(No Model.) 5 Sheets—Sheet 1.

J. SHARPE.

CASH INDICATOR AND REGISTER.

No. 482,760. Patented Sept. 20, 1892.

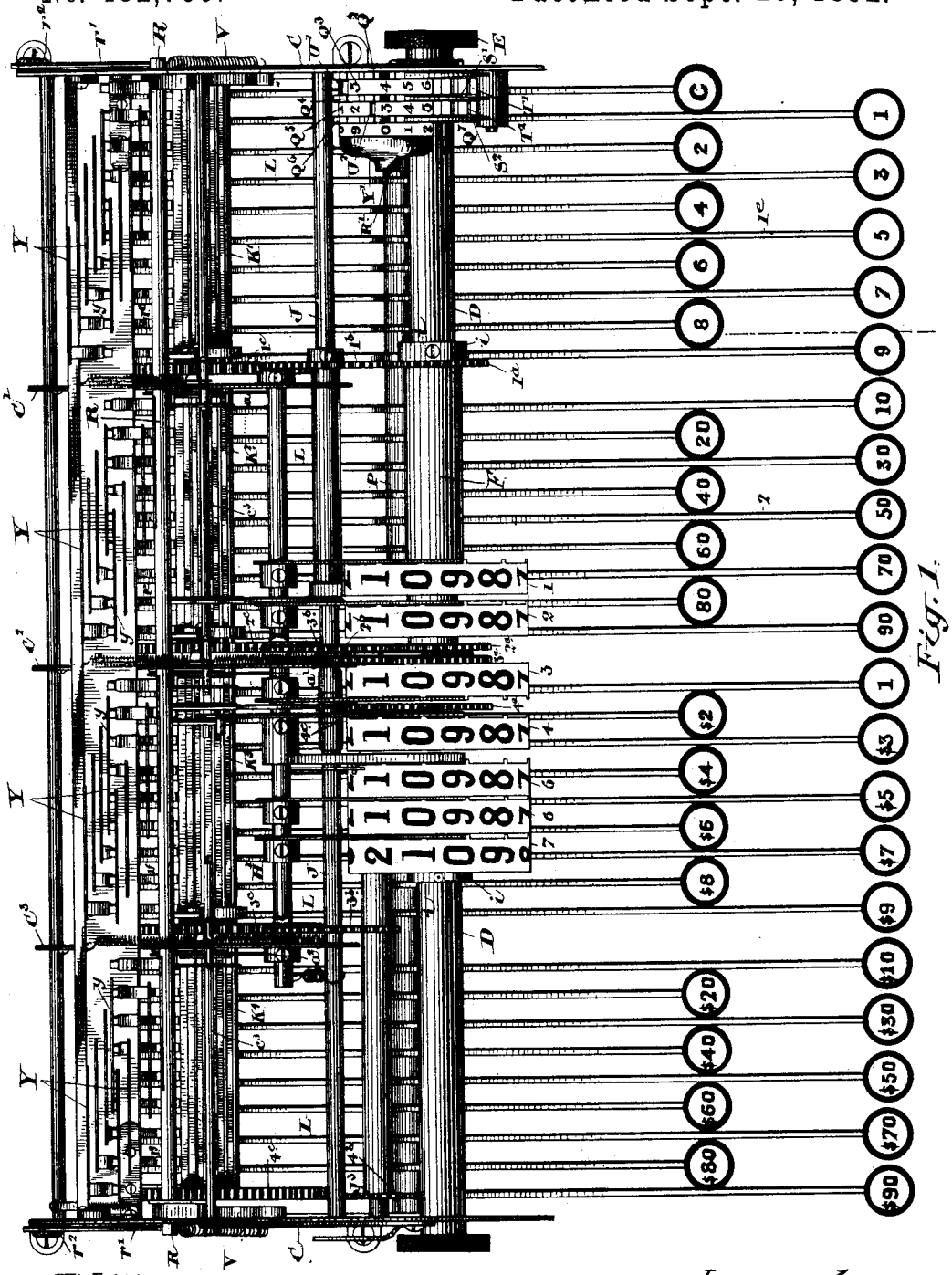

Fig. 1.

Witnesses.
Lewis P. Abell.
H. G. S. Young.

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Attys.

(No Model.) 5 Sheets—Sheet 2.

J. SHARPE.

CASH INDICATOR AND REGISTER.

No. 482,760. Patented Sept. 20, 1892.

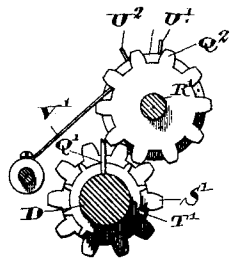

Fig. 6.

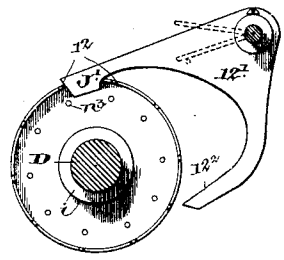

Fig. 5.

Fig. 2.

Witnesses.
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(No Model.) 5 Sheets—Sheet 3.

J. SHARPE.

CASH INDICATOR AND REGISTER.

No. 482,760. Patented Sept. 20, 1892.

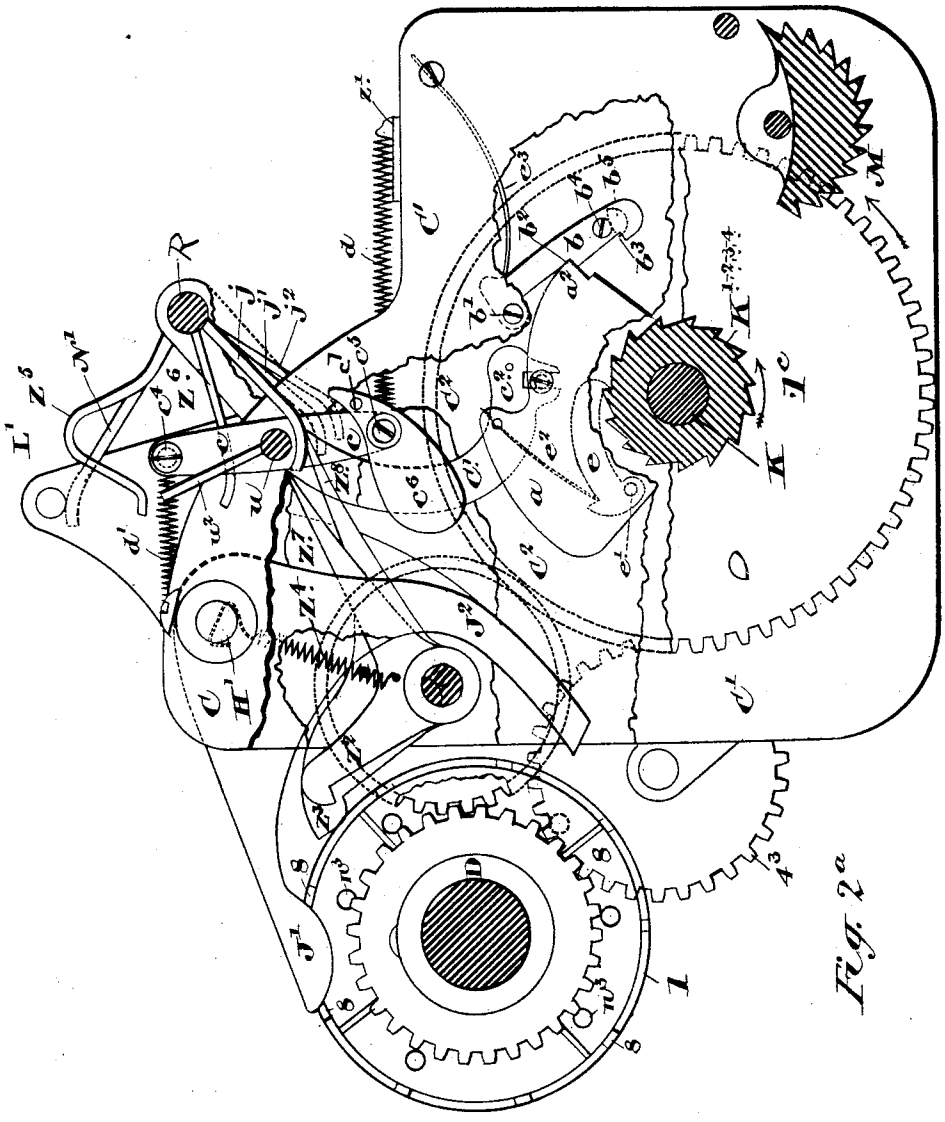

Fig. 2a

Witnesses.
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(No Model.) 5 Sheets—Sheet 4.

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No. 482,760. Patented Sept. 20, 1892.

