(No Model.) 2 Sheets—Sheet 1.

J. P. CLEAL.

CASH REGISTER AND INDICATOR.

No. 555,282. Patented Feb. 25, 1896.

Fig. 5.

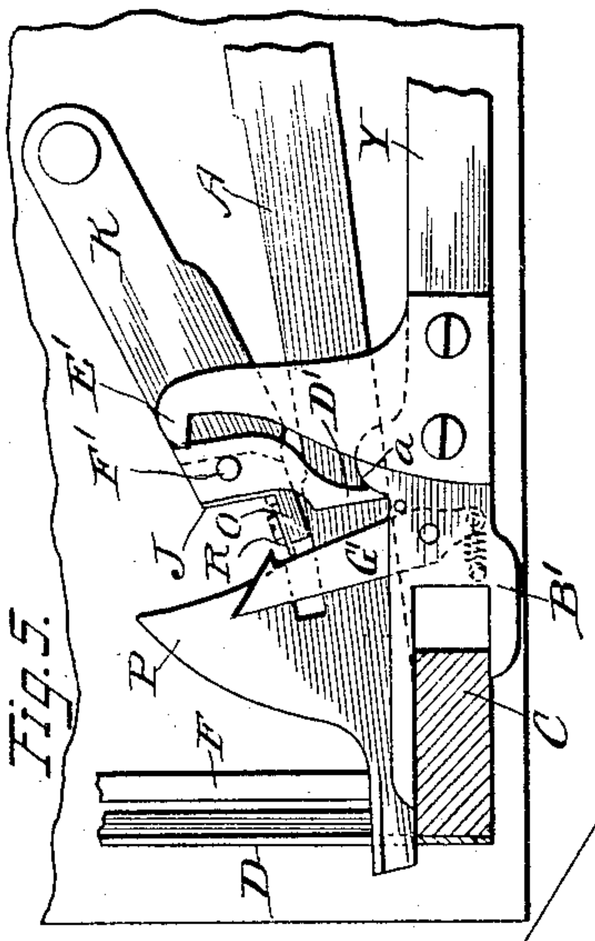


Fig. 7.

Witnesses
Martin H. Olsen.
Leonora Niemann.

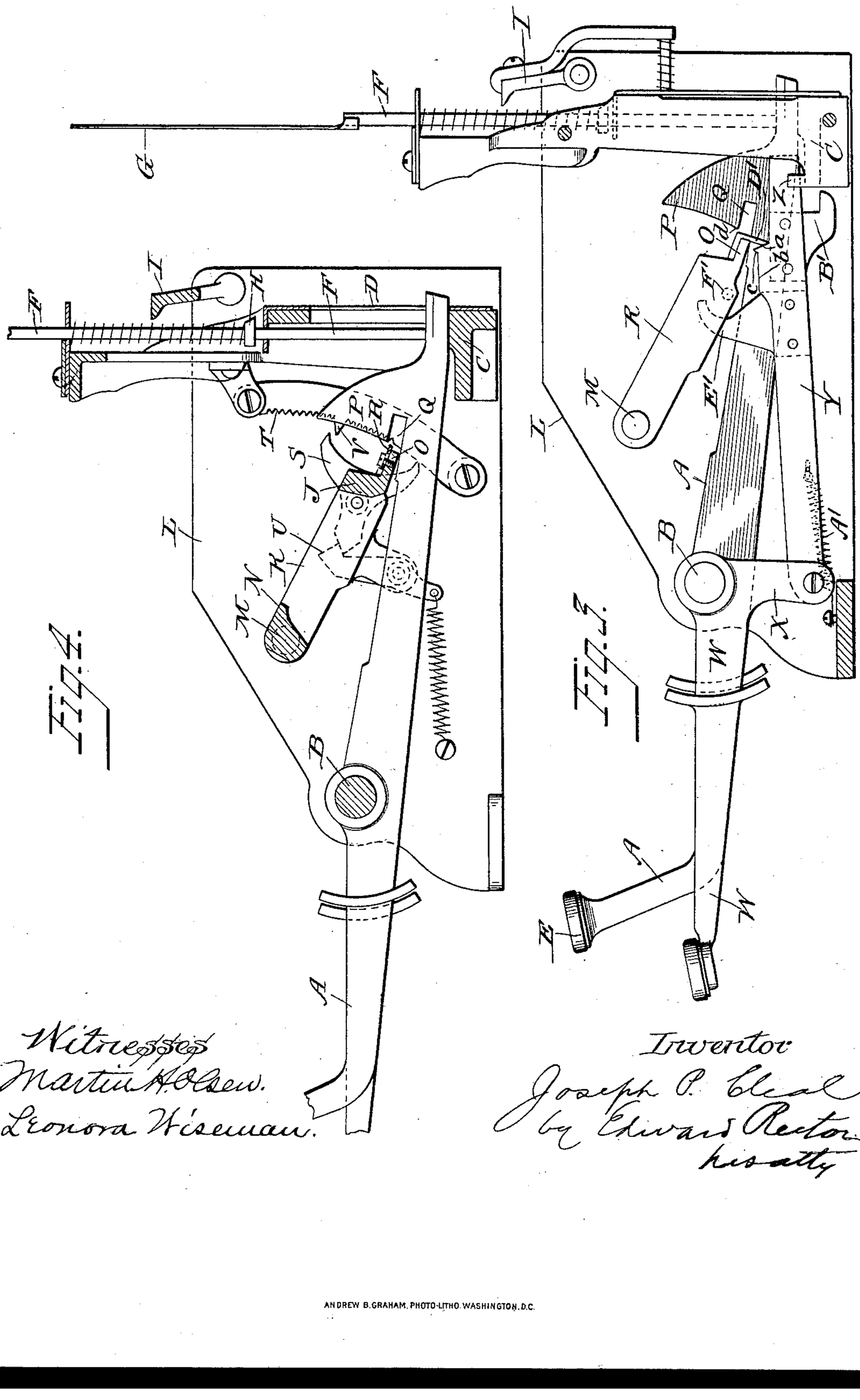
Inventor
Joseph P. Cleal
by Edward Rector
Atty.

