W. P. QUENTELL.

CONTROLLING DEVICE FOR ADDING MACHINES.

APPLICATION FILED FEB. 25, 1919.

1,318,798.

Patented Oct. 14, 1919.

2 SHEETS—SHEET 1.

Fig. 2.

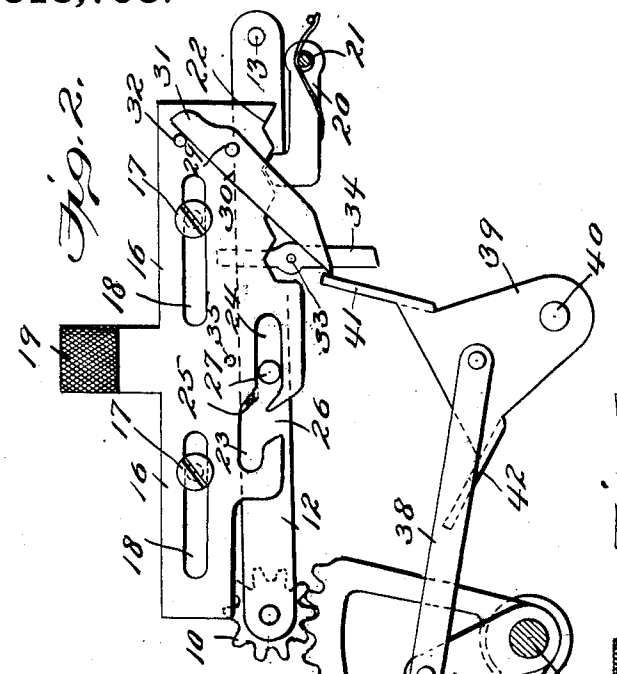


Fig. 1.

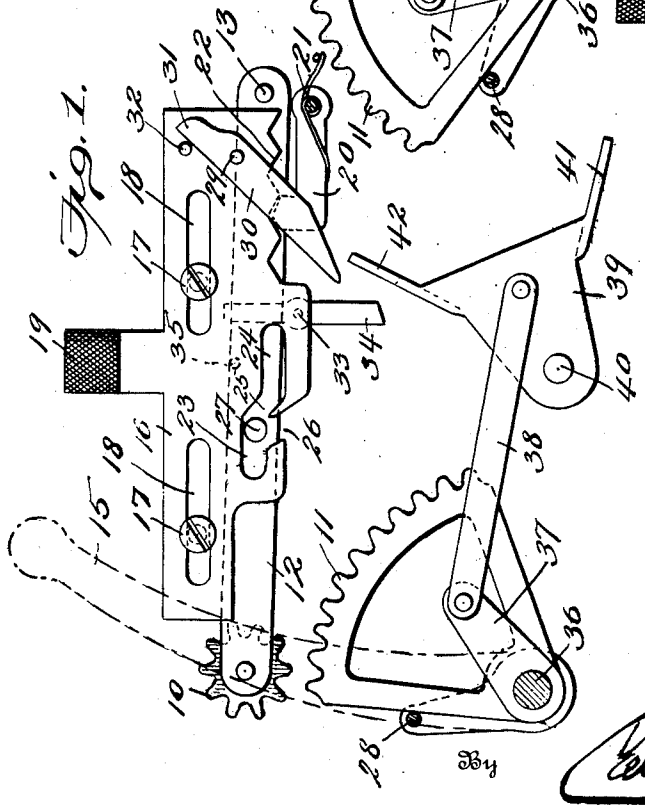
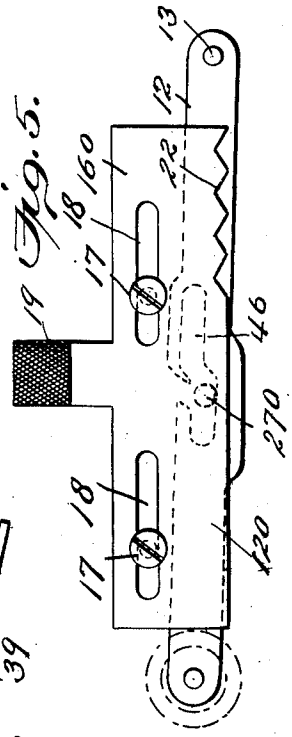


Fig. 5.