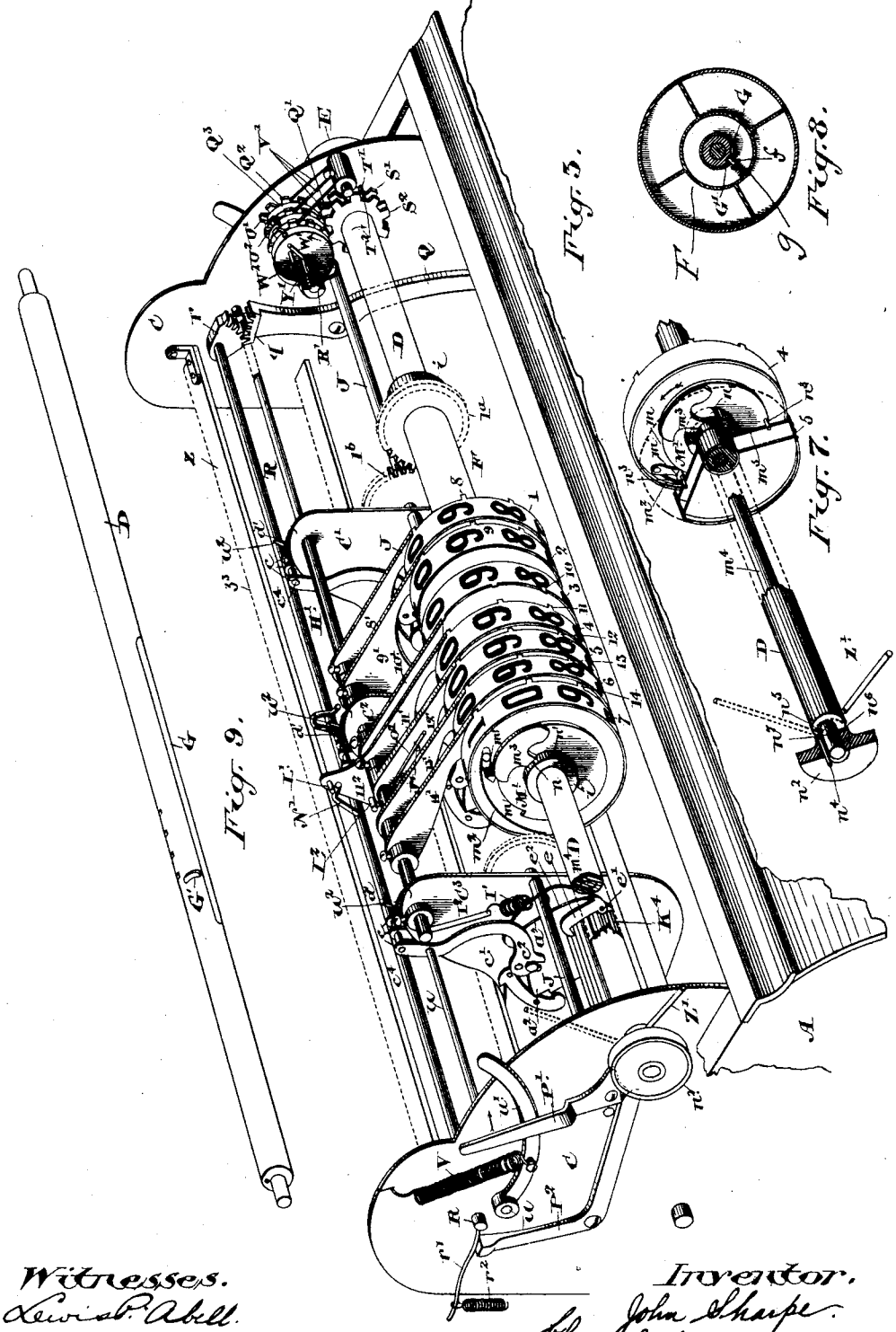

Fig. 9.

Fig. 5.

Fig. 8.

Fig. 7.

Witnesses.
Lewis P. Abell.
A. E. Young.

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(No Model.) 5 Sheets—Sheet 5.

J. SHARPE.

CASH INDICATOR AND REGISTER.

No. 482,760. Patented Sept. 20, 1892.

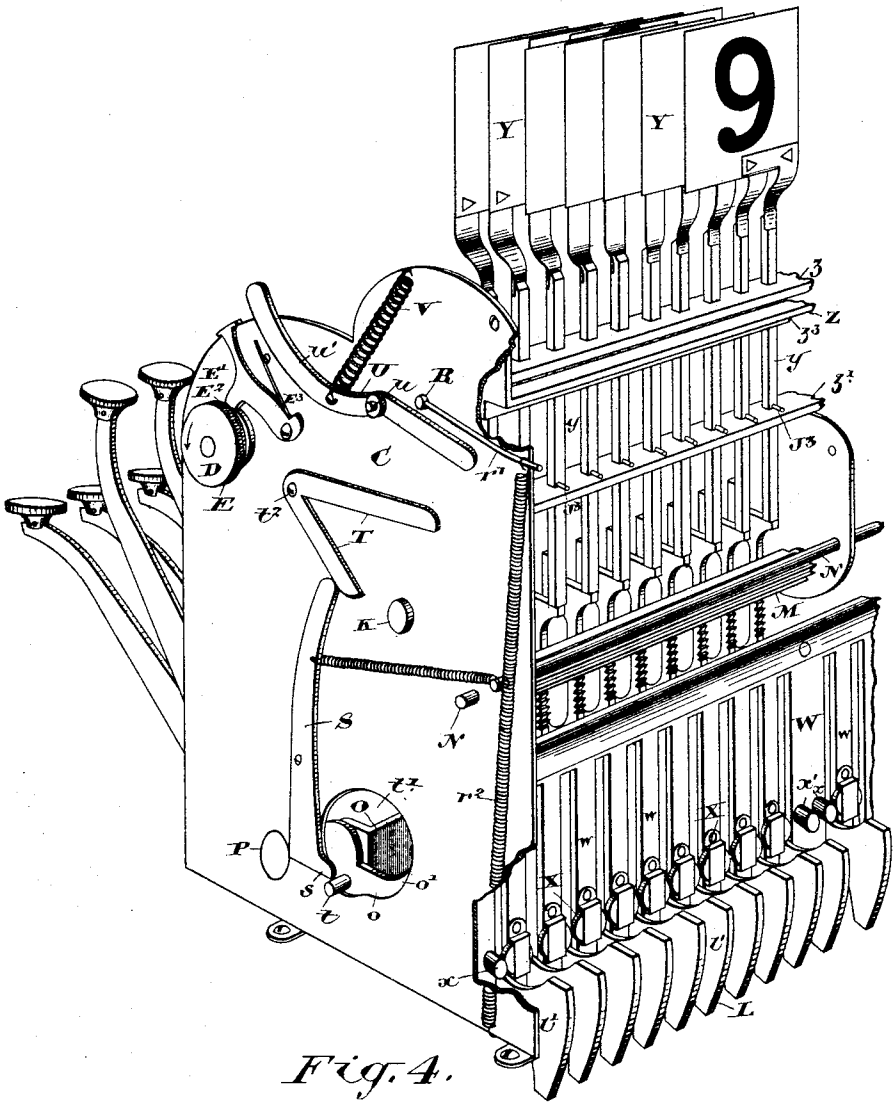

Fig. 4.

Witnesses.
Lewis B. Abell.
H. G. Young.

Inventor:
John Sharpe.
by Fetherstonhaugh & Co
Attys

UNITED STATES PATENT OFFICE.

JOHN SHARPE, OF TORONTO, CANADA.

CASH INDICATOR AND REGISTER.

SPECIFICATION forming part of Letters Patent No. 482,760, dated September 20, 1892.

Application filed January 21, 1892. Serial No. 418,754. (No model.) Patented in Canada November 18, 1891, No. 38,405.

To all whom it may concern:

Be it known that I, JOHN SHARPE, 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 Indicators and Registers, of which the following is a specification.

My invention relates to an improvement in cash indicators and registers patented to me in the United States of America on November 12, 1889, under No. 414,872, and in the Dominion of Canada on August 3, 1889, under No. 31,976.

The object of my invention is, first, to simplify the construction and operation of my cash indicator and register, and, secondly, to provide further safeguards whereby inaccurate sums may be prevented from being registered and the machine may be prevented from being tampered with by dishonest persons so as to falsify the total amount registered at any particular time; and it consists, essentially, of the peculiar construction and arrangements of devices designed to accomplish these objects, as hereinafter more particularly explained.

