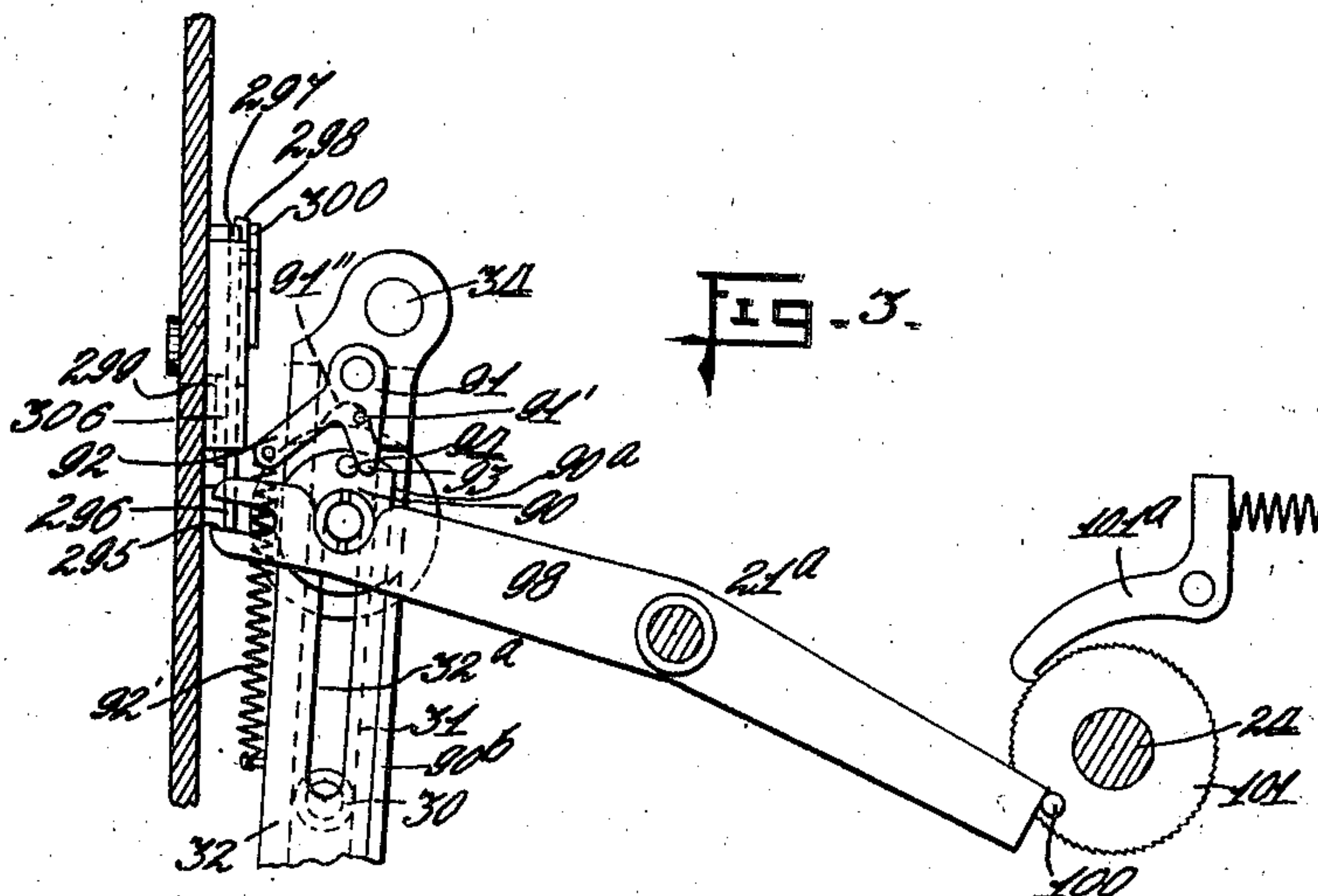
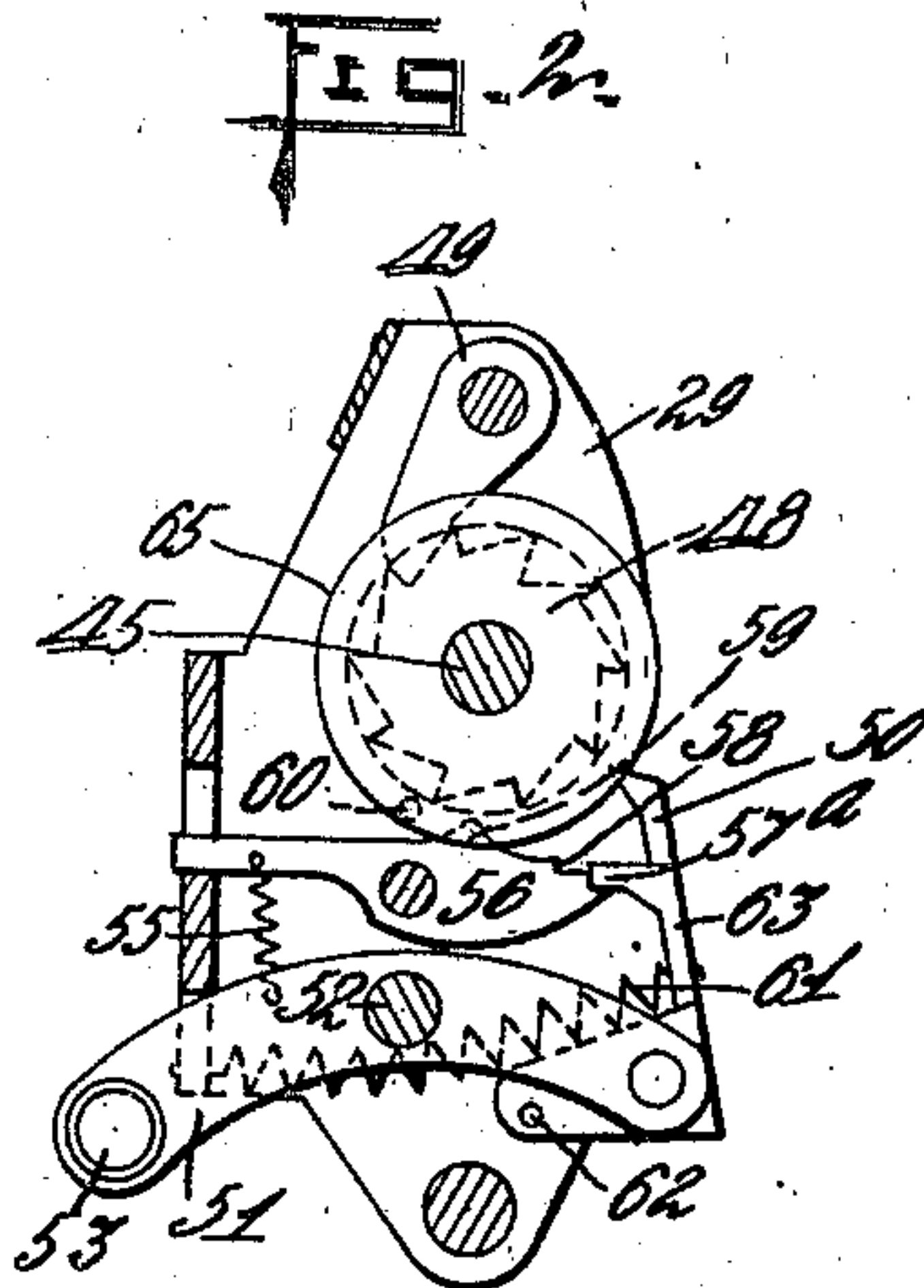
