

982,936.

5 SHEETS—SHEET 1.



Wm. Foster.
 Earl Hunt.

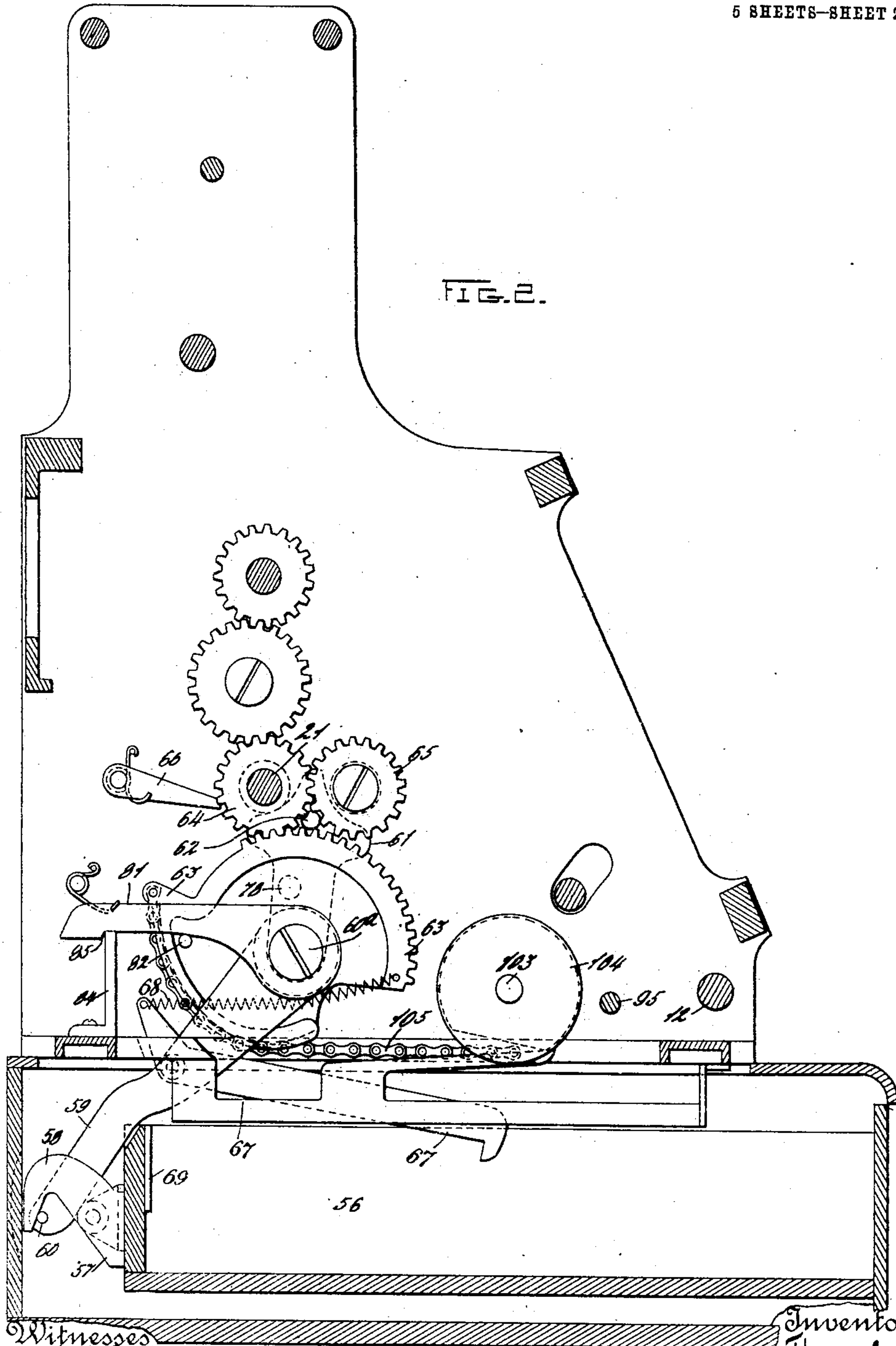
Inventor
Thomas Carroll
by J. B. Hayward
and others
Attorneys

T. CARROLL.
 OPERATING MECHANISM FOR CASH REGISTERS.
 APPLICATION FILED MAY 7, 1906.

982,936.

Patented Jan. 31, 1911.