(No Model.) 2 Sheets—Sheet 2.

J. P. CLEAL.

CASH REGISTER AND INDICATOR.

No. 555,282. Patented Feb. 25, 1896.



Witnesses:
Martin A. Olsen.
Leonora Wiseman.

Inventor
Joseph P. Cleal
by Edward Rector
his atty

UNITED STATES PATENT OFFICE.

JOSEPH P. CLEAL, OF DAYTON, OHIO, ASSIGNOR TO THE NATIONAL CASH REGISTER COMPANY, OF SAME PLACE.

CASH REGISTER AND INDICATOR.

SPECIFICATION forming part of Letters Patent No. 555,282, dated February 25, 1896.

Application filed December 26, 1895. Serial No. 573,239. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH P. CLEAL, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented a certain new and useful Improvement in Cash-Registers, of which the following is a description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates more particularly to cash-registers of that class in which the operating-keys may be successively coupled or connected to a universal bar or frame common to all of the keys and adapted to be moved by the operation of any one of them, so that a number of keys may be successively attached to said universal bar and be thereby "set," as it were, and the operation of all of them be then completed by giving said universal bar a full movement—as, for instance, by fully depressing or completing the operation of any one of the set keys. The provision of means for thus permitting the successive connection of the keys to the universal bar or frame renders it unnecessary to simultaneously depress all of the keys which may be required at a given operation to indicate and register the desired amount and permits any required combination of the keys to be operated with one hand, if desired. A practical objection has been found in the use of these machines, however, in the fact that the keys were liable to be accidentally or inadvertently slightly depressed and thereby connected to the universal bar, as by the clerk or some one else touching the keys with his hand or arm without intending to operate any of them, or by some object being allowed to strike the keys or rest upon them, in which case it was not possible to detach the depressed keys from the bar and nothing could be done but to complete their operation and indicate and register their values. So, too, if in operating the machine the wrong key should be inadvertently slightly depressed or set, the mistake could not be corrected, and the amount represented by that key would have to be indicated and registered whether it corresponded to the amount of the sale or not.

To obviate these difficulties and objections my invention consists primarily in the provision of a setting device or means independent of the operating-keys, which co-operates with the universal bar and the coupling or connecting devices for connecting it with the keys in such manner that the danger of any inadvertent or accidental connection of the keys to such bar is removed, and by which it is also rendered possible, after a key has been connected to such bar, to disconnect it and permit it to return to normal position without completing its operation or registering its value. The universal bar and coupling or connecting devices are normally in such position or condition that the keys cannot be readily connected to such bar, or at least so that there is practically no danger of their being accidentally or inadvertently connected to it. When a sale is made which requires the operation of several keys, in order to properly indicate and register the amount of it the special setting means which I have provided is first operated to set the universal bar and connecting devices or put them in condition or position for the keys to be readily connected to the bar, and then the proper keys to indicate and register the amount of the sale are slightly depressed and thereby connected to the bar, after which the operation is completed by fully depressing or completing the operation of any one of them. Inasmuch as this preliminary setting operation, preparatory to the setting of the keys to be operated, involves a positive voluntary act on the part of the clerk it follows that the liability of the keys being accidentally or inadvertently connected to the universal bar is removed. Again, after the universal bar and connecting devices have been set or put into condition for the operations of the keys, by the operation of the special setting means, and after one or more keys have been connected to such bar, the bar and connecting devices may be released and permitted to return to normal position, and the connected keys be thus disconnected from the bar and likewise returned to normal position without indicating or registering anything. In this manner, when, by a mistake, the clerk depresses and sets the wrong key he may correct the mistake

by releasing that key and any others that may have been previously set permitting them to return to normal position.