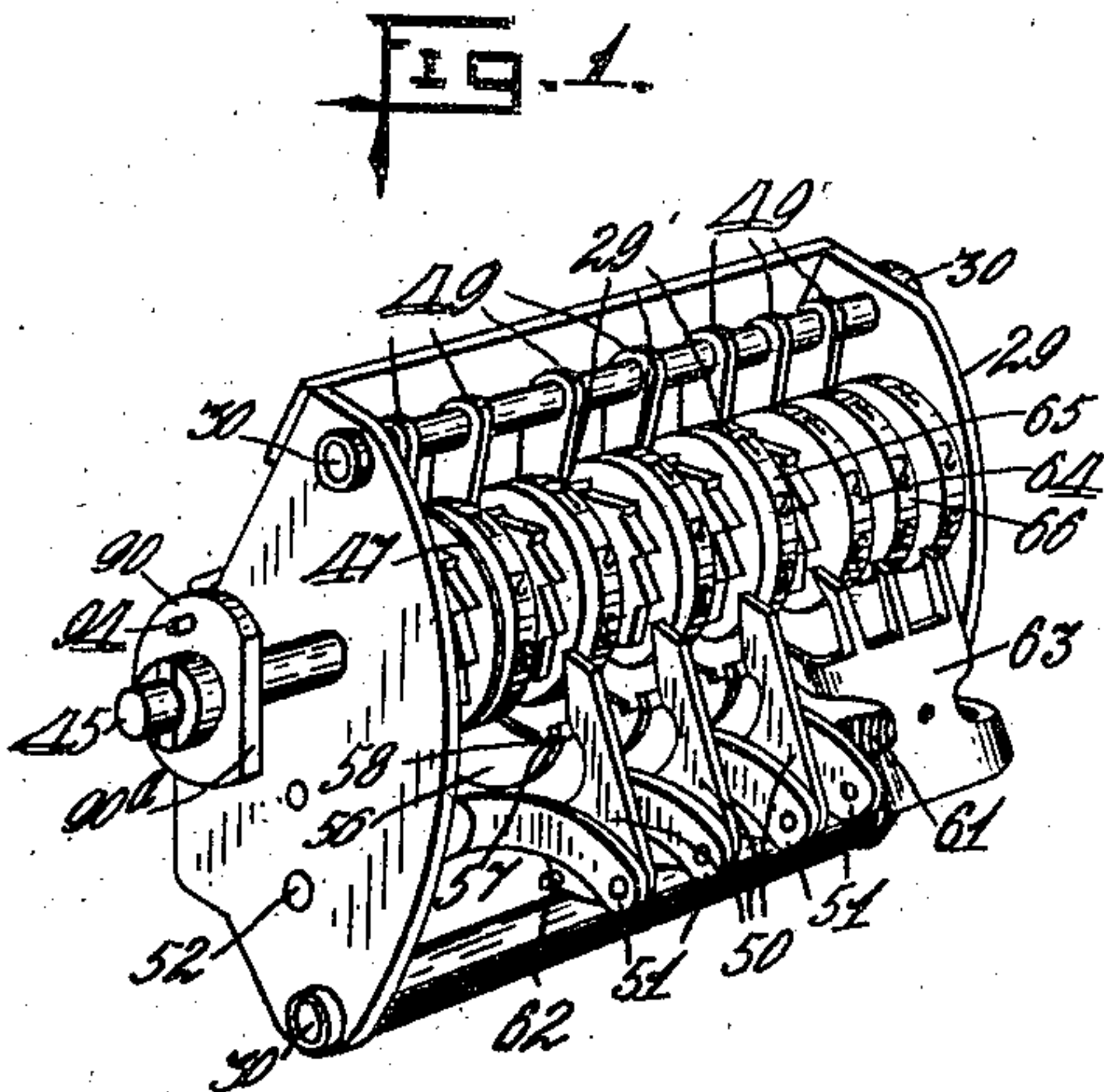