Figure 1 is a plan of my machine with the case removed, so as to show my improvements. Fig. 2 is a sectional elevation through the line *x y*, Fig. 1. Fig. 2ª is an enlarged view of a part of the mechanism shown in Fig. 2. Fig. 3 is a front perspective view of the upper operating mechanism with the case mostly broken away, so as to exhibit the construction of the parts. Fig. 4 is a perspective view from the rear, showing the right-hand portion of the machine. Fig. 5 is a cross-section showing the position of one of the double-acting locking-dogs in relation to the registering-disks. Fig. 6 is a sectional elevation of the registering mechanism designed to indicate any tampering with the machine. Fig. 7 is a perspective view, partially in section, showing the carrying device between the registering-disks, which are not operated directly from the keys. Fig. 8 is a sectional detail showing the stopping device for the registering-disk carrying the units of the highest denomination. Fig. 9 is a perspective view of a shaft, showing the grooves and stopping mechanism for controlling the revolution of the disks.

In the drawings like letters and figures of reference indicate corresponding parts.

A is the case, and B the lid, which when shut, as indicated in Fig. 2, completely incloses all the operating mechanism, with the exception of the keys by which the mechanism is set in motion to perform the function arranged for each part, as hereinafter more particularly explained.

Near the ends of the case, and rigidly secured in place in any suitable manner, are a pair of standard-plates C, which support all the interior mechanism.

The main shaft D of the registering mechanism is journaled in bearings in the standard-plates C and extends entirely across the case near the front side thereof. At one end of the main shaft D and outside of the standard-plates C, I secure a turning-knob E, (see Figs. 1 and 4,) whereby the main shaft is adapted to be revolved in its bearings for the purpose of turning all the numbered disks to the zero or naught point, as will be described hereinafter.

Arranged on the main shaft is a series of disks 1 2 3 4 5 6 7, each of which is provided with a series of numerals from "0" to "9," arranged at suitable distances apart. The numbers on the disk 1 indicate cents, those on disk 2 indicate dimes, those on disk 3 indicate dollars, those on disk 4 indicate tens of dollars, those on disk 5 indicate hundreds of dollars, those on disk 6 indicate thousands of dollars, and those on disk 7 indicate tens of thousands of dollars. Of course the number of disks may be increased at will to adapt the machine for registering sums of any desired magnitude. The disks 1 2 3 4 are in connection with spur-wheels 1^a, 2^a, 3^a, and 4^a, respectively, which are connected rigidly to or are formed integrally with their respective disks. The said disks are arranged loosely on the main shaft and are independently revoluble thereon, and the said spur-wheels are all of the same diameter and provided with the same number of teeth. The disk 5 is connected to the disk 4 by a carrying device, and the disk 6 is connected to the disk 5 by a similar carrying device, and the disk 7 is connected to the disk 6 by the same carrying device. Should it be desired to register sums of a greater magnitude from what these disks

provide for, each of any further disks required would be connected by the same carrying device as above mentioned and as hereinafter described. The hub or central sleeve F of each disk carries a stop-pin *f* and a spiral spring *g* to normally force the same inward.

G is a longitudinal groove made in the shaft D and extending from outside to outside of the hubs of the disks 1 and 7. One side of the groove G is inclined and the other is radial. The stop-pins *f* are preferably arranged in the sleeves or central sleeves of each of the disks in line radially with the zero-marks on said disks, and hence it follows that when the straight sides of the inner ends of the stop-pins *f* are in engagement with the radial side of the groove G and of the disks it will present their zero-marks in the front portion of the disks, where an opening *h* is made in the cover, as described in the patent above referred to. The hinged cover I, with which the case is provided, and which is usually locked, is arranged over the plate or cover H, and when the cover I is opened the numbers on the disks opposite the openings can easily be read. The disks 1 2 3 4 5 6 7 are held in position, so as to prevent them moving laterally on the shaft by the collars *i* abutting the outer ends of the sleeves F.

C′ C^2 C^3 are intermediate standard-plates, which form auxiliary supports for the operating mechanism. It will be noticed on reference to Figs. 1 and 3 that the sleeve F of the disk 1 is elongated in form, so as to bring the gear-wheel 1^a into mesh with the operating-gearing of the first bank of keys. The gear-wheels 2^a, 3^a, and 4^a are situated close to their respective registering-disks 2 3 4. The registering-disk 1 derives motion from the keys of the first bank through the gear-wheels 1^a, intermediate gear 1^b, situated on the counter-shaft J, which extends throughout the breadth of the machine and is supported in the standard-plates C′, C^2, and C^3, and gear-wheel 1^c, which revolves on the shaft K, supporting the operating ratchet-sleeves K′, K^2, K^3, and K^4 of each of the four banks shown in Fig. 1. The registering-disk 2 derives motion from the keys of the second bank through the gear-wheel 2^a, intermediate gear-wheel 2^b, situated on the counter-shaft J, and gear-wheel 2^c on the shaft K. The registering-disk 3 derives motion from the keys of the third bank through the gear-wheel 3^a, intermediate gear-wheels 3^b, situated on the counter-shaft J, and gear-wheel 3^c on the shaft K. The registering-disk 4 derives motion from the keys of the fourth bank through the gear-wheel 4^a, intermediate gears 4^b, situated on the counter-shaft J^3, and gear-wheel 4^c on the shaft K. In each case each gear-wheel 1^c, 2^c, 3^c, and 4^c is secured to or forms part of its respective ratchet-sleeve K′ K^2 K^3 K^4.

In the patent above referred to I show only ten ratchet-teeth in each sleeve K; but in my present machine for the sake of convenience in operating I show twenty teeth in the ratchet-sleeves K′, K^2, K^3, and K^4, and also make the gear-wheels 1^c, 2^c, 3^c, and 4^c twice the diameter shown and described in the above-mentioned patent. It will thus be seen that the gear-wheels 1^a, 2^a, 3^a, and 4^a will make one complete revolution upon each half-revolution of the gear-wheels 1^c, 2^c, 3^c, and 4^c. As each of these sets of gears above mentioned are entirely independent of each other, it will be seen that each bank of keys may be operated to register any number on its respective disk simultaneously. The ratchet-sleeves K′ K^2 K^3 K^4 are operated by a corresponding number of vertically-moving ratchet-bars 1^d 1^e 1^f 1^g, each set of which are provided, as in my former machine, with a series of ratchet-teeth from 1 to 9. Each ratchet-bar is pivoted at its lower end to the rear end L of its respective finger-key by means of a pin *l*, which operates in a slightly-elongated slot made transversely in the ratchet-bar. Each of the ratchet-bars of each bank are operated by the finger-keys in identically the same manner as described in my former patent. M is a substantial semicylindrical ratchet-tumbler sleeve loosely journaled on the shaft N, and also formed and operating in identically the same manner in each of the four banks, as in my former machine, and therefore I do not go into detail in describing the same.

In order to provide a simple and effective means of bringing the keys up into position after they have been depressed to register the number, I provide a bar O, which is secured at each end to the inner side of the brackets *o*, extending from and secured to the shaft P, upon which the finger-keys are pivoted. The brackets *o* are secured one at each end of the shaft P, close to the inner side of the standard-plates C. The free ends *o′* of the bracket *o* extend upwardly into proximity with the lower ends of the lever Q. The upper end of the lever Q has a quadrant *q* formed on it, which meshes with a quadrant *r*, rigidly secured to the rocking shaft R, which is supported in bearings in the standard-plates C C′ C^2 C^3. *r′* are arms secured to the ends of the rocking-shaft R and extending rearwardly. The outer ends of the arms *r′* are connected by the spiral springs r^2 to any suitable portion of the frame. It will thus be seen that immediately upon pressing down any of the finger-keys the upper end *o′* of the bracket *o* will come in contact with the lower end of the lever Q and tilt it on its pivots, so as to cause the quadrant *q* to mesh with the quadrant *r*, thereby turning the rocking shaft R and raising the arm *r′* upwardly, so as to produce an increased tension on the springs r^2. It will consequently be seen that on immediately relieving the finger-key, the springs r^2 will draw down upon the arm *r′* and the quadrants *q* and *r* will be so brought into mesh as to tilt the lever Q in the opposite direction, and thereby bring it to bear against the upper end *o′* of the bracket *o*, so as to cause the bar O to press against the

raised rear end of the depressed finger-key, and thus bring the key into its normal position again. It will be seen that each key of each bank when operated will be simultaneously thrown up into position by the bar O.

