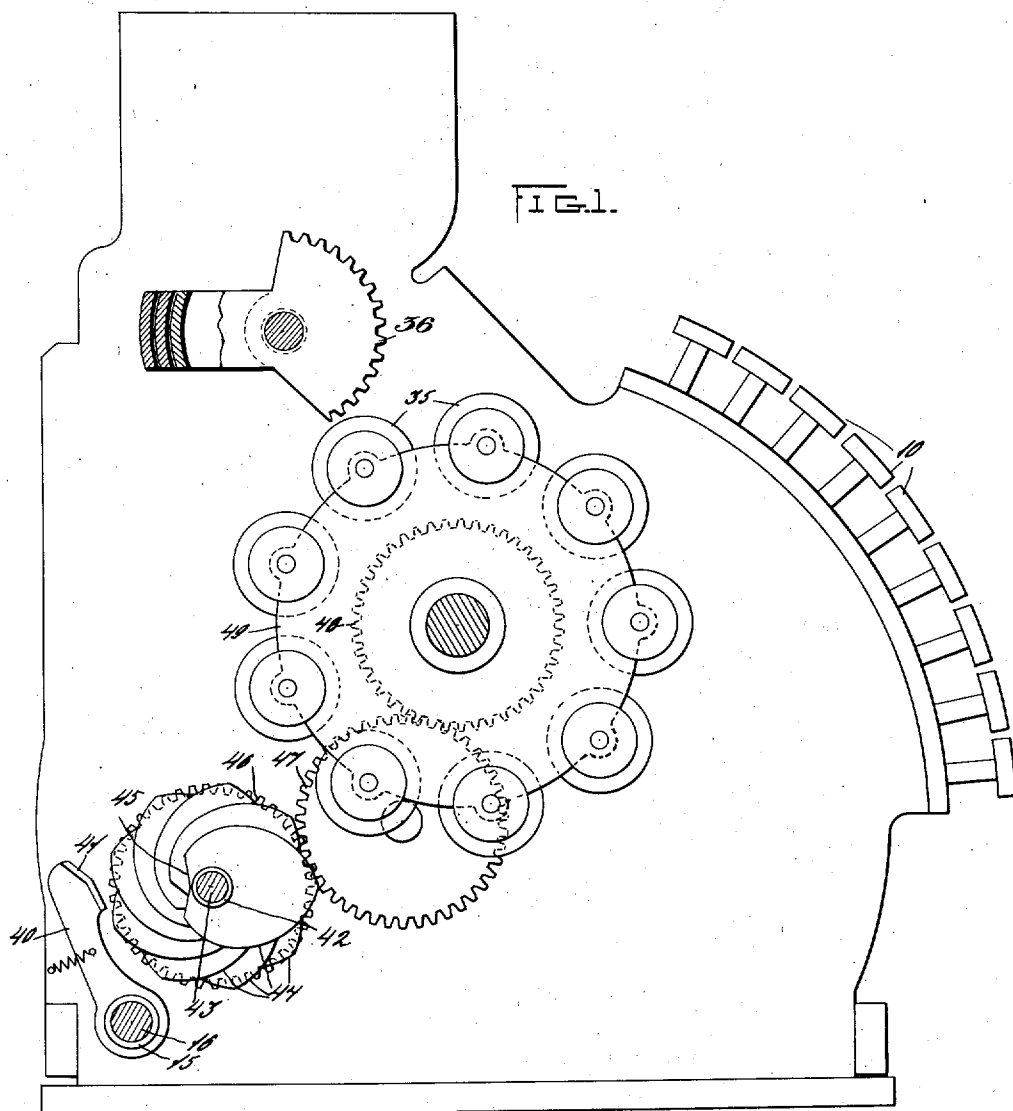


E. S. CHURCH.
CASH REGISTER.
APPLICATION FILED SEPT. 10, 1906.

974,952.

Patented Nov. 8, 1910.
3 SHEETS—SHEET 1.



Witnesses

[Signature]

Carl Maut.