No. 864,512.

T. GARROLL.  
CASH REGISTER.  
APPLICATION FILED MAR. 31, 1905.

PATENTED AUG. 27, 1907.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 4.

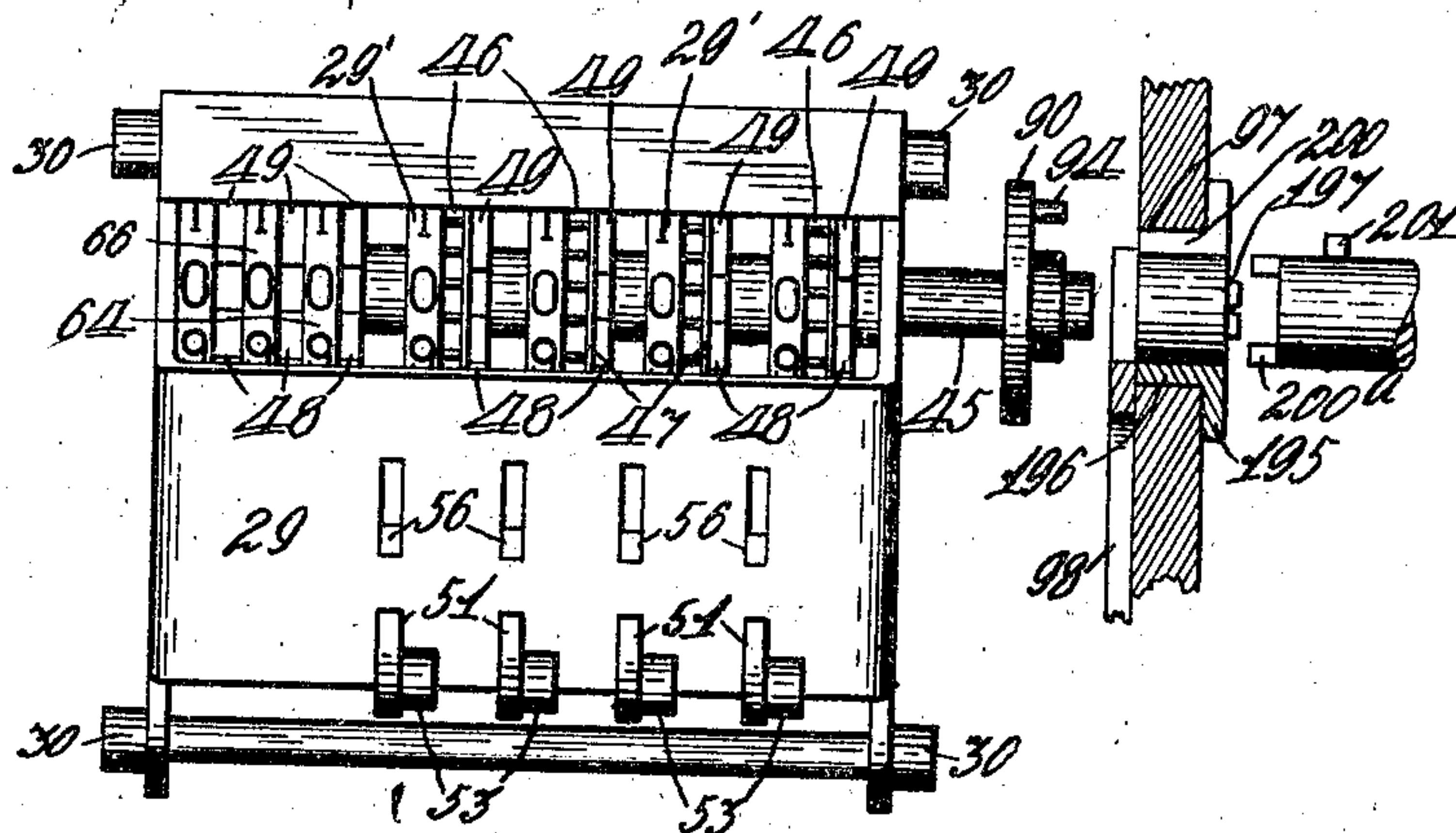


Fig. 5.

