No. 609,384. Patented Aug. 16, 1898.

W. BENTLEY.

CASH REGISTER.

(Application filed Nov. 2, 1896.)

(No Model.) 2 Sheets—Sheet 1.

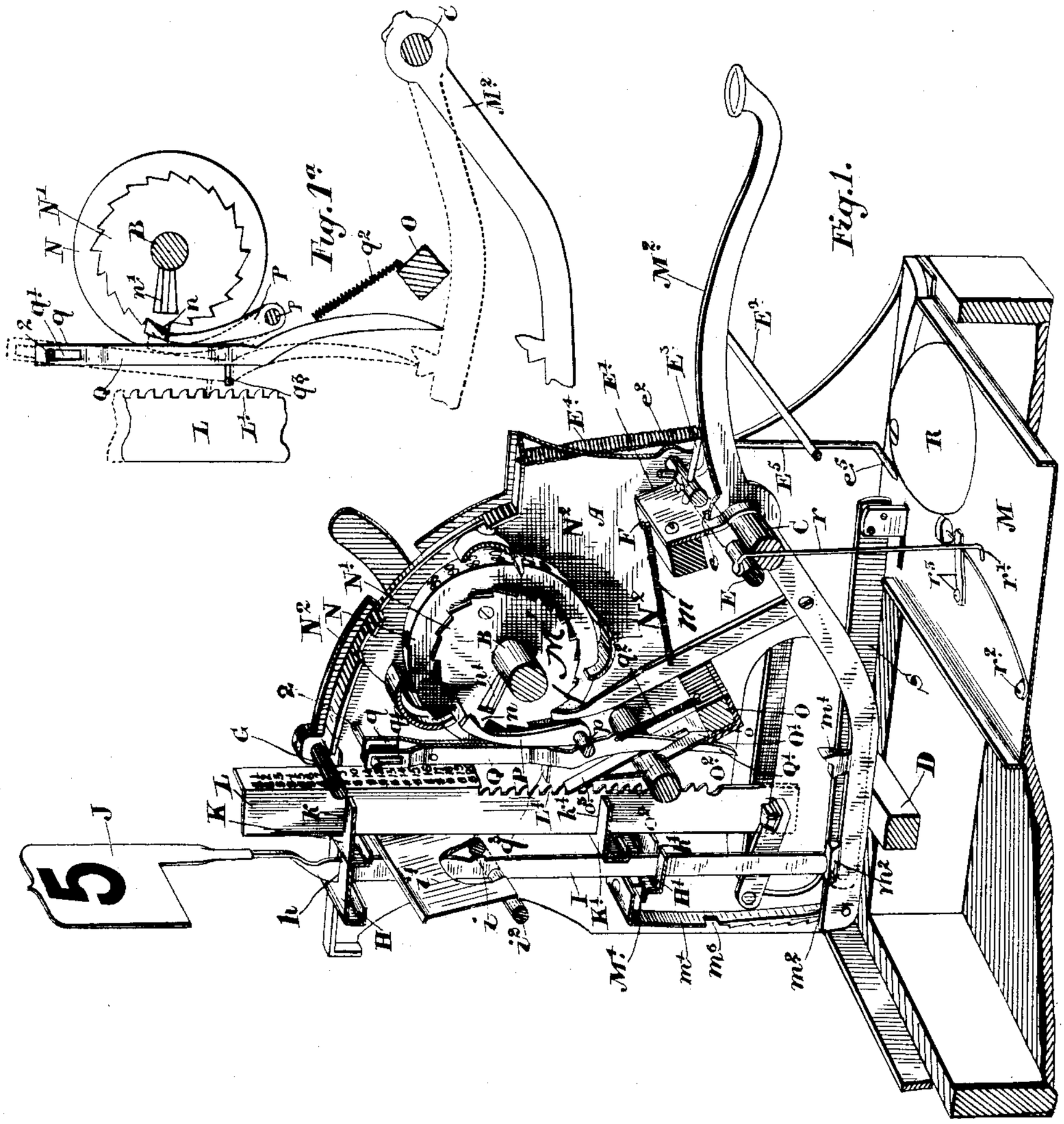

Fig. 1.

Fig. 1a.

Witnesses.
H. I. S. Young
H. Dennison.

Inventor:
Wm Bentley.
by Fetherstonhaugh & Co
Atty's

No. 609,384. Patented Aug. 16, 1898.

