

March 12, 1940.

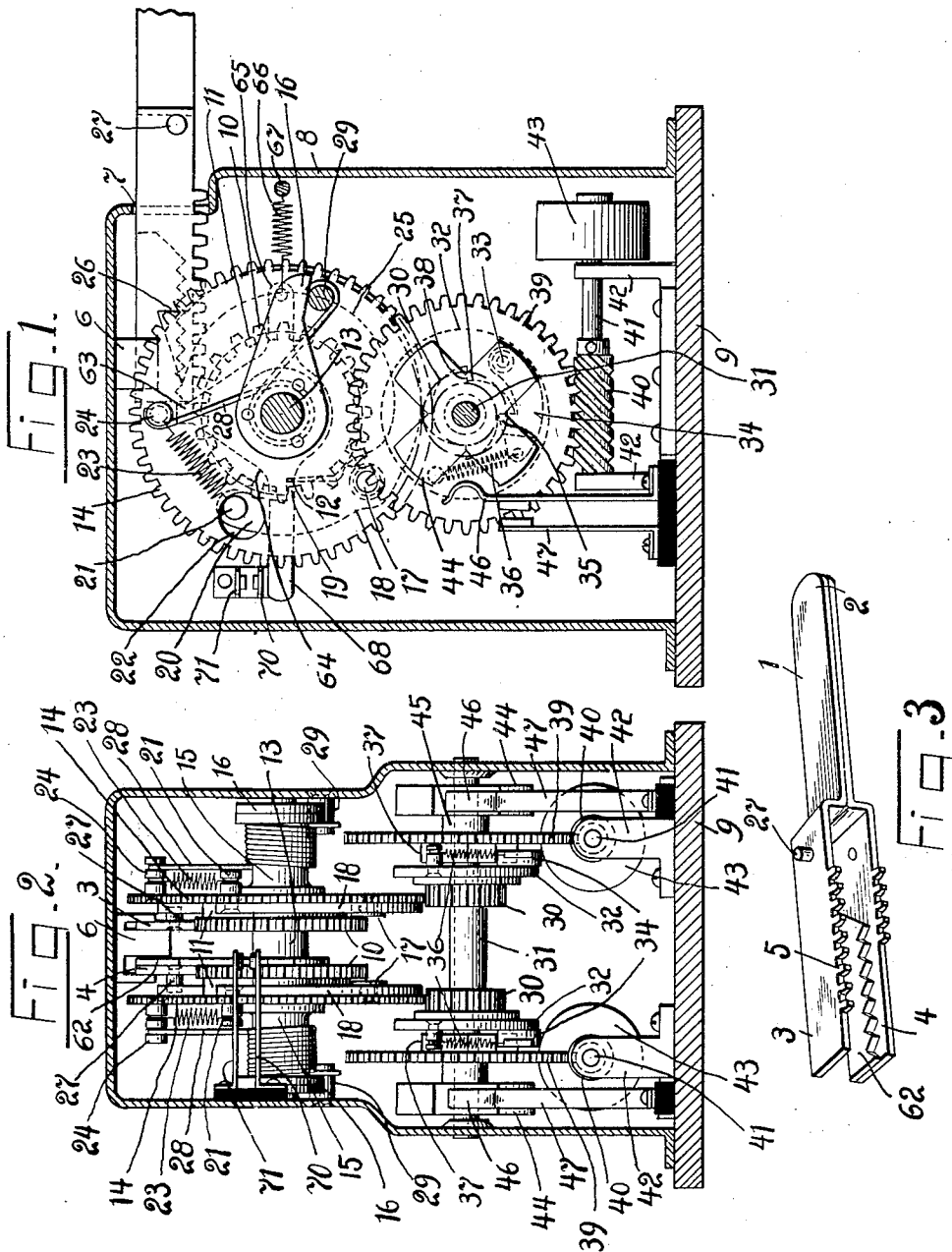
J. E. HOPPING

2,193,629

REGISTER

Filed July 22, 1935

3 Sheets-Sheet 1



INVENTOR
John E. Hopping.
BY *H. W. Baker*
ATTORNEY

March 12, 1940.