5 SHEETS—SHEET 2.



Witnesses

W. H. Bunt
Carl H. Bunt

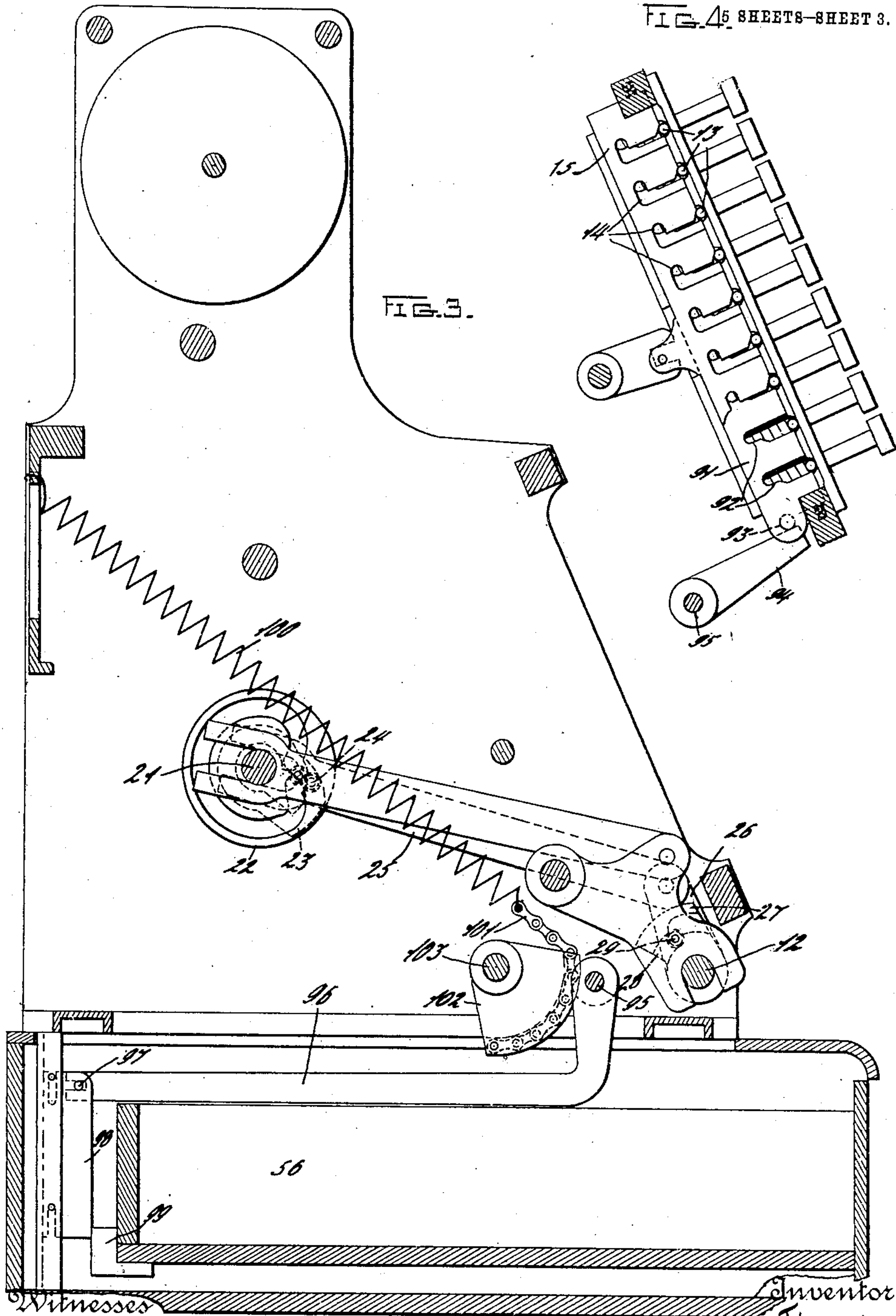
Inventor
 Thomas Carroll
 by J. B. Hayward
 and R. C. Glass
 Attorneys

T. CARROLL.
OPERATING MECHANISM FOR CASH REGISTERS.
APPLICATION FILED MAY 7, 1906.

982,936.

Patented Jan. 31, 1911.

FIG. 45 SHEETS-SHEET 3.



Witnesses

Wm. H. H. H.
Carl H. H.