Edmund S. Church
Inventor

J. B. Hayward

and R. C. Glass.

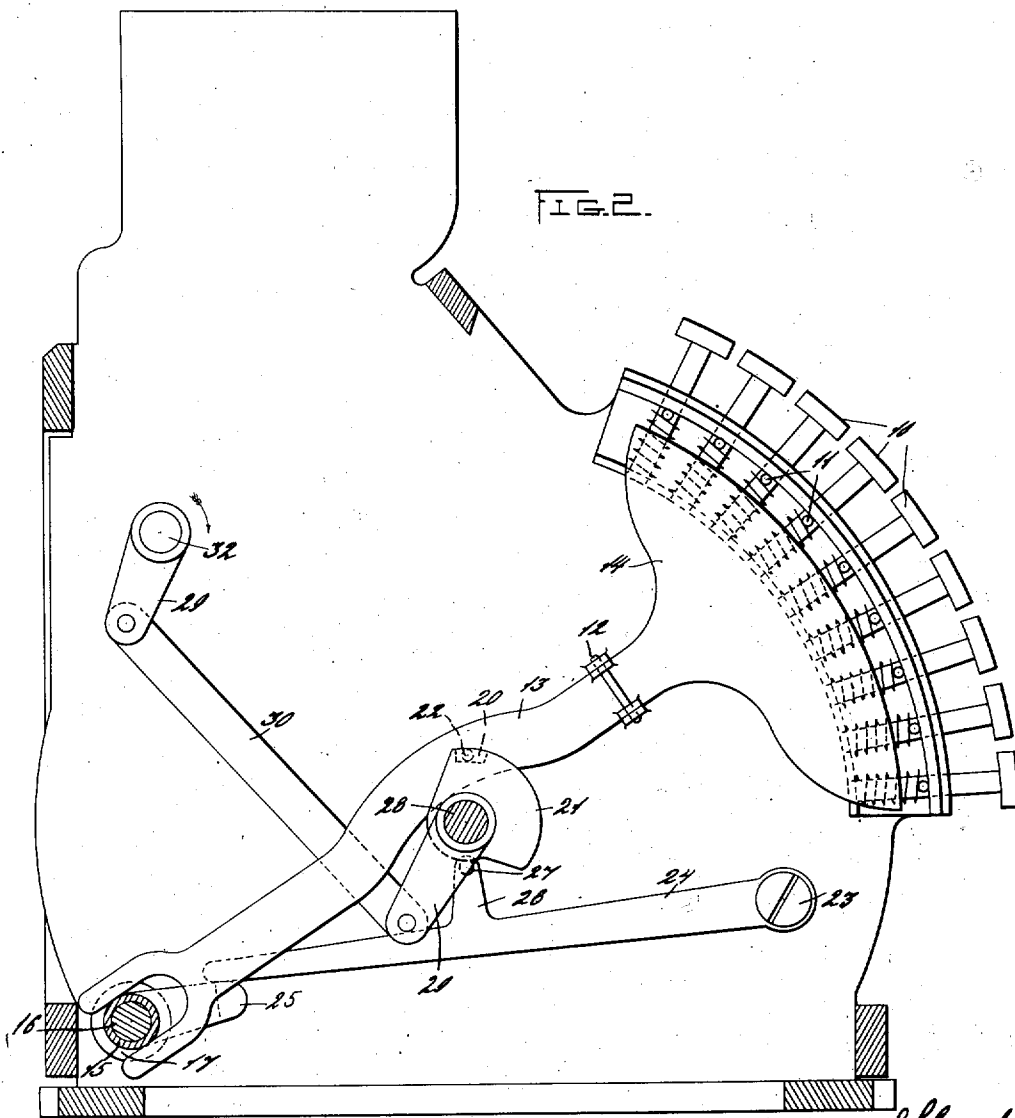
Attorneys

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Witnesses

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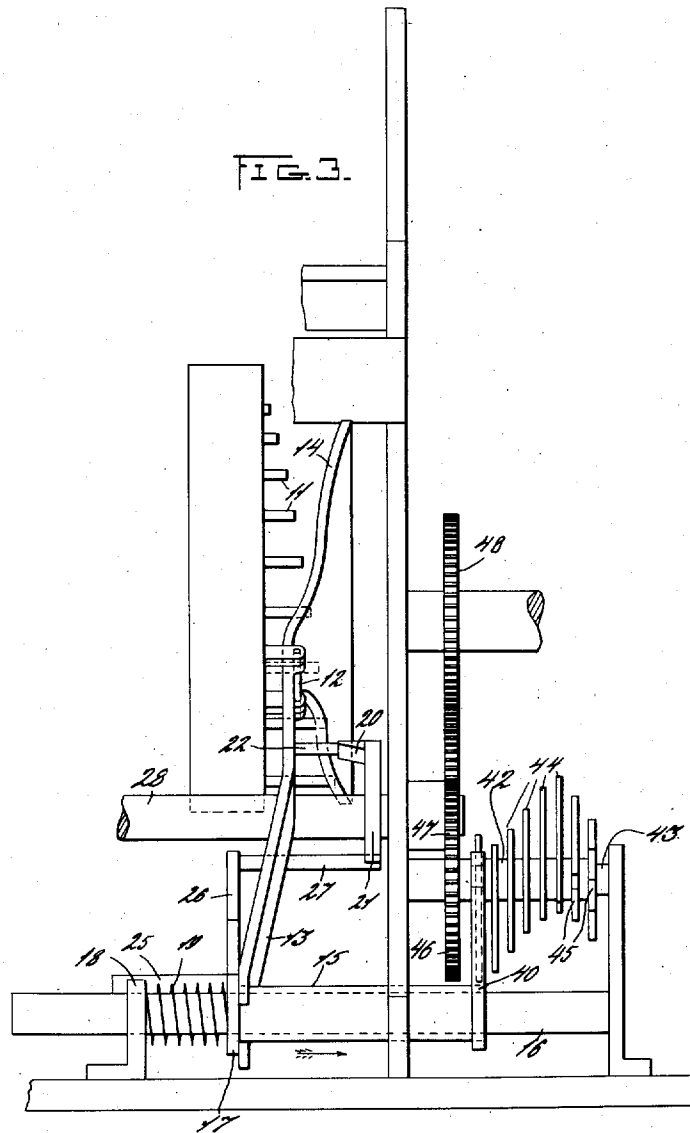
Attorney s.

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8 SHEETS-SHEET 3.



Witnesses

W. H. White
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Attorneys

UNITED STATES PATENT OFFICE.

EDMUND S. CHURCH, OF DAYTON, OHIO, ASSIGNOR TO THE NATIONAL CASH REGISTER COMPANY, OF DAYTON, OHIO, A CORPORATION OF OHIO, (INCORPORATED IN 1906.)

CASH-REGISTER.

974,952.

Specification of Letters Patent.

Patented Nov. 8, 1910.

Application filed September 10, 1906. Serial No. 333,950.

To all whom it may concern:

Be it known that I, EDMUND S. CHURCH, 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 cash registers and has for its object to improve the construction of that type of machine known as the multiple register. By this term is meant one in which transactions are adapted to be entered in the machine in segregated groups.

The invention includes a plurality of accounting devices which may be registers or sets of printing wheels or separate mechanisms for carrying record material.

The invention is adapted to be used with all such types of device, consisting as it does of mechanism for easily and quickly bringing any desired accounting device into position to be operated.

The invention further contemplates improvements in that type of cash registers having a rotatable reel containing a plurality of accounting devices. In the prior art instances of the use of such reels are to be found but they have in most cases been adapted to be positioned directly by a manipulative device such as a lever and such positioning consumes valuable time. The present invention improves this construction by providing a series of keys which when depressed serve to determine the positioning of such a reel, the actual work of such positioning being performed by a main operating device such as a handle or crank lever or cash drawer.

