

C. SMYTH.
CASH REGISTER.

No. 514,666.

Patented Feb. 13, 1894.

Fig. 1.

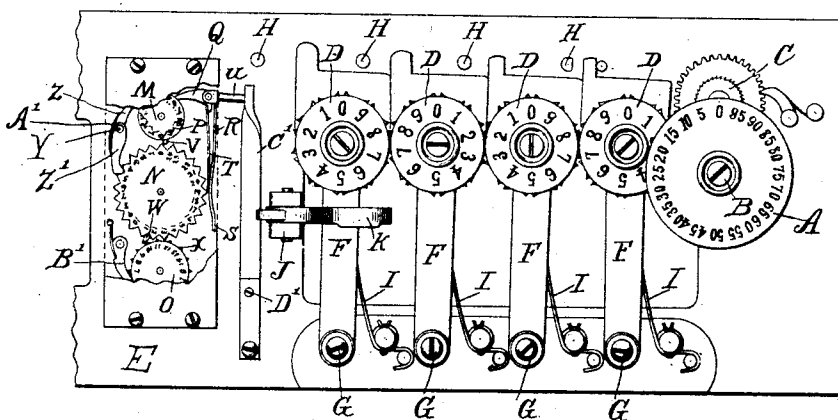


Fig. 2.

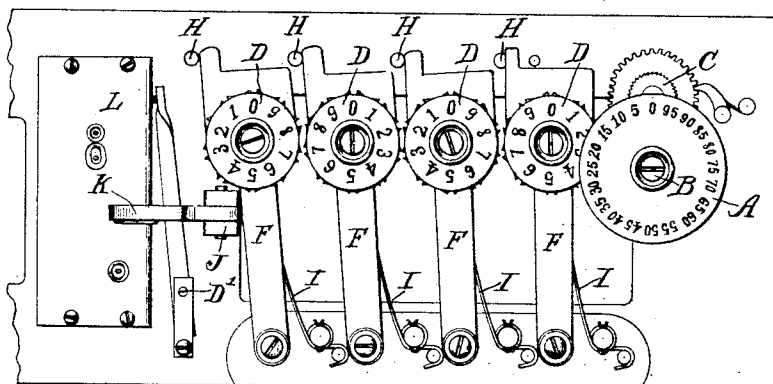
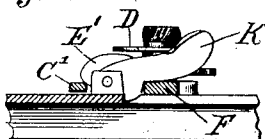


Fig. 3.



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Charles Smyth
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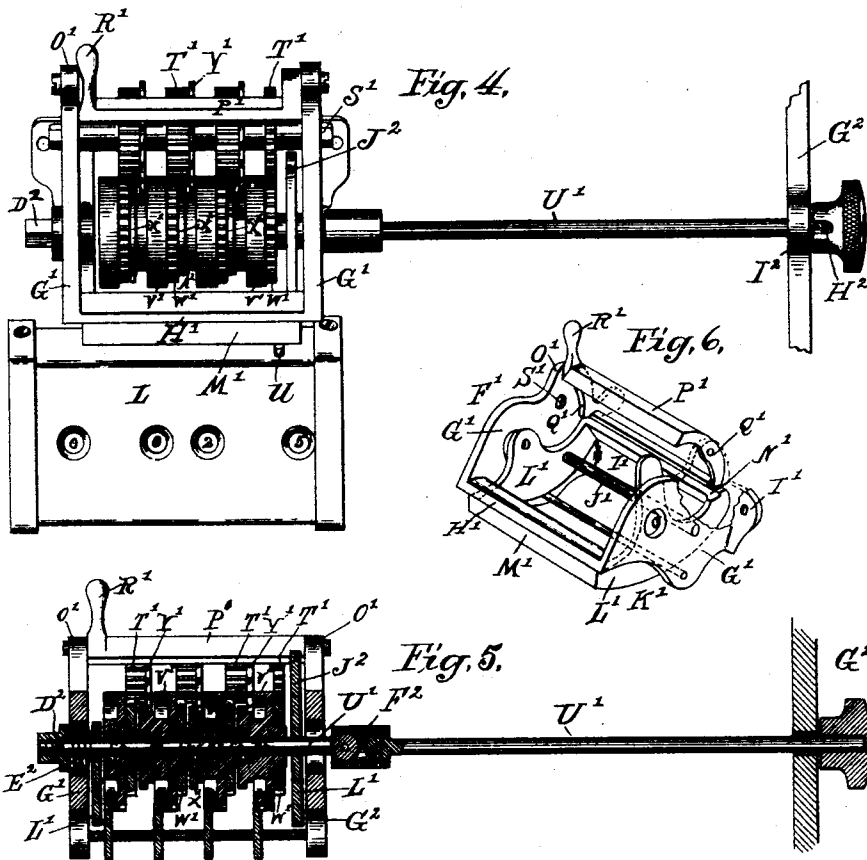
(No Model.)

3 Sheets—Sheet 2.

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3 Sheets—Sheet 3.

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Fig. 7.

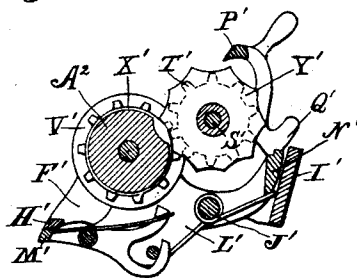
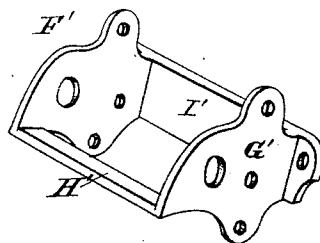


Fig. 8.



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UNITED STATES PATENT OFFICE.

CHARLES SMYTH, OF DAYTON, OHIO, ASSIGNOR TO THE NATIONAL CASH REGISTER COMPANY, OF SAME PLACE.

CASH-REGISTER.

SPECIFICATION forming part of Letters Patent No. 514,666, dated February 13, 1894.

Application filed June 15, 1893. Serial No. 477,721. (No model.)

To all whom it may concern:

Be it known that I, CHARLES SMYTH, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented a certain new and useful Improvement in Cash-Registers, of which the following is a description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to that class of machines in which the registering wheels are adapted to be set back to zero at stated intervals, as at the end of each day's business, and it has for its object the provision of novel means for preserving a record of the number of times the wheels are so reset or of the fact that they have been re-set. Machines of this class are usually provided with a locked lid, the key to which is carried by the proprietor or other person in authority, which lid has to be unlocked and opened each time it is desired to inspect the registering wheels and reset them to zero, and it has been common in such machines to combine an auxiliary registering device with the lid or lock thereof in such manner as to cause a unit to be added upon such registering device each time the lid is unlocked and opened. A record was thus preserved of all unlockings and openings of the lid, but inasmuch as the lid might be unlocked and opened for the purpose of merely inspecting the registering wheels, without returning them to zero, or for other purposes, such auxiliary registering device did not necessarily preserve an exact record of the number of times the wheels were reset to zero.

My present invention relates to the combination, with the train of registering wheels, of an auxiliary registering device which is necessarily actuated to register a unit each time the wheels are reset to zero.

I have illustrated in the drawings and will hereinafter describe two methods of so combining the auxiliary registering device with the train of registering wheels. I have not attempted to illustrate and will not attempt to describe all of the different ways in which such an auxiliary registering device may be so combined with the main registering wheels as to register the number of times they are reset to zero, but I have illustrated two dif-

ferent methods, and from the description of my invention hereinafter found it will be understood that it is not restricted, in its broader scope, to the particular method of combining the auxiliary register with the main registering wheels, but contemplates broadly the combination of such auxiliary register with such main registering wheels by means which will cause the auxiliary register to be automatically or necessarily actuated to register a unit each time the main registering wheels are disconnected for the purpose of resetting them to zero.

In the accompanying drawings Figure 1 represents a plan view of a train of registering wheels of a well-known form of cash register, having combined therewith an auxiliary registering device adapted to be actuated each time the main registering wheels are thrown out of driving connection with each other preparatory to resetting them to zero; Fig. 2 a corresponding view showing said wheels in the position they occupy when thrown out of driving connection with each other; Fig. 3 a detail sectional view showing the cam locking device by which the wheels are normally held in driving connection and by which the auxiliary register is actuated when the wheels are released and thrown out of driving connection; Fig. 4 a front view at an angle of another well known form of registering device having my auxiliary register combined with it; Fig. 5 a vertical section of the same through the main registering wheels; Fig. 6 a perspective view of the fixed and rocking frames in which the registering wheels and transfer gears are mounted; Fig. 7 a vertical cross-section through the registering wheels shown in Fig. 4; and Fig. 8 a perspective view of the fixed register-wheel frame shown in Figs. 4 to 7.

The same letters of reference are used to indicate identical parts in all the figures.

In the registering mechanism shown in Figs. 1 and 2 the primary registering wheel A is mounted upon a fixed stud B and geared to a master wheel C which is actuated in some suitable manner by the operations of the machine to register different values. The secondary wheels D are mounted upon arms F pivoted to the frame plate at one end, at G,

and adapted to have limited vibration at their opposite ends, the movement of said arms to the left being limited by stops H upon the frame plate and their movement to the right being limited by the adjacent registering wheel. The secondary registering wheels consist of an ordinary train of Geneva stop wheels, each wheel adapted to actuate the next higher wheel at each complete revolution, to add upon the higher wheel the amount registered by the lower one, and each wheel being adapted to lock the adjacent higher wheel from movement except at such times as the lower wheel itself is brought into position to advance the higher wheel. The primary wheel is provided with a single tooth or projection adapted to engage the first of the secondary wheels at each complete revolution of the primary wheel and advance the secondary wheel one number; all in the usual well-known manner. Engaging each of the arms F is a spring I tending to press the arm to the left and disengage the wheel carried by it from the adjacent wheel on the right. Pivoted between ears J upon the frame-plate, at the left of the left hand arm F, is a locking arm K provided with a shoulder, Fig. 3, adapted to engage the left hand arm F when the locking arm K is thrown down into normal position, to hold all of the arms F in their extreme right hand position, with their respective registering wheels in driving connection with each other. Whenever the locking arm K is thrown upward and the arms F released their springs I will throw their free ends to the left, and the positions of the stops on the frame-plate are such that the first arm F on the right will move just far enough to disengage its wheel from the primary wheel, the second arm will move a little farther, to accommodate the movement of the first arm and at the same time carry its registering wheel away from the first wheel D, the third arm will move a little farther than the second arm, to accommodate the movement of the second arm and also carry the third wheel D away from the second wheel D, while the fourth arm F will move far enough to accommodate the movement of the third arm and also disengage its wheel D from the third wheel. In this manner by simply throwing up the locking arm K and thereby releasing the arms F their free ends will be thrown to the left different distances by their respective springs and all of the registering wheels disengaged. When so disengaged they are free to be turned separately upon their respective studs to bring their zeros to the reading point, and when this has been done the simple throwing of the locking arm K downward to normal position will cause its cam surface below the locking shoulder to force the arms F back to the right and throw the registering wheels into driving connection again, and the locking shoulder of the arm will thereupon engage the left hand arm F and hold the wheels in such position.

Located at the left of the locking arm K, in this instance inclosed in a casing L secured upon the frame-plate E and broken away in Fig. 1 to expose the parts within, is the auxiliary registering device. This device in the present instance consists of three registering wheels M N O, with suitable means for actuating the primary wheel M and for adding the revolutions of each wheel upon the next higher wheel. The casing L is provided above each of the wheels with a reading opening, Fig. 2, through which openings the numbers upon the respective wheels are adapted to be singly exposed. The primary wheel M has fast upon its under side a ratchet P which is engaged by a pawl Q pivoted to the outer end of a spring arm R which is secured at its opposite end to the casing L at S. The pawl Q is in this instance in the form of a bell-crank arm, pivoted at its bend to the spring arm R, and having its shorter arm engaged by a flat spring T also secured to the casing L at the point S, said spring operating to yieldingly press the actuating pawl into engagement with the ratchet P upon the wheel M. Secured to or formed upon the outer end of the spring arm R is a stud or pin U which projects laterally to the right through an opening in the side of the casing L. Whenever this pin is pressed to the left, into the casing, the pawl Q is caused to turn the primary wheel M one number. The wheel M is provided at one point upon its periphery with a projection V adapted at each complete revolution of said wheel to engage a tooth of the wheel N and turn said wheel one number, while the wheel N is provided with a projection W adapted at each complete revolution of said wheel N to engage a toothed wheel X fast upon the under side of the wheel O and advance the latter one number. Pivoted upon a stud at Y are two pawls Z Z' pressed by a spring A' into engagement with the ratchet P of the wheel M and the toothed wheel N respectively, to yieldingly hold said wheels in normal position and prevent reverse movement of them, while a second spring-pressed pawl B' engaging the toothed wheel X performs that office for the latter.

Arranged intermediate the locking arm K and the auxiliary registering device above described is an arm or bar C' pivoted at one end to the frame-plate of the machine at D' and having its opposite free end resting adjacent the end of the operating pin U of the auxiliary registering device. The locking arm K is provided upon its left hand end adjacent its pivotal point with a cam E', Fig. 3, which when the right hand end of the arm is thrown upward to release the arms F which carry the main registering wheels, in the manner before described, will force the arm C' to the left, causing it to press the pin U to the left and the pawl Q to turn the primary wheel of the auxiliary registering device one number. When the locking arm is thrown downward to normal position again and the cam

E' clears the arm C' the spring arm R will return to normal position, projecting the pin U out of the casing L and causing it to carry the arm C' to normal position, the pawl Q being thereby thrown backward over a new tooth of the ratchet P. In this manner each time the locking arm K is thrown forward to release the arms F and permit the disengagement of the registering wheels from each other, preparatory to resetting them to zero, the auxiliary registering device is actuated and a unit added upon its primary wheel. The purpose of the auxiliary registering device is not so much to preserve a record of the total number of times that the main registering wheels may have been set to zero, as it is to prevent their being so reset without knowledge of the proprietor by any unauthorized person. Such being the case it has heretofore been the practice in some of the lid registering devices before referred to to provide the wheels of the auxiliary registering device with irregular series of numbers, for the purpose of preventing fraudulent manipulation of the machine by "running out" the auxiliary registering device, after it has been actuated to register the fact of a resetting of the main registering wheels to zero, and then continuing to actuate such auxiliary device until the previously indicated numbers are again brought into view. If the numbers upon the registering wheels are placed in irregular order the person attempting such manipulation of the machine will be unable to ascertain how many operations of the device will be necessary to return such numbers to exposed position. In the present instance the numbers upon the registering wheels are arranged in regular order, but instead of each wheel being provided with the nine digits and a cipher, as usual in adding devices, the primary wheel has such numbers and cipher, while the second wheel N has twenty-four numbers and a cipher, and the third wheel O fourteen numbers and a cipher.

My present invention has nothing to do with the arrangement of the numbers upon the registering wheels, nor to the number of figures upon each wheel, and a consecutive adding device, or a series of irregularly numbered wheels, may be employed in the auxiliary registering device.

In Figs. 4 to 8 I have shown the application of my invention to a different form of registering device from that in the first three figures of the drawings, being, however, a well known form in common use. In this device the registering wheels proper and their driving and transfer gears or pinions are mounted upon two separate parallel rods or shafts adapted to be moved bodily toward and from each other, to throw the wheels into and out of driving connection. The driving gears are mounted in a fixed frame F', see particularly Fig. 6, which consists of two side plates G' rigidly connected by a front cross bar H' and a rear cross bar I', by the latter of which the

frame is secured to the main frame of the machine or other fixed support. Loosely hung upon a transverse rod J' supported in the side plates of this frame is a second rocking frame K', composed of two side plates L' rigidly connected by front and rear cross bars M'N'. Pivoted between ears O' upon the upper rear edges of the side plates G' of the frame F' is a rocking bar P' supported by and having depending from it at each end an arm Q', the lower ends of which arms are adapted to cooperate with the rear cross bar N' of the frame K'. At its left hand end the bar P' is provided with an upwardly projecting handle R'. When the bar is in normal position the lower ends of its pendent arms Q' overlie the rear cross bar N' of the frame K' and lock the latter in normal position with its front cross bar M' abutting against the under side of the front cross bar H' of the frame F'. When the handle R' is thrown forward and the lower ends of the arms Q' thereby moved rearward and disengaged from the rear cross bar of the frame K' the latter is free to rock upon its pivotal rod J', which it will do by the gravity of its forward end and parts carried by it, or may be aided in this movement by a spring if desired. A spring may also be applied to the bar P' to hold the latter in normal position, so that when the handle R' is swung forward and the frame K' released and its front end thrown downward and rear end upward, the bar P' when released will be returned toward normal position until the lower ends of its pendent arms Q' engage the rear side of the cross bar N'. When the frame K' is thrown back to normal position its cross bar N' will move the lower ends of the arms Q' rearward until it clears them, whereupon the arms will be thrown forward and catch over said cross bar and lock the frame K'.

Loosely mounted upon a rod secured at its opposite ends in the side plates G' of the fixed frame F' at S' is a series of driving gears T', the one on the extreme right being simply a driving gear, while the other three may be considered both transfer and driving gears, each being intermittently actuated by the preceding registering wheel to transfer a unit to the succeeding wheel in the manner hereinafter explained.

Loosely mounted in the frame K', in front of its pivotal support, is a rotary shaft U' whose opposite ends project through enlarged openings in the side plates G' of the fixed frame F'. Loosely mounted upon this rotary shaft U' are the registering wheels V', each provided upon its right hand side with a gear W' meshing with one of the driving gears T'. The gears W' are of about one-half the width of the three left hand gears T', and immediately at the right of each gear W' of the three left hand wheels is a single-toothed disk X' fast upon and turning with the preceding registering wheel and standing in the plane of the same gear T' with which such gear W' meshes. At each complete revolu-

tion of such preceding wheel the single-toothed disk X' will engage the gear T' and advance it far enough to cause it to turn the succeeding wheel, to which the gear W' is secured, the distance of one number, and thereby effect the transfer to it of the amount indicated by the complete revolution of the preceding wheel. Each of the three left hand gears T' has fast upon its right hand side a locking disk Y' which co-operates with a locking disk A^2 fast upon the left hand side of the preceding registering wheel, between such wheel and its single-toothed transfer disk X' , the engagement of the two locking disks preventing any movement of the gear T' except at such time as the single-toothed disk X' is engaged with such gear, at which time a notch in the locking disk A^2 will be brought opposite the locking disk Y' , to permit such disk and its gear T' to be turned by the toothed transfer disk X' , in the usual well known manner.

The hubs of the registering wheels, as seen in the vertical section in Fig. 5, are provided upon their left hand sides with annular recesses. Within each recess and projecting to the left from the bottom thereof, parallel with the rotary supporting shaft of the wheels, is a pin or projection B^2 , while projecting from the rotary shaft U' within each of the recesses is a radial pin or projection C^2 . In the normal position of the parts these pins or projections upon the shaft and wheels do not stand in the same vertical planes, so that the wheels are free to be turned upon the shaft, but when the shaft is slid to the right its pins C^2 are brought into the same plane as the pins B^2 of the wheels, so that if the shaft be rotated in this position its pins C^2 will engage the pins B^2 and pick up the registering wheels at the various points at which they may be standing and carry them around with the shaft. The shaft has fast upon its extreme left hand end, outside the left hand side plate G' of the frame F' , a flanged nut D^2 , between which and the side plate L' of the frame K' a spring E^2 is coiled around the shaft. This spring E^2 yieldingly presses the shaft to the left and holds it in normal position, so that by pulling the shaft to the right against the stress of this spring and giving it a complete revolution all of the registering wheels may be picked up and carried to initial position by the pins C^2 upon the shaft. At the left of the frame F' the shaft U' in this instance has interposed in it a flexible joint F^2 , while the extreme right hand end of the shaft U' extends through a fixed plate of the framework G^2 of the machine and upon its outer end has fastened a thumb piece for turning it. This thumb piece is provided with a notch or recess H^2 which co-operates with a pin I^2 upon the side of the frame plate G^2 . The notch and pin are normally in engagement, and by pulling the thumb piece and shaft U' to the right until the notch is disengaged from the pin and then rotating the thumb piece and shaft until the notch comes opposite the pin

again the shaft will have been given a complete revolution and at the end of it be thrown to the left into normal position again by the action of the spring E^2 . It will be understood that the registering wheels cannot be returned to zero or initial position in this manner until the handle R' of the rocking bar P' is thrown forward and the lower ends of the arms Q' disengaged from the rear cross bar N' of the frame K' and the latter released and its front end thrown downward, so that it is necessary, preparatory to each resetting of the registering wheels to zero, to unlock the rocking frame in which the registering wheels are mounted and swing the wheels away from the driving pinions T' , and it is by this movement of the swinging frame that the auxiliary registering device is actuated under one of the methods by which I have combined it with this form of registering device, as may now be described. The auxiliary registering device is, or may be, in this instance substantially the same as that shown in Figs. 1 and 2 of the drawings and heretofore described. It is arranged transversely beneath the front cross bar M' of the frame K' , with the pin U projecting upward immediately beneath said bar. Whenever the handle R' of the locking bar P' is thrown forward and the frame K' thereby unlocked the downward movement of the front end of the frame K' , as the registering wheels are thrown out of gear with the driving gears, will depress the pin U and cause the primary wheel of the auxiliary registering device to be turned one number. When the frame K' is thrown back to normal position again and the registering wheels re-engaged with the driving gears the pin U will resume its normal position, ready to be engaged and depressed the next time the registering wheels are thrown out of driving connection. In this manner the auxiliary registering device is actuated at each disconnection of the registering wheels from their driving gears preparatory to resetting them to zero.

The frame K' is provided at one side with an upwardly extending arm or handle J^2 by which the frame can be readily thrown into normal position after it has been moved therefrom and the registering wheels reset. The rear cross bar N' of the frame K' is also preferably provided with a sharp upper edge which is adapted to engage the driving gears T' whenever the front end of the frame K' is thrown downward and the registering wheels disengaged from the gears T' , to lock the latter and prevent them becoming displaced while the registering wheels are disengaged from them.

I have now described two methods of combining the auxiliary registering device with two widely differing forms of registering devices by means which causes the auxiliary device to be actuated each time the main registering wheels are thrown out of driving connection with each other preparatory to reset-

ting them to zero. In Figs. 7 and 8, however, I have shown the combination of the auxiliary registering device with the main registering device by means which is independent of the connection and disconnection of the registering wheels. Under the arrangement shown by those views the auxiliary registering device is actuated by the rotary shaft by which the registering wheels are returned to initial position. This method of combining the auxiliary registering device is not applicable to the form of registers shown in Figs. 1 and 2 of the drawings, but is applicable not only to the form shown in the remaining figures but to all registering devices in which the wheels are adapted to be returned to initial position by the rotation or oscillation of the shaft upon which they are mounted or which is common to them. As shown in Fig. 7 the auxiliary registering device is arranged with its upper edge adjacent to and parallel with the rotary shaft U' heretofore described, with the pin U of its pawl-carrier, (in this instance widened into a plate,) standing in the path of a cam K² fast upon the shaft U'. At each complete revolution of the shaft U' the cam K² will engage and depress the pin U and actuate the auxiliary register to add one upon it, and in this manner a record of the number of times the main registering wheels have been reset to zero by rotation of this shaft may be preserved.

It will be understood from the foregoing description that my invention is not restricted, in its broader scope, to any particular method of combining the auxiliary register with the main registering device, but contemplates broadly the combination of a main register whose wheels are adapted to be returned to initial position at intervals, with an auxiliary register actuated each time the main registering wheels are so returned to initial position. In the first six figures of the drawings I have illustrated the combination of the auxiliary register with the main register by means which causes the auxiliary register to be actuated when the wheels of the main register are thrown out of driving connection preparatory to returning them to initial position, and in the last two figures of the drawings I have shown the auxiliary register combined with the main register by means which causes the auxiliary register to be actuated by the act of returning the wheels of the main register to initial position after they have been thrown out of driving connection with each other. My broader claims are therefore intended to include both of these arrangements as well as any others coming within the terms of my claims, while my more specific claims are directed to the combination of the auxiliary register with the main register by means

which causes the auxiliary register to be actuated when the wheels of the main register are thrown out of driving connection with each other preparatory to being reset to initial position.

In another pending application filed simultaneously with this I have illustrated and described, and specifically claimed, the combination of the auxiliary register with the rotary resetting shaft, as illustrated in Figs. 7 and 8 of this application and above described.

Having thus fully described my invention, I claim—

1. In a cash register, the combination of a main registering device, whose wheels are adapted to be thrown out of driving connection with each other preparatory to returning them to initial position, with an auxiliary registering device actuated each time the wheels of the main registering device are so disconnected, substantially as and for the purpose described.

2. In a cash register, the combination of a main registering device having a driving wheel and a registering wheel adapted to be thrown into and out of operative connection with each other, with an auxiliary registering device actuated each time the driving wheel and registering wheel are so disconnected, substantially as and for the purpose described.

3. In a cash register, the combination of a train of driving gears and a train of registering wheels, the one mounted in a fixed frame and the other in a movable frame, whereby wheels and gears may be thrown into and out of engagement with each other, and an auxiliary registering device actuated by the movable frame, substantially as described.

4. In a cash register, the combination of a fixed frame, a rocking frame pivoted therein, a train of driving gears mounted in the fixed frame, a train of registering wheels mounted in the rocking frame and adapted to be thrown into and out of engagement with the driving gears, and an auxiliary registering device actuated by the movements of the rocking frame, substantially as described.

5. In a cash register, the combination of a fixed frame, a rocking frame pivoted therein, a train of driving gears mounted in the fixed frame, a train of registering wheels mounted in the rocking frame, a locking device for holding the rocking frame in normal position, and an auxiliary registering device actuated by the rocking frame when released from the locking device and permitted to move, substantially as described.

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