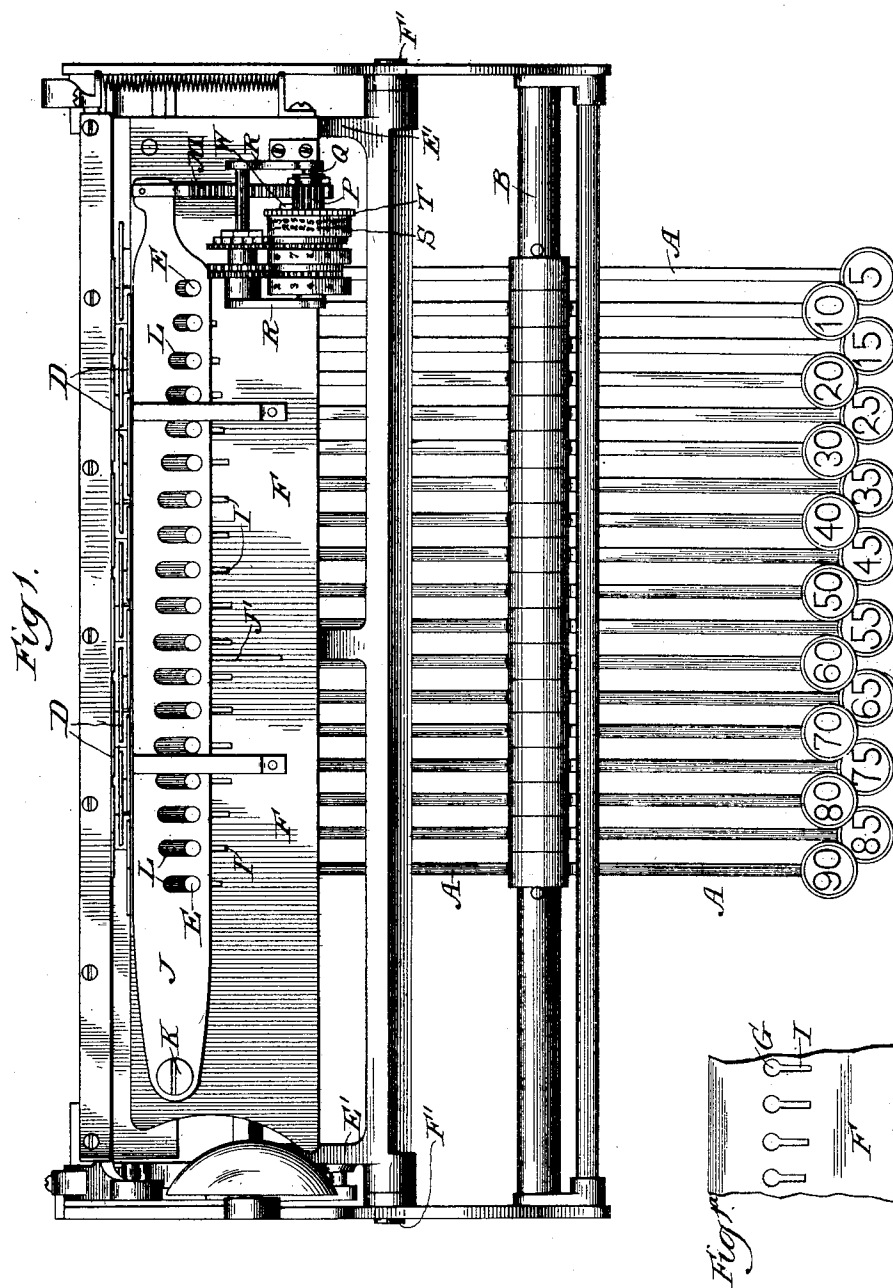


A. I. BLANCHARD.
CASH REGISTER.

No. 482,514.

Patented Sept. 13, 1892.



Witnesses:
Wm. F. Heming
S. M. Rheem.

Inventor:
Allen I. Blanchard
By Edward Rector
per Atty.

