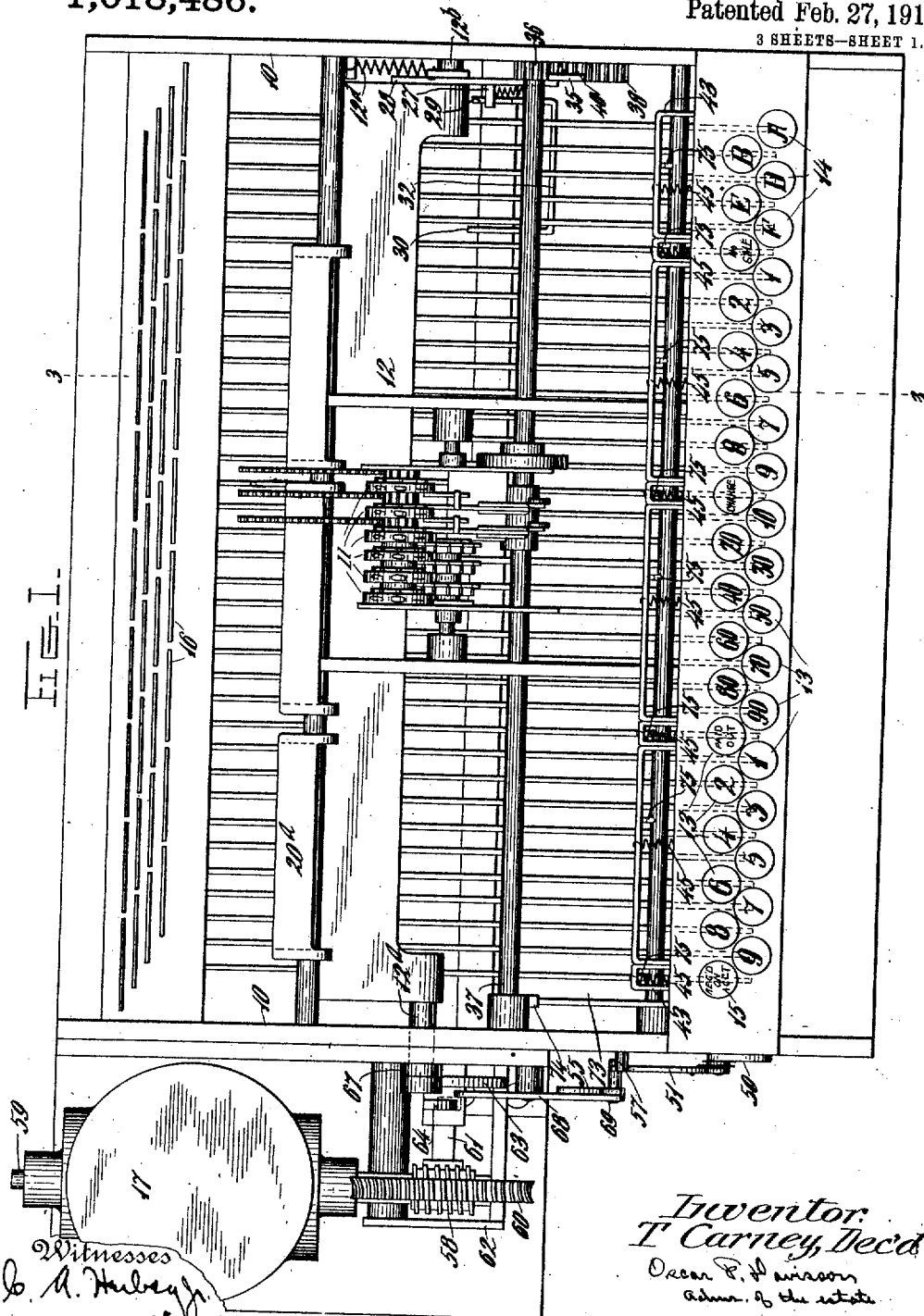


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O. F. DAVISSON, ADMINISTRATOR
CASH REGISTER.
APPLICATION FILED JUNE 16, 1908.

1,018,486.

Patented Feb. 27, 1912.

