

909,867.

Fig. 1.

Fig. 2.

Witnesses
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UNITED STATES PATENT OFFICE.

THOMAS CARROLL, OF DAYTON, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE NATIONAL CASH REGISTER COMPANY, OF DAYTON, OHIO, A CORPORATION OF OHIO (INCORPORATED IN 1906).

KEYBOARD MECHANISM FOR REGISTERING-MACHINES.

No. 909,867.

Specification of Letters Patent.

Patented Jan. 19, 1909.

Application filed December 23, 1905. Serial No. 293,091.

To all whom it may concern:

Be it known that I, THOMAS CARROLL, 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 Keyboard Mechanisms for Registering-Machines, of which I declare the following to be a full, clear, and exact description.

10 This invention relates to improvements in keyboard devices for registering machines, such as cash registers, adding machines and the like, and has among its objects to provide a detent mechanism which will serve to latch an operated key in depressed position and at the same time unlock a register controlling device, this mechanism being combined with another device which will prevent misoperation or manipulation of the first mentioned mechanism.

15 In a co-pending application, Serial No. 291,973 filed by the same applicant on December 16th, 1905, there is shown and described a keyboard mechanism having certain of the features embodied in the present application. It is desired that said prior filed application shall contain the broad claims common to these two cases. The present case shows this form of keyboard mechanism applied to a cash register of the type set forth in the British Letters Patent No. 22535, dated October 19, 1904 and issued to Frederick L. Fuller.

20 With the above mentioned 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.

25 Of said drawings: Figure 1 represents a detail sectional view of a portion of a cash register embodying the present inventions; and Fig. 2 represents a detail view of one of the locking plates together with the release key of the machine.

30 Referring to said drawings, the keys 10 are arranged in the usual form of vertical columns, one column or bank for each amount digit or other divisional use to which the keys may be applied. These keys are inserted through the usual apertures in the

keyboard and are spring-pressed outward by means of the usual springs 11 to retain the keys normally in outward position. Each key has projecting from its side a pin 12. Coöperating with each bank of keys is a differentially movable element 13 which may be either a register controlling element or a recorder element to effect the registration of various amounts or effect the printing of certain insignia according to the differential movements of the element 13. In the present instance this element will be referred to as the registering segment, this segment being formed with teeth meshing with a gear wheel 14, which gear wheel is given differential movements according to the differential movements of the segment 13 as determined by the key depressed, and this differential movement of the gear wheel 14 may be transferred to any suitable registering device or recording device in any one of the various manners well known in the art. The gear wheel 14 has projecting from it a pin 16 which is normally engaged by the nose of a hook 17. This hook is loosely pivoted upon a transverse shaft and is connected by an arm to a detent plate 18. The registering segment 13 is pivoted upon a collar 19^a loosely mounted on a transverse shaft 19 and is connected by a spring 20 to the gear wheel 14 which is pivoted upon a transverse shaft 19^b. The engagement of the hook 17 with the pin 16 normally holds the parts in the position shown in Fig. 1 against the tension of the spring 20 tending to revolve the gear wheel 14 and likewise rotate the forward side of the segment 13 forward.

The detent plate 18 is formed with a series of heads, one for each key, each of these heads having a beveled surface which lies in the path of the key pin 12. This beveled edge ends in a recess 23 so that when any key is pressed in, the action of the pin 12 against the beveled edge forces the detent plate upward against the tension of its spring 24, and as soon as the pin reaches the recess 23 the detent plate snaps back slightly to latch over the pin 12 and thus latch the key in depressed position. Thus the detent plate 18 is moved upward a certain extent under the key action, but then moves downward again slightly to effect the latching of the key, but the ultimate position of the detent plate is to such an extent

above its normal position that the hook 17 has been swung upon its pivot sufficiently to withdraw its nose from contact with the pin 16, and thus release the gear wheel 14 whereby to release the registering segment 13 to permit it to spring forward. This registering segment springs forward differentially according to whichever key in this bank is depressed. This is effected by means of the butt or inner end of the key, when the key is depressed, coming into the path of a stop pin 30 on the side of the registering segment so as obviously to limit the forward movement of the registering segment 13 differentially according to whichever key is depressed in this particular bank.

