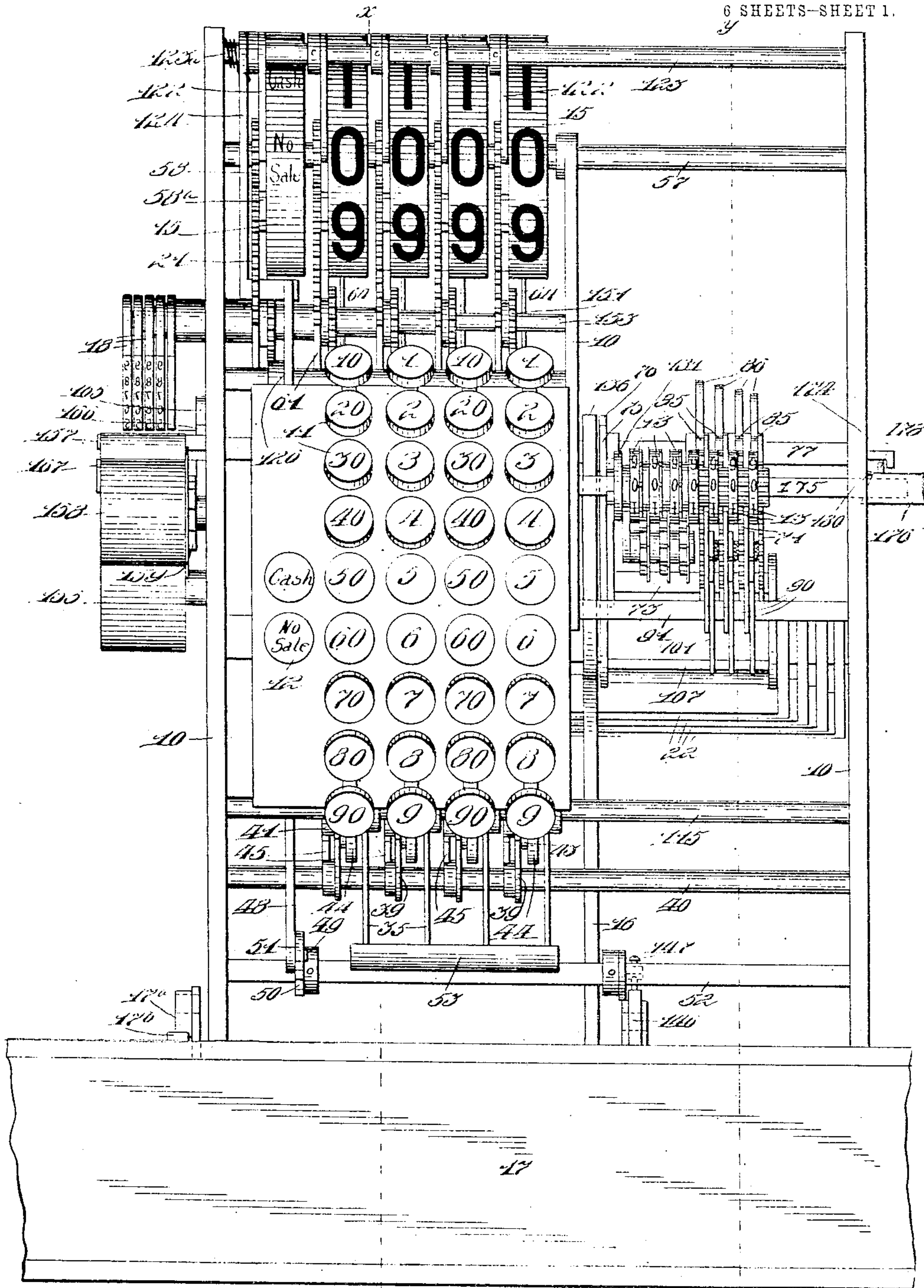


W. I. SPANGLER.  
CASH REGISTER.  
APPLICATION FILED JAN. 23, 1902.

973,577.

Patented Oct. 25, 1910.

6 SHEETS—SHEET 1.



Witnesses

W. M. McCarthy  
Ira Berkstresser

FIG. 1.

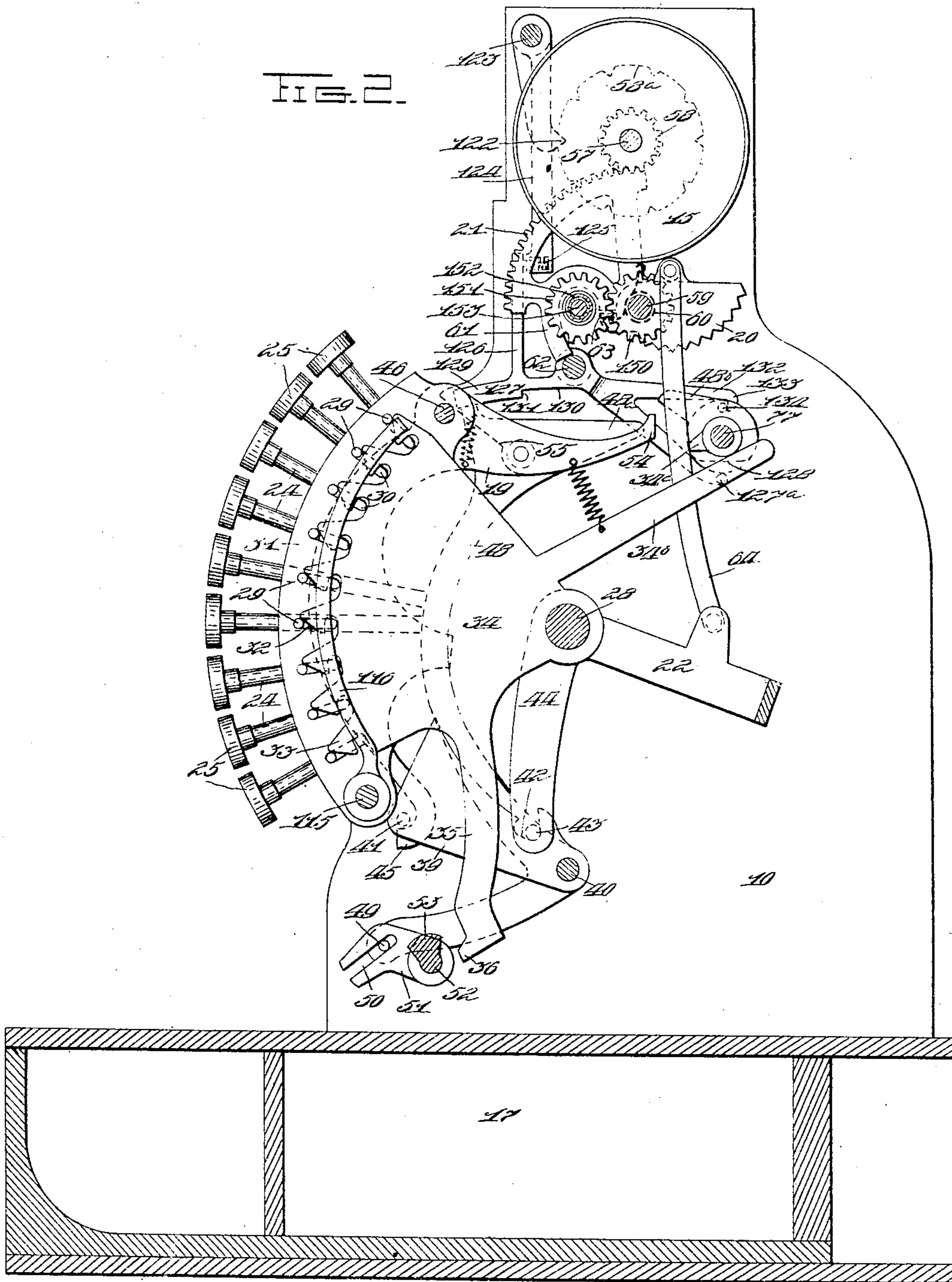
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973,577.

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6 SHEETS—SHEET 2.



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973,577.

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6 SHEETS—SHEET 3.

