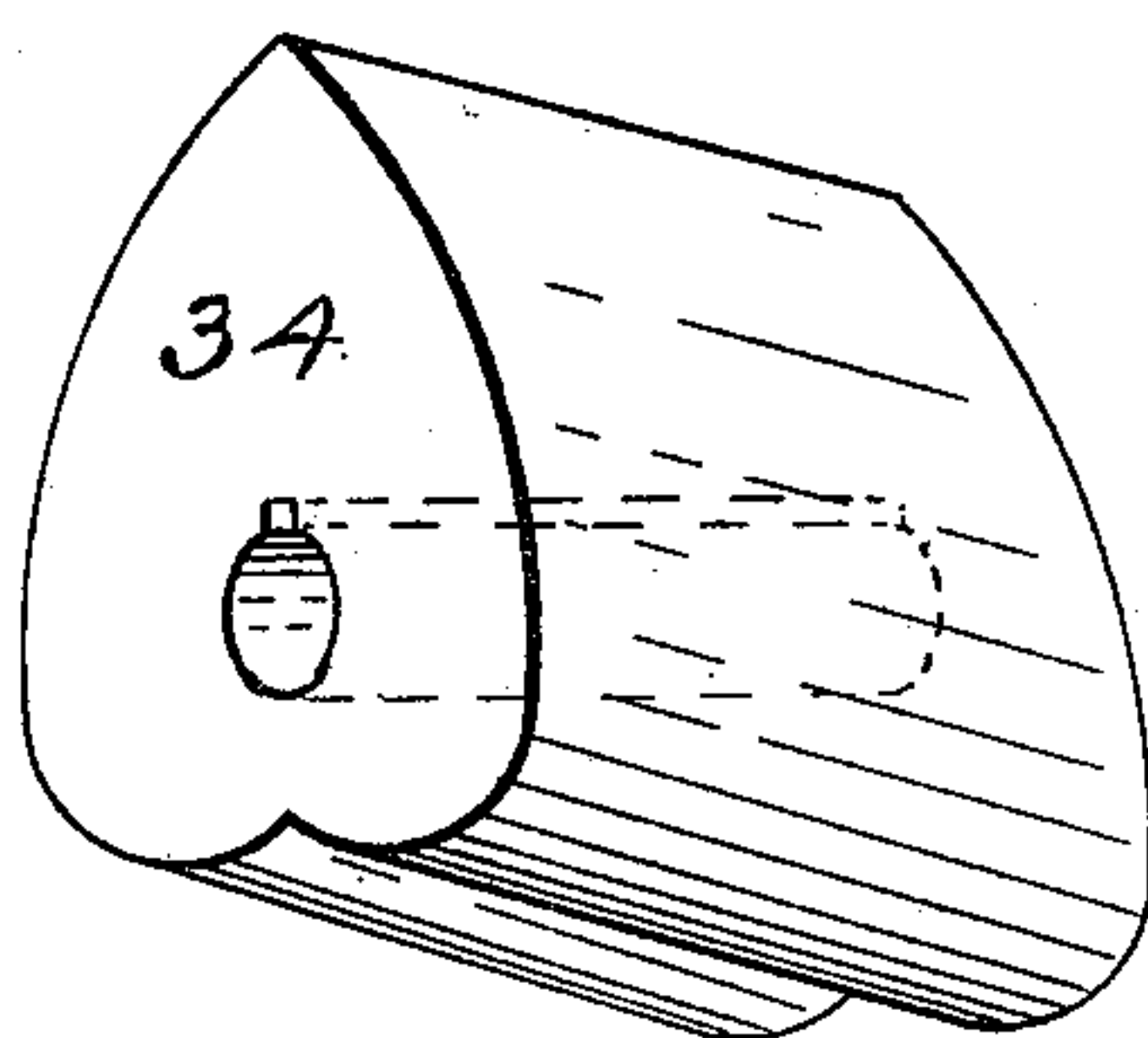