The transverse shaft 19 upon which the collar 19^a and the registering segments 13 are mounted, constitutes a main operating shaft of the machine and may be operated by means of any suitable handle or other power device as shown in the aforesaid Fuller patent. Extending from this shaft is a pair of crank arms carrying between them a restoring rod 60 which when the shaft 19 is rocked will be oscillated to act against the projections 61 of the registering segments 13 and thus restore the segments to normal position after they have been allowed to drop differentially. This same restoring rod 60 may be utilized to strike against the under sides of the detent plates 18 for all of the banks of keys and rock said plates slightly upward sufficiently to release any operated key as described in said Fuller patent.

The normal position of the restoring rod 60 is as shown in Fig. 1 so that it does not normally stand in position to prevent the free movements of the registering segments 13 when released by the keys, but is merely used to rock forward to restore the segments to normal position and then rock backward free from engagement with the same. The segments however do not immediately spring forward when any key is depressed, but such forward movement takes place subsequently upon the depression of a certain release key 50 (see Fig. 2). This key projects through a suitable aperture in the main keyboard by the side of the amount or other keys, and is formed with a slotted recess into which projects a curved arm 51 extending from rock shaft 52 carrying locking pawls 53 fast on said shaft which engage teeth on the periphery of the aforesaid gear wheel 14. These pawls 53 normally lock the gear wheels 15 from movement, so that the registering segments 13 cannot spring forward until the release key 50 is depressed whereby to rock the shaft 52 and withdraw all of the locking pawls from engagement with their gear wheels.

Since the ultimate position of the detent plate 18 when any key is depressed, is with

the recess 23 engaging the key pin 12, the hook 17 is thereby retracted forward far enough to unlock the gear wheel 14 and registering segment 13 as above described. As also stated above however, the registering segments do not at this time spring forward but such forward movement is dependent upon the depressing of the release key 50. Therefore if a mistake has been made in the pressing in of a key in this bank, this key may be released by simply tapping another key in this bank to operate the beveled detent plate sufficiently to release the formerly depressed key, this being an example of the so-called "flexible keyboard." If however, a key were pressed in not quite to the full extent of carrying its pin 12 along the beveled edge 22, the detent plate might by this means be moved upward sufficiently to withdraw the hook 17 from engagement with the pin 16, the position of the plate 18 then being the same in upward extent as if the pin 12 were engaged by the recess 23. When the key and plate are in this position just described, the registering segment 13 and gear wheel 14 would be unlocked but the key would not be latched in depressed position; therefore if the release key 50 were now operated, the registering segment 13 would spring forward and the depressed amount key could be withdrawn or would spring back to normal position. Thus apparently from the looks of the keyboard, no registration would have been entered, whereas in reality by this careless operation or misoperation, the registering segment would have sprung forward to its fullest extent and would have made an entry in the machine. To prevent any such misoperation, a locking plate is provided as shown in Fig. 2. This locking plate 70 is made fast to the collar 19^a which is journaled upon the transverse shaft 19, the various registering segments 13 being in turn journaled upon the collar 19^a as aforesaid. Each plate 70 is formed with a series of noses or heads 71. Formed in the plate 70 which is adjacent to the release key 50 is a curved slot 72 engaged by a pin 73 projecting from the side of the release key 50. The formation of this slot is such that when the release key 50 is pressed in, this locking plate 70 is rocked downward slightly. There is of course one of these plates 70 for each bank of keys and being all connected to the collar 19^a, the rocking of this particular one by the key 50 as just described, will also rock all the others similarly. In the normal outward and unoperated position of the keys, the key pins 12 stand forward of the various locking noses 71 of the locking plate 70 so that the plate is free to be rocked downward upon the depression of the release key 50. Also if any key is completely depressed, the shape of the enlarged recess below the

corresponding nose 71 is such that the plate 70 can still be rocked downward without hindrance, that is, without striking the key pin 12. When however, any key is partially depressed in the manner above outlined so as to carry it inward in order to move the detent plate 18 upward sufficiently to unlatch the gear wheel 14 and registering segment 13 without moving the key pin far enough inward to be latched by the detent plate, this partial depression of the key will bring its pin into the path of the corresponding nose 71 of the locking plate 70. In such a situation, if the operator attempts to press in upon the release key 50, the locking plate 70 cannot be rocked downward because of this locking nose striking against the key pin 12. Therefore it will be plain that the release key 50 cannot be operated to release the segments 13 while any one of the ordinary keys is in this intermediate position. The keys must be either in their normal outward position or fully depressed to their inner position.