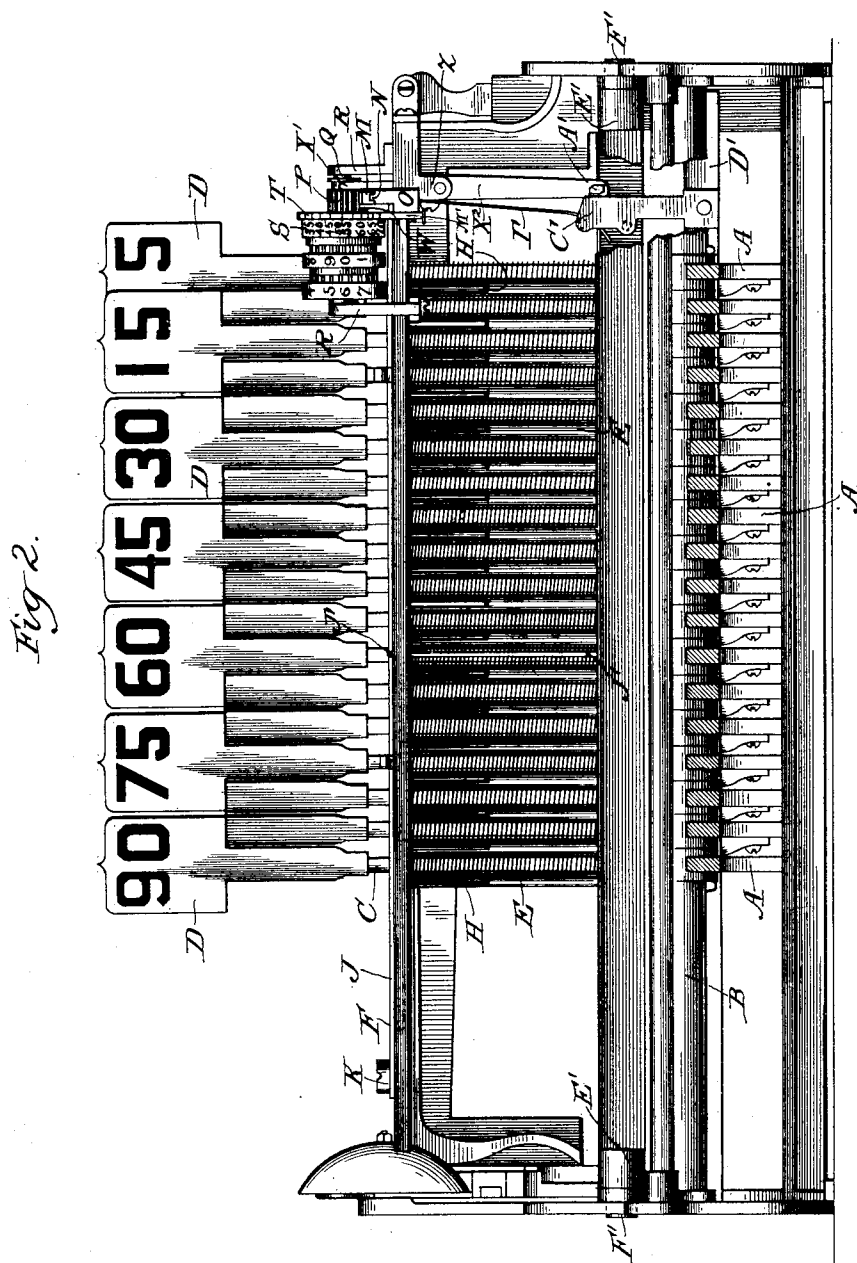
(No Model.)

4 Sheets—Sheet 2.

A. I. BLANCHARD.
CASH REGISTER.

No. 482,514.

Patented Sept. 13, 1892.



Witnesses:
Wm. J. Hanning
J. M. Rhen

Inventor:
Allen J. Blanchard
By Edward Rector
his Attorney;