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 is a side elevation of the machine to which these improvements are applied. Fig. 2 is a transverse vertical section through the machine

taken just inside of the side frame, and Fig. 3 is a partial rear view of the machine.

The present invention is designed to furnish means for quickly and accurately setting any one of a plurality of accounting devices for operation by a common operating mechanism. In the present improvement the accounting devices are shown as counters mounted on a rotatable carriage. Connected to this carriage through gearing are a plurality of helically arranged heart cams which are adapted to be separately engaged by a movable element to bring the carriage to a desired position. Such heart cams are widely used to reset clocks and are used herein in a very similar way except that a plurality of them are provided displaced angularly around a common shaft, so that the whole system may be set at any one of a plurality of positions. A series of keys is used to determine the positioning of the carriage such keys when depressed being in the path of a lever which serves to position the movable element before referred to in the plane of any desired heart cam. The mechanism described serves to take all the work of positioning the carriage from the keys or levers and put it on the main operating device.

The type of machine to which these improvements are shown as applied is now well known in the art being fully shown and described in Letters Patent to Thos. Carroll No. 654,226 dated July 24, 1900 and No. 703,639 dated July 1, 1902, but it is to be understood that the invention is equally as well adapted to be applied to other types of machine.

Keys 10 are slidably mounted in the framework of the machine and on their outer ends bear characters representing different clerks, departments or classes of transactions. When any of these keys is depressed it sets the mechanism shown in a position such that upon the operation of the machine one of the counters (or sets of printing wheels) 35 corresponding to the keys 10 depressed will be brought into a position to be operated upon by mechanism fully shown and described in the above mentioned patents. This operating mechanism comprises a series of segment racks 36, having connections to the main operating devices of the

machine, and any one of the registering devices or counters may be actuated by these segment racks.

Hereafter the counters or sets of printing wheels 35 will be called "counters," it being understood that they may equally as well be formed with type on their periphery to print upon any suitable printing surface or may be record carrying devices.

On reference to Fig. 2 it will be seen that the keys 10 are spring pressed to their normal outer position and are provided with laterally projecting pins 11 which (see Fig. 3) are of different lengths. When one of the keys 10 is depressed it is latched in its operated position by a detent (shown in the above mentioned patents).

Pivoted at 12 on the framework of the machine is a lever 13 having a sector shaped forward end 14 which spans all of the key pins 11 but which is not of great enough extent to strike any of the said pins unless the key bearing a pin has been depressed. The lever 13 is normally held out of engagement with the key pins 11 by a camming lug 20 which is mounted on a camming disk 21 and coöperates with a pin 22 mounted on said lever 13.

The rear end of the lever 13 is so formed as to straddle a sleeve 15 mounted on a shaft 16. On said sleeve is mounted a collar 17 between which and a stationary standard 18 is interposed a spring 19 which normally tends to force the collar 17 in the direction of the arrow in Fig. 3.

From the above description of the mechanism it will be plainly seen that when a key 10 is depressed one of the key pins 11 is brought into the path of the sector shaped end 14 of the lever 13 thereby forming a stop against which said lever abuts, when released by mechanism to be later described. When the lever 13 is released the spring 19 will force the sleeve 15 to the right in Fig. 3, a distance depending upon the key depressed until it is stopped by the pin 11 of the depressed key.

Pivoted at 23 on the framework of the machine and extending rearward is a lever 24 the end of which coöperates with an arm 25, secured to the sleeve 15, to operate said sleeve. The arm 25 is so shaped as to be always in the path of the lever 24. Extending upward from the center of the lever 24 is an arm 26 upon which is mounted a pin 27. This pin is acted upon by the periphery of the camming disk 21 and when forced downward will through the arm 25 rock the sleeve 15 toward the front of the machine.

The camming disk 21 is rigidly mounted on the shaft 28 and is rocked through the arms 29 and link 30 by the shaft 32 which revolves in the direction of the arrow in Fig. 2.