3 SHEETS—SHEET 1.



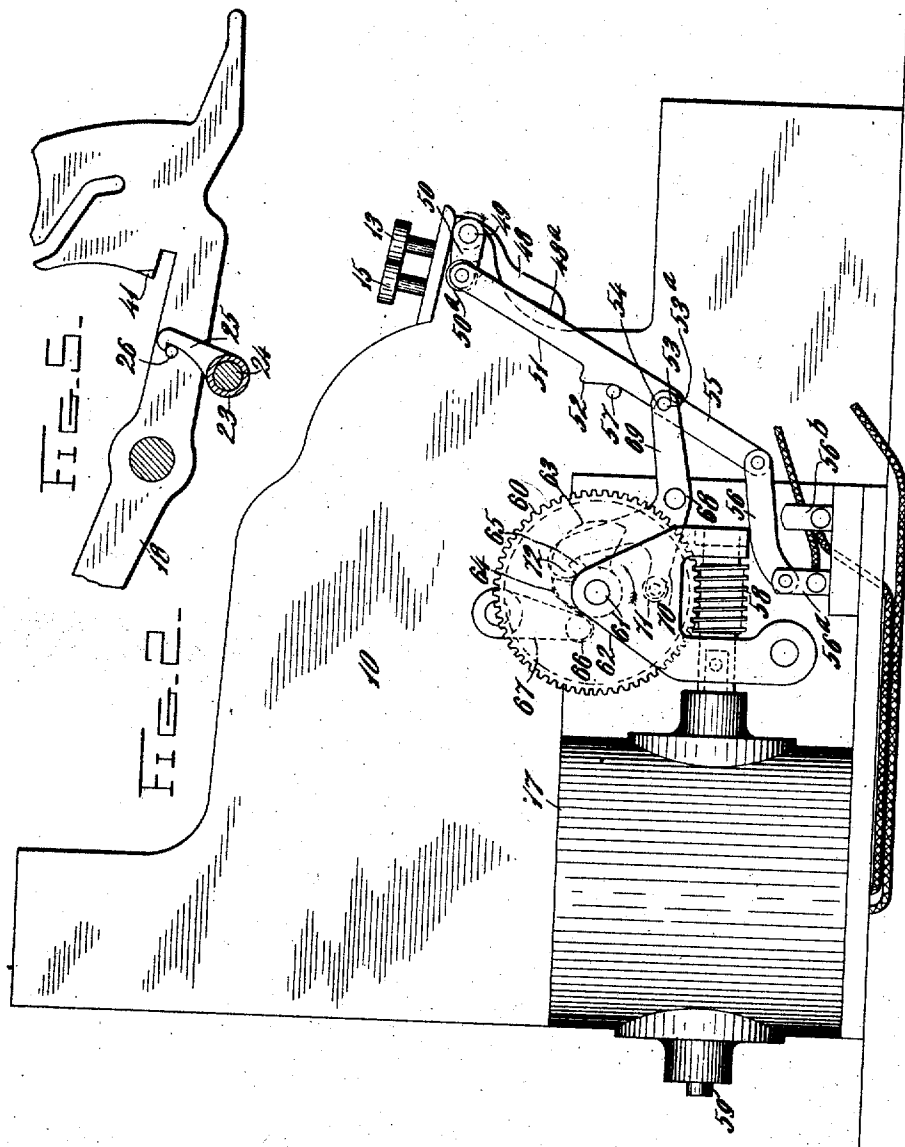
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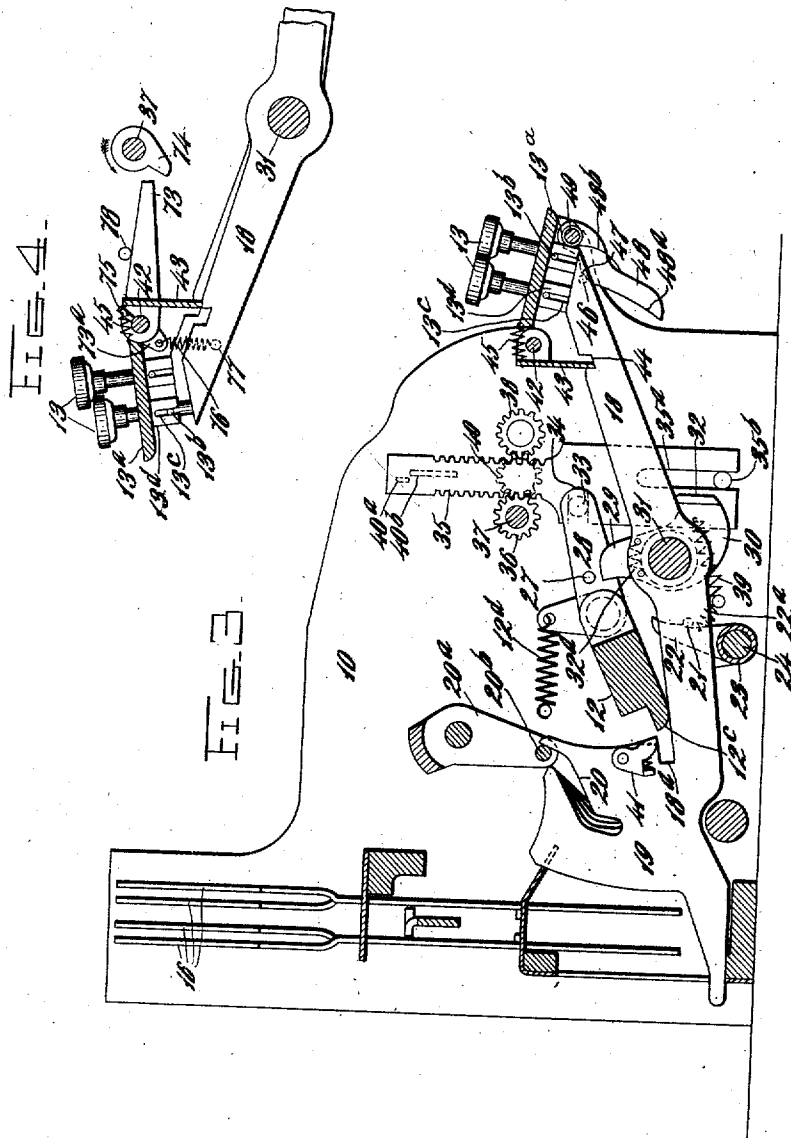
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