W. BENTLEY.

CASH REGISTER.

(Application filed Nov. 2, 1896.)

(No Model.) 2 Sheets—Sheet 2.

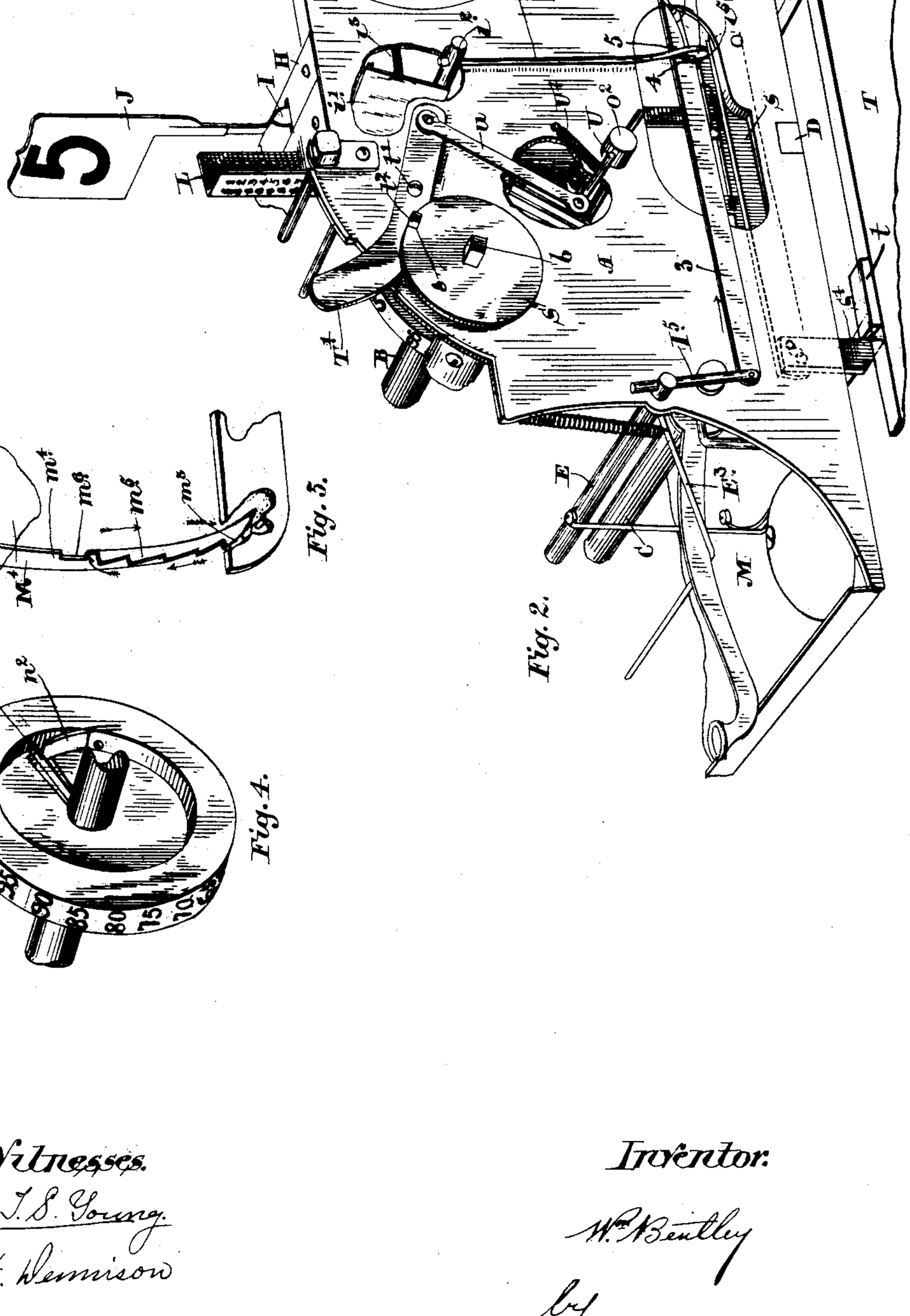

Fig. 2.

Fig. 3.

Fig. 4.

Witnesses.

H. I. S. Young.

H. Wemison

Inventor:

W. Bentley

by Fetherstonhaugh & Co

Attys.

UNITED STATES PATENT OFFICE.