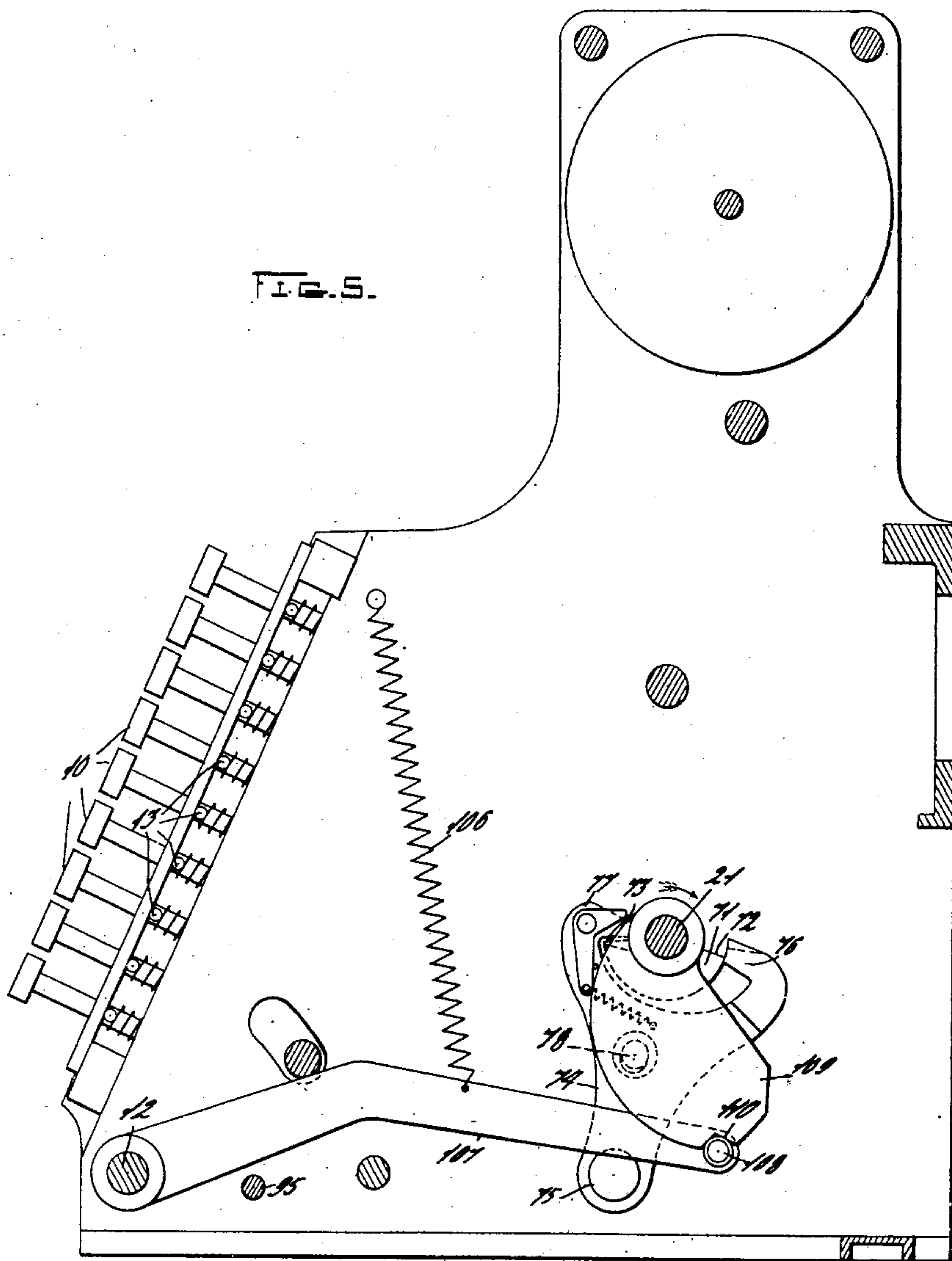
Inventor
Thomas Carroll
by J. B. Hayward
and R. H. H.
Attorneys

T. CARROLL.
OPERATING MECHANISM FOR CASH REGISTERS.
APPLICATION FILED MAY 7, 1906.

982,936.

Patented Jan. 31, 1911.

5 SHEETS-SHEET 4.



Witnesses

Wm. H. H. H.

Carl H. H.

Inventor

Thomas Carroll

by J. B. Hayward
and R. H. H.