J. E. HOPPING

2,193,629

REGISTER

Filed July 22, 1935

3 Sheets-Sheet 2

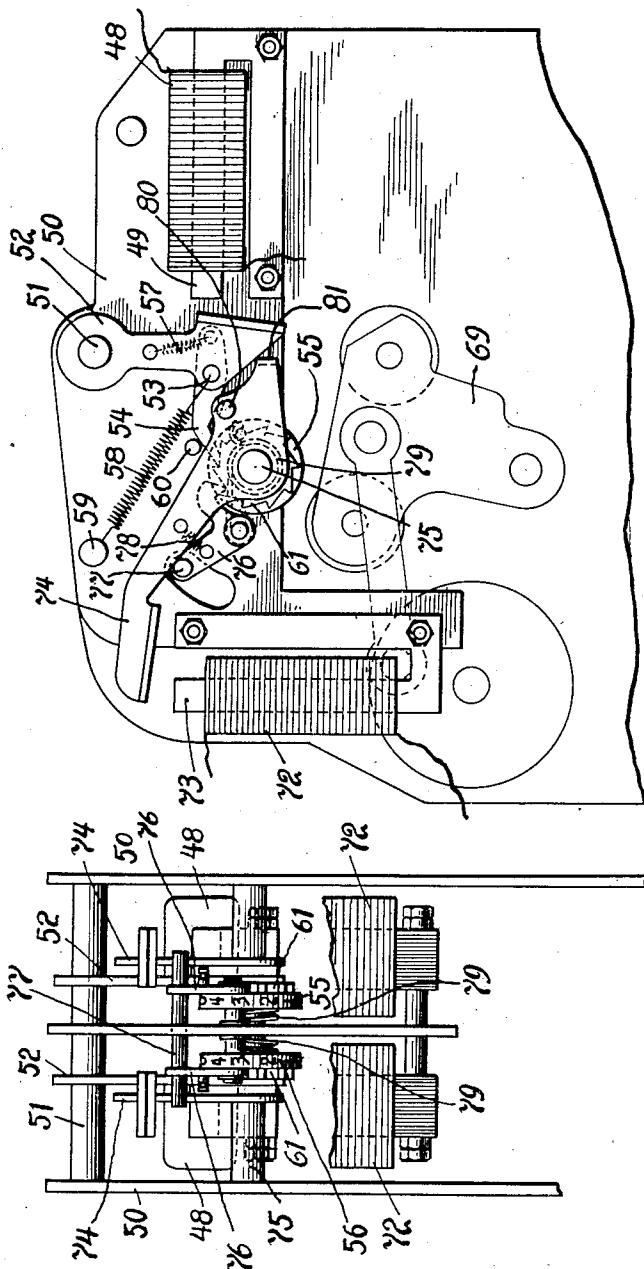


Fig. 4.

Fig. 5.

INVENTOR
John E. Hopping
BY *H. W. Baker*
ATTORNEY

March 12, 1940.