WILLIAM BENTLEY, OF TORONTO, CANADA, ASSIGNOR TO THE REX CASH REGISTER COMPANY, LIMITED, OF SAME PLACE.

CASH-REGISTER.

SPECIFICATION forming part of Letters Patent No. 609,384, dated August 16, 1898.

Application filed November 2, 1896. Serial No. 610,874. (No model.) Patented in Canada January 4, 1897, No. 54,512.

To all whom it may concern:

Be it known that I, WILLIAM BENTLEY, manufacturer, of the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Cash-Registers, of which the following is a specification.

This invention has been patented to me in Canada January 4, 1897, No. 54,512.

My invention relates to improvements in cash indicators and registers; and the object of the invention is to produce a machine of this class which will be simple, positive, accurate, and effectual in its operation and so cheap in its manufacture that it may be sold profitably at a market price much less than cash-registers now commonly in use; and it consists, essentially, in the simple construction, arrangement, and operation of the finger-keys with their coacting registering parts and the controlling and operating mechanisms of the number-wheels, the bell, and the drawer, as hereinafter more particularly explained.

Figure 1 is a perspective inside view of one section of the register and the end plates. Fig. 1ª is an end elevation, showing the finger-bar and mechanism for operating and controlling the ascent of the vertically-moving registering-bar. Fig. 2 is an outside end view of the frame, portion of the drawer only being shown. Fig. 3 is a perspective detail of the peculiarly-formed controlling-spring for each key. Fig. 4 is a view of one of the number-wheels with stop device to insure of the wheel being only turned one way to zero.

In the drawings like letters and numerals of reference indicate corresponding parts in each figure.

A is one end plate of the machine, the end plate at the opposite side of the machine being exactly alike.

B is the number-wheel shaft, which extends from end plate to end plate and is suitably journaled therein.

C is the shaft for supporting the finger-keys, which also extends from end plate to end plate.

D is a bar which is secured at the bottom to the end plate and extends from end plate to end plate and forms a rest for the bottom inner end of the finger-keys and the bottom of the registering-bar, hereinafter described.

E is a shaft which also extends from end plate to end plate across the machine in proximity with the shaft C.

F is a bar which extends across the machine in proximity to the rear of the shaft C, being suitably supported on the end plates.

G is a shaft which is secured at each end in the top of the end plates and extends across the machine.

H and H′ are the top and bottom guide-plates for the vertically-moving bars I of the indicating-tablets J. The guide-plates H and H′ are suitably secured at each end to the end plates and are provided with a plurality of notches *h* and *h′*, in which the vertically-moving bars are held.

K and K′ are guide-plates which are provided with notches *k k′* to hold the vertically-moving registering-bars L. The guide-plates K and K′ extend across the machine and are suitably secured to the end plates A.

M is a plate which extends across the front of the machine between the end plates, between which it is suitably secured.

Having now described the general construction of the frame, I shall describe the operation of the finger-key with its coacting mechanism. It will of course be understood that each finger-key will be operated in the same way, as also its coacting mechanism.

M^2 is one of a series of finger-keys which is journaled on the shaft C and extends forwardly through the case in the usual manner and rearwardly in the manner shown in the drawings.

E′ is a plate secured to the cross-bar F and provided with a series of notches *e*, through which the finger-keys extend, such notches serving to separate the finger-keys at equal distances apart.

N is one of a series of registering-wheels, in this case the five-cent-registering wheel. The periphery of the registering-wheel N is preferably divided into twenty parts or spaces, which contain the numerals from "5," increasing by five, to "95," the extra space being left blank.

N′ is a ratchet-wheel, preferably secured to the face of the registering-wheel N. The ratchet-wheel N′ is provided with twenty teeth, one of the teeth *n* extending out beyond the points of the remaining teeth.

n' is a pin which is inserted in the shaft B and is designed to abut the end of the catch n^2, secured to the inner periphery of the registering-wheel N.

N^2 are concavo-convex cross-bars which extend across the machine and are fastened to the end plates. The cross-bars N^2 are provided with notches through which the registering-wheels run, such notches being designed to keep the registering-wheels equidistant, and consequently the ratchet-wheels in proper relative position to the finger-keys.

M′ is a push-dog which is pivotally connected to the finger-key and has its upper end held in engagement with the teeth of the ratchet-wheel N′ by means of the spiral spring m, attached to the push-dog M′ and the cross-bar F. Upon each depression of the finger-key, which has a movement limited by the rear cross-bar H′, against which the rear end of the finger-key comes in contact, the push-dog moves a sufficient distance to turn the ratchet-wheel, and consequently the registering-wheel, the peripheral distance of one tooth.

