

March 14, 1944.

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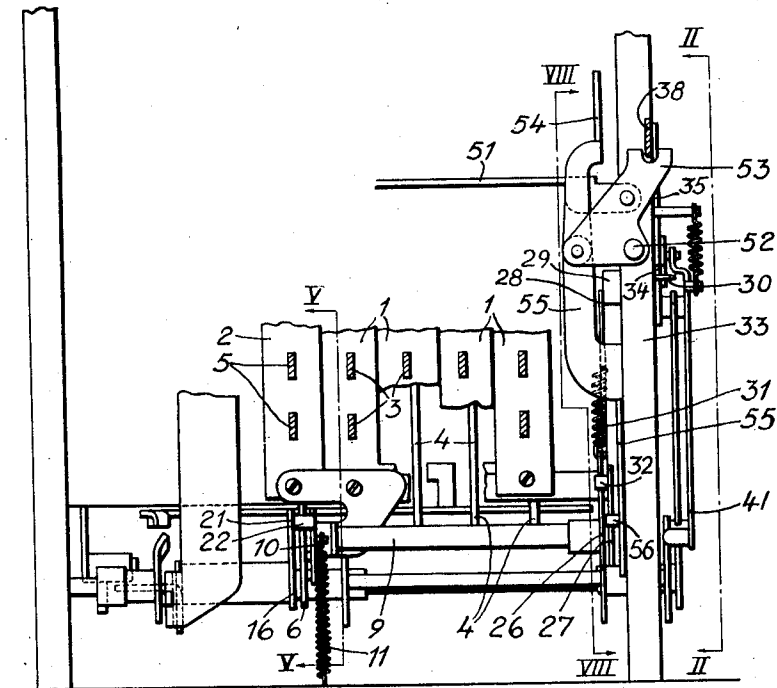
2,344,377

KEY LOCK AND INTERLOCK FOR CASH REGISTERS

Filed April 11, 1941

3. Sheets-Sheet 1

Fig. 1.



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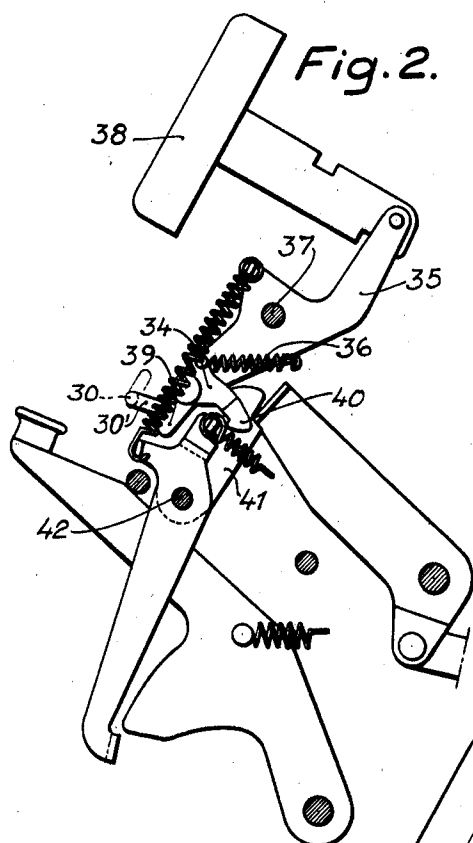
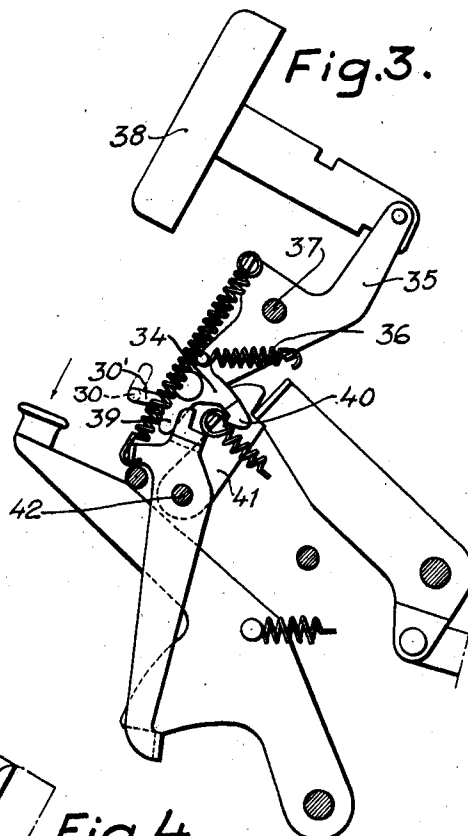
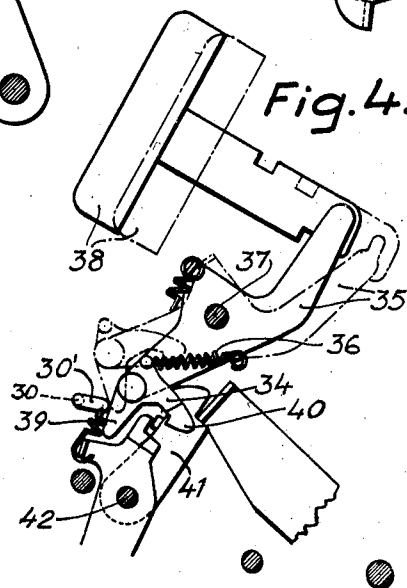
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KEY LOCK AND INTERLOCK FOR CASH REGISTERS