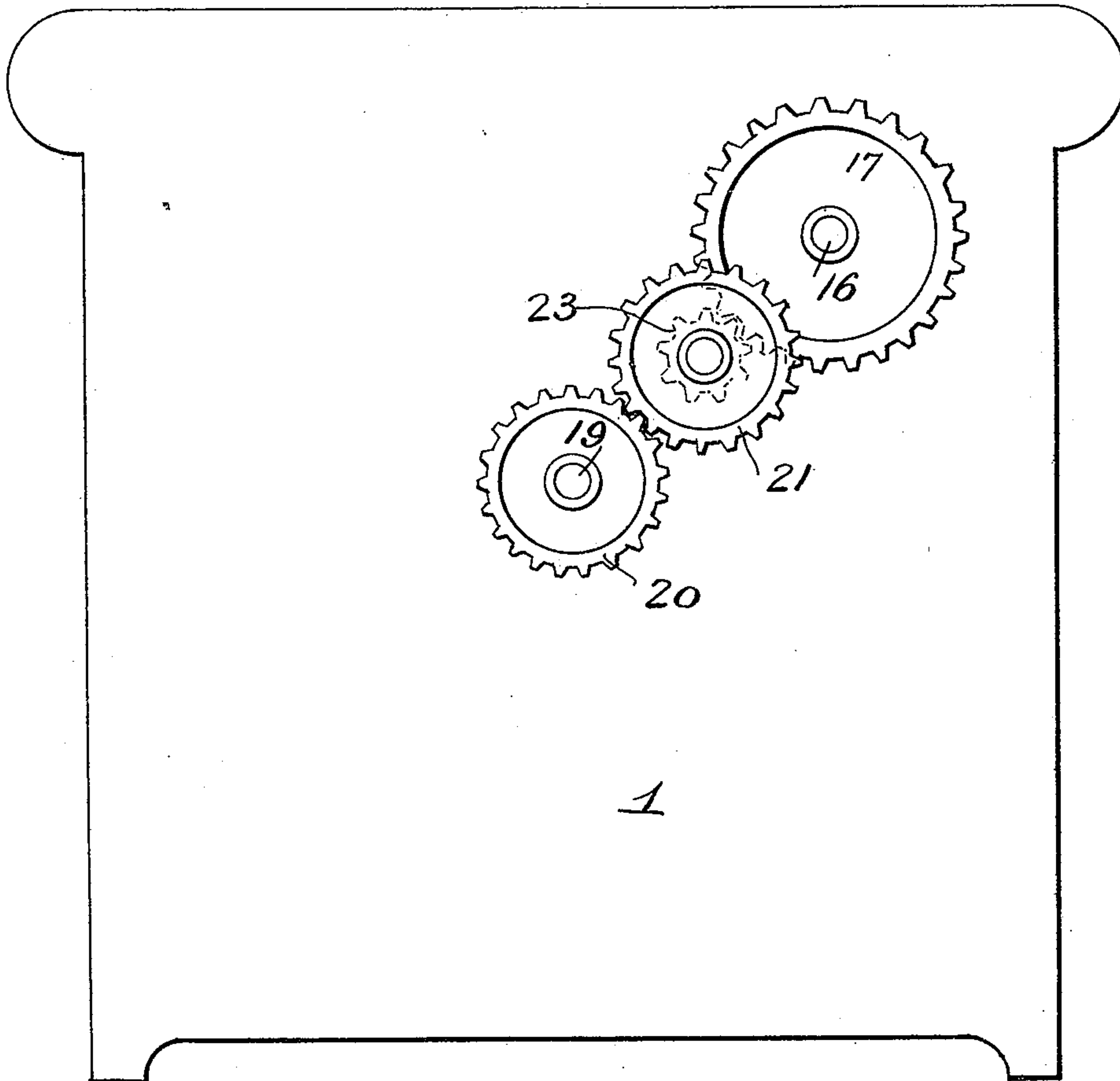