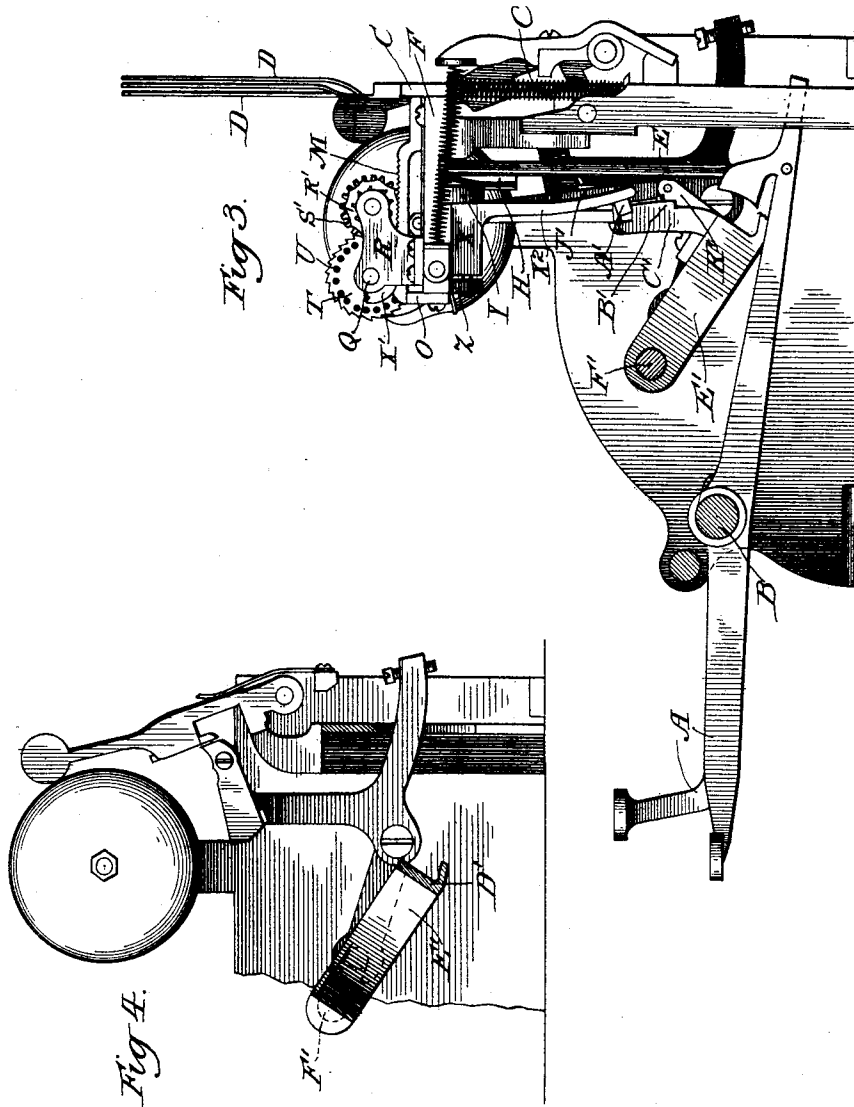
(No Model.)

4 Sheets—Sheet 3.

A. I. BLANCHARD.
CASH REGISTER.

No. 482,514.

Patented Sept. 13, 1892.



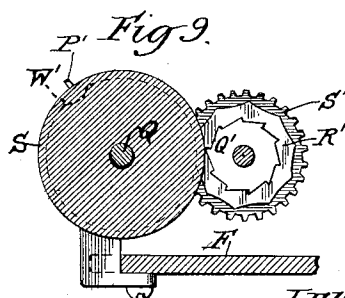
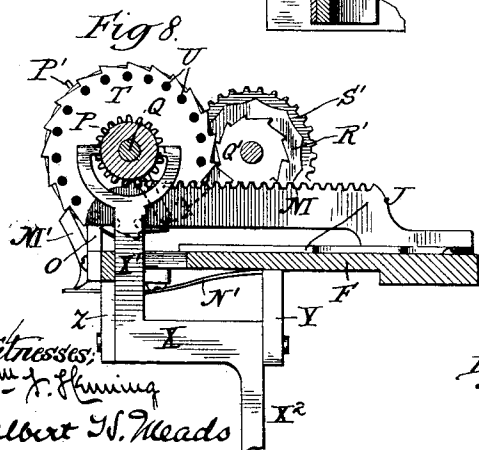
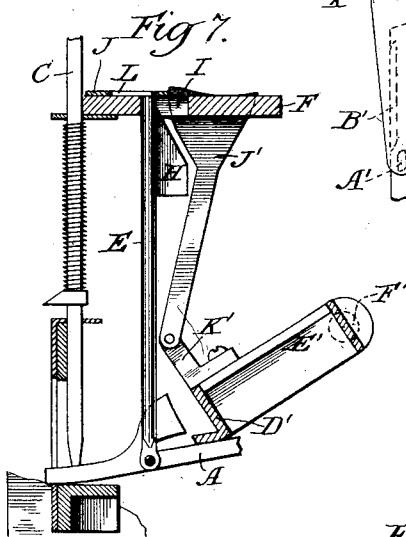
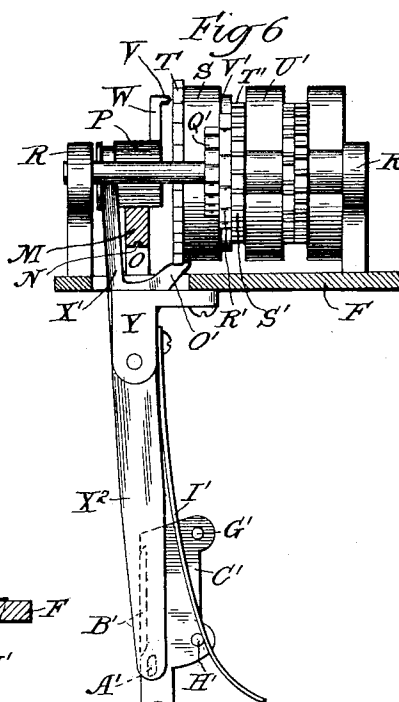
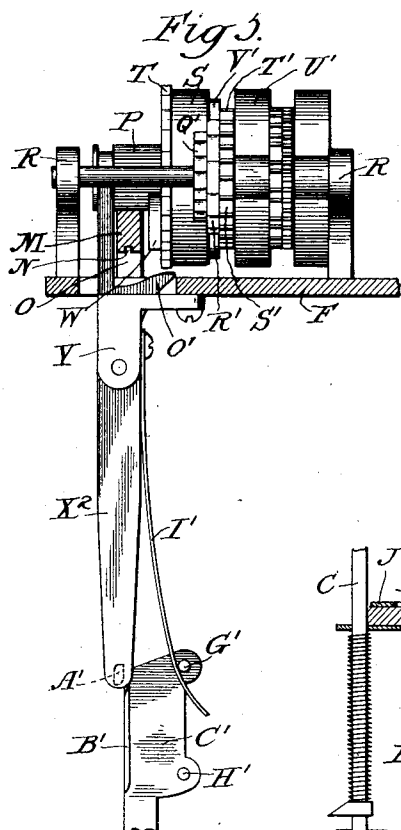
Witnesses:
Wm. J. Fleming
J. M. Rhem.