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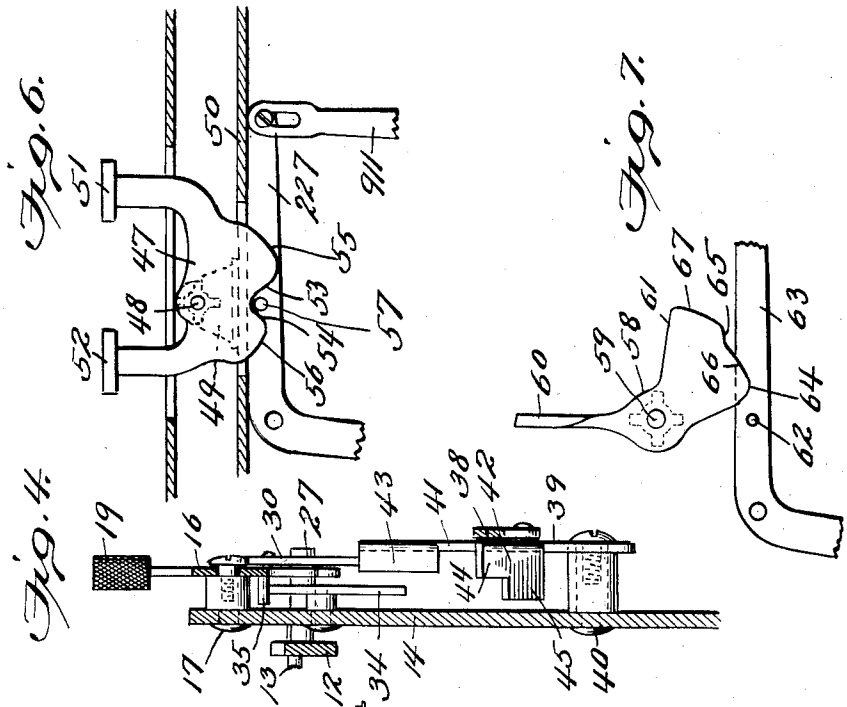


Fig. 6.

Fig. 7.

Fig. 4.