From the shape of the camming disk 21

and the position of the camming lug 20 it will be clear that the lug 20 will first be moved out of the path of the pin 22 to release the lever 13 and allow spring 19 to set the sleeve 15 in a desired position corresponding to the key 10 depressed, after which the lever 24 will be cammed downward to rock the sleeve 15.

On the outer end of the sleeve 15 is secured a spring drawn camming arm 40 which is provided with a V shaped operating face 41. Rigidly secured to a sleeve 42 mounted on a shaft 43 is a set of nine heart cams 44 equally spaced around said sleeve, this being equal to a 40° pitch.

Referring to Fig. 3 it will be seen that when the sleeve 15 is moved to the right it will position the camming arm 40 directly in line with one of the heart cams and when arm 40 is operated as before explained the operating face thereof will contact with the periphery of one of said cams and rotate it until said operating face 41 coöperates with a V shaped alining notch 45 of said cam, thereby positioning the desired counter or other accounting device for operation. It will be noticed that the greatest possible degree of movement of the sleeve 42 is 4/9 of a rotation in either direction.

A gear wheel 46 is rigidly secured to the sleeve 42 and meshes with an idler 47 which in turn meshes with another gear wheel 48. The gear 48 is mounted upon a drum 49 which carries on its periphery nine counters 35 and thus it will be clearly understood that when the sleeve 42 is moved to any one of its nine positions it will through the gears 46—47 and 48 rotate the drum 49 to bring a corresponding counter into operating position.

The operation of the machine is as follows: The desired key 10 is depressed and the handle or other actuating device on shaft 32 is given a complete rotation. When the key is depressed it is locked in position and remains so during the operation of the handle, such depression carrying the key pin 11 into the path of the sector 14. When shaft 32 starts to rotate the cam 21 begins to oscillate, and the camming lug 20 is thereby carried away from the pin 22 on lever 13. This lever therefore moves under the tension of spring 19 until the sector 14 abuts the key pin 11 of a depressed key thereby carrying the sleeve 16 and operating arm 40 into register with one of the set of heart cams. Further oscillation of cam 21 serves to depress lever 24 thereby rocking arm 25 which as stated is rigidly connected to the operating arm 40. Such rocking causes the V shaped end 41 of the operating arm to engage one of the heart cams and move the same until its notch 45 is brought to contact with the operating arm 40.

As the counter carriage is connected rig-

idly to the system of cams the said carriage is thereby also positioned with a desired counter in the proper place for its operation.

When the cam 21 is reversely oscillated it releases lever 24 which therefore rises allowing arm 40 to be withdrawn from the heart cam. When cam 21 nears its normal position the camming lug 20 strikes the pin 22 on lever 13 and resets the same against the tension of spring 19. The depressed key is also released and returns to normal position under the tension of its spring. It will be seen that the carriage and heart cams have no normal position to which they are returned at each operation. The system remains in the position to which it has been adjusted until it is desired to set it to some new position and it will be clear that in no case will it be necessary to rotate the reel more than $4/9$ of a circle or 160° for the reason that the heart cams will in every case move the carriage toward the desired position through the shorter of two paths.

The invention is not limited to the number of counters used because the mechanism described is evidently adapted to be used in connection with any number of counters, by merely changing the number and angular difference of position of the heart cams.

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

What is claimed is as follows:

1. In a cash register, the combination with a rotatable member and a plurality of counters mounted thereon, of a shaft for moving said member, a plurality of helically arranged heart cams mounted on said shaft, a lever and means for positioning said lever to engage any one of said cams to move the member differentially.

2. In a cash register, the combination with a rotatable carriage, and a plurality of accounting devices mounted thereon, of a shaft with connections to said carriage, a plurality of driving cams helically mounted on said shaft, a lever adapted to engage any desired one of said cams, means for moving said lever laterally to engage any desired driving cam, means for forcing said lever against its cam when so positioned, whereby to move the carriage differentially, and keys for controlling the position of said lever.

