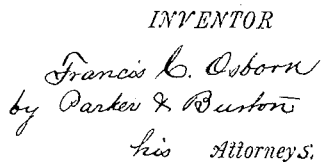


7 Sheets—Sheet 1.

Patented June 30, 1891.



F. C. OSBORN.
CASH REGISTER AND INDICATOR.

No. 455,111.

Patented June 30, 1891.

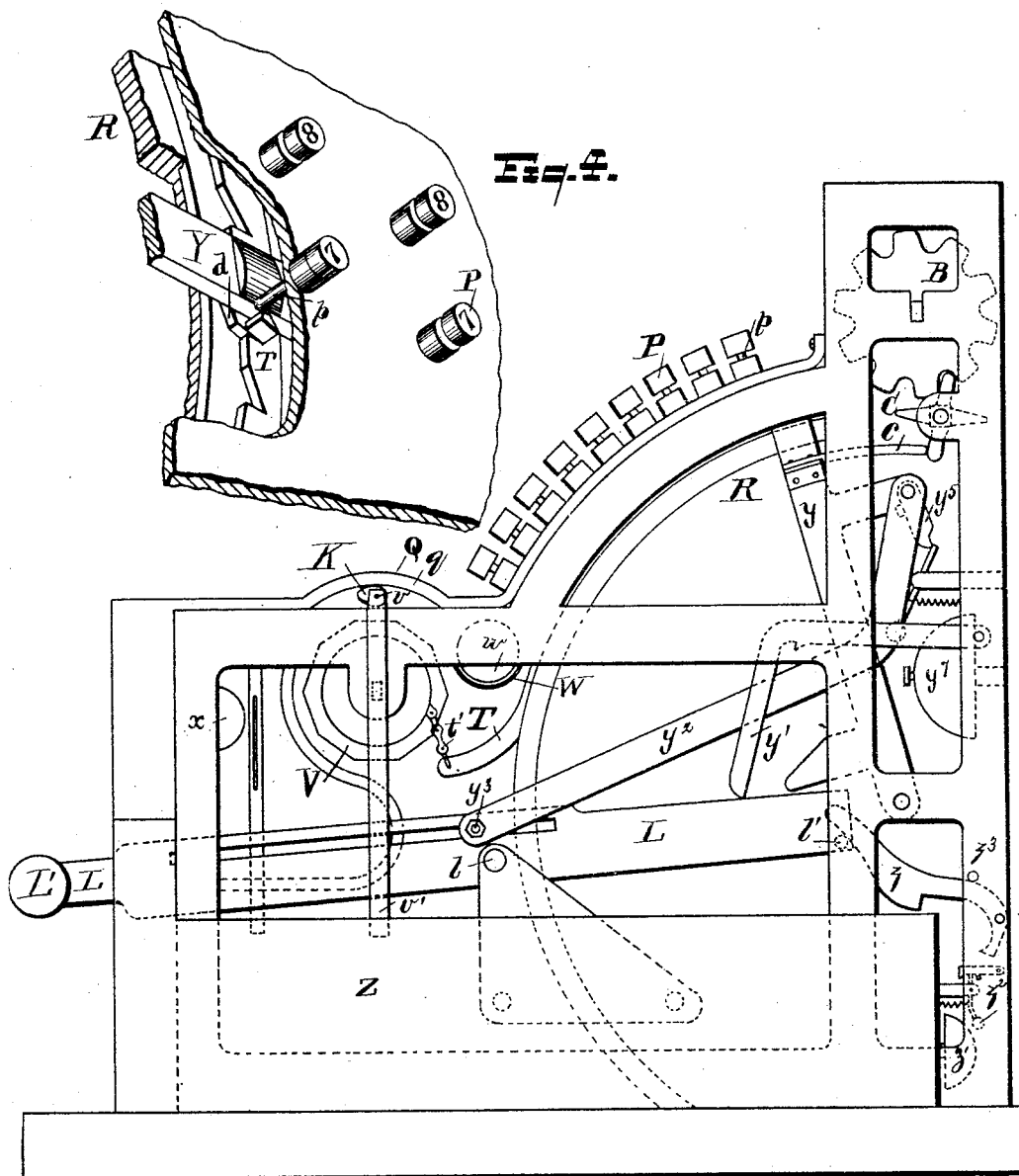


Fig. 3.