As it is necessary when the machine is open that some safeguard should be provided so that the keys cannot be operated and the record of the sale falsified, I provide the following mechanism: S is a lever, which at its bottom end is pivoted with a toe *s*, which projects rearwardly in proximity to a pin *t*, secured on the outer end of the bracket *o* and projecting through a hole *t'* made in the standard-plate C. T is a bell-crank pivoted at t^2 on the standard-plate C and having the lower arm resting against the top end of the lever S. U is a lever secured on the end of the spindle *u* and having a curved outer arm *u'*, which is held down in the position shown in full lines in Figs. 2 and 4 by the lid B when closed and locked. V is a spiral spring connected to the curved arm *u'* of the lever U on one end and to the top of the standard-plate C at the other end. The tension of the spiral spring V is exerted so as to have an upward pull on the arm *u'*. It will now be understood on reference to the position of the mechanism as shown in Fig. 4 that on account of the nose *s* of the lever S being held away from the top of the pin *t* the finger-keys may be readily operated. The position of the levers in this view is that which they occupy when the machine is closed ready for registering. When, however, the lid B is thrown open, the spring V draws the curved arm of the lever U upwardly, and thus causes the other arm of the lever U to move downwardly. As the upper arm of the bell-crank T is in the sweep of the rear arm of the lever U, it will be seen that the said rear arm will engage with the upper arm of the bell-crank T, and thereby press it downwardly, so as to cause the lower arm of the bell-crank T to tilt the lever S on its pivot and throw the toe *s* at the bottom end of the lever S over the pin T. It will therefore be seen that it will now be impossible to operate the finger-keys, as the toe *s* holds the pin T down, and consequently the bar O directly on top of the rear end L of all the finger-keys.

I also provide means by which no more than one key in each bank can be operated at the same time. W is the rear frame of the machine, which is secured between the standard-plates C. *w* are a series of fingers forming part of the frame W and extending downwardly between the rear ends L of the finger-keys. X are a series of disks, each of which is supported in the bracket secured to the downwardly-projecting fingers *w*. *x x'* are two pins situated one at each end of the series of disks X. These disks between the pins *x x'* abut each other in such a manner that there is only sufficient space between any two of them to allow of the passage of only one of the enlarged downwardly-projecting ends *l'* at the rear end of the finger-keys. It will therefore be understood that it would be impossible, as the series of disks for each bank are placed in the same relative position, for more than one key to be operated at a time in any one of the banks.

I shall next proceed to describe the manner in which the tablets, which expose the amount of the sale to the view of the purchaser, are operated. It will be seen on reference to Figs. 2 and 4 that the tablets Y for each blank are fastened on a corresponding number of rods *y*, which in their normal position rest upon a corresponding number of ratchet-bars for each bank, attached to the rear end of the finger-keys L, as hereinbefore described. Arranged on the shaft P are four banks of finger-keys 1^e 2^e 3^e 4^e, there being nine keys in each bank and the said keys of each bank being numbered consecutively, from "1" to "9" and "10" to "90," as indicated. The rods *y* are held in a vertical position by the guide-bars *z z'*. Z is a swinging frame pivoted at each end *z'* on the standard-plates C. The cross-bar z^3 of the swinging frame Z in its normal position is beneath the guide-bar *z* and has extending from below it a hanger z^4, upon which is pivoted the rocking dog z^5. The front end of the dog z^5 is held against the shoulder z^6, formed on the hanger z^4 above the dog by the spiral spring z^7, which is secured at its upper end to the rear end of the dog and at its lower end suitably connected to the standard-plates C. z^8 is a spiral spring connected at one end to the swinging frame Z and at the other to the standard-plates C. J' is a detent secured on one end to the rocking shaft R in proximity to the quadrant *r*. The detent J', being secured on the rocking shaft R, is raised at each depression of the finger-keys, so as to engage with the lower side of the front end of the rocking dog z^5. As the front end of the rocking dog z^5 is held by the spiral spring z^7 against the shoulder z^6, the detent J' will tilt or throw back the swinging frame Z on its pivot z^2. J^3 is a pin which projects from the rear end of each of the rods *y* and in its normal position rests upon the bottom guide-bar *z'*. Upon the depression of a key in each or any of the banks the ratchet-bar attached to the rear end L of the finger-keys throws the pin J^3 upwardly, and as the detent J' causes the swinging frame Z to move rearwardly simultaneously the pin J' is allowed a free vertical passage-way past the cross-bar z^3 of the swinging frame Z. At this juncture the detent J' has been raised so high that it passes the front end of the rocking dog z^5, and the spiral spring z^8 causes the swinging frame Z to move forwardly into its normal position, thus throwing the cross-bar z^3 beneath the pin J^3, thereby retarding the descent of the rod *y*—in other words, holding the said rod up, so as to expose the tablet corresponding to the number on the key operated to the view of the purchaser. It will now be seen that the tablet or tablets now

raised in each bank will remain exposed until a key has been again operated, and the swinging frame Z will be again caused to move upwardly and allow the pin or pins J^3, supported on the cross-bar z^3, to drop into their normal position and the pin J^3 on the rod which is raised to rest on the cross-bar Z. This raising and releasing of the pin J^3 on the rod Y will of course recur upon each depression of one or more of the finger-keys.

Next in order I shall proceed to describe the manner in which the rocking device operates so as to carry from one disk containing units of a lower denomination to another disk containing units of a higher denomination. In the machine shown in the drawings I show plates a a' a^2 secured loosely on the shaft K to the left-hand side of the plates C' C^2 C^3, respectively. (See Figs. 1 and 2.) The plate a is held in its normal position by the catch b, pivoted at b' on the intermediate plate C', and by the jaw c^2, forming the end of the goose-neck arm c' of the rocking lever c. The rocking lever c is formed of three parallel strips c, which are pivoted on the spindle u, which is cut away between the standards C^2 and C^3, so as to permit the operation of a portion of the mechanism. The upper ends of the parallel strips c are connected together by the pin c^4, and two strips c are situated on the right-hand side of the intermediate plate C', and the strip containing the goose-neck arm c' is situated on the opposite or left-hand side of the intermediate plate C'. The lower ends of the two strips on the right-hand side of the intermediate plate C' are connected together by the pin c^5, which has pivoted at its outer end the rocking dog c^6. The dog c^6 has a pin or projection c^7 on its shorter end, which extends inwardly in front of the strip, by which it is held in the position shown in Fig. 2. d is a spiral spring connecting the pin c^5 at the lower end of the lever c to the guide-bar z', and d' is a spiral spring connecting the upper pin c^4 of the lever c to the forward end of the intermediate plate C'. It will be noticed that the catch b is held in position by the spring e^3, and has two notches b^2 and b^3, in the upper notch b^2 of which the dog-shaped end a^2 of the plate a is held when in its normal position, as shown in Fig. 2. b^4 is a pin secured in the catch b and extending through the slot in the intermediate standard-plate C'. This slot of course cannot be shown, as the plate C' is broken away. b^5 are engaging pins secured on the inner side of the gear-wheel 1^c, next the standard-plate C'. The end of one of these pins is shown in the gear-wheel 1^c, while the other is shown in position dotted, as I have also broken away the gear-wheel in order to more clearly show the essential parts involved. e is a dog pivoted at e' on the plate a and held so as to engage with the ratchet-sleeve K^2 by the spring e^2. j, j', and j^2 are arms extending forwardly and downwardly from the shaft R. The position in which the pins b^5 are shown in Fig. 2 are those in which they will be when the registering-disk 1 has registered the ninth digit on its periphery and is about to carry to the registering-disk 2, so as to indicate the number "10." The gear-wheel 1^c is caused by the finger-keys to move in the direction indicated by arrow in identically the same manner as described in my former patent, with the exception that there being twenty teeth on the sleeve K' it will only make half a revolution. As before stated, when the pin b^5 has registered the ninth digit, and consequently the gear-wheel 1^c moves in the direction indicated by arrow, the engaging pin b^5 will engage with the pin b^4, and thereby raise it, so as to throw the catch b outwardly. As the pressure of the jaw c^2 is toward the back of the machine, on account of the tension of the spiral spring d' on the upper portion of the lever c, of which the jaw forms a part, the dog-shaped end a^2 is thrown downwardly, so as to engage with the lower notch b^3 of the catch b. The pin b^5 has, however, before this latter operation has taken place passed the pin b^4 and continues around in its course as far as its particular finger-key throws it. The dog e has meanwhile been carried by the plate a so as to engage with the next succeeding tooth of the ratchet-sleeve K^2, which is attached to or forms part of the gear-wheel 2^c. Simultaneously with the movement of the mechanism above mentioned occurs the movement of the arm j, which strikes the upper end of the rocking dog c^6, and passes the same in its downward movement, on account of the rocking dog c^6 having its upper end free to move downwardly. When the arm j has passed the rocking dog c^6, the dog returns to its normal position, being held in such position, as before stated, by the pin or stop c^7. Upon the finger key or keys being released by the operator the arm j, being caused to move upwardly again, comes in contact with the upper end of the rocking dog c^6, which is held rigidly with the lower end of the lever c by the stop-pin c^7. Consequently the lower end of the lever c is tilted forwardly until the arm j passes it. In so tilting it forwardly the goose-neck arm c' of the lever c is also moved forwardly and brings the plate a back to its normal position, so as to cause the dog-shaped end a^2 to spring from the notch b^3 into the notch b^2. The plate a is now held rigidly in position by the dog a^2 resting in the notch b^2. During the period that the plate a is being moved back into position it carries with it the dog e, which is pivoted on it, and thereby moves the ratchet-sleeve K^2 forward space of one tooth. It will thus be seen that the gear-wheel 2^c, which is attached to or forms part of the ratchet-sleeve K^2, has its periphery brought around a proportionate circumferential distance, and the gear-wheels 2^b and 2^a are turned around sufficiently far so as to bring the digit "1" in the disk 2 opposite one of the openings k in the covering-plate H. The digit "0" in the disk 1 has, when the pin b^5 passed the pin b^4, been