Having now indicated the general nature of my invention, I will proceed to describe the particular embodiment of it, which has been illustrated in the accompanying drawings, in which—

Figure 1 represents a vertical section of the operating-keys, universal bar, and indicating mechanism of a well-known form of cash-register having my invention applied to it and with the parts in normal position; Fig. 2, a corresponding view with the parts in the position they occupy after the special setting means has been operated to put the universal bar and connecting devices in condition for the keys to be connected to the bar; Fig. 3, a view of the parts shown in Fig. 1 and in the same position, but looking at them from the opposite side of the machine just within the right-hand side plate of the framework; Fig. 4, a vertical section looking in the same direction as in Fig. 3 and showing the complete-stroke mechanism for the universal bar and keys which is omitted from Fig. 3; and Fig. 5, a detail view showing a modified construction and arrangement of the parts and a locking device for the universal bar.

The same letters of reference are used to indicate identical parts in all the figures.

Under the construction illustrated in the drawings the operating-keys consist of the levers A fulcrumed on the horizontal rod B at the front of the machine and resting at their rear ends upon the cross-bar C of the framework in the lower ends of vertical slots in the guide-plate D and bearing at their front ends the usual numbered finger-buttons E. Resting upon the rear ends of the levers A are the vertically-guided indicator-rods F, carrying the indicators G at their upper ends and provided with the collars H, whose beveled rear sides co-operate with the usual supporting bar or wing I in the well-known manner.

The universal bar or frame of the machine consists of a bar J, extending transversely across the series of levers A a short distance in front of their rear ends and hung by side arms K at its opposite ends to the side plates L of the framework at M, the front ends of the arms K being in the present instance connected by an integral cross-bar N, the bars J and N and side arms K forming a single integral frame pivotally supported at M. The bar J is provided along the lower edge of its rear side with a rearwardly-projecting flange O, whose rear edge rests upon the upper sides of the levers A. Immediately in rear of the flange O the levers A are provided with the vertical extensions P, having the recesses or slots Q adapted to co-operate with the flange O and having also their forward faces curved in approximately the arc of the circle described by the rear edge of the flange O, as is common in machines of this character, the curved front edges of the extensions P terminating at their lower ends in the points *d* at the mouths of the slots Q.

Under the construction above described, when the front end of any key-lever is depressed and its rear end lifted the flange O, as it rises with the rear end of the lever, will move rearward and enter the slot Q in the lever, thereby connecting the lever to the universal bar J. If the front ends of several levers be depressed at once, their rear ends will all become connected to the bar J in this manner, so that the operation of all of them may be completed by fully depressing any one of them. With this construction alone, however, it would be necessary for the front ends of all of the operated levers to be depressed at the same time, since they could not be successively coupled to the bar J, because a movement of any lever sufficient to connect it to said bar would move the bar into position to lock the keys which remained at rest.

For the purpose of permitting the successive connection of a number of keys to the universal bar there has heretofore been provided in machines such as that illustrated in the drawings one or more thin plates R, resting upon the flange O of the bar J and held thereon by screws passing through slots in the plates and pressed rearward by suitable springs and yieldingly held in such position with their rear edges projecting beyond the rear edge of the flange O. Under this construction the bar J may be lifted by depressing the front end of one of the levers A or otherwise until the rear edge of the plates O stand in the path of travel of the lower forward points *d* of the extensions P of the levers, as seen in Fig. 2, without locking the levers from movement, as would be the case if the flange O of the bar J stood in the path of such points, since whenever the rear end of any lever is then lifted the lower end of its extension P will simply press forward the plate R with which it contacts and pass it, and the plate will thereupon spring rearward and catch under the point *d* of the extension and the lever be thereby connected to the universal bar. To permit such successive connection of the keys to the universal bar without the necessity of holding one key slightly depressed for the purpose of maintaining the bar in the position shown in Fig. 2 while the other keys were being depressed and connected to it, suitable means were employed for holding the bar in such slightly-lifted position after being moved thereto. In Fig. 4 is shown one common form of means for that purpose, where it will be seen that the side arm K at the left-hand end of the bar J has pivoted to it the double-toothed pawl S, which co-operates with the curved rack T at its rear end and at its front end with a spring-latch U. When the bar J has been lifted far enough for the lower tooth of the pawl S to engage the lowermost notch in the rack T, the bar will be held in such ele-

vated position by the engagement of such tooth with such notch, and cannot be returned to normal position without first lifting it high enough for the lower tooth of the pawl to contact with the projection V at the middle of the rack and shift the pawl to disengage the lower tooth from the rack and engage its upper tooth therewith, as is common in these machines. With the provision of this means it was only necessary to lift the bar J high enough for the lower tooth of the pawl to engage the lower notch of the rack in order to support the bar in position for any desired number of keys to be successively connected to it; but after any key had been connected to it it was impossible to disconnect such key from it, and nothing could be done but to complete the full movement of the key and bar.