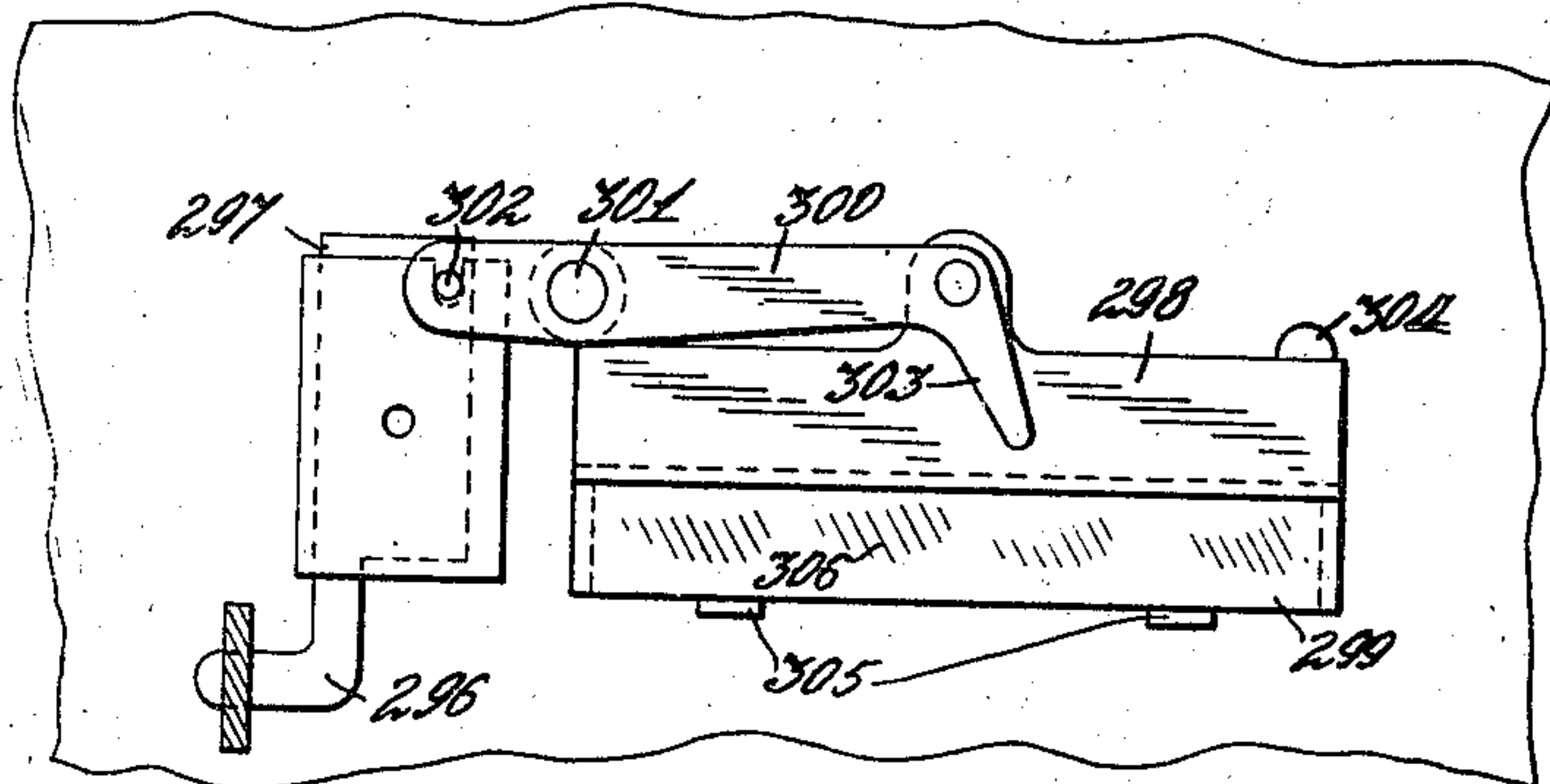


Fig. 7.