Inventor.
Allen I. Blanchard
By Edward Hector
his Atty.

A. I. BLANCHARD.
CASH REGISTER.

No. 482,514.

Patented Sept. 13, 1892.



Witnesses:
Wm. J. Fleming
Albert H. Meads

Inventor:
Allen I. Blanchard
By Edward Rector
his Atty.

UNITED STATES PATENT OFFICE.

ALLEN I. BLANCHARD, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE NATIONAL CASH REGISTER COMPANY, OF DAYTON, OHIO.

CASH-REGISTER.

SPECIFICATION forming part of Letters Patent No. 482,514, dated September 13, 1892.

Application filed May 10, 1892. Serial No. 432,440. (No model.)

To all whom it may concern:

Be it known that I, ALLEN I. BLANCHARD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements 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 chiefly to the registering and indicating mechanisms of such machines; and it consists in the novel combination of a series of keys of different values with a bar which is given different degrees of movement by the different keys proportionate to the respective values. This bar may be connected with registering mechanism alone to register the values of the keys or with indicating mechanism to temporarily indicate their values, or with both to accomplish both results. It might also be connected with a printing mechanism to set a type-wheel at the proper point to print the value of the operated key upon a paper strip or ticket; but in the machine illustrated in the drawings it is combined with a registering mechanism alone.

The novelty of my invention will be more particularly set forth in the following specification, and specifically pointed out in the claims.

In the accompanying drawings, Figure 1 represents a top plan view of my improved machine removed from the casing; Fig. 1^a, a detail of the guide-plate; Fig. 2, a front elevation of the machine with the front ends of the operating-keys cut off; Fig. 3, a side elevation of the right side of the machine; Fig. 4, a sectional detail showing the vibrating frame and gong-sounding mechanism; Fig. 5, an enlarged rear elevation of the registering-wheels, clutch, and shifter with the parts in normal position; Fig. 6, a corresponding view with the parts in the position they occupy at the completion of the stroke of an operated key; Fig. 7, a sectional detail showing the resetting-plate for the registering-bar and associated parts; Fig. 8, an enlarged detail side elevation of the registering-wheels and associated parts, and Fig. 9 a sectional detail through the primary registering-wheel.

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

The operating-keys of the machine consist of levers A, fulcrumed upon a horizontal shaft B, extending across the lower forward part of the machine. In this instance they are eighteen in number and bear upon their front ends the usual finger-buttons numbered from "5" to "90" in multiples of five. Upon their rear ends rest the usual tablet-rods C, carrying indicating-tablets D, adapted to be lifted into view by the operations of the respective keys and temporarily held in exposed position by supporting devices of familiar construction and operation, which need not be here described.

Pivoted to the side of each key near its rear end is a vertical rod E, which extends up through a horizontal guide-plate F, extending from side to side of the framework. In this instance the rods E are circular in cross-section and pass through circular holes G in the plate F, Fig. 1^a, the rods snugly fitting the holes, so as to be guided vertically thereby.

