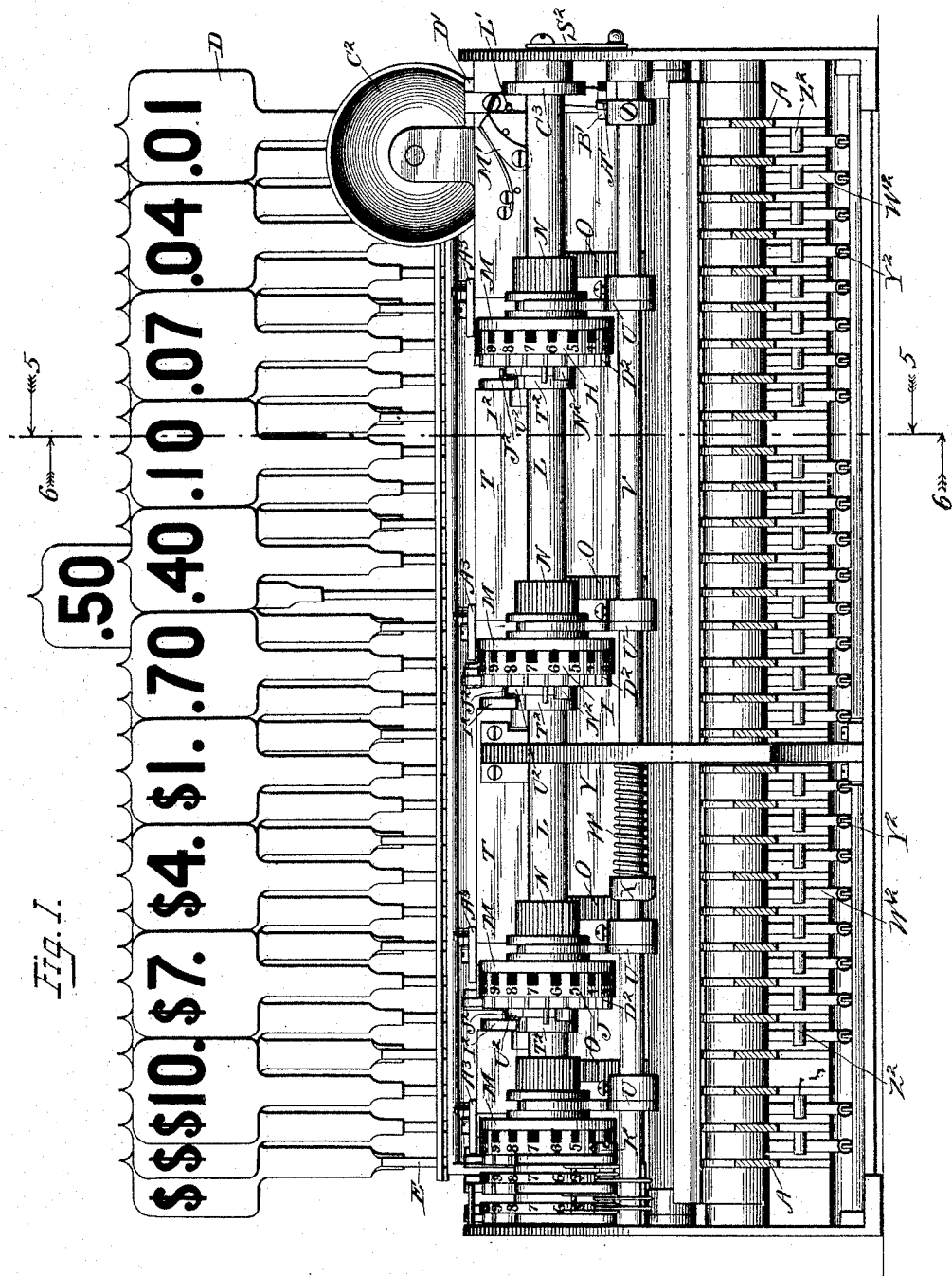


J. PFEIFER.
CASH REGISTER.

No. 491,587.

Patented Feb. 14, 1893.



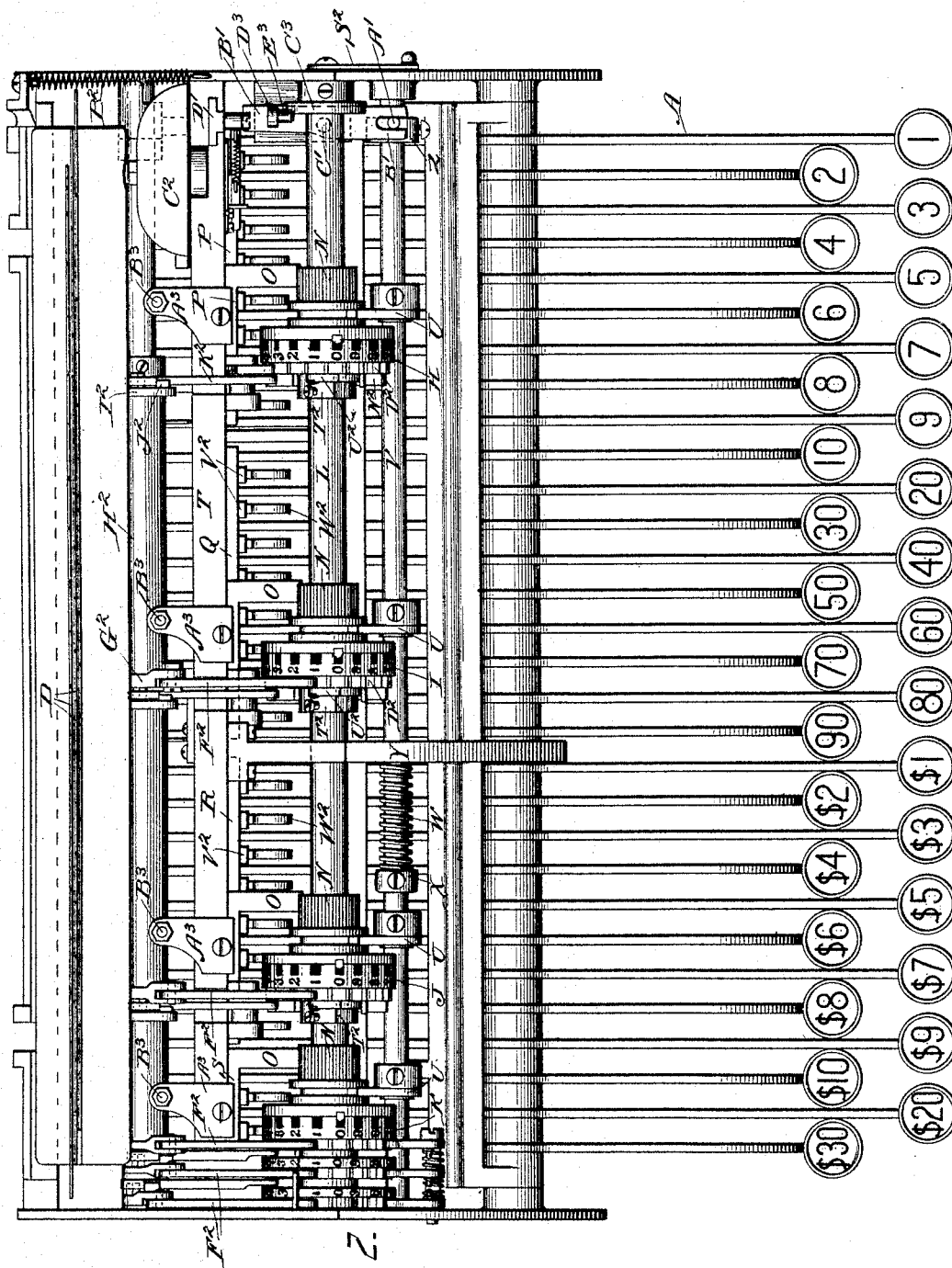
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CASH REGISTER.