brought opposite one of the openings k by the gear-wheel 1^c turning the gear-wheels 1^b and 1^a, so as to make the disk 1 revolve one-tenth of its revolution. The number "10" will now appear before the two openings k in the covering-plate H. In carrying from the disk 2 to the disk 3 and from the disk 3 to the disk 4 exactly the same kind of mechanism is employed, the wheels 2^a, 3^a, and 4^a being geared to the respective gear-wheels 2^c, 3^c, and 4^c in the manner hereinbefore described and operating in the same manner with the plates a' and a^2 and their respective operating mechanism, which is exactly similar to that shown and described in reference to the plate a. On reference to Fig. 3 it will be seen that the digit "9" on each of the disks 1 2 3 4 5 6 is in alignment and that the digit "0" on the disk 7 is in alignment with the said digits "9." These digits on the disks 1 2 3 4 5 6 7 are now opposite the openings h in the cover H, the cover being removed in this figure to show the upper operating mechanism. It will also be seen that from my peculiar construction, connection, and operation of the carrying device, no matter whether there is any one or more than one of the keys of the series of banks of keys depressed at one time, if the disk-wheels and carrying device are in a certain position in relation to each other the carrying will be done from one disk to the other throughout the disks practically simultaneously; or, in other words, the amount appearing before the opening may be entirely changed by the one operation.

It is a very essential and new feature by which the carrying is done from one disk to the other throughout the disks, so as to change the "9" to "10," "99" to "100," "999" to "1,000," "9,999" to "10,000," "99,999" to "100,000," and "999,999" to "1,000,000," and I shall now proceed to describe how by the depression of the one-cent key in the first bank the way each carrying device is arranged to operate in succession as to the disks 1 2 3 4, beginning with the disk 1, so as to change the "9" to "0," and the method in which the disks 5 and 6 are brought around to the "0" digit and the "0" digit on the disk 7 brought around to the "1" digit simultaneously with the bringing around of the disk 4 to the "0" digit. When the digits, as above described, are in the position shown in Fig. 3, upon the depression of the one-cent finger-key the pin b^5 in the gear-wheel 1^c raises the pin b^4 and allows the dog-shaped end a^2 of the plate a to drop into the lower notch b^3 of the catch b. The pin b^5 during this period is caused to pass the pin b^4 by the upper movement of the ratchet-bar 1^d, and the gear-wheel 1^c has moved the digit "0" on the disk 1 opposite the opening h in the cover H. The arms $j\,j'\,j^2$ have in the meantime traveled down into the position shown in dotted lines in Fig. 2. As the arm j on the shaft R moves forward and carries with it the dog e^6, and consequently the plate a, the dog e, being pivoted on the plate a, carries the sleeve K^2 around in the direction indicated by arrow the space of one tooth. As the sleeve K^2 is secured to the end of the gear-wheel 2^c, the said gear-wheel 2^c will carry the pin b^5 against the pin b^4, attached to the catch b on the left-hand side of the gear-wheel 2^c, raising the said catch and allowing the dog-shaped end a^2 of the plate a' to fall into the notch b^3. As the pin b^5 in the gear-wheel 2^c passes the pin b^4 on the left-hand side of the gear-wheel 2^c, the gear-wheel 2^c is moved sufficiently far forward by the dog e on the plate a so as to bring the "0" or zero-point on the registering-disk 2 opposite the opening h in the cover H. The arm j' opposite its dog C^6 now throws the dog C^6 forward and raises the plate a' to its normal position. In so doing the dog e of the plate a throws forward the ratchet-sleeve K^3 the space of one tooth and brings the gear-wheel 3^c, to which the ratchet-sleeve K^3 is attached, around so as to bring the pin b^5 past the pin b^4 and the gear-wheel 3^c sufficiently far so as to show the digit "0" before the opening h. Exactly the same operation takes place as to the plate a^3 and its corresponding catch b, so as to bring the "0" digit in the disk 4 opposite the opening h. When the disk 4 has reached the "0," it must necessarily, from what has been before described as to the relation of the catches m' to the pins n^3, simultaneously carry forward the disks 5 and 6 and 7, so as to exhibit the "0" digit on the disks 5 and 6 and the "1" digit on the disk 7. It will now be understood that instead of the "999,999" appearing before the opening h the sum "$1,000.00" or "$10,000.00" will appear in lieu thereof. It will also be understood that when the disks are in the position shown in Fig. 3, with the "9" digit on each disk 1 2 3 4 5 6 before the openings h and the "0" digit on the disk 7 before its openings h, should it be desired to register an amount on the disks 1, 2, 3, and 4 or any one or more than one of them, by operating their respective finger-keys, the carrying device connected to each of the disks operated will first bring around its respective disk to zero or "0" point, and upon the finger-keys operated returning to their normal position the disks will appear before the openings h, so that the amount registered will be added to the "$9,999.99," which before appeared at the openings, and a correct total will now show before the openings h, the carrying and registering of the amount being practically effected simultaneously. For example, should the disks 1, 2, 3, and 4 be operated so as to register the amount "$22.23" immediately upon the keys being operated the disks 1, 2, 3, and 4, being then in position for carrying, would be brought by their respective finger-keys and the ratchet-bars and sleeves connected to the same around into such a position so that "$10,011.12" would appear for an instant before the openings h and would immediately be replaced by the amount of

"$10,022.22" on account of each carrying device, as before described, now operating simultaneously, so as to change the three "1's" in the disks 2, 3, and 4 into "2's," thus showing the accurate amount before the openings *h*.

It will be seen from the above description that each of the banks of keys are operated independently, so as to register on its respective disk, and yet the carrying is done from one to the other without interfering with the independent working of each bank which operates the disks 1, 2, 3, and 4. It will also be seen that the carrying is done from the registering-disk 4 to the registering-disk 5, and from the disk 5 to the disk 6, and from the disk 6 to the disk 7 by differently-operating mechanism than that by which the registering-disk for each bank is operated, and this latter mechanism I shall now describe. M′ is a disk secured firmly to the shaft on the left-hand side of the registering-disk 4 and having a notch *m* cut out of its periphery, as indicated. *m′* is a pivoted catch, which is held pressing against the edge of the disk M′ by the spring m^2. m^3 is an adjustable quadrant secured on the spindle m^4, which extends through the hollow end of the shaft D as far as the inner side of the registering-disk 4. The quadrant m^3 is designed to close the notch *m*, cut in the periphery of the disk M, and is adjusted circularly in the slot *n*, extending through the hub *n′* and shaft D to the spindle m^4 by the turning-knob n^2. n^3 are a series of ten pins secured at equal distances apart around and in the face m^5 of the registering-disk 5 next to the disk 4, and designed to be engaged by the catch *m′* when the said catch is in the notch *m* of the disk M, as shown in Fig. 7. n^4 is a pin which projects through the knob n^2 and fits into a hole n^5 in its normal position—that is to say, when all parts of the machine are ready to operate. It will be seen that when the disk 4 has been turned around so as to reach the "0" digit the catch *m′* will engage with one of the pins m^3 which is opposite the "1" digit in the disk 5 and bring it around until it is on a line with the "0" digit in the disk-wheel 4. At each revolution the catch will be raised on the inclined end of the notch *m*, so that it is raised on the periphery of the disk *m* out of the path of the pins, and therefore will not carry around the pins opposite the digit "1" and the wheel 5 any longer. The catch *m′* now passes around the periphery on the disk *m* until it again reaches the notch *m*, when it will engage with the pin n^3 on the same radial line as the digit "2" in the wheel 5, which it will now carry around until the digit "2" is opposite to the digit "0" on the wheel 4, when it will again be thrown out of the path of the pins in the manner before stated. It will now be understood that upon each revolution of the disk 4 the disk 5 will be brought around the space of one digit, as the disks 5 and 6 and 6 and 7 are connected together in the same manner as the disks 4 and 5—that is to say, by the same carrying device as described above. It will be seen that each disk has to make a revolution, so as to make the disk next it move forward one digit. Although I have only shown four disks connected together by this carrying device, it will be understood that as many disks may be placed on the shaft D as may be required to register a number of any desired magnitude.