Formed or secured upon the forward side of each rod E near its upper end is a wedge or cam-plate H, consisting of a thin plate having its upper portion inclined downwardly and forwardly from the rod, this inclined portion terminating in a vertical portion at its lower end. These cam-plates on the keys play up and down through slots I, extending forward from the holes G in the plate F, Fig. 1^a.

Immediately above and in this instance resting upon the guide-plate F is what may be called the "registering-bar," being the bar which is to be given different degrees of movement by the different keys to register or indicate their respective values or to move a type-wheel into position to print them upon a paper strip or ticket. This bar J is in this instance a swinging bar pivoted to the plate F at one end at K and connected with the registering mechanism at its opposite end. It is provided with a series of transverse slots L—one for each rod E—through which slots the rods and their cams H pass when they are lifted by the depression of the front ends of the key-levers. The bar J normally rests in such position that the upper ends of the rods

E stand immediately below the front ends of the slots in the bar J, as seen in Fig. 1. The extent of movement given the bar J by any rod E and its cam H upon operating the key corresponding to such rod is determined both by the width of the cam and the position of the rod relatively to the pivotal point K of the bar. Thus the cam upon the rod carried by the key at the extreme right of the series will move the bar a unit of distance—in this instance representing five cents. The second rod will move it two units, the third three, and so on to the rod and key at the extreme left of the series, which latter rod will move it eighteen units of distance to indicate or register ninety cents.

Each of the slots L in the bar J is of just the length of the combined diameter of the rod and width of the cam which play through it, so that when any rod is lifted until the beveled portion of its cam-plate H is carried above the bar J and the vertical portion of the plate H brought into the slot the rod and its plate will completely fill the length of the slot and positively hold the bar from movement in either direction. The purpose of this is to positively arrest the bar and prevent its momentum throwing it too far when a key is quickly or violently operated. Inasmuch as the rods E are confined in the guide-holes in the plate F and the forward movement of the bar J when any one of them is lifted is limited by the engagement of the rear end of the slot with the rear side of the rod, it will be seen that the extent of movement of the bar will always be accurately determined by the width of the cam and the position of the rod relatively to the fulcrum of the bar and any overthrowing of the register or indicator by momentum of the bar effectively prevented.

The bar J may be connected at its right-hand end with a register or counter or an indicator or type wheel in any suitable manner. In the drawings I have shown it connected by a rack and pinion and clutch with the primary wheel of a train of registering-wheels. The rack-bar M is pivoted at its rear end to the bar J and is guided in its forward and backward movement by a groove in its under side, which fits over a short tongue or lug N upon the upper end of a plate O, secured to the front edge of the plate F, Fig. 2. The rack upon the upper side of the bar M meshes with a pinion P, mounted to turn and slide laterally upon a shaft Q, supported at its ends in brackets R upon the plate F of the framework. Loosely mounted upon the shaft Q beside the pinion P is the primary wheel S of a train of registering-wheels. This wheel has fast upon its right side, between it and the pinion P, a locking-disk T. This disk is provided with twenty equidistant holes U, with which co-operates a pin V, projecting laterally from an arm W, fast upon the pinion P, Fig. 6. This pin is normally engaged with one of the holes in the disk T, so that the pinion P turns the disk and wheel S with it when

the rack M is moved forward. The pinion P is slid to the right to disengage the pin V from the disk T and permit the pinion to turn backward without the disk and wheel by means of a shifter X, Figs. 5, 6, and 8. This shifter consists of a frame pivoted near its middle between brackets Y Z upon the under side of the plate F and having an upwardly-extending arm X' and a downwardly-extending arm X². The upper end of its arm X' is forked and provided with pins fitting in a groove in the hub of the pinion P, while the lower end of its arm X² is provided upon its forward side with a lug A', Figs. 2 and 3. This lug co-operates with a rib or cam B' upon the rear side of a plate C', carried by and projecting upwardly from a bar D', extending across and resting upon the keys. This bar forms part of a vibrating frame whose side arms E' are hung to the side frames of the machine at F', so that the bar rises and falls with the rear ends of the keys when the latter are operated. In addition to the cam B' the plate C' has projecting from its rear side two pins G' H', Figs. 5 and 6, which co-operate with a curved spring I', secured at its upper end to the shifter X.