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Fig. 2.

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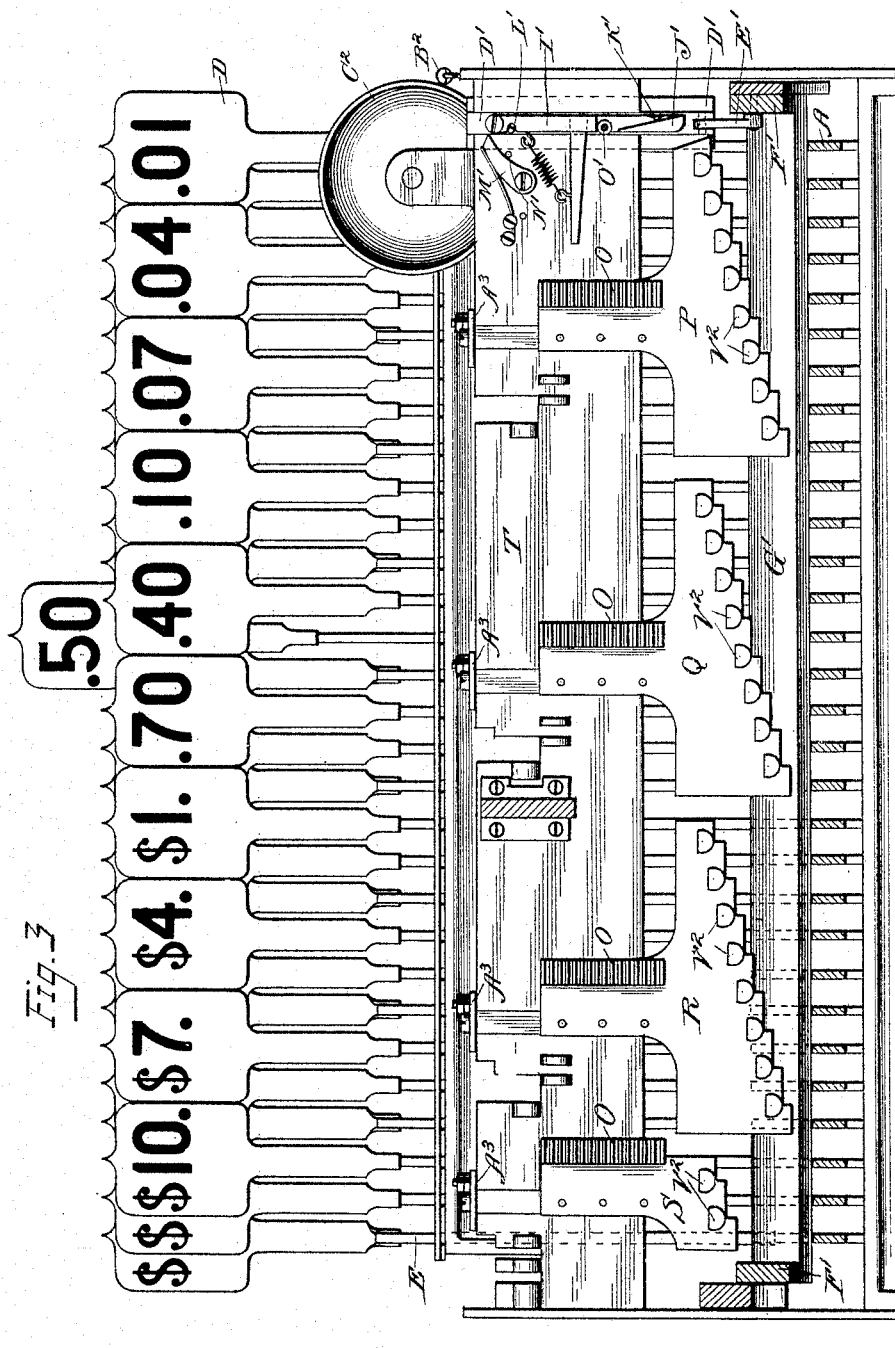
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J. PFEIFER.
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(No Model.)