Another difficulty was that if the first key depressed should happen to be moved far enough to lift the flange O of the bar J into the upward path of the points *d* of the extensions P of the key-levers remaining at rest all of the latter would become locked by the flange O and only the one key could be operated. Considerable care had therefore to be exercised in slightly depressing all of the keys excepting the last one to avoid moving them too far and thereby preventing the operation of any others in the manner described.

Having now described so much of the structure shown in the accompanying drawings as is old, I will next describe the part thereof which is new and illustrates my invention.

Hung at some point upon the fulcrum-rod B of the key-levers, in this instance at the extreme right-hand side of the series, is a special lever W in the form of a bell-crank, its horizontal arm extending forward of the fulcrum-rod B and corresponding to the front ends of the other levers, while its vertical arm X extends downward beneath the rod B. Pivoted to the lower end of the arm X is a rearwardly-extending arm or bar Y, whose rear end fits in a guideway at Z upon the front edge of the cross-bar C of the framework, so that the arm is free to slide backward and forward when the front end of the lever W is depressed and raised. A spring A′ connected to the arm Y yieldingly holds it and the lever W in and returns them to normal position. Secured upon the side of the arm Y, in front of the cross-bar C, is a plate B′, having its rear end formed into a hook adapted to pass under the front edge of the cross-bar C, for a purpose hereinafter explained. The upper edge of the rear end of the arm Y is cut away to form an inclined elevation at *a*, the upper end of which is connected with the approximately horizontal surface *b* of the arm Y in front of it by an abrupt shoulder *c*. The bar J or its flange O has depending from it a finger D′, whose lower end normally rests upon the upper edge of the bar Y immediately in rear of or against the inclined surface *a*, with the result that whenever the bar Y is slid rearward and the inclined surface forced under the finger D′ the bar J will be lifted, and as the lower end of the finger D′ is forced upward over the point at the upper end of the surface *a* and drops in front of the shoulder *c* and rests upon the surface *b* the bar J will be supported in the position shown in Fig. 2, the engagement of the lower end of the finger D′ with the shoulder *c* preventing the arm Y being drawn forward by the spring A′ and the parts thereby released and permitted to drop to normal position. In this position of the parts, as before explained, any desired number of the key-levers may be successively slightly depressed and their hooks caught upon the plates R resting upon the flange O of the bar J and the operation of all of them completed by giving the bar J a full movement by fully depressing the front end of some one of the levers or otherwise.

With the parts in the position shown in Fig. 2 and with one or more levers A connected to the universal bar it is possible to disconnect such lever or levers from the bar by slightly further depressing the front end of one of such levers just sufficiently to lift the bar J slightly and disengage the lower end of the finger D′ from the shoulder *c* and permit the spring A′ to draw the arm Y forward without lifting the bar J high enough to cause the lower tooth of the pawl S in Fig. 4 to engage the lower notch in the rack T. The bar J being thus freed from its support by the arm Y will thereupon immediately drop back to normal position, and the operated or set keys will return with it and become disconnected from it.

As heretofore stated, in the use of these machines as they have existed without my present invention the universal bar has been supported in set position by the engagement of the pawl of the complete-stroke mechanism with the rack thereof. In such cases where a complete-stroke mechanism, such as that shown in Fig. 4, has been employed the lower half of the rack has been provided with more teeth than are shown in Fig. 4, so that it was not necessary to lift the bar J so high as would be necessary in Fig. 4 in order for it to be caught and held in set position. As has also been explained, the bar J was lifted to this position by depressing the front end of the first key-lever operated the exact distance necessary to so lift the bar to position for additional keys to be connected to it, without lifting it far enough to cause its flange O to lock the remaining keys. The difficulty with this construction and operation was, as has been stated, twofold. In the first place, too great care had to be exercised in slightly depressing the first key in order that the universal bar might be lifted to and supported in set position, yet not lifted high enough to lock the remaining keys, and, in the second place, after any keys had once been connected to the bar it was impossible to disconnect them therefrom without fully operating them

and registering their values. The provision of my present invention for permitting disconnection of such keys has been explained above, and its provision for overcoming the other difficulty mentioned may be now described.