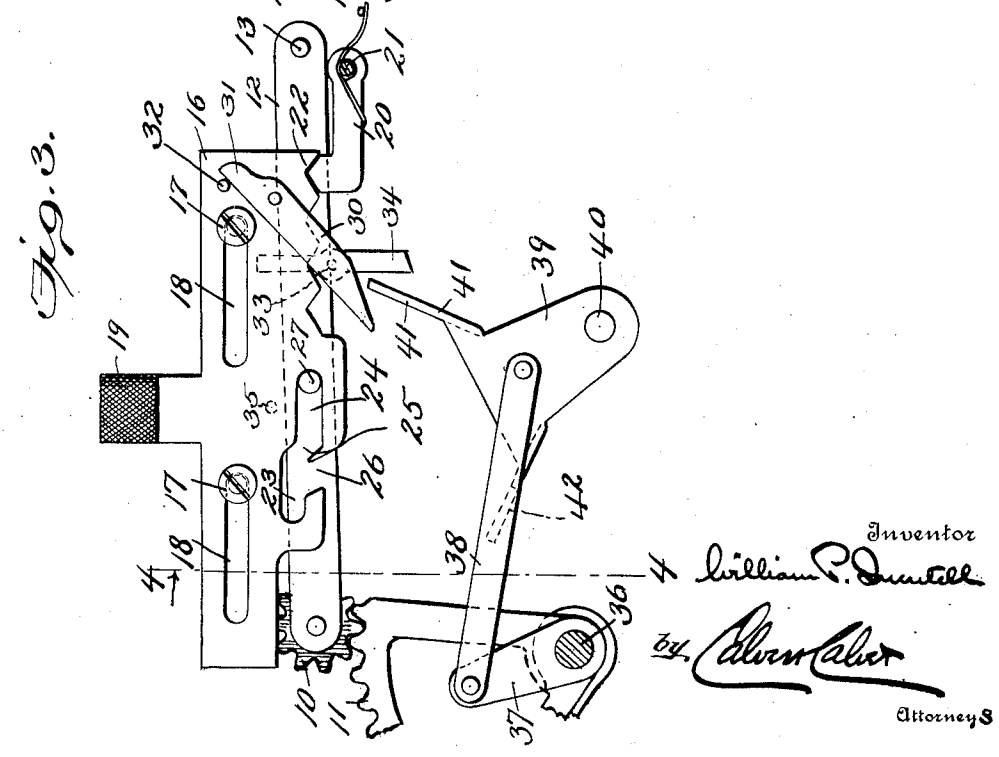


Fig. 3.

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CONTROLLING DEVICE FOR ADDING-MACHINES.

1,318,798. Specification of Letters Patent. Patented Oct. 14, 1919.

Application filed February 25, 1919. Serial No. 279,134.

To all whom it may concern:

Be it known that I, WILLIAM P. QUENTELL, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented or discovered certain new and useful Improvements in Controlling Devices for Adding-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to adding or computing machines, and especially to machines of the type adapted to add and print items, to print totals and sub-totals, and also, at the will of the operator, to print items without adding the same.

In machines of this type it is common practice to provide keys for controlling or setting the machine to perform these different operations, an individual key being provided for each special function, as, for example, a key for controlling the printing of the totals and simultaneously clearing the machine, leaving the accumulating mechanism or adding wheels at zero, this operation being called taking a total; a second key for setting the machine to print the total but leaving said total on the accumulating mechanism, this operation being called taking a sub-total; and a third key for adjusting the machine to print items without adding them; this operation being called non-adding. These keys are held in operative position, either manually by the operator during the operation of the handle or power shaft for operating the machine, or by latches or locking devices so that the operator does not have to hold them after setting them in operative position.

The present invention has for its primary object to provide a single control key adapted to perform the functions of all of the keys above referred to, or any desired number of them, so as to take the place of the several control keys heretofore employed for performing the several functions, which single control key will remain or be self-retained in any position into which it is intended to be adjusted without the use of locking devices.

The foregoing and other objects of the invention, together with means whereby the same may be carried into effect, will best be understood from the following description of certain forms or embodiments thereof illustrated in the accompanying drawings. It will be understood, however, that the particular constructions described and shown have been chosen for illustrative purposes merely, and that the invention, as defined by the claims hereunto appended, may be otherwise practised without departing from the spirit and scope thereof.

In said drawings: Figure 1 is a fragmentary or diagrammatic view, in side elevation, of a key or control device constructed in accordance with the invention and the parts controlled thereby. Figs. 2 and 3 are similar views showing the parts in different positions of adjustment. Fig. 4 is a section on the line 4—4, Fig. 3. Fig. 5 is a view similar to Fig. 1 showing a modified construction. Figs. 6 and 7 are similar views illustrating further modifications.

A machine of the character under consideration usually comprises a series of adding wheels or accumulators and a corresponding series of actuators for variably operating the adding wheels respectively, said actuators at each operation of the machine being oscillated through a greater or less distance according to the value of the items to be added, and said adding wheels and actuators being relatively movable into and out of operative engagement with one another in such a manner as to cause the adding wheels to be rotated in forward or adding direction by the actuators. Suitable printing mechanism is also provided, such printing mechanism being automatically set in accordance with the position of the actuators at each operation thereof so as to print amounts corresponding to the extent of movement of said actuators.