6 Sheets—Sheet 4.

J. PFEIFER.
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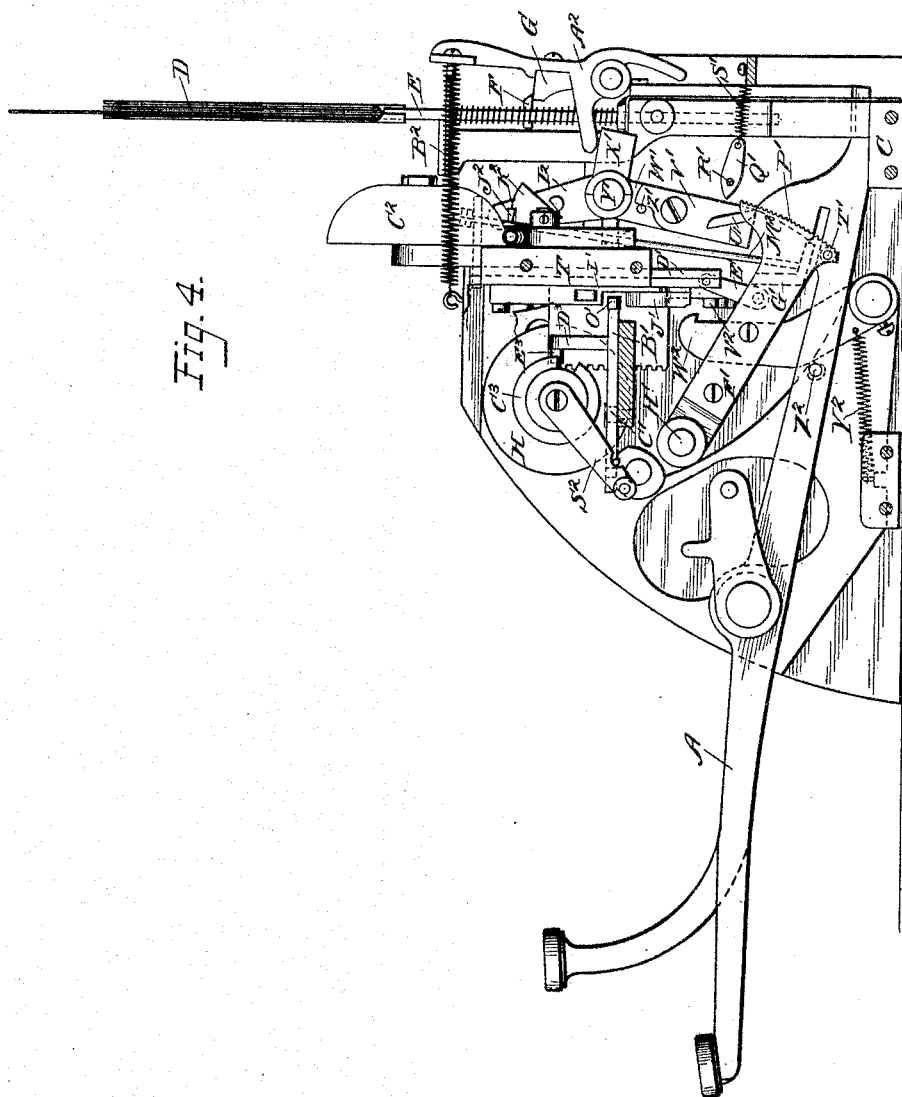


Fig. 4.

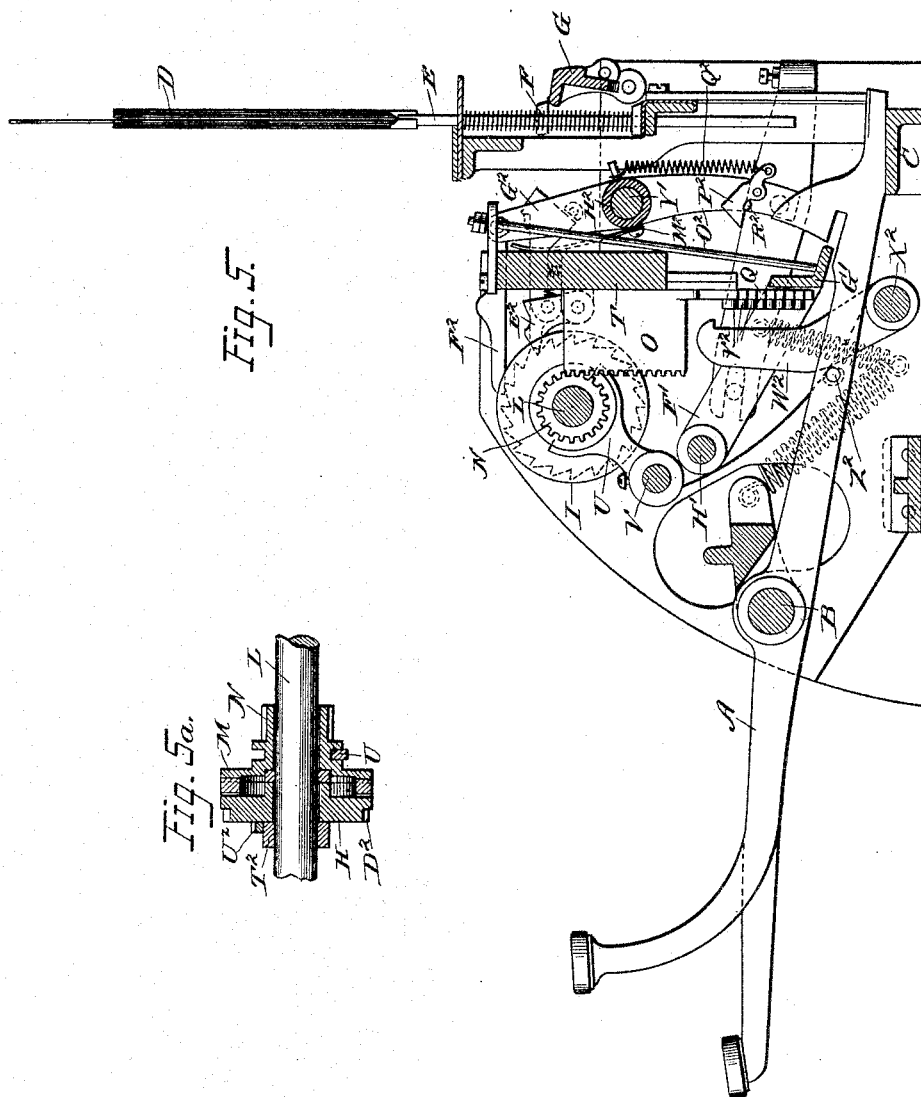
Witnesses
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John L. Tunison

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CASH REGISTER.