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3 Sheets-Sheet 2



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Fig. 5.

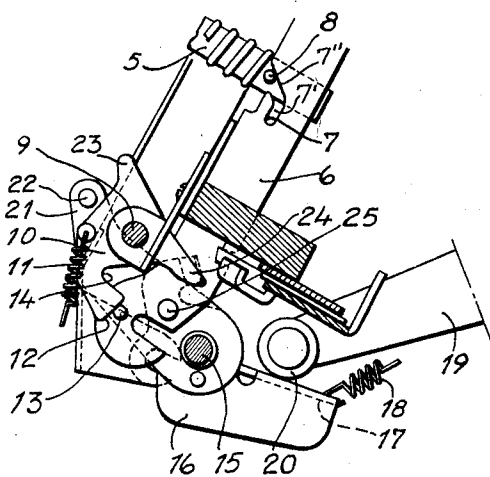


Fig. 6.

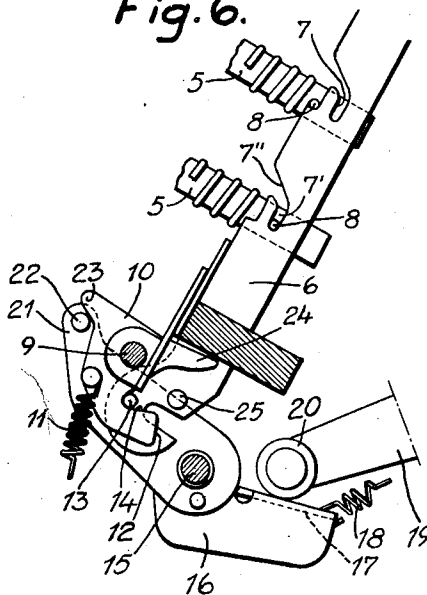
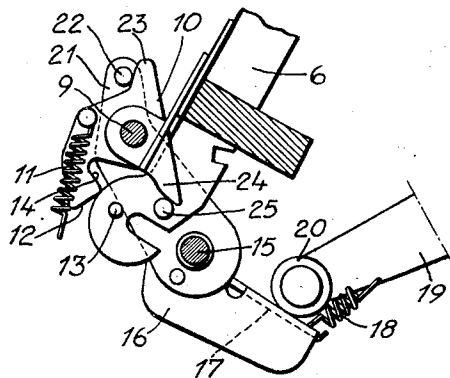
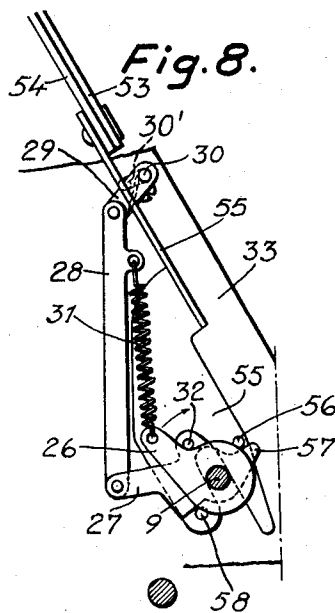


Fig. 7.