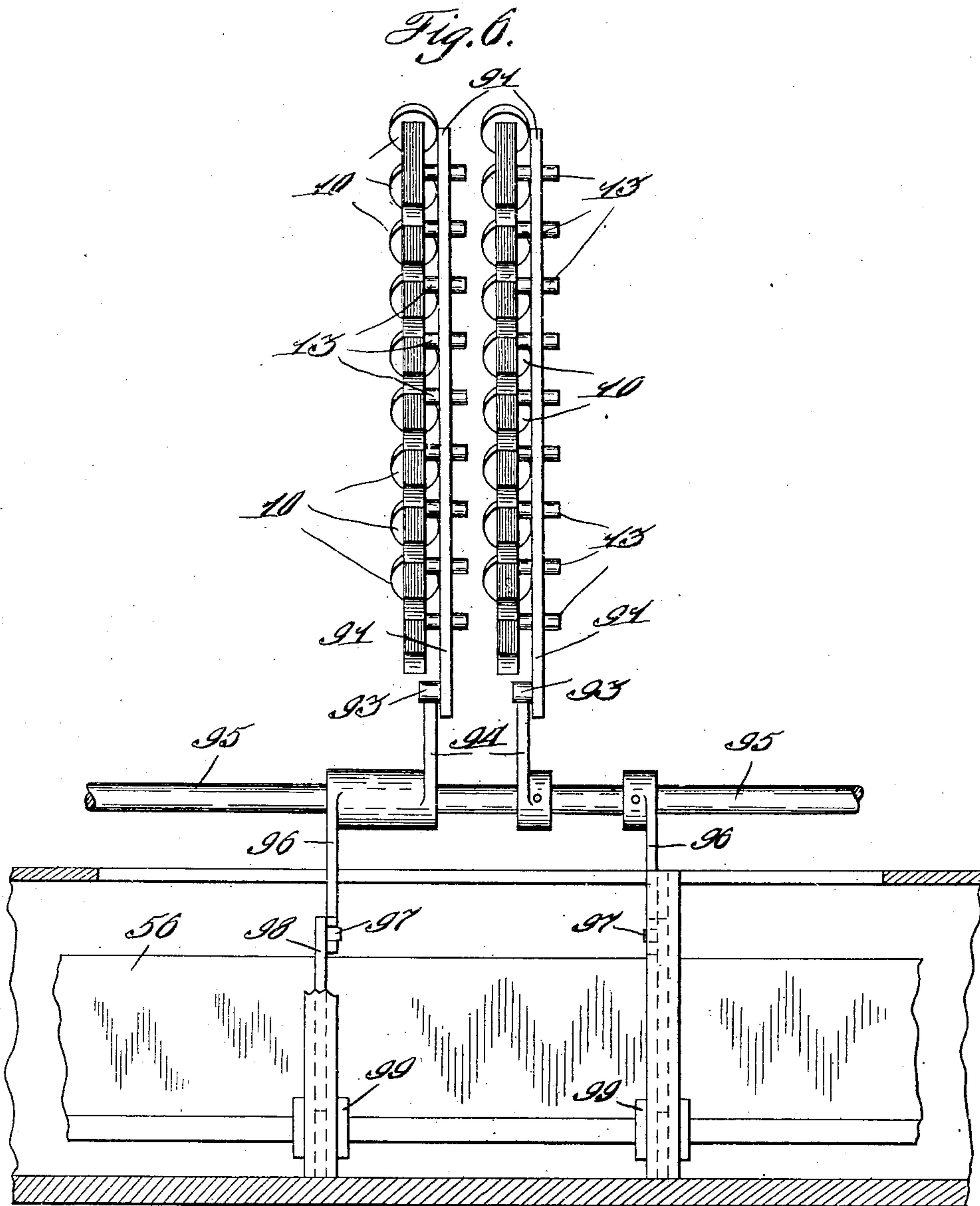
Attorneys

T. CARROLL.
OPERATING MECHANISM FOR CASH REGISTERS.
APPLICATION FILED MAY 7, 1906.

982,936.

Patented Jan. 31, 1911.

5 SHEETS—SHEET 5.



Witnesses:
G. H. Fairchild
Geo. S. Forrester

Inventor
Thomas Carroll
by *W. H. H. H.*
and R. C. H. H.
Attorneys

UNITED STATES PATENT OFFICE.

THOMAS CARROLL, OF DAYTON, OHIO, ASSIGNOR TO THE NATIONAL CASH REGISTER COMPANY, OF DAYTON, OHIO, A CORPORATION OF OHIO.

OPERATING MECHANISM FOR CASH-REGISTERS.

982,936.

Specification of Letters Patent.

Patented Jan. 31, 1911.

Application filed May 7, 1906. Serial No. 315,590.

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 Operating Mechanisms for Cash-Registers, of which I declare the following to be a full, clear, and exact description.

My invention relates to cash registers, and has among its objects to provide an improved operating mechanism for machines of the type to be controlled from the cash-drawer or other type of cash safe having some movable part.

A further object is to provide improved means for transmitting the reciprocating motion of the cash-drawer into the continued rotary motion demanded of cash registering machines.

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 is a transverse section through the machine showing the bank of clerks' keys. Fig. 2 is a section on a different line looking in the same direction, showing the driving connections to the cash-drawer. Fig. 3 is a section on still another line, showing the main motor-spring and other associated elements. Fig. 4 is a detail view of the clerks' keys and mechanism operated thereby. Fig. 5 is a section nearly on the line of Fig. 2, but looking in the opposite direction, showing an auxiliary device for assisting the main spring, and a full-stroke device. Fig. 6 is a partial rear view of a releasing mechanism, being a modification showing two banks of keys as controlling the cash drawer.