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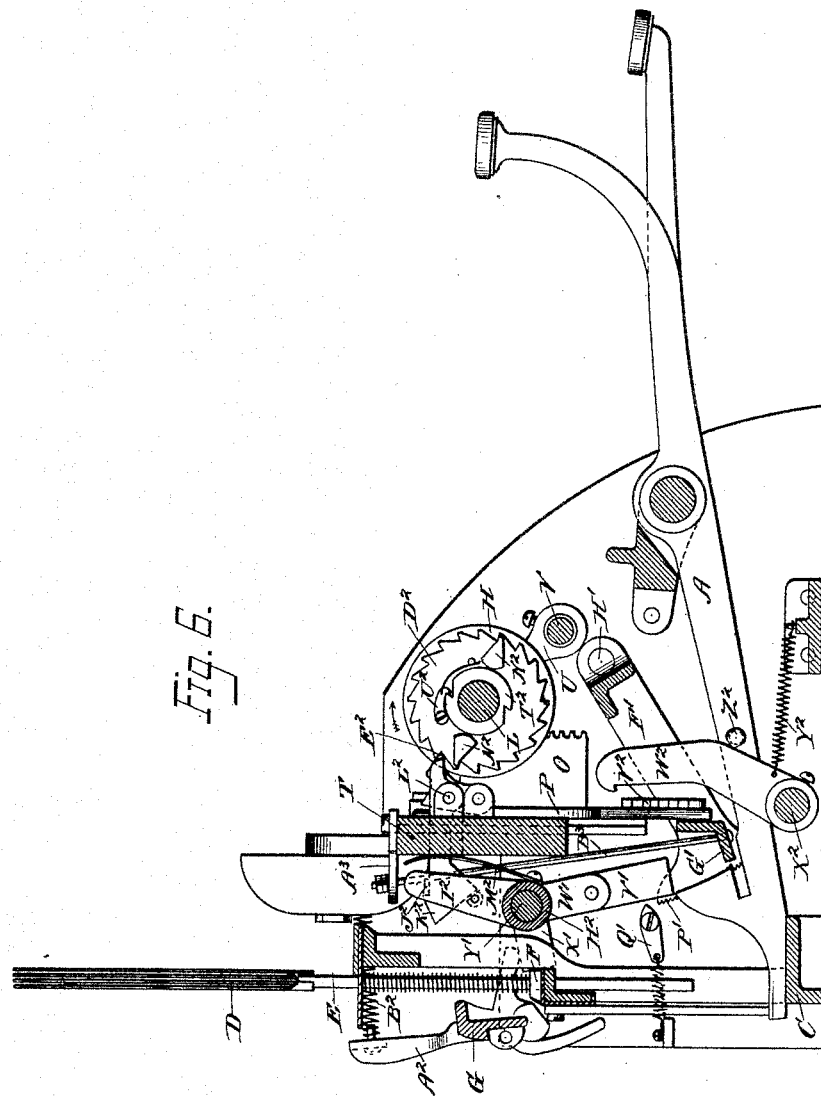
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UNITED STATES PATENT OFFICE.

JOHN PFEIFER, OF DAYTON, OHIO, ASSIGNOR TO THE NATIONAL CASH REGISTER COMPANY, OF SAME PLACE.

CASH-REGISTER.

SPECIFICATION forming part of Letters Patent No. 491,587, dated February 14, 1893.

Application filed November 2, 1892. Serial No. 450,774. (No model.)

To all whom it may concern:

Be it known that I, JOHN PFEIFER, 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 chiefly to that class of cash registers in which a series of operating keys of different values actuate or co-operate with a single registering wheel or train of registering wheels, to register their respective values; and more particularly to machines in which several sets or series of keys co-operate with as many registering wheels, and in which the amounts added upon each wheel are intermittently transferred to the next higher wheel in the series or train, for the purpose of adding the values of all of the operated keys into one common total.

The novelty of my invention consists in the new constructions, arrangements, combinations and modes of operation of the various parts, all of which will be hereinafter set forth and particularly pointed out in the claims.

In the accompanying drawings, in all of which the machine is shown removed from its casing, Figure 1 represents a front elevation of the machine with the front ends of the operating keys cut off; Fig. 2 a top plan view; Fig. 3 a transverse vertical section of the machine, facing its front side, just forward of the graduated registering plates, with some of the parts removed to more clearly expose others; Fig. 4 a side elevation of the right side of the machine with the right side of the framework removed to more clearly expose the parts within the machine; Fig. 5 a vertical section of the machine approximately on the line 5—5 of Fig. 1; Fig. 5^a a sectional detail of one of the clutches; and Fig. 6 a vertical section approximately on the line 6—6 of Fig. 1.

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

The operating keys and the indicating mechanism are of familiar construction and need not be further described than to say that the keys consist of levers A hung upon a hori-

zontal shaft B in the lower forward part of the machine and resting at their rear ends upon a cross piece C. The indicating mechanism consists of the tablets D carried upon vertically guided rods E, which latter are provided with collars or projections F adapted to co-operate with a pivoted supporting bar or wing G to hold the operated rods in lifted position and expose their tablets to view at the customary window in the casing of the machine.

In the particular machine illustrated in the drawings the operating keys are arranged in four sets, as indicated by the numbers upon the finger buttons at their front ends in Fig. 2, the first nine keys at the right representing units of cents, from 1 to 9, the next nine keys tens of cents, from 10 to 90, the next nine keys to the left units of dollars, from 1 to 9, and the three keys on the extreme left tens of dollars, from 10 to 30. Each of these sets of keys co-operate with a single registering wheel, the first set on the right with the wheel H, the second with the wheel I, the third with the wheel J and the fourth with the wheel K, said wheels being loosely mounted upon a horizontal shaft L extending transversely across the machine. Each of these wheels bears upon its periphery two series of equidistant numbers, from zero to nine inclusive, and at each half revolution, through mechanism hereinafter described, actuates the next higher wheel and turns the latter forward one number to register upon it the half revolution of the lower wheel. Each of the registering wheels is provided on its right hand side with clutch teeth with which co-operate clutches M mounted to turn upon and slide longitudinally of the shaft L. These clutches consist of the disks M having upon their left hand sides one or more teeth or projections adapted to enter the notches between the teeth on the registering wheels, and having circumferentially grooved collars or hubs fast upon them, with which co-operate the shifters hereinafter described. Each clutch also has fast upon or formed integral with it a pinion N, and these pinions mesh with racks O upon the vertically sliding graduated registering plates P Q R S which are mounted in guide-ways in the main cross bar T of the

framework. These registering plates overlie and co-operate with the four sets of keys before described, the plate P being located over the right hand set of keys, the plate Q over the second set, the plate R over the third set and the plate S over the three keys at the left. The lower edges of these plates are graduated or stepped from their lower left hand corners toward their upper right hand corners, the plates P Q R being each provided with nine steps, and the plate S with three. As these plates overlie the keys in rear of their pivotal support they will be lifted when the front ends of the keys are depressed to their full limit of stroke, and as the keys have a uniform stroke the distance which the depression of the front end of any key will lift its corresponding registering plate will be governed by the space between the upper edge of said key and the lower edge of the plate at a point immediately above said key. Thus, as seen in Fig. 3, the extreme left hand key in each series except the one on the extreme left will engage its corresponding registering plate almost as soon as the key begins to rise and will consequently lift the plate nearly the full distance the key travels in completing its stroke, while the key upon the extreme right in each series will not engage the plate until the key has nearly completed its stroke, and the adjustment is such that the key on the extreme right in each series will lift its registering plate a unit of distance, the next key on the left will lift it two units, the third three, and so on to the ninth key, on the extreme left of the series, which will lift the plate nine units of distance.