In the normal position of the parts, with the keys at rest, the upper pin G' bears against the outer side of the spring I', as seen in Fig. 5, and presses the lower end of the shifter toward the left in said figure and holds its upper end thrown to the right and the pin V on the arm W in engagement with one of the holes in the disk T of the primary registering-wheel. In this position of the parts the lug A' upon the lower arm of the shifter stands immediately to the left of the upper end of the cam B', so that when a key is operated and the cross-bar D' and plate C' are lifted the cam B' will travel upward upon the right-hand side of the lug A'. When the plate has been lifted a certain distance, the lower pin H' will engage the inner side of the curved spring and press it to the right, thereby causing it to pull the lower arm of the shifter in that direction and press the lug A' against the left side of the cam. This cam is of such length that its lower end will be carried above the lug A' just as the operated key has completed its positive stroke and the parts have been lifted to their highest position. When the cam passes above the lug, the stress of spring will throw the lower end of the shifter to the right and its upper end to the left and disengage the pin V from the disk T of the registering-wheel, as seen in Fig. 6. During the return stroke of the parts the pinion P will therefore be uncoupled from the registering-wheel and the latter will remain stationary. The cam B' will travel downward upon the left side of the lug A'. When parts nearly reach normal position, the pin G' will engage the outer side of the curved spring I' again and tend to throw the lower end of the shifter to the left. The engagement of the lug A' with the right side of the cam B' pre-

vents such movement of the shifter, however, until the upper end of the cam passes below the lug, whereupon the spring will throw it to the left again into the position shown in Fig. 5, ready for the next operation of the machine.

The bar J might be returned to and yieldingly held in normal position by means of a suitable spring; but I have provided a device which positively restores it to such position and which offers no resistance to its forward movement, as would a spring. This device consists of an arm or plate J', Fig. 7, pivoted at its lower end to an upwardly-projecting lug or ear K' upon the cross-bar D', preferably at or near the middle of said bar. This plate has a widened upper end, forming an inclined surface on its rearward or forward edge, or both, as shown. The upper end of this plate passes through a slot in the plate F, and the length of the slot is such that when the parts are at rest and the plate in its lowermost position the forward edge of its upper end will be engaged with the forward edge of the slot and its rear edge will engage the forward edge of the bar J and hold it in normal position, as seen in Figs. 1 and 7. When any one of the keys is operated and the cross-bar D' and plate J' are lifted thereby, the widened portion of the plate J' will be carried above the plate F, so that the plate J' will be free to swing forward until its narrow lower portion engages the front end of the slot. This releases the bar J, and the cam-plate H on the rod of the operated key moves it forward the proper distance to register the value of such key. When the key is released and the cross-bar D' drops back to normal position, carrying the plate J' down with it, the beveled forward edge of the plate J' will ride over the front end of the slot in the plate F, and the upper end of the plate J' will be thrown rearward thereby and its rear edge will engage the bar J and push it back to normal position. By employment of this means for resetting the bar J no resistance is offered to its forward movement, as would be the case if a spring were employed, and therefore less power is required to operate the keys. A pawl M', pressed by a spring N' into engagement with the teeth of the disk T, Fig. 8, prevents any backward movement of the primary registering-wheel during the return strokes of the rack and pinion and resetting of the parts.

For the purpose of preventing overthrow of the primary wheel by its own momentum after the pinion has been uncoupled from it by the shifter at the completion of the stroke of the operated key in the manner before described I provide a lock which is operated by the shifter and co-operates with the disk T to positively lock said disk and the registering-wheel at the instant the driving-pinion is uncoupled from them. This locking device is shown in Figs. 5 and 6 and consists of an arm O', secured to or formed integral with the upper arm X' of the shifter and pro-

jecting to the right beneath the toothed disk T. When the parts are in normal position, with the pinion P coupled to said disk, the locking-arm O' stands in approximately horizontal position with its right end immediately below the disk, as seen in Fig. 5; but when the positive stroke of an operated key is completed and the upper arm of the shifter is swung to the left to uncouple the pinion from the disk T and registering-wheel the end of the locking-arm O' will be thrown upward into engagement with one of the notches in the disk T, as seen in Fig. 6, and positively lock the same and the registering-wheel from movement until the parts are reset to normal position and the upper end of the shifter swung to the right again, whereupon the arm O' will be thrown downward out of engagement with the disk.

The primary registering-wheel S has projecting from its periphery a pin P', which co-operates with a ratchet Q', Figs. 8 and 9, fast upon the side of a locking-disk R', which is in turn fast upon the side of a gear S', which meshes with the gear T' of the second registering-wheel U', Figs. 5 and 6. The primary wheel has fast upon its side a circular locking disk or flange V' in line and co-operating with the disk R', above referred to. The engagement of the concave surfaces of the latter disk with the convex surface of the disk V' prevents the disk R' and gear S' from turning, except when a notch W' in the surface of the disk V', Fig. 1, is brought opposite the point of union of two of the concave surfaces on the disk R'. At each complete revolution of the primary registering-wheel S its pin P' will engage a tooth of the ratchet Q' and turn the same forward between two of its ten teeth, the notch W' in the disk V' being brought into position to permit the disk R' to turn at the moment the pin P' engages the tooth of the ratchet Q'. This forward movement of the ratchet Q' will be transmitted through the gears S' and T' to the second registering-wheel U', which will be turned forward one space or number to register the one complete revolution of the primary wheel S. The revolutions of the second registering-wheel are added upon the third and the third upon the fourth, and so on in the usual manner.