The method most generally employed in machines of this type for taking totals or sub-totals consists in holding the adding wheels in operative engagement with their actuators during the forward movement of the handle or power shaft, and during which operation the actuators rotate the adding wheels in a retrograde direction until said adding wheels have been returned to zero position and stopped therein by engagement with suitable zero stops, thereby permitting movements of the actuators to an extent corresponding to the total which has been set up on the adding wheels, and adjusting the printing mechanism to print such total. If the total is to be taken and the machine left

clear, the adding wheels are disengaged from their actuators at the end of the forward movement of the handle or power shaft, or at the beginning of the return movement thereof, thereby leaving the adding wheels at zero. If a sub-total is to be taken, the wheels are held in operative engagement with their actuators through the entire operation of the power shaft in both directions, which means that the adding wheels are first rotated in the retrograde or reverse of adding direction into zero position during the forward movement of the power shaft, and then rotated in forward or adding direction during the return movement of the power shaft, thereby again setting up the total on said wheels. If an item is to be printed but not added, the adding wheels are kept out of operative engagement with the actuators during the entire operation of the power shaft in both directions. The adding wheels are usually mounted to rotate independently on a shaft carried in a frame which is moved forwardly and backwardly so as to bring the adding wheels into and out of operative engagement with the actuators, said adding wheels, in the normal operation of adding, being in engagement with said actuators when the latter move in one direction (usually during the rearward or return movement of the operating handle or power shaft), and out of engagement therewith when said actuators move in the opposite direction. The wheels may be normally in engagement with the actuators and moved out of engagement therewith at the proper time, or they may be normally out of engagement with said actuators and moved into engagement therewith at the proper time. The frame which carries the adding wheels may, in the total or sub-total taking or non-adding operation, be actuated directly by the proper control keys, or it may be actuated by connections which in turn are controlled or set by said control keys. The keys or other devices for controlling the setting of the actuators, the mechanism for operating the latter and the accumulating mechanism for adding and total taking, as well as the printing mechanism, are all, in a wide variety of forms, well known in the art, and are not shown herein as, specifically, they form no portion of the present invention.

The illustrative embodiment of the invention shown in Figs. 1 to 4 comprises a key which is adapted, when moved out of its normal position into any one of several adjusted positions, to control the adding mechanism for taking a total, for taking a sub-total, or for non-adding. In said figures a form of adding mechanism is shown wherein the adding wheels or pinions 10 are normally out of engagement with their actuators or toothed segments 11, said adding wheels being carried by a frame 12 pivoted on a rod 13 which is carried by suitable machine frame members or plates (one of which is shown at 14 in Fig. 4) in such a manner as to permit said adding wheels to be swung into mesh with said sectors during movement of the latter in one direction, for example, toward the right as shown in Figs. 1, 2 and 3. The actuators 11 normally occupy the position shown in Fig. 1, into which position they will be returned after each operation of the machine by a suitable bail 28 (Fig. 1) operated by a shaft 36, which may be the main power shaft of the machine operated by the handle 15, or a counter shaft operatively connected with said power shaft, according to the particular type of machine.

The control key comprises a slide 16 provided with an operating handle or finger piece 19 and guided for rectilinear movement on studs 17 which project from the frame plate 14 and extend through slots 18 in said slide. For convenience in locating the slide 16 in any one of several longitudinal positions, there may be provided a positioning or centering pawl 20 pivoted at 21 to the frame plate 14 and having a beveled end cooperating with a series of beveled notches 22 formed in the edge of said slide. The slide 16 is formed with a cam slot which receives a stud 27 projecting laterally from the frame 12, said slot comprising straight portions 23 and 24 disposed parallel to the slots 18, and consequently parallel to the direction of movement of said slide, and connected by a cam or inclined portion 25, and a lateral extension or opening 26 communicating with the straight portion 23 at its end thereof adjacent the cam portion 25.

The normal position of the slide 16 during the regular operation of adding and printing items is as shown in Fig. 1. When the slide is in this position, the stud 27 occupies a position in the straight portion 23 of the slot in said slide opposite the extension or opening 26, thereby permitting the frame 12 to be oscillated by its regular operating or controlling mechanism (not shown) to move the adding wheels into mesh with their actuators 11 when said actuators are moved toward the right, and to move said wheels out of mesh with said actuators upon the completion of said movement of the latter. To adjust the machine for total or sub-total taking, or for non-adding, the slide 16 is manually moved longitudinally out of this normal position, as hereinafter more fully explained. Said slide may be manually returned to normal position after such special operations, but preferably means are provided for returning the same automatically, such means as herein shown being as follows:

Pivoted at 29 to the slide 16 is a pawl 30 normally held by gravity in the position

shown in Figs. 1 to 3 with its upper end 31 in engagement with a stud 32 projecting from said slide. Also pivoted at 33 to the frame member 14 is a lever 34 having a relatively heavier lower end so as to be normally held by gravity in the upright position shown, said lever coöperating at certain times, as hereinafter further explained, with a stud 35 projecting from the slide 16. Fixed to the shaft 36 is an arm 37 connected by a link 38 with a rocker 39 pivoted at 40 to the frame plate 14 and having two angularly spaced arms 41 and 42. Said arms 41 and 42 are formed with offset portions 43 and 44 (see Fig. 4) adapted to coöperate with the lower end of the pawl 30 which, however, when the slide is in its normal position as shown in Fig. 1, is just out of the range of movement of said offset portions. The arm 42 is formed with a further offset portion 45 adapted similarly to coöperate with the lever 34.

The operation of the mechanism thus far described is as follows.

To adjust the mechanism for taking a total and clearing the machine, the slide 16 is moved toward the left from its normal position into the position shown in Fig. 2, causing the stud 27 to pass from the straight slot portion 23 through the cam portion 25 into the straight portion 24, thereby moving the adding wheels 10 into mesh with their actuating sectors 11 and locking them in this position. During the forward or counterclockwise movement of the handle 15, power shaft 36, and rocker 39, from the position shown in Fig. 1 into that shown in Fig. 2, the bail 28 releases the sectors 11 which, under the influence of the usual operating mechanism (not shown) move toward the left in engagement with the adding wheels 10 until the movement of the latter is arrested, by their zero stops, thereby clearing the accumulator of the total previously registered thereby and setting the printing mechanism to print said total. Also during said forward movement of the power shaft and rocker the offset portions 43 and 44 of the arms 41 and 42 lift the pawl 30 and pass the same idly. Upon the beginning of the return or clockwise movement of the shaft and rocker, the offset portion 43 of the arm 41 engages the pawl 30, thereby returning the slide 16 to normal position and, through the cam slot 25, positively disengaging the adding wheels 10 from the sectors 11, so that, when said segments are returned to their initial position by the bail 28, the adding wheels are left at zero.

For the purpose of taking a subtotal, the slide 16 is given a further movement toward the left into the position shown in Fig. 3. With this adjustment of the slide, the operations during the forward movement of the power shaft are substantially the same as in taking a total. This adjustment, however, carries the pawl 30 out of the range of movement of the offset 43 on the arm 41, so that during the return movement of the power shaft the slide is left in adjusted position, and the adding wheels 10 are left in mesh with the sectors 11, whereby, as the latter are returned, the total is again set up on the adding wheels. Just prior to the completion of the return movement of the power shaft, the offset 44 engages the pawl 30 and returns the slide to normal position.

In order to adjust the mechanism for non-adding, the slide 16 is moved toward the right from the position shown in Fig. 1, thereby engaging the stud 27 with the left end of the straight portion 23 of the cam slot, and locking the adding wheels out of engagement with their sectors. Said sectors and the printing mechanism controlled thereby may therefore be operated in the usual manner to set up and print an item without adding the same upon the adding wheels. This adjustment of the slide brings the pin 35 into the range of movement of the lever 34, which, during the forward movement of the power shaft, is engaged by the offset portion 45 of the arm 42 and rocked idly thereby in a clockwise direction. At, or just prior to the completion of the return movement of the power shaft, the lever 34 is again engaged and rocked in a counterclockwise direction by the offset 45, said lever in turn acting through the stud 35 to restore the slide 16 to normal position.

It will be observed that, in each of the above described adjusted positions of the slide 16, the stud 27 of the frame 12 engages a straight portion of the slot in said slide, which portion is substantially parallel to the direction of movement of the slide and perpendicular to the direction of movement of the stud. It will therefore be seen that any reaction or pressure of the stud against the slide will take place against a surface parallel to the direction of movement of the slide, and perpendicular to the direction of movement of the stud, so that said pressure, irrespective of its amount, will have no tendency to move said slide out of its adjusted position. While the pawl 20 is preferably provided to assist the operator in accurately locating the slide in its several adjusted positions and to center said slide in its normal position when moved thereinto by the mechanism above described, said pawl is by no means necessary in order to retain the slide in any position and may be omitted if desired.