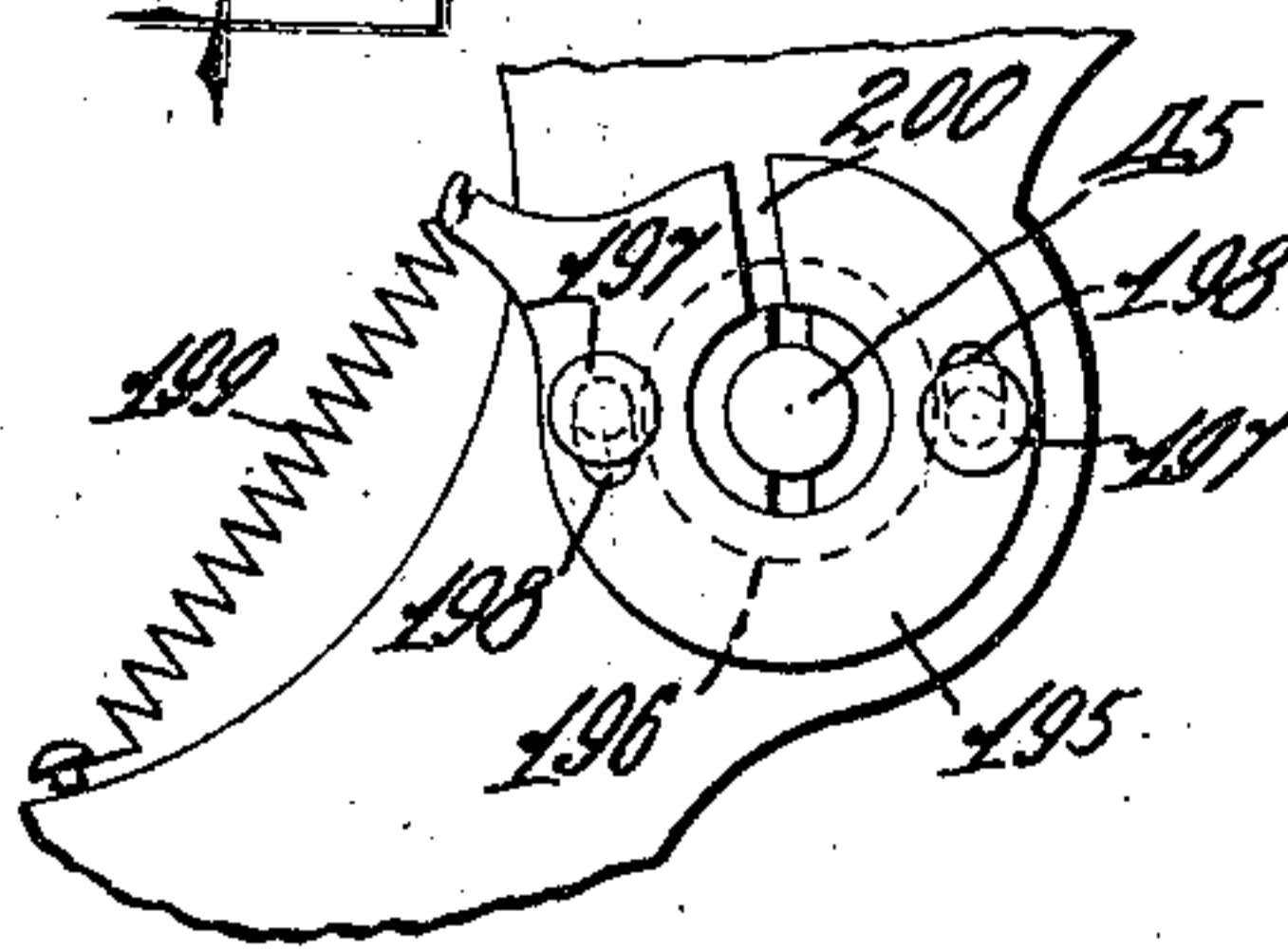
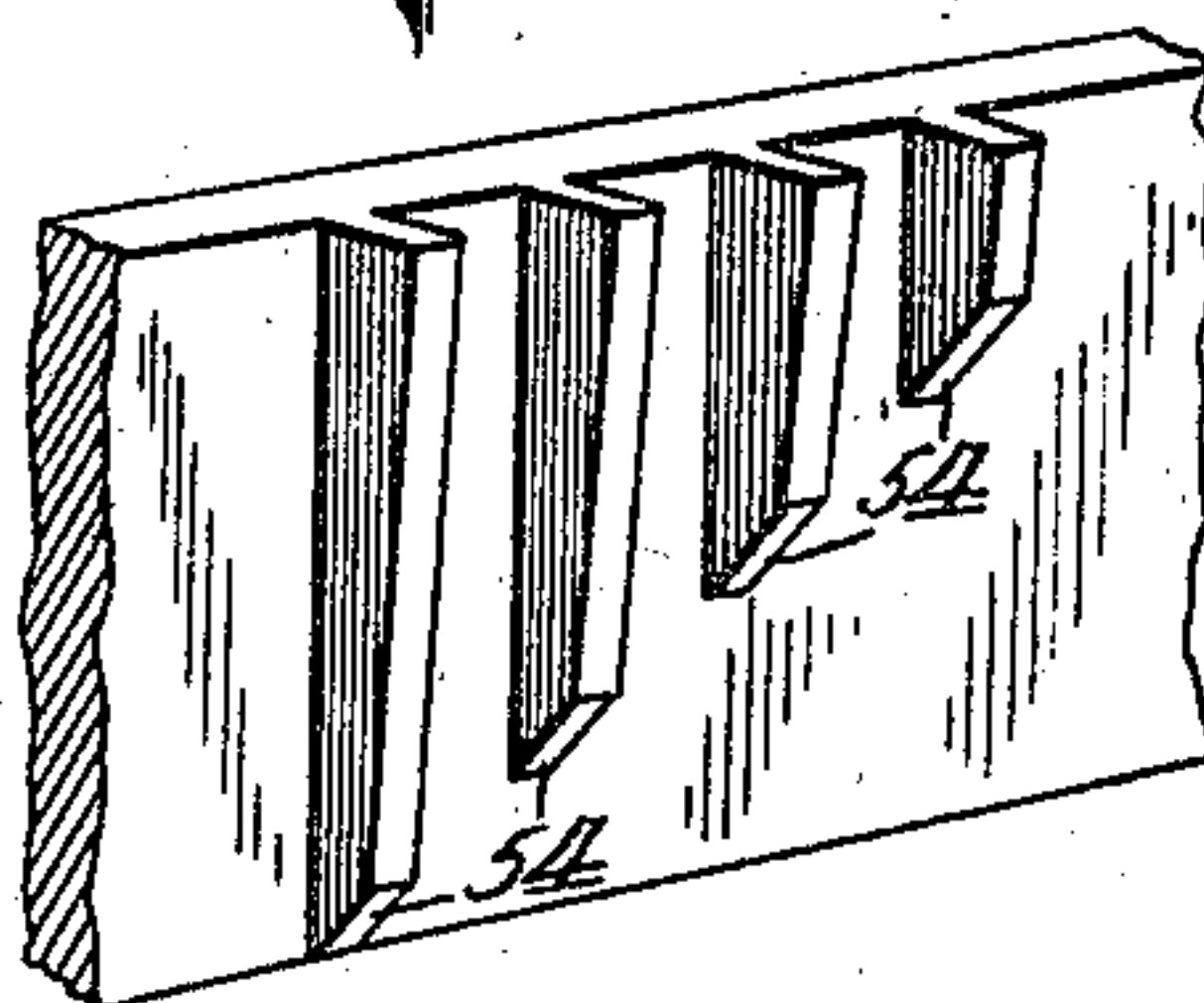


Fig. 6.



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# UNITED STATES PATENT OFFICE.

THOMAS CARROLL, OF DAYTON, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE NATIONAL CASH REGISTER COMPANY, OF DAYTON, OHIO, A CORPORATION OF OHIO, (INCORPORATED IN 1906.)

## CASH-REGISTER.

No. 864,512.

Specification of Letters Patent.

Patented Aug. 27, 1907.

Original application filed June 6, 1903, Serial No. 160,416. Divided and this application filed March 31, 1905. Serial No. 253,001.

To all whom it may concern:

Be it known that I, THOMAS CARROLL, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Cash-Registers, of which I declare the following to be a full, clear, and exact description.

This invention relates to improvements connected with the registering mechanism of cash registers and has among its objects to provide improved turn-to-zero devices in connection with such registering mechanism; this application being a division of a co-pending application Serial No. 160,416 filed by me on June 6, 1903.

With these and incidental objects in view, the invention consists in certain novel features of construction and combinations of parts, the essential elements of which are set forth in appended claims and a preferred form of embodiment of which is hereinafter specifically described with reference to the drawings which accompany and form part of this specification.