OSCAR F. DAVISSON, OF DAYTON, OHIO, ADMINISTRATOR OF THOMAS CARNEY, DECEASED, ASSIGNOR TO THE NATIONAL CASH REGISTER COMPANY, OF DAYTON, OHIO, A CORPORATION OF OHIO, (INCORPORATED IN 1906.)

CASH-REGISTER.

1,018,486.

Specification of Letters Patent.

Patented Feb. 27, 1912.

Original application filed December 22, 1902, Serial No. 136,165. Divided and this application filed June 16, 1908. Serial No. 438,808.

To all whom it may concern:

Be it known that I, OSCAR F. DAVISSON, a citizen of the United States, residing at Dayton, county of Montgomery, in the State of Ohio, administrator (with will annexed) of the estate of THOMAS CARNEY, deceased, late a citizen of the United States, who did in his lifetime invent certain new and useful improvements in Cash-Registers, do declare the following to be a full, clear, and exact description of said invention.

This invention relates to driving or operating devices and has particular relation to improvements in electrically operated machines.

Among the objects of the invention are to provide electric driving or operating device particularly adapted to operating a cash register or other machine needing an intermittent operation, although many features of the invention are equally applicable to other types of driven mechanisms. A cash register is operated only intermittently, and at each operation is not in motion for more than a few seconds so that particular attention must be paid to the starting and controlling devices for the motor.

A second object therefore, is to provide an improved key control for the motor preventing a second operation before the completion of the first, and thereby insuring a complete movement of the registering mechanism.

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

Of said drawings: Figure 1 represents a top plan view of the machine embodying my invention, with the cabinet removed. Fig. 2 represents an end elevation of the same, the cash drawer being omitted. Fig. 3 represents a vertical, transverse section through the machine, on the line 3—3 of Fig. 1; the cash drawer being omitted. Fig.

4 represents a detail side elevation of the key levers and their detent; one of the said levers being in a depressed position. Fig. 5 represents a detail side elevation, partly broken away, one of the clerks' keys and its lock.

The electric motor used for driving the cash register or other machine is not a part of the present invention and has been indicated only diagrammatically.