My present invention is in the nature of an improvement on the machine shown in my prior application, Serial No. 274,099, filed August 14, 1905. In said application I have described and claimed a machine having the same general mode of operation as has my present invention, but arranged to be actuated through the medium of an oscil-

lating lever. In the present invention the mechanism is allowed to be actuated by a reciprocating element, which I have shown as embodied in a cash-drawer of a usual type. Many of the parts of the machine will be only generally described, as they are not parts of the present invention.

Referring to Fig. 1, a series of keys 10 are adapted to determine the differential movement of a segment 11, which is journaled on a rod 12 near the bottom of the machine. It will be understood that there will be a number of banks of keys and associated devices. When any key 10 is depressed, the corresponding segment 11 is rocked around its pivot 12 to a distance depending on the key. This differential motion is produced by providing different extents of lost motion between the pins 13 of the various keys and the operating edge of the segment. The keys are arranged when depressed to remain so until the operation has been completed. They are held depressed by bayonet slots 14 in a detent 15, arranged to be slightly raised by the pins 13, and then allowed to drop again when the key reaches its inmost position. A plurality of levers 17 are also journaled on the rod 12, but the journal is elongated, as shown at 18, for the purpose of allowing the levers to be slightly raised. After the segments 11 have been rocked rearwardly, on the operation of the machine the levers 17 are slightly raised by means hereinafter described to cause gear-teeth 18 carried thereby to engage with gear-teeth 19 on a plate 20, mounted on the segment 11. When the segments are then returned to normal position, as shown in Fig. 1, a differential motion of levers 17 is produced.

The elevation of levers 17 is produced by means shown in Fig. 3. Mounted on a main operating-shaft 21 is a box-cam 22, having a cam groove 23, in which is arranged to ride an anti-friction roller 24, mounted on a reciprocating link 25. This link is arranged to straddle shaft 21, and at its forward end is connected to a lever 26 rigidly mounted on shaft 12. Also rigid with this shaft are a plurality of plates 27 having cam grooves 28. In these cam grooves anti-friction rollers 29 are adapted to ride, and these rollers are mounted on the levers 17, before referred to. It follows from this structure that when shaft 21 is rotated, link 25 will be drawn

rearwardly. This will rock the plates 27, and through the shape of the cam groove 28 will cause an elevation of the anti-friction rollers 29, thereby raising levers 17, as before stated, so that gear-teeth 18 mesh with the gear-teeth 19 of the levers 11. At the end of the operation link 25 is rocked forwardly, thereby withdrawing the levers 17, and allowing them to return to normal position.

A counter 31 is shown in Fig. 1, and a pinion is mounted rigidly with each of the wheels of the counter. These pinions mesh with gears 32, journaled on a rod 33, and beside and parallel to each gear 32 is a second gear not shown. The pinions 34, mounted in a rocking frame 35, are adapted to connect each pinion 32 with its corresponding gear. The segments 11 have each gear-teeth 36 at the outer end thereof, and these teeth are in constant mesh with the companions to gears 32. After the segments 11 have been moved rearwardly by the keys, the pinions 34 are moved forwardly to connect each gear 32 with its companion gear. By this construction, when the segments 11 are returned to their position, as shown in Fig. 1, the restoration of the companion gear will, through the medium of pinion 34, cause an operation of gear 32, and this will serve to add the proper amount to the counter 31. A transfer device, comprising trip-pawls 37, transfer-pawls 38, trip-pins 39, and an actuating shaft 40 serves to carry from a lower to higher denominations, but no further description of this seems necessary.

Levers 17 are adapted to determine the motion of the indicators, and for this purpose each lever is provided with a link 42 connected through a lever 43 to a second link 44. This link 44 is adapted to move a segment 45, having gear-teeth 46 meshing with a pinion 47 connected to the indicator. Depending from the center of lever 43 is a bar 48, carrying on opposite sides thereof anti-friction rollers 49 and 50. The rotation shaft 21 carries two cams 51 and 52, adapted to move the rollers 49 and 50, respectively. Means are provided, although not shown herein, for retaining the indicators in set position between operations of the machine. When the levers 17 are moved forwardly, the links 42 are elevated, and levers 43 thereby rocked around pins 53. Before the levers have assumed their new position, the locking device for the indicators is released, and rotation of shaft 21 will cause a movement of the bars 48, depending on the distance through which the levers 17 have been moved, thereby setting the indicators to their new position. It is evident that this structure provides means for setting the indicators directly, and by the shortest path from any one indicating position to a new position without return-

ing them to zero, as has heretofore been the case. This mechanism, however, is also shown in the prior application.