Fig. 5

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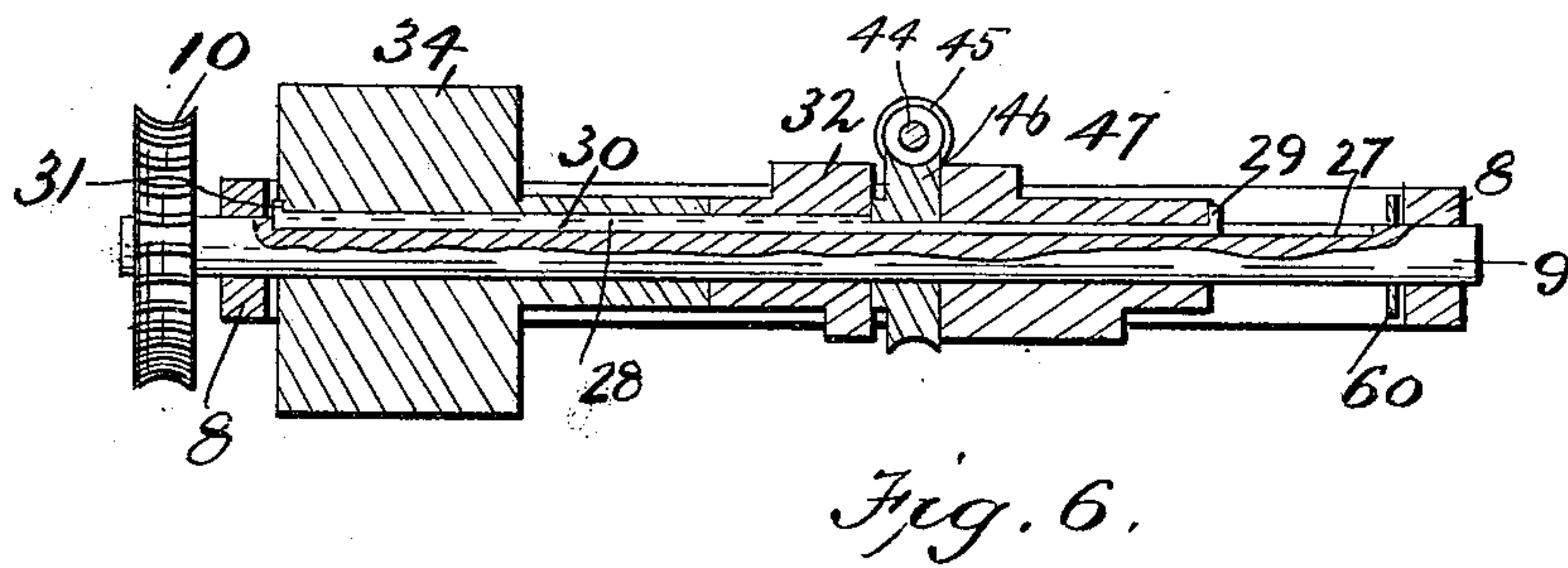
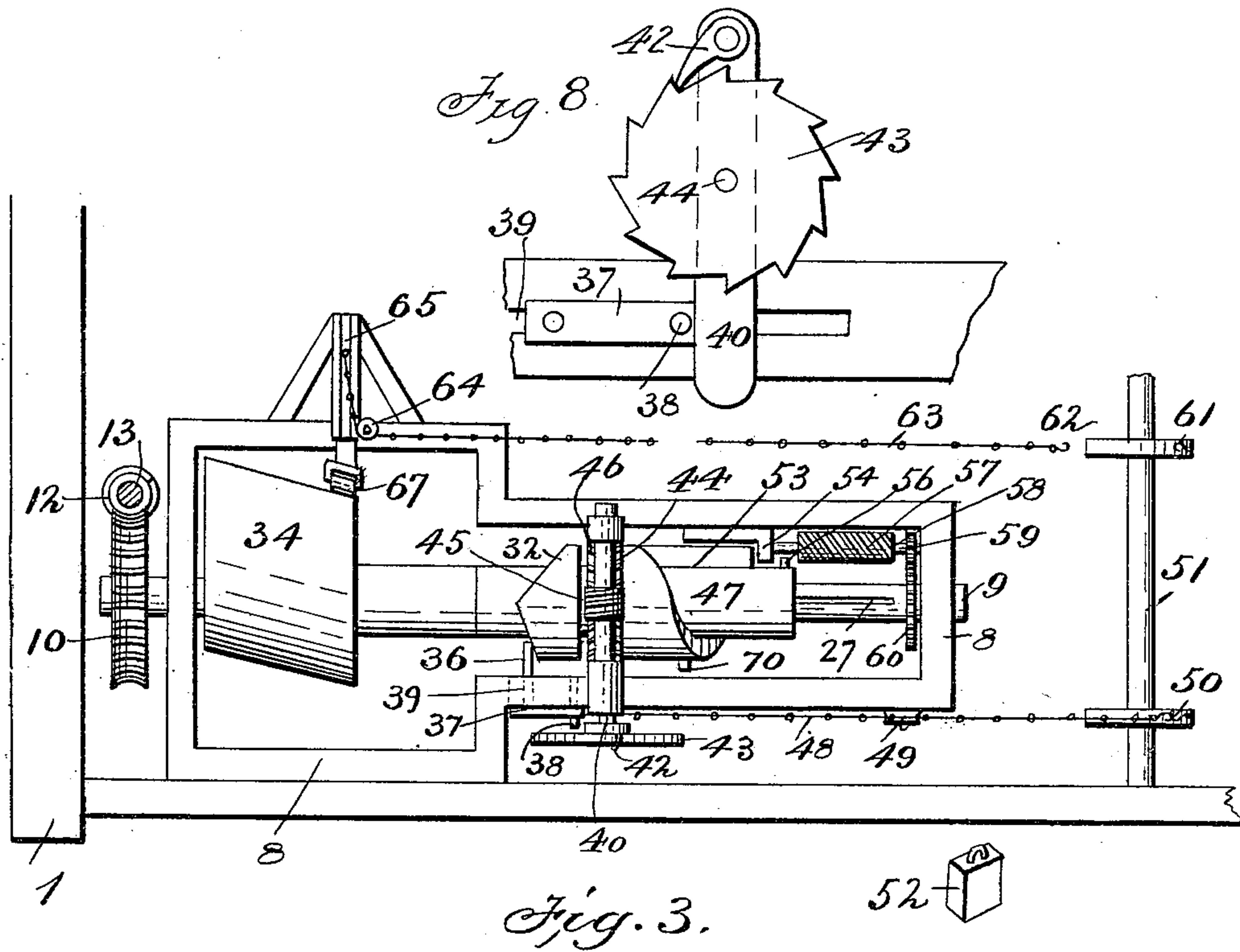
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4 Sheets—Sheet 3.