The invention is shown as applied to a well-known type of cash register now on the market but it will be evident that its applicability is not limited to use with this particular style of machine nor in fact is it limited to driving cash registers but may be used with other types of mechanism. In the register shown banks of keys are employed serving to control the movement of levers. A member common to the key levers is employed for driving them and the motor is arranged to give this common member a constant excursion at each operation of the machine. The motor is connected through a worm wheel to a cam which serves to give this constant excursion and the motor circuit is arranged to be closed by special keys, whereby in addition to the depression of the value key it is necessary to depress some one of the special keys, before the motor will operate. The motor circuit while closed by the key is nevertheless out of control of the key after it has been closed so that the operator cannot by a second depression of the key or in any other manner prevent a complete operation of the machine. Near the completion of the operation the movement of the motor breaks its own circuit and restores all the parts to normal position. With this general statement a detailed explanation of the operation may be given.

In the aforesaid drawings, 10 represents the frame of the machine, 11 the register or counter, 12 the key coupler, 13 the amount keys, 14 the clerks' keys, 15 the special keys, 16 the tablet indicators and 17 the electric motor.

Described in general terms, the machine comprises a series of amount key levers which are coupled by an initial movement to a common operating member. An elec-

tric motor is suitably connected with this member, and is provided with a switch, which is operated to break the circuit, by means which connect it, with the common operating member. The clerks' keys which operate the switch, to complete the circuit remain locked until one of the amount keys, or one of the special keys is operated.

The amount keys 13, comprise suitably numbered heads and shanks, which latter are mounted in a supporting and guiding plate 13^a of the main frame. The key shanks are provided with laterally projecting pins 13^b, which operate in slots 13^c of sleeves 13^d, formed on the under side of the plate 13^a. This slot and pin construction prevents the keys from turning in the plate 13^a.

The key levers 18 are journaled upon a transverse shaft 31, so that their forward ends normally project under the lower ends of the key shanks, as shown in dotted lines in Fig. 1. When a key is depressed, the forward end of its respective key lever is correspondingly depressed, and its rear end elevated to effect the coupling with the pivoted key coupler 12.

As a number of the parts shown in the present application are substantially the same in construction, as the parts shown and described in the patent to Carney #583,888, said patent may be referred to for a more detailed description of said parts.

The aforesaid key coupling bar 12 is journaled in the frame of the machine by trunnions 12^a and 12^b, and is arranged to co-operate with notches 18^a formed in the respective key levers, to couple the levers for simultaneous operation. In order, however, that the keys may be operated successively, to couple them to the coupling bar, each of the same are provided with a pivoted, spring pressed pawl 41. When one of the amount or special keys is depressed, it imparts a slight upward movement to the key coupler. This movement is sufficient to cause the coupler to pass under the lower end of the pawl 41. This action prevents the return of the lever, independently of the coupler. After the coupler has been so raised, the operation of the second key lever will cause its pawl 41 to engage the key coupler, as said lever rises, and thus force the pawl backward against the tension of its spring, so that, when it passes above the coupler flange 12^c, it will again spring forward over the same and become coupled thereto.

The key coupler is limited in its initial movement by a stop nose 29, formed on a pivoted yoke 32, so as to normally project into the path of a pin 27, carried by an arm 28, integral with the key coupler. This yoke 32 projects under all of the clerks' key levers 18 and is held in its normal position by a coiled spring 32^a which connects it with the stationary shaft 31 as shown in dotted line

in Fig. 3. When one of the clerks' key levers is depressed the frame 32 is rocked and the nose 29 is moved out of the path of the pin 27, to permit the coupler to be operated.

The keys of this machine, as is usual in cash registers, are divided into a series of banks, and each of these banks is provided with one of a series of detent plates 43. These plates are pivotally mounted upon a rock shaft 42, and each of the same is held in its normal position by a coil spring 45, which connects it with the stationary plate 13^a. (See Fig. 1). The lower edges of the plates 43 project into notches 44 formed in the key levers. When a key lever is given its initial movement its respective detent 43, will be rocked slightly forward, by the rear wall of the notch 44, until the lever passes free of the detent, when the latter will assume its normal position, and lock the key lever in its depressed position, by passing over the same as shown in Fig. 4. One of the detents 43 is provided, as before stated, for each bank of keys; but as the special keys 15 must be operated independently of the regular keys, they are provided with an independent detent, as clearly shown in Fig. 1. The detents are rocked forward, to permit the operated key levers to return to their normal positions, by a series of pins 75, fast on the shaft 42, and arranged to engage the upper edges of the plates 43, as plainly shown in Fig. 4. The shaft is rocked near the end of the operation of the machine, by an arm 73 which is fast thereto, and which is engaged and operated by a cam 74, fast on a transverse rotation shaft 37. This shaft is given one rotation during each operation of the machine as hereinafter described. The lever 73 is held in its normal position against the stop pin 78 by a coil spring 76 which connects an arm 73^a thereof with a pin 77 on the main frame (see Fig. 4).