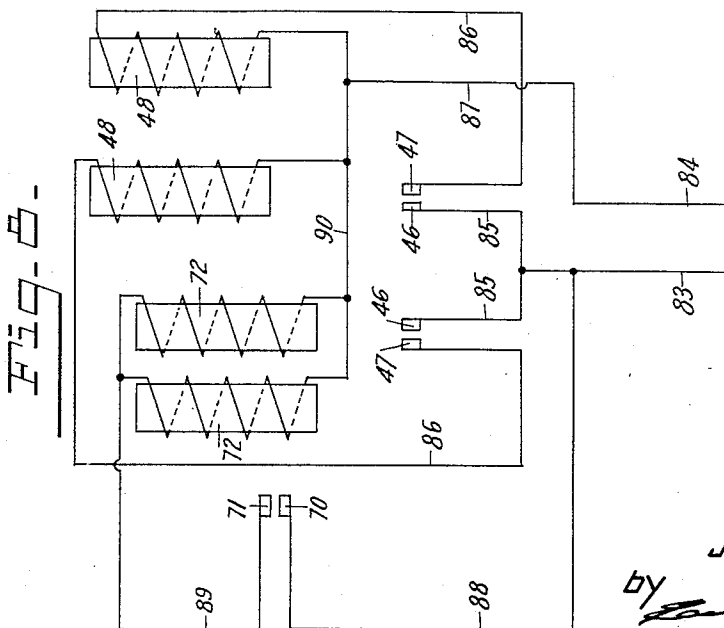
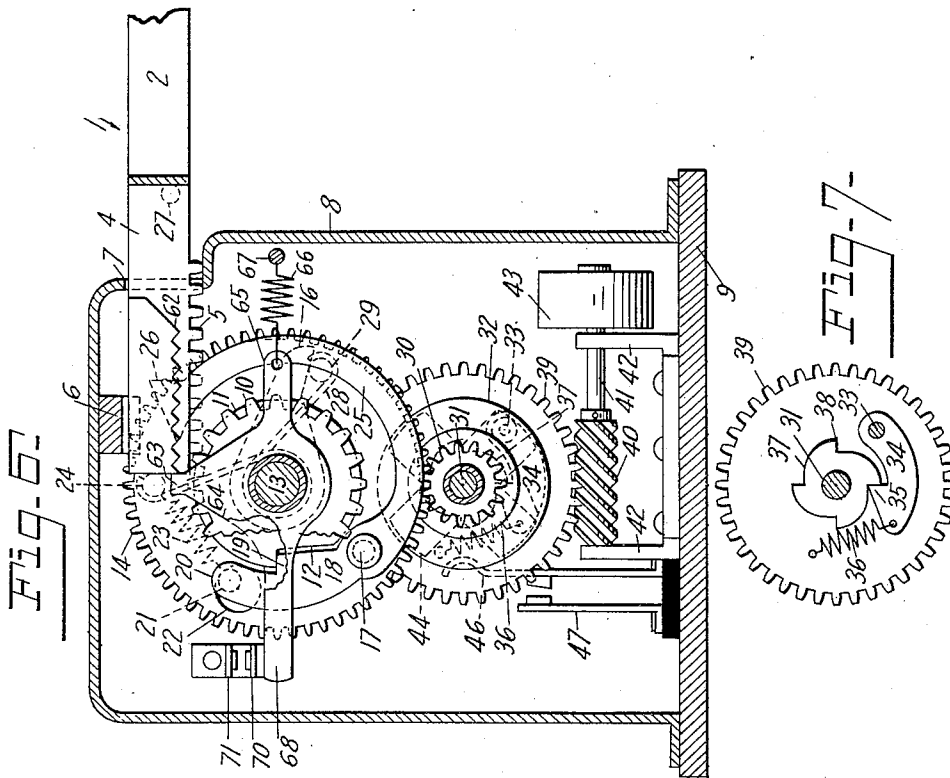
J. E. HOPPING

2,193,629

REGISTER

Filed July 22, 1935

3 Sheets-Sheet 3



INVENTOR.
JOHN E. HOPFING.
by Edward A. Hood
his ATTORNEY.

UNITED STATES PATENT OFFICE

2,193,629

REGISTER

John E. Hopping, Dayton, Ohio, assignor, by
mesne assignments, to Central National Bank
of Cleveland, Cleveland, Ohio

Application July 22, 1935, Serial No. 32,477

7 Claims. (Cl. 177—380)

This invention relates to registering mechanism and more particularly to means for recording the identity of the individual who operates the register. In various types of registers which print a record of each transaction there is included in the record a number identifying the operator who made the record. However, this usually requires that the operator shall insert in the register itself an identifying element or key and is not applicable to a remote control register, that is, an installation where the register controlling devices are located adjacent to the place where the transaction is effected and the register itself is located in an office at some distance from the controlling devices.

One object of the invention is to provide improved means for registering, or setting up on a printing counter, the identifying number of the operator.

A further object of the invention is to provide means whereby the insertion of an identifying element or key in the register controlling device will cause the identifying number of that element to be set up on a counter in a remotely located register.

Another object of the invention is to provide means to reset the said counter to zero when the key is removed.