Inasmuch as a complete stroke of the special setting-key W serves merely to lift the universal bar into set position it follows that no special care need be exercised in operating the setting device in order to prevent the bar being lifted high enough to engage the pawl and rack of the complete-stroke mechanism and thereby lock the keys from operation. Indeed, it is not possible by any ordinary operation of this special setting device to do anything else than properly set the bar for the connection of the keys to it, and even if the special key W be quickly or violently depressed the distance which the universal bar is positively lifted by the inclined shoulder *a* is so short that there is little danger of it being carried too far by the momentum imparted to it; but to absolutely prevent any excessive movement being given it by depressing the key W with extreme violence I provide the setting-bar Y with an upward extension or arm E′, whose upper end projects rearwardly and is adapted when the bar Y is moved rearwardly to catch over a stud F′ upon the side arm K of the universal bar, as seen in Fig. 2. Inasmuch as the hooked plate B′ upon the under side of the bar Y at the same time catches under the fixed cross-bar C of the framework it follows that the universal bar is positively locked from excessive upward movement so long as the setting device remains in rearward position, as in Fig. 2. The result is that no matter how quickly or violently the setting-bar Y may be forced rearward the upward movement of the universal bar will be arrested and limited by the contact of the stud F′ with the arm E′.

The stud F′ and arm E′ serves a further purpose in that when the bar J, by the subsequent operations of the keys, is lifted from the position shown in Fig. 2, far enough for the lower end of the finger D′ to clear the shoulder *c* the stud F′ will contact with the under side of the extreme rear end of the arm E′ and positively start the setting-bar Y forward toward normal position, thus aiding the spring A′ in resetting the parts.

Under the general construction illustrated in the drawings and above described it will be understood that the double-toothed pawl and co-operating devices of Fig. 4 serve merely as a complete-stroke mechanism to insure the full movements of the parts after they have been moved beyond the position shown in Fig. 2, and do not have anything to do with the mechanism for successively coupling or connecting the key-levers to the universal bar, and that in order that they may not interfere with the release in the manner described, of keys set by mistake or inadvertance, the adjustment of the parts is such that the lower teeth of the pawl S will not engage the lowermost notch in the rack until after the universal bar has been moved upward beyond the highest position to which it is moved by the setting device. Some of the advantages of my invention may, however, be realized by the use of the special setting device merely for the purpose of setting the universal bar preparatory to the connection of the keys with it, without regard to the provision for supporting the bar in set position by means of the setting device itself, and without regard to the provision for permitting the release of set keys after they have been connected to the bar, as where the wrong key has been inadvertently set. Thus, for instance, the shoulder *c* on the setting-bar Y might be omitted, and the bar Y with its inclined surface *a* be employed simply to lift the bar J to set position, and the teeth upon the lower half of the rack in Fig. 4 be extended farther downward so that such lifting of the universal bar to set position would cause the pawl S to engage one of the lower notches in the rack and thereby support the bar in set position. This arrangement would not permit the release of any keys which might thereafter be connected to the bar, but it would yield the other advantages of my invention in that the universal bar would always be moved to exactly the proper position by the operation of the special setting device. and it would be impossible to move it too far and thereby lock the keys, as there has always been danger of doing in the machines as heretofore constructed, where the first key operated served as the setting device for the bar.

In Fig. 5 I have illustrated a modified construction or arrangement of the setting devices, where the bar Y with its inclined shoulder *a* serves merely to lift the universal bar to set position and is withdrawn by the spring A′ as soon as the special setting-key is released, and hence does not serve to support the bar in set position, the pawl and rack of the complete-stroke mechanism being employed to support the bar in set position, as above described. So, too, in Fig. 5 provision is made for normally locking the universal bar in its initial position, the locking device being controlled by the setting device, so that the bar is released only when the setting device is operated to lift it to set position. With this provision for normally locking the bar it is impossible to set it by depressing any one of the regular keys of the machine in the first instance, and it can only be set by means of the special device provided for that purpose.

Referring now to Fig. 5 it will be seen that the bar Y is provided upon its upper edge with an inclined or rounded surface *a*, corresponding to that in the other views, which rides under the finger D′ depending from the universal bar, to lift the latter to set position, but has no shoulder *c* to engage said finger and hold the bar Y in rearward position to support the bar J in elevated position,

and the result is that the bar Y is drawn forward by the spring A′ as soon as the setting-key W is released. The upward movement given the bar J, however, is sufficient to engage the pawl of the complete-stroke mechanism with the rack thereof, which serves to support the bar in set position and permit the keys to be successively coupled in the manner before explained. It will also be seen that the bar Y has pivoted to it a pawl G, whose hook-shaped upper end catches over the plate R upon the flange O of the bar J, when the latter and the setting-bar Y are in normal position, and thus serves to lock the bar J in initial position and prevent operation of any of the key-levers A. When the special setting-key W is depressed and the bar Y moved rearward the pawl G′ is disengaged from the plate R and permits the bar J to be lifted as the shoulder *a* rides under the finger D′. When the setting device is released and drawn forward again by the spring A′ the beveled nose of the pawl is brought beneath the plate R and flange O of the bar J, so that as the latter returns to initial position at the end of the operation of the machine the plate R will ride over the beveled nose of the pawl and catch under its hook again and the bar J thereby becomes relocked in normal position. In the absence of this locking device it has sometimes been found possible in machines of this class to strike the front end of one of the key-levers A such a sharp quick blow as to throw the bar J upward high enough to cause its flange O to lock all of the keys, including the one to which such blow was applied, the bar J at such operation being thrown ahead of the key at the beginning of its movement owing to the character of the blow upon the key, so that even such key would not become connected to the bar. In this manner an evil-disposed clerk or a stranger was able to throw the machine out of order, since after the bar J had been thrown in the manner above described into position to lock all of the keys (being held in such position by the rack and pawl of the complete-stroke device) not one of the keys could be operated and the machine could not be used until its casing was opened and an instrument inserted to move the bar upward to its limit of movement, whereupon the complete-stroke device would permit it to drop back to initial position and thereby release the keys and permit them to be operated. The provision of the locking device above described not only insures the proper setting of the universal bar by the operation of the setting device, but also prevents the machine being thrown out of order in the manner just explained.