As it is desirable to prevent the operation of any one of the clerks' keys until after one of the amount keys, or one of the special keys has been operated, each of the clerks' key levers is provided with a stop pin 26 best shown in Fig. 5. These pins are normally engaged by hook arms 25, mounted on a sleeve 23 fast to a transverse rock shaft 24. This shaft also carries a series of cam arms 22, which project upward in proximity to each of the amount keys and special keys. These cam arms engage pins 21, projecting from the amount and special key levers so as to be rocked thereby.

It will be seen from the above that, when one of the amount or special key levers is operated, the shaft 24 will be rocked rearward and thus disengage arms 25, from pins 26, to release all of the clerks' keys. The latching arms and cam arms are re-

turned to their normal positions by a suitable coil spring 22^a which connects one of said arms with the main frame.

Each of the key levers 18, except those 5 of the special keys 15, is formed with a cam slot 20. These slots of each bank are of graduated formation relative to a bar 20^b of the registering frame 20^a with which they coöperate, as shown in Fig. 3. The pivoted, 10 registering frames 20^a, carry suitable rack segments and are mounted above the respective key banks. Each of these frames is provided with a cross bar 20^b which when a key lever is operated, is engaged by the 15 walls of the cam slot of said key, and the frame 20^a, thus rocked to a greater or less degree, according to the value of the key operated. The operating rack segments carried by the registering frames coöperate 20 with the pinions of the counter wheels, to impart movement thereto, in a manner well known in the art and described in the aforesaid patent. The tablet indicators 16 are mounted to coöperate with the rear ends of 25 the key levers substantially as described in the said patent.

The oscillatory movement of the key coupler 12, is converted into rotary movement of the shaft 27 by means of a rack bar 35. This 30 bar is formed with a horizontal slot 34, into which projects a pin 33 mounted on the arm 28. By this means, the bar 35 is raised and lowered with the key coupler. At its lower end, the bar is formed with a vertical 35 slot 35^a, through which projects a guiding and fulcrum pin 35^b mounted on the main frame. The opposite edges of the upper portion of the bar are formed with rack teeth which are adapted to alternately en- 40 gage and operate pinions 36 and 38. These pinions are connected, at one side of the rack bar, by an intermediate pinion 40 whereby the pinion 36 is continuously rotated in the same direction, even though the 45 pinion 38 travels in an opposite direction when rotated. The rack bar is held to its work by a lug 40^a which plays on one or the other side of a stationary, vertical flange 40^b formed on the main frame. A spring 39 50 is connected to the lower end of the plate 35, and is so arranged, that it exerts its tension alternately above and below the pin 35^b as the bar is reciprocated. This construction results in the rack bar being shifted from 55 one pinion to the other, as the lug 40^a passes free of flange 40^b upon the completion of the opposite strokes of the rack bar.

The devices above described, are substantially identical with the devices in Letters 60 Patent of the United States issued to Thomas Carney, July 12, 1904, and numbered 764,559 with the exception that the keys and key levers are separate as shown in the first mentioned patent, to Thomas 65 Carney numbered 583,888.

After the amount keys and special keys have been coupled to the key coupler, it is necessary to oscillate the latter, in order to complete the operation of the machine. To effect this result, the depression of one of 70 the clerks' keys establishes an electric circuit through the motor 17, which is geared to the key coupler, as hereinafter described.

To accomplish the closing of the electric circuit, each clerk's key lever is provided 75 with a pin 46, which engages one of a series of cam arms 48 to rock the shaft 49 upon which the said arms are mounted. Each of the cam arms is formed with a cam edge 47 and a concentric edge 48^a, whereby, when 80 a key lever is operated, the arm 48 will move only when the pin 46 is engaging the edge 47. During the time that the pin is passing over the edge 48^a, the arm 48 remains stationary for a purpose hereinafter de- 85 scribed. The spring 48^b wound about the shaft 49 is connected with the main frame, and to one of the arms 48 so as to normally hold the arms 48 in the position shown in Fig. 3. The left end of the shaft 49 is pro- 90 vided with a crank 50 to which is pivotally connected a pendant link 51 having a cam nose 52 and a notched end 53. The spring 50^a is wound about the pivot of the link 51, and bears with its respective ends against the 95 link and the arm 50. The office of this spring is to hold the link 51 against a stationary stop pin 57. The lower notched end 53 of the link 51 engages a pin 53^a which connects a pivoted bell crank lever, 68, and 100 a link 55. The link 55 is in its turn connected with a switch lever 56 which is pivoted to one of the circuit terminals 56^a of the switch. The contact terminal 56^b of the switch, is of the usual split spring construction, and is arranged to receive the contact lever 56 when the latter is depressed, and thus complete the circuit.