Other objects and advantages will appear in the detailed specification which follows.

In the drawings:

Fig. 1 is an end elevational view partly in cross section of an impulse transmitter;

Fig. 2 is a view of said transmitter taken at right angles to the view shown in Fig. 1;

Fig. 3 is a detailed perspective view of one of the keys;

Fig. 4 is a side view of the counter operating mechanism;

Fig. 5 is an end elevational view taken from the left hand side of the mechanism shown in Fig. 4.

Fig. 6 is a vertical sectional view of the transmitter taken centrally of Fig. 2 and partly broken away; Fig. 7 is a detail view of the one-way clutch; and Fig. 8 is a circuit diagram.

In the drawings a key 1 is provided with a handle 2 which the operator may grasp. This key is bifurcated, forming prongs 3 and 4, each of which are provided with teeth 5. The number of teeth on each prong may vary from zero to nine inclusive. Prong 3 might be considered as the unit's prong and the prong 4 might be considered as the ten's prong, although there would be no objection to reversing this order. It is

obvious that since we have two prongs with any number of teeth from zero to nine inclusive on either or both of said prongs any combination of digits from one to ninety-nine inclusive might be set up, which in this case, of course, would require ninety-nine separate keys. In other words, as many keys would be required as there are numerals which might be set up on the counters. A guide 6 is provided for a key which may be inserted through an aperture 7 in the cover 8 of the machine, which cover is mounted on a base 9. Each operator is provided with a key having a number of teeth corresponding to his identifying number and when he desires to operate the register he inserts his key in the machine, thus causing the teeth of the key to engage and actuate a gear, or gears, 10 mounted on a shaft 13 within the machine. As shown in Fig. 2 there are two gears 10, one of which is engaged by the teeth on the prong 3 and the other of which is engaged by the teeth on the prong 4. Inasmuch as the gears 10 are identical and all of the mechanism driven or controlled by the said gears is the same with certain minor exceptions which in nowise affect the functions thereof, a description of one train will suffice. The differences mentioned above consist of such minor details as appear in Fig. 2, in which figure it is shown that the mechanism driven by the right hand gear 10 extends to the right of the gear 10 while the mechanism driven by the left hand gear 10 extends to the left of the said gear.

The gear 10 is rotated anti-clockwise as viewed in Fig. 1 the key 1 is being inserted. This gear has secured thereto a disk 11 which is provided with a single notch 12. Both the disk and the gear are loosely mounted on the shaft 13.

Loosely mounted on the shaft 13 is a gear 14 which is connected by means of a sleeve 15 to a stop arm 16. The gear 14 carries a pin 17 which is the fulcrum for a pawl 18 provided with a single tooth 19 which is normally seated in the notch 12. As shown in Fig. 1, this pawl is provided with an arm 20 which carries a pin 21 which projects through an orifice 22 in the gear 14. Attached to this pin 21 is a spring 23 which is connected to a pin 24 mounted on the gear 14. This spring urges the tooth 19 towards the disk 11 so that the said tooth would either ride on the periphery of the said disk or rest in the notch therein. The pawl 18 is also provided on that side of its axis opposite the tooth 19 with an arcuate arm or tail 25, which extends about the axis of the gear 14 near the periphery thereof and is so arranged that when in any position to which

it may be moved by the rotation imparted to the gear 14 by the key 1 some part of the arm 25 will be in the path of a pin 27 on the prong 3 of the key and will be engaged by that pin just before the key completes its inward movement, and the continued movement of the key will actuate the pawl to withdraw the nose 19 thereof from the notch in the disk 11.

As the key 1 is being inserted so that the teeth thereon rotate the gear 10 anti-clockwise as viewed in Fig. 1 the disk 11 rotates therewith. The tooth 19 is resting in the notch 12 so that the pawl 18 is driven with the disk 11. Since the pawl 18 is carried by the gear 14 which has attached thereto the arm 16 it is apparent that on the inward movement of the key the said gear, disk, pawl, and arm are rotated anti-clockwise. Secured to the pin 24 carried by the gear 14 is a spring 28 which as shown in Figs. 1 and 2 is coiled about the sleeve 15 and has its other end anchored on a pin 29 carried by the frame of the machine. When, therefore, the arm 16 is rotated anti-clockwise as above described it places the said spring 28 under tension.