The form of the invention shown in Fig. 5 is substantially the same in construction and operation as that above described. In this form of the invention, however, the stud 270, corresponding to the stud 27, is

carried by the slide 160, and the cam slot 46 is formed in the adding wheel frame 120 instead of in the slide. It will be clear, however, that the coöperative action of the slide upon the adding wheel frame through the stud and slot will be substantially the same as in the construction shown in Figs. 1 to 3. It will also be observed that in this construction the surfaces of the slot 46 which are engaged by the stud 270 are substantially parallel to the direction of movement of the slide and perpendicular to the direction of movement of the adding wheel frame. In order to simplify the illustration, the actuating sectors, positioning pawl, and restoring mechanism are omitted from Fig. 5, these parts being substantially identical with the corresponding parts shown in Figs. 1 to 3.

In Fig. 6 is illustrated a form of the invention suitable for use in a well known type of adding machine shown, for example, in Letters Patent No. 1,131,620, granted March 9, 1915, to William E. Swalm. A machine of this type comprises a lever 227 connected by a link 911 with a member which controls the engagement of the adding wheels with their actuators, the construction being such that, when the parts are in the normal position shown in Fig. 6, the machine is adjusted for normal item adding and printing, when the lever 227 is turned a short distance in a clockwise direction the parts will be adjusted for non-adding, and when said lever is given a further movement in the same direction the parts will be adjusted for total taking. In applying the present invention to machines of this type there is provided a key or controlling member 47 which is pivoted at 48 to any suitable support, as to a bracket 49 carried by a suitably disposed frame member 50, said key or controlling device 47 being provided with two finger pieces 51 and 52 whereby said key may be rocked on its pivot 48 in either direction from its normal central position shown in Fig. 6. The controlling member 47 is formed with two cam surfaces 53 and 54 terminating respectively in surfaces 55 and 56 which are concentric with the axis of the pivot 48. Said cam surfaces coöperate with a stud 57 carried by the lever 227, and are so relatively designed and proportioned that the surface 53, acting through said stud 57, is adapted to move said lever 227 a greater distance in a clockwise direction than the surface 54.

In operation, when it is desired to adjust the machine for total taking, the finger piece 51 is depressed, causing the member 47 to be rotated in a clockwise direction, thereby causing the cam surface 53, acting through the stud 57 to depress the lever 227 to the maximum extent. On the other hand, in order to adjust the machine for non-adding the finger piece 52 may be depressed, thereby rotating the member 47 in a counterclockwise direction, and causing the cam surface 54, through the stud 57, to depress the lever 227 into the intermediate position proper for this operation. In either case it will be observed that the stud 57, after passing out of engagement with the surface 53 or 54, passes into engagement with the surface 55 or 56, which, being concentric with the axis of rotation of the member 47, is parallel to the direction of movement of said member and also substantially perpendicular to the direction of movement of the stud 57 when engaged by the latter, so that, as in the construction previously described, this key is also self-retaining in either adjusted position.

It will also be observed that, as in the forms of the invention shown in Figs. 1 to 5, the controlling device shown in Fig. 6 is moved in opposite directions from its normal position to adjust the mechanism for non-adding and for total taking respectively. In Fig. 7 is shown a further modification of the invention wherein the single controlling member is movable progressively in the same direction from normal position in order to produce these several adjustments of the machine. This construction comprises a member 58 pivoted, as at 59, in a manner similar to the member 47 above described, said member 58 having an operating finger piece 60 and a cam sector 61 having an edge surface adapted to coöperate with a stud 62 carried by a member 63, which, for the purposes of the present description, may be considered to correspond to the lever 227 shown in Fig. 6. The edge of the cam segment 61 comprises two cam portions 64 and 65 of different rise connected by a portion 66 which is concentric with the pivot 59, the cam portion 65 communicating also with a second concentric portion 67 of greater radius than the concentric portion 66. It is believed to be obvious without further explanation in detail that an initial movement of the member 58, in a clockwise direction from the normal position shown, sufficient to engage the stud 62 with the surface 66 will result in adjusting the mechanism for non-adding, and that a further movement of the member 58 in the same direction, sufficient to engage the stud 62 with the surface 67, will adjust the mechanism for total taking, said member being self-retained in either adjusted position by engagement of the stud 62 with the concentric surface 66 or 67.