When one of the clerks' keys is given its initial movement its particular arm 48 is 110 rocked forward and the shaft 49 rocked. This action forces the link 51 downward and as before described, closes the circuit through the motor which operates the machine. As the key lever continues its down- 115 ward movement, the pin 46, simply plays along the edge 48^a, of the arm 48 and thus holds the link 51 depressed, until the key lever is subsequently released, by the rocking of its detent 43. The first downward 120 movement of the link 51 forces the arm 56 to engage the contact terminal 56^b. As the link 51 continues its downward movement, the cam 52, engages the pin 57 and moves the link out of engagement with the pin 53^a. 125 This leaves the link 55 free to rise and break the circuit, before the link 51 is allowed to return to its normal position. This construction prevents any manipulation of the machine, such as an attempt to depress 130

the link 51, the second time, during the same operation of the machine, and also permits the necessary sequence of operation.

One of the projecting trunnion ends of the key coupler is provided with a crank arm 67 carrying an antifriction roller 66. This roller is engaged by cam 63, mounted upon a short rotation shaft 61, which latter is journaled in the main frame, and in an auxiliary frame 62. The shaft 61 carries a worm wheel 60 which meshes with a worm 58, fast to the armature shaft 59 of the motor. The shaft 61 also carries a stop lug 65 and a cam 64. The bell crank 68 is formed with an auxiliary arm 70 carrying a roller 71, and is also formed with a hook 72. This hook is adapted to normally project into the path of the lug 65, to arrest the mechanism in its normal position. When the link 51 is depressed, the hook 72 is moved out of the path of the lug 65, thus leaving the shaft 61 free to be rotated. This same movement of the bell crank brings the roller 71 into the path of the cam 64 whereby, when the operation is about half completed, with the key coupler raised, the lever 68 will be rocked to draw the contact lever 56 out of connection with the contact 56^b, and break the circuit. The momentum of the armature, however, is sufficient to carry the parts forward, after the circuit is broken, until the lug 65 contacts with the hook 72, when the parts are all arrested. The key coupler and key levers are returned to normal position by gravity or if desired, suitable springs 12^a may be employed to assist in the return movement.

The motor employed in this machine may be of any suitable construction and operation, and, as such construction forms no part of the present invention it is not thought necessary to describe it.

The operation of the machine is as follows: If a sale of \$5.50 is made by clerk A, the amount keys are first pressed and then the clerk's key A. The depression of the amount keys causes their respective key levers to become coupled to the key coupler. When the clerk's key is depressed, its particular key lever becomes coupled to the key coupler and the circuit is closed by the depression of the contact lever 56. This operation also releases the machine by moving the hook nose 72 out of the path of the lug 65. The operation of the motor then causes the worm 58 to rotate the worm wheel 60, and thus elevate the coupler by means of the cam 63 connected to said worm wheel. After the coupler has been fully elevated, the cam 63 passes free of the roller 66 and thus leaves the coupler free to descend by gravity. At the same time the circuit is broken, but the momentum of the different parts carries the worm

wheel 60 forward until it is arrested in its normal position by the lug 65 coming into contact with the hook 72.

By means of the peculiar worm and worm gear connection it is practicable to employ a high speed motor and at the same time only operate the machine with a medium speed and not fast enough to rack or jerk the parts during the operation. By this rapid movement of the motor and relatively slow movement of the machine the motor may run with the speed necessary for its most efficient operation.

With this improved machine the key action is very light as only enough power is required to depress the respective key levers and couple them to the coupler. The operation of this machine is very light when compared to the usual key machines in which the full stroke of the key lever is accomplished by hand, or the key is set and the machine subsequently operated by hand.

It will, of course be understood that the key levers 18 may be given their initial movements to couple them to the key coupler directly and without the intervention of the keys 13, without departing from the spirit of this invention. It will also be understood that suitable printing devices may be coupled to the operating rack segments, in a manner well understood in the art and embodied in numerous machines, now in use.