The gear 14 meshes with and drives a pinion 30 loosely mounted on a shaft 31. Secured to the pinion 30 is a disk 32 which is provided with a pin 33 on which is mounted a pawl 34 provided with a nose 35. Secured to the end of the pawl 34 remote from the pin 33 is a spring 36 which urges the nose 35 inwardly against a disk 37 provided with four notches 38 spaced 90 degrees apart. Secured to the disk 37 is a worm gear 39 which meshes with a worm 40 on a shaft 41 mounted in bearings 42, which shaft 41 is provided with a fly wheel governor 43. When the key is being inserted and the pinion 30 is driven clockwise as above described, the disk 32 also moves clockwise and the tooth 35 on the pawl 34 is cammed out of the notches 38 in the disk 37 so that no movement is transmitted to the gear 39 or the governor 43. Neither would any movement be imparted to the four-lobed star wheel 44 which is secured to the gear 39 by means of a sleeve 45.

After the last tooth on the prongs has actuated the gears 10 and immediately prior to the limit of travel on the inward movement of the key 1, the pin 27 engages arm 25 of the pawl 18, rotating the said pawl on its pivot pin 17 and moving the tooth 19 out of the notch 12, thereby releasing the gear 14 so that the spring 28 rotates the gear 14 reversely to its first movement, that is, in a clockwise direction, until the stop arm 16 engages the pin 29, thereby stopping the gear 14 in its zero position. As the gear 14 rotates clockwise as described immediately above no movement is imparted to the gear 10 but movement is imparted to the pinion 30 so that the pinion 30 and its disk 32 rotate anti-clockwise, carrying the pawl 34, which pawl engages the abrupt wall of one of the notches 38 rotating the disk 37 and one gear 39 in an anti-clockwise direction. The speed at which it is rotated is governed by the fly wheel governor 43. As the gear 39 is rotated anti-clockwise the four-lobed star wheel 44 is likewise rotated anti-clockwise and as each of its four lobes engage a spring contact 46 it presses this spring contact into engagement with a stationary contact 47, thereby closing a circuit connected to a coil 48 (Fig. 4) surrounding a soft iron magnet 49 so that each time one of the lobes closes the contact the magnet 49 is energized. Attention is called to the fact that the maximum number of teeth on each

prong of the key is nine. The gear ratio between the gear 10 and the gear 39 is such that the lobes of the four-lobed star wheel 44 will engage and actuate the spring contact 46 as many times as there are teeth on the prong of the key 1 so that if, for instance, there are seven teeth on the prong of the key, the lobes on the star wheel will engage the spring contact 46 seven times so that the magnet 49 will be energized seven times. The key controlled gear 14 thus constitutes a controlling member for the magnet 49, which forms a part of the counter actuating means to be hereinafter described.

The mechanism shown in Figs. 4 and 5 may be located at a place adjacent to or remote from the mechanism shown in Figs. 1, 2, and 3, suitable lead wires connecting the contacts 46 and 47 to the corresponding coil 48, a separate coil being provided for each pair of contacts shown in Fig. 2. Secured to the side walls 50 of the counting mechanism shown in Figs. 4 and 5 is a shaft 51 on which are mounted two arms 52. It should be remembered that there are two magnets 49, one of which is controlled by the teeth on the prong 3 and the other of which is controlled by the teeth on the prong 4, and the two magnets control separate counters having duplicate actuating mechanisms. Each arm 52 is provided with a pin 53 on which is mounted an operating pawl 54 which is urged against the ratchet wheel 61 of the corresponding counting wheel, the unit's counting wheel 55 or the ten's counting wheel 56, by means of a spring 57. A spring 58 is also connected to the pin 53 and to a pin 59 carried by the side wall 50, which latter spring urges the arm 52 in a clockwise direction. A pin 60 mounted in the side wall urges the pawl 54 into engagement with the teeth of the ratchet 61 connected to its respective counting wheel. Each time the magnet 49 is energized it attracts the arm 52, rotating it anti-clockwise so that the pawl 54 rides over one tooth of the ratchet 61 into a position to engage the next tooth. When the magnet is de-energized the spring 58 rotates the arm 52 in an anti-clockwise direction and the pawl 54 rotates the ratchet 61 and its counting wheel one space corresponding to one unit, the extent of this movement being limited by the pin 60. By the above described means an amount is set up on the counting wheels 55 and 56 corresponding to the number of teeth on the inserted key.