I shall now describe the mechanism by which the vertically-driven registering-bars L are operated upon each revolution of the registering-wheel, or, more explicitly, upon the blank of the registering-wheel being brought opposite to the inspection-slot. It will of course be understood in this respect that the registering-wheel in this instance would register ninety-five cents before the change, and when the blank is brought opposite the inspection-slot the dollar must be registered in some other part of the machine, and in this instance it is upon the vertically-moving registering-bar, which must be arranged by mechanism which I now describe to register one dollar upon the completion of every revolution of the registering-wheel, so as to form a detail adder on the registering-bar. It will be noticed that on the front face of the registering-bar the amounts "$1" to "$20" are placed vertically one above the other at equal distances apart. Consequently such vertical bar L must be moved an equal distance for every revolution of the registering-wheel, and this is done by the following mechanism:

O is a bar extending across the machine and secured at each end to the end plates A. O′ is a cross-plate secured to the bar O and provided with a series of notches o. O^2 is a shaft extending across the machine and journaled in the end plates, one end extending outside of one end plate, as indicated in Fig. 2. o^2 are upwardly-extending pins held by the cross-shaft O^2. P is a detent journaled on the cross-spindle p. Q is an upright bar which is provided with a forked upper end q, having slots q'. 2 is a cross supporting-spindle extending from end plate to end plate, suitably held therein and passing through the slotted forked ends of the upright bar Q. The tail Q′ of the bar Q extends through the notches o in the plate O′, such notches thereby serving to hold the bar Q from lateral displacement. q^2 is a spiral spring connected at one end to the bar Q and at the other end to the cross-bar O. The tendency of the spring q^2 is to hold the lower part of the bar Q against the cross-spindle p. The vertical bar L has formed on the lower front edge the ratchet-toothed rack L′, which is supported in position by the spring projections o^3, attached to or forming part of the plate O′. The distance between the points of the teeth of the rack L′ is equal to the distance between the vertical center of the dollar-figures. q^3 is a toe formed midway of the length of the bar Q and extending rearwardly, as shown.

As shown in the drawing, the mechanism is in the position so that upon the depression of the finger-key the vertical rack will be moved upwardly, and this is accomplished in this manner:

It will be noticed that the tooth n is underneath the top of the detent P, which is curved at this side in order to provide for the easy passage of the tooth along the front edge of the detent. As the ratchet-wheel upon the depression of the key is moved around the tooth n pushes the detent P forwardly, pressing against the bar Q, so as to throw it in the position shown in dotted lines in Fig. 1^a. As the rear end of the finger-key is brought upwardly a boss m', with a broad V-shaped upper end, comes in contact with the lower end of the tail Q′ of the bar Q, which is thrown forward by the detent P into alinement with the boss, and the toe now extending into the rack raises and holds such bar during the period that the tooth n is passing the upper end of the detent and until the finger-key is released, thus insuring that the registering-bar is not raised more than one tooth for each revolution of the registering-wheel—that is, a space arranged in relation thereto to be the distance between the teeth of the rack or a one-dollar space. This increases the number of dollars shown above the cross-bar G upon the completion of each revolution of the registering-wheel N. The operation hereinbefore described is of course repeated upon every revolution of the registering-wheel.

Although I describe the registering-wheel as arranged in reference to a five-cent key, it might with equal facility be arranged as to a one-cent key, two-cent key, three-cent key, a twenty-five-cent key, a dollar-key, or, in fact, a key of any denomination desired or desirable in any business.

It is also clear that the keys of the different denominations may be arranged adjacently across the machine, and there is nothing to prevent them from all acting accurately and independently to accomplish the detail adding, as hereinbefore described.

The vertically-moving bar I, hereinbefore referred to, is supported normally with the key down at the rear by a boss m^2, formed at the rear of the key. i is a tooth formed at

the front edge of the bar I, and i' is a rocking detent-plate extending across the machine and connected to the rod i^2, which is pivoted in the end plate of the machine, one end extending through, as indicated in Fig. 2. The upper end of the detent is held so as to have a rearward pressure by spiral springs i^3, attached thereto and to the end plate, as indicated in Fig. 2. It will be seen that upon every depression of the finger-key the tablet J will also be raised into position, so that such tablet is opposite an opening to exhibit to the purchaser the amount of the purchase. The tablet J is held up by means of the detent-plate i', the top of which enters beneath the tooth i when such tooth has passed the top of the plate, thus preventing the tablet from descending upon the finger-key resuming its normal position.