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KEY LOCK AND INTERLOCK FOR CASH
REGISTERSKarl Matts Vigborg, Stockholm, Sweden, assign-
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Stockholm, SwedenApplication April 11, 1941, Serial No. 388,130
In Sweden March 19, 1940

3 Claims. (Cl. 235—130)

This invention relates to cash registers, book-keeping machines, and calculating machines of the kind having amount keys and special keys, the depression of which causes associated slidable detents to perform a longitudinal movement away from an inoperative position. The amount key detents lock the depressed amount keys by returning to their initial positions whereas the special key detents lock the depressed special keys by being retained in the positions which they assume upon depression of the associated keys. However, this locking of the special keys is not sufficiently reliable, since it has been found possible to release the keys by actuation from the outside.

One object of the invention is to provide a cash register in which the special keys are effectively locked immediately after depression and cannot be released until after the machine has been started and a calculating operation has been completed.

Another object of the invention is to provide a cash register which cannot be started for a calculating operation unless a special key has been previously depressed and effectively locked in the depressed position.

A still further object is to provide a cash register which has a main driving shaft locked for calculating operations unless a specific key has been previously depressed, but can be zeroized by zeroizing gears driven from the main driving shaft of the machine while all the special keys are in their inoperative positions.

The above specified and other objects are accomplished, according to the invention, by the arrangement and combination of parts set forth in the following detailed description, defined in the appended claims and illustratively exemplified in the accompanying drawings, in which

Fig. 1 is a front view of part of the machine.

Figs. 2, 3 and 4 show on a larger scale certain elements assuming various operative positions, the views being taken on the line II—II in Fig. 1.

Figs. 5, 6 and 7 show other elements of the machine assuming various operative positions, the views being taken on the line V—V in Fig. 1.

Fig. 8 is a section on line VIII—VIII in Fig. 1.

Referring to the drawings, the reference numerals 1 denote four amount key banks and the reference character 2 designates a special key bank of a cash register. The amount keys 3 are locked in their depressed positions by means of slidable spring controlled detents 4, which assume the same position before, as well as after, the depression of a key. Each special key 5 car-

ries on its shank a locking pin 8 (see Figs. 5 and 6) cooperating with a recess 7 of an elongated detent 6 extending parallel to the special key bank 2 and being longitudinally slidable from a rest position (Fig. 5) to a key locking position (Fig. 6). Each recess 7 comprises a slot portion 7' extending parallel to the longitudinal axis of the detent 6 and being closed at one end thereof and an oblique cam portion 7'' having its outer end disposed adjacent the locking pin 8 of the corresponding key 5 when said detent 6 is in its rest position (see Fig. 5) and leading with its inner end into said slot portion 7'. When a key 5 is depressed, its pin 8 slides to the inner end of the oblique cam portion 7'' causing a lengthwise displacement of the detent 6 to a position intermediate its rest position and its key locking position in which the pin 8 is disposed at the open end of the slot portion 7'. At this moment, a driving device comes into operation to shift the detent 6 into its final key locking position. This driving device comprises a plate 10 controlled by a spring 11 and secured to a shaft 9 rotatably mounted in the machine frame. When the detent 6 is in its rest position, as shown in Fig. 5, the spring 11 forces a projection 12 of the plate 10 against a pin 13 secured to the detent 6. Upon depression of a key 5, the upward shifting of the detent 6 to its intermediate position breaks the contact between the projection 12 and the pin 13. The spring 11 is now free to turn the plate 10. A cam surface 14 of the latter cooperates with the pin 13 and forces the detent 6 automatically and very rapidly into its key locking position shown in Fig. 6 in which the pin 8 of the depressed key 5 is disposed wholly inside and locked in the corresponding slot portion 7'. During this upward movement of the detent 6, the shape of the recess 7 makes it impossible to release the depressed key or to influence the motion of the detent 6 from the outside. After the detent 6 has reached its locking end position the machine may be started. The detent 6 remains in its locking position during the entire subsequent calculating operation. During the last part of each working stroke of the machine, the detent 6 and the plate 10 are positively returned to their initial positions by the following device:

On a shaft 15 there is rockably mounted an arm 16, one end portion 17 of which is pressed by a spring 18 against a roller 20 on an arm 19. The other end portion 21 of the arm 16 carries a pin 22. During the calculating operation, the arms 16 and 19 assume the positions shown in

Fig. 6. Towards the end of each working stroke of the machine, after completion of the calculating operation, an up and down rocking motion is applied to the arm 19 by a cam not shown, so that the arm 19 is pressed downwardly. This causes the pin 22 on the arm 16 to cooperate with a projection 23 on the plate 10, the latter being thereby turned against the action of the spring 11 to the angle position shown in Fig. 7. Towards the end of this turning movement another projection 24 on the plate 10 cooperates with a pin 25 on the detent 6, whereby the detent is positively returned to its rest position, the depressed key being simultaneously released for return to its initial position under the action of its associated spring. When thereafter, the arm 19 rocks upwardly, the plate 10 returns to the initial position shown in Fig. 5.