The release key 50 may be held latched in depressed position by any suitable means such as is shown in the aforesaid Fuller patent, and may be released to return to normal position by the operation of the driving shaft 19, as also shown in said patent. As soon as the key has been released in this manner so that it springs outward to normal position, the locking plate 70 will of course again return to normal upper position, wherein its locking noses 71 will be out of the path of any key pin of a depressed key so that when said key is unlatched by the rocking of its detent plate 18, this depressed key may freely return to normal position.

While the form of mechanism here shown and described is admirably adapted to fulfill 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:

1. In a keyboard mechanism for accounting machines and the like, the combination with a series of keys and a normally locked accounting element controlled thereby, of a detent member having provisions for latching said keys in depressed position and unlatching said accounting element; means for holding said accounting element in normal position independently of said key detent member; a special key for releasing said second latching means; and means for preventing the operation of said special key when any one of said series of keys is in partially depressed position.

2. In a keyboard mechanism for account-

ing machines and the like, the combination with a series of keys and a normally locked accounting element controlled thereby, of a detent member having provisions for latching said keys in depressed position and unlatching said accounting element; latching means for holding said accounting element in normal position independently of said key detent member; a special key for releasing said second latching means; and means for locking said special key from operation when any one of said series of keys is depressed to such an extent as to move said detent member sufficiently to unlock the accounting element without an attendant latching of the key.

3. In a keyboard mechanism for accounting machines and the like, the combination with a series of keys, and an accounting element controlled thereby, of a detent member having an extension normally engaging said accounting element to lock the same, said detent also being formed with beveled and notched projections acted upon by said keys to move the detent out of locking engagement with said accounting element while said detent at the same time latches the key in depressed position; a second latching means for latching said accounting element in normal position independently of said detent member; a special key for releasing said second latching means; and means for locking said special key when any one of the series of keys is partially depressed to disengage the detent member from said accounting element.

4. In a keyboard mechanism for accounting machines and the like, the combination with a series of keys, and an accounting element controlled thereby, of a detent member having an extension for normally locking said accounting element, said detent being positioned to be acted upon by said keys to be displaced a certain extent and then moved backward to a fractional degree thereof whereby to latch the depressed key in operated position and at the same time leave the accounting element unlocked; a second latching means for latching said accounting element in normal position independently of said detent member; a special key for releasing said second latching means; and means for preventing the operation of said special key when any one of the series of keys is in partially depressed position.

5. In a keyboard mechanism for accounting machines and the like, the combination with a series of keys, and an accounting element controlled thereby, of a detent member having an extension for normally locking said accounting element, said detent being positioned to be acted upon by said keys to be displaced to a certain extent and then moved backward to a fractional degree

thereof whereby to latch the depressed key in operated position and at the same time leave the accounting element unlocked; a second latching means for latching said accounting element in normal position independently of said detent member; a special key for releasing said second latching means; and a locking member connected with and moved by said special key, with provisions for preventing the operation of said locking member and thus locking said special key when any one of said series of keys is in partially depressed position.

6. In a keyboard mechanism for accounting machines and the like, the combination with a series of keys, and an accounting element controlled thereby, of a detent member having an extension for normally locking said accounting element, said detent being positioned to be acted upon by said keys to be displaced a certain extent and then moved backward to a fractional degree thereof whereby to latch the depressed key in operated position and at the same time leave the accounting element unlocked; a second latching means for latching said accounting element in normal position independently of said detent member; a special key for releasing said second latching means; and a locking plate normally moved by said special key with provisions co-existing between said plate and said series of keys for obstructing the movement of said plate when any one of said series of keys is in partially depressed position whereby to lock said special key from movement.