The registering plates are so geared to the clutches M by means of the racks O and pinions N that for each unit of distance which a registering plate is lifted it will turn the clutch one twentieth of a revolution, and, if the clutch be engaged with its registering wheel, will turn said wheel a corresponding distance. The clutches M are normally engaged with their respective registering wheels by means of the teeth shown in Fig. 2, and preferably, also, by a similar set of teeth upon the diametrically opposite sides of the clutch disks, Fig. 5^a so that when any registering plate is lifted by the operation of a key in the series to which it belongs the clutch geared to said plate will turn its registering wheel forward as many twentieths of a revolution as the plate is lifted units of distance, and, by means of the shifters hereinafter described, the clutch is disengaged from its registering wheel at the end of the positive stroke of the key, or at the very beginning of its backward stroke, so that as the registering plate moves downward to normal position it will turn the clutch back independently of the registering wheel, and the latter will remain in the new position to which it has been turned, a pawl and ratchet being preferably employed in connection with it to positively

prevent any backward movement. When the operated key and registering plate are completely reset to normal position the shifters re-engage the clutches with the registering wheels, or permit them to be re-engaged by the action of suitable springs, ready for the next operation of the machine. Inasmuch as each registering wheel is divided into twenty equidistant spaces and bears two series of numbers, each from zero to nine, it will be seen that in registering the units of distance through which the registering plate is lifted it will register the value of the operated key. Thus the lowest key in either set will lift its corresponding registering plate one unit of distance and add one upon its registering wheel; the five key in any set will lift its registering plate five units of distance and add five upon the registering wheel, while the nine key in any set will lift its registering plate nine units of distance and add nine upon the registering wheel.

The shifters, heretofore referred to, consist of yokes or plates U fast upon a shaft V mounted at its opposite ends in the side plates of the framework and capable of longitudinal play. The shifters U fit in the circumferential grooves before referred to in the hubs or collars of the clutches, so that when the shaft V is slid in either direction it will carry all of the clutches with it. A coiled spring W surrounding the shaft V and confined between a collar X fast upon the shaft and a bracket Y secured upon the framework normally presses the shaft V toward the left and causes the shifters to hold the clutches in engagement with the registering wheel and in this position of the parts if a key in any one or more of the sets be operated the corresponding clutches will turn their registering wheels forward a distance proportionate to the values of the operated keys. At the end of the positive strokes of the operated keys, or beginning of their return strokes, the shaft V is slid to the right and the shifters U caused to disengage the clutches from the registering wheels, by means to be now described: As seen in Fig. 2 the shaft V has fast upon it near its right hand end a collar Z carrying a pin A' projecting through a slot in the front end of a lever B' which extends rearward nearly to the main cross piece T of the framework and is pivoted near its middle at C', indicated by the dotted lines beneath the shaft L in Fig. 2, and also shown in Fig. 4. It will be seen that whenever the rear end of this lever B' is forced to the left its front end will carry the shaft V to the right, against the resistance of the spring W, and disengage all of the clutches from the registering wheels. The rear end of this lever is forced to the left at the beginning of the backward stroke of the operated keys and maintained in this position until such stroke of the key is substantially completed, whereupon it is released and the spring W allowed to draw the shaft V to the left again and re-engage

the clutches with the registering wheels, all by the following means: As seen in Figs. 1, 2 and 3 there is mounted in a guideway in the cross piece T, adjacent to the rear end of the lever B', a vertically sliding plate D' whose lower end is connected by a link E', Fig. 4, with one of the side arms F' of a vibrating frame, consisting of a flanged or angular cross bar G' extending across the entire series of keys, Figs. 3, 4, 5 and 6, and hung by side arms F' at each end upon pivotal supports at H' upon the side frames of the machine. When the front end of any one of the operating keys is depressed and its rear end lifted the cross bar G' will be lifted with the key and will lift the vertically sliding plate D' before referred to, and when the operated key has completed its stroke and been released the resetting of the cross bar G' will draw down the sliding plate D'. A coiled spring connected to one of the side arms F', dotted lines, Fig. 5, aids gravity in restoring the vibrating frame and connected parts to normal position. Pivoted at its upper end to the plate D' is a pendent arm or bar I' provided on its front side near its lower end with a cam J' having its right side inclined or beveled off as shown. The arm I' is free to swing upon its pivotal support at its upper end, but its movement to the right is limited by a pin K' upon the plate D', so that it cannot swing to the right of a vertical position, its movement toward the left being also limited by a pin L' upon the plate D', which pin is in line with a notch in the arm I' and permits limited movement of the lower end of the latter toward the left. A spring-pressed plate M' resting upon a pin N' forms a yielding guide upon the left hand edge of the arm I' and tends to maintain the latter in its normal vertical position when the plate D' is lifted in the manner before described, but permits the arm I' to be swung to the left, to its limit of movement, against the resistance of the spring bearing upon said plate M'. The rear end of the lever B' before described carries a friction roller O', Fig. 4, which in the normal position of the parts stands immediately above the upper end of the cam J' upon the pendent arm I', Fig. 3. When the front end of an operating key is depressed and the vibrating frame and the plate D' and parts carried by it lifted, in the manner before described, the cam J' will travel up the left hand side of the roller O' upon the rear end of the lever B', the arm J' swinging slightly to the left to permit this movement. As soon as the lower end of the cam J' has passed above the roller O' the arm I' will be swung to the right into vertical position again, against the pin K', by the pressure of the plate M' against its left hand edge. The lower end of the cam I' will now stand above the roller O'. When the operated key is released and the parts descend the lower rounded or beveled left hand corner of the cam J' will engage the roller O', and as the cam cannot yield toward the right, owing to

the engagement of the arm I' with the pin K', the roller O' will be forced to the left, thereby throwing the front end of the lever B' to the right, carrying the shaft V with it and disengaging all of the clutches from the registering wheels. The left hand side of the cam J' being substantially vertical the roller O' and rear end of the lever B' will be held in this right hand position during the downward travel of the parts, until the upper end of the cam J' passes below the roller, whereupon the lever B' will be released and the spring W allowed to throw the shaft V to the left again, and re-engage the clutches with the registering wheels. In this manner at the beginning of the backward stroke of any operated key or keys the shaft V carrying the shifters U is forced to the right and the clutches disengaged from the registering wheels and maintained out of engagement with them until the return stroke of the key or keys is nearly completed, whereupon the shaft is released and the spring W allowed to restore it to normal position and re-engage the clutches with the registering wheels.