In Fig. 5 the upper end of the stop-arm E′ is so shaped that, while it serves to arrest the upward movement of the bar J in the same manner as does the arm E′ in the other views, it does not perform the additional function of aiding the spring A′ in resetting the arm Y, as does the arm E′ in the construction as described.

Having thus fully described my invention, I claim—

1. In a cash-register or analogous machine, the combination, with a series of keys, a movable bar common to said keys, and means for connecting the keys to said bar, of means independent of the keys for setting the movable bar and connecting means, or putting them in position or condition, to facilitate the connection of the keys to the bar, substantially as and for the purpose described.

2. In a cash-register or analogous machine, the combination, with a series of keys, a movable bar common to said keys, and means for connecting the keys to said bar, of means independent of the keys for putting the movable bar and connecting devices into position or condition to facilitate the connection of the keys to the bar, said means permitting the release of a key after it has been connected to the bar, substantially as and for the purpose described.

3. The combination, with a series of keys, a movable bar common to said keys, and means for connecting the keys to the bar, said bar requiring to be moved from normal position in order to facilitate the connection of the keys to it, of special setting means, independent of the keys, for so moving or setting the bar, for the purpose described.

4. The combination, with a series of keys, a movable bar common to said keys, and means for connecting the keys to the bar, said bar requiring to be moved from normal position in order to facilitate the connection of the keys to it, of special setting means, independent of the keys, for so moving or setting the bar, and a stop controlled by such setting means to prevent excessive movement of the bar, substantially as and for the purpose described.

5. The combination, with a series of keys, a movable bar common to said keys, and means for connecting the keys to the bar, said bar requiring to be moved from normal position in order to facilitate the connection of the keys to it, of special setting means, independent of the keys, for so moving or setting the bar, and an arm or plate moved by the setting means into the path of the bar, to arrest the same and prevent excessive movement thereof, substantially as and for the purpose described.

6. The combination, with a series of keys, a movable bar common to said keys, and means for connecting the keys to the bar, said bar requiring to be moved from normal position in order to facilitate the connection of the keys, of means independent of the keys for so moving the bar to and releasably supporting or holding it in set position, for the purpose described.

7. The combination, with a series of keys, a movable bar common to said keys, and means for connecting the keys to the bar, said bar

requiring to be moved from normal position in order to facilitate the connection of the keys to it, of a special setting device co-operating with the bar to move it to set position, a spring for returning the setting device to normal position, and means for supporting the bar in set position, for the purpose described.

8. The combination, with a series of keys, a movable bar common to said keys, and means for connecting the keys to the bar, said bar requiring to be moved from normal position in order to facilitate the connection of the keys to it, of a special setting device co-operating with the bar to move it to set position, a spring for returning the setting device to normal position, and means for supporting the bar in set position and releasing it and permitting disconnection of the connected key or keys, for the purpose described.

9. The combination, with a series of keys, a movable bar common to said keys and means for connecting the keys to the bar, said bar requiring to be moved from normal position in order to facilitate the connection of the keys to it, of a special setting device for moving the bar to and supporting it in set position, and a spring for returning the setting device to normal position, for the purpose described.

10. The combination, with a series of keys, a movable bar common to said keys, and means for connecting the keys to the bar, said bar requiring to be moved from normal position in order to facilitate the connection of the keys to it, of a special setting device co-operating with the bar to move it to and releasably support it in set position, and a spring for returning the setting device to normal position, for the purpose described.

11. The combination, with a series of keys, a movable bar common to said keys, and means for connecting the keys to the bar, said bar requiring to be moved from normal position in order to facilitate the connection of the keys to it, of a special setting device for moving the bar to and supporting it in set position, a spring tending to return the setting device to normal position, and means for holding the setting device in operative position and adapted to release it upon striking a set-key, to permit its spring to return it to normal inoperative position, for the purpose described.