The invention may be applied to a cash register or the like in which the main driving shaft is normally locked against rotation and must be unlocked by actuation of a starting key prior to each operation of the machine, as described for instance in U. S. Patent No. 1,929,652 to Robertson. In this case, it is desirable to prevent starting of the machine for a calculating operation, unless a special key has been previously depressed. This is accomplished by the following arrangement.

To the shaft 9 there is secured an arm 26 (Figs. 1 and 8). Further, on the same shaft is rockably mounted a plate 27 united with a link 28. The link 28 is connected to a clamp member 29 embracing one end of a pivot pin 30 passing through the frame wall 33 and carrying on its opposite end a stop finger 30' projecting radially from the pin 30'. A spring 31 extending between the arm 26 and the link 28 forces a pin 32 on the plate 27 against the arm 26, as will be seen from Fig. 8. When the elements of the machine assume zero or rest positions, i. e., when the plate 10 and the shaft 9 are in their angle positions shown in Fig. 5, the stop finger 30' assumes the position shown in full lines in Figs. 2, 3 and 4. However, when the detent 6 is shifted to its key locking position shown in Fig. 6, the shaft 9, when turning, rotates the pin 30 and swings the stop finger 30' to the position shown in dot-dashed lines in Fig. 2.

The stop finger 30' is arranged for cooperation with an angle shaped element 34 which is rockable on an arm 35 and actuated by a spring 36. The arm 35 is rockable about a shaft 37 and united with the start key 38 of the machine. When the stop finger 30' assumes the operative position shown in full lines in Figs. 2, 3 and 4, the angle leg 39 of element 34 cooperates with the free end of said finger upon depression of the start key 38. As can be seen from Fig. 4, this cooperation causes the element 34 to perform a rocking movement against the action of spring 36, and, when the start key 38 has been fully depressed, the elements assume the positions indicated by dot-dashed lines. When the element 34 performs said rocking movement, its hook-shaped portion 40 does not actuate an arm 41, which is rockable around a shaft 42 and, upon being displaced, causes unlocking of the main driving shaft of the machine, for instance in the manner described in U. S. Patent 1,929,652 in connection with the start key controlled displacement of link 110. Thus, as long as no special key 5 has been depressed, depression of the start key 38 will not unlock the main driving shaft of the machine for a calculating operation.

Upon depression of a special key 5 the plate 10 and the associated shaft 9 turn as described above. This causes the arm 26 to turn in the direction indicated by an arrow in Fig. 8. The arm 26 cooperates with the pin 32 and the arm 27 is rocked upwardly. As a result the pin 30 is rotated and the finger 30' is shifted into the position shown in dot-dashed lines in Fig. 2. When the finger 30' assumes this inoperative angle position, the hook-shaped portion 40 of element 34 will take along the member 41 and free the arm 43 when a rocking movement is carried out by the arm 35 upon depression of the start key 38. The main driving shaft of the machine is thus unlocked and a calculating operation may be started.

If a cash register or the like comprises, in addition to a start key adapted to unlock the main drive shaft of the machine, a zeroizing mechanism which is operated from the main drive shaft and operator controlled means for initiating the operation of the zeroizing mechanism, as described for instance in U. S. Patent No. 1,929,652, a stop finger 30', which normally renders the start key 38 inoperative unless a special key 5 has been previously depressed, must be capable of being shifted to its inoperative position permitting starting of the machine without previous operation of a special key 5 whenever a zeroizing operation is initiated. This is accomplished by the following arrangement. The reference numeral 51 (Fig. 1) indicates an operator controlled arm that may be shifted along its own axis in either direction in order to initiate a desired zeroizing operation, said arm being pivotally connected with an element 53 rockable about a pin 52. A rod 54, which serves to actuate the zeroizing gear of the machine (not shown), is pivotally connected with the element 53 to be displaced upwardly or downwardly as the arm 51 is shifted to the right or to the left, respectively. A second rod 55 is pivoted to the element 53 and extends downwardly therefrom, as seen in Fig. 8. When the rod 54 is shifted downwardly, the rod 55 is displaced in the same direction and a pin 56 on the lower plate-shaped portion of the rod 55 cooperates with a projection 57 on the plate 27 to rock the latter, against the action of the spring 31, in such a direction that the link 28 performs an upward movement. This movement causes the stop finger 30' to move from the position shown in full lines in Fig. 2 to that shown in dot-dashed lines. The result is the same if the rods 54, 55 carry out an upward movement, since in this case a second pin 58 on the rod 55 will cooperate with the plate 27 and, against the action of the spring 31, shift the link 28 upwardly. In spite of the special keys 5 being in inoperative positions, the stop finger 30' can thus be moved to its inoperative position to permit unlocking of the main driving shaft of the machine for the execution of a zeroizing operation.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a calculating machine having a series of special keys arranged in at least one key bank, each of said keys carrying on its shank a locking projection, an unlocking device for the normally locked main driving shaft of the machine including a start key, an unlocking lever and means for shifting said unlocking lever, upon operation of said start key, from a shaft locking position to a shaft release position, the combina-