I show in Fig. 3 the carrying devices on the face of the wheel 7; but it will be understood that the carrying device thus shown is not really necessary if this should be the last registering-disk on the shaft. In the last disk 7 I preferably make a supplemental groove G′ on the shaft beneath the hub of the disk 7, so that the stop-pin *f* in coming around will not come as far as the "0" or zero mark, but will stop opposite the "9" digit, so that in the denomination which this disk represents "9" will be the largest digit which can be registered on the disk. By this means I provide a safeguard so that the shaft D cannot be turned to falsify when the registration by the disks has reached the magnitude which would be indicated by the "9" digit on the disk 7 without the turning of the same being known to the employer, as all the disks on the right-hand side of the disk 7 would be interlocked as soon as the "9" digit in each bank shows before the opening *h* in the cover H.

As it is necessary that the notch *m′* must not operate when it is desired to turn all the registering-disks on the shaft D back to "0," I provide a very simple and effective means by which the operation of the catch upon the pins n^3 may be prevented. It consists, essentially, in inserting through the slot n^6 in the end of the spindle m^4 a key n^7, which also extends through the hub of the knob n^2. Although this key prevents this knob from turning on the spindle, it allows of the longitudinal adjustment of the knob n^2 on the spindle m^4. By drawing the knob n^2 outwardly the pin n^4 is withdrawn from the hole n^5 in the end of the hollow shaft D, and the knob may be turned so as to bring the spindle m^4 around and the quadrant m^3 in the direction indicated by arrow, so as to throw the catch *m′* outside of the path of the pins n^3, and thereby allow of the free turning of the shaft D. E′ is a catch which is held in the recess E^2 in the hub of the turning-knob E by the spring E^3, so as to hold the said shaft stationary. By raising the catch E′ the shaft D may be turned in the direction indicated by arrow until the radial side of the groove G engages with the stop-pin *f* in the hub of each and every disk. When this takes place, as each stop in each disk is in the same radial line as the zero marks of the disks they will be brought around to zero and in perfect alignment opposite the openings *h* made in the covering H. When this is accomplished, the knob n^2 is turned in the opposite direction to that in which it was turned before, and the quadrant m^3 consequently thrown back from

closing of the notch m. As the pin n^4 would now be opposite the hole n^5, the hub n' may be pushed inwardly, so as to cause the pin n^4 to project into the hole n^5, and thereby prevent the quadrant m^3 from getting out of position when the machine is being operated. As, however, before the rod or shaft D can be turned I have to release the disks, I shall now describe the method in which the disks are held rigidly in position, so that the digits may be held in perfect alignment before the openings h, and the means by which the disks are released, so that the shaft D may be freely turned.

8, 9, 10, 11, 12, 13, and 14 are series of ten projections extending laterally from the rim of each of the registering-disks 1 2 3 4 5 6 7. Each of the projections in each registering-disk is situated about opposite the center of each digit on its respective disk, and therefore are at equal distances apart. 8′ 9′ 10′ 11′ 12′ 13′ 14′ are series of stop-pins, each of which, with the exception of the stop-arm 12′, are secured on the counter-shaft H′, which is supported in bearings in the intermediate standard-plates C′, C^2, and C^3. I′ is a spring connecting the counter-shaft J to the arm I^2, secured in the end of the shaft H′. By means of this spring a downward tension is exerted on the stop-arms 8′ 9′ 10′ 11′ 13′ 14′. It will be noticed on reference to Fig. 2 that the end J′ of each stop-arm in its normal position entirely fills up the space between the two projections in each of the registering-disks, and yet is so formed that the disk will force the succeeding projections against the end J′ of the stop-arm, so as to raise it and allow of the projection passing, when the end J′ will be immediately forced down again by the tension of the spring I′ and hold the disk J^8 rigidly in position. Each of the arms 8′, 9′, 10′, 11′, and 12′ have downwardly-projecting supplemental arms J^2, which, when the end J′ is raised by the projection outside the periphery of the wheel, interposes itself in the path of the projection, so as to prevent the impetus of the disk from carrying it too far when it is revolved by the depression of a key. The arms 13′ and 14′ I do not provide with these downwardly-projecting supplemental arms J^2, as in the stop-arms there is no direct connection with the gearing by which the fingers are manipulated. I provide the stop-arm 11′ with rearwardly and upwardly extension-piece 11^2, and at the upper end of the extension-piece I secure a pin L′, under which the arm N′ extends and is caused to press upwardly against by the tension of the spring r^2, connected to the arm r', secured in the end of the shaft R. This arm N′ consequently holds the end J′ of the arm 11′ so as to fill up the space between the two succeeding projections 11 on the wheel 4, and as this arm 11′ is keyed to the shaft H′ and all the arms 8′, 9′, 10′, 13′, and 14′ are also keyed to the shaft the ends J′ of each of these arms also fill up the space between the projections 8, 9, 10, 13, and 14. Consequently the digits in the disks 8, 9, 10, 13, and 14 are held in perfect alignment with each other. It will be seen from what has been before described that when any one key of any or each bank is depressed the shaft R turns in its bearings so as to bring the arm N′ down against the pin L′, thereby turning the shaft H and raising the arms 8, 9, 10, 11, 13, and 14 sufficiently high so as to permit the disks to be freely revolved when operated from the finger-keys. Immediately on the release of finger it will be seen that they all return to their normal position. The stop-arm 12′ also holds the digits on the disk 5 in perfect alignment with the other disks by means of the arm o^2, extending from the shaft H′ and pressing against the pin J^4 on the arm 12′, so as to force the end J′ to fill up the space between two succeeding projections 12. When any one or more than one of the keys are depressed, the rocking shaft R is turned in the manner hereinbefore described, so as to bring the arm N′ away from the pin L′, thus leaving only the tension of the spring I′ upon the shaft H′, and consequently upon the arms 8′ 9′ 10′ 11′ 13′ 14′. This tension is sufficiently lax so as to permit any of the disks to rotate the distance which they are caused to move by the depression of the keys without detrimentally interfering with their movement. It will be noticed on reference to Fig. 5 that the end J′ of the stop arm 12′ is differently constructed than the end of the other stop-arms, as the said end does not entirely fill up the space between the two succeeding projections 12. As before described, the arms 8′, 9′, 10′, 11′, 13′, and 14′ are secured on the shaft H′, and the arm 12′ is loose on the shaft and has an arm O^2 extending above the pin J^4. The end J′ of the arm 12′ extends between two succeeding projections 12 on the disk 5. When the disk 4 is thrown around by the operation of the finger-key in the bank from which it is operated, the impetus of the said disk 4 derived from the finger-key would have a tendency, when the disk 4 has reached such a position in its revolution, to bring around the disk 5, which at this period is at zero, past the first digit on its periphery, and thereby register an inaccurate sum before the openings h in the cover H. As, however, the stop-arm 12′ is loose on the shaft H′, it keeps of its own gravity its end J′ in such a position that immediately upon the carrying from the disk 4 to the disk 5, and consequently the disk 1 coming into position on the disk 5, the end J′ falls between the next succeeding projections, thereby preventing more than one digit being carried. As, however, it is necessary to prevent the impetus of the disk 4 from throwing around the disk 5 during the period the end J′ is passing over one of the succeeding projections 12, I provide a tail 12^2 to the stop-arm 12′, which tail 12^2 as the end J′ is passing

over these proceeding projections comes into the path of the projections 12 between two succeeding projections 12 at the lower portion of the disk, thereby preventing the disk from passing over more than the space between two succeeding projections 12 when the end J′ is raised so as to fall into the next space between the projections 12 at the top of the disk. When the finger-key operated has been released, all the stop-arms are brought down in position and the arm O^2 is brought down against the pin J^4, so that all the disks are now in alignment and the carrying has been done without inaccuracy. As it is important that the said carrying device should not operate to carry when the lid B is open and it is desired to turn the disks to "0," I provide pins u^2, which extend forwardly and upwardly from the spindle u. When the lid B is closed, these pins are held in the position shown in Figs. 2 and 3, so as to give freedom of action to the lever c, connected to the plate A, as hereinbefore described, so that when the pin b^5 passes the pin b^4 the plate A will be brought down into the notch b^6 by the tension of the springs d, attached to the pin c^5 at the lower end of the lever c, and the upper end of the lever c will be tilted forwardly. As, however, I do not want this carrying device to operate when the lid B is open and as the pin u^2 on the spindle u will be brought by the spiral spring V, attached to the arm u', so as to exert a very strong pressure against the top pin c^4, connecting the upper ends of the lever c, it will be seen that the jaw c^2 of the arm c' of the lever c will hold the plate A stationary, so that although the pin b^5 will pass the pin b^4 and relieve the end a^2 of the plate a from the notch b^2 of the catch b the plate a' will remain in its normal position. When the disks are brought around by the knob E the required distance, the plate A will not move out of its normal position at all, and consequently the dog e will not carry the ratchet-sleeve in the next bank forward the space of one tooth.