Of said drawings: Figure 1 represents an enlarged perspective view of the counter. Fig. 2 represents a transverse sectional view through the counter. Fig. 3 represents an enlarged detail side elevation of the full stroke wheel mounted on the main revolution shaft and the coöperating devices for the machine and the counter. Fig. 4 represents a detail front elevation partly in section of the counter and its turn-to-zero devices. Fig. 5 represents a detail view of the counter wheel flash or guard and its coöperating mechanism. Fig. 6 represents a detail perspective view of the cam flanges or projections for operating the transfer levers for the counter; and Fig. 7 represents a detail view of a part of the turn-to-zero mechanism.

The general style of machine to which the present improvements are applied is one in which there are a series of setting levers which are first adjusted to the desired position and then the complete operation of the machine is effected by the rotation of a suitable crank handle which imparts a complete rotation to a main operating shaft at each operation of the machine whereby to effect the necessary registration determined according to the positions of the setting levers. In this exact type of machine the counter is one which is mounted in a movable frame and by the operation of the machine is given a bodily movement to carry the counter over a series of rack bars which are set to differential positions by the aforesaid setting levers, this general construction and mode of operation being precisely similar to the construction also shown in my Patent No. 751,611 dated February 9, 1904, in which patent it will be seen that registering rack bars are first set up

by means of setting levers and then the counter is given a reciprocatory movement to carry the same over the rack bars and thereby effect the necessary registration.

In the machine shown in the present application the counter as shown in Fig. 1 is mounted in a frame 29 which has two antifriction rollers 30 upon each end, and this counter frame is itself vertically slidable in a rock frame which is formed with two parallel vertical side arms 32, the inner side of each of which vertical side arms has formed therein a slide way or channel 31 within which run the antifriction rollers 30 of the counter frame, so that the counter may be reciprocated vertically in these slide-ways. A transverse shaft 34 passes through bearings formed in the upper ends of the vertical side arms 32 so that the rock frame carrying the counter may swing about the shaft 34 as a pivot, this limited swinging movement of the rock frame being utilized to carry the counter into and out of mesh with the registering rack, and the vertical reciprocatory movements of the counter itself within the rock frame, being utilized to carry the counter over the registering racks to effect the registration, all as set forth in the application of which this application is a division and also as set forth in the aforementioned patent. The transverse shaft 24 (see Fig. 3) is the main operating shaft which is rotated by a crank handle or other suitable means, and from which power is derived to give the counter the above-described movements.

As shown in Fig. 4, each of the first four counter or registering wheels 29', counting from the right, carries a registering pinion 46, which is arranged to engage with the above-mentioned registering racks (not shown) when the counter is carried over said racks in the manner above referred to. Each pinion is secured to the right hand side of its respective registering wheel, and to the right-hand side of each pinion is secured a thin metal disk 47 of a diameter about equal to that of the registering wheel, and finally to the right side of each disk is secured the ratchet wheel 48. The purpose of the disk 47 is to keep the registering racks properly in engagement with the registering pinion.

Coöperating with the ratchet wheels 48 are the usual spring-pressed retaining pawls 49 to prevent retrograde movement of the registering wheels. Transfer pawls 50 coöperate with the wheels 48 and are pivoted at their lower ends to the rear ends of the transfer levers 51, each of which is pivoted about midway of its length upon a cross-shaft 52 which is supported at its ends in the counter frame. At its front end, each of the pawl actuating levers carries an antifriction roller 53. During the return movement of the counter,—that is—while it is being swung upward to normal position,



these antifriction rollers contact with the fixed transfer cams or projections 54, which are rigidly mounted near the front of the casing of the machine and are arranged in graduated order (see Fig. 6) so that the respective pawl-actuating levers will contact therewith successively and thereby be successively actuated. When so actuated the front ends are swing downward and their rear ends carrying the transfer pawls 50 are swung upward against the tension of the springs 55 which connect the pawl carrying levers and the trip pawls 56. The latter are, as usual, for the purpose of holding the transfer pawls in their inoperative positions so that normally they will not engage the teeth of the ratchet wheels 48 and hence normally will not move the registering wheels, and this despite the fact that all of the pawl carrying levers are successively actuated at each operation of the machine, and carry the pawls with them.

By reference to Fig. 6 it will be seen that the cam projections 54 are inclined so that when the counter frame is in its normal upper position the levers 51 have been depressed sufficiently at their forward ends to cause the transfer pawls to slightly overlap the teeth of the ratchet wheels. This is to prevent the transfer pawls falling in back of the ratchet teeth when the trip pawls 56 are operated by the counter being turned to zero. The trip pawl holds the transfer pawl in inoperative position by reason of the normal engagement of an arm 57<sup>a</sup> with the outer one of the two notches 58 formed on the rear end of the trip pawl. The upper side of said pawl is provided with an operating nose 59 which lies in the path of a trip pin or projection 60, from which it results that when the registering wheel has made a complete revolution, the trip pin will strike the operating nose 59 and thereby swing the rear end of the trip pawl downward against the tension of the spring 55 and permit the transfer pawl to swing toward the ratchet under the impulse of a spring 61 until the arm 57 drops into the second or inner notch of the trip pawl. Each spring 61 is connected at its forward end to the counter frame. The tripping action brings the upper operating end of the transfer pawl into such position that the transfer pawl will turn the registering wheel of next higher denomination one notch, when its respective lever 51 is operated. Of course when the counter is reset to zero while the counter is in normal upper position, each pin 60 will strike its trip pawl 56 to trip the same, but the transfer pawl 50 is at this time resting upon the ratchet wheel 48 as above-mentioned, owing to the fact that the rollers 53 are resting upon the transfer flanges 54, thus abnormally raising the transfer pawls 50, and therefore the pawls 50 cannot spring inward into position to effect a transfer, and the trip pawls 56 are free to return to latching position as soon as the pins 60 have passed by the same, so that the transfer pawls 50 will nevertheless remain untripped and no transfer will take place on the succeeding operation of the machine.