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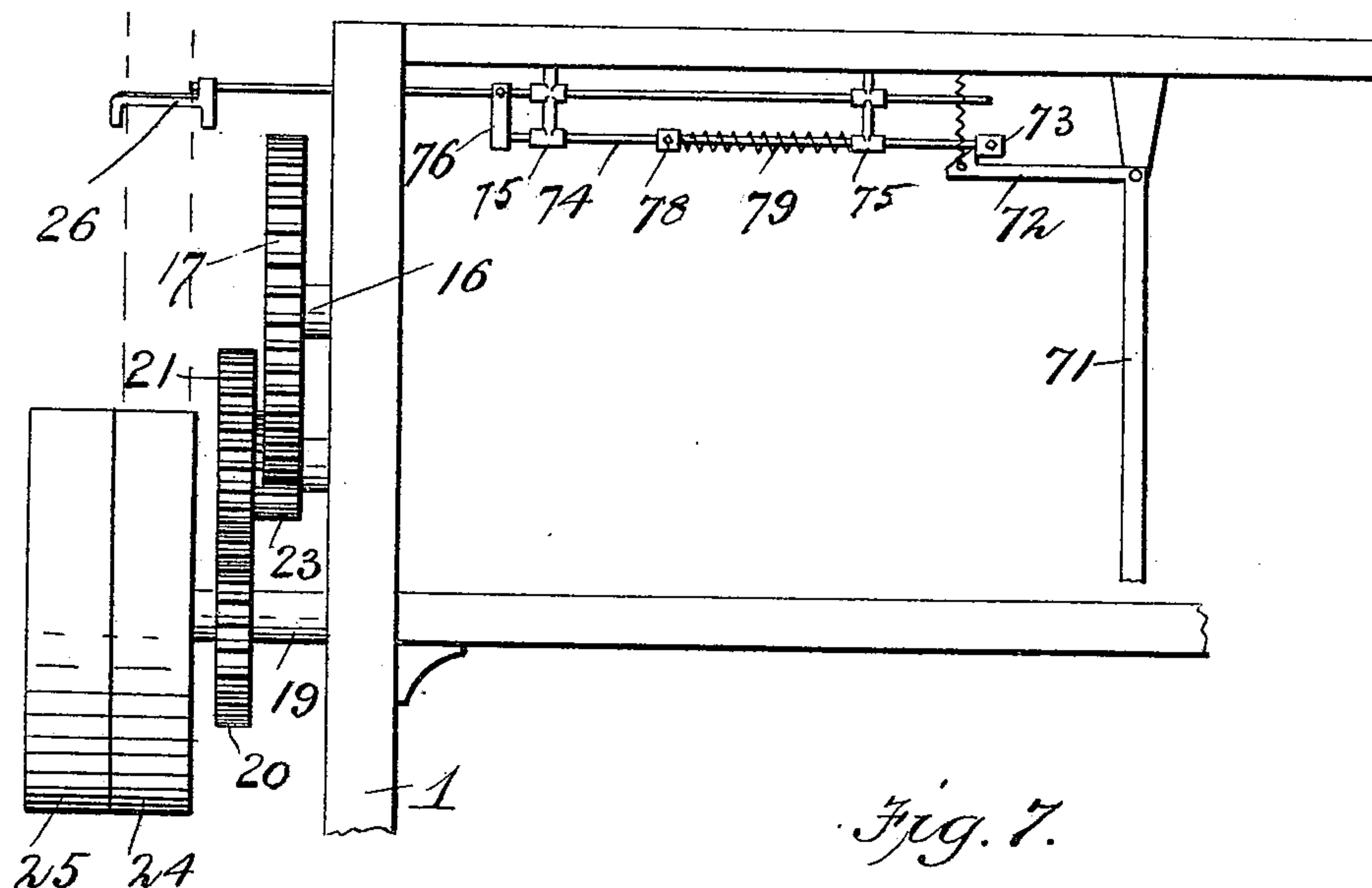


Fig. 7.