Full stroke mechanism

Means are provided to prevent the operator partly inserting a key and then removing it. Secured to the inner side of the arm 4 of the key 1 is a full stroke ratchet 62. As the key is being inserted this ratchet engages an arm 63 of a three-armed member 64. Another arm 65 is connected to a spring 66 secured to a fixed pin 67, the object of this construction being to tend to hold the three-armed member in the position shown in Fig. 1. However, as the key is being inserted the full stroke ratchet 62 will engage the arm 63 and rotate the said member in an anti-clockwise direction against the tension of a spring 66 and will depress the arm 68. If the operator, after partly inserting the key, attempts to withdraw the key the blunt end of the arm 63 will engage the teeth on the full stroke ratchet and prevent such movement. However, when the key has been fully inserted the full stroke ratchet 62 will have passed beyond the arm 63 and the spring 66 will return the three-armed

member 64 to the position shown in Fig. 1. When the key is withdrawn the teeth of the ratchet 62 will engage the end of the arm 63 and move the arm in the direction of movement of the key, thereby permitting the teeth to ride over the end of the arm, but the spring 66 will hold the arm in engagement with the teeth and in a position to prevent the reinsertion of the key until the ratchet has been moved outwardly beyond the arm and the latter has been returned to its normal position by the key. If, therefore, he commences the insertion of the key he must complete the insertion and if he starts to withdraw the key he must completely withdraw it so as to free the full stroke ratchet from the arm 63.

Printing mechanism

The counting wheels 55 and 56 are type wheels and when the key has been inserted and the type wheels set to print the number of the key the record may be taken from the type wheels by any suitable mechanism, such for example as that fully shown and described in United States Patent No. 1,960,918, granted May 29, 1934 to O'Connor. This printing mechanism forms no part of the present invention and is not shown or described except that there is shown in Fig. 4 a platen carrier which forms a part of the printing mechanism of the above mentioned patent. When the operator goes on duty he inserts his identification key in the apparatus thereby setting the type wheels to print his identification number. Usually the key remains in the apparatus until the operator goes off duty, at which time it is withdrawn and the type wheels reset to zero. Any operation of the register during the time that the key remains in the apparatus will result in a record being taken from the type wheels of the identification apparatus, the printing mechanism being operated upon each operation of the register. The manner of operating the register is immaterial but ordinarily it will be operated by the use of remote control operating mechanism of a well known character. If desired, means may be provided for preventing the operation of the register when no key is in the identification apparatus but this is not essential because if the register is operated when no key is in the identification apparatus the record then printed will contain no identification number and this will immediately be apparent to an inspector.

Resetting mechanism

After the counting wheels 55 and 56 have been actuated and a printed record has been taken therefrom as above described it is necessary that these counting wheels should be reset. As the key 1 is being withdrawn the full stroke ratchet 62 engages the arm 63 and rotates the three-armed member 64 slightly clockwise so that the arm 68 engages a spring contact 70 and moves it into engagement with the stationary contact 71, thereby completing a circuit connected to a coil 72 surrounding a soft iron magnet 73. There is a separate coil and magnet for each counting wheel but both coils are connected in the same circuit, which is controlled by the contacts 70 and 71. Each magnet when energized attracts an arm 74 mounted on the shaft 75 which also serves as a supporting shaft for the counting wheels. Each counting wheel is held normally against reverse movement by a holding pawl 76 which is provided with a pin 77 which extends beneath the corresponding arm 74. The arm 74