tion of an elongated detent extending parallel to said key bank and being longitudinally slidable from a rest position to a key locking position, said detent being provided, opposite each key in said key bank, with a recess including a slot portion extending parallel to the longitudinal axis of said detent and being closed at one end thereof and an oblique cam portion having its outer end disposed adjacent the locking projection of the corresponding key when said detent is in its rest position and leading with its inner end into said slot portion, whereby, upon depression of any key in said key bank, said detent is shifted to an intermediate position and the locking projection of the depressed key assumes a position at the open end of the corresponding slot portion, a rotatable plate member, means giving said member a tendency for rotation in a predetermined direction, said member having a first portion arranged to abut against a portion of said detent so as to arrest said member in a predetermined angular position provided said detent is in its rest position, and a second portion arranged for cooperation with a portion of said detent when the latter has been shifted to said intermediate position to convert the rotary movement of said member away from said predetermined angular position into a longitudinal movement of said detent whereby the latter is shifted to its locking position in which the locking projection of the depressed key assumes a position inside of the slot portion of the corresponding recess, means to restore said detent to its rest position and said plate member to its predetermined angular position at the end of each working stroke of the machine, an interlock stop displaceable between a first position in which it projects into the path of a part of said unlocking device to render the same inoperative and a second position in which it does not interfere with the operation of said unlocking device, and motion transmitting means between said plate member and said interlock stop whereby the latter is shifted from said first to said second position when said plate member carries out a rotary movement in said predetermined direction.

2. In a calculating machine having a series of special keys, and a start key for unlocking the normally locked main driving shaft of the machine, the combination of a lever capable of being shifted from a normal driving shaft locking position to a driving shaft release position, a member displaced from a normal position upon depression of the start key, an element pivoted to said member and being resiliently held in a position in which one portion thereof, upon displacement of said member, cooperates with a portion of said lever to shift the same to said

shaft release position, a movable stop capable of assuming alternatively a first position in which it projects into the path traversed by a second portion of said pivoted element upon displacement of said member, so as to cause a rocking of said element whereby it does not act upon said lever, and a second position in which it does not interfere with the normal drive shaft releasing cooperation between said pivoted element and said lever, means to shift said stop from said first to said second position when any key in said series is depressed, and means to restore said stop to its first position at the end of each working stroke of the machine.

3. In a calculating machine having a series of special keys and an unlocking device for the normally locked main driving shaft of the machine including a start key, an unlocking lever, means for shifting said unlocking lever, upon operation of said start key, from a normal shaft locking position to a shaft release position, and an interlock stop displaceable between a first position in which it projects into the path of a part of said unlocking device to render the same inoperative and a second position in which it does not interfere with said unlocking device, the combination of a rotatable shaft, a first plate member keyed to said shaft, means urging said member and shaft to carry out an angular movement in a predetermined direction, means to arrest said plate member and shaft in their initial positions against movement in said predetermined direction unless one of said keys in said series is depressed, means to restore said plate member and shaft to their initial positions at the end of each working stroke of the machine during which they have been displaced, a second plate member secured to said rotary shaft, a third plate member loosely mounted on said shaft, means to transmit rotary movement in said predetermined direction positively from said second plate member to said third plate member, means to transmit rotary movement in a direction opposite to said predetermined direction resiliently from said second plate member to said third plate member, motion transmitting means between said third plate member and said movable stop whereby the latter is shifted from said first to said second position when said third plate member carries out a rotary movement in said predetermined direction, and separate operator controlled means to cause a rotary movement of said third plate member in said predetermined direction while said shaft and first and second plate members are arrested in their initial positions.

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