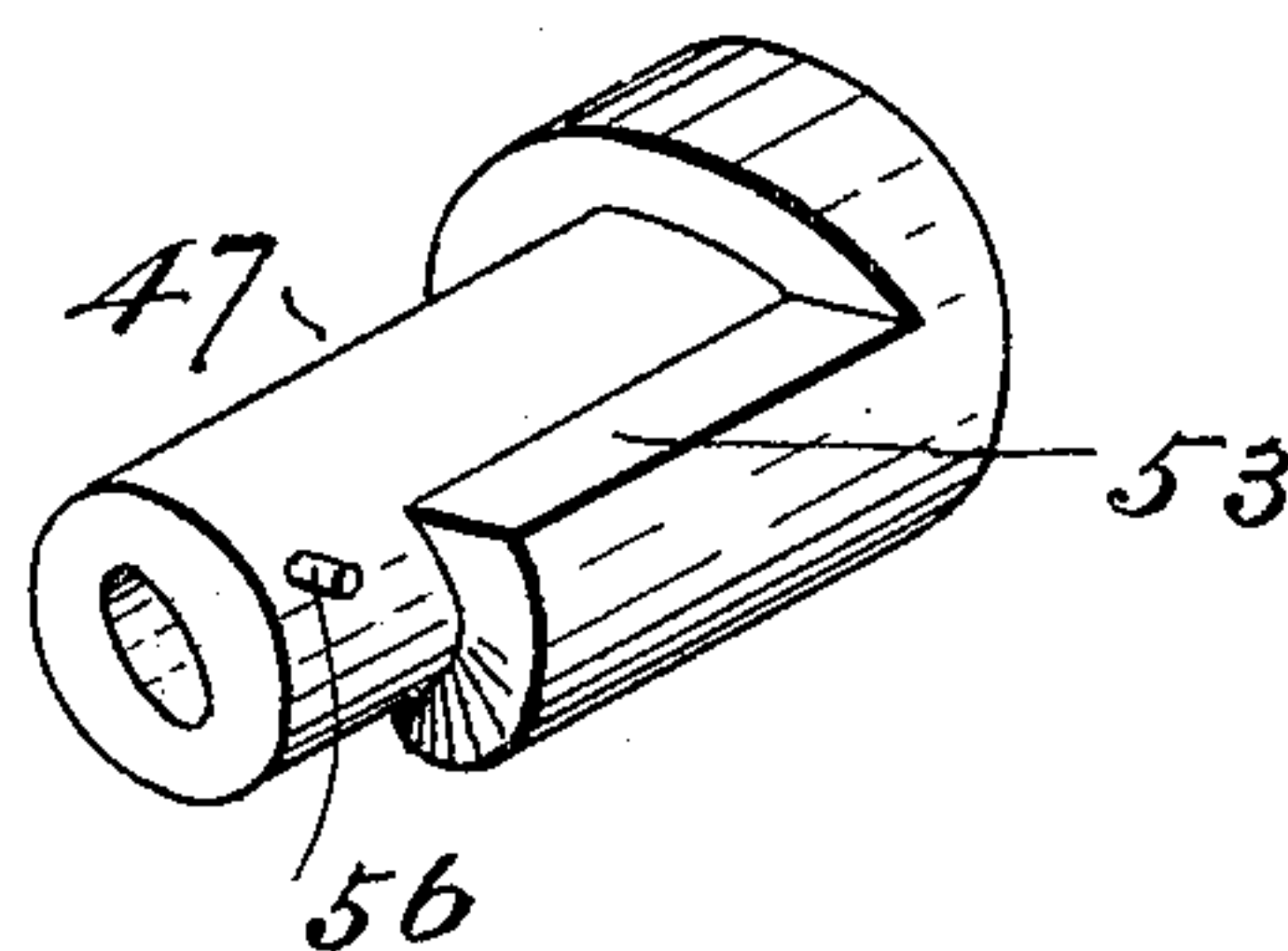


Fig. 4.

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UNITED STATES PATENT OFFICE.

SIMEON BERARD, OF FALL RIVER, MASSACHUSETTS.

WINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 622,103, dated March 28, 1899.

Application filed April 27, 1898. Serial No. 679,005. (No model.)

To all whom it may concern:

Be it known that I, SIMEON BERARD, a citizen of the United States, residing at Fall River, in the county of Bristol and State of Massachusetts, have invented new and useful Improvements in Winding-Machines, of which the following is a specification.

My invention relates to winding-machines; and its object is to provide improved means for automatically reciprocating or moving the ring-rail up and down, so as to insure the yarn being wound evenly thereon; also, to provide an improved cop-forming cam for automatically causing the bobbins to be tapered or beveled at the ends and a stop-motion cam for stopping the machine when the bobbins are full.