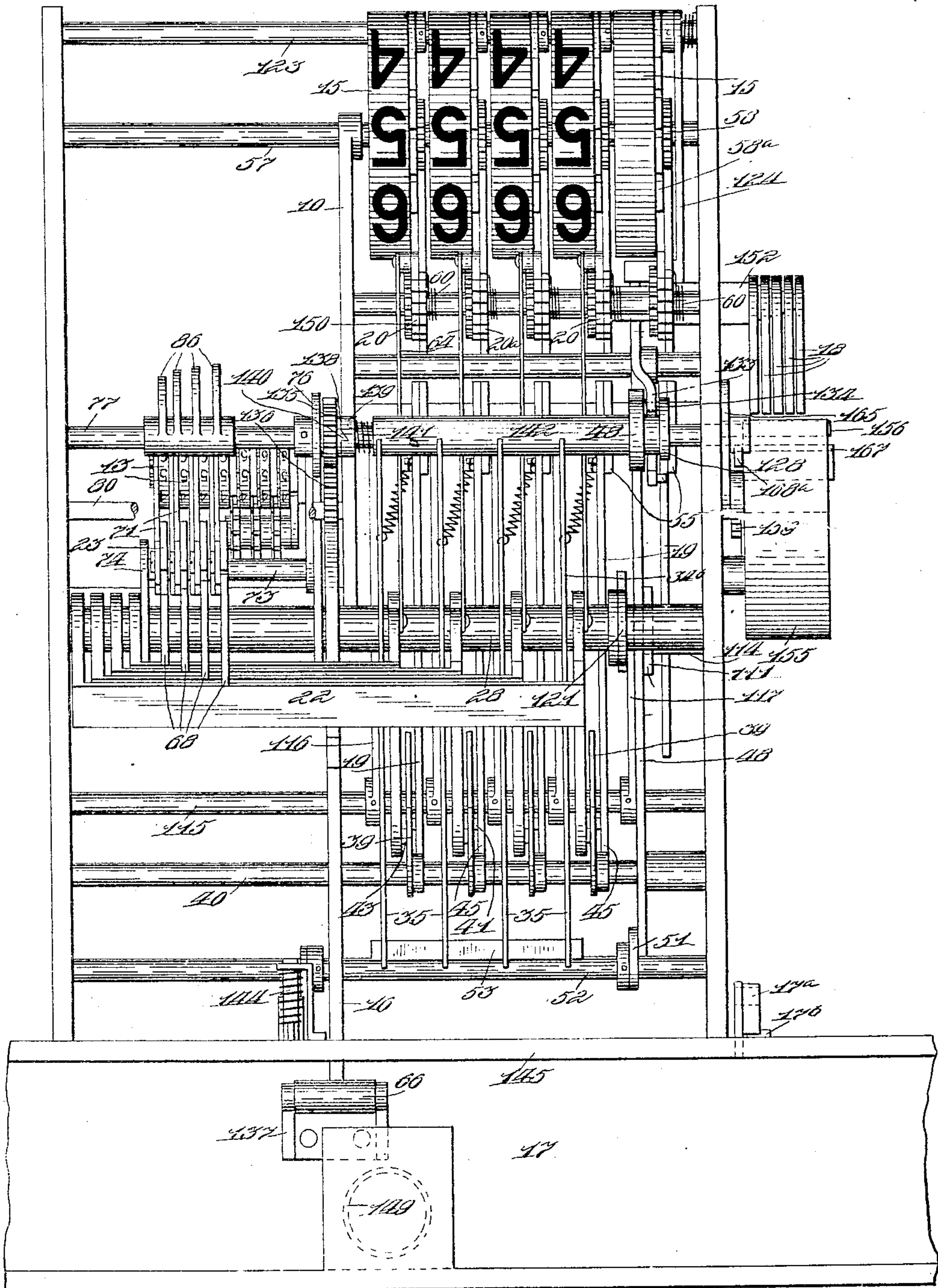
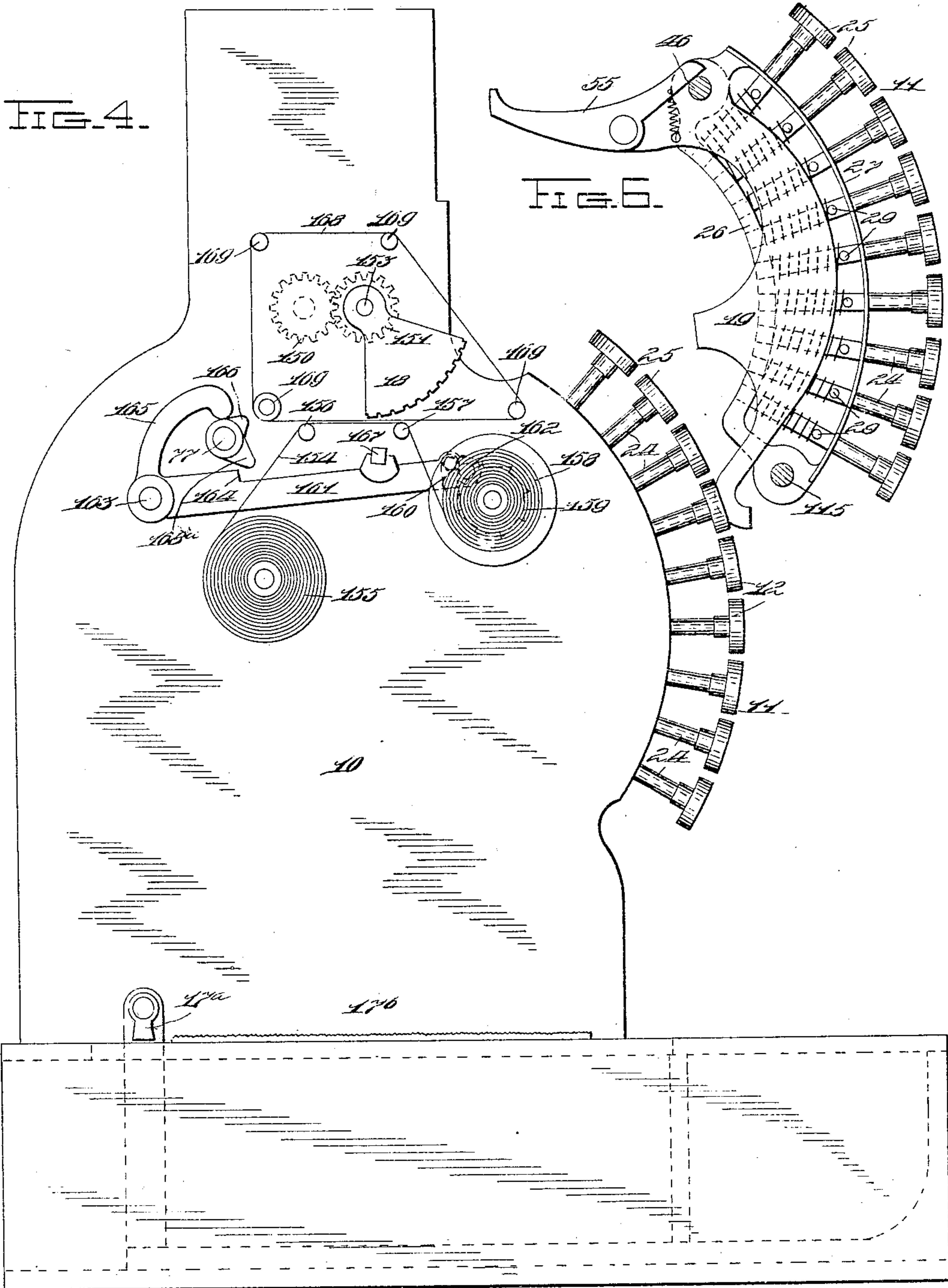


FIG. 3.

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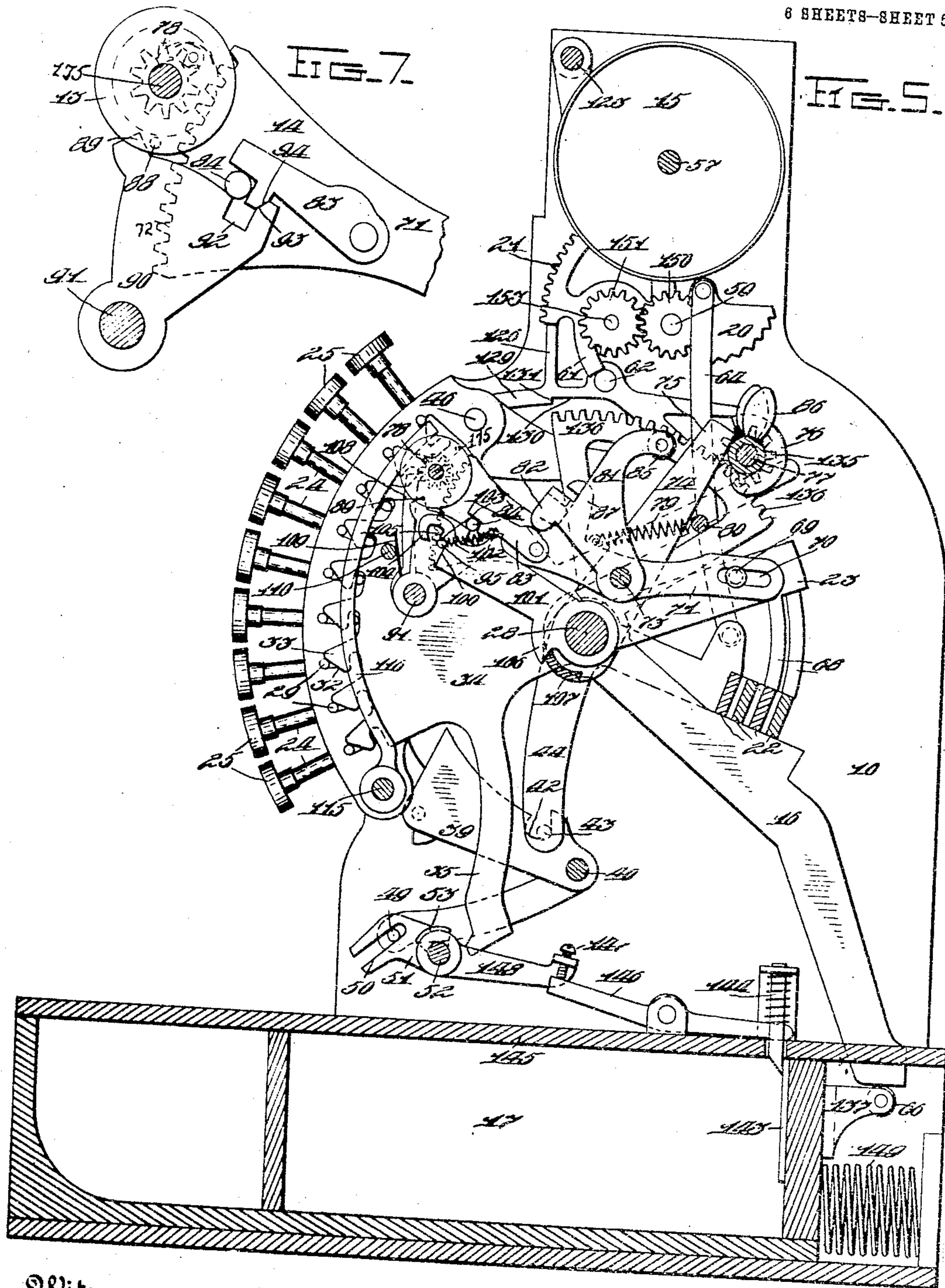


973,577.

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APPLICATION FILED JAN. 28, 1902.

Patented Oct. 25, 1910.

6 SHEETS-SHEET 5.



Witnesses  
W. M. Healey  
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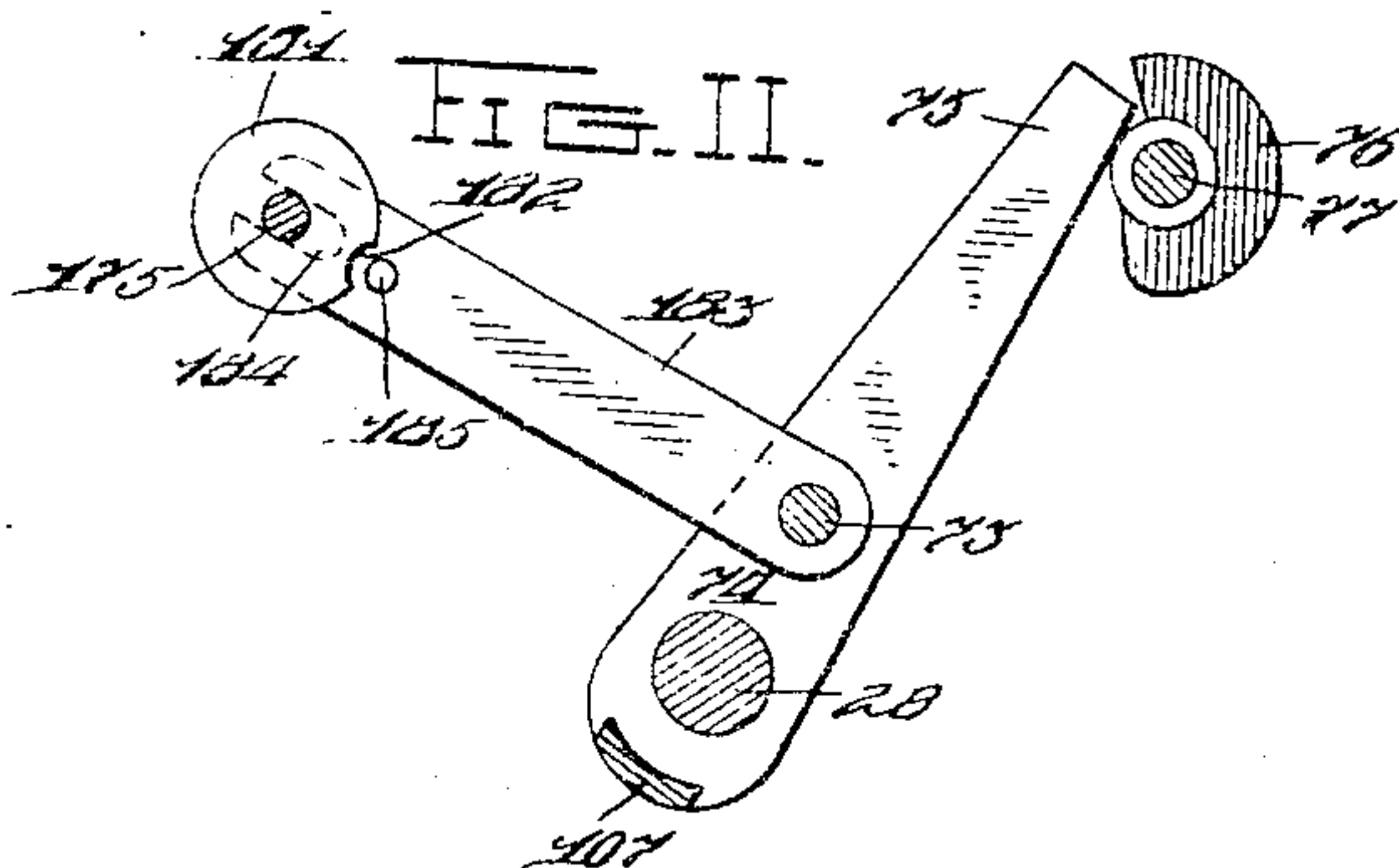
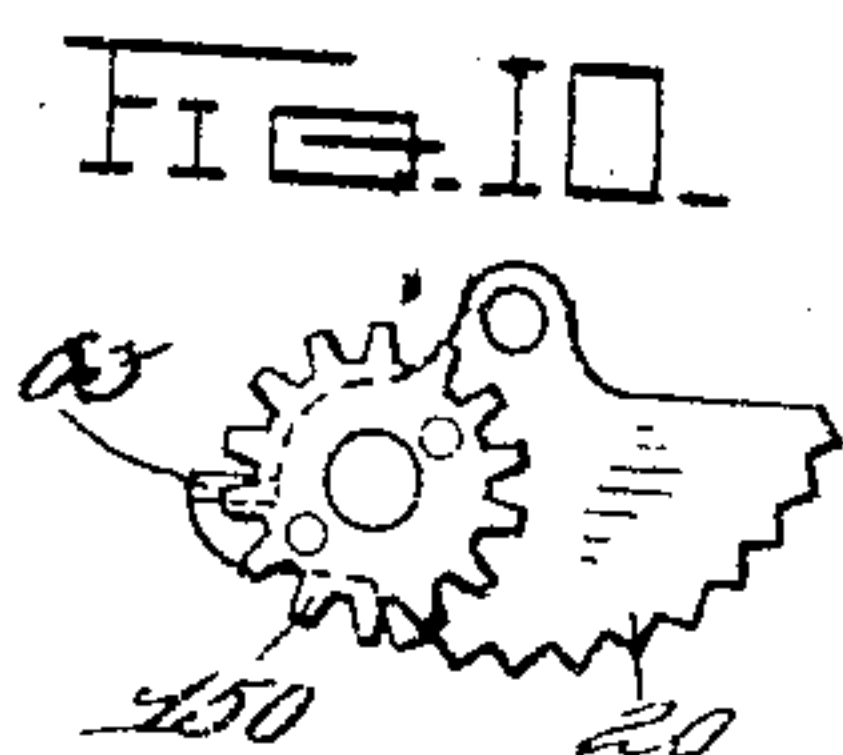
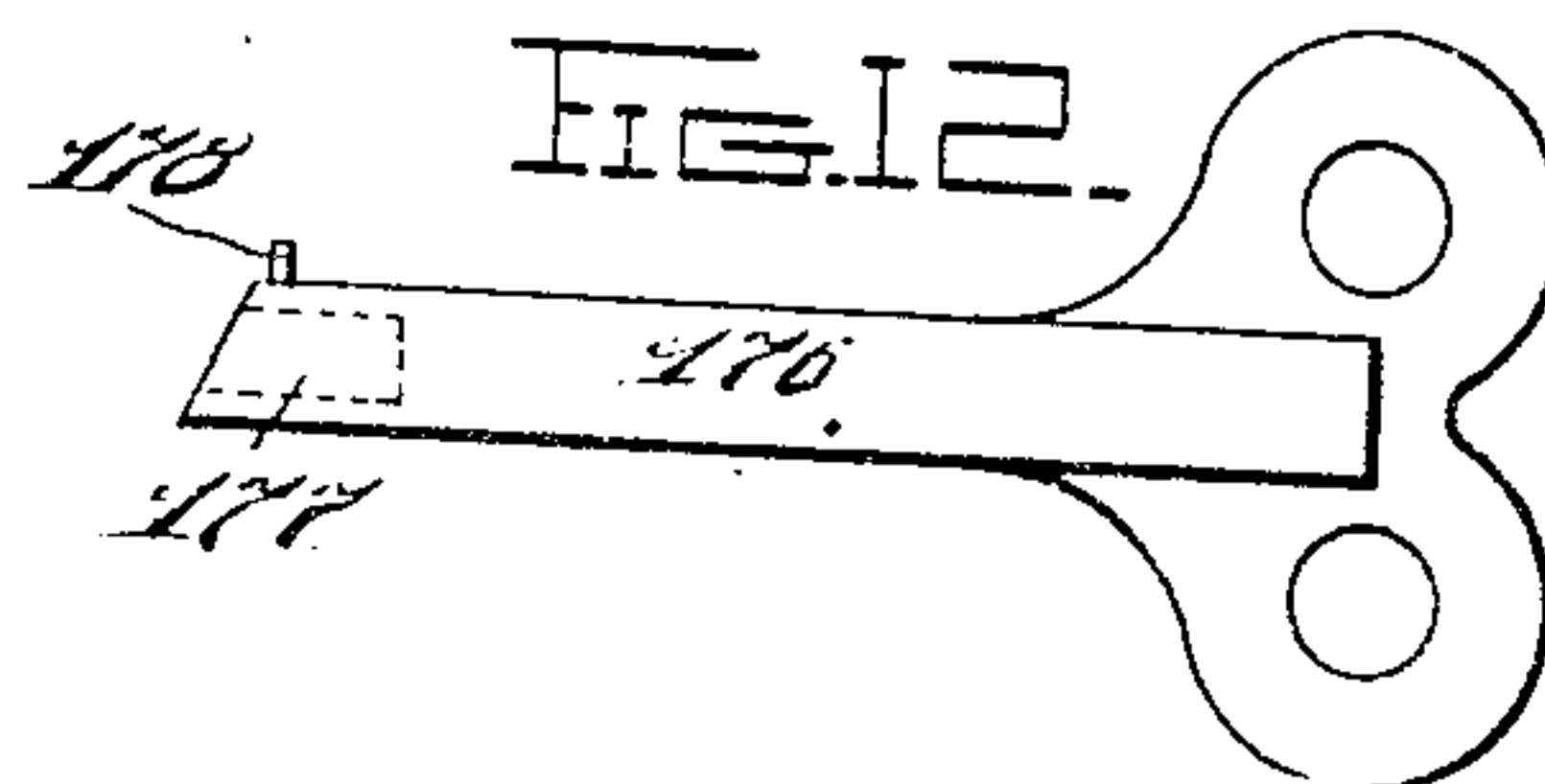
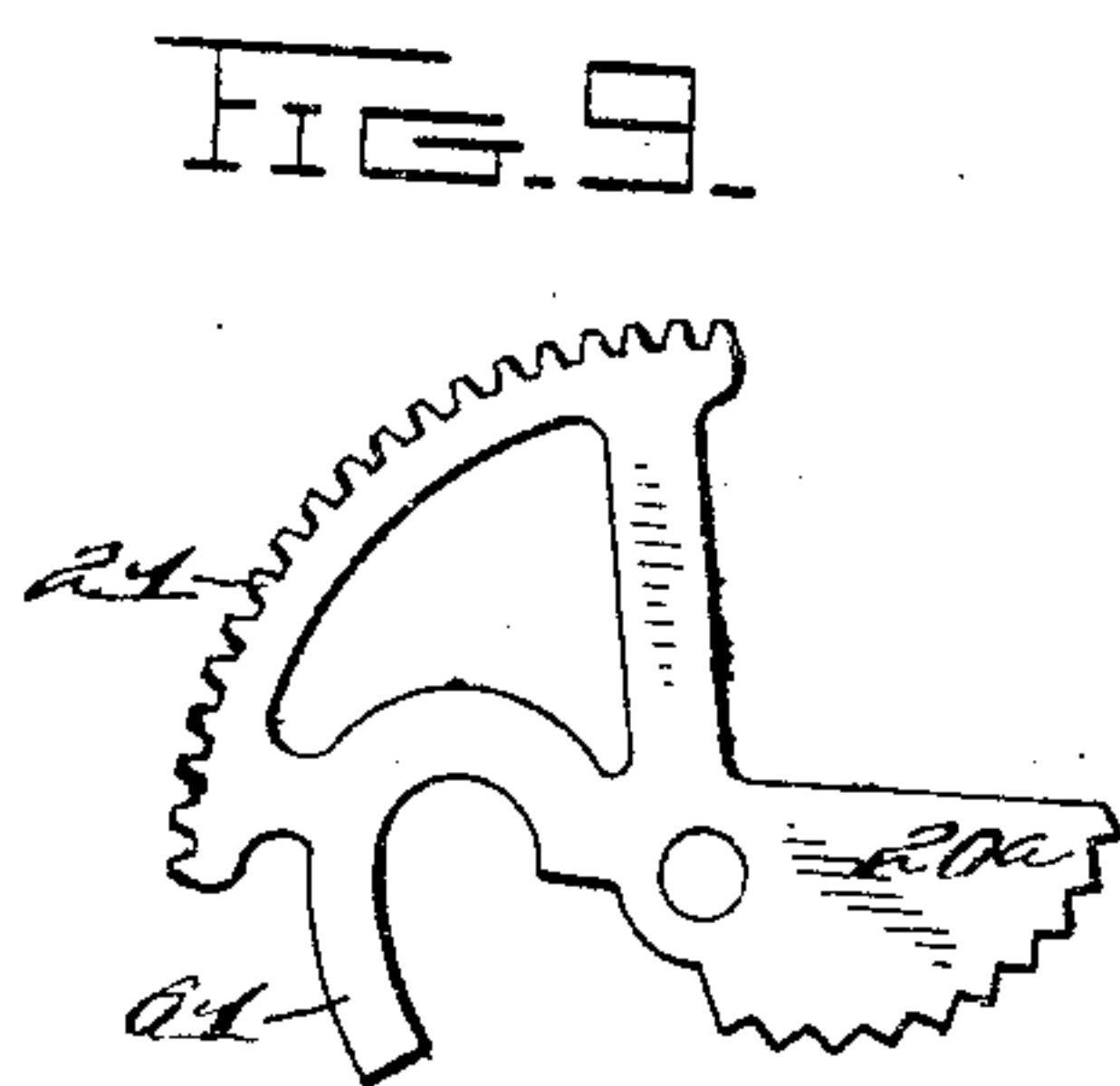
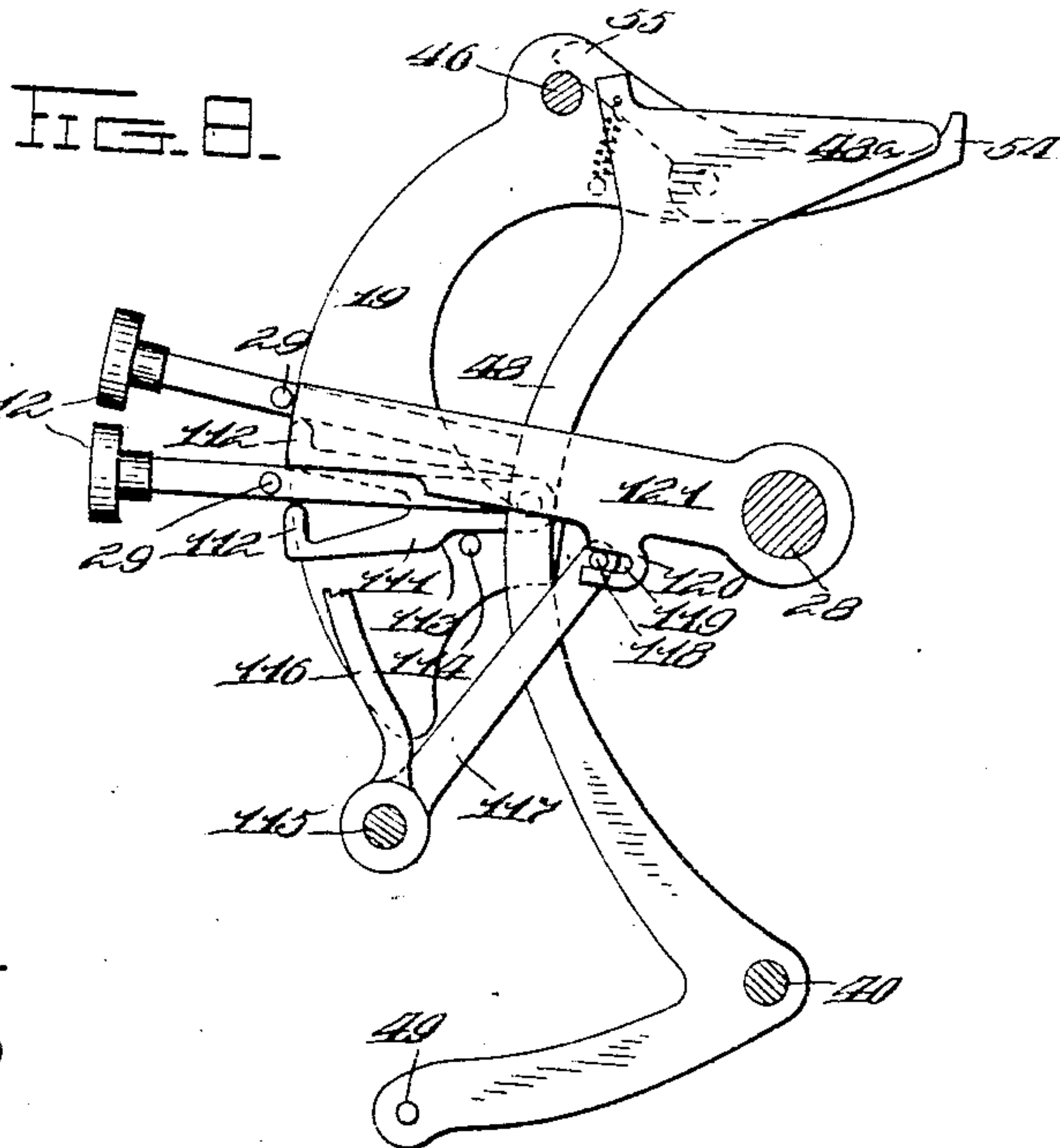
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973,577.

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APPLICATION FILED JAN. 28, 1902.

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6 SHEETS—SHEET 6.



Witnesses  
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# UNITED STATES PATENT OFFICE.

WILLIAM I. SPANGLER, 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.

973,577.

Specification of Letters Patent.

Patented Oct. 25, 1910.

Application filed January 28, 1902. Serial No. 91,602.

To all whom it may concern:

Be it known that I, WILLIAM I. SPANGLER, 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 in cash registers and has more particular relation to improvements in registers of the "two motion" type in which a key is first set to predetermine the degree of movement, and a movable member is subsequently operated to effect the registration, indication and recording.

The invention consists of certain novel constructions, combinations and arrangements of parts, all of which will be hereinafter more particularly set forth and claimed.

In the accompanying drawings forming part of this specification, Figure 1 represents a front elevation of a machine embodying the invention with the cabinet removed and partly broken away. Fig. 2 represents a vertical transverse section through the same on the line  $x-x$  of Fig. 1. Fig. 3 represents a rear elevation of the improved machine with the cabinet removed. Fig. 4 represents an end elevation of a machine embodying the invention illustrating the printing attachment; the hood of the latter being removed. Fig. 5 represents a view similar to Fig. 2, but taken on the line  $y-y$  of Fig. 1. Fig. 6 represents a detail side elevation of one of the amount banks, its graduated lever and pivoted stop pawl. Fig. 7 represents a detail side elevation of one of the registering segments, a counter wheel and the transfer devices. Fig. 8 represents a detail side elevation of the special key bank and cooperating parts. Fig. 9 represents a detail side elevation of one of the indicator rack segments and its stop segment. Fig. 10 represents a detail side elevation of one of the auxiliary stop segments and its pinion. Fig. 11 represents a detail side elevation of the devices for locking the machine while the counter is being turned to zero. Fig. 12 represents a detail side elevation of the key for returning the counter to zero.

In the aforesaid drawings, 10 represents

the frame of the machine, 11 the amount keys, 12 the special keys, 13 the counter wheels 71 the counter operating segments, 15 the indicators, 16 the main operating lever, 17 the cash drawer, and 18 the printing segments.

Described in general terms, the depression of an amount key operates a graduated lever 19, which is moved into the path of a step segment 20, which, upon being released, drops until arrested by the stop lever 19. A segmental gear 21, cooperating with the segment 20, positions the indicators. The segment 20 is connected to one of a series of yoke frames 22, which frames govern the movements of the pivoted levers 23. Each lever 23 cooperates with a pivoted rack lever 71, which lever is thrown into and out of gear with the pinions of the counter-wheels 13. When the yoke 22 descends according to the degree of movement of its step segment 20, its respective lever 71 is set accordingly, so that when the counter is thrown in and the lever 71 subsequently returned to its normal position by the closing of the cash drawer, the registration is effected. The movements of the indicator-operating step frames 20 also position the printing segments.

*The key banks.*—It will be seen by reference to Fig. 1 that the machine illustrated is a five bank machine, including four amount banks and one special key bank, the latter including in the present instance a "no sale" key and a "cash" key. This special bank, however, may include a series of nine keys if so desired, which keys may represent either a number of clerks or different departments. The amount banks cover units and tens of cents and units and tens of dollars. All of the keys in the amount banks cooperate with the registering devices, the indicating devices and the recording devices hereinafter described, but the keys of the special key bank cooperate only with the special indicator and the special printing segment. As the constructions of the several key banks, excepting the special bank, are substantially identical, I will describe only one as this will suffice for all.

Each key comprises a shank 24 and a suitably numbered head 25. The shanks 24 are mounted in apertured guideplates 26 and



27, forming part of the main frame, in such manner as to practically radiate from the main transverse shaft 28. Each of the key shanks is provided with a transverse pin 29 which operates through a suitable elongated slot 30 formed in a wall 31 which is fast to the main frame beside its particular bank of keys. Each of the pins 29 is adapted to contact with the cam edge 32 of one of a series of hook-projections 33 formed on the pivoted detent 34 which is mounted upon the shaft 28. By this construction when one of the keys is forced inward, the detent 34 is first elevated and then drops when the key is fully depressed, so that one of its hook-projections 33 will engage the pin and hold the key in its depressed position until the detent is later elevated by the operation of the machine to release said key. The detent 34 is provided with a pendent arm 35 which is formed at its lower end with a locking nose 36. (See Figs. 2 and 5.) A latch-plate 39 fulcrumed on a transverse shaft 40 is provided with a locking stud 41 and a locking recess 42, the latter being arranged to receive a stud 43 mounted upon a pendent arm 44 which is formed integral with its respective yoke 22 hung loosely upon the shaft 28, the yokes 22 being nested and arranged to operate one within the other in a manner well known in the art. When the parts are in their normal positions, shown in Fig. 2 the pin 43 engages the rear wall of the recess 42 and thus holds the latching-plate 39 in its elevated position. In order to prevent the descent of the latch-plates 39 in the bank in which no keys have been operated, I provide an additional latching means in a hook 45 which is formed on the lower end of the segmental graduated lever 19 and normally lies, as shown in Fig. 2, in the path of the stud 41 so that when the plate 39 is partly relieved of the pressure of the stud 43, it will be arrested by the stud 41 striking the hook 45. The arm 44 will thus remain latched.

It will be seen from the above that when a key in a bank has been operated and the lever 19 forced rearward, that the hook 45 will be also forced rearward so far that the pin 41 is free to descend with its plate 39 and thus unlock its respective yoke 22. The lever 19 is swung loosely from a transverse shaft 46 and has its periphery so formed as to lie at different distances from the respective key pins so that the latter will engage the lever to move it a greater or less distance according to the key operated. The shortest degree of travel of the lever 19 is sufficient to move the hook 45 out of the path of the stud 41 and thus leave the latch-plate 39 free to descend and unlatch its respective arm 44.

In machines of the type shown in the present drawings, and in which the cash drawer is released by the operation of some one of

the special keys, it is imperative that means be provided for compelling the operation of the amount keys before a special key. In the present instance this means comprises a curved pivoted lever 48 mounted in proximity to the lower ends of the special key shank so as to be struck and operated by the same. This lever is of bell-crank formation, as shown in Fig. 2, and is pivotally hung upon the shaft 40 and is provided at its forward end with a pin 49. This pin projects into an elongated slot 50 formed in a crank-arm 51 which is fast to a transverse rock-shaft 52. This shaft carries a locking projection 53, which, when one of the special keys is operated and the shaft rocked, passes in front of all the noses 36 of the arms 35 and thus locks all of the detents 34 against operation.

From the above it will be seen that if a special key is operated before an amount key, the amount keys will become locked and cannot be operated until that particular operation of the machine is completed by the opening and closing of the cash drawer and the release and return of the special key to its normal position. Should one of the amount keys be partly operated and an attempt then be made to release the machine by operating one of the special keys, the nose 36 of the detent 34 will occupy such a position as to block the movement of the projection 53 and thus prevent the releasing of the machine by a special key. No special key can be operated unless all of the detents 34 are in their normal positions, and this of course is not true when any of the amount keys are partly depressed.

The lever 48 is provided with a rearwardly extending projection 48<sup>a</sup> which cooperates with a cam 48<sup>b</sup> mounted on the rotation shaft 77 hereinafter described, whereby the lever 48 is returned to its normal position at the completion of the movement of the machine. Each of the detents 34 is provided with a trip arm 34<sup>b</sup> which extends rearwardly into proximity to a series of releasing cams 34<sup>c</sup> mounted on the rotation shaft 77 and arranged to engage said arms and rock the detent to release the keys. The pins 29 of the special keys cooperate with a pivoted latch 111 which is pivotally mounted on the lever 48 and is provided with two hook-projections 112, and is formed with a cam edge 113, (see Fig. 8). When a special key is operated and the lever 48 forced inward, the cam edge 113 engages a stationary transverse shaft or rod 114 and thus forces the plate 111 upward to cause the hooks 112 to engage the respective key pins and lock the keys to the lever 48. By this means any fraudulent operation of the machine, such as a sudden stroke upon the special key to throw the lever 48 inward independently, is prevented.



A transverse shaft 115 is provided with a series of upwardly-extending curved arms 116 which are located in proximity to the pins 29 of the keys of the amount banks, so that when a key in any one of the amount banks is operated the shaft 115 will be rocked. This shaft further carries a rigid arm 117 which is provided at its upper end with a stud 118. This stud projects into an elongated notch 119 formed in a pendent arm 120 of a locking lever 121 which is hung upon the shaft 28 and projects forward into proximity to the pins 29 of the special keys. The width of the forward end of the lever 121 is such that it may block one or the other of the special key pins, but not both at the same time. When the parts are in their normal positions, shown in Figs. 2 and 3, the forward end of the lever 121 lies back of the pin 29 of the "cash" key, thus leaving the "no sale" key free for operation. When one of the amount keys is operated, however, the lever 121 is rocked through the aforesaid connection and passes out of the path of the "cash" key pin and into the path of the "no sale" key pin, thus releasing the "cash" key and locking the "no sale" key. By this means the machine cannot be released by the "no sale" key for a cash transaction.

*The indicating mechanism.*—Each of the graduated levers 19 is of bell-crank formation and is formed at its rear end with a stop nose 54. This rear end of the lever is provided with a pivoted spring-pressed pawl 55 which is of substantially the same shape as the end of the lever and is normally held by the shaft 46 in substantial alinement with the end of the lever proper. Each of the indicators 15, is journaled upon a transverse shaft 57 and is provided with an operating pinion 58 and a star wheel 58<sup>a</sup>. Each of the pinions meshes with one of the operating segments 21. These segments are mounted respectively upon a transverse shaft 59. Each of the segments 21 is formed with a pendent stop arm 61 which contacts with a rigid transverse shaft 62 for limiting the backward movement of the indicator. Each of said segments has formed therewith a step segment 20<sup>a</sup> (see Fig. 9), and mounted loosely upon the shaft 59 beside each of these segments, is a similar segment 20 which is formed with a nose 63 so located as to contact with the under side of the segment 21 (see Fig. 10).

From the above construction it will be seen that when the segment 20 is drawn downward, as hereinafter described, the nose 63 will cause the rack segment 21 to rock rearward and thus move its respective indicator 15. The downward movement of the segment 20 occurs after the stop lever 19 has been set, so that after the segment 20 and its companion segment 20<sup>a</sup> have moved

a predetermined distance, the proper step projections thereon will engage simultaneously with the nose 54 and the pawl 55. If the segment 20 alone were arrested by the nose 54, the momentum of the segment 21 would cause the same to overthrow, but as the pawl 55 engages the projection of the segment 20<sup>a</sup> at the same time that the nose 54 engages the segment 20, the rack 21 is positively arrested. When the segment 20 is again elevated the nose 54 disengages from the teeth of the same while the pawl 55 remains in engagement with the segment 20<sup>a</sup>, thus locking the indicator in its set position until it is subsequently locked by its regular retaining pawl. Should one of the indicators stand out of normal position when the machine is subsequently operated, the lever 19 would be set in the usual manner, but as the segment 20<sup>a</sup> would stand in the path of the pawl 55, the latter would turn on its pivot against the tension of its spring upon striking said segment. Now if a special key were operated the indicator would be released in a manner hereinafter described and returned toward normal position, the pawl 55 meanwhile riding over the step projection of the segment 20<sup>a</sup> until it assumed its normal position in alinement with the nose 54. Each of the indicators is held in its normal position by a coiled spring 60 which is connected at one end to its segment 21 and at the other to the projection 63 of its respective segment 20. These springs are mounted on the shaft 59. The indicator retaining pawls 122 are mounted upon a transverse rock-shaft 123 located above the indicators so that they may be rocked into and out of engagement with the star-wheels 58<sup>a</sup>. The shaft 123 is provided at one end with a pendent arm 124, in the lower end of which is located a spring-pressed plunger 125. This plunger is engaged by an arm 126 of a pivoted bell-crank lever 127 mounted loosely upon the shaft 62, the lower end of said lever carries a pin 127<sup>a</sup> which coöperates with a cam 128 mounted on the rotation shaft 77, whereby the lever is operated to relock the indicators after they have been once released. An arm 129 of the lever 127 is formed with a reduced portion 130 and is arranged to normally rest upon the top of the lever 48, which latter acts as a latch to hold the lever 127 in its locking position. When one of the special keys is operated and the lever 48 forced inward, as far as the recess 130, the lever 127 is released, and rocking forward at its upper end relieves the spring-pressed plunger 125 of any pressure and thus permits the indicators to be returned by their springs 60. The office of the spring plunger 125 is to permit the indicators to be locked through the cam operation of the lever 127 and still allow sufficient free play of this latter lever



to do away with any fine working points between it and the cam 128. The shaft 123 at one end supports a coiled spring 123<sup>a</sup>, one end of which is secured to the main frame and the other to the lever 124, whereby said lever when relieved of the pressure of the arm 126 is rocked forward to disengage the pawls 122 from the star wheels of the indicators to permit the latter to freely return to normal position. When the arm 129 descends over the upper end of the lever 48, a shoulder 131 formed thereon passes in front of said lever and thus locks the same in its rear position until the cam 128 again rocks the lever 127 and elevates the arm to clear said lever 48. When the lever 48 has been relieved of the latching lever 127, it is thrown forward into its normal position by its own weight and by the assistance of the drawer plunger spring. Should it for any reason fail to fully return to its normal position, an arm 48<sup>a</sup> formed thereon is engaged by a cam 48<sup>b</sup> on the rotation shaft to effect the desired return.

*The registering mechanism.*—Each of the step segments 20 is connected to its respective pivoted yoke 22 by a pivoted link bar 64, whereby the segment and yoke will move simultaneously. All of the yokes 22 normally rest upon a pivoted lever 16 which is journaled upon the shaft 28 and rests with its lower end upon an anti-friction roller 66 mounted upon the rear wall of the cash drawer 17. When the parts are in the position shown in Fig. 5, it will be seen that the lever 16 is supporting all of the yokes 22 in their uppermost positions. When a special key is operated and the cash drawer released, as hereinafter described, said drawer is forced forward out of its casing by a suitable coiled spring 149 interposed between the drawer and the rear of the casing. As the drawer passes outward the roller 66 passes from under the lower end of the lever 16 and thus leaves the lever free to descend as the drawer moves outward. As said lever descends, the yokes 22 which have been previously released by the operation of the keys in the amount banks, as heretofore described, will descend therewith until arrested by their respective step segments 20. When the cash drawer is again closed the roller 66 will engage the inclined forward edge of the lever 16 and force the same rearward and upward, thus elevating all of the yokes 22 and returning them to their normal positions.

Pivotally supported upon the shaft 28 are a series of levers 23 formed with pendant arms 68 which rest upon the respective yokes, whereby said arms follow the movement of the yokes in descending, but move independently of the same in ascending. Each of said arms is provided with a screw stud 69 which projects into an elongated

slot 70 formed in the rear end of a pivoted lever 71, the forward end of said lever being formed with a segmental rack. There is one of the levers 71 for each of the amount banks and these levers are journaled upon a transverse shaft 73 which is mounted in a yoke-shaped frame 74 journaled upon the shaft 28 and having an operating extension 75. This extension is arranged to be engaged by a cam 76 mounted upon a rotation shaft 77 and thus rocked forward to cause the rack segments 72 to mesh with the counter pinions 78. When the cam 76 passes free of the arm 75 toward the end of the closing movement of the cash drawer, the frame 74 is drawn back to its normal position to disengage the rack segments from the counter pinions, by coiled springs 79, which connect the respective levers 71 to a transverse shaft 80. After one of the levers 71 has been positioned by the descent of its respective lever 23, it is returned to its normal position by one of a series of pivoted levers 81 journaled upon the shaft 73 and formed with an operating nose 82 which is arranged to engage the upper edge of a pawl 83 pivoted upon said lever 71. The forward end of the pawl 83 normally rests upon a stop pin 84 mounted on the lever 71 (see Fig. 7) so that when said pawl is forced downward by the projection 82, the lever 71 will be correspondingly moved and returned to its normal position, during which operation its respective counter wheel will be actuated. The lever 81 at its rear end is provided with an anti-friction roller 85 which is so located as to be engaged and forced forward by one of a series of cams 86 mounted in progressive order upon the rotation shaft 77. In order to prevent any excessive movement of the lever 81 independently of the lever 71, the latter is provided with a hook-projection 87 which extends over the projection 82 so as to contact with the same when it is moved backward independently.

It will be seen from the above description that when the yokes 22 descend and are arrested according to the values of the keys operated, the levers 23 move correspondingly and thereby set the respective rack-segments. When the rotation shaft 77 is now operated, the rack-segments are first all drawn into engagement with the counter-pinions by the rocking forward of the frame 74. The levers 81 are then successively operated and the rack-segments thereby successively returned to their normal positions, thus registering the amount on the counter-wheels 13. After all of the rack-segments have been returned to their normal positions, the cam 76 passes free of the arm 75 and allows the spring 79 to draw all of the rack-segments out of mesh with the counter-pinions. After the first, second or third



counter-wheel has made a complete revolution, a pin 88 mounted thereon contacts with a hooked nose 89 formed on a segmental plate 90 and thus rocks said plate to set the transfer devices, as hereinafter more fully described. As all the plates 90 are similar, I will describe the action of only one as this will suffice for all.

The plate 90 is pivotally mounted upon a transverse shaft 91 and is formed in its upper edge with a recess 92 and a cam projection 93. The pawl 83 is provided with a pendent cam nose 94 which normally projects into the recess 92 forward of the projection 93, as clearly shown in Fig. 7. The pin 84 on the lever 71 rests normally upon the upper edge of the plate 90 so as to form a positive stop for the segment lever 71 when the same is returned to its normal position. When one of the plates 90 is rocked forward, however, by its respective counter wheel pin 88, as before described, the cam projection 93 by its engagement with the cam nose 94 will force the pawl 83 upward and so change the relative positions of the rack-segment 71 and its operating lever 81 whereby when the latter is operated, the rack-segment will be moved forward a distance equal to one of its teeth to effect the transfer to the counter wheel of the next higher denomination. It will be understood that the counter wheel pin 88 is mounted on a counter wheel of a denomination lower than the counter wheel controlled by the rack-segment 71 which is governed by said pin. When the plate 90 is rocked forward, the recess 92 is brought under the stud 84 so that the rack-segment 71 is left free to make the additional transfer movement. The progressive arrangement of the cams 86 is such that the levers 81 are timed so as to be moved each when a preceding lever has made about half of its stroke. The tripping of plate 90 at times will occur when one of the segments 71 is elevated or is being returned to its normal position, and in this instance the relative change in positions between the respective lever 81 and the rack-segment 71 will not immediately occur, but will be accomplished when the segment has practically reached its normal position, by the cam nose 94 striking the upper end of the projection 93 and thus tending to force the nose 94 upward. As the pawl at this time, however, is in contact with the unyielding projection 82, it will move with this projection as a fulcrum and through its pivotal connection with the rack-segment 71 will cause it to be advanced the distance of one tooth until the stud 84 strikes the bottom of the recess 92. In order to hold the plate 90 in its set position after it has been once adjusted, I provide it with a stud 95 which normally rests against a shoulder 100 formed on the

outer end of a pivoted lever 101 which is loosely mounted upon the shaft 28. A coiled spring 102 connects this lever to the pin 95 to normally hold the parts in the position shown in Fig. 5. When the segment 90 is rocked forward, as before described, the pin 95 passes clear of a shoulder 103 formed on the lever 101 and thus permits the lever to be drawn downward by its spring 102 until a hook 104 formed thereon contacts with the pin 95. The rear wall 105 of the hook 104 engages the pin 95 and thereby holds the segment 90 in its set position. The lever 101 is formed near its fulcrum with a shoulder 106 which is so located as to be engaged by a cross-bar 107 of the frame 74 when the latter returns to its normal position and thus lift said lever 101 and permit the segment 90 to again become set in the position shown in Fig. 5. The shaft 91 further supports a series of retaining pawls 108 which engage the counter pinions 78 and are held to their work by flat springs 109 connected thereto and engaging a transverse bar 110. The distance between the pawls 108 and the bar 110 is such as to prevent any excessive forward throw of the pawls such as might cause said pawls to fail to properly engage the counter pinions and prevent overthrow of the counter wheels.

The transfers above described relate to the counter wheels which are operated by the several rack levers, but as counters almost necessarily include other counter wheels, there may be provided any suitable and well-known form of transfer wheels for these latter counter wheels.

The above described counter wheels 13 are mounted upon a rotary shaft 175 which is suitably mounted in the main frame, as shown in Fig. 1. These wheels are provided with suitable pawls which, when the shaft is rotated, engage a longitudinal groove formed therein thus picking up their wheels and returning them to their normal positions in a manner well known in the art. The rotation of the shaft is effected by a key 176, shown in Figs. 1 and 12. This key is beveled at the end and is provided with a squared recess 177 for the reception of the squared end of the shaft, and also with a stop pin 178. An angular arm 174 mounted upon the main frame projects beyond the pin 178 when the turning to zero operation is commenced, but as the key continues to rotate, its beveled edge bearing upon a pin 180 mounted on the main frame, gradually forces the key outward so that when the zero position is reached the pin 178 will contact with the arm 174 and thus positively arrest the counter wheels at the zero position. The shaft 175 carries a disk 181, shown in Figs. 1 and 11. This disk is formed with a notch 182. A link bar 183 pivoted on the



shaft 73 is slotted at its forward end at 184 so as to straddle the shaft 175. This link is provided with a pin 185 which normally occupies the position shown in Fig. 11.

5 When the parts are in the position shown in this figure, the counter is free to be turned to zero, but when the arms 74 are thrown forward to throw in the rack segments, the pin 185 enters the notch 182 and locks the counter shaft. After the rotation of the counter shaft has been commenced the notch 182 will be out of alinement with the pin 185 and it will thus be impossible to throw the segments into mesh with the counter 16 pinions as the arms 74 cannot be thrown forward.

*The printer.*—Each of the step segments 20 is provided with a pinion 150 which meshes with a corresponding pinion 151 mounted on the inner end of one of a series of nested sleeves 152, said sleeves being mounted upon a transverse shaft 153 which also carries one of the pinions 151. The outer end of the nested sleeves and shaft 25 above mentioned carry the respective printing segments 18 which are provided upon their peripheries with suitable type representing amounts from 1 to 9 and characters corresponding to those on the special indicator and the special keys. The detail strip 30 154 passes from a storage roller 155 mounted on one of the side-frames, upward and over two guiding pins 156 and 157 and down to the winding and feeding roller 158. This latter roller carries a ratchet 159 with which a pivoted spring-pressed pawl 160 35 engages for feeding the roller forward to wind the detail strip thereon with a step by step movement. The pawl 160 is mounted upon a platen lever 161 so as to be reciprocated once during each operation of the machine. In order to prevent any overthrow of the feeding roller, the lever 161 is provided with a rigid stud 162, which, when 45 the lever moves downward to operate the ratchet 159, jams against one of the teeth of said ratchet and thereby prevents any overthrow movement. The lever 161 is journaled on a stud 163 projecting from the side frame and is formed with a shoulder 164 50 and a curved arm 165. A cam 166 mounted on the rotation shaft 77 is arranged to engage the arm 165 and the shoulder 164 and thus force the flexible platen 167 carried by the platen lever 161, upward against the detail strip and then downward away from the same. An endless ribbon 168 is mounted upon supporting studs 169 so as to pass between the detail strip 154 and the printing segments. Any suitable means may be provided for feeding the strip forward upon 60 the operation of the machine so as to bring a fresh inked portion into printing position. The printing ribbon 168 is fed forward by a cam arm 168<sup>a</sup> mounted on the end of the

shaft 77 and adapted to punch the ribbon against one of the rollers 169 and thus feed it forward by frictional contact therewith. A suitable hinged and locked hood is provided for the printer and secured to the side 70 frame so that an inspection may be made at will of the parts by the proprietor.

*General construction.*—In order to lock the shaft 77 in its normal position and to also arrest it positively after it has made a 75 complete revolution, the lever 127 (Fig. 2) is formed with a rearwardly-extending arm 132 having a hook end 133. This hook normally passes to the rear of a pin 134 mounted on the cam 128. When the lever 48 is 80 operated and the lever 127 released in the manner above described, the hook 133 is elevated clear of the pin 134 and remains so until the cam 128 again rocks said lever 127 as the cash drawer starts to close, when 85 the hook is again moved into the path of the pin to positively arrest the movement of the shaft 77 and prevent any overthrow. The aforesaid shaft 77 is given a complete rotation at each operation of the machine 90 through the medium of a pinion 135 (Figs. 3 and 5) mounted loosely upon the shaft 77 and meshing with a rack-segment 136 which is formed integral with the aforesaid lever 16 so that when the drawer passes outward, 95 the lever 16 will be rocked downward and forward, and when the drawer is forced inward, the lever will be forced rearward and forward. When the segment 136 is rocking rearward the pinion 135 turns idly on the 100 shaft 77, but when the reverse movement of the segment takes place, the pinion becomes coupled to the shaft and thus imparts a complete rotation to the same. The connection between the pinion and the shaft may be 105 any desirably formed clutch, but for the sake of illustration I have shown in Fig. 3 a construction which employs two members 138 and 139 either of which is spring pressed. 110

The cash drawer is provided on its rear wall (Fig. 5) with a retaining plate 143 with which a spring-pressed plunger latch 144 mounted on the base plate 145, coöperates to retain the drawer in its closed position (see Fig. 5). This plunger is beveled at its lower end so that when the drawer is closed it will be engaged by the plate 143 and elevated until the plate passes to the rear of the same, when it will spring down 120 into its locking position. This plunger is arranged to be elevated by a pivoted lever 146 mounted on the plate 145 and engaged at its forward end by an adjusting screw 147 which is mounted in the rear end of the 125 lever 148 fast to the shaft 52.

From the above it will be seen that the drawer will be released only when one of the special keys is operated. The drawer is mounted in the main frame or casing in 130



any suitable manner so that when released it will be automatically forced out of the same by a coiled spring 149 as before described.

5 In order to compel the full opening and closing movement of the cash drawer without any intermediate retrograde movement, I provide the drawer with a pivoted pendent pawl 17<sup>a</sup> Fig. 4 which is arranged to ride  
10 over and engage a stationary rack plate 17<sup>b</sup> mounted on the frame of the machine, as shown in Fig. 4. This construction is old and well known in the art.

It will of course be understood that while  
15 there has been illustrated one set only of indicators, a second or duplicate set can readily be mounted upon the shaft 57 and be coupled to the indicators 15 so as to indicate properly at the opposite side of the machine.  
20 The invention is not limited to the use of two keys only in the special key bank as a full set of keys could readily be used without departing from the spirit of this invention, the connections of the special key bank  
25 as far as indicators and printing devices are concerned being substantially the same as amount banks.

While the form of mechanism herein shown and described is admirably adapted  
30 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  
35 coming within the scope of the claims which follow.

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

40 1. In a cash register, the combination with a series of keys; of a movable stop member adapted to be actuated by the keys and thereby set to different positions; a graduated segment cooperating with said  
45 stop member, an indicator controlled by said segment but movable independently of the same, with provisions for moving said indicator positively by said segment; and means for returning the indicator to its normal  
50 position.

2. In a cash register, the combination with a series of keys; of a movable stop member adapted to be actuated by the keys and thereby set to different positions; a  
55 graduated segment cooperating with said stop member; an indicator controlled by said segment; means for establishing a one-way connection between said segment and said indicator whereby to set the latter by  
60 the movement of the former; and means for preventing overthrow of said indicator beyond said segment.

3. In a cash register, the combination with a series of keys; of a movable stop  
65 member arranged to be actuated thereby; a

graduated segment cooperating with said stop member; an indicator; a counter; means for controlling the indicator by said segment; and connections controlled by said segment but independent of the indicator  
70 controlling means, for controlling said counter.

4. In a cash register, the combination with a series of keys; of a stop member actuated thereby; a segment cooperating with  
75 said member; a gear moved positively in one direction by said segment but movable independently of the same in the other direction; and an indicator connected to said gear.  
80

5. In a cash register, the combination with a series of keys; of a movable stop member actuated thereby; a differentially  
80 movable segment cooperating with said stop member; an indicator controlled by said  
85 segment but movable independently of the same; a second differentially movable segment movable with the indicator; and means carried by said stop member for engaging said second segment.  
90

6. In a cash register, the combination with a series of keys; of a movable stop member carrying a movable stop device and arranged to be set to different positions by  
95 said keys; an indicator; a movable graduated member connected to said indicator and arranged to cooperate with the movable stop device upon said stop member; and a second graduated member mounted independently  
100 of the first mentioned graduated member and arranged to operate the latter.

7. In a cash register, the combination with a series of keys; of a movable stop member arranged to be actuated thereby; a  
105 graduated segment cooperating with said member; an indicator controlled by said segment but movable independently of the same; and means for retaining the indicator in its set position when not under the influence of said segment.  
110

8. In a cash register, the combination with a series of keys; of a movable stop member; a pivoted pawl carried by the  
115 latter; an indicator; a graduated member connected to said indicator and cooperating with said pivoted pawl; and in independently movable graduated segment cooperating with said indicator and also with said movable stop member.

9. In a cash register, the combination  
120 with a series of keys; of stop members actuated thereby; a series of segments cooperating with said stop members; a series of movable setting members controlled by the movements of said segments; a series of rack  
125 segments cooperating with said setting members; a counter; and means for moving the rack segments into and out of operative relation with the counter.

10. In a cash register, the combination  
130



with a series of keys; of a stop member actuated by said keys; a differentially movable segment cooperating with said member; a counter; a rack segment for operating the counter; means for moving the latter into and out of cooperative relation with the counter; and means for controlling the rack segment by said differentially movable segment.

11. In a cash register, the combination with a series of keys; of a counter; a movable frame; a series of rack segments mounted in said frame; means for moving said frame to carry said rack segments into and out of engagement with said counter; a series of setting members controlling said rack segments; a series of graduated segments connected to said setting members; and a series of stop members actuated by said keys and co-acting with said graduated segments.

12. In a cash register, the combination with a series of keys; of a counter; a movable frame; a series of rack segments mounted in said frame; means for moving said frame to carry said rack segments into and out of engagement with said counter; a series of stop members actuated by said keys; a series of differentially movable segments cooperating with said stop members; connections between said differentially movable segments and said rack segments for controlling the movement of the latter in one direction; and a series of actuating devices for moving said rack segments in the opposite direction.

13. In a cash register, the combination with a series of keys; of a stop element operated by said keys; a graduated member cooperating with said element; a pivoted yoke connected to the graduated member; a counter; counter operating devices controlled by said yoke; and means for operating said yoke.

14. In a cash register, the combination with a series of keys; of a counter; a movable frame; a series of rack segments mounted in said frame; means for moving said frame to carry said rack segments into and out of engagement with said counter; a series of setting members controlling said rack segments; a cash drawer; means operated by the drawer for controlling the setting members; a series of differentially movable segments connected to the setting members; and a series of stop members actuated by said keys and controlling the movements of said differentially movable segments.

15. In a cash register, the combination with a counter; of a series of rack segments for controlling the same; a series of levers connected to the respective segments; a series of movable frames cooperating with said levers; a cash drawer; means controlled by the cash drawer for supporting said movable frames; and means actuated by the

cash drawer for actuating the respective rack segments.

16. In a cash register, the combination with a counter; of a series of operating rack segments; a cash drawer; a movable member operated by said drawer; a series of controlling devices for the rack segments dependent for operation upon the movable member; a series of keys and connections for controlling the movements of the segment controlling devices; and means actuated through the drawer operated member for successively operating the rack segments.

17. In a cash register, the combination with a counter; of a frame carrying a series of counter operating racks; a series of keys; means controlled by said keys for limiting the movements of said racks; means for rocking the rack carrying frame to bring said racks into mesh with said counter; a cash drawer; and means cooperating with the cash drawer for controlling the movement of said racks.

18. In a cash register, the combination with a counter; of a movable frame carrying a series of counter operating racks and arranged to be actuated to bring said racks into mesh with said counter; a cash drawer; means operated by the cash drawer for actuating the movable frame; a series of keys controlling the movement of the counter operating racks; and devices actuated by the cash drawer for returning the racks to normal position.

19. In a cash register, the combination with a counter; of a movable frame carrying a series of counter operating elements; a series of keys for controlling said elements; and a cash drawer and connections for first moving the frame and then the counter operating elements.

20. In a cash register, the combination with a series of keys; of a stop member arranged to be actuated and set by said keys; a movable device cooperating with said member; a counter; means intermediate the movable device and the counter for actuating the latter by the movement of the former; and a cash drawer and connections for operating said intermediate means.

21. In a cash register, the combination with a series of keys; of a counter; a stop element arranged to be moved to different positions by said keys; a setting element and connections controlled by said stop element; a latch for said setting element operated by the movement of said stop element; and mechanism for operating the setting element.

22. In a cash register, the combination with a series of keys; of a counter; a stop element arranged to be set to different positions by the operation of said keys; a graduated member cooperating with said stop element; a counter operating device controlled by said graduated member; and



a latching means for said graduated member operated by said stop element.

23. In a cash register, the combination with a series of keys; of a stop member arranged to be operated by said keys; a segment cooperating with said stop member; an indicator; gearing connected to the indicator and controlled by said segment; means for returning said indicator to zero position when released; latching devices for said indicator; and special keys and connections for controlling said latching devices.

24. In a cash register, the combination with a series of amount keys; of a stop member operated thereby; a series of indicators; a graduated device connected to the indicators and cooperating with said stop member; latches for holding the indicators in their set positions; springs for returning the indicators; special keys for releasing the indicator latches; and locking devices for preventing the operation of the amount keys after the operation of a special key.

25. In a cash register, the combination with a series of indicators; of an operating mechanism; latches for said indicators; means for returning the indicators when released; a lock for the operating mechanism; a series of special keys; and means controlled by said special keys for operating the indicator latches and also the lock for the operating mechanism.

26. In a cash register, the combination with a series of amount keys; of a detent for said keys; a locking device for the detent; special keys; a movable device operated by the special keys for operating the detent lock; and means for locking the special keys to said movable device when said keys are displaced from normal position.

27. In a cash register, the combination with an indicator; of a latch for the same; special keys; a movable member operated by the special keys for tripping the indicator latch; and means for locking the special keys to said movable member when said keys are displaced from normal position.

28. In a cash register, the combination with a series of amount keys; of special keys; a cash drawer; a lock for the amount keys; a lock for the cash drawer; and a movable member to which the special keys become locked, said movable member operating said amount key lock and said drawer lock.

29. In a cash register, the combination with a series of amount keys, a "no sale" key, and a special key for use in connection with said amount keys; of a single locking piece normally in the path of said special key; and means controlled by said amount keys to move said locking piece out of the path of said special key and into the path of said "no sale" key whereby to unlock the former and lock the latter.

30. In a cash register, the combination with a counter, of a movable frame carrying a series of counter operating elements and arranged to be moved to bring said elements into connection with the counter; means for turning the counter to zero; and a locking device for said means controlled by the frame carrying the counter operating elements.

31. In a cash register, the combination with a counter including a turn-to-zero shaft, of a notched disk mounted on said shaft; a series of counter operating elements arranged to be thrown into connection with the counter; and means for locking the notched disk when the counter operating elements are in connection with the counter.

32. In a cash register, the combination with a counter, of an operating rack segment therefor; an actuating device for said segment; a movable stop on said segment engaged by the actuating device; and transfer devices for moving said stop to positively change the relative positions of the segment and its actuator.

33. In a cash register, the combination with a counter, of a series of operating racks for the same; a series of keys; means connected to the keys for controlling the movements of the rack segments when out of connection with the counter; a series of actuating devices for moving the segments when in connection with the counter; means for moving the segments into and out of cooperative relation with the counter; and transfer means for positively changing the relative positions of the rack segments and their respective actuators.

34. In a cash register, the combination with a counter, of an operating rack for the same; an actuating device for said rack; a movable device mounted on said rack and arranged to engage a relatively stationary part of the machine; and means operated by the counter for engaging said movable device and thus change the relative positions of said device and rack to effect the transfer.

35. In a cash register, the combination with a counter, of an operating rack for the same; an actuating device for said rack; transfer devices for positively changing the relative positions of the rack and its actuating device; and means for preventing the transfer devices being set when the machine is in normal position.

36. In a cash register, the combination with an operating mechanism, of transfer devices; latches for holding the transfer devices in position when set; and means for preventing the operation of the latches when the machine is in normal position.

37. In a cash register, the combination with an operating mechanism, of a counter; transfer devices for said counter; latches for



said transfer devices; a cash drawer controlling the operating means; and mechanism for preventing the operation of the latches when the cash drawer is closed.

38. In a cash register, the combination with a register, a transfer operating device connected therewith, a differentially movable register operating device, and keys for predetermining the extent of differential movement of the latter; of an actuating member having regular excursions and arranged to give said register operating device its differential registering movements; an adjustable device carried by said register operating device, and arranged to be engaged by said actuating member; and means controlled by said transfer operating device to move said adjustable device into position to cause the actuating member by its engagement therewith to give the register operating device a positive transfer movement.

39. In a cash register, the combination with a register, a transfer operating device connected therewith, a differentially movable register operating device, and keys for predetermining the extent of differential movement of the latter; of an actuating member having regular excursions and arranged to give said register operating device its differential registering movements; an adjustable device carried by said register operating device, and arranged to be engaged by said actuating member; and means controlled by said transfer operating device to partially obstruct said adjustable device and thereby cause a relative change of position between the latter and the register operating device attendant upon the engagement of the actuating member with said adjustable device, whereby to give said register operating device a positive transfer movement.

40. In a cash register, the combination with a register, a transfer operating device connected therewith, a differentially movable register operating device, and keys for predetermining the extent of differential movement of the latter; of an actuating member having regular excursions and arranged to give said register operating device its differential registering movements; an adjustable device carried by said register operating device, and arranged to be engaged by said actuating member; and an intermediate transfer controlling device having provisions for presenting a positive stop for said register operating device in its normal movement of registration but arranged to be shifted by said transfer operating device to permit the unitary transfer movement.

41. In a cash register, the combination with a register, a transfer operating device connected therewith, a differentially movable register operating device, and keys for

predetermining the extent of differential movement of the latter; of an actuating member having regular excursions and arranged to give said register operating device its differential registering movements; an adjustable device carried by said register operating device, and arranged to be engaged by said actuating member; and an intermediate transfer controlling device having provisions for presenting a positive stop for said register operating device in its normal movement of registration but arranged to be shifted by said transfer operating device to permit the unitary transfer movement, with provisions formed in said intermediate device for presenting a positive stop for the register operating device at the end of its unitary transfer movement.

42. In a cash register, the combination with a register, a transfer operating device connected therewith, a differentially movable register operating device, and keys for predetermining the extent of differential movement of the latter; of an actuating member having regular excursions and arranged to give said register operating device its differential registering movements; an adjustable device carried by said register operating device, and arranged to be engaged by said actuating member; and an intermediate transfer controlling device having provisions for presenting a positive stop for said register operating device in its normal movement of registration but arranged to be shifted by said transfer operating device to permit the unitary transfer movement, with provisions formed on said intermediate device for moving said adjustable device to cause the actuating member to give the register operating device a positive transfer movement, and also having provisions formed thereon for presenting a positive stop to said register operating device at the extremity of such transfer movement.

43. In a cash register, the combination with a registering wheel, a transfer pin carried thereby, a differentially movable register operating segment, and keys for predetermining the extent of differential movement of the latter; of an actuating member having regular excursions and arranged to give said register operating segment its differential registering movements; an adjustable pawl carried by said registering segment and arranged to be engaged by said actuating member; a pin also carried by said segment and arranged to be engaged by said pawl during the normal movements of registration; and an adjustable plate arranged to be engaged by said transfer pin and shifted into position to cause a transfer, said plate being formed with an abutment to present a positive stop to said pin in the normal movements of registration, and being formed with a recess to permit the trans-



fer movement when shifted, and also being formed with a projection for engaging said pawl and adjusting the same to cause a positive transfer movement of the registering segment.

44. In a cash register, the combination with a counter, operating racks for the same, and an actuating device for said racks including means for giving said racks a positive transfer movement; of movable elements carried upon said racks, the position of said elements relative to said racks controlling the positive transfer operation.

45. In a cash register, the combination with a register and actuating racks for same, of a main operating mechanism for said racks, means mounted on said racks for giving same a movement determined by the operating mechanism, and means for partly obstructing the movement of said last means to effect the transfer.

46. In a cash register, the combination with a register, of actuating racks for same, and means controlling the differential movements of said racks, means for operating said racks, and means carried by said racks and operated by said operating means for moving said racks an additional step to effect the transfer.

47. In a cash register, the combination with a register and operating racks for the same, driving devices for said racks, an element pivoted to one of said racks, normally stationary relative to said rack, and against which one of the driving devices is positioned to engage, and transfer controlling devices positioned to be engaged by the free end of said pivoted element when a transfer is required.

48. In a cash register, the combination with a series of amount keys normally operative, a special key, a no sale key and a bar for locking either the special or no sale key and normally in the path of the special key, of connections whereby the operation of any amount key moves said locking bar into the path of the no sale key and out of the path of the special key.

49. In a cash register, the combination with type carrying elements, and a platen for taking impressions from same, of a platen support comprising a bell crank lever, a shaft positioned between the arms of said lever, and two cams on said shaft positioned so that as said shaft rotates one cam engages one arm of said lever to cause the platen to move to printing position, and thereafter the second cam engages the other lever arm to cause return of said platen support to a position of retraction from said type carrying elements.

50. In a cash register, the combination with a register, of a turn to zero shaft therefor, a disk fast on said shaft and having a notch, an operating shaft of the machine,

and means operated by the movement of said shaft from normal position to enter said notch and prevent movement of said turn to zero shaft.

51. In a cash register, the combination with counter elements, racks for actuating said elements, lever arms mounted on said racks, and means for operating said lever arms to move said racks, of transfer trip devices carried by said counter elements, transfer trip plates positioned to be moved by said trip devices, and serving to obstruct one of the ends of each of said lever arms at points depending on whether the trip plates have been moved.

52. In a cash register, the combination with a main driving shaft, and a locking device for said shaft, of keys for controlling the unlocking movement of said locking device and a cam on said driving shaft for positively returning said locking device to locking position.

53. In a cash register, the combination with counter elements, racks for actuating same, and an operating mechanism for said racks, of transfer trip plates normally in position to obstruct said racks at the ends of their strokes, and trip devices carried by the counter elements and serving to shift the trip plates so as to change the point at which said plates obstruct the racks.

54. In a cash register, the combination with counter elements, racks for actuating said elements, and means for differentially operating said racks, of transfer trip devices carried by said elements, and trip plates moved by said trip devices and formed so as to obstruct said racks at different positions depending on the position of said trip plates.

55. In a cash register, the combination with counter elements, racks for actuating same, and an operating mechanism for said racks, of transfer trip devices carried by said elements, transfer trip plates positioned to be rocked by said trip devices, and formed with a projection and a depression for obstructing said racks in different positions depending on the position of said trip plates.

56. In a cash register, the combination with a register and operating racks for the same, of a driving link pivoted to one of said racks and normally stationary relative to said rack, means for driving an intermediate portion of said pivoted link to a constant position, and transfer controlling devices positioned to be engaged by the free end of said pivoted link when a transfer is required.

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

WILLIAM I. SPANGLER.

Witnesses:

WM. H. MUZZY,  
IRA BERKSTRESSER.