The side arm F' which supports the right hand side of the vibrating frame, Fig. 4, carries at its rear end a toothed segment P' which co-operates with a detent Q' pivoted to the side frame at R' and yieldingly held in normal position by the coiled spring S' connected to its rear end. When one of the keys is operated and the vibrating frame lifted the segment P' will travel upward over the forward end or point of the detent Q', slightly lifting it, and the engagement of the detent with the teeth of the segment will prevent any backward movement of the vibrating frame until after the lower end of the segment has passed entirely above the point of the detent, whereupon, as the parts return toward normal position, the segment will re-engage the point of the detent and slightly depress it, the teeth of the segment slipping freely over the detent but the engagement of the latter with them preventing any return upward movement of the segment and vibrating frame until after they have been first returned to normal position. The co-operation of the segment P' and detent Q' thus compels a full movement of the vibrating frame in each direction after it has been started. The cross bar G' of the vibrating frame has a rearwardly projecting flange which co-operates with slotted lugs or hooks upon the upper sides of the key levers A, in the usual well known manner, the keys hooking onto the flange as soon as they are displaced from normal position, thereby coupling the operated keys to the vibrating frame so that the frame and operated key or keys are obliged to move together. In this manner the co-operation of the segment P' and detent Q' in compelling full movements of the vibrating frame in each direction also compels full strokes of the operated keys in each direction, so that when any key is partly operated it cannot be restored to normal posi-

tion until given its full stroke and caused to register its full value. The travel of the rearedge of the flange upward along the curved front edges of the lugs or hooks of the unoperated keys holds them from movement until the operated key and vibrating frame have completed their movement and been returned to normal position, as is common in machines of this class. Any suitable stops or locking devices may be employed for the purpose of preventing the simultaneous operation of two keys in the same set.

A pin T' projecting from the inner face of the segment P' at its lower end, Fig. 4, co-operates with a cam U' upon the right hand side of a plate V' pivoted to the lower end of a bell-crank lever W' X' hung upon a shaft Y'. The gravity of the plate V' holds it in the normal position shown, where its upper end rests against a pin Z' upon the arm W' of the bell-crank. The lower end of the plate V' is thus free to be swung toward the left but cannot be moved to the right of the position shown. When the vibrating frame is lifted by the operation of a key the pin T' will ride up against the front side of the cam U' and force the lower end of the arm W' rearward, and the rear end of the arm X' upward. When the pin T' has cleared the cam U', a spring, hereinafter referred to, will restore the bell crank to normal position. As the vibrating frame descends the pin T' will engage the rear side of the cam U' and swing the plate V' forward as the pin passes the cam, without moving the bell-crank. The arm X' of the bell-crank has resting upon it the front end of a forwardly projecting portion of the pivoted arm or plate A—² which supports the right hand end of the bar or wing G which co-operates with the collars or projections F upon the tablet rods E as before described. Whenever the arm X' is thrown upward by the operation of a key the wing G will be thrown rearward from under the collars F of any tablet rods which may be resting upon it, to permit these rods and their tablets to drop, and when the bell-crank is released a coiled spring B—² connected to the upper end of the supporting arm A—² of the wing G will pull the latter forward into position to catch under the collar F of the newly lifted tablet rod. A gong C—² is sounded at each operation of the machine by mechanism interposed between the bell-crank and its striker, which need not be illustrated or described in detail.

Each of the registering wheels has fast upon its left hand side a ratchet D—² with which co-operates a spring holding-pawl E—² to prevent backward movement of the registering wheel. Likewise co-operating with the ratchets of each of the registering wheels excepting the one on the right is a transfer pawl F—², Figs. 2 and 5. The pawl F—² which co-operates with the ratchet of the ten cent wheel I, Figs. 2 and 5, is pivoted at its rear end to an arm G—² fast upon and projecting upwardly from the left hand end of a

sleeve H—², loosely mounted upon the shaft Y' heretofore described. At its right hand end the sleeve H—² has fast upon it an upwardly projecting arm I—², Figs. 2 and 6, provided on its right hand side with a lug J—² which co-operates with the shoulder of a latch lever K—² which extends forward through a slot in the cross piece T of the framework, Fig. 1, and is pivoted at L—² to a lug or bracket upon the forward side of said cross piece, Fig. 6. A coiled spring interposed between the under side of the latch lever and bottom of the slot in the cross-piece T, Fig. 5, presses the rear end of the latch upward. A spring M—², Figs. 5 and 6, secured at its lower end to the forward side of the sleeve H—² and bearing against the rear side of the cross piece T of the framework tends to oscillate the sleeve H—² and throw the arms G—² I—² rearward, but said arms and sleeve are normally held in their forward positions by the engagement of the lug J—² with the shoulder of the latch lever K—², Fig. 6. The ratchet D—² of the units wheel H, Fig. 6, has fast upon it, at points diametrically opposite each other, two cams or projections N—² into the path of travel of which projects the front end of the latch lever K—², so that at each half revolution of the wheel H one of said cams will strike and lift the front end of the latch K—² and throw down its rear end, thereby disengaging its shoulder from the lug J—² on the arm I—² and permitting the spring M—² to oscillate the sleeve H—² and throw the arms I—² G—² rearward, carrying the pawl F—², Fig. 5, with them and causing its front end to drop into a fresh notch in the ratchet of the wheel I. The sleeve H—² also has fastened to it a pendent arm O—², Fig. 5, which carries a pivoted trip P—² held by a spring Q—² against a pin R—² upon the side of the arm O—². When the sleeve H—² is oscillated in the manner above described and the arms G—² I—² thrown rearward the lower end of the arm O—² will be thrown forward, carrying the front end of the trip P—² into the path of travel of the cross bar G' of the vibrating frame above described. When said frame is lifted by the operation of a key its rear edge will strike the under side of the front end of the trip P—² and flip it up, against the resistance of the spring Q—², as it passes, without moving the arm O—², but when the vibrating frame returns to normal position the rear edge of the cross bar G' will strike the upper beveled side of the trip P—², and as the trip cannot swing on its pivot in this direction, owing to the stop pin R—², the cross bar G' will force the arm O—² rearward as it rides over the beveled end of the trip, and will thereby return the sleeve H—² to normal position, throwing forward the arms G—² I—² and causing the pawl F—² to turn the wheel I forward one number and the lug J—² upon the arm I—² to become re-engaged with the shoulder of the latch K—². In this manner at each half revolution of the

units wheel H the latch which holds the transfer pawl for the tens wheel I will be tripped and said pawl set for the transfer, and upon the return stroke of the operated key the pawl will be actuated to turn the tens wheel I forward one number and register upon it the half revolution of the wheel H. Similar transfer mechanism is interposed between the tens wheel I and the units of dollars wheel J, and between the latter and the tens of dollars wheel K. At the left of the wheel K are two wheels representing respectively hundreds and thousands of dollars, the first receiving transfers from the wheel K, and in turn adding its half revolutions upon the last wheel.