In order to provide that when each tablet is raised the preceding one raised will drop, I provide the following simple device: I^2 is a rod the lower end of which is provided with a lateral offset i^4, which is held against the stop i^5, formed on the end of the plate I^3 by the tension of the spring i^3. I^4 is a stop-pin extending outwardly from the plate I^3. I^5 is a rod held in the end of the cross-shaft E outside of the end plate A. 3 is a bar having the front end pivotally connected to the lower end of the bar i^5 and the rear end supported upon the offset i^4. The rear end has a jog 4, which normally abuts the offset i^4 in the front thereof. 5 is a beveled end extending from the jog 4 rearwardly. It will now be seen that upon the depression of any finger-key, as the shaft E is caused to turn in its bearings on account of the depression of the rod E^2, the bar E will be thrown in the direction indicated by arrow, carrying with it the rod I^2. As the bar 3 moves backwardly it is raised by the pin I^4 at the rear end, so that the jog 4 escapes the offset i^4, and thereby releases the bottom of the rod I^2, thus allowing the detent at the upper end to resume its normal position under the tooth i of the subsequently-raised bar I. During the period that the rod I^2 is being carried backwardly at the bottom the detent-plate i' is drawn away from contact with the bar I, and consequently the preceding tablet raised is allowed to drop on account of not being held up by any finger-key.

All the tablets across the machine are arranged in the same way as to their supporting-bars, it being clear from what has been before described that when one tablet is raised into position by its corresponding finger-key the tablet formerly raised will drop as the top of the detent-plate is pushed out of contact with the tooth i formerly raised by the finger-key.

In order to insure the finger-key being raised at the front to its normal position, I provide a cross-rod E^2, which extends in front of the cross-shaft C close to the finger-key throughout the entire width of the machine. Each end of the cross-bar E^2 is turned inwardly to form an arm E^3, which is securely fastened in the cross-shaft E by a set-screw e^2 or any other suitable fastening device. E^4 is a spiral spring connected at one end to the arm E^3 at each end of the machine and at the other end to the end plate A. The normal tendency of the springs, only one of which is shown, is to exert an upward pull upon the rod E^2, and thus should any key be depressed throw the finger end of the key up again, restoring the rear end into its normal position, as shown in the drawings.

I provide a bell R, which is suitably held on the plate M. r is a rod which is fastened at the upper end to the cross-shaft E and at the lower end is L-shaped. The extreme end of the arm r is beveled. r' is a spring-hammer which is securely fastened to the plate at r^2, and r^3 is an inclined guide, also securely fastened to the plate M and underneath which the hammer has movement. Upon depressing a finger-key the rod E^2, being also depressed, turns the shaft E, and the bottom end of the rod r on the shaft coming in contact as it turns with the stem of the spring-hammer pushes such hammer backwardly until the downward incline of the plate r^3 relieves such stem from the end of the rod r, when the hammer springs forward and strikes the bell. This, it will be readily understood, will occur on the depression of any key of the series.

In order to release the drawer and allow it to be moved forwardly by means of a back spring in the case behind the drawer, I provide the following mechanism. I do not show the spring for operating the drawer, as it is very commonly known and understood in this class of machines. S is a bar pivoted at the rear inside of the end plate A. The bar S normally rests upon the cross-bar D and is provided at its front end preferably with a hanger S', beveled at the bottom downwardly from front to rear. T is the drawer, and t is a plate secured on the top edge of the drawer and in front of which the rear end of the hanger S' abuts when the drawer is closed, so as to prevent the drawer from sliding open in the direction indicated by arrow. E^5 is a downwardly-extending rod secured in the cross-bar E near the end plate A and provided with a lower inclined end c^5. As the finger-key is depressed and the shaft E turned, as hereinbefore described, the inclined end e^5 of the rod E^5 is thrown underneath the end of the pivoted bar S, thereby raising it on its pivot and releasing the plate t from the bottom end of the hanger S', whereupon the spring at the back of the drawer will throw it open. This of course occurs, it will be understood, upon every depression of the finger-key. The drawer is readly pushed back as the plate in returning passes under the beveled end of the hanger S', raising it until the drawer assumes its normal closed position.