12. The combination, with a series of keys, a movable bar common to said keys, and means for connecting the keys to the bar, said bar requiring to be moved from normal position in order to facilitate the connection of the keys to it, of a special setting device for moving the bar to and supporting it in set position, a spring tending to return the setting device to normal position, and means whereby the bar when in set position holds the setting device from return movement, and when moved from set position releases the setting device and permits the spring to return it, for the purpose described.

13. The combination, with a series of keys, a movable bar common to said keys, and means for connecting the keys to the bar, said bar requiring to be moved from normal position in order to facilitate the connection of the keys to it, of a special setting device for moving the bar to and supporting it in set position, a spring tending to return the setting device to normal position, and a shoulder or projection upon the setting device co-operating with the movable bar to cause the latter to hold the former in position to support the bar in set position, substantially as described.

14. The combination, with a series of keys, a movable bar common to said keys, and means for connecting the keys to the bar, said bar requiring to be moved from normal position in order to facilitate the connection of the keys to it, of a special setting device for moving the bar to and supporting it in set position, a spring tending to return the setting device to normal position, and a shoulder or projection upon the setting device co-operating with the movable bar to cause the latter to hold the former in position to support the bar in set position and permitting a slight movement of the bar from set position to release the setting and supporting device and permit the spring to withdraw it, substantially as described.

15. The combination of a series of key-levers, a movable bar common thereto and pivotally supported above their rear ends, means for connecting the levers to said bar, a reciprocating setting member adapted to slightly lift said bar when moved in one direction, means for supporting the bar in lifted position, and a spring for returning the setting member to normal position, substantially as described.

16. The combination of a series of key-levers, a movable bar common thereto and pivotally supported above their rear ends, means for connecting the levers to said bar, a reciprocating setting member adapted to slightly lift said bar when moved in one direction and provided with a shoulder or projection adapted to be engaged by said bar and to be disengaged from it when the bar is slightly lifted from set position by striking a set key or otherwise, and a spring for returning the setting member to normal position, substantially as described.

17. The combination, with a series of keys, and a movable bar or frame common to said keys, and moved by the operation of any one of them, of a locking device for locking said bar in normal position, and means for releasing the bar and slightly moving it from normal position and supporting it in such moved position, substantially as described.

18. The combination, with a series of keys, and a movable bar common thereto and moved

by the operation of any one of them, of a locking device for locking said bar in normal position, and a special key and connections for releasing said bar and slightly moving it from normal position, substantially as described.

19. The combination, with a series of keys, and a movable bar common thereto and moved by the operation of any one of them, of a locking device for locking said bar in normal position, a special key and connections for releasing the bar and slightly moving it from normal position, and means for supporting the bar in moved position, substantially as described.

20. The combination, with a series of keys, and a movable bar common thereto and moved by the operation of any one of them, of a locking device for locking said bar in normal position, and a special key and connections for releasing said bar and slightly moving it from normal position and supporting it in moved position, substantially as described.

21. The combination, with a series of keys, and a movable bar common to said keys and moved by the operation of any one of them, of a locking device for locking the bar in normal position, a reciprocating member adapted to release the bar when moved in one direction and to slightly lift and support the bar and be engaged thereby, and a spring for returning said member to normal position when disengaged from the movable bar, substantially as described.

22. The combination, with a series of keys, a movable bar common to said keys, and means for connecting the keys to the bar, said bar requiring to be moved from normal position in order to facilitate the connection of the keys to it, of a locking device for locking the bar in normal position, means for releasing the bar and slightly moving it from normal position, and means for supporting the bar in moved position, substantially as and for the purpose described.

23. The combination, with a series of keys, a movable bar common to said keys, and means for connecting the keys to the bar, said bar requiring to be moved from normal position in order to facilitate the connection of the keys to it, of a special key and connections for releasing the bar and slightly moving it from normal position, and means for supporting it in moved position, substantially as and for the purpose described.

24. The combination, with a series of keys, a movable bar common to said keys, and means for connecting the keys to the bar, said bar requiring to be moved from normal position in order to facilitate the connection of the keys to it, of a reciprocating member adapted when moved in one direction to release the bar and slightly move it from normal position and support it in such moved position, and a spring for returning said member to normal position when disengaged from the movable bar, substantially as and for the purpose described.

25. The combination of the key-levers A, the universal bar J overlying said levers and moved by the operation of any one of them, the reciprocating arm or bar Y adapted to lift the bar J when moved rearward, and provided with a shoulder or projection, as *c*, co-operating with the bar J or a projection thereon, and the spring A′ for resetting the arm Y, substantially as described.

26. The combination of the key-levers A having the extensions P provided with the slots Q, the universal bar J overlying the keys in front of the slots Q and provided with the flange O, the spring-pressed plate R resting upon the flange O and projecting beyond its rear edge, the reciprocating setting arm or bar Y adapted to lift the bar J when moved rearward, means for supporting the bar J in such lifted position, and the spring A′ for resetting the arm Y, substantially as described.