It will, of course be understood that any suitable form of cash drawer may be applied to the machine shown, and the latch for said drawer automatically operated during the movement of the key levers.

While the form of mechanism herein 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.

This application is a division of a prior application Serial No. 136,165 for cash registers, filed on December 22, 1902, by Thomas Carney, now deceased.

What is claimed is as follows:

1. In a machine of the class described, the combination with an operating mechanism, of an electric motor for driving same, a circuit closer for said motor; means for operating said circuit closer at will, means for destroying the control of said operating means over said circuit closer by its own operation, and devices controlled by said motor and actuated when a complete operation thereof has been given for again giving said operating means control of said circuit closer.

2. In a cash register, the combination with an operating mechanism, of an electric mo-

tor connected thereto, a circuit closer and means for operating the circuit closer constructed to automatically disengage therefrom after operating said circuit closer, and devices connected to the operating mechanism for returning the circuit closer to its normal position.

3. In a machine of the class described, the combination with an operating mechanism, of an electric motor connected to the same, a circuit closer for said motor, and means for operating said circuit closer, said means having provisions for disengaging itself from said circuit closer to allow independent movement of said circuit closer.

4. In a machine of the class described, the combination with an operating mechanism, of an electric motor for driving same, a circuit closer for said motor, means for operating said circuit closer, means connected to said motor for withdrawing said circuit closer from closing position, and means for disconnecting said circuit closer operating means for the purpose of preventing a second operation of the same during an operation of the machine.

5. In a machine of the class described, the combination with an operating mechanism, of an electric motor for driving same, a circuit closer, manipulative means for operating said circuit closer and normally engaging said closer, and means actuated by the movement of said manipulative means for breaking said engagement.

6. In a machine of the class described, the combination with an operating mechanism, of an electric motor driving same, a circuit closer for said motor, means for operating said circuit closer and normally engaging said closer, means actuated by the movement of said manipulative device for breaking said normal engagement, and means operated by said motor for returning said circuit closer to its position breaking circuit.

7. In a machine of the class described, the combination with an operating mechanism, of an electric motor for driving same, a circuit closer, means for operating same, means whereby the actuation of said operating means disconnects same from the circuit closer; and means for returning said circuit closer to its normal position breaking circuit, and arresting said motor.

8. In a machine of the class described, the combination with an operating mechanism, and an electric driving device controlling the same, of a circuit closer, circuit closer actuating means; and means, comprising devices operated by the motor to move said circuit closer to circuit breaking position, for preventing the continued repetition of operations of the machine by a continued retention of the circuit closer operating means in operated position.

9. In a machine of the character described, the combination with an operating mechanism, and an electric driving device controlling the same, of a circuit closer, circuit closer operating means, and means operated by the motor for automatically breaking the circuit to stop the machine at the end of one operation while permitting the circuit closer operating means to remain in operated position.

10. In a machine of the character described, the combination with an operating mechanism, and an electric driving device controlling the same, of a circuit closer, key means engaging said circuit closer for operating the closer, and means for automatically disengaging said key means from the circuit closer after the circuit has been closed.

11. In a machine of the character described, the combination with an operating mechanism, and an electric driving device controlling the same, of a circuit closer, key means engaging said circuit closer for operating the closer, and means for automatically disengaging said key means from said circuit closer after the circuit has been closed and until the key has been returned to normal position.

12. In a machine of the character described, the combination with an operating mechanism, and an electric driving device therefor, of a circuit closer, a key for operating the same to close the circuit, and means for automatically disengaging the circuit closer from the key to permit the former to return to normal broken-circuit position before the key returns.

13. In a machine of the character described, the combination with an operating mechanism, and an electric driving device therefor, of a circuit closer, a circuit closer operating means, engaging said circuit closer, means for automatically disengaging said circuit closer operating means after the circuit has been closed, and means for arresting the electric driving device at a predetermined point.

14. In a machine of the character described, the combination with an operating mechanism, and an electric driving device therefor, of a circuit closer, circuit closer operating means, and means connected to the operating mechanism for positively insuring the arresting of the electric driving device.

15. In a machine of the character described, the combination with an operating mechanism, and an electric driving device therefor, of a circuit closer, circuit closer operating means, and means connected to the operating mechanism for simultaneously breaking the circuit and positioning a member for positively arresting the electric driving device.