7. In a keyboard mechanism for accounting machines and the like, the combination with a series of keys, and an accounting element controlled thereby, of a detent member having an extension for normally locking said accounting element, said detent being positioned to be acted upon by said keys to be displaced a certain extent and then moved backward to a fractional degree thereof whereby to latch the depressed key in operated position and at the same time leave the accounting element unlocked; a second latching means for latching said accounting element in normal position independently of said detent member; a special key for releasing said second latching means; projections extending from said series of keys; and a locking plate cooperating with said projections and moved by said special key, said plate being formed with recesses shaped to lock the plate and the special key from movement when any one of said special keys is partially depressed but to permit free movement of the plate and special key when such one of the keys is undepressed or fully depressed.

8. In a keyboard mechanism for accounting machines and the like, the combination with a series of keys, each formed with

projections extending therefrom, and an accounting element controlled by said keys, of a detent plate having an extension for normally locking said accounting element, said detent plate being formed with beveled surfaces cooperating with said key projections, and also being formed with latching recesses, said recesses being of such extent as to leave the detent plate displaced from normal position when any key is latched in depressed position, and thereby leaving the accounting element unlocked; a second latching means for latching the accounting element in normal position independently of said detent plate; a special key for releasing said second latching means; and a locking plate moved by said special key and having provisions cooperating with the aforesaid key projections for locking said special key when any one of the series of keys is in partially depressed position.

9. In a keyboard mechanism for accounting machines and the like, the combination with a series of keys, each formed with projections extending therefrom, and an accounting element controlled by said keys, of a detent plate having an extension for normally locking said accounting element, said detent plate being formed with beveled surfaces cooperating with said key projections, and also being formed with latching recesses, said recesses being of such extent as to leave the detent plate displaced from normal position when any key is latched in depressed position, and thereby leaving the accounting element unlocked; a latch pawl engaging said accounting element to latch the same in normal position independently of said detent plate; a special key engaging an extension from said latch pawl whereby to disengage said latch pawl from said accounting element upon the depression of said special key; and a blocking plate engaged by a projection from said special key to be moved thereby, said plate being formed with recesses shaped to lock the plate and the special key from movement when any one of the series of keys is partially depressed, but permitting free movement of the plate and special key when such one of the series of keys is undepressed or is fully depressed.

10. In a keyboard mechanism for accounting machines and the like, the combination with a series of keys, and a registering element differentially controlled thereby, of a detent plate formed with beveled surfaces cooperating with said keys, and also being formed with latching recesses, said recesses being of such extent as to leave the detent plate displaced from normal position when any key is latched in depressed position; a gear wheel connected with said registering element; a latching extension connected with said detent plate and moved thereby to unlock the registering element when said plate

is displaced by the latching of a depressed key; a latching pawl engaging said gear wheel to latch the latter and also the registering element in normal position; a special
5 key engaging an extension from said latch pawl for disengaging said pawl from said gear wheel upon the depression of said special key; and a locking plate engaged and moved by a projection extending from said special key, said locking plate also having provisions for causing itself to be blocked when any one of said series of keys is in partially depressed position.

11. In a key board mechanism for accounting machines and the like, the combination
15 with a series of keys and a registering element differentially controlled thereby, of a plate movable by said keys, a latch for said element connected to said plate and
20 movable thereby to release said element, a second latch controlling said registering element, a special key for operating said

latch, and a plate operated by said key positioned and constructed to engage said series of keys if the special key is operated when
25 one of the series of keys is partially depressed.

12. In a keyboard mechanism for accounting machines and the like, the combination
30 with a series of keys and an accounting element controlled thereby, of a latch for said element, a plate movable by said keys and controlling said element, a second latch for said element, a special key for releasing
35 said latch, and means for preventing the operation of said special key when any one of said series of keys is partially depressed.

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

THOMAS CARROLL.

Witnesses:

WM. O. HENDERSON,
CARL W. BEUST.