The present invention is designed as an improvement upon the invention disclosed in an application for Letters Patent filed by me October 6, 1897, Serial No. 654,263; and it consists in the novel construction and combination of parts hereinafter fully described and claimed.

In the accompanying drawings, Figure 1 is a side elevation of a winding-machine constructed in accordance with my invention. Fig. 2 is a front elevation of the same. Fig. 3 is a plan view, on an enlarged scale, of the cam-frame, showing the filling, the cop-forming, and building and stop-motion cams and other parts. Fig. 4 is a detail perspective view of the building and stop-motion cams. Fig. 5 is a similar view of the cam for forming the cop. Fig. 6 is a longitudinal sectional view of the cam-shaft and cams. Fig. 7 is an elevation of the means for stopping the machine when the bobbins are full. Fig. 8 is a detail elevation of the pawl-and-ratchet mechanism.

In the said drawings the reference-numeral 1 designates the machine-frame, and 2 the vertically-movable ring-rail, supported by a rod 3 passing through a hole in the horizontal spindle-rail 4. The lower end of this rod is pivotally connected with a lever, hereinafter described, for vertically reciprocating the ring-rail. The numeral 5 designates the spindles, journaled to the rail 4 and provided with pulleys 6, by which they are rotated. The numeral 7 designates the bobbins, which are movable with said frame.

The parts so far described may be similar to the machine shown in my aforesaid application or they may be of any other ordinary or suitable construction.

The numeral 8 designates the cam-frame near the bottom of the machine at one end; provided with a horizontal shaft 9, provided at one end with a worm-wheel 10, with which engages a worm-gear 12 at the lower end of a vertical shaft 13, provided at its upper end with a beveled pinion 14, which is driven by a corresponding pinion 15 on a horizontal shaft 16. This shaft is provided with a cog-wheel 17, which is driven by a driving-shaft 19 through the medium of a pinion 20 and intermediate gears 21 and 23. Mounted on said shaft 19 is a fast pulley 24 and a loose pulley 25.

The numeral 26 designates a laterally-movable shifting device for shifting the belt (not shown) from one pulley to the other.

The shaft 9 is formed with a horizontal groove 27, in which is located a laterally-movable key 28, provided at one end with a lug 29 and at the other end with an enlarged portion 30, projecting beyond the periphery of the shaft, and also provided with a lug 31. Mounted on said shaft is a cam 32, which is rotatable with and also laterally movable on said shaft by means of the enlarged portion of the key engaging with a groove therein. This cam I term the "filling-cam," as by its action the bobbins are vertically reciprocated to insure the even winding of the yarn. Also mounted on said shaft and rotatable therewith and laterally slidable thereon is a heart-shaped tapering cam 34, which I term the "cop-forming" cam, by means of which the bevel or taper is given to the ends of the bobbins. The enlarged portion of said slidable key also engages with a groove in said cam, and the lug 31 bears against the outer end of the cam.

The numeral 36 designates a pin secured to a horizontally-movable feed-slide, also provided with a pin 38. These pins project through a slot 39 in one of the sides of said cam-frame and serve as guides for the slide. The said pin 38 projects beyond the outer side of the slide and is adapted to strike and operate a vertical lever 40, which is pivoted to one end of a worm-shaft 44. This lever is provided with a pawl 42, which engages with

a ratchet-wheel 43 on the intermittently-rotating shaft 44, so that as said slide is moved forward by said pin it will engage with and rotate the ratchet. Secured to said shaft is
 5 a worm 45, which engages with a corresponding worm-wheel 46 on a building and stop-motion cam 47, hereinafter described, loosely mounted on the shaft 9 and the outer end of which engages with the lug 29 of the sliding
 10 key. Connected with said slide 37 is one end of a chain 48, which passes over a pulley 49 and at its opposite end is provided with a hook 50, which removably engages with an eye or loop on a rock-shaft 51. This chain
 15 where disconnected from said shaft is adapted to be connected with a weight 52. The cam-face of the stop-motion cam is in the form of a spiral and has a straight longitudinal edge 53. This cam engages with a dog
 20 54, secured to the cam-frame, so that as the cam is intermittently rotated by the worm-wheel and shaft operated by the lever, pawl, ratchet, and slide it will be moved laterally forward on the shaft 9. When the said stop-
 25 motion cam reaches the end of its forward motion, the dog 54 will come into coincidence with the straight edge 53 of the cam and allow the latter to be moved back by a pin 56 thereon engaging with a rotatable shaft 57,
 30 formed with a spiral groove 58. This shaft is driven by the cog-wheel 59, secured thereto, which meshes with a cog-wheel 60 on the shaft 9. The rock-shaft 51 is also provided with an eye or loop 61, with which is remov-
 35 ably connected a hook 62 on one end of a chain 63. This chain extends over a pulley 64 and its opposite end is connected with a laterally-movable rod which works in a sleeve 65, secured to the cam-frame. The free end
 40 of this rod is provided with a roller 67, which engages with the cop-forming cam. Secured to said rock-shaft 51 is a chain 68, which is connected with a segment-head at one end of a lever 69, the other end of which is connect-
 45 ed with rod 3, so that as said rock-shaft is oscillated the ring-rail will be vertically reciprocated. Secured to said stop-motion cam is a pin 70, which is adapted to strike against the lower end of an elbow-lever 71, the short
 50 arm 72 of which engages with a shoulder 73 on one end of the horizontally-movable rod 74, which works in bearings 75. This rod is connected by a bracket 76 to the belt-shifter 26 and is provided with a lug 78, between which
 55 and one of said bearings is interposed a coiled spring 79, which shoots the belt-shifter when the arm 72 is disengaged from the shoulder 73.