27. The combination of the key-levers A having the extensions P provided with the slots Q, the universal bar J overlying the keys in front of the slots Q and provided with the flange O, the spring-pressed plate R resting upon the flange O and projecting beyond its rear edge, the reciprocating setting arm or bar Y adapted to lift the bar J when it is moved in one direction, and provided with a shoulder or projection, as *c*, co-operating with the bar J or a projection thereon, and the spring A′ for yieldingly holding the arm Y in and returning it to normal position, substantially as described.

28. The combination of the key-levers A having the extensions P provided with the slots Q, the universal bar J overlying the keys in front of the slots Q and provided with the flange O, the spring-pressed plate R resting upon the flange O and projecting beyond its rear edge, the reciprocating setting arm or bar Y adapted to lift the bar J when it is moved rearward, and provided with a shoulder or projection, as *c*, co-operating with the bar J or a projection thereon, the bell-crank lever W for actuating the arm Y, and the resetting-spring A′, substantially as described.

29. The combination of the key-levers A having the extensions P provided with the slots Q, the cross-bar J overlying the rear ends of the levers in front of the extensions P and provided with the flange O, the spring-pressed plate R resting upon the flange O and projecting beyond its rear edge, the reciprocating arm Y provided with the rearwardly-facing inclined surface or beveled shoulder *a*, and the abrupt forwardly-facing shoulder *c*, the pendent projection or finger D′ upon the bar J adapted to co-operate with the shoulders *a* and *c*, the bell-crank lever W for actuating the setting-arm Y, and the resetting-spring A′, substantially as described.

30. The combination of the key-levers A, the cross-bar J overlying said levers and moved by the operation of any one of them, and the reciprocating arm Y adapted to lift the bar J when moved rearward and provided with the

stop-arm E′ co-operating with the bar J to prevent excessive movement thereof, substantially as described.

31. The combination of the key-levers A, the cross-bar J overlying said levers and moved by the operation of any one of them, the reciprocating arm Y adapted to slightly lift said bar when moved rearward, means for supporting the bar in lifted position, and the stop-arm E′ moving with the arm Y and co-operating with the bar J to prevent excessive movement thereof, substantially as described.

32. The combination of the key-levers A, the cross-bar J overlying said levers and moved by the operation of any one of them, the reciprocating arm Y adapted to slightly lift said bar when moved rearward and provided with a shoulder or projection, as *c*, co-operating with the bar or a projection thereon, the stop-arm E′ moving with the arm Y and co-operating with the bar J, and the resetting-spring A′ for the arm Y.

33. The combination of the key-levers A having the extensions P provided with the slots Q, the cross-bar J overlying the levers and provided with the flange O in front of the slots Q, the spring-pressed plate R resting upon the flange O and projecting beyond its rear edge, the reciprocating setting-arm Y adapted to lift the bar J as it is moved rearward and provided with a shoulder or projection co-operating with said bar to prevent return movement of the setting-arm, the hooked plate B′ secured to the arm Y and adapted to co-operate with a fixed member, as C, the arm E′ also secured to the setting-arm Y and adapted to co-operate with a stud or projection F′ upon the bar J or its supporting-arm, the bell-crank lever W for actuating the arm Y, and the resetting-spring A′, substantially as described.

34. The combination of the key-levers A, the cross-bar J overlying the same and moved by the operation of any one of them, the reciprocating arm Y adapted to lift the bar J when moved in one direction, and the locking-pawl G′ co-operating with the bar J and with the setting-arm Y, normally locking the bar J and moved to release it by the arm Y, substantially as described.

35. The combination of the key-levers A, the cross-bar J overlying the same and moved by the operation of any one of them, the reciprocating arm Y adapted to lift the bar J when moved in one direction, the locking-pawl G′ co-operating with the bar J and arm Y, normally locking the bar and moved by the arm Y to release it, and means for supporting the bar J in lifted position, substantially as described.

36. The combination of the key-levers A, the cross-bar J overlying the same and moved by the operation of any one of them, the reciprocating arm Y adapted to slightly lift said bar when moved in one direction and provided with a shoulder or projection, as *c*, co-operating with the bar or a projection thereon, the resetting-spring A′ for the arm Y, and the locking-pawl G′ normally locking the bar J and moved by the arm Y to release it, substantially as described.

37. The combination of the key-levers A, the cross-bar J overlying the same and moved by the operation of any one of them, means for connecting the levers to said bar, the reciprocating arm Y adapted to slightly lift the bar when moved in one direction, means for supporting the bar in lifted position, and the locking-pawl G′ co-operating with the bar to lock it in normal position and moved by the arm Y to release it, substantially as described.

JOSEPH P. CLEAL.

Witnesses:
ALVAN MACAULEY,
PEARL N. SIGLER.