Coming now to the subject matter of the particular invention, Fig. 2 shows a usual type of cash-drawer 56. Mounted on the rear of the drawer is a plate 57, and carried by this plate is a curved bar 58. A main actuating lever 59 is adapted to be moved in one direction by a power spring as will be later described and in the reverse direction by the curved bar 58, through the medium of a pin 60, mounted on said lever 59 and adapted to be engaged by the bar 58. This lever 59 is journaled on a shaft or floating pivot 60^a, carried on a plate 61, the said plate being journaled on a pin 62, carried on the main frame. Rigid with lever 59 is a segment 63, adapted to mesh successively with two interconnecting gears 64 and 65. Upon the release of the locking means to be hereinafter described the segment 63 is rotated by the power spring toward the rear of the machine and will through the lever 59, pin 60 and plate 58 eject the drawer. If the mechanism would in any way become rusted or gummed up so as to prevent free working of same the drawer may be pulled out by hand and the mechanism positively operated by the following described device. Pivoted loosely upon the lever 59 is a forwardly projecting hooked lever 67 which is spring drawn to the position shown in Fig. 2 by a spring 68. A plate 69 secured to the inside of the rear of the cash drawer is adapted to engage the hooked end of the lever 67 and cause a positive operation of the lever 59. During the return movement of the drawer the lever 59 will be rotated around its pivot by the plate 58 contacting with and camming the pin 60. Retaining pawl 66 prevents the said gears 64 and 65 from moving backwardly. This mechanism serves to provide means for converting the reciprocating motion of the cash-drawer into a continuous forward motion of gears 64 and 65. When the lever 59 is moved through the release of the cash-drawer, there will be a tendency to turn gear 64 in a clockwise direction, but as this is prevented by the retaining pawl a rotating motion of plate 61 will be caused, and segment 63 will be thereby carried into mesh with gear 65. When the teeth of segment 63 have been withdrawn from gear 64, the segment can then turn, and a half rotation will be given to gear 65, and therethrough to gear 64. When the cash-drawer reaches its outward position, and its direction of motion is reversed, the segment 63 will again be thrown into mesh with gear 64 by a reversal of the operation previously described; so that on the return of the cash-drawer to its inward position, a second half rotation will be given to gear 64, although this time without the in-

intervention of gear 65. With the mechanism
 as thus described, however, there is nothing
 to compel a full stroke of the drawer, and if
 by accident or design the drawer was partly
 5 pulled out and then returned, it is evident
 that a misoperation of the machine would
 take place. To prevent this, I have provided
 means shown in Fig. 5. On the shaft 21,
 which carries gear 64, is a semi-circular lock-
 10 ing flange 71, having shoulders 72 and 73.
 Adapted to engage with this flange is an es-
 capement 74, journaled on a pin 75, and pro-
 vided with pallets 76 and 77. It will be un-
 derstood that the direction of motion of
 15 shaft 21 is as indicated by the arrow on Fig.
 5. The escapement 74 is connected by a pin
 78 to the plate 61, previously referred to.
 This mechanism compels a full stroke of the
 cash-drawer. As shown in Fig. 2, the cash-
 20 drawer is slightly advanced from its rear-
 most position, and this is the normal posi-
 tion of the cash-drawer. On giving the
 cash-drawer a slight rearward movement the
 shaft 21 will be slightly rotated and the
 25 shoulder 72 and the flange 71 moved out of
 the path of pallet 76. When the cash-
 drawer is then pulled out the plate 61 will be
 rocked around its pivot 62, and this through
 pin 78 will throw forward the escapement
 30 74, thereby withdrawing pallet 77 from the
 path of flange shoulder 73. When the
 drawer reaches its outward position, this
 operation will be reversed, the pallet 76 then
 being drawn rearwardly out of the path of
 35 shoulder 73 at the beginning of the reverse
 motion of the drawer. It will be seen that
 a reversal of the motion of the drawer at
 some intermediate position is prevented in
 both directions, inasmuch as a reversal of
 40 motion would necessitate the rocking of
 plate 61, but such rocking is prevented
 through the rigid connection of said plate
 to the escapement 74. At any intermediate
 45 position the flange 73 would prevent motion
 of one or the other of the escapement pallets
 76 or 77. To compel the slight rearward
 movement of the drawer, previously referred
 to, I have provided a lever 81, carried by the
 shaft 60^a. Mounted on the segment 63 is
 50 a pin 82, adapted in the normal position of
 the mechanism to be directly under the lever
 81. A frame-piece 84 is in the path of the
 shoulder 85 on said bar 81, and prevents the
 bar being drawn forwardly. When, how-
 55 ever, the drawer is pushed rearwardly, the
 lever 81 will be raised enough to carry shoul-
 der 85 above the frame-piece 84. When
 thereafter the drawer is pulled outwardly,
 the plate 61 is rocked, as before stated, and
 60 this causes forward motion of the shaft 60^a
 enough to carry the shoulder 85 over the
 frame-piece 84. When the drawer is re-
 turned to its normal position, plate 61 is re-
 versely rocked, thereby carrying the bar
 65 rearwardly, and it then drops to the position