16. In a cash register, the combination

with an operating mechanism, and a driving motor therefor having a constant direction of motion, of a circuit closer for said motor, means for operating the circuit closer, and means for preventing a second operation of said circuit closer during the operation of the machine, but allowing the return of the circuit closer operating means to normal position.

17. In a cash register, the combination with an operating mechanism, of an electric motor for driving same, a circuit closer for said motor, means for operating said circuit closer, with provisions in the machine for destroying the control by the closer operating means by movement of said means.

18. In a cash register, the combination with an operating mechanism, of an electric driving device for same, a circuit controller for said motor, means for operating said circuit controller, and means for destroying the operative control of the operating means over the circuit controller by the movement of the operating means.

19. In a cash register, the combination with an operating mechanism and an electric driving device for same, of means for rendering the device operative, a controlling device for said means, and means controlled from the driving device for returning the said first means to normal position irrespective of the position of the controlling means.

20. In a cash register, the combination with an operating mechanism and an electric driving device for same, of a circuit closer for said device, means for operating the circuit closer, provisions in the machine by virtue of which the movement of the circuit closer operating means destroys its control over the circuit closer, and means for positively opening said circuit.

21. In a cash register, the combination with an operating mechanism and means normally locking the same, of an electric driving device for said mechanism, a circuit closer, means for operating same constructed to release the locking means, and provisions in the machine by virtue of which the movement of the circuit closer and lock operating means destroys its control over the same.

22. In a machine of the class described, the combination with an operating mechanism, of a driving device for same, electrical means for controlling said device, including a circuit closer, means for operating said closer and normally engaging said closer, and means actuated with the movement of said operating means for disengaging the same from said circuit closer.

23. In a machine of the class described, the combination with an operating mechanism, of a driving device for same, electrical means, including a circuit closer for controlling the movement of said device, means for operating said circuit closer and

normally engaging said closer, means actuated with said operating means for disconnecting said means from said circuit closer, and means operated by said driving device for returning said circuit closer to normal breaking position.

24. In a machine of the class described, the combination with a driven mechanism, having a constant excursion, of an electric motor for driving same, a circuit closer for said motor, means for operating said closer to start said motor, means operated by said driven mechanism as it returns to normal position for moving said closer to break circuit, and devices preventing a second operation of said operating means from operating said closer until the driven mechanism has returned to normal position.

25. In a machine of the class described, the combination with a driven mechanism having a constant excursion, of an electric motor for driving same, a circuit closer for said motor, manipulative devices for operating said circuit closer, means for destroying the control of said manipulative device over said circuit closer, means operated by said driven mechanism on its return movement for moving said closer to break circuit, and means for reestablishing the control by said manipulative device only when the driven mechanism returns to normal position.

26. In a machine of the class described, the combination with an operating mechanism, of an electric motor for driving same, a circuit closer for said motor, means for operating said circuit closer, means connected to said motor for withdrawing said circuit closer from closing position independent of any movement of said circuit closer operating means and means for preventing a second operation of said circuit closer and a resultant operation of the motor until said circuit closer operating means has been allowed to assume its normal position.

27. In a machine of the class described, the combination with an operating mechanism, of an electric motor for driving same, a circuit closer for said motor, means for operating said circuit closer and for disconnecting said circuit closer operating means for the purpose of preventing a second operation of the same during an operation of the machine.

28. In a machine of the class described, the combination with an operating mechanism, of an electric motor for driving same, a circuit closer for said motor, means for operating said circuit closer, and means connected with said motor for withdrawing said circuit closer from closing position, and means independent of the said operating mechanism for preventing a second effective operation of said circuit closer operating means during an operation of the machine.

29. In an accounting machine, the combination with an electric driving motor and mechanism driven by said motor, of circuit closing means for said motor and means independent of the mechanism driven by the motor for preventing a second effective operation of the circuit closing means during a single operation of the machine.

30. In an accounting machine, the combination with an electric driving motor and mechanism driven thereby, of circuit closing means for said motor, circuit opening means operable before the completion of an

operation of the machine, and means for preventing a second effective operation of the circuit closing means during a single operation of the machine. 15

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

OSCAR F. DAVISSON,

Administrator of the estate of Thomas Carney.

Witnesses:

J. B. HAYWARD,
R. C. GLASS.