The stop pin 62, one of which is carried by each transfer pawl, is for the purpose of preventing said pawl from being inadvertently or otherwise thrown entirely out of engagement with the ratchet teeth at the point of the extreme upward travel of said pawl which might permit overthrow.

The three registering wheels on the left hand end of the counter are not actuated directly by the registering

racks and receive movement only as it is transmitted to them from the tens-of-dollars registering wheel. A single pawl actuating lever 51, shown in Fig. 1, has pivoted to its rear end a spring pawl 63 which has three graduated teeth arranged in a manner well known in the art whereby the hundreds-of-dollars registering wheel 64 is turned one notch whenever the tens-of-dollars wheel 65 has made a complete revolution. To this end I employ the usual trip pawl 56 which coöperates with the tripping pin 60 carried by the tens-of-dollars registering wheel and with an arm 57<sup>a</sup> on the pawl 63. The three-tined pawl 63 operates so that when the hundreds-of-dollars registering wheel has made a complete revolution, the thousands-of-dollars registering wheel 66 is turned one notch, and so on, up through the capacity of the counter.

As will be seen in Figs. 1 and 3, the counter shaft 45, carrying the aforesaid registering wheels, is extended at one end through the counter frame and through a slot 32<sup>a</sup> formed in one of the side pieces. A stop disk 90 is secured to the outer end of this shaft. A stop pawl 91, pivoted on one of the side arms 32, coöperates with a pin 94, mounted upon the disk 90. The pawl 91 is limited in its movements by pin 91' projecting from the same into a recess 91'', formed in the side bar 32.

The counter is, of course, turned to zero when in its upper position, and when in this position, the pin 94 will contact with the stop arm 93 of the pawl 91, if the counter shaft is rotated, and thereby arrest the counter wheels in zero position. This operation will move the pawl 91 out of its normal position against the tension of the spring 92', which connects an arm 92 of the pawl to the counter frame. When the counter is subsequently moved downward during any regular operation of the machine, the pin 94 disengages from the arm 93 and permits the pawl 91 to move back to its normal position. After the counter is so lowered and again raised, the pin 94 will occupy a position to the opposite side of the arm 93, and the counter shaft will thus be locked against retrograde movement.

The disk 90 is formed with a flat side 90<sup>a</sup> which, when the counter moves downward, passes along a vertical guide or flange 90<sup>b</sup> formed on one edge of one of the side arms 32, as shown in Fig. 3. By this means the counter shaft is locked against any rotation except when it is in normal position in which the disk 90 is free of the flange 90<sup>b</sup>.

In order to prevent the crank handle from being started or operated while the machine is being turned to zero, I arrange the machine so that the turn-to-zero key or wrench must be inserted through an aperture formed in the side frame, in order to engage said key with the notched end of the counter shaft. Between this aperture and the end of the counter shaft, however, is located a pivoted lever 98 which is hung upon the shaft 21<sup>a</sup>, and is operated as hereinafter described. The front end of this locking lever must therefore be swung down, away from the key aperture in the frame before the wrench can be fitted to the end of the counter shaft, and when this swinging takes place, the lever is brought directly in front of a locking pin 100 which is carried by a full stroke disk 101 mounted on the shaft 24, as shown in Fig. 3. A spring-pressed pawl 101<sup>a</sup> coöperates with the disk 101 to prevent any retrograde movement of the same in a manner well known in the



art. It results from this construction, as will be readily understood, that the machine cannot be operated while the counter is being turned to zero.

The aperture 97 is guarded by a movable disk 195 (see Figs. 4 and 7) formed with a hub portion 196 which projects into the aperture 97 and forms a journal for the disk. The disk is limited in its movements by stop pins 197 which project through slots 198 formed in the disk. A coil spring 199 is connected to the disk and the main frame to normally draw the disk into position shown in Fig. 7. A radial slot 200 is formed in the disk and hub for the passage of a pin 201 mounted on the turn-to-zero key (see Fig. 4). After the key has been partly inserted it must be turned backwards slightly before its coupling projections 200<sup>a</sup> can enter and become coupled to the end of the counter shaft. In so turning the key backward, the pin 201 will engage the rear wall of the slot 200 and rock the disk 195 slightly to the rear. When the key is now forced further inward to couple it to the countershaft, the disk 195 is released and allowed to return to its normal position by the pin 201 passing free of the slot 200. The turn-to-zero key must now be given a full revolution from its starting position and then turned a slight additional distance in order to bring the pin 201 into alinement with the slot 200, to permit the key to be withdrawn. By means of the above described device, it is necessary, in turning to zero, to always turn the key a slight distance in excess of a full revolution. The object of this construction is to insure a complete return of the counter wheels to their zero positions. It will of course be understood that the counter shaft is provided with the usual groove for the reception of the spring-pressed pawls on the counter wheels whereby the shaft when rotated will pick up the counter wheels and carry them with it. As has been before stated, the lever 98 is normally in a position to prevent the turn-to-zero wrench being applied to the end of the counter shaft 45 to turn the counter to zero. For this purpose the forward end of the lever is formed with a notch 295 into which projects an angular arm 296 forming part of a bolt 297, as best shown in Figs. 3 and 5. The bolt 297 may be controlled by any suitable form of lock mechanism arranged to be operated by a detachable key. When the parts are in the position shown in Fig. 3, the bolt 297 has been thrown downward to permit the counter to be turned to zero. When the bolt is thrown in this manner it is also desirable to expose the counting wheels so that a reading may be made from the same before the counter is turned to zero. The counting wheels are normally concealed by a shutter or plate 298 which projects over a sight aperture 299 through which the counter wheels may be viewed. The shutter 298 is pivotally connected to one end of a lever 300 which is pivoted upon the main frame as at 301 and is connected to the bolt 297 by a pin 302. A spring arm 303 is formed on the lever 300 and engages the side of the shutter 298 to prevent any excessive vibration or rattling of the shutter during the time the same is being shifted. When the bolt 297 is moved downward the lever 300 is rocked on its fulcrum and the shutter 298 moved upward at its outer end. After this end has moved up a certain distance it contacts with a stationary pin 304 on the main frame and thus arrests this end of the shutter. As the lever 300 continues to operate the pin 304 be-