in Fig. 2 engaging frame-piece 84. I have
 provided means for compelling a depression
 of a clerk's key to allow this rearward mo-
 tion of the drawer.

Referring to Fig. 4, it will be seen that the
 bank of keys has a plate 91 in addition to the
 usual detent. This plate has a series of
 70 cam slots 92, and when any key is depressed
 its pin 13 is adapted to engage the cam
 edge of the corresponding slot and depress
 the plate 91. Mounted on each of the plates
 75 is a pin 93, adapted to depress a lever 94.
 This lever is mounted rigidly on shaft 95,
 and also carried by this shaft is a long lever
 96, shown in Figs. 1 and 3. At the rear
 80 end of this lever, and back of the cash-
 drawer, a pin 97 carried thereby moves in
 a slot in a vertically-movable abutment 98.
 In the normal position of the device the
 abutment 98 is in the rear of a lug 99 carried
 85 by the cash-drawer, so that rear movement
 of the cash-drawer is prevented. When,
 however, a clerk's key is depressed the abut-
 ment 98 is raised out of the path of the
 lug 99, and the operation of the machine
 90 can then take place. It will be evident that
 this mechanism may be used to compel a
 depression of any desired number of banks
 of keys by a mere duplication of the abut-
 ment 98 and parts associated therewith, for
 95 example, as shown in Fig. 6 a bank of trans-
 action keys and a bank of value keys could
 each be supplied with a plate 91, arranged
 to operate additional abutments 98, and
 thereby compel the depression of a value,
 100 and a transaction key before an operation
 of the machine could take place. I have
 provided a main motor-spring 100 to fur-
 nish power for the first half of the opera-
 tion, and to eject the cash-drawer. This
 105 spring is connected to the machine frame at
 its rear end, and at its forward end is con-
 nected to a chain 101, fastened to a segment
 102 rigid with a shaft 103. This shaft car-
 ries a disk 104, having a peripheral groove,
 110 and riding therein is a second chain 105,
 connected as shown to the segment 63.
 When the cash-drawer is released and al-
 lowed to come out, the spring 100 will con-
 tract, and will be again tensioned on the
 115 reversal of motion of the cash-drawer. An
 auxiliary spring 106 is provided to assist
 in the rotation of shaft 21. This spring 106
 is connected at its top to the machine frame,
 and at the bottom to a lever 107, journaled
 120 on the shaft 12. At its rear end the lever 107
 carries an anti-friction roller 108, adapted
 to engage with a cam 109 on shaft 21. The
 normal position of the cam is such that a
 notch 110 engages the roller 108, but when
 125 the shaft 21 has been slightly moved through
 the slight rearward motion of the cash-
 drawer, the notch will be withdrawn from
 the roller and the spring 106 tends to raise
 the lever 107 against the slanting side of 130

the cam 109. When a half rotation of cam 109 has been made, and the cash-drawer is in its outward position, any reverse movement of the cash-drawer will cause the cam to depress lever 107, and thereby again tension the spring 106. This auxiliary motor-spring may evidently be used or not, as desired. It will be seen from Fig. 5 that the pressure of auxiliary spring 106 tends to hold the machine in normal position by engagement of roller 108 with notch 110. When the cash drawer is given its preliminary inward movement the roller is forced out of the notch and engages the oblique portion of cam 109, thus assisting the main motor spring to start the machine parts. However, the substantially radial portion of cam 109 soon reaches roller 108 and thereafter the auxiliary spring 106 gives no assistance to the main motor spring.