No positioning or restoring means are shown in Figs. 6 and 7. If desired, positioning pawls similar to the positioning pawls 20 may be employed, although in these forms of the invention such positioning pawls are believed to be unnecessary,

since the constructions are such that proper adjustment can readily be made without assistance of this character, and since, as above explained, no means are required for retaining the controlling members in adjusted position. In view of the unbalanced shape of the devices 47 and 58, light friction springs may be employed to prevent their accidental displacement, although close fit is believed to be sufficient for this purpose. Restoring means similar to that shown in Figs. 1 to 3 may, if desired, be provided for the controlling devices 47 and 58, or they may be restored by hand.

Having thus described my invention I claim and desire to secure by Letters Patent:

1. In an adding machine, mechanism adjustable to vary the operation of said machine, said mechanism including two cooperating members, one of said members being a key manually operated to engage and control the other of said members, the engaging portion of one of said members being substantially parallel to the direction of movement of said manually operated member.

2. In an adding machine, mechanism adjustable to vary the operation of said machine, said mechanism including two cooperating members, one of said members being a key manually operated to engage and control the other of said members, the engaging portion of one of said members being substantially perpendicular to the direction of movement of said last-named member.

3. In an adding machine, mechanism adjustable to vary the operation of said machine, said mechanism including two cooperating members, one of said members being a key manually operated to engage and control the other of said members, the engaging surface of one of said members having a cam portion and a portion substantially parallel to the direction of movement of said manually operated member.

4. In an adding machine having operating mechanism, mechanism adjustable to vary the operation of said machine and including two coöperating members, one of said members being a key manually movable from a normal position to engage and control the other of said members, the engaging surface of one of said members being substantially parallel to the direction of movement of said manually operated member, and means for restoring said manually operated member to normal position at a predetermined period during the operation of said operating mechanism.

5. In an adding machine having operating mechanism, mechanism adjustable to vary the operation of said machine and including two coöperating members, one of said members being a key manually movable from a normal position to engage and control the other of said members, the engaging surface of one of said members having a cam portion and a portion substantially parallel to the direction of movement of said manually operated member, and means for restoring said manually operated member to normal position at a predetermined period during the operation of said operating mechanism.

6. In an adding machine, mechanism adjustable to vary the operation of said machine, said mechanism including two coöperating members, one of said members being a key manually movable in either direction from a normal position to engage and control the other of said members, the engaging surface of one of said members being substantially parallel to the direction of movement of said manually operated member.

7. In an adding machine, mechanism adjustable to vary the operation of said machine, said mechanism including two cooperating members, one of said members being a key manually operable in either direction from a normal position to engage and control the other of said members, the engaging surface of one of said members having a cam portion and a portion substantially parallel to the direction of movement of said manually operated member.

8. In an adding machine, the combination with adding mechanism, of means for controlling said adding mechanism to vary the operation of said machine, said parts including a movable member and a single member comprising a key manually adjustable into different positions to engage and control said first named member and thereby set said adding mechanism to perform different operations, the engaging portion of one of said members being parallel to the direction of movement of said manually adjustable member.

9. In an adding machine, the combination with adding mechanism, of a single manually adjustable member and connections for controlling said adding mechanism, said member being movable into one position to prevent said adding mechanism from performing the adding operation, and into another position to adjust said adding mechanism to take a total, said member being self-retaining in each of said positions.