The shaft L upon which the registering wheels are mounted is a rock-shaft journaled at its ends in the side frames of the machine and having secured upon its extreme right hand end, outside the framework, a handle S² by which the shaft may be rocked. Fast upon the shaft immediately to the left of each registering wheel is a collar T², Fig. 6, provided with two diametrically opposite notches with which co-operates a hooked pawl U² pivoted to the side of the ratchet of the registering wheel and spring-pressed against the periphery of the collar T². It results from this construction that the registering wheels are free to turn forward upon the shaft L, the pawls U² slipping over the notches in the collars T², but when the shaft L is itself turned forward the abrupt sides of the notches will engage the hooked pawls U² when they come opposite to them and will pick up the registering wheels and cause them to be turned with the shaft. Now, by turning the shaft L backward a half revolution by means of the handle S² and then turning it forward to normal position again the notched collars T², co-operating with the pawls U² carried by the registering wheels, will pick up all of the registering wheels and carry them around to zero or initial position, as will be readily understood. To permit the registering wheels to be themselves turned, however, it is necessary that the clutches be disengaged from them, and to that end I have provided means for automatically disengaging the clutches by the act of oscillating the shaft L in the manner above described. Fast upon the shaft near its right hand end is a cam disk C³, Figs. 2, 3 and 4. As seen in Fig. 4 this disk has a notch in its rear side, the upper edge of the notch being beveled off as shown in Fig. 2 to form a cam surface. Upon the forward side of the upper end of an arm D³ projecting upward from the lever B' is mounted a friction roller E³ which stands in the path of travel of this cam surface on the disk C³, so that whenever the shaft L is oscillated backward by means of the handle L² the disk C³ will force the rear end of the lever B' to the left, thereby throwing the shifter rod V to the right and disengaging the clutches from the registering wheels. The

engagement of the left hand side of the cam disk C³ with the roller E³ will hold the lever and connected parts in this shifted position until the shifter L has been turned forward again to normal position, whereupon the spring W will throw the shaft V to the left again and re-engage the clutches with the registering wheels.

It is not essential that the shaft L be a rock shaft, as it might be a revoluble shaft and be given a complete revolution each time for the same purpose.

In machines of this class, in which a series of operating keys of different values actuate a single registering wheel through the medium of a single vibrating plate, bar or frame common to all of the keys and moved different distances by the operations of different keys, it is often difficult to prevent the registering wheel being overthrown or carried too far by the momentum of the parts when a key is quickly or violently operated. In the present machine, to prevent the registering plates P Q R S from being lifted too far by the quick operation of any key I have provided each of them with a series of stops or projections V², Fig. 3, which are arranged to co-operate with a series of hooks W² pivoted at their lower ends upon a transverse shaft X², one beside each key lever A, and each pulled forward by a spring Y² against a projection Z² upon the side of the adjacent key lever A. These hooks are all of the same length, but the projections V² upon the registering plates are arranged in inclined order corresponding to the steps in the lower edges of the plates. The forward sides of the hooks W² are so shaped that when the front end of any key lever A is depressed its projection Z² will throw its corresponding hook W² rearward at the very beginning of the stroke of the key, bringing the upper end of the hook into the path of travel of that projection V² upon the registering plate which stands in line with the hook, and maintain the hook in this rearward position during the further stroke of the key. The hook thus forms a positive stop for the registering plate and arrests it at the exact point to which it should be moved by the operated key, and inasmuch as each registering plate is geared directly to its registering wheel during the registering stroke of the key the registering wheel is positively arrested by the arresting of the plate itself, so that there is no opportunity whatever for the registering wheel to be carried too far by a quick manipulation of the key.

For the purpose of aiding the gravity of the registering plates in re-setting them each plate has secured to its upper end, at the upper edge of the cross piece T, a plate A³, and these plates are connected with the cross bar G' of the vibrating frame by rods B³ connected to the bar G' at their lower ends and passed at their upper ends through holes in the plates A³ and having nuts screwed upon their ends above said plates. These nuts are

so adjusted upon the rods that when the vibrating frame is in its normal position the rods B—³ will hold the registering plates in normal position. When any key is operated the vibrating frame is free to rise independently of the registering plate lifted by said key, the rod B—³ playing through the hole in the plate A—³ or the hole in the cross bar G' through which its lower end is passed, but when the operated key is released and returns to normal position the resetting of the vibrating frame will pull the registering plate down to normal position again, no matter what distance it may have been lifted by the key.

I am aware that it is not broadly new to combine a series of operating keys of different values with a vibrating registering bar or plate overlying the keys and provided with a stepped or graduated under side, to cause the different keys to move the bar different distances, nor to combine with such keys and registering plate a series of hooks co-operating with the plates and with projections on the keys to arrest the plates at different points; but

Having thus fully described my invention I claim:

1. In a cash register, the combination of a series of operating keys of different values and having a uniform length of stroke, a vertically sliding registering plate overlying said keys and having its lower edge provided with a series of steps at different distances from the respective keys, a rack carried by said vertically sliding plate, a pinion meshing with said rack, a registering wheel, and a clutch between said pinion and wheel for causing the pinion to carry the wheel with it in one direction and move independently of it in the other, substantially as described.

2. In a cash register, the combination of two or more sets of operating keys, two or more vertically sliding registering plates, one overlying each set of keys and having its lower edge provided with a series of steps at different distances from the respective keys of its set, a rack carried by each vertically sliding plate, a pinion meshing with each rack, a registering wheel adjacent to each pinion, a clutch between each pinion and adjacent registering wheel, and means common to all of the keys for shifting the clutches to connect the pinions with and disconnect them from their respective registering wheels, substantially as described.

3. In a cash register, the combination of a series of operating keys of different values, a vertically sliding registering plate overlying said keys and having its lower edge provided with a series of steps at different distances from the respective keys, a rack carried by said vertically sliding plate, a pinion meshing with the rack, a registering wheel adjacent to the pinion, a sliding clutch turning with the pinion and capable of being slid into and out of engagement with the registering wheel, a

shifter for said clutch, and means common to all of the keys for operating the shifter to disengage the clutch from the registering wheel at the end of the registering strokes of the keys, substantially as described.

4. In a cash register, the combination of two or more sets of operating keys representing different values, two or more vertically sliding registering plates, one overlying each set of keys and having its lower edge provided with a series of steps at different distances from the respective keys of its set, a rack carried by each vertically sliding plate, a pinion meshing with each rack, a registering wheel adjacent to each pinion, a sliding clutch interposed between each pinion and adjacent registering wheel, turning with the pinion and movable into and out of engagement with the registering wheel, an endwise sliding rod or bar carrying a series of shifters, one for each clutch, and means common to all of the keys for moving said rod in one direction at the end of the registering strokes of the keys to disengage the clutches from the registering wheels, substantially as described.