comes a fulcrum for the shutter with the result that the opposite end of the same is then raised until it contacts with the pivot pin 301. The shutter is moved downward in substantially the same manner, its lower edge contacting with stationary lugs 305 mounted on the main frame. These latter lugs also support a suitable transparent guard plate 306 which projects over the aperture 299.

While the form of mechanism here shown and described is admirably adapted to fulfil the objects primarily stated, it is to be understood that it is not intended to confine the invention to the one form of embodiment herein disclosed, for it is susceptible of embodiment in various forms, all coming within the scope of the claims which follow.

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

1. In a cash register, the combination with a registering mechanism, of an inclosing cabinet having a window therein, a shutter for said window, a lock, a lever operated by said lock and connected to the shutter and a second lever operated by the lock for preventing operation of the registering mechanism.
2. In a cash register, the combination with an operating mechanism including a counter the shaft of which is arranged to be rotated to turn said counter to zero, of a pivoted lever normally guarding the shaft against the adjustment of a turn-to-zero key, and means for locking the operating mechanism by the movement of the lever which exposes the shaft.
3. In a cash register, the combination with an operating mechanism including a rotary shaft, of a counter having a turn-to-zero shaft, a lever for preventing access to said latter shaft and arranged to lock the rotary shaft when moved into a position allowing access to said turn-to-zero shaft.
4. In a cash register, the combination with an inclosing casing, of a counter mechanism including a turn-to-zero shaft, a turn-to-zero key, and means mounted on the inclosing casing for compelling the key to make more than a full revolution after being attached to the turn-to-zero shaft.
5. In a cash register, the combination with an inclosing casing, of a counter mounted therein including a turn-to-zero shaft, a turn-to-zero key, and a spring member mounted on the casing and arranged to be turned back slightly by the key before the latter can engage the turn-to-zero shaft and to be then released so as to spring forward and compel more than the full rotation of the key.
6. In a cash register, the combination with an inclosing casing, of a counter mounted therein and having a turn-to-zero key, an oscillating spring device mounted on the casing and constructed to compel more than the full rotation of a key in order to permit the insertion and the withdrawal of the key from the casing.
7. In a cash register, the combination with an operating mechanism, of a counter including a turn-to-zero shaft, a device arranged to guard the turn-to-zero shaft and to also lock the operating mechanism, a cabinet having a window for the inspection of the counter, a shutter for said window, and means for simultaneously operating the shutter and the guard and locking device.
8. In a cash register, the combination with an inclosing casing, formed with a key aperture, of a counter mounted in said casing and a movable guard for the key aperture which must be given a slight movement to permit the insertion of the turn-to-zero key, and a turn-to-zero key constructed to engage said movable device and operate the same when inserted.
9. In a cash register, the combination with an inclosing casing having a key aperture, of a counter within the casing, an oscillating collar mounted in the key aperture and formed with a groove or channel, and a turn-to-zero key which operates in said channel.
10. In a cash register, the combination with an inclosing casing having a key aperture, of a counter having a turn-



- to-zero shaft, a guard for the key aperture arranged to be moved from its normal position and automatically return to the same when released, and a turn-to-zero key for displacing the guard from its normal position.
- 5 11. In a cash register, the combination with a registering mechanism, of an inclosing cabinet having a window therein, a shutter for said window, a lock, and a lever positively operated by said lock in both directions, and connected to the shutter.
- 10 12. In a cash register, the combination with a counter having a turn to zero shaft, of a guarding disk for said shaft having a slot, a key having a projection to enter said slot, and means for normally holding said disk out of line with the key projection.
- 15 13. In a cash register, the combination with an operating mechanism, a counter having a turn to zero shaft, a lever normally preventing access to said shaft, means under lock and key for operating said lever, and means for locking said operating mechanism when the lever has been moved to allow access to said turn to zero shaft.
- 20 14. In a cash register, the combination with an accumulating device, having a turn to zero shaft, of a shutter normally covering said accumulating device, means normally preventing access to said turn to zero shaft, and means under lock and key for positively moving said shutter to allow observation of said accumulating device and positively moving said first-mentioned means to allow access to said turn to zero shaft.
- 25 15. In a cash register, the combination with a counter having a turn to zero shaft, a spring-actuated disk aligned with said shaft, and having a radial slot, a turn to zero key and projections for rotating said shaft, and a projection for entering said slot out of line with the said first projections.
- 30 16. In a cash register, the combination with a counter having a turn to zero shaft, of means for moving said counter bodily, and means for preventing the turn to zero shaft from being given more than one rotation, said means arranged to be disabled by the bodily movement of the counter.
- 35 40
- In testimony whereof I affix my signature in the presence of two witnesses.
- THOMAS CARROLL.
- Witnesses:  
HERBERT C. WOOD,  
FRANK PARKER DAVIS.