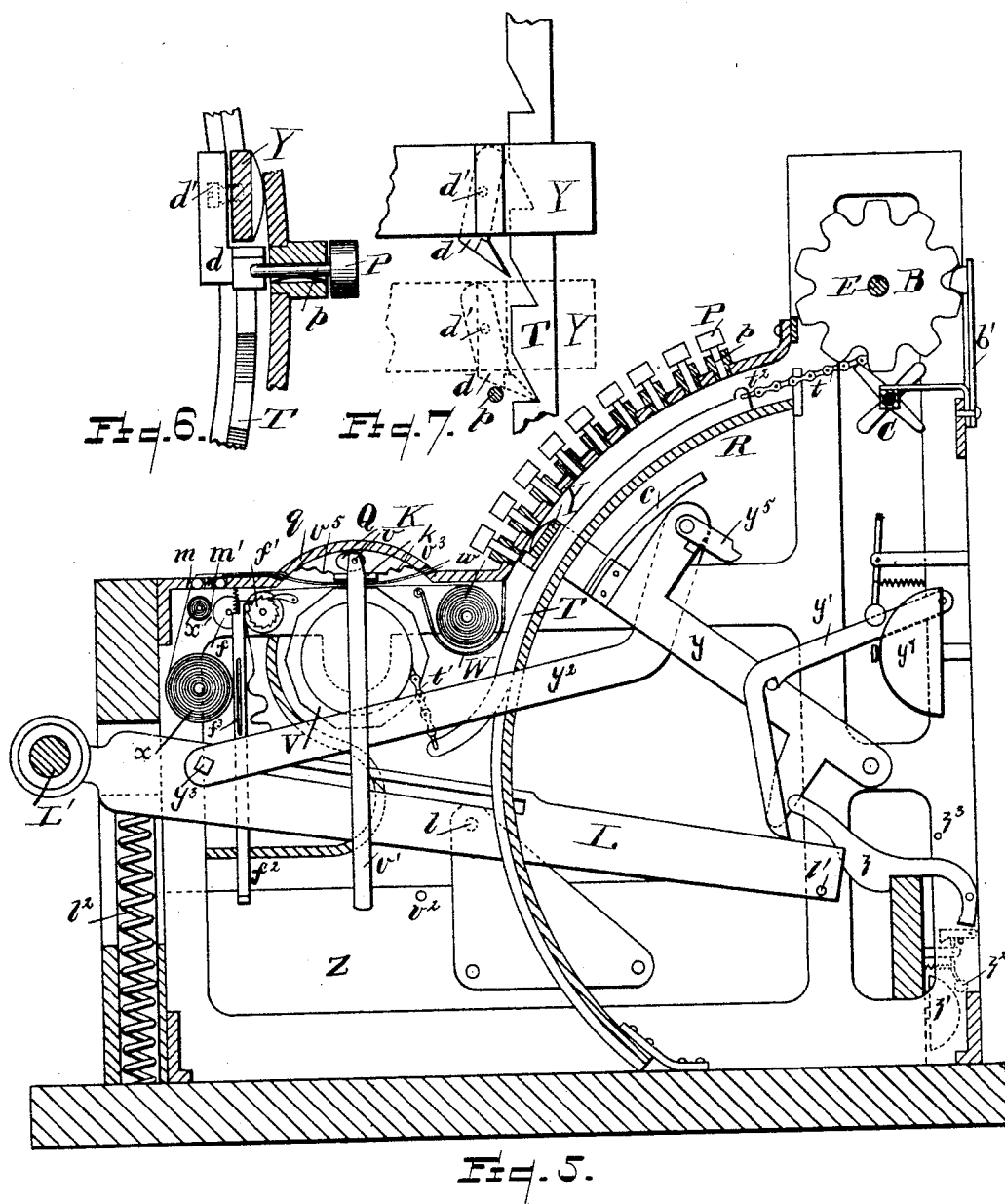
WITNESSES
Wm. S. Shuyette
Effie J. Croft

INVENTOR
Francis C. Osborn
by *Parker & Burton*
his Attorneys.

F. C. OSBORN.
CASH REGISTER AND INDICATOR.

No. 455,111.

Patented June 30, 1891.



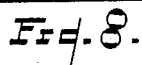
WITNESSES
Wm. S. Huggins
Effie S. Croft

INVENTOR
Francis C. Osborn
by Parker & Boston
his Attorneys