5. In a cash register, the combination of the vertically sliding registering plates P Q R carrying the racks O and having their lower edges provided with a series of steps, the three sets of operating keys co-operating with said plates, the pinions N meshing with the racks O and mounted to turn upon and slide longitudinally of the shaft L, the registering wheels H I J mounted upon the shaft L, the clutches M interposed between the pinions N and registering wheels and carried by the pinions N, the endwise sliding rod V, the spring W pressing it in one direction, the shifter plates U fast upon said rod and engaging the clutches M, a vibrating frame common to all of the keys, and means intermediate the frame and rod V for moving the latter endwise at the end of the registering strokes of the keys to cause the shifters U to disengage the clutches from the registering wheels, substantially as described.

6. In a cash register, the combination of the clutches, the sliding rod V, shifters U fast thereon, spring W, lever B', the vibrating frame common to all of the keys, the vertically sliding plate D' connected to said frame, and the swinging arm I' carried by the plate D' and provided with the cam J' co-operating with the lever B', substantially as described.

7. The combination of the vertically sliding registering plate P carrying the rack O and having its lower edge provided with the series of steps, the set of operating keys A co-operating with said plate, the pinion N meshing with the rack O, the registering wheel H, a clutch between said pinion and registering wheel, and the series of hooks W—² co-operating with the projections Z² upon the keys A and with the projections V—² upon the plate P, substantially as described.

8. In a cash register, the combination of a series of operating keys of different values, a

registering plate common to all of said keys and movable different distances by keys of different values, a rack carried by said plate, a pinion meshing with the rack, a registering wheel adjacent to the pinion, an interposed clutch turning with the pinion and movable into and out of engagement with the registering wheel, a shifter for said clutch, and means common to all of the keys for actuating said shifter at the end of the registering strokes of the keys to disengage the clutch from the registering wheel, substantially as described.

9. In a cash register, the combination of two or more sets of operating keys of different values, two or more registering plates, one co-operating with each set of keys and movable different distances by the keys of different values, a rack carried by each of said plates, a pinion meshing with each rack, a registering wheel adjacent to each pinion, a sliding clutch interposed between each pinion and registering wheel and turning with the pinion, the endwise sliding rod or bar, a series of shifters carried by said rod, one for each clutch, and means common to all of the keys for moving said rod at the end of the registering strokes of the keys to cause the shifters to disengage the clutches from the registering wheels, substantially as described.

10. In a cash register, the combination of two or more sets of operating keys of different values, two or more graduated registering plates, one co-operating with each set of keys and movable different distances by the keys of different values, a rack carried by each plate, a sliding pinion meshing with the rack, a registering wheel adjacent to each pinion, a clutch interposed between each pinion and registering wheel and carried by the pinion, an endwise sliding rod or bar, a series of shifters carried by said rod, one for each clutch, a spring pressing said rod in one direction to cause the shifters to hold the clutches in engagement with the registering wheels, a vibrating frame common to all of the keys, and means intermediate said frame and endwise sliding rod for moving the latter against the resistance of its spring to disengage the clutches from the registering wheels at the end of the registering strokes of the keys and maintain them out of engagement during the non-registering strokes of said keys, substantially as described.

11. In a cash register, the combination of the several sets of operating keys, the vibrating frame F' F' G' common to all of them, the vertically sliding registering plates P Q R and registering devices actuated thereby, the plates A—³ carried by the registering plates, and the rods B—³ loosely connecting the cross-bar G' of the vibrating frame with the plates A—³, substantially as described.

12. In a cash register, the combination of a primary and a secondary registering wheel, the latter provided with a ratchet and the former with a cam or projection, a transfer pawl co-operating with the ratchet of the secondary wheel,

a spring tending to set said pawl for a transfer, a latch operating to hold the transfer pawl against movement by its spring and arranged to be tripped by the projection upon the primary wheel to release the transfer pawl and permit its spring to set it for the transfer, a series of operating keys, a vibrating frame common to all of the keys, and a trip movable with the transfer pawl and thrown into the path of the vibrating frame by the setting of said pawl for the transfer, said trip being arranged to yield to permit the passage of the vibrating frame in one direction and operating to actuate the transfer pawl to effect the transfer at the passage of the vibrating frame in the opposite direction, substantially as described.

13. In a cash register, the combination of the registering wheels H I, the former provided with one or more cams or projections N—² and the latter provided with a ratchet D—², the oscillatory sleeve H—², the transfer pawl carried by said sleeve at one end and engaging the ratchet D—² of the wheel I, the arm I—² carried by the sleeve at its opposite end and provided with the lug J—², the latch K—² co-operating with the lug J—² and with the projection N—² on the wheel H, the spring M—² tending to rock the sleeve H—², the pendent arm O—² carried by the sleeve H—², the trip P—² pivoted to the arm O—², the operating keys A, and the vibrating frame F' F' G' common to all of the keys and co-operating with the trip P—², substantially as described.

14. In a cash register, the combination of an axially movable shaft, a series of registering wheels loose thereon, a series of sliding clutches mounted thereon adjacent to the registering wheels, an endwise moving rod or bar carrying a series of shifters engaging said clutches, means intermediate the shaft and registering wheels for causing the shaft to pick up the registering wheels and carry them with it when it is turned in one direction, and means intermediate said shaft and the endwise moving shifter rod for moving the latter to disengage the clutches from the registering wheels when the shaft is turned to carry the registering wheels to initial position, substantially as described.

15. In a cash register, the combination of the axially movable shaft, the registering wheels loose thereon, the sliding clutches loose thereon adjacent to the registering wheels, the shifters for said clutches carried by an endwise moving rod, means intermediate the registering wheels and rock-shaft for causing the latter to pick up the wheels and carry them with it when it is turned in one direction, and a cam upon said shaft co-operating with the endwise moving shifter rod to disengage the clutches from the registering wheels when the shaft is oscillated to return the registering wheels to initial position, substantially as described.

16. The combination of the axially movable

shaft L having the operating handle S—² fast upon it, the registering wheels loose upon the shaft and carrying the pawls U—², the notched collars T—², fast upon the shaft and co-operating with said pawls, the sliding clutches M co-operating with the registering wheels, the endwise moving rod V, the shifters U carried by said rod and co-operating with the clutches, the spring W pressing said rod in one direction, the cam C—³ fast upon the shaft L, and the lever B' interposed between and co-operating with said cam and the endwise moving shifter rod V, substantially as described.

17. The combination of the operating keys A, the vertically guided tablet rods E ar-

ranged to be lifted thereby and provided with collars or projections F, the supporting bar or wing G co-operating with the collars F, the vibrating frame common to all the keys A, the bell crank W' X', the plate V' pivoted thereto and provided with the cam U' co-operating with a pin T' upon the vibrating frame, and a connection, as by the arm A—², between the arm X' of the bell-crank and the supporting bar or wing G, substantially as described.

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Witnesses:

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