3. In a cash register, the combination with a carriage and a plurality of counters mounted thereon, of a shaft, a plurality of heart cams mounted on said shaft, connections between said shaft and carriage, means adapted to cooperate with any cam to set said carriage, means for moving said cooperating

means differentially, and manipulative devices controlling the extent of such movement.

4. In a cash register, the combination with a plurality of counters, and common operating means for same, of means for bringing any desired counter into operative relation with said operating means, a plurality of heart cams controlling said means, said cams being helically arranged, a lever adapted to be moved to bring it into position to cooperate with any cam, and means for rocking the lever when so moved.

5. In a cash register, the combination with a plurality of accounting devices, and operating devices therefor, of means for bringing any desired accounting device into operative relation with the operating mechanism, cams controlling said means, and a common element adjustable to cooperate with any desired cam and movable to operate said cam, with means for moving and adjusting said element.

6. In a cash register, the combination with a plurality of accounting devices, of an operating mechanism therefor, a plurality of devices one for each accounting device, an adjustable means for actuating any one of the second mentioned devices to bring its corresponding accounting devices and operating mechanism in cooperative relation, and manipulative devices controlling the positioning of the adjustable actuating means relative to the devices actuated thereby.

7. In a cash register, the combination with a plurality of accounting devices, and a common operating mechanism for said accounting devices, of a plurality of similar helically positioned cam devices, with connections therefrom to said accounting devices, a series of keys, an operating lever, and means under control of said keys for adjusting said lever bodily to cooperate with any desired one of said cam devices.

8. In a cash register, the combination with an operating mechanism of a rotary register frame, a plurality of registers carried thereby, a plurality of heart cams adapted to be separately actuated by the operating mechanism, and cooperating with the register frame to move the latter to different extents to bring the different registers into position to be operated by the operating mechanism.

9. In a cash register, the combination with an operating mechanism, of a rotary frame, a plurality of accounting devices carried by said frame, a plurality of heart cams for turning said frame to different extents to bring any desired accounting device to position to cooperate with said operating mechanism and means movable to engage and operate any desired heart cam.

10. In a cash register, the combination with an operating mechanism, of a plurality of accounting devices separately operated

thereby, a plurality of heart cams for bringing any accounting device into operative relation with said mechanism, and means for engaging and operating any desired one of said cams.

11. In a cash register, the combination with an operating mechanism, of a plurality of accounting devices adapted to separately cooperate therewith, a plurality of heart cams connected to said accounting devices for controlling the operative relation between the operating mechanism and any desired accounting device, means for engaging and actuating any of said cams and manipulative devices for determining which cam shall be engaged and actuated.

12. In a cash register, the combination with an operating mechanism, of a plurality of accounting devices adapted to be operated thereby, a plurality of cams positively connected to said accounting devices, and means for acting on any desired cam for moving the accounting devices.

13. In a cash register, the combination with an operating mechanism, of a plurality of accounting devices adapted to be operated thereby, a plurality of heart cams positively connected to said accounting devices, and means for acting on any desired cam to move the accounting devices.

14. In a cash register, the combination with an operating mechanism, of a rotatable carriage, a plurality of accounting devices carried by said carriage and adapted to be separately operated by said mechanism, a plurality of cams connected to said carriage, an operating device for said cams and keys for moving said operating device to engage any desired cam.

15. In a cash register, the combination with an operating mechanism, of a plurality of accounting devices operated thereby, a shaft, a plurality of cams mounted on said shaft, connections whereby said cams serve to determine which accounting device shall be operated a plurality of keys and a means controlled by said keys, constructed to engage and operate any desired cam.

16. In a cash register, the combination with an operating mechanism, of a rotary carriage, a plurality of registers carried thereby and adapted to be separately operated by said mechanism, a plurality of rotatable cams, means adjustable to engage and operate any desired one of said cams, and connections whereby the operations of a predetermined cam serves to position a desired register for operation.

17. In a cash register, the combination with an operating mechanism, of accounting devices arranged to be actuated thereby, a plurality of differently positioned devices positively connected to said accounting devices, and means for operating on any one of said positioned devices to bring a desired

accounting device into operative relation with the operating mechanism.

18. In a cash register, the combination with an operating mechanism and a plurality of accounting devices constructed to be separately operated thereby, of a plurality of differently positioned devices connected to move as a unitary structure, connections from said unitary structure to said accounting devices, and a lever constructed to act on any one of said differently positioned devices and thereby position the desired accounting device for operation.

19. In a cash register, the combination with a plurality of accounting devices, of a movable carrier for said devices, a plurality of differentially positioned devices, with positive connections from said positioned devices to said accounting devices, a member movable in one direction to operative relation with any selected one of said positioned devices and movable in another direction to operate said selected positioned device, and manipulative devices controlling the extent of the first mentioned movement.

20. In a cash register, the combination with a plurality of accounting devices and an adjustable carrier for said devices, a plurality of differentially positioned elements connected to said carrier, a driving device for said carrier, means for differentially adjusting said driving device in one direction to operative relation with any selected one of said positioned elements, means for moving said device in a different direction to operate the selected positioned element and keys controlling the differential movement of said driving device.

21. In a cash register, the combination with a driven shaft, of helically spaced cams mounted on said shaft and positioned to produce differential movement of said shaft, a driving arm cooperating with said cams, means for causing relative lateral movement between said cams and said driving arm to bring a desired cam in alinement with said arm, and means for forcing the driving arm against the alined cam to produce the differential movements of said driven shaft.

22. In a cash register, the combination with counters and a driven shaft carrying said counters, of helically spaced cams mounted on said shaft and positioned to produce differential movement of said shaft, a driving arm cooperating with said cams, means for causing relative lateral movement between said cams and said driving arm to bring a desired cam in alinement with said arm, and means for forcing the driving arm against the alined cam to produce the differential movements of said driven shaft.

23. In a cash register, the combination with a driven shaft, of helically spaced cams

mounted on said shaft, and positioned to produce differential motion thereof, a driving arm cooperating with said spaced cams, a series of keys, means controlled by said
 5 keys for causing relative motion between said spaced cams and driving arm to bring any desired cam and said arm into alignment, and means for forcing said driving arm against the aligned cam to produce differential movements of said driving shaft.
 10

24. In a machine of the class described, the combination with a movable frame and a plurality of accounting devices carried thereby, of an operating mechanism, and
 15 means for moving said frame always in the shorter direction to bring any one of the accounting devices and the operating mechanism into cooperative relation.

25. In a machine of the class described, the combination with a plurality of accounting devices, of an operating mechanism therefor, the said accounting devices and operating mechanism being relatively adjustable to bring any one of the accounting
 25 devices and operating mechanism in cooperative relation, and means always bringing the operating mechanism and any one of the accounting devices into cooperative relation by the minimum extent of movement.

26. In a machine of the class described, the combination with a movable frame and a plurality of accounting devices carried thereby, of an operating mechanism for said
 30 accounting devices, a plurality of cams connected to the movable frame, and an adjustable device for actuating the cams to bring

the operating mechanism and accounting devices in cooperative relation, the said cams and adjustable device being constructed to impart always to the frame the minimum
 40 extent of movement in bringing any of the accounting devices in cooperative relation with the operating mechanism.

27. In a machine of the class described, the combination with a movable frame and
 45 a plurality of accounting devices carried thereby, of an operating mechanism for said accounting devices, and a single means for positively moving the frame to bring any one of the accounting devices in cooperative
 50 relation with the operating mechanism, and then positively arresting said frame.

28. In a machine of the class described, the combination with a movable frame and a plurality of accounting devices carried
 55 thereby, of an operating mechanism for said accounting devices, a series of helically arranged cams connected to the movable frame, and an adjustable device constructed to engage any one of the cams and move the
 60 frame to bring anyone of the accounting devices in cooperative relation with the operating mechanism, the said adjustable device being constructed to arrest positively the frame when it has been positioned properly.
 65

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

EDMUND S. CHURCH.

Witnesses:

ROY C. GLASS,

CARL W. BEUST.