It is essential in the operation of a cash-

register that each finger-key must be depressed to the full extent, so that the amount of the purchase may be registered and the drawer not opened unless the registration is effected.

In order to provide for the full depression of the finger-key, and the consequent opening of the drawer, I provide the following simple device: m^3 is a pin extending laterally from the rear end of the finger-key. m^4 is one of a series of hangers forming part of a plate M^4, extending across the machine and supported upon the bars M^5. Each hanger m^4 is a spring-hanger and is curved in the form shown, so as to correspond substantially to the curve traversed by the pin m^3 on the rear end of the finger-key. m^5 is a ratchet-toothed rack extending upwardly at the back of the spring-hanger m^4, and m^6 is a notch formed in the spring-hanger immediately above the ratchet-toothed rack. Upon the downward depression of the front of the finger-key the pin m^3 travels up the toothed rack, sliding over the teeth, which are spring-held against it. As it passes each tooth it will be readily understood that the front end of the finger-key cannot be pushed upwardly again, but must be depressed until it reaches the end of the toothed rack, when the pin will pass through the notch m^6 to the front end of the spring-hanger on account of the normal tendency of the spring-hanger being to press rearwardly, and such pin will now pass down in front of the spring-hanger until it reaches the normal position shown in the drawings, the front end of the finger-key of course moving upwardly at the same time into position.

In order to restore the registering-wheels and vertically indicating-plate to zero, I provide the following mechanism: S′ is a disk secured on the square end b of the shaft B. s is a notch made in the disk. T′ is a bent lever pivoted at t' upon the end plate and having a pin t^2 attached to the lever and designed to normally rest in the notch s. U is an arm extending through the end of the shaft O^2, and u is a connecting-rod connecting the rear end of the lever T′ with the upper end of the arm U. o^2 is a pin extending upwardly from the shaft O^2 into proximity with the projection o^3, forming part of the plate O′. (See Fig. 1.)

It will now be seen that upon raising the upper end of the lever T′ the shaft O^2 will be turned in the direction indicated by arrow, thereby throwing the holding projection O^3 out of engagement with the rack L′, and as these holding projections and racks extend across the machine it will be seen that all the vertically-moving indicating-bars will drop down into their lowest position, so that no number will appear before the opening. The registering-wheels may as the square pin t' is released from the notch s in the disk S^2 be also turned back to zero by inserting a crank on the square end b of the shaft B. This is effected by the pin n', extending radially from the shaft B, coming in contact with the catch n^2 of each registering-wheel, so that every registering-wheel is turned until the notch s on the disk S is brought back opposite the pin t^2, when such pin will be caused to drop into it by means of the tension exerted upon the arm U by the spiral spring U′. When this is accomplished, all the registering-wheels will have a blank or zero appearing before the inspection-opening.

What I claim as my invention is—

1. In combination the finger-key provided with a boss at or near its rear end, the registering-wheel supported on a suitable shaft, the ratchet-wheel secured thereto, the projecting tooth of the ratchet-wheel, a rocking detent pivoted adjacent to the wheel and with which the projecting tooth is designed to come in contact, a bar suitably hung, permissible of vertical movement, located adjacent to the rocking detent and having a tail spring-held in position and with which the boss on the finger-key is designed to come in contact and a toe extending rearwardly from the bar, the registering-bar suitably held in guides and provided with a vertical column of figures and the vertical rack formed at the lower part of same and means for holding such bar in position upon being raised from number to number as and for the purpose specified.

2. In combination the finger-key provided with a boss at or near its rear end, the registering-wheel supported on a suitable shaft, the ratchet-wheel secured thereto, the projecting tooth of the ratchet-wheel, a rocking detent pivoted adjacent to the wheel and with which the projecting tooth is designed to come in contact, a bar suitably hung, permissible of vertical movement, located adjacent to the rocking detent and having a tail spring-held in position and with which the boss on the finger-key is designed to come in contact, a toe extending rearwardly from the bar, the registering-bar suitably held in guides and provided with a vertical column of figures, the vertical rack formed at the lower part of same and an oblique projecting spring designed to engage with the lower edge of each tooth of the rack as it ascends as and for the purpose specified.