I am aware that it has heretofore been proposed to operate a registering or equivalent bar by a series of cams or wedges carried by the keys and adapted to pass through slots in the bar to move it different distances proportionate to the values of the keys; but so far as I am aware I am the first in the art to combine a slotted registering-bar with a series of cams arranged to reciprocate through its slots and move it different distances and each adapted to fill the entire length of its co-operating slot, so that when any cam has passed through the bar and moved it as far as it is capable of moving it, it will fill the full length of the slot and positively arrest and lock the bar and prevent any overthrow

from the momentum of the bar. I therefore desire to secure such combination, broadly, in a machine of the character described—that is to say, in a machine in which a registering or equivalent bar is moved various distances by keys representing different values to either register, indicate, or print their respective values, or to accomplish all of those results.

It will be understood that the driving-pinion P might be connected with the primary registering-wheel by an ordinary ratchet-and-pawl connection instead of the clutch devices I have illustrated and described, and where a type-wheel is employed to print the values of the keys it might be geared directly to the rack or pinion, the portion of the stroke of a key after the movement of the bar by its cam is completed being utilized to actuate a printing-platen co-operating with the type-wheel in the usual manner. Again, while I have shown the rods E, which carry the cams H, as pivoted to the rear ends of the key-levers, it is not essential that they should be. They might, instead, simply rest upon the rear ends of the levers or stand in their path of travel, so as to be lifted by them, and might in such case be reset by coiled springs surrounding them, as are the tablet-rods C.

Having thus fully described my invention, I claim—

1. In a machine such as described, the combination of a movable bar or plate provided with a series of slots and a series of cams arranged to reciprocate through said slots, so as to move the bar different distances, and each adapted to entirely fill the length of its co-operating slot when moved through it for the purpose of positively arresting the bar when it has been moved the proper distance.

2. In a machine such as described, the combination of a movable bar or plate provided with a series of slots and a series of graduated cams arranged to reciprocate through said slots, so as to move the bar different distances, and each adapted to entirely fill the length of its co-operating slot when moved through it for the purpose of positively arresting the bar when it has been moved the proper distance.

3. In a machine such as described, the combination of a horizontally-movable bar or plate provided with a series of slots and a series of vertically-guided cams arranged to reciprocate through said slots and move the bar different distances and each adapted to entirely fill the length of its co-operating slot when moved through it for the purpose of positively arresting the bar when it has been moved the proper distance.

4. In a machine such as described, the combination of a horizontally-movable bar or plate provided with a series of slots and a series of vertically-guided graduated cams arranged to reciprocate through said slots and move the bar different distances and each adapted to entirely fill the length of its co-

operating slot when moved through it for the purpose of positively arresting the bar when it has been moved the proper distance.

5. In a machine such as described, the combination of a movable bar containing a series of slots of different lengths, a series of cams of different widths corresponding to the lengths of the respective slots in the bar and movable in defined paths through said slots, and suitable means for moving the respective cams through the slots in the bar, substantially as and for the purpose described.

6. In a machine such as described, the combination of a movable bar provided with a series of slots of different lengths, a series of cams of different widths corresponding to the lengths of the respective slots in the bar and movable in defined paths through said slots, and a series of key-levers representing different values and co-operating with the series of cams to move them through the slots in the bar, substantially as and for the purpose described.

7. In a machine such as described, the combination of a horizontally-movable bar provided with a series of slots of different lengths, a series of vertically-guided rods carrying cams of different widths corresponding to the lengths of the respective slots in the bar and adapted to pass through said slots, and a series of keys of different values for lifting the respective rods and moving the cams through the slots in the bar, substantially as and for the purpose described.

8. In a machine such as described, the combination of a series of key-levers representing different values, a series of vertically-guided rods arranged to be lifted by the rear ends of said levers and provided with cams of varying widths, and a movable bar arranged above the series of cams and provided with a series of slots of different lengths corresponding to the widths of the respective cams, through which slots said cams are adapted to pass when the front ends of the key-levers are depressed, substantially as and for the purpose described.