At the beginning of the operation the cams will be at the right of the cam-frame, with the
 60 dog 54 engaging with the inner end of the spiral face of the stop-motion cam and the chain connected with the slide operated by the filling-cam disconnected from the rock-shaft 51 and the chain connected with the roller which
 65 is actuated by the cop-forming cam secured to said shaft. The machine is now set in motion by shifting the belt from the loose to the

fast pulley, the short arm of the lever 71 engaging with the shoulder 73 of the rod 74, so as to hold the belt-shifter and keep the belt
 70 on the fast pulley. The shaft 9 will now be rotated by the worm-wheel and connections from the driving-shaft. As the said shaft rotates the filling-cam is correspondingly ro-
 75 tated, which acting on the pin of the slide 37 will cause the latter to be reciprocated back and forth, and the worm-shaft and stop-motion cam will be rotated through the medium of the ratchet 43, pawl 42, and lever 40. The
 80 slide makes one reciprocation for each revolution of the filling-cam, pushing the slide toward the right during one half of the revolution and turning the shaft 44, and during the other half of the revolution allowing the
 85 slide to be pulled in the opposite direction by the weight 52, the pawl 42 riding over the teeth of ratchet 40. This reciprocation of the slide is caused by the peculiar formation of the filling-cam, and the ratchet is moved one
 90 tooth or step at each reciprocation. As the stop-motion cam is thus intermittently rotated the dog 54 engages with the front end of the spiral cam-face thereof, causing said cam and the filling and cop-forming cams to
 95 be moved forward or toward the left end of the machine. During this operation the roller 67 rides upon the cam 34, which by its peculiar formation will cause the ring-rail, through its connections, to be vertically reciprocated,
 100 and by the shape of said cam the stroke of the ring-rail will be gradually shortened, so that the ends of the bobbin will be tapered. After said ends are thus tapered the chain 63 is disconnected from the rock-shaft 51 and
 105 the weight 52 detached from the chain 48 and the latter connected with the rock-shaft. The ring-rail will now be moved up and down through the medium of the filling-cam and the slide 37. The filling operation is con-
 110 tinued until the bobbins are full, when the stop-cam will have made a complete revolution. The said cam will now ride off of the dog 54, and the pin 56 will engage with the spiral groove in the rotating shaft 57, where-
 115 by said stop-cam, filling-cam, and cop-forming cam will be returned to the right-hand end of the machine. The sliding key and the lugs on the ends thereof cause the filling-cam and cam 34 to move with the stop-cam. As
 120 said stop-cam reaches its first position the pin 70 thereof will strike and actuate the elbow-lever 71, releasing the belt-shifter, so that the belt will be shifted from the fast to the loose pulley and the machine stopped.
 125 During the latter part of the above operation the cop-forming cam will perform no function, the filling-cam causing the yarn to be wound evenly upon the bobbin, the cop-forming cam being only employed to cause the taper at the ends of the bobbin at the begin-
 130 ning of the operation. The cop-forming cam may be disconnected from the rock-shaft which reciprocates the ring-rail at any stage of the operation. For winding a bobbin with-

out tapered ends the cop-forming cam is not used, but is disconnected from the rock-shaft.

Having thus fully described my invention, what I claim is—

1. In a winding-machine, the combination with the vertically-reciprocating ring-rail, the supporting-rod, the lever connected therewith and the rock-shaft connected with said lever, of the cam-frame, the slide provided with pins, the chains connected with said slide and removably connected with said rock-shaft, the rotatable shaft journaled in said cam-frame, the filling-cam rotatable with and slidable thereon, the lever with which one of the pins on the slide is adapted to engage, the pawl pivoted to said lever, the ratchet-wheel with which said pawl engages, the worm-shaft to which said ratchet-wheel is secured, the stop-motion cam rotatable on and slidable on said rotatable shaft having a spiral cam-face and a straight edge parallel to the axis of said cam, the dog connected with the cam-frame engaging therewith, and the worm-wheel on said cam with which the said worm-shaft engages, substantially as described.