3. In combination the finger-key provided with a boss at or near its rear end, the registering-wheel supported on a suitable shaft, the ratchet-wheel secured thereto, the projecting tooth of the ratchet-wheel, a rocking detent pivoted adjacent to the wheel and with which the projecting tooth is designed to come in contact, the double bar provided with a slotted upper end supported on a cross-spindle, located adjacent to the rocking detent and having a tail spring-held in position with which the boss on the finger-key is designed to come in contact and a toe extending rearwardly from the bar, the registering-bar suitably held in guides and provided with a vertical column of figures and the vertical rack formed at the lower part of same and

means for holding such bar in position upon being raised from number to number as and for the purpose specified.

4. The combination with the registering-bar of L shape in cross-section at the top thereof and provided with a column of figures arranged equidistant on the face thereof, the registering-disk, the key and key-lever for operating said disk, suitable guides for said bar, a rack formed on the lower front edge thereof, means operated by the finger-key and through the registering-disk mechanism whereby on each downward depression of the finger-key the registering-disk is rotated one step, means for lifting the registering-bar one tooth of its rack on each complete revolution of said disk and means for holding the registering-bar in its raised position after each upward movement, substantially as described.

5. In combination the registering-bar, suitable guides therefor, a rack formed at the lower front edge of the bar, the shaft, a spring projection having one end fixed in said shaft and its opposite end extending into the rack for holding the registering-bar in the raised position and means for rocking said shaft for throwing out the spring projection from its engagement with the rack as and for the purpose specified.

6. In combination the registering-bar, suitable guides therefor, a rack formed at the lower front edge of the bar, a spring projection extending into the rack for holding the registering-bar in the raised position, a shaft extending across the machine and having a pin extending upwardly therefrom into proximity with the spring projection and means for turning the shaft so as to throw the pin against the spring projection as and for the purpose specified.

7. In combination the registering-bar suitable guides therefor, a rack formed at the lower front edge of the bar, a spring projection extending into the rack for holding the registering-bar in the raised position, a shaft extending across the machine and having a pin extending upwardly therefrom into proximity with the spring projection, a spring-held lever extending through the end of the shaft, an operating-lever extending above the end plate and suitably held in its normal position and a connecting-rod between the operating-lever and the spring-held lever on the end of the shaft as and for the purpose specified.

8. In combination, the casing, the registering-disks, the registering-bars operated through said disks, the shaft carrying said disks, the means for locking said bars, and the means for simultaneously releasing said bars and shaft, substantially as described.

9. The combination with the tablets and bar and supporting-guides therefor, the spring-held finger-key, the boss at the rear end of the finger-key, the tooth on the tablet-bar and the spring-held detent-plate designed to come in contact with the back of such tooth when the bar is thrown up by the finger-key, a rocking bar carrying said plate, a rod depending from the end of the same and having a lateral offset and means for rocking the bar directly by pressure upon such offset upon each downward movement of the finger-key as and for the purpose specified.

10. The combination with the tablets and bar and supporting-guides therefor, the depending spring-held finger-key, the boss at the rear end designed to form a rest for the bottom end of the tablet-bar, the tooth on the tablet-bar, the spring-held detent-plate designed to come in contact with the back of such tooth when the bar is thrown up by the finger-key, a rod depending from the end of the detent-plate shaft and having a lateral offset, a bar having a jog in it designed to normally abut the offset and an inclined end designed to normally rest on a guiding-pin extending laterally from the frame, a rod pivotally connected to the front end of the bar, the shaft from which such rod depends and is secured, the bent rod spring-held and finger-key all arranged to operate as and for the purpose specified.

11. The combination with the finger-key journaled on a shaft extending from end plate to end plate, a supplemental shaft having a bent rod extending outwardly therefrom, the spring for maintaining an upward pressure upon such rod, the depending rod secured to the supplemental shaft and having a bent end as specified and the spring-hanger, inclined guide situated above the stem of such hanger, and the bell situated in proximity to the hanger suitably supported as and for the purpose specified.

12. The combination with the finger-key, the supplemental shaft, the bent rod extending forwardly therefrom, the spring holding such rod with a normal pressure upward, the depending rod with inclined bent end, the lever with which such inclined end is designed to come in contact, the hanger having a beveled lower end, the spring-pressed drawer and the stop on the upper edge thereof designed to normally abut the straight rear end of the hanger as and for the purpose specified.

WILLIAM BENTLEY.

Witnesses:
B. BOYD,
H. DENNISON.