and the pawl 76 are connected by means of a spring 78. The holding pawl 76 normally prevents the ratchet 61 from rotating clockwise, it being urged to thus rotate by means of the coil spring 79. The arm 74 is also provided with a pin 80 which extends beneath the operating pawl 54 and is also provided with an over-turned flange 81 which lies beneath the lower sloping edge of the arm 52. When the key is being withdrawn so that the arm 63 moves the spring contact 70 into engagement with the contact 71 closing a circuit and energizing the coil 72, thereby energizing the magnet 73, the arm 74 is moved downwardly or in an anti-clockwise direction, thereby moving the pawl 76 in an anti-clockwise direction and in this way disengaging the same from the ratchet wheel 71. The over-turned flange 81 engages the arm 52 and moves it anti-clockwise, carrying with it the pawl 54 and the pin 80 raises the pawl 54 out of engagement with the ratchet 61 so that both of the pawls are removed from the ratchet and the ratchet is rotated to zero position by means of the coil spring 79. Conventional means are employed to stop the wheels in their zero position on being reset.

When the operator goes on duty, or when he desires to effect a registration, he inserts his key 1 in the housing 8 of the apparatus and leaves it there until he goes off duty or for some reason leaves the apparatus. Upon the insertion of the key the teeth on the two prongs thereof engage the respective gears 10 which are connected with the respective controlling gears 14 by the pawls 18, and thereby rotate the two controlling gears in a reverse direction against the action of the springs 28 distances determined by the number of teeth on the respective prongs of the key. As the key approaches the inner limit of its movement the pins 27 thereon engage the shoulders 26 on the pawls 18 and actuate the pawls to disengage the controlling gears 14 from the gears 10 and thereby permit the controlling gears to be moved in operative direction and returned to their initial positions, by the springs 28. When either prong of the key carries a small number of teeth these teeth are preferably arranged at the outer end of the prong so that they will remain in engagement with the gear 10 and hold that gear and the controlling gear against movement by the spring 28 until the pawl has been actuated. Each controlling gear 14, acting through the one way clutch as hereinbefore described, rotates the actuating member 44 a distance corresponding to the operative movement of the controlling gear, thereby closing the contacts 46 and 47 a number of times determined by the number of teeth on the corresponding prong of the key. The contacts 46 and 47 are connected in the operating circuit and, as shown in Fig. 8, this circuit comprises a main current supply line consisting of conductors 83 and 84 which may be connected with any suitable source of current supply. The conductor 83 is connected with one contact of each pair of contacts and, in the present instance, is connected by conductors 85 with the movable contacts 46. When either movable contact is moved into engagement with the corresponding fixed contact 47 the circuit is closed through a conductor 86, the corresponding solenoid 48 and a conductor 87 connected with the other line conductor 84, thereby intermittently energizing the solenoid and causing the corresponding counter to be advanced to or set in a position to indicate the

number of teeth on the key, in the manner heretofore described. When the operator goes off duty, or leaves the apparatus, he withdraws his key, thereby causing the arm 68 of the full stroke mechanism to close the contacts 70 and 71. As shown the contact 70 is connected by a conductor 88 with the line conductor 83 and the contact 71 is connected by a conductor 89 with the two resetting solenoids 72 and said solenoids are connected by a conductor 90 and the conductor 87 with the other side 84 of the supply line. Thus when the key is withdrawn these resetting solenoids are energized to initiate the resetting operation hereinbefore described and the counters are returned to their initial or zero positions.

I realize that many changes may be made in my invention without departing from the spirit thereof and I, therefore, desire to claim the same broadly except as I may limit myself in the appended claims.

Having now described my invention, I claim:

1. In an apparatus including an operable member, an actuating device having means to impart to said operable member a number of movements determined by the extent of the movement of said actuating device, a controlling member, means for operatively connecting said controlling member with said actuating device during the operative movement only of said controlling member, means including a key for moving said controlling member in a reverse direction a distance determined by the characteristics of said key, means controlled by said key for releasing said controlling member for operative movement with relation to said key, and means to return said released controlling member to its initial position and thereby operate said actuating device in accordance with the reverse movement imparted to said controlling member by said key.