The operation of the mechanism will be as follows: The value keys, representing the desired amount, and some one of the clerk's keys 10 will first be depressed. The cash-drawer is then moved slightly rearwardly, after which it will be ejected to its outermost position. The return of the cash-drawer to its normal position concludes the operation. When the clerk's key 10 is depressed, its pin 13 moves segment 11 rearwardly, depending on the key. The depression of the said key also depresses plate 91, and this withdraws abutment 98 from the drawer lug 99, thereby allowing the drawer to be pushed farther in. This slight rearward movement of the drawer rocks lever 59 around shaft 60^a and pin 82 thereby raises lever 81, carrying the shoulder 85 away from the frame-piece 84. The drawer can then be moved forwardly. Plate 61 will be rocked around its pivot 62 and carry the segment 63 into mesh with gear 65, and a half rotation of gears 64 and 65 will result during the outward movement of the drawer. The said outward movement is caused by the main motor-spring 100, through its connection with the segment 63, and it is assisted by spring 106 through its connection with cam 109. A full stroke of the drawer is compelled by the escapement 74. During the first part of the outward movement of the drawer link 25 is moved rearwardly, and this raises levers 17, so that their teeth 18 mesh with teeth 19 of segments 11. When segments 11 are returned to normal position, the counter is actuated and the lever 43 for the indicating device is set. Cams 51 and 52 thereafter cause movement of the indicating devices to a new position. On the return movement of the drawer, plate 61 is rocked to the position shown in Fig. 2, and the drawer pushed in to its normal position, thereby causing a second half rotation of gear 64. The keys are released by a mechanism not shown, and this allows abutment

98 to again drop into the path of lug 99, thereby preventing the drawer from being moved to its rearmost position. The parts are then in position for another operation.

While the form of mechanism here shown and described is admirably adapted to fulfill 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.

What is claimed is as follows:

1. In a cash register, the combination with an operating mechanism, of a cash safe for moving same, means normally preventing outward movement of said safe, said means being disabled by an inward movement of the safe.

2. In a cash register, the combination with an operating mechanism, of a cash safe and means normally locking the operating mechanism, said locking means constructed to be released by a preliminary inward movement of the cash safe from its inner position.

3. In a cash register, the combination with an operating mechanism, of a cash safe for controlling same normally prevented from outward movement, means preventing an inward movement of said safe, and keys for disabling said preventing means.

4. In a cash register, the combination with an operating mechanism, of a cash safe having a movable part for controlling said mechanism, an abutment preventing inward movement of said movable part, and keys for removing the abutment from the path of the said movable part.

5. In a cash register, the combination with an operating mechanism, of a cash safe having a movable part for operating same, means normally preventing outward movement of said movable part, an abutment normally preventing inward movement of said part, means for removing the abutment, and means operated by a movement of said safe inward from normal position for disabling the first mentioned preventing means.

6. In a cash register, the combination with an operating mechanism, of a cash safe having a movable part for driving said mechanism, means normally preventing operation of the movable part, and means operated by an inward movement of said part for disabling said preventing means.

7. In a cash register, the combination with an operating mechanism, of a cash safe having a movable part for driving said mechanism, and normally slightly advanced from its rearmost position, and means for preventing outward operative movement of said movable part until an inward movement has been made.

8. In a cash register, the combination with an operating mechanism, of a cash safe having a movable part for operating same, means for preventing inward movement of said part, and keys for releasing said preventing means.

9. In a cash register, the combination with an operating mechanism, of a cash safe having a movable part for operating same, and normally in intermediate position, means preventing inward movement thereof, and keys for controlling said means.

10. In a cash register, the combination with an operating mechanism, of a cash safe for controlling same, means for normally preventing outward movement of said cash safe, means for preventing inward movement of said cash safe, keys for disabling the latter preventing means, and means whereby a preliminary inward movement of the cash safe will disable the first preventing means.

11. In a cash register, the combination with an operating mechanism, of a cash safe for moving same, means normally preventing outward movement of said safe, said means being disabled by an inward movement of the safe, an abutment preventing said inward movement, keys for removing the abutment from the path of the cash safe and means operated by the cash safe for securing a positive operation of the operating mechanism.

12. In a cash register, the combination with an operating mechanism, of a main motor spring for driving said operating mechanism in one direction, an auxiliary motor spring and an arm operated thereby, a cam connected to said operating mechanism, positioned to be engaged by said arm, and having an oblique and a substantially radial portion, whereby the auxiliary spring is effective during a portion only of said one direction movement of the operating mechanism, a cash safe, and means operated by the inward movement of said safe for driving said operating mechanism in the opposite direction and storing power in the main and the auxiliary motor springs.

13. In a cash register, the combination with a cash safe, of means normally preventing outward movement of same, the construction being such that the preventing means is disabled by a preliminary movement of said safe.

14. In a cash register, the combination with the cash receptacle, of means to lock the same in its closed position, and means actuated by the receptacle to completely unlock the same.

In testimony whereof I affix my signature in the presence of two witnesses.

THOMAS CARROLL.

Witnesses:

R. C. GLASS,
CARL W. BEUST.