10. In an adding machine, the combination with adding mechanism, of means for controlling said adding mechanism to vary the operation of said machine, said parts including a movable member and a single member manually adjustable to engage and control said first-named member, the engaging portion of one of said members being parallel to the direction of movement of said manually adjustable member, and said manually adjustable member being movable into one position to prevent said adding

mechanism from performing the adding operation and into another position to adjust the adding mechanism to take a total.

11. In an adding machine, the combination with adding mechanism, of a single manually adjustable member and connections for controlling said adding mechanism, said member being movable in one direction to prevent said adding mechanism from performing the adding operation and in the opposite direction to adjust said adding mechanism to take a total.

12. In an adding machine, the combination with adding mechanism, of a single manually adjustable member and connections for controlling said adding mechanism, said member being movable in one direction to prevent said adding mechanism from performing the adding operation and in the opposite direction to adjust said adding mechanism to take a total, and being self-retaining in each of the positions into which it is so moved.

13. In an adding machine, the combination with adding mechanism, of control mechanism therefor adjustable to vary the operation of said machine, said control mechanism including a movable member and a single member manually adjustable to engage and control said first named member, the engaging portion of one of said members being parallel to the direction of movement of said manually adjustable member, and said manually adjustable member being movable in one direction to prevent said adding mechanism from performing the adding operation and in the opposite direction to adjust said adding mechanism to take a total.

14. In an adding machine, the combination with adding mechanism, of a single manually adjustable member and connections for controlling said adding mechanism, said member being movable into one position to prevent said adding mechanism from performing the adding operation, into another position to adjust said adding mechanism to take a total, and into a third position to adjust said adding mechanism to take a subtotal.

15. In an adding machine, the combination with adding mechanism, of a single manually adjustable member and connections for controlling said adding mechanism, said member being movable into one position to prevent said adding mechanism from performing the adding operation, into another position to adjust said adding mechanism to take a total, and into a third position to adjust said adding mechanism to take a subtotal, said member being self retaining in each of said positions.

16. In an adding machine, the combination with adding mechanism, of a single manually adjustable member and connections for controlling said adding mechanism, said member being movable in one direction to prevent said adding mechanism from performing the adding operation, into one position in the opposite direction to adjust said adding mechanism to take a total, and into another position in said last-named direction to adjust said adding mechanism to take a subtotal.

17. In an adding machine, the combination with adding mechanism, of a single manually adjustable member and connections for controlling said adding mechanism, said member being movable in one direction to prevent said adding mechanism from performing the adding operation, into one position in the opposite direction to adjust said adding mechanism to take a total, and into another position in said last-named direction to adjust said adding mechanism to take a subtotal, said member being self-retaining in each of said positions.

18. In an adding machine, the combination with adding mechanism and operating mechanism therefor, of a single manually movable member and connections for controlling said adding mechanism, said member being adjustable from a normal position into a plurality of different positions to set said adding mechanism to perform different operations, and means for positively restoring said member to normal position at a predetermined period during the operation of said operating mechanism.

19. In an adding machine, the combination with adding mechanism and operating mechanism therefor, of a single manually movable member and connections for controlling said adding mechanism, said member being adjustable from a normal position into a plurality of different positions to set said adding mechanism to perform different operations, and being self-retained in each of said adjusted positions, and means for automatically restoring said member to normal position at a predetermined period during the operation of said operating mechanism.

20. In an adding machine, the combination with adding mechanism and operating mechanism therefor, of a single manually adjustable member and connections for controlling said adding mechanism, said member being movable from normal position in one direction to prevent said adding mechanism from performing the adding operation and in the opposite direction to adjust said adding mechanism to take a total, and means for positively restoring said member to normal position at a predetermined period during the operation of said operating mechanism.

21. In an adding machine, the combination with adding mechanism and operating mechanism therefor, of a single manually adjustable member and connections for con-

trolling said adding mechanism, said member being movable from a normal position into one position to prevent said adding mechanism from performing the adding operation, into another position to adjust said adding mechanism to take a total, and into a third position to adjust said adding mechanism to take a subtotal, and means for restoring said member to normal position at a predetermined period during the operation of said operating mechanism.

In testimony whereof I affix my signature.

WILLIAM P. QUENTELL.