9. In a machine such as described, the combination of a pivoted bar arranged to swing in a horizontal plane and provided with a series of slots of different lengths, a series of cams of different widths corresponding to the lengths of the respective slots and movable in defined paths through the same, and a series of keys representing different values for moving the different cams through the slots in the bar, substantially as and for the purpose described.

10. In a machine such as described, the combination of a horizontally-swinging bar provided with a series of slots of different lengths, a series of vertically-guided rods carrying cams of different widths corresponding to the lengths of the respective slots in the bar and adapted to pass through said slots, and a series of key-levers representing different values for lifting the respective rods and moving the

cams through the slots in the bar, substantially as and for the purpose described.

11. In a machine such as described, the combination of a movable bar provided with a series of slots of different lengths, a fixed guide-plate provided with coincident slots of corresponding lengths, a series of cams of different widths corresponding to the lengths of the respective slots in the guide-plate and movable bar and adapted to pass through said slots and move the bar different distances, and a series of keys for operating the cams, substantially as and for the purpose described.

12. In a machine such as described, the combination of a horizontally-movable bar provided with a series of slots of different lengths, a fixed guide-plate provided with coincident slots of corresponding lengths, a series of vertically-guided rods carrying cams of different widths corresponding to the lengths of the respective slots in the movable bar and guide-plate and adapted to pass through said slots, and a series of key-levers representing different values for lifting their respective rods, substantially as and for the purpose described.

13. In a machine such as described, the combination of a horizontal guide-plate provided with a series of slots of different lengths, a swinging bar resting thereon and provided with a series of coincident slots of corresponding lengths, a series of vertically-guided rods carrying cams of different widths corresponding to the lengths of the respective slots in the movable bar and guide-plate and adapted to pass through said slots, and a series of key-levers representing different values for lifting the respective rods, substantially as and for the purpose described.

14. In a registering-machine, the combination of a series of keys representing different values, a registering-bar adapted to be moved different distances by the operations of different keys, a rack moving with the bar, a pinion meshing with the rack, a registering-wheel, a clutch between the pinion and registering-wheel, and a shifter actuated at the completion of the positive stroke of a key to break the clutch between the pinion and registering-wheel and permit the latter to remain stationary while the pinion returns to normal position, substantially as described.

15. In a registering-machine, the combination of a slotted registering-bar, a series of cams of different widths adapted to pass through the slots and move the bar different degrees, a series of keys for operating the cams, a rack moving with the registering-bar, a pinion meshing with the rack, a registering-wheel, a clutch between said wheel and pinion, a vibrating bar common to all of the keys, and a shifter for the clutch actuated by said bar to break the clutch at the completion of the positive stroke of an operated

key, substantially as and for the purpose described.

16. In a registering-machine, the combination of a series of keys representing different values, a registering-bar adapted to be moved different distances by the operations of different keys, a rack moving with the bar, a pinion meshing with the rack, a registering-wheel, a clutch between the pinion and the wheel, a shifter for the clutch, and a lock operated by the shifter to lock the registering-wheel simultaneously with the breaking of the clutch between the pinion and wheel.

17. In a registering-machine, the combination of the slotted guide-plate F, the swinging bar J, moving upon said plate and provided with slots L of different lengths, the key-levers A, and the rods E, carried by the rear ends of the said levers and provided with cam-plates H of different widths corresponding to the different lengths of the slots L in the bar J and adapted to pass through said slots, substantially as and for the purpose described.

18. In a registering-machine, the combination of the shifter X, provided with the lug A' and spring I', and the reciprocating plate C', provided with the cam B', co-operating with the lug A', and with the pins G' H' co-operating with the spring I', substantially as described.

19. In a registering-machine, the combination of the toothed disk T, the sliding pinion P, a clutch connection between them, the shifter X, provided with the locking-arm O', co-operating with the disk T and provided also with the spring I' and the lug A', and the reciprocating plate C', provided with the cam B' and pins G' H', co-operating with the lug A' and spring I', respectively, substantially as described.

20. In a machine such as described, the combination of a series of operating-keys, a movable bar provided with slots of different lengths, a series of cams of different widths corresponding to the lengths of the respective slots in the movable bar and movable in defined paths through the slots, a vibrating frame common to all of the keys, and a resetting-plate operated by said frame to reset the movable bar upon the release and return of the operated key, substantially as described.

21. The combination of the operating-keys A, the rods E, operated thereby and provided with the cams H, the guide-plate F, the slotted bar J, the vibrating frame D' E', and the resetting-plate J', operated by the vibrating frame and co-operating with the bar J, substantially as described.

ALLEN I. BLANCHARD.

Witnesses:

EDWARD RECTOR,
ALBERT H. MEADS.