2. In a winding-machine, the combination with the vertically-reciprocating ring-rail, the supporting-rod, the lever connected therewith, and the rock-shaft with which said lever is connected, of the cam-frame, the slide provided with pins, the chain connected therewith and removably connected with said rock-shaft, the rotatable shaft journaled in the cam-frame, the filling-cam rotatable with and slidable on said shaft, the pin secured thereto for operating the slide, the stop-motion cam rotatable and slidable on said cam provided with a spiral cam-face and a straight edge parallel to the axis of the head, means for intermittently operating said cam by the movement of the filling-cam, the dog on the cam-frame, the pin on the stop-motion cam, the rotatable shaft formed with a spiral groove with which said pin engages, and the gears for rotating the same, substantially as described.

3. In a winding-machine, the combination with the cam-frame, the rotatable shaft journaled thereon formed with a longitudinal groove, and the sliding key located on said groove formed with an enlarged portion and with a lug at each end, of the cop-forming and filling cams rotatable with and slidable on said shaft, and the stop-motion cam rotatable and slidable on said shaft, substantially as described.

4. In a winding-machine, the combination with the cam-frame and the rotatable shaft, of the cop-forming and filling cams rotatable with and slidable on said shaft, the intermittently-rotatable stop-motion cam rotatable and slidable on said shaft, and means for causing said cams to move laterally on said shaft, in unison, substantially as described.

5. In a winding-machine, the combination with the rotatable filling-cam, and the inter-

mittently-rotatable and laterally-movable stop-motion cam provided with a pin and means for actuating said cams, of the rotatable shaft formed with a spiral groove, with which said pin is adapted to engage, substantially as described.

6. In a winding-machine, the combination with the rotatable shaft, the rotatable and slidable filling-cam and the intermittently-rotatable and slidable stop-motion cam, of the cop-forming cam connected with said filling and stop cams, means for moving said filling and stop-motion cams in unison the laterally-movable rod having a roller engaging with said cop-forming cam, the sleeve, the chain secured to said rod, the rock-shaft with which said chain is adapted to be engaged, and the pulley over which said chain passes, substantially as described.

7. In a winding-machine, the combination with the ring-rail, the supporting-rod, the lever connected therewith and the rock-shaft connected with said lever, of the cam-frame provided with a slot, the slide provided with pins projecting through said slot, the chain connected with said slide and removably connected with the rock-shaft, the rotatable shaft journaled in the cam-frame and formed with a longitudinal groove, the sliding key located in said groove formed with an enlarged portion and with a lug at each end, the cop-forming and filling cams rotatable with and slidable on said shaft, the pivoted lever, the pawl, the ratchet-wheel with which said pawl engages, the worm-shaft to which said ratchet-wheel is secured, the stop-motion cam provided with a worm-wheel with which said worm-shaft engages and formed with a spiral cam-face and a straight edge parallel to the axis of said cam, the dog secured to the cam-frame, the pin on said stop-motion cam, the rotatable shaft formed with a spiral groove, the gear or pinion on said shaft and the intermeshing gear secured to the main shaft journaled in the cam-frame, substantially as described.

8. In a winding-machine, the combination with the vertically-reciprocating ring-rail, the supporting-rod, the lever connected therewith, and the rock-shaft connected with said lever, of the cam-frame, the rotatable shaft, the cop-forming cam rotatable therewith and slidable thereon, the sleeve secured to said frame, the rod working therein provided with a roller contacting with said cam, the chain secured to said rod and adapted to be connected with said rock-shaft, the filling and stop cams connected with said cop-forming cam and means for moving said filling and stop-motion cams in unison, substantially as described.

9. In a winding-machine, the combination with the rotatable shaft, the stop-cam slidable thereon provided with a pin, the shaft having a spiral groove with which said pin is adapted to engage the pin carried by said cam and the gears for rotating the

cam, of the movable belt-shifter, the spring-
actuated rod connected therewith having a
shoulder at one end, the elbow-lever engag-
ing with said shoulder and adapted to be
5 struck by the pin 70 on said cam to release
the belt-shifter, substantially as described.
In testimony whereof I have hereunto set

my hand in presence of two subscribing wit-
nesses.

SIMEON BERARD.

Witnesses:

JOSEPH MENARD,

JOSEPH A. GAUTHIER.