2. In an apparatus including an operable member, an actuating device having means to impart to said operable member a number of movements determined by the extent of the movement of said actuating device, a controlling member, means for operatively connecting said controlling member with said actuating device during the operative movement only of said controlling member, a key controlled device to impart reverse movement to said controlling member, releasable means for connecting said key controlled device with said controlling member, a key having means for moving said key controlled device and said controlling member a distance determined by the characteristics of said key and to actuate said releasable means to disconnect said controlling member from said key controlled device at the end of the movement of the latter by said key, and means for moving the disconnected controlling member to its initial position and thereby operating said actuating device in accordance with the reverse movement imparted to said controlling member.

3. In an apparatus comprising a circuit breaker and closer, a movable member to impart successive operative movements to said circuit breaker and closer in accordance with the amount of movement imparted to said member, a second member to control the movement of the first mentioned member, a key adapted to be inserted in said apparatus and having one or more teeth, means controlled by the insertion of said key to move said second member in one direction with relation to said first mentioned member a distance determined by the number of

teeth on said key and to release the same for movement in the other direction, means for moving said second member in said other direction, and means controlled by the movement of said second member in said other direction to impart to the first mentioned member a movement determined by the number of teeth on said key.

4. In an apparatus including an operable member, a rotatable device to impart successive movements to said operable member in accordance with the movement of said rotatable device, a controlling member rotatable in one direction with relation to said rotatable device, means for connecting said rotatable device with said controlling member for rotation thereby when the latter is rotated in the other direction, a key having one or more teeth, means actuated by said key for rotating said controlling member in the first mentioned direction a distance determined by the number of teeth on said key, and means controlled by said key for rotating said controlling member to the limit of its movement in the last mentioned direction after its movement by said key has been completed.

5. In an apparatus comprising a circuit breaker and closer, a movable member to impart successive operative movements to said circuit breaker and closer in accordance with the amount of movement imparted to said member, a second member to control the movement of the first mentioned member, a key adapted to be inserted in said apparatus and having one or more teeth, means controlled by the insertion of said key to move said second member in one direction with relation to said first mentioned member a distance determined by the number of teeth on said key and to release the same for movement in the other direction, means for moving said second member in said other direction, means to prevent the retraction of said key prior to the release of said second member, and means controlled by the movement of said second member in said other direction to impart to the first mentioned member a movement determined by the number of teeth on said key.

6. In an apparatus of the character described, a device to be operated, an operable member, means controlled by said operable member to impart movement to said device upon each operation of said operable member, an actuating device to impart to said operable member a number of operations determined by the extent of movement of said actuating device, a controlling member having movement in two directions, a key adapted to be inserted in said apparatus, means actuated by the insertion of said key to move said controlling member in one direction with relation to said actuating device a distance determined by the characteristics of said key, means for moving said controlling member in the other direction to its initial position, means for operatively connecting said controlling member with said actuating device during the last mentioned movement of said controlling member, means controlled by the insertion of said key for initiating said last mentioned movement of said controlling member after the completion of the first mentioned movement thereof, means for restoring said device to be operated to its initial position, and means controlled by the withdrawal of said key for initiating the operation of said restoring means.

7. In an apparatus comprising a circuit breaker and closer, a movable member to impart successive operative movements to said circuit

breaker and closer in accordance with the amount of movement imparted to said member, a second member to control the movement of the first mentioned member, a key adapted to be
5 inserted in said apparatus and having one or more teeth, means controlled by the insertion of said key to move said second member in one direction with relation to said first mentioned member a distance determined by the number of
10 teeth on said key and to release the same for movement in the other direction, means for moving said second member in said other direction, means controlled by the movement of said second

member in said other direction to impart to the first mentioned member a movement determined by the number of teeth on said key, a device to be operated, means controlled by said circuit
breaker and closer to operate said device, a sec- 5 ond circuit breaker and closer, means controlled by said second circuit breaker and closer to return said device to be operated to its initial position, and means controlled by the withdrawal of
said key to actuate said second circuit breaker 10 and closer.

JOHN E. HOPPING.