In order to permit the shaft D to be readily turned around, so as to bring all the registering-disks to their "0" or zero point under the openings H, it will be understood that the stop-arms 8′, 9′, 10′, 11′, 12′, 13′, and 14′ will have to be released of the tension exerted by the arm N′ against the pin L′. For this purpose I provide a lever P′, which I bring forward in the direction indicated by arrow, so as to press the end of the crank-arm P^2 downwardly, so as to raise the arm r', to which the spring r^2 is attached, and thereby lower the arm N′ on the rod r and release the tension. The shaft D may now be readily turned by the knob E. Z^2 and Z^3 are rocking detents held opposite the path of the projections 9 and 11 of the disks 2 and 4 by the spiral springs Z^4, connected to the center of each at one end and to the shaft H′ at the other. Z^5 and Z^6 are arms projecting from the shaft R and designed to come in contact with the tails Z^7 and Z^8, respectively, of the rocking detents Z^5 and Z^6. When the arms come down they throw the engaging ends of the rocking detents away from the projections in the registering-disks 2 and 4; but as they come up they push them forward and throw the said detents into the path of the projections 9 and 11 on the registering-disks 2 and 4. The rocking detents Z^2 and Z^3 are arranged to operate, as above described, so that when the carrying is done between the disks 1 and 2 and 3 and 4 the impetus of the disk 1 will not carry around the disk 2 or the impetus of the disk 3 will not carry around the disk 4 farther than their particular finger-key operated should carry them in order to register the correct amount.

It is necessary to provide some means for indicating the number of times the registering-disks have been set to zero in order to prevent tampering with the machine for dishonest purposes in the event of a somewhat prolonged absence of the proprietor, and in my present application I have simplified the means by which this setting of the disks to zero may be checked, and I also devise a safeguard in connection therewith by which the registering-disks cannot be turned to zero or "0" more than a certain number of times. The shaft D is provided near its end with a pin Q′, which meshes with the gear-wheel Q^2, having ten teeth. This gear-wheel Q^2 is supported on a short spindle R′, and attached to the gear-wheel Q^2 is a registering-disk Q^3, which is numbered with digits from "1" to "0." Q^4 and Q^5 is a gear-wheel and disk respectively abutting the gear-wheel Q^2 and Q^3, and Q^6 and Q^7 is a gear-wheel and disk respectively abutting the gear-wheel Q^4 and Q^5. The gear-wheel Q^4 and disk Q^5 are rigidly connected together, as are also the gear-wheel Q^6 and disk Q^7. S′ and S^2 are gear-wheels meshing with the gear-wheels Q^4 and Q^6. T′ and T^2 are gear-pinions secured on the shaft D at the right-hand side of the gear-wheels S′ and S^2, respectively. U′ and U^2 are projecting pins extending from the periphery of the registering-disks Q^3 and Q^5 and are designed to engage with the gear-wheels T′ and T^2. Upon each revolution of the shaft D the pin Q′ turns the gear-wheel Q^2 around the space of one tooth in the direction indicated by arrow. V′ are spring-stops designed to hold the gear-wheels Q^2, Q^4, and Q^6, and consequently the digits on the registering-disks Q^3, Q^5, and Q^7 are in perfect alignment. It will be seen that the shaft D will have to turn around ten times before it will turn around the gear-wheel Q^2, and consequently the registering-disk Q^3, to the tenth or zero digit. When the disk Q^3 has been brought around one revolution the pin U′ engages with the gear-pinion T′, which is attached to or forms part of the gear-wheel S′, and in passing causes it to move in the direction indicated by arrow one tooth, and thus bring the gear-wheel S′ forward one tooth, and there-

by bring the gear-wheel Q^4, with which it meshes, one tooth, so that in this case it will take ten revolutions of the registering-disk Q^3 to bring the gear-wheel Q^4 forward one tooth or the registering-disk Q^5, to which it is attached, forward the space of one digit. As the pin U^2 projects from the periphery of the registering-disk Q^4 and meshes with the spur-pinion T^2 in its revolution, it will take ten revolutions of the disk Q^4 to turn the gear-wheel S^2 one revolution, and therefore turn the gear-wheel Q^6 and the disk Q^7 one revolution.

As I do not wish that the registering-disk Q^7 should make ten revolutions, on account of the disks being in that event capable of being brought back to zero and thus form no check on turning the shaft D, I provide the following means, whereby the disk Q^7 can only be brought to "9" opposite the openings h' in the cover H. W′ is a pin extending radially from the short spindle R′, and on a radial line with the digit "0" on the periphery of the disk Q^7. W^2 is a pin extending outwardly from the face of the disk Q^7 and designed to come in contact with the pin W′. The pin W^2 is sufficiently near the center so as to prevent the pin W′ passing it, and, in fact, is sufficiently wide so as to prevent the pin W′ from coming any farther than the disk Q^9. Y′ is a cap which is screwed or otherwise fitted on the end of the short spindle R′, so as to conceal and prevent the pin W′ being removed. It will probably be found preferable to have the cap Y′ soldered onto the end of the short spindle R′. From this description of this latter check device it will be seen that only nine hundred and ninety-nine revolutions can be made by the shaft D in turning the shaft D back to zero, and consequently that the cap and pin W′ will have to be removed and the disks reset to zero by the proprietor, who of course will only be acquainted with the means of resetting.

Other means might be employed by which the cap might be secured in position so as to prevent the removing of the pin W′; but I do not claim this, as there are various methods by which it would be impossible to remove the cap if the secret of its removal is only known to the proprietor. It will also be seen that the pin Q′ has to move around ten times to turn around the ten digits of the disk Q^3, and that the disk Q^3 has to turn around ten times in order to move the disk Q^5 a space of one digit, and that the disk Q^5 has to turn around ten times to move the disk Q^7 one digit or nine times to move the disk Q^7 nine digits, or the pin Q′ will have to move around nine hundred and ninety-nine times in order to bring the pin W′ against its stop-pin W^2.

In order to insure that all the quadrants m^3 are removed from in front of the notches n to allow of the proper working of all the registering-disks, and more particularly of the registering-disks 4 5 6 7, I provide a pin Z′, which extends upwardly from the hub of the knob n^2, so as to prevent the lid B from being closed, thereby forming a means of warning the proprietor that the mechanism is not in proper working order. By turning the knob n^2 around, as shown in Figs. 3 and 7, so that the pin Z′ is down and the pin n^4 opposite the hole n^5 in the hollow shaft D the pin Z′ is entirely removed from out of the way of the lid B and the quadrants m^3 from in front of the notches m. The proprietor will now know immediately that the mechanism is in proper working order. I may finally draw attention to the fact that in each of the Figs. 1, 2, 3, and 4 the lid is supposed to be closed and the mechanism in proper working order.

What I claim as my invention is—

1. The combination of the ratchet-sleeves, the finger-keys and ratchet-bars to partly rotate the sleeves on one stroke of the ratchet-bars, the vertical rods containing the tablets Y at their upper ends, supported in their normal position in guide-bars and designed to be moved upwardly by the upper throw of the ratchet-bars operated from the finger-keys, the pins J^3, secured in each ratchet-bar and extending rearwardly from the same, the detent J′, secured to the rod R and designed to come in contact with the swinging dog z^5 and thereby throw the swinging frame Z clear in order to permit of the passage of each pin J^3 to be engaged by the said frame for holding the rod up, and the connections to the key-levers for rocking the rod R, as and for the purpose specified.

2. The combination of the ratchet-bars operated as described, the vertical rods containing the tablets on the same and having pins J^3, and the detent J′ on the shaft R, designed to engage with the swinging spring-dog z^5, rigidly held against the shoulder z^6, so that the rearward movement of the detent J′ will swing the frame Z, with its cross-bar z^3, rearwardly and allow the pin J^3 to rise above said cross-bar to be held thereby, as and for the purpose specified.

3. The combination of the registering-disks, the ratchet-sleeves geared thereto, the finger-keys and ratchet-bars to partly rotate the sleeves on one stroke of the ratchet-bars, the carrying-plate loosely supported on the shaft and held in position by the jaw-shaped end of the goose-neck arm of the lever c between each adjacent ratchet-sleeve and the upper notch of the spring-catch, which is pivoted on the intermediate standard-plate, and the spring-dog e, pivoted on the carrying-plate and designed to move the adjacent carrying-sleeve forward the space of one tooth, as and for the purpose specified.

4. The combination of the registering-disks, the ratchet-sleeve geared thereto, the finger-keys and ratchet-bars to partly rotate the sleeves on one stroke of the ratchet-bars, the carrying-plate loosely supported on the shaft and held in position by the jaw-shaped end of the goose-neck arm of the lever c between each adjacent ratchet-sleeve, the upper notch

of the spring-catch, which is pivoted on the intermediate standard-plate, the spring-dog *e*, pivoted on the carrying-plate and designed to move the adjacent carrying-sleeve forward the space of one tooth, the pins b^5 on the gear-wheel adjacent to the carrying-plate designed to engage with the pin b^4 on the catch *b*, and in passing it to raise the said catch and the spiral spring *d*, attached to the lower end of the lever *c* and designed to bring the goose-neck arm of the lever rearwardly and throw the dog-shaped end a^2 into the lower notch of the catch b^3 and the dog *e* rearwardly, so as to engage with the next succeeding tooth, substantially as and for the purpose specified.

5. The combination of the registering-disks, the ratchet-sleeves geared thereto, the finger-keys and ratchet-bars to partly rotate the sleeves on one stroke of the ratchet-bars, the carrying-plate loosely supported on the shaft and held in position by the jaw-shaped end of the goose-neck arm of the lever *c* between each adjacent ratchet-sleeve, the upper notch of the spring-catch, which is pivoted on the intermediate standard-plate, the spring-dog *e*, pivoted on the carrying-plate and designed to move the adjacent carrying-sleeve forward the space of one tooth, the pins b^5 on the gear-wheel adjacent to the carrying-plate designed to engage with the pin b^4 on the catch *b* and in passing it to raise the said catch, and the spiral spring *d*, attached to the lower end of the lever *c* and designed to bring the goose-neck arm of the lever rearwardly and throw the dog-shaped end a^2 into the lower notch of the catch b^3 and the dog *e* rearwardly, so as to engage with the next succeeding tooth, the swinging dog pivoted on the lower end of one of the strips of the lever *c* and provided with a stop c^7, so as to enable its corresponding engaging arm, extending from the shaft R and receiving its upward movement from the tension of the spring r^2, attached to the arm r' on the outer end of the shaft R, to engage with the end of the swinging dog and in passing it to throw the lower end of the lever forwardly, so as to bring the carrying-plate and dog to their normal positions and the adjacent sleeve forward the space of one tooth, as and for the purpose specified.

6. The combination, with the carrying device consisting of the carrying plate and catch *b* and their operating mechanism, of the pin u^2, extending upwardly from the spindle *u* and designed to be held by the spring V, attached at one end to the curved arm u' of the arm *u* and at the other end to the standard-plates, so as to hold the pin u^2 against the upper spindle c^4 of the lever *c* when the lid is open, and thereby hold the lever *c* and the carrying-plate A stationary, as and for the purpose specified.

7. The combination, with the registering-disks and the finger-keys attached to and operating the ratchet-bars, which are connected with said disks, said keys being pivoted on the shaft P, supported in bearings in the outer standard-plates, of the bar O, attached at its outer end to the brackets *o*, secured to the shaft P and having the upper end *o'*, against which the bottom ends of the levers Q abut, the upper ends of the levers Q having a quadrant *q* formed on them designed to engage with the quadrant *r* on the shaft R, which has arms *r'* extending rearwardly, the rear ends of the said arms being connected by the spiral springs r^3 to the bottom of the standard-plates, the said shaft R, with its spring, serving to return all the keys to normal position.

8. The combination, with the finger-keys attached to and operating the ratchet-bars and pivoted on the shaft P, supported in bearings in the outer standard-plates, the bar O, attached at its outer ends to the brackets *o*, secured to the shaft P, and the pin *t* at the outer end of one of the brackets, of the pivoted lever S, having a toe *s*, designed to be thrown above the pin *t* by the bell-crank T, which is tilted on its pivot by the engagement of the lower arm of the lever U, caused by the upward throw of its arm *u'* by the spring V when the lid is open, as and for the purpose specified.

9. The combination, with the finger-keys, the bracket *o*, and pivoted lever Q, provided at its upper end with the quadrant *q* to mesh with the quadrant *r* on the shaft R, of the arm N', extending beneath and abutting the pin L', secured in the rearwardly-projecting end of the stop-arm 11', rigidly secured to the shaft H', of the stop-arms 8', 9', 10', 11', 13', and 14', also secured to the shaft H', all of the stop-arms engaging with the projections 8, 9, 10, 11, 12, 13, and 14 on the disks 1 2 3 4 5 6 7, as and for the purpose specified.

10. The combination, with the finger-keys, the brackets *o*, the pivoted lever Q, provided at its upper end with the quadrant *q*, arranged to mesh with the quadrant *r* on the shaft R, and the arm N', extending beneath and abutting the pin L' and the pin L^2, both of which are secured in the rearwardly-projecting end of the stop-arm 11', rigidly secured to the shaft H, of the stop-arms 8', 9', 10', 11', 13', and 14', also secured to the shaft H', all of the stop-arms engaging with the projections 8, 9, 10, 11, 12, 13, and 14 on the disks 1 2 3 4 5 6 7, as and for the purpose specified.

11. The combination, with the stop-arms 8', 9', 10', 11', 13', and 14', operated as described and having enlarged ends J', designed to fill up the space between two succeeding projections 8, 9, 10, 11, 13, and 14 on the disks 1, 2, 3, 4, 6, and 7, of the stop-arms 12', loosely journaled on the shaft H', and having an enlarged end *j'*, designed to fill up the space between two succeeding projections 12 on the disk 5, and pin J^4, over which extends an arm o^2, projecting forwardly from the shaft H', as and for the purpose specified.

12. The combination, with the banks of keys, the registering-disks 1, 2, 3, and 4 of each bank connected to and operated from

the finger-keys by means of the ratchet-bars, ratchet-sleeves and trains of gearing, as described, and the disks 5 6 7, connected to and operated from the disk 4, of the stop-arms for holding the said disks in alignment, and the spiral spring l', connected to the shaft H' at one end and at the other to the shaft J, whereby all of the said arms are subjected to tension, as and for the purpose specified.

13. In combination, the disks 1, 2, 3, and 4, with operating means therefor, said disks having projections 8, 9, 10, and 11, the stop-arms 8' 9' 10' 11', the disk 5, having an independently-movable stop-arm 12', the shaft H', on which the said arm is loosely secured, the projecting arm O^2, extending over the pin j, and the carrying mechanism between the disks 4 and 5, substantially as described.

14. In combination, the registering-disks M, secured to the hollow shaft in proximity to the faces of the disks 4, 5, and 6 and provided with notches, the pawls, the quadrant for engaging the said pawls, the means for manually operating the quadrant, consisting of the spindle m^4, extending through the hollow shaft, and the knob at its outer end, and the knob for turning the disks back to zero, substantially as described.

15. The disks M', secured to the hollow shaft D in proximity to the faces of the disks 4, 5, and 6 and provided with notches m, in combination with the quadrants m^3, secured in the spindle m^4, the turning-knob n^2, the slot n^6, made in the end of the spindle m^4, and the pin n^7, extending through the slot n^6 and turning-knob n^2, and the pin n^4, designed to extend into the pin n^5 in the end of the hollow shaft D, as and for the purpose specified.

16. In combination, a series of disks having pins f and arranged side by side, a shaft D, carrying said disks, said shaft having a groove or grooves G, extending longitudinally of the same and in the same radial plane and corresponding to the zero position of the disks, the said shaft having a second short section of groove G', extending parallel with the main groove directly adjacent thereto, but in a different radial plane, said groove G' extending only under the last disk of the series and in radial position corresponding to the "9" digit and adapted to form a stop for the disk when its "9" digit is brought to view, substantially as described.

17. The shaft D, provided with a turning-knob E, a series of disks 1, 2, 3, 4, 5, 6, and 7, having spring-pins f, extending into a longitudinal groove G cut in the shaft D, in combination with the turning-knob E, secured in the end of the shaft D, and the bell-crank P^2, the forward end of which is depressed by the lever P', so as to raise the arm r', and thereby relieve the arm N' on the shaft R from its contact with the pin L' on the rearwardly-projecting end 11^2 of the arm 11', as and for the purpose specified.

18. In combination, in a cash-register, the casing, the disks arranged therein side by side, the carrying mechanism between the disks, the means for adjusting the same, including the shaft m^4, reaching outside the casing, and the turning-knob, the cover of the casing, and the arm z', projecting from the hub of the turning-knob and adapted to engage with and resist the closing movement of the cover when the registering mechanism is not properly adjusted, substantially as described.

19. The disks 2 and 4, provided with projections 9 and 11 and supported on the shaft B and operated as specified, in combination with the rocking detents Z^2 and Z^3, held in their normal position by the spring Z^4 and designed to be brought into the path of the projections 9 and 11, respectively, by the arms Z^5 and Z^6, extending from the rock-shaft R, the said rock-shaft being connected with the key-levers, substantially as described.

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