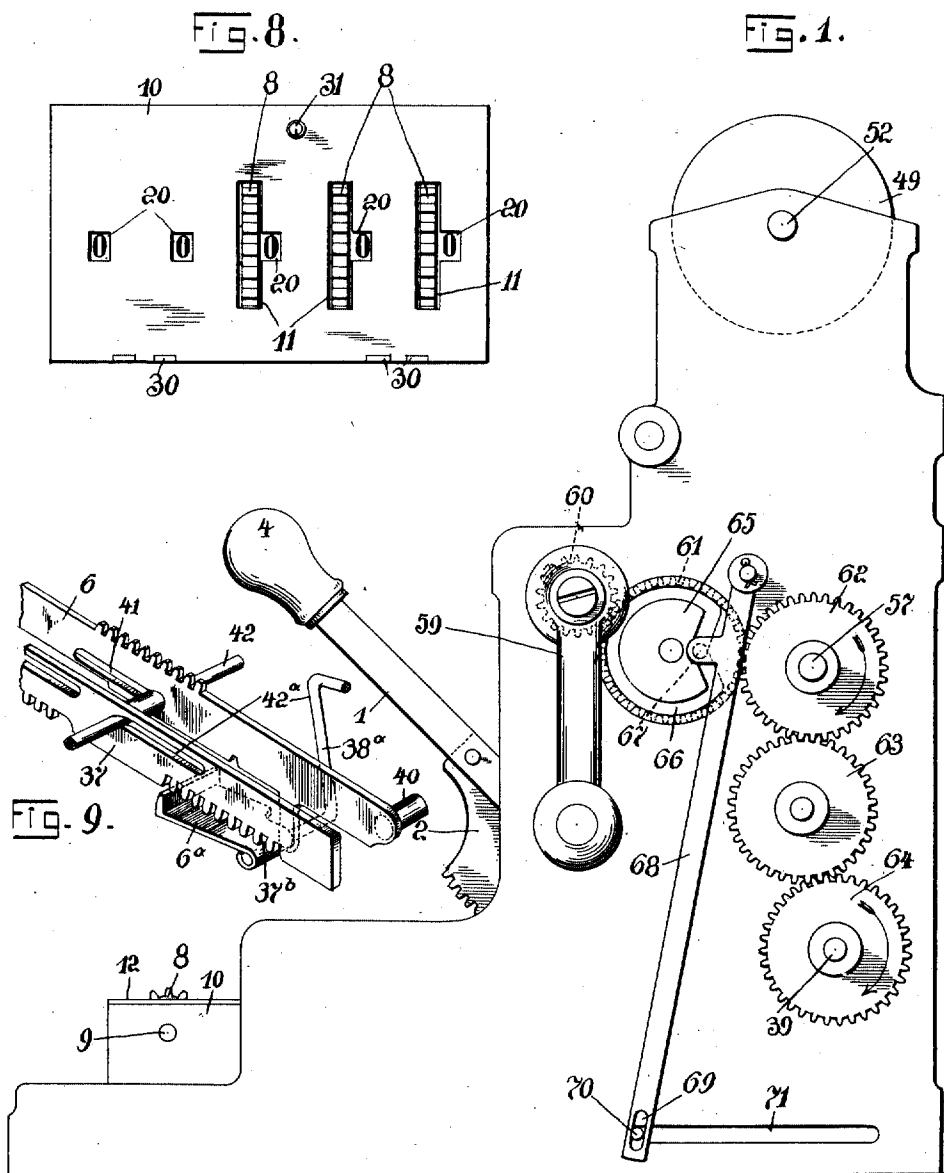


W. H. MUZZY.
CASH REGISTER.
APPLICATION FILED NOV. 8, 1907.

1,008,357.

Patented Nov. 14, 1911.

3 SHEETS-SHEET 1.



Witnesses
C. H. Kortmann
W. M. W. Shortley

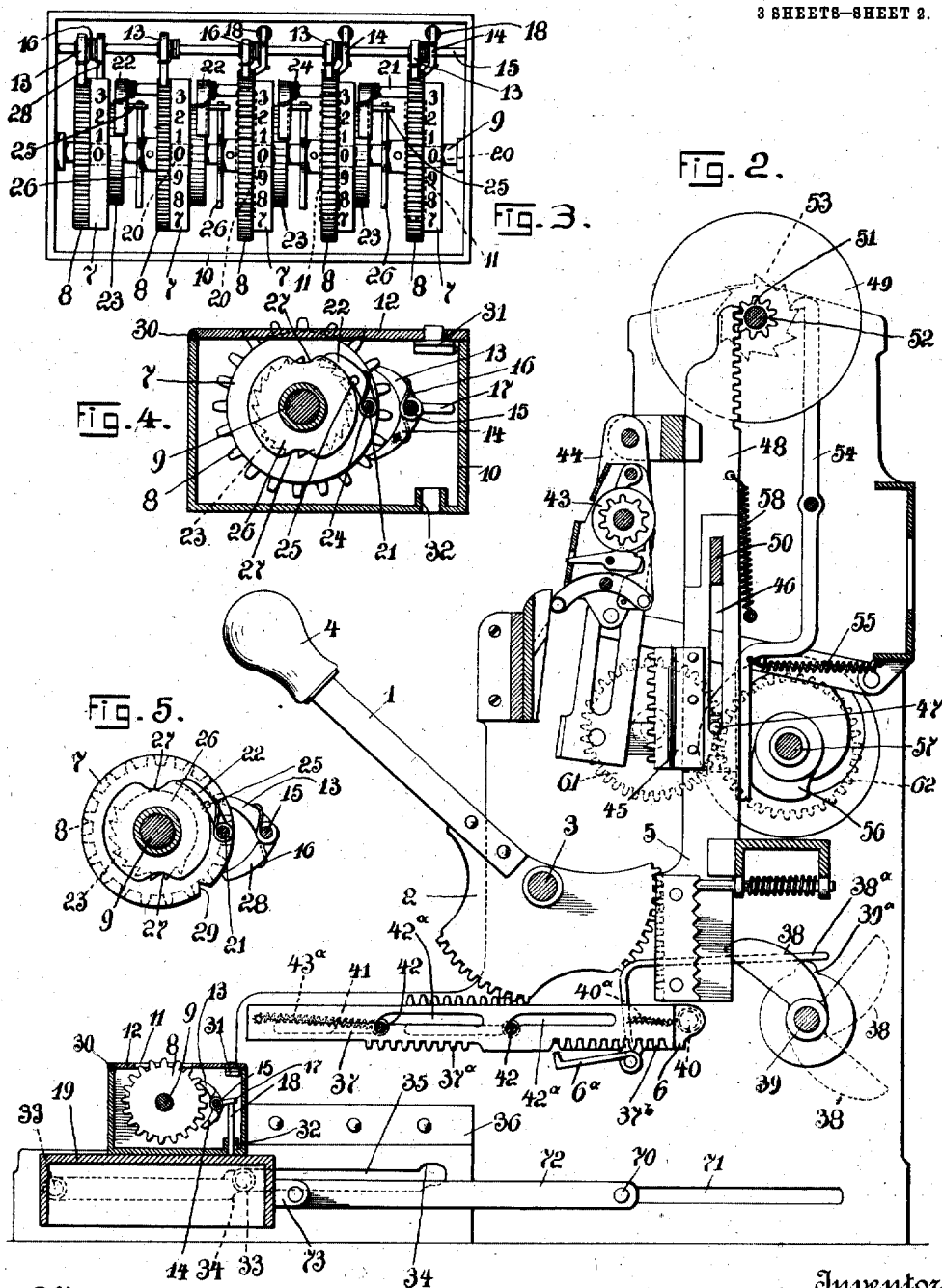
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3 SHEETS-SHEET 2.



Witnesses
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3 SHEETS—SHEET 3.

Fig. 6.

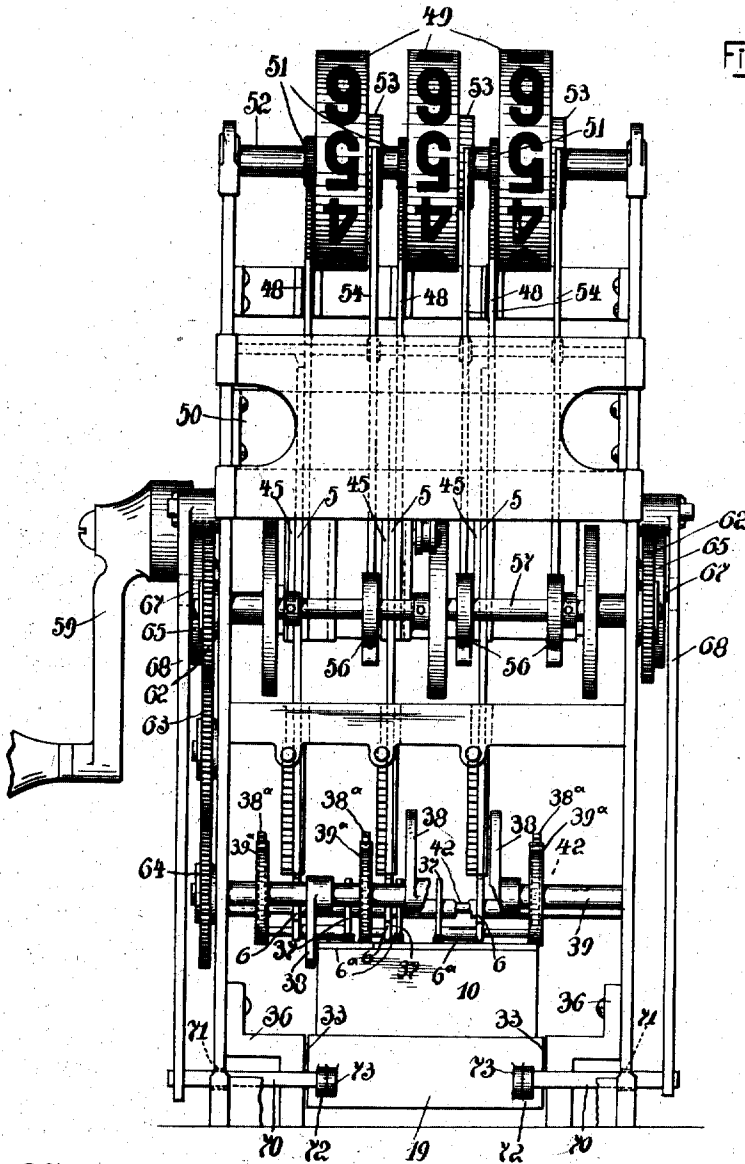
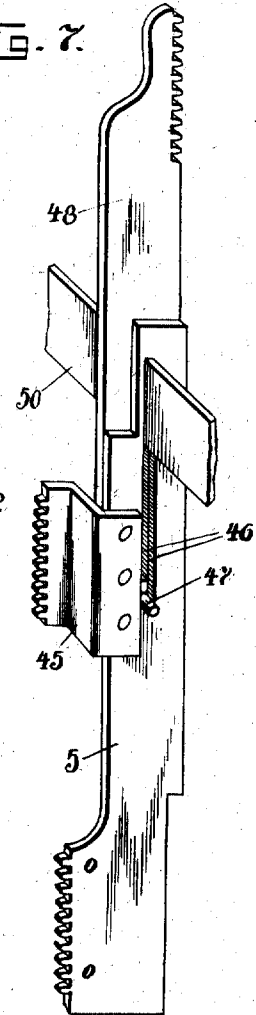


Fig. 7.



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Inventor
W. H. Muzzy

UNITED STATES PATENT OFFICE.

WILLIAM H. MUZZY, OF DAYTON, OHIO, ASSIGNOR TO THE NATIONAL CASH REGISTER COMPANY, OF DAYTON, OHIO, A CORPORATION OF OHIO, (INCORPORATED IN 1906.)

CASH-REGISTER.

1,008,357.

Specification of Letters Patent. Patented Nov. 14, 1911.

Application filed November 8, 1907. Serial No. 401,284.

To all whom it may concern:

Be it known that I, WILLIAM H. MUZZY, 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 more particularly to the type of machine known in the art as multiple counter registers.

The principal object of the invention is to provide an improved mechanism including an unlimited number of detachable registering mechanisms which may be used to keep separately the receipts of different clerks, departments or customers' accounts.

Another object of this invention is to provide automatically operating locking devices for the movable elements of the registering mechanism when the latter is detached from the machine, so as to prevent manipulation of said elements.

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

Of said drawings, Figure 1 represents a side elevation of the machine embodying my invention showing the operating gearing. Fig. 2 represents a central transverse section through the machine. Fig. 3 represents a top plan view of one of the detachable counters with the top of its casing removed. Fig. 4 represents a transverse section through the same showing the locking pawls for the counter wheels and the transfer devices. Fig. 5 represents a detail side elevation of the last counter wheel for each counter with the locking mechanism therefor. Fig. 6 represents a rear elevation of the machine, and Fig. 7 represents a detail perspective view of a pair of rack bars for actuating the main registering mechanism and the indicators. Fig. 8 represents a top plan view of a detachable counter in its casing, and Fig. 9 represents a detail perspective view of one pair of the counter actuating racks.

The invention may be described in gen-

eral as comprising a series of adjustable levers for controlling the amounts to be added upon the main registering mechanism as well as upon a detachable counter and also for controlling the indicators for displaying the amount added. After the amount to be added has been set up by the levers, the main counter is moved across racks connected to the levers and the amount represented by the position of the levers will be added thereon. Auxiliary rack bars also connected to the levers will be afterward cammed forward successively to register upon the detachable counter which has previously been brought rearward and elevated into engagement with said rack bars. The carriage carrying the detachable counter will then be lowered and moved forward in which position the counter may be removed.

Having described in general terms the operation of the invention a detail description of the different parts will now be given.

As a number of parts shown in the present drawings are old and well known in the art and are shown in the patent to Carroll 751,611—February 9, 1904, I will refer to said patent for such description as is not here given.

Amount determining devices.—These devices comprise a series of adjustable levers 1, only one of which is shown, see Fig. 2. Each lever is arranged to be moved along an index formed upon the cabinet of the machine (not shown). Each one of these levers carries a segmental rack plate 2 mounted upon a transverse shaft 3, while at its outer end it is provided with a knob 4. Each plate 2 meshes with a vertical rack bar or actuator 5 and a horizontal rack bar or actuator 6, from which it will be seen that any movement of the lever 1 will be conveyed to said actuators.

Registering mechanism.—This machine is provided with a movable carriage upon which may be placed any one of a plurality of detachable counters, after which the carriage is moved rearwardly and upwardly carrying the counter into the path of the horizontal racks. The racks are then moved forward to effect the registration. A total counter upon which is entered the different amounts registered upon the detachable counters is also employed and is reciprocated upon each operation of the machine, during which movement the vertical racks previ-

ously described actuate the counter, all of which is described in the aforesaid patent to Carroll. Each of the detachable counters is provided with a series of movable elements 7 in the form of adding wheels to which are attached gear wheels 8 rotatably mounted upon a transverse shaft 9 which is suitably secured in the sides of the casing 10. The first three gear wheels 8 are larger than the remaining wheels and protrude through openings 11 formed in the top 12 of the casing 10, as shown by dotted lines in Fig. 3. Pawls 13 and 14 mounted upon a rod 15 are forced into engagement with the first three wheels 8 by coil springs 16 which surround the rod 15 and having their ends contacting with the rear side of said pawls, thereby preventing any accidental movement of the gear wheels. The pawls 14 are provided with tails 17 with which pins 18, projecting upwardly from a movable carriage 19, contact when the counter is placed upon the carriage as hereinafter described. The remaining gear wheels 8 are of the same size as the adding wheels and are inclosed by the casing 10 and the top 12, the latter being provided with openings 20 through which the numerals of each adding wheel may be seen. The openings 11 through which the first three gear wheels protrude have offsets corresponding to the openings 20 through which the numerals on the adding wheels attached to said wheels may also be seen as shown in Fig. 8. Each adding wheel 7, except the last, is provided with two series of numerals from 0 to 9 and as any one of said wheels makes a half revolution one is transferred to the wheel of the next higher denomination by the following means: Projecting laterally from the first four gear wheels are pins 21 upon the outer ends of which are mounted pawls 22 that are normally forced toward ratchet wheels 23 attached to the numeral wheels of the next higher denomination by coil springs 24 which surround the pins 21 and have one end fast thereto while their opposite ends contact with the backs of pawls 22. Each of these pawls has projecting therefrom a pin 25 which contacts with the periphery of a disk 26 secured to the shaft 9 and thereby normally holds the pawl out of engagement with its ratchet wheel 23. Each of the disks 26 has two cut out portions 27 into which the pin 25 enters so that its pawl 22 will engage with a tooth of the ratchet wheel 23 of a higher denomination and advance it one notch as the wheel of the next lower denomination passes from 9 to 0. This form of transfer is well known in the art and needs no further description here. The fourth and fifth gear wheels 8, reading from the right in Fig. 3, are engaged by pawls 13 so as to prevent any retrograde movement but are free to be moved forward.

The fifth wheel is limited in its forward movement to its capacity, which is nine, by the following means: A pawl 28 somewhat similar to the pawls 14 is mounted upon the rod 15, see Fig. 5, and is forced into engagement with the periphery of the numeral wheel 7 by the spring 16. When the wheel is rotated so as to bring the numeral 9 beneath the opening 20 the pawl 28 will enter a notch 29 formed in the wheel 7 and prevent any further forward movement of the wheel. The ratchet wheel 23 connected to this wheel is provided with only a sufficient number of teeth so that its pawl 22 will advance it only from 0 to 9, after which the pawl 22 will ride upon the periphery of the wheel 23 when a transfer is to be made. The capacity of these counters is such that they greatly exceed the average sales of individual clerks and if any attempt is made to reset the counter by overrunning its capacity this lock will act as a telltale. The top 12 is hinged at one end as at 30 and is provided at its other end with a lock 31 so as to secure it to the casing 10 and permit it to be opened to turn the counter wheels to zero.

As previously described the carriage 19 is provided with pins 18 which are arranged to pass through openings 32 formed in the bottom of the casing 10 and rock the pawls 14 out of engagement with the gear wheels 8 as the counter is placed upon said carriage. These pins also securely hold the counter in place upon the carriage. As the counter and carriage is drawn rearward by mechanism hereinafter described, pins 33 projecting laterally from the carriage will ride up sharp inclines 34 of slots 35 formed in standards 36 just at the end of the rearward movement of the carriage, and carry the protruding teeth of wheels 8 into the paths of rack bars 37 which cooperate with the rack bars 6, in which position the counter will remain until after spirally arranged cams 38 secured to a rotary shaft 39 move the rack bars 37 forward a distance equal to the previous rearward movement of the bars 6. This movement is effected by the cams engaging rollers 40 secured to the rear ends of said bars 6. The carriage and counter is then lowered and returned to its normal position, shown in Fig. 2.

The rack bars 6 are provided with slots 41 through which horizontal rods 42 extend to act as guides for said bars. On account of the direct transfer hereinbefore described it is necessary to actuate the rack bars 6 successively by the cams 38. The rack bars 37 are arranged beside the bars 6 and are supported by the rods 42 which project through slots 42^a formed therein. These slots are inclined downward at their forward end so that when the racks are drawn rearward by coil springs 43^a connecting them to the forward shaft 42, said racks will be

raised out of the same horizontal plane with the teeth of the wheels 8 when the latter are in their raised positions. Each of the bars 37 is provided with counter operating rack teeth 37^a and latch teeth 37^b.

Each bar 6 is provided with a pivoted pawl 6^a arranged to engage teeth 37^b and thus lock the bars together. Each pawl tends to move to engaging position by means of a spring 40^a which connects it to its bar 6, and is normally held out of such engagement by an angular arm 38^a connected thereto and engaged by a cam 39^a on the rotation shaft 39. The grand total counter 43 is mounted in a swinging frame 44 and is arranged to be given a reciprocating movement, after being swung rearward over rack plates 45 secured to the vertical rack bars 5 so as to register the amount set up by the levers 1 after which the operating mechanism will swing the frame forward and return the counter to its normal position, as fully shown and described in the aforesaid patent to Thomas Carroll.

The timing of the above described mechanism is such that the grand total counter is registered upon and disengaged from the rack plates 45 before the levers 1 and the rack bars 5 and 6 are returned to normal position by the cams 38.

Indicator mechanism.—The indicators are controlled by a series of adjustable levers which are returned to normal position at the end of the operation of the machine leaving the indicators latched in their adjusted positions. Each of the rack bars 5 is provided with an elongated slot 46 in the bottom of which rests a pin 47 projecting from the lower end of a rack bar 48, when the levers 1 and the indicators 49 are at zero. The rack bars 48 are also provided with an elongated slot similar to and in alinement with slots 46 of the rack bars 5 and through which extends a guide bar 50. The upper ends of racks 48 engage with pinions 51 secured to indicators 49 mounted loosely upon a transverse shaft 52. As each lever 1 is moved downward its rack bar 5 will be moved upward and carry with it the rack bar 48 by means of the pin 47 resting in the bottom of the slot 45 thereby rotating its indicator drum 49. Each drum is provided with a ratchet wheel 53 on the side opposite to the pinion 51, with which a hook lever 54 is held in engagement by a spring 55. The lower ends of the levers 54 are arranged to be engaged by cams 56 mounted upon a rotary shaft 57 at the beginning of the rotation of the shaft and rock said levers so as to disengage their upper hook ends from the ratchets 53 to allow the indicators to return to zero by means of the rack bars 48 and springs 58. The cams 56 are all so shaped as to hold the hook ends of the levers 54 out of engagement with their ratchets long

enough to allow the springs 58 to return the indicators to zero from any position which they may be rotated by the levers 1. It will be seen from the above construction that if the indicators display \$9.99 and it is desired to indicate \$5.55 the levers 1 will be first moved to the latter position indicated by the indices on the cabinet (not shown). The shaft 57 is then revolved. The first movement will, through the cams 56, rock the upper ends of the levers out of engagement with the ratchets 53 and permit the springs 58 to return the indicators through the rack bars 48 until they are arrested by pins 47 contacting with the lower ends of the slots 46 after which the cams 56 will pass out of engagement with the levers 54 allowing the upper ends of said levers to engage the ratchets 53 and hold the indicators in this position, the levers 1 and rack bars 5 being then returned to normal position independent of the rack bars 48 by cams 38 contacting with the rollers 40 of the rack bars 6.

Operating mechanism.—A crank handle 59, see Fig. 1, has attached thereto a pinion 60 which meshes with a gear wheel 61 that engages a similar gear 62 secured to one end of the rotary shaft 57. An idler 63 meshes with the gear 62 and in turn engages a gear wheel 64 secured to the shaft 39. The pinion 60 is only half the size of the other gears, thereby requiring two turns of the crank handle for a complete operation of the machine. A disk 65 is attached to the gear 61 and is provided with a cam groove 66 in which plays a pin 67 projecting from a forward extension of an arm 68, which is pivoted at its upper end to the side frame of the machine. The lower end of the arm 68 is provided with a slot 69 into which projects a pin 70 extending through an elongated slot 71 of the side frame. A link 72, one end of which is pivoted to a rearward projection 73 of the carriage 19, carries the pin 70. The shape of the cam groove 65 is such that the first one-eighth of a turn of the disk 65 will cam the arm 68 rearward, thereby carrying the carriage 19 rearward and upward and holding it in this position until the last one-eighth of the rotation of disk 65, when the parts are returned to their normal positions. The gears 61, 62, disk 65 and the rest of the parts for reciprocating the carriage 19 are duplicated upon the opposite side of the machine, see Fig. 6, so as to exert an even pull upon the carriage 19.

Having described the invention in detail a brief description of its operation will now be given, the different parts being designated by their reference numerals.

Assuming that all of the parts are at their normal zero position and clerk A desires to register a sale of \$5.00 he places his counter upon the carriage 19 which act releases the locked registering wheels 7 by

pins 18 contacting with the tails 17 of the pawls 14 and withdrawing the latter from engagement with the gear wheels 8. The dollar level 1 is then moved to its fifth position, which movement will carry the rack bar 5 upward and the rack 6 backward five teeth. As the bar 5 moves upward it will also carry the rack bar 48 upward by the bottom of the slot 46 contacting with the pin 47 of the bar 48 and thereby rotate the dollar indicator against the tension of the spring 48 to display the numeral 5. The crank handle 59 is then started which, through the cam disks 65, arms 68, pins 70 and links 71, will draw the carriage 19 rearward and at the end of its rearward movement cam the carriage upward by pins 33 engaging inclines 34 of slots 35 of standards 36 thereby bringing the protruding teeth of the gear wheels 8 into the line of movement of the rack teeth 37^a. During this movement the cam 56 secured to the shaft 57 will rock the hook ends of the levers 54 out of engagement with the ratchets 53, but the indicators not being in advance of the rack bars 5 will not be returned. After the cams 56 pass out of contact with the levers 54 the latter will be drawn into engagement with the ratchets 53 by springs 55. After the detachable counter is cammed into position the levers 54 spring back into engagement with the ratchets 53 and the last of the spirally arranged cams will contact with the roller 40 of the displaced dollar rack bar 6 and cam it back to normal position. Prior to this movement, however, the cam 39^a has released the arm 38^a and the pawl 6^a engaged rack teeth 37^b to couple the rack bars together. As rack bar 6 moves forward the bar 37 moves forward and downward into mesh with the proper counter wheel to actuate or move the same five teeth. The carriage will then be lowered and returned to its normal position by the inclines 34 in the standards 36, disks 65, arm 68, pins 70 and links 71. Previous to the return of the rack bar 6 the grand total counter 43 will be drawn to the rear and then downward over the rack plate 45 of the displaced rack bar 5 and then disengage therefrom as fully shown and described in the aforementioned patent. When the cam again engages arms 38^a the pawls 6^a are moved downward and the rack bars 37 released and returned by their springs.

It will be seen from the foregoing description that while the counter wheels of one of the auxiliary counters might be unlocked by inserting some instrument through the apertures 32 these wheels could only be turned in a forward direction, which would simply make the clerk accountable for more cash. The counter wheels even though they do project through the casing of the counter are locked against being turned backward at all times and also locked against any acci-

dental turning when the counter is not in the clerk's pocket or placed away in any suitable receptacle. It is only after the counter is inserted into the machine that the wheels are unlocked for forward rotation.

While I have shown one form of transfer mechanism for the counters it will be readily understood that any of the forms well known on the market might be substituted without departing from the spirit of this invention.

The independent movable counters may be kept in any suitable storage receptacle, but I prefer a drawer located in proximity to the register and divided into suitable labeled compartments for the counters. If the counters are to be employed for different clerks these clerks may simply slip their counters into their pockets or place them anywhere else where they will be inaccessible to other clerks. By this means a clerk is absolutely assured that no one else would be able to register upon his counter. It will, of course, be understood that the number of counters which may be employed is unlimited.

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

What is claimed is:

1. In a machine of the class described, the combination with an operating mechanism comprising differentially movable actuators, of a registering device normally detached from the machine but manually insertible therein and comprising a series of denominational registering elements, devices for bringing said registering device into operative position relative to the actuators after insertion of said registering device in the machine, and means for differentially moving said actuators while said registering elements are in operative position.

2. In a machine of the class described, the combination with an operating mechanism comprising differentially movable register actuators, of a registering device normally detached from the machine but manually insertible therein, and comprising a series of denominational registering elements, with a casing surrounding said elements, and means for locking said registering elements, with connections whereby said locking means are disabled as the registering device is inserted in the machine.

3. In a machine of the class described, the combination with an operating mechanism comprising differentially movable register actuators, of a registering device normally detached from the machine but manually in-

sertible therein, and comprising a casing with a series of registering elements projecting from said casing, locking devices for the registering elements inaccessible to the operator, and means carried by the machine for actuating said locking devices as the registering device is inserted in the machine.

4. In a machine of the class described, the combination with an operating mechanism including differentially moving register actuators, of a registering device normally detached from the machine but manually insertible therein, and comprising a series of denominational registering elements, means for moving said registering device when inserted in the machine to a position of operative relation with said actuators, and means for giving said register actuators differential movements after said operative relation has been formed.

5. In a machine of the class described, the combination with a manually adjustable setting element, of a driving rack beside said setting element, a latch carried by said setting element for rigidly connecting said driving rack thereto, a registering element actuable by said driving rack, means for restoring said setting element to normal position after its manual adjustment from normal position, and means for actuating said latch and retaining it in latching position during restoration of said setting element whereby to add amounts to said registering element.

6. In a machine of the class described, the combination with an operating mechanism, comprising differentially adjustable register actuators, of a registering device normally detached from the machine but manually insertible therein, a main registering device, means for moving said first registering device when inserted in the machine into operative relation with said actuators, and means for actuating said main registering device and said first registering device successively during an operation of the machine.

7. In a machine of the class described, the combination with an operating mechanism comprising a manually adjustable register actuator, of a registering device normally detached from the machine but manually insertible therein and comprising a registering element, a carriage on which the registering device may be received and means to reciprocate said carriage and thereby move said registering element into operative relation with said register actuator.

8. In a machine of the class described, the combination with a series of setting elements, of a series of indicators controlled thereby, means for successively returning the setting elements to normal position, a series of counter actuators, a normally detached counter, a support for the counter for holding it in the path of movement of the

counter actuators and means for holding the indicators in set positions when the setting elements are returned to normal position.

9. In a machine of the class described, the combination with an operating mechanism, of a series of register actuators, a registering device normally detached from the machine but manually insertible therein and comprising registering elements having projecting pinions, a carriage on which said registering device is placed, and connections from said operating mechanism for moving said carriage sufficiently to form an operative relation between said actuators and said registering elements.

10. In a machine of the class described, the combination with a series of setting elements, of a main counter, operating racks for said main counter connected to the setting elements, means for successively returning the setting elements to normal position, a counter normally detached from the machine but manually insertible therein, operating racks for said insertible counter controlled by the setting elements, and a support for holding the inserted counter when inserted in position to be operated by these latter racks.

11. In a machine of the class described, the combination with a series of register actuators, of a registering device normally detached from the machine but manually insertible therein, and comprising a series of registering elements and transfer devices for said elements, a carriage on which said registering device may be placed, means for drawing said carriage into the machine to bring the registering elements into operative relation with the register actuators, and means for operating said actuators.

12. In a machine of the class described, the combination with a register actuator, of a registering device normally detached from the machine but manually insertible therein, and comprising a registering element, a carriage on which said registering device may be manually placed, and an operating device with connection for drawing said carriage into the machine sufficiently to form an operative relation of said registering element and said actuator.

13. In a machine of the class described, the combination with an operating mechanism, of a register actuating rack, a registering device normally detached from the machine but manually insertible therein, and comprising a registering element having an operating pinion, a carriage on which said registering device may be placed, locking means for said registering element actuated when said registering device is placed on said carriage, and connections from said operating mechanism for drawing said carriage into the machine and thereby causing an operative relation between said actuat-

ing rack and said operating pinion to be formed.

14. In a machine of the class described, the combination with a series of setting elements, of counter operating racks connected thereto, a main counter, means for returning the setting elements to their normal positions after being set, auxiliary counter operating racks, means connecting the auxiliary racks to the setting elements for operation upon the return of the latter and an additional counter which may be operated by the auxiliary racks.

15. In a machine of the class described, the combination with a series of setting elements and mechanism for returning them to their normal positions after being set, counter operating devices arranged to be connected to said elements a counter, means for bringing the counter into the plane of operation and means for bringing the counter operating elements into the plane of operation.

16. In a machine of the class described, the combination with a registering element, and means for bodily reciprocating it, of a rack bar for actuating said element, means for reciprocating said rack bar, and means for moving both said registering element and said rack bar in directions at an angle to their planes of reciprocation.

17. In a machine of the class described, the combination with a registering element, of a rack bar for actuating said element, a carriage on which said registering element may be mounted, means for reciprocating said carriage constructed to also raise and lower it, and means for reciprocating said rack bar constructed to also raise and lower it out of and in to operative relation with said registering element.

18. In a machine of the class described,

the combination with a registering element, of an actuating device therefor, the said element and device being normally out of operative condition, means for moving the registering element horizontally and then vertically to bring it in operative position, and means operative after the element has been positioned, for lowering the actuating device and then moving it horizontally to actuate the registering element.

19. In a machine of the class described, the combination with a registering mechanism having a plurality of movable elements, means for actuating said elements, differentially adjustable devices, means for connecting the devices and actuating means, and means restoring the adjustable devices to normal position when connected to the actuating means, the latter having an independent movement in a direction at right angles to the restoration movement to connect the same with the registering mechanism so as to impart to the latter the extent of the restoration movement.

20. In a registering mechanism, the combination with a plurality of differentially movable elements, of actuating slides therefor normally out of an operative plane, determining slides adjacent to the actuating slides, adjustable levers operating said determining slides, and means for first moving the actuating slides into an operative plane and then imparting thereto the extent of movement determined by the determining slides to actuate the elements of the registering mechanism.

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

WILLIAM H. MUZZY.

Witnesses:

R. W. FAIRCHILD,

A. B. CLARK.