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No. 773,116.

PATENTED OCT. 25, 1904.

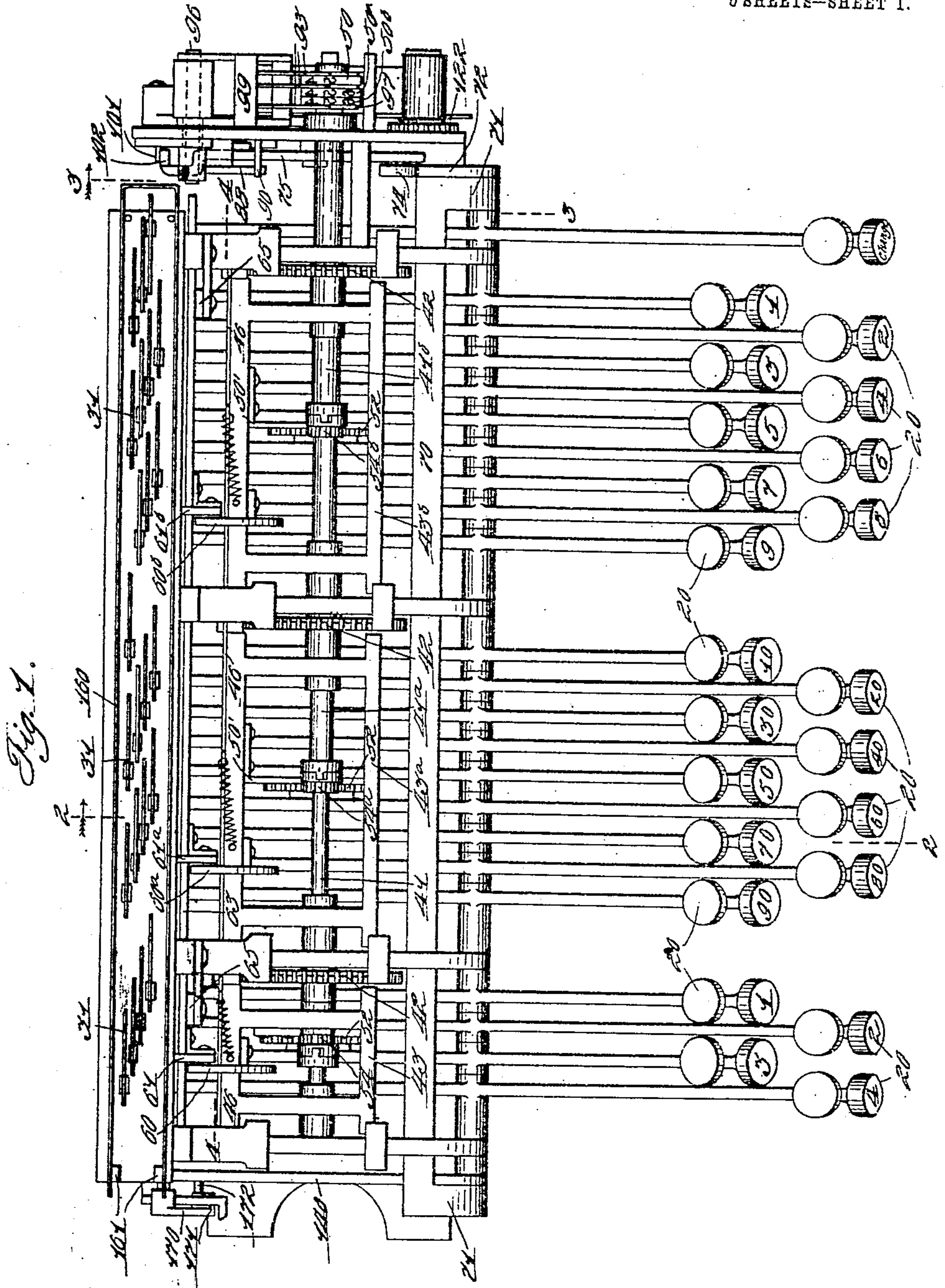
W. F. BOCKHOFF & E. J. VON PEIN.

CASH REGISTER.

APPLICATION FILED JULY 27, 1903.

NO MODEL.

5 SHEETS—SHEET 1.



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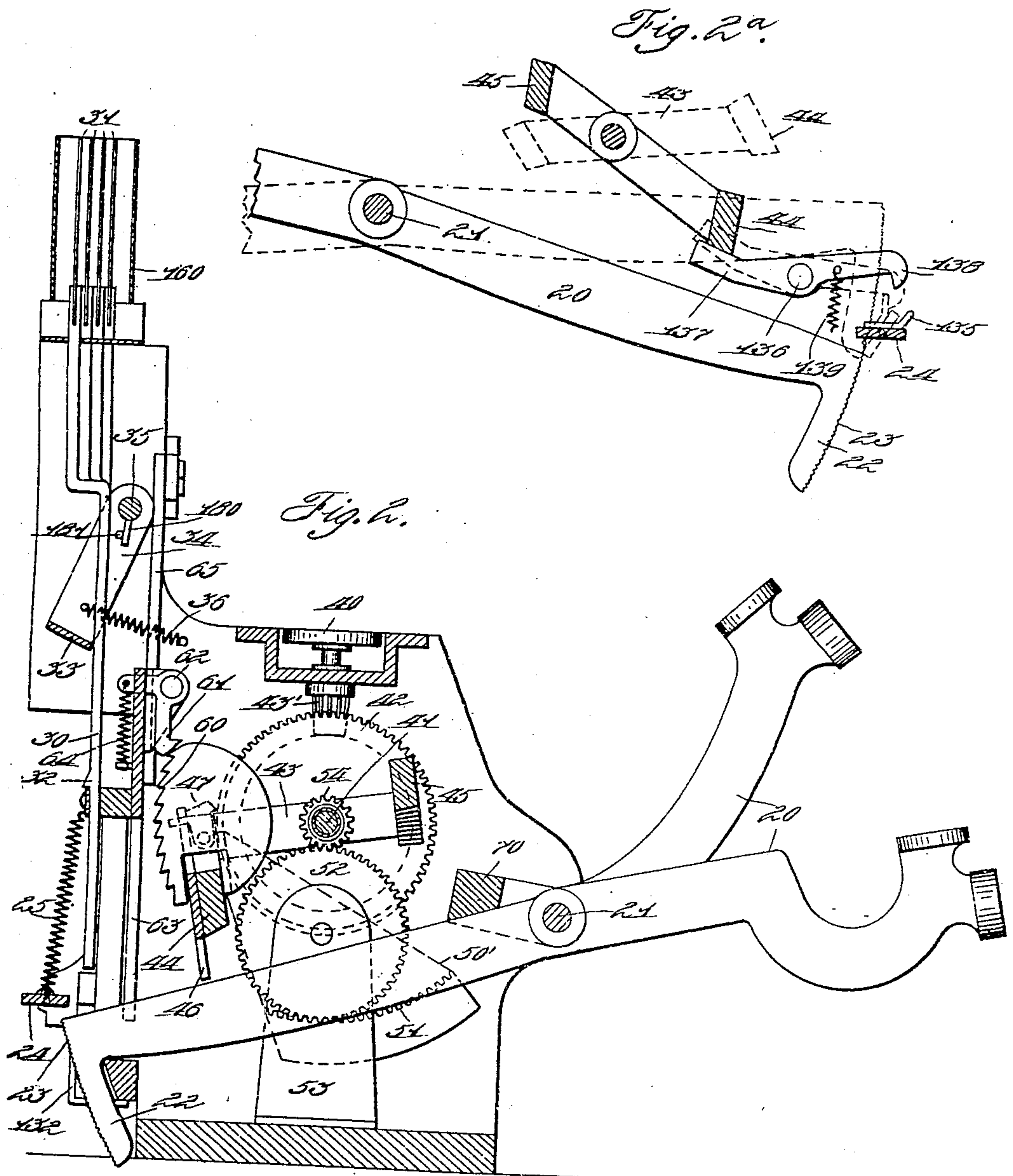
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6 SHEETS—SHEET 2.



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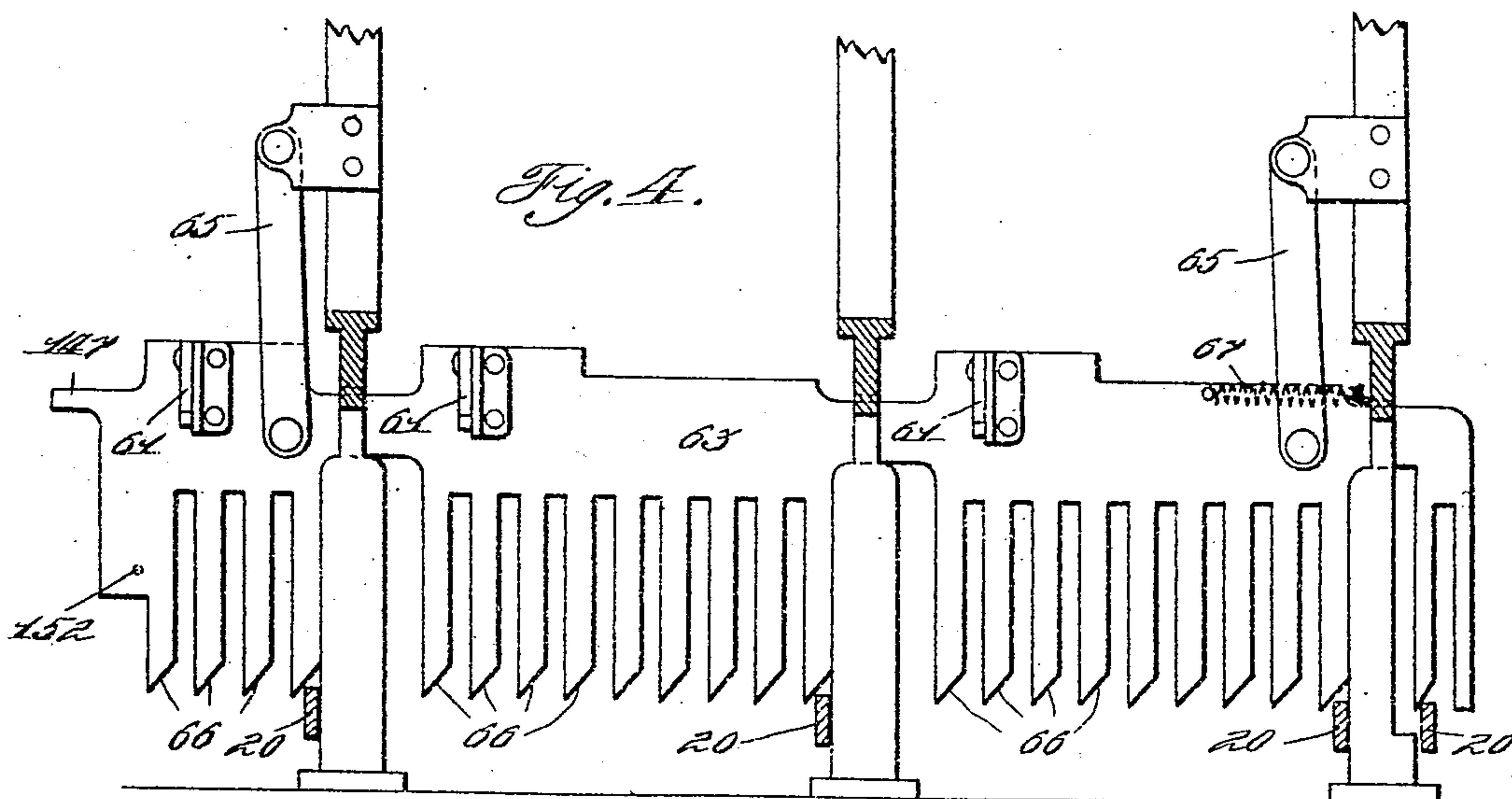
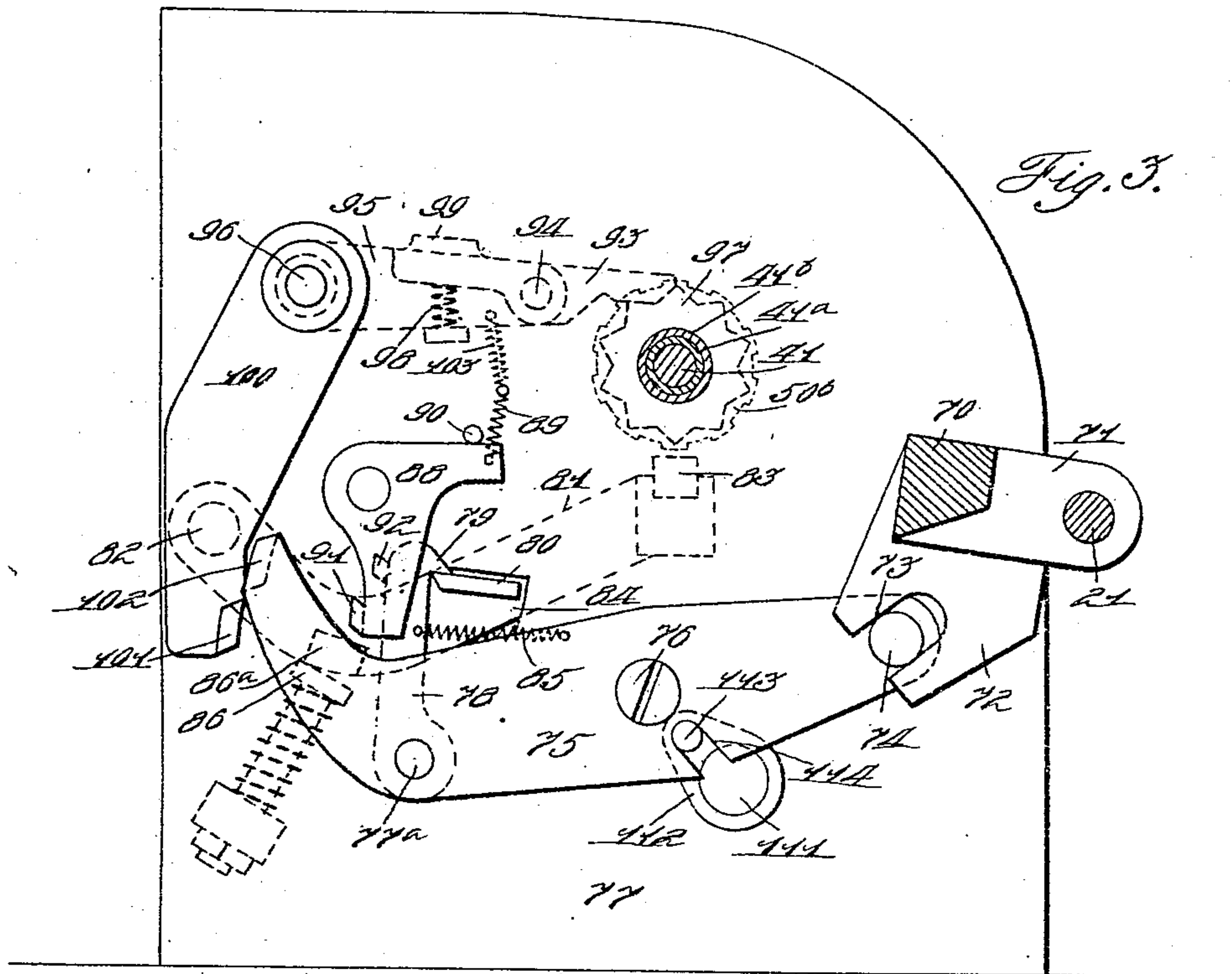
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5 SHEETS—SHEET 3.



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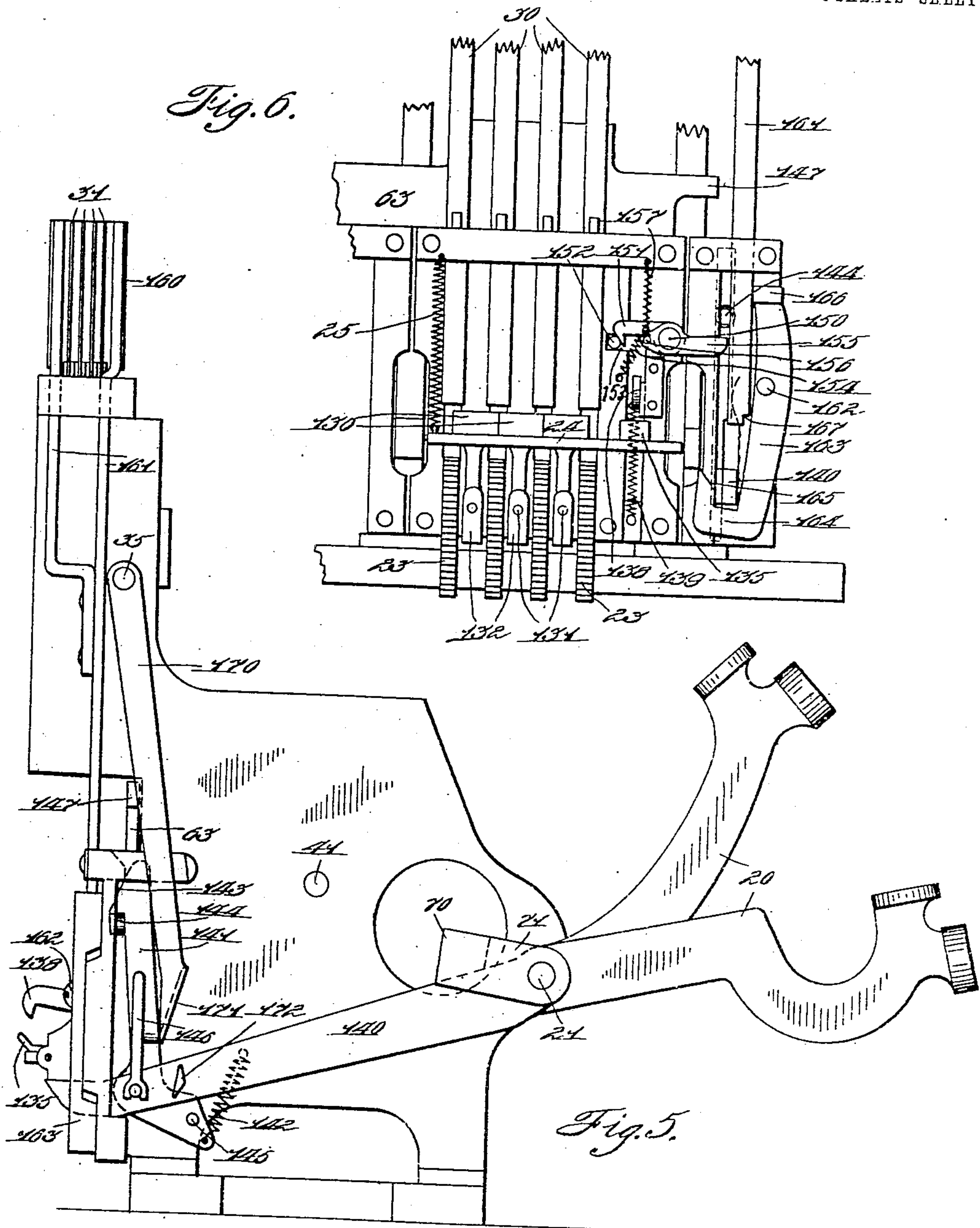
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CASH REGISTER.

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NO MODEL.

5 SHEETS—SHEET 4.



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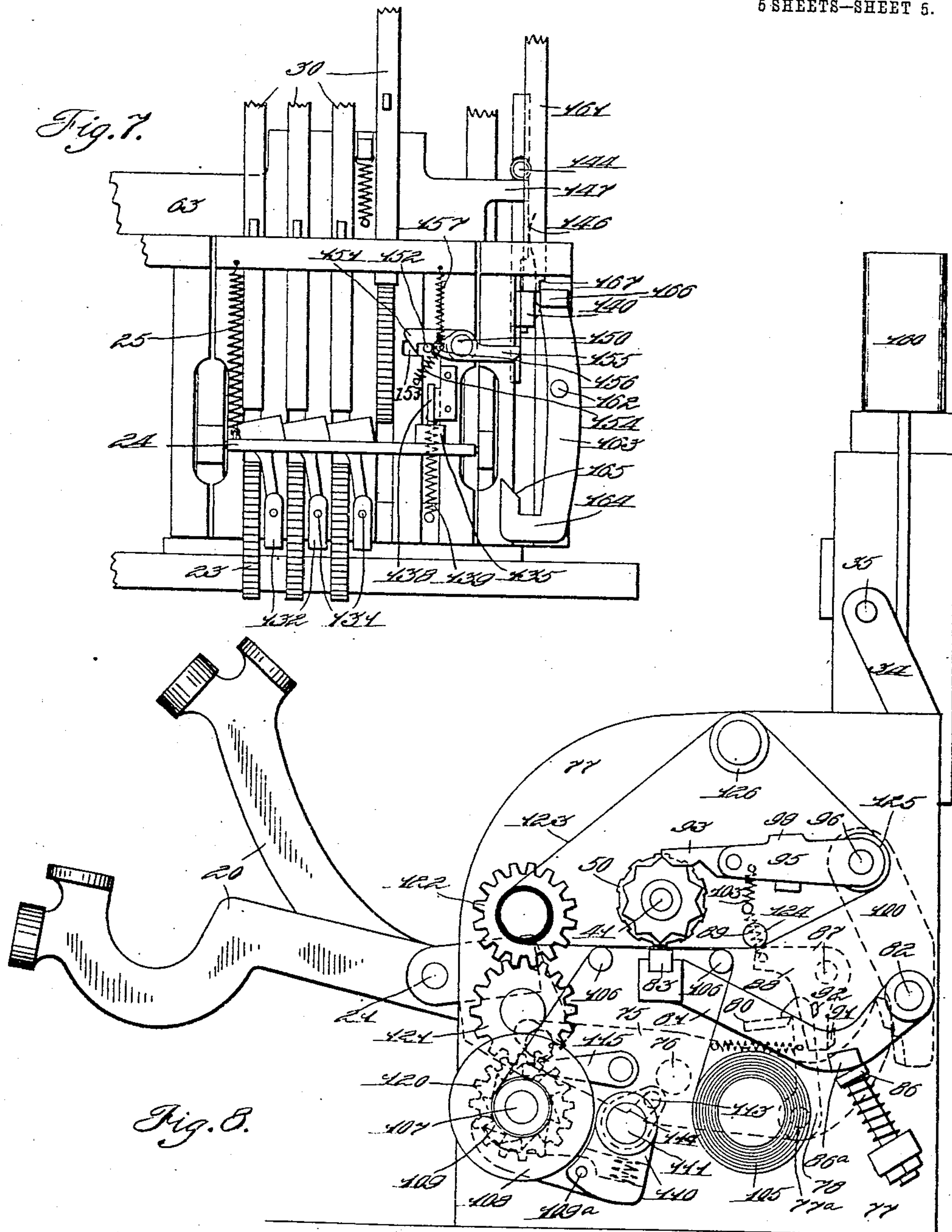
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CASH REGISTER.

APPLICATION FILED JULY 27, 1903.

NO MODEL.

5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

WILLIAM F. BOCKHOFF, OF INDIANAPOLIS, INDIANA, AND EDWARD J. VON PEIN, OF DAYTON, OHIO, ASSIGNORS TO NATIONAL CASH REGISTER COMPANY, OF JERSEY CITY, NEW JERSEY, AND DAYTON, OHIO, A CORPORATION OF NEW JERSEY.

CASH-REGISTER.

SPECIFICATION forming part of Letters Patent No. 773,116, dated October 25, 1904.

Application filed July 27, 1903. Serial No. 167,177. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM F. BOCKHOFF, residing at Indianapolis, county of Marion, and State of Indiana, and EDWARD J. VON PEIN, residing at Dayton, in the county of Montgomery and State of Ohio, citizens of the United States, have invented certain new and useful Improvements in Cash-Registers, of which we declare the following to be a full, clear, and exact description.

Our invention relates to a printing attachment for cash-registers of the kind generally known as "key-operated" machines; and while its general purpose is to provide a novel form of printing mechanism for such machines, it has the added object of providing an improved key-locking mechanism whereby to lock the keys of one bank after one key in that bank has been depressed and returned to normal position until a complete operation of the machine has been effected, and although this latter device is particularly desirable as an adjunct to the printing mechanism in the special form of machine to which we have applied our invention, yet such device may be useful in any key-operated machine.

We have shown our improvement as particularly applied to the style of machine set forth in Letters Patent to Luke Cooney, Jr., No. 575,331, dated January 19, 1897, to which patent reference may be had for a more detailed description of some of the parts; but it is of course to be understood that our invention is as well applicable to other forms of key-operated registers.

In the accompanying drawings, forming part of this specification, Figure 1 represents a top plan view of the machine with the casing and some of the parts removed. Fig. 2 represents a vertical cross-section taken on the line 2 2 of Fig. 1 looking in the direction of the arrow crossing said line. Fig. 2^a represents a detail view of the key-arrester device. Fig. 3 represents a vertical cross-section taken on the line 3 3 of Fig. 1 looking in direction of the arrow crossing said line. Fig. 4 repre-

sents a longitudinal section taken substantially on the line 4 4 of Fig. 1, showing the shifting cam-plate in elevation with some of the parts omitted and showing the rear ends of several keys in cross-section. Fig. 5 represents a side elevation of the left-hand end of the machine. Fig. 6 represents a detail rear elevation of part of the machine, showing the parts in their normal position. Fig. 7 represents a similar detail rear elevation showing the position of the parts when the keys are depressed. Fig. 8 represents a side elevation of the right-hand end of the machine, showing the printing attachment.

Keys and key-arrester.—Referring to Figs. 1 and 2, a series of value-keys 20 are pivoted upon a transverse axis 21 and are arranged in the usual banks of units of cents, tens of cents, and dollars. These keys have formed upon their rearward extensions downwardly-extending tails 22, formed with rack-surfaces 23, which are engaged by transverse bars 24, which extend across the back of the keys, one bar for each bank and which bars are pivoted on a transverse axis at their central portions and are normally held in horizontal positions by springs 25. On the downward stroke of any key the tail 22 rises and is engaged by the bar 24 to arrest the key and prevent retrograde movement. As soon as the key has reached its lowest position the tail 22 has been carried upward beyond the arrester-bar 24, so that the bar swings back to its normal horizontal position and again engages the rack 23 on the downward movement of the tail 22. The arrester-bar 24 therefore obviously acts as an arrester in both directions of movement of the operating-keys. Resting over the end of the rear portion of each key is the stem 30 of the usual tablet indicator 31. Each stem is provided with a nose 32 on its rearward side, and as the stem is lifted on the depression of any key this nose is carried upward and is engaged and held upward by the transverse bar 33 of the swinging frame 34, which is pivot-

ed to the main frame at 35 and is spring-drawn toward the indicator-stems by a spring 36. At each operation of the machine this swinging frame 34 is first swung rearwardly, so as to release the previously-raised indicators in the manner to be later described.

Registering mechanism.—A separate counter or register 40 is provided for each bank of keys, and since the register-actuating mechanism is the same for all the banks we shall describe it for one bank only. Mounted loosely upon a transverse shaft 41, which is suitably journaled in the main frame, is a gear-wheel 42, the teeth of which mesh with the beveled pinion 43' of the counter 40. This gear-wheel 42 is arranged to be moved graduated distances, according to the value of the key depressed, thereby moving the pinion 43' graduated distances, and suitable transfer devices are provided in the counter 40 for counting the number of units of rotation of this pinion 43'. The manner of moving the gear-wheel 42 graduated distances is as follows: Mounted loosely upon the shaft 41 is an oscillating frame 43, which rocks about its central portion on the shaft 41 and is provided at its outer portions with transverse bars 44 and 45, which extend transversely across the bank of keys and are formed with graduated steps, as is shown on bar 45 in Fig. 2. The arrangement of these graduated steps is such that on the depression of the keys the rear ends thereof come in contact with the rearward-stepped bar 44 at different points in the movement of the key, and thereby move the bar 44 upward graduated distances, and the construction and situation of the forward bar 45 is such that when the key which is operated reaches the extent of its downward movement the corresponding stepped notch of the bar 45 is moved downward into contact with the rising portion of the rear end of the key, and thereby serves as a positive stop to prevent the oscillating frame 43 from being overthrown.

Upon the beginning of the upward movement of the rear end of any key said rear end comes in contact with a laterally-shifting cam-plate 46, mounted upon the bar 44, and by shifting the same laterally forces the pawl 47 into engagement with the teeth of the gear-wheel 42, so that thereby as soon as the stepped frame begins to rise its movement is transmitted, by means of said pawl 47, to the gear-wheel 42, and thereby it is evident that movement is transmitted to the gear-wheel 42 corresponding in amount to the value of the key depressed. Only a brief description of this part of the mechanism has here been given, since it constitutes no part of our present invention, and for a more detailed description reference may be had to the aforesaid patent.

Printing mechanism.—In order to transmit the correct movement of said gear-wheel 42 to suitable printing-wheels for printing a rec-

ord of each transaction, we provide the following mechanism: The shaft 41 extends through the right-hand side frame of the machine and has fast upon its outer end the printer-wheel 50. (See Fig. 1.) Fast to the rear bar 44 of the oscillating frame 43 is a downwardly-extending plate 50', which has fast to its lower end a concave segment-rack 51, which meshes with the gear-wheel 52, mounted in a support 53, which extends upward from the base of the machine. The gear-wheel 52 meshes with a pinion 54, which in the dollar-bank is made fast to the transverse shaft 41, and thereby it is evident that upon an upward movement of the rear end of the oscillating frame 43 the gear-wheel 52 is rotated by means of the segment-rack 51, and thereby the pinion 54 and the printer-wheel 50 upon the outer end of said shaft 41 are also rotated, the construction of course being such that the printer-wheel 50 is set in this manner to bring into printing alinement the type-figure corresponding to the value of the key depressed. In the units-of-tens bank the oscillating frame 43^a (see Fig. 1) has attached to it a similar segment-rack, which actuates a pinion 54^a, which is made fast to a sleeve 41^a, surrounding the shaft 41, and which sleeve has fast upon its outer end the printer-wheel 50^a. Similarly in the units-of-cents bank the oscillating frame 43^b actuates the pinion 54^b, which is made fast to the sleeve 41^b, which sleeve carries a printing-wheel 50^b. It is thus apparent that in the depression of keys in the three banks the printing-wheels are set to bring the proper type into alinement to print the amount upon the paper strip in a manner to be described.

It will be obvious from the construction that if any key in one of the banks is depressed and immediately allowed to return to normal position its corresponding registering-frame and type-wheel will also be set to the proper position and will then return to their normal positions. However, it is desirable to provide means for allowing the concurrent use of a key in each one of the banks for any single transaction and to have the total amount represented by the depression of these keys in the various banks added upon the counters and printed as one item upon the detail-strip. For this purpose we have provided mechanism now to be described for permitting the simultaneous or successive operation of a key in each bank and for holding the corresponding registering-frame and printer-wheels in operated positions until the printing has taken place.

Fast to the rear of bar 44 of the oscillating frame 43 is a segment-plate 60, (see Fig. 2,) having teeth on its rear side which are adapted to be engaged by a pawl 61, which pawl is pivoted, as at 62, to a laterally-shifting cam-plate 63, the formation of which is better shown in Fig. 4, and the pawl 61 is spring-

pressed forward by means of a spring 64. The cam-plate 63 is suspended from the main frame of the machine by means of links 65, Fig. 4, and is formed with a series of vertical slots, one for each key, and the normal position of the cam-plate is such that the rear ends of the keys 20 lie directly beneath the beveled lower ends 66 of the cam-plate, and on the depression of any key the rear end 20 of said key of course rises and by acting upon the beveled surface 66 shifts the cam-plate to a slight extent laterally, and the rear end of the key then slides upward in the slot and holds the cam-plate in its shifted position against the tension of a spring 67. As will be seen in Fig. 1, the pawl 61 lies normally out of alinement with the rack-plate 60; but when any key is operated the cam-plate 63 is shifted to the left, as just described, and the pawl 61 is thereby carried into engagement with the rack-plate 60, so that when said rack-plate is carried upward by the movement of the oscillating frame 43 the pawl 61 will support the rack-plate 60, and consequently said oscillating frame 43, in its operated position, and therefore the printing-wheel 50, corresponding to this oscillating frame 43, will also be held in its operated position. As seen in Fig. 1, there is a corresponding supporting-pawl 61^a, a rack-plate 60^a for the units-of-tens bank, and a supporting-pawl 61^b and a rack-plate 60^b for the units-of-cents bank, whereby on the pressing of any key in these banks the respective oscillating frames and printer-wheels will be held in operated positions. Since the cam-plate 63 extends across all the keys in the other banks, it is apparent that the depression of a single key in any one bank—for example, in the dollar-bank—will serve to carry the supporting-pawls 61, 61^a, and 61^b into engagement with their respective rack-plates 60, 60^a, and 60^b to maintain these pawls in this supporting position as long as the key remains depressed. Therefore after having depressed this key in the dollar-bank it will be possible to press a key in any one or both of the other banks and release these other keys to their normal positions; but, nevertheless, the oscillating register-frames and printer-wheels of these other banks will remain supported in their operated positions in spite of the fact that the operated keys in these other banks have returned to normal positions, for the continued depression of the key in one of the banks is what serves to hold the cam-plate 63 in its shifted position, and thereby hold the supporting-pawls in engagement with their respective racks in all the banks. Thus if the operator wishes to register a transaction amounting to four-dollars and twenty-five cents he will first depress the four-dollar key and holding the same depressed will then successively depress and release first the twenty-cent key and then the five-cent key, or, if desired, may depress

and release these keys simultaneously. Since the four-dollar key is maintained in its depressed position, the cam-plate 63 remains shifted to the left in such manner as to hold in operated positions the oscillating register-frames and the printer-wheels of all the banks, and since the printing-wheels are now all in position to print the amount—four dollars and twenty-five cents—the printing mechanism may be operated in any manner desired, which in this case takes place, as later described, upon the return of the four-dollar key toward its normal position, and at the end of the upward stroke of the key the rear end of the key is again withdrawn from the slots of the cam-plate 63 and the plate again shifts to the right, so as to release the supporting-pawls 61 from engagement with their respective racks and allow the oscillating frames of the various banks, together with the corresponding printing-wheel, to return to their normal positions. The manner and sequence of operation of the return of the parts to their normal positions will be described later.

In order to prevent the simultaneous operation of more than one key in any bank, the usual key-stops are provided, as shown in Fig. 6. These key-stops consist of wedge-shaped blocks 130, which are pivoted at 131 to angle-arms 132, fast to the main frame of the machine, and the width of these blocks is such that when any key is depressed the blocks are crowded together in such manner that only one key can be depressed at a time, all of which is a well-known device in the art and is set forth in detail in the aforesaid Letters Patent.

Since, as above described, the registering-frames become latched in their operated positions when the cam-plate 63 is held in its shifted position by the depression of any key, it is obvious that it is desirable to provide some means for preventing a second operation of a key in those banks other than the bank in which the key is already depressed—that is, in the above-mentioned illustration, after the four-dollar key has been depressed and held down then if the twenty-cent key in the tens-of-units bank is depressed and released to its normal position it is essential that it should be impossible to press another key in this tens-of-units bank until all of the parts have returned to normal position and the printing has taken place, and similarly with the units-bank. The device for accomplishing this is shown in Fig. 2^a. Formed upon each of the transverse arrester-bars 24 is a lug 135, which projects upward slightly at an angle. Pivoted to the main frame at 136 is a dog 137, formed with a nose 138, the rearward end of which dog is drawn downward by a spring 139. There is one of these dogs for each bank of keys, and they are situated in lateral alinement with the aforesaid lugs 135. The dog 137 is engaged at its forward end by the rearward-stepped

bar 47 of the oscillating registering-frame 43. When the parts are in their normal position, the bar 47 rests upon the forward end of the dog 137 and holds the rearward end out of the path of the lug 135. However, as soon as a key is depressed and the registering-frame is moved from its normal position by contact with the key the dog 137 is of course released and its rearward end drops downward. During this part of the stroke of the key—that is, while the arrester-rack 23 is rising—the forward end of the transverse arrester-bar 24 is tilted upward, as before described; but on the beginning of the return stroke of the key after the tail 22 has been freed from the transverse bar 24 the bar is then tilted in the opposite direction and the lug 135 is forced under the nose 138, and the bar 24 is thus held in this tilted position, as shown in dotted lines in Fig. 2^a, and although the key returns to its normal position, yet if the registering-frame is still held displaced from normal position the nose 138 will still engage the lug 135 and the bar 24 remain latched in this position, whereby it is obvious that if the same key or any other key in this same bank is attempted to be depressed such key will be locked from operation by contact with its arrester-rack 23 with the bar 24. The bar obviously remains in this latched position until the registering-frame 43 has descended to its normal position, when the forward end of the dog 137 is again depressed and the rearward end lifted, thereby allowing the bar 24 to return to its normal horizontal position, the return of the parts to their normal positions taking place, as before stated, as soon as the last key has returned to its normal position and has allowed the camplate 63 to shift, and thereby allow the registering-frames to drop. It is apparent from this construction that it is impossible after having once pressed a key in any bank and set the registering-frames and printing-wheels in their operated positions to press another key in this same bank until the printing has taken place.

The operation of the printing mechanism for recording the amount of each transaction upon the detail-strip is as follows: Extending transversely across all the keys slightly in the rear of their pivotal points is a universal bar 70; (see Figs. 1 and 3,) which bar is swung upon side arms 71, pivoted on the shaft 21, upon which the keys are pivoted, and obviously the bar 70 receives a uniform movement at each operation of the machine, being carried upward by contact with the upper side of the rear end of the keys. To the right-hand end of the universal bar 70 is attached a plate 72, (see Fig. 3,) which is formed with a slot 73, which engages a pin 74 on the forward end of a lever 75, pivoted at 76 to the side frame 77 of the printing attachment. At the rearward end of the lever 75 is pivoted, as at 77^a, a pawl 78, formed at its upper end

with a nose 79, which nose engages a lug 80, formed on the side of the printer-hammer 81, which printer-hammer is pivoted, as at 82, on the outer side of the side frame 77 and carries a resilient platen 83, adapted to engage the type-wheels 50, 50^a, and 50^b. Since the printer-hammer 81 is on the outer side of the side frame 77 and the pawl 78 is on the inner side thereof, the side frame 77 is provided with a recess 84, through which the said lug 80 projects to be engaged by the nose 79 of the pawl 78, and the pawl 78 is held in engagement with this lug 80 by means of a spring 85. The printer-hammer 81 is normally held in its upper position by means of a spring-pressed plunger 86, (see also Fig. 8,) which plunger engages a lug 86^a, formed upon the printer-hammer 81. Pivoted at 87 to the side frame 77 is a swinging arm 88, which is normally held, by means of a spring 89, in engagement with a stop-pin 90, extending outward from the side frame 77. The lower end of this arm 88 is formed with a beveled lug 91, which is adapted to engage a similar beveled lug 92, formed upon the rear side of the pawl 78. The operation of these parts is as follows: When any key is depressed, the bar 70 is carried upward, and thereby by means of the slot-and-pin connections 73 and 74 swings the lever 75 about its pivot 76, carrying the rear end thereof downward, and since the nose 79 of the pawl 78 is in engagement with the lug 80 on the printer-hammer 81 the printer-hammer is thereby also carried downward against the pressure of the spring-pressed plunger 86, and the beveled lug 92 slides over the forward side of the beveled lug 91 and forces the lower end of the arm 88 rearward against the tension of the spring 89; and the pawl 78 is unaffected thereby. However, as soon as the universal bar 70 begins to descend the rearward end of the lever 75 begins to ascend, and the upper surface of the beveled lug 92 engages with the under surface of the beveled lug 91, and since the arm 88 cannot swing forward because of the stop-pin 90 the pawl 78 is thereby forced out of engagement with the lug 80, and consequently the printer-hammer is released and flies upward, carrying the platen 83 against the type-wheels.

The type-wheels are provided with the usual alining-pawls 93, which are pivoted, as at 94 in the frame 95, to the side frame 77 on a stub-shaft 96. Each type-wheel is provided with an alining star-wheel 97, fast upon the side of the type-wheel, which star-wheel is engaged by its respective alining-pawl, and the alining-pawls are made individually flexible by means of springs 98, mounted in the frame 95, which springs force the rear end of the alining-pawls up against a transverse bar 99 on the frame 95. The frame 95 is made fast at its pivotal point to a downwardly-extending arm 100, which arm has formed upon its

lower end a beveled lug 101, adapted to be engaged by a similar beveled lug 102, formed upon the rearward end of the lever 75. Upon the upward movement of the universal bar 70 and the consequent downward movement of the rear end of the lever 75 the lower end of the beveled lug 102 engages the upper side of the beveled lug 101, and consequently rocks the arm 100 forward, thereby withdrawing the alining-pawls 93 from engagement with their respective type-wheels to be set free from the spring resistance of the alining-pawls, and as soon as the beveled lugs have passed each other the alining-pawls of course snap into place in engagement with their respective star-wheels, and upon the downward movement of the universal bar 70 and the consequent upward movement of the rear end of the lever 75 the lug 102 slides upon the forward side of the lug 101 and forces the arm 100 slightly rearward, so as to jam the alining-pawls 93 into firm engagement with their respective type-wheels to hold the latter firmly in position while the printing is taking place, which, as previously described, occurs upon the initial upward movement of this rear end of the lever 75. As soon as the lug 102 has moved past the lug 101 the arm 100 is free to move forward, and the type-wheels can then return to their normal positions, since the alining-pawls no longer positively hold them in their operated positions. The alining-pawl frame 95 is normally drawn downward by a spring 103, whereby the arm 100 is normally held in its rearward position.

The position and the operation of the detail-strip can best be seen in Fig. 8. The paper is unwound from a supply-roll 105 and is led up over guide-rollers 106, with a stretch of the paper extending between the type-wheels and the platen 83, and the paper is then led down around a winding-roller 107. The paper receives a spacing movement at each operation of the machine by means of a pawl 108, which engages a ratchet 109, fast upon the winding-roller 107. This feed-pawl is pivoted at 109^a to an arm 110, which is mounted upon a stub-shaft 111, journaled in the side frame 77. This stub-shaft 111 extends through to the inner side of the side frame 77, where it has fast upon it an arm 112, carrying a pin 113, which plays in the slot 114, formed in the lever 75. Upon the rocking of the lever 75 in the manner before described it is apparent that the arm 112, and consequently the arm 110, will be rocked upon the shaft 111 in such manner that the feed-pawl 108 will be first thrown rearward to space the strip and will then be returned to its normal position without any further feeding movement.

Upon the winding-roller 107 is a gear-wheel 120, which meshes with an intermediate pinion 121, mounted on a shaft journaled in the side frame 77, which pinion in turn meshes with another gear 122, which is also mounted

upon a stub-shaft journaled in the side frame 77 and which also carries an outwardly-extending roller, around which is passed the inking-ribbon 123, which inking-ribbon passes between the type-wheels and the detail-strip, then around a guide-pin 124, over a roller 125, mounted loosely upon the shaft 96, and over a supporting-roller 126. It is thus obvious that by means of these gears 120, 121, and 122 the inking-ribbon 123 also receives a spacing movement by means of the pawl 108 at each operation of the machine.

The mechanism which produces the sequence of operation of the various parts to effect the printing and return these parts to their normal positions will now be described.

Fast to the left-hand end of the universal bar 70 is a rearwardly-extending lever 140, similar in shape to the rear ends of the key-levers. (See Fig. 5.) At the rearward end of this lever is pivoted a pawl 141, the upper end of which is drawn rearward by a spring 142, attached to the lower end of said pawl. The upper end of this pawl is formed with an inclined head 143, below which is fastened an antifriction-roller 144. The rearward movement of the upper end of this pawl is limited by a stop-pin 145, which is adapted to abut against the lever 140. The pawl 141 is loosely pivoted upon the lever 140 in such manner as to allow a slight lateral movement against the pressure of a spring 146, which extends upward from the lever 140. Extending outwardly from the left-hand end of the shifting cam-plate 63 (see Fig. 7) is an arm 147, which is adapted to be engaged by the pawl 141. Pivoted to the main frame at 150 is a pawl 151, formed with a nose which engages a pin 152, fast upon the shifting cam-plate 63 and extending rearwardly through a slot 153, formed in the main frame. The pawl 151 is normally drawn downward by means of a spring 154. Also pivoted at 150 is a trip-lever 155, which has at its right-hand end a pin 156, which engages the pawl 151, and this pin is drawn upward by means of a spring 157; but the spring 154 being stronger than the spring 157 the normal positions of the pawl and lever is as shown in Fig. 6. Upon the operation of any key the cam-plate 63 is shifted laterally to the left, as before explained, whereupon the pin 152 immediately passes by the nose of the pawl 151 and the pawl resumes its normal position ready to engage the pin on its return shifting movement, the cam-plate 63 being held in its shifted position, not by means of this pawl, but by the engagement of the key-lever with the slot in the cam-plate, as heretofore stated. At the same time, the raising of the universal bar 70 carries with it the lever 140, and the pawl 141 (see Fig. 5) is thereby elevated, and its beveled head 143 slides by the laterally-projecting arm 147 of the cam-plate 63, and at the limit of the upward movement of this lever 140 the

pawl 141 locks over this arm 147, with the antifriction-roller 144 resting upon the arm, whereby the lever 140, and therefore the universal bar 70, is held in its raised position. This position is shown in Fig. 7. The rearward end of the lever 140 engages the left-hand end of the trip-lever 155 (see Fig. 6) during this upward movement, but simply snaps by this lever without affecting the pawl 151. All this operation of the parts takes place while any key is being depressed, and it is upon the return of the key to its normal position that the printing is to take place, as will now be explained.

Since the universal bar 70 is held latched in its upward position by means of the engagement of the pawl 141 with the arm 147, it is evident that the printing cannot take place until the cam-plate 63 is shifted back again to the right, so as to allow the pawl 141 to be freed from engagement with said arm, it having been previously stated that the operation of the printing-hammer takes place upon the beginning of the downward movement of the universal bar 70. This shifting of the cam-plate 63 to the right takes place when the key has returned almost to its normal position—that is, when the rear end of the key-lever has again come opposite the beveled surface 66 of the shifting cam-plate. As soon as the key has reached this position the cam-plate of course begins to shift laterally to the right; but it has only a partial initial movement, for it is caught and held in partially-shifted position by the engagement of the pin 152 with the pawl 151. However, this partial movement is sufficient to bring the end of the arm 147 slightly beyond the center of the roller 144 of the pawl 141, so that the lateral movement of said pawl will allow it to free itself from the arm 147 and crowd by the end thereof, whereby the lever 140 and the universal bar 70 are allowed to drop, and on the beginning of this dropping movement the printing-platen is operated to take the impression from the type-wheels. Although the key may have fully returned to its home position and be free from the inclined ends 66 of the cam-plate 63, yet the cam-plate does not return immediately to its normal position; but, as explained above, it is caught by engagement of its pin 152 with the nose of the pawl 151, and thereby held in its partially-shifted position until the rear end of the lever 140 strikes the left end of the trip-lever 155, and thereby raises the pawl 151 by means of the pin 156, so as to free the pawl from the pin 152 and allow the cam-plate to return completely to its normal position. By this means the printing-wheels are held in their set positions until the printing has taken place, and the cam-plate cannot be released to its normal position, so as to unlatch the oscillating frame and their connected type-wheels, until the pawl 151 has been

operated by the downward movement of the lever 140, which operation takes place after the universal bar 70 has descended far enough to operate the printing-hammer. Since this entire operation of the release of the parts takes place almost at the limit of the upward movement of the key—that is, when the end of the key-lever again reaches the beveled surface of the cam-plate—it is obvious that this sequence of operation of the parts is practically simultaneous and that it is impossible to operate the machine so rapidly as to prevent the proper sequence of operation.

Flash mechanism.—In order to operate the flash which conceals the indicators until the complete operation of the machine, we provide the following mechanism: The flash 160 (see Fig. 5) is mounted upon suitable rods 161, which slide in guideways in the main frame, and one of these rods extends downward in alinement with the rearward end of the lever 140. Pivoted at 162 to the main frame is a lever 163, formed at its lower end with a hook 164, Fig. 6, having a beveled surface 165, which is adapted to be engaged by the lever 140 and formed at its upper end with a lug 166. Upon the upward movement of the lever 140 the rear end thereof engages the rod 161 and elevates the rod and its flash until the shoulder 167, formed on the lower end of the rod 161 is opposite the lug 166, and in this position the weight of the lower end of the lever 163 is such as to throw the lug 166 into engagement with the shoulder 167 and hold the flash in its upward position, and upon the return of the lever 140 to its normal lower position the rear end of the lever engages the beveled surface 165 and forces that end of the lever 164 inward, and thereby carries the lug 166 out of engagement with the shoulder 167 and allows the flash to drop and display the indicators.

Release for indicators.—The releasing of the indicators which have been exposed on the previous transaction is accomplished by means of an arm 170, (see Fig. 5,) which is fast at its upper end to the shaft 35, which carries projecting pins 180, that contact with laterally-extending pins 181 on the swinging frames 34. (See Fig. 2.) The lower end of this arm 170 is beveled, as at 171, and is engaged by a lug 172 upon the lever 140. From this construction it is apparent that upon the upward movement of the lever 140 the lug 172 engages the beveled surface 171 and rocks the arm 170 rearward, thereby carrying all of the swinging frames 34 rearward and out of engagement with the noses 32 upon the indicator-stems, thus allowing the previously-exposed indicators to drop, and upon the downward movement of the lever 140 the lug 172 slides over the rearward part of the beveled surface 171 and forces the arm 170 forward without affecting the frames 34.

While we have adopted certain details of

construction as best adapted to secure the result desired in our improvement, yet it is of course to be understood that we do not wish to be limited thereto in the broad interpretation of our invention as set forth in the appended claims.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is as follows:

1. In a cash-register, the combination with a series of keys, register and printing mechanisms therefor, of a common member arranged to be moved by any of the keys and to actuate the printing mechanism, a second member also arranged to be moved by any of the keys, and means controlled by the latter member for disconnecting the former member from the keys.

2. In a cash-register, the combination with a series of keys, register and printing mechanisms therefor, a common member arranged to be moved by any of the keys and to actuate the printing mechanism, a second common member also adapted to be moved by any of the keys, and arranged to hold the printing devices in their set positions, and means for controlling the movement of the first common member by the position of the second common member.

3. In a cash-register, the combination with a plurality of banks of keys, an accounting mechanism and operating devices therefor connected with each bank, of means for holding said operating devices in operated positions until all the operated keys have returned to normal position.

4. In a cash-register, the combination with a series of keys, type-carriers, and mechanism for setting said type-carriers to correspond with the operated keys, of means for holding said mechanism in set position until all the operated keys have returned to normal position.

5. In a cash-register, the combination with a plurality of banks of keys, a register and register-operating devices connected with each bank, of printing-wheels connected with said operating devices, a platen, and means for holding said printing-wheels in their operated positions until all the keys have returned to normal position.

6. In a cash-register, the combination with a plurality of banks of keys, a register and register-operating devices, type-carriers connected with said operating devices, means for holding the said operating devices in their operated positions until all of the operated keys have returned to normal position, and means for preventing the subsequent operation of a second key in any bank after one key in that bank has been depressed and returned to normal position, so long as a key in another bank remains displaced from normal position.

7. In a cash-register, the combination with a plurality of banks of keys, register-actuating

devices for each bank, a register, type-carriers permanently connected with said actuating devices, and a platen, of means controlled by the keys to first hold the said actuating devices in their operated positions, actuate the platen, and finally release the actuating devices.

8. In a cash-register, the combination with a plurality of banks of keys, a register and oscillatory register-actuating devices for each bank arranged to be engaged by said keys on opposite sides of its center of oscillation and to be moved graduated distances thereby, of means for supporting said oscillating frames in their operated position until all the keys have returned to normal position.

9. In a cash-register, the combination with a plurality of banks of keys, a register and register-operating devices connected with each bank, of means for holding said register-operating devices in operated positions until all the operated keys have returned to normal position.

10. In a cash-register, the combination with a plurality of banks of keys, a register and register-operating devices one for each bank, of means controlled by the keys of any bank to support said operating devices of all of said banks in their operated positions, with provisions permitting the operated keys of the other banks to return to normal position while their operating devices remain supported in operated positions.

11. In a cash-register, the combination with a plurality of banks of keys, register-actuating devices, a register and type-carriers for each bank, of a universal member common to and moved by all of said keys, a platen arranged to be retracted thereby, means controlled by the keys for holding said register-actuating devices and said universal member in the positions to which they are moved by the keys, with provisions for releasing said universal member and platen and causing the latter to act against the type-carriers, before said register-actuating devices are released.

12. In a cash-register, the combination with a series of keys arranged in a plurality of banks, registering mechanism for the various banks including register-actuating devices consisting of graduated bars extending transversely across the keys, type-wheels geared to said register-actuating devices, a universal bar moved by all of the keys, a platen, and means connected with said universal bar for controlling the platen.

13. In a cash-register, the combination with a series of keys, a register and register-actuating devices, type-carriers connected with said register-actuating devices, a platen, a universal bar common to all of the keys for actuating the platen, and a member common to and moved by all of the keys together with provisions for engaging said universal bar by

said common member whereby to control the operation of the platen by said common member.

14. In a cash-register, the combination with
5 a series of keys, a register and register-actuating devices, type-carriers controlled by said register-actuating devices, a platen and a universal bar common to all of the keys for actuating said platen, a member common to and
10 moved by all of the keys for holding the register-actuating devices in their set positions, means for engaging said common member with said universal bar, means for partially releasing said common member whereby the
15 universal bar is released and the platen is actuated, and means actuated by said universal bar for completely releasing said common member.

15. In a cash-register, the combination with
20 a series of keys arranged in a plurality of banks, a register and register-actuating devices for each bank, of a slidable cam-plate formed with a series of slots which are engaged by said keys so as to move said cam-plate, segment-racks connected with said register-operating devices, and pawls connected with said
25 cam-plate for engaging said segment-racks substantially as and for the purpose described.

16. In a cash-register, the combination with
30 a series of keys, and a register and register-actuating devices, of type-carriers connected with said register-actuating devices, a platen for said type-carriers, a universal bar arranged to be moved by any of said keys, an
35 arm connected with said universal bar carrying a pawl for retracting said platen, and a projection extending into the path of said pawl for tripping the same and allowing the platen to act against the type-carriers.

40 17. In a cash-register, the combination with a series of keys, and a register and register-actuating devices, of type-carriers connected with said register-actuating devices, a platen for said type-carriers, a universal bar arranged to be moved by any of said keys, an
45 arm connected with said universal bar carrying a pawl for retracting said platen, a projection extending into the path of said pawl for tripping the same and allowing the platen
50 to act against the type-carriers, alining-pawls for said type-carriers, and an arm connecting the said alining-pawls arranged to be engaged by the aforesaid platen-operating arm.

18. In a cash-register, the combination with
55 a series of keys arranged in a plurality of banks, and an accounting mechanism operated thereby, of means controlled by the keys of one bank for preventing the operation of more than one key in the other banks until the accounting mechanism has been operated.
60

19. In a cash-register, the combination with
a series of keys arranged in a plurality of banks, and printing mechanism operated thereby, of automatically-releasable means
65 for preventing the subsequent operation of

any key in a bank after one key in that bank has been depressed and returned to normal position so long as a key in any one of the other banks remains displaced from normal position.

20. In a cash-register, the combination with
70 a series of keys arranged in a plurality of banks, and a registering and printing mechanism therefor, of means controlled by the displacement of a key of any one bank for
75 permitting the depression of any key of any other bank while said displaced key remains in displaced position but with provisions preventing a second operation of a key in any of such operated banks until said printing
80 mechanism has been operated.

21. In a cash-register, the combination with
a series of keys arranged in a plurality of banks, and a registering mechanism therefor, of automatically-releasable means for preventing
85 the subsequent operation of any key in a bank after one key in that bank has been depressed and returned to normal position so long as a key in any of the other banks remains displaced from normal position.
90

22. In a cash-register, the combination with
a series of keys and a registering mechanism therefor, of means for preventing the subsequent operation of any key in a bank after
95 one key in that bank has been depressed and returned to normal position, until the normal cycle of operation of the machine has been completed.

23. In a cash-register, the combination with
a series of keys arranged in a plurality of
100 banks and a registering mechanism therefor, of means controlled by the displacement from normal position of any key of one bank for preventing the subsequent operation of any key in another bank after one key in such
105 other bank has been depressed and returned to normal position.

24. In a cash-register, the combination with
a series of keys arranged in a plurality of
110 banks and a registering mechanism therefor, of means controlled by the keys of one bank for preventing the subsequent operation of any key in another bank after one key in such
115 other bank has been depressed and returned to normal position, until the key of the first bank has returned to normal position.

25. In a cash-register, the combination with
a series of keys arranged in a plurality of
120 banks and registering mechanism therefor, of means controlled by the keys of one bank permitting complete operation of any key in each of the other banks but preventing subsequent operation of any key in the other
125 banks after the complete operation of one such key in the bank, until the first key has returned to normal position.

26. In a cash-register, the combination with
a series of keys, of a register, a reciprocatory register-actuating mechanism, with provisions
130 for holding the latter in operated position

while permitting the operated key to return to or toward normal position, and means controlled by said register-actuating mechanism for preventing the subsequent operation of any key of the series after one key of said series has been operated and returned to normal position until said register-actuating mechanism has been released to return toward normal position.

27. In a cash-register, the combination with a series of keys, a register and register-actuating mechanism, of a key-arrester, and means connected with the register-actuating mechanism to hold the said arrester in arresting position.

28. In a cash-register, the combination with a series of keys, a register and register-actuating mechanism therefor, of a key-arrester and means for holding said arrester in arresting position when the register-actuating mechanism is displaced from normal position and after an operated key has been returned to normal position.

29. In a cash-register, the combination with a series of keys, a register, an oscillating frame arranged to be engaged by said keys on opposite sides of its center of oscillation and to be moved graduated distances, and means controlled by said oscillating frame for preventing the subsequent operation of any key in the series after one key in said series has been operated.

30. In a cash-register, the combination with a series of keys, a register and register-actuating mechanism, of a key-arrester, and means for latching the arrester in arresting position, but permitting the operated key to return to normal position.

31. In a cash-register, the combination with a series of keys, a register and register-actuating mechanism, of a key-arrester bar, and a dog arranged to engage said bar, said dog being positioned to be held in inoperative position by contact with said register-actuating mechanism when said mechanism is in its normal position.

32. In a cash-register, the combination with a series of keys and a universal bar moved

by any of said keys, of a slidable cam-plate formed with slots and arranged to be moved a uniform distance by any of said keys, an arm connected with said universal bar, a pawl carried by said arm and positioned to engage said cam-plate, type-carriers connected with said keys, and a platen connected with said universal bar.

33. In a cash-register, the combination with a series of keys and a universal bar moved by any of said keys, of a slidable cam-plate formed with slots and arranged to be moved a uniform distance by any of said keys, an arm connected with said universal bar, a pawl carried by said arm and positioned to engage said cam-plate, type-carriers connected with said keys, a platen connected with said universal bar, a pawl for engaging said cam-plate and holding the same in partially-shifted position, and a trip-latch operated by said arm and arranged to thereby trip the latter pawl and allow the cam-plate to return to normal position.

34. In a cash-register, the combination with a series of keys, of a common member moved horizontally by any of said keys, a universal bar moved vertically by any of said keys, means for latching said universal bar to said common member whereby to retain the same in raised position, type-carriers connected with said keys, and a platen operated by said universal bar.

35. In a cash-register, the combination with a registering mechanism and a series of keys, of two common members each moved by any one of said keys during the initial movement thereof, and means connected with one of said common members for controlling the movement of the other common member during the subsequent movement of the operated key.

In testimony whereof we affix our signatures in the presence of two witnesses.

WILLIAM F. BOCKHOFF.
EDWARD J. VON PEIN.

Witnesses:

LEWIS D. BAKER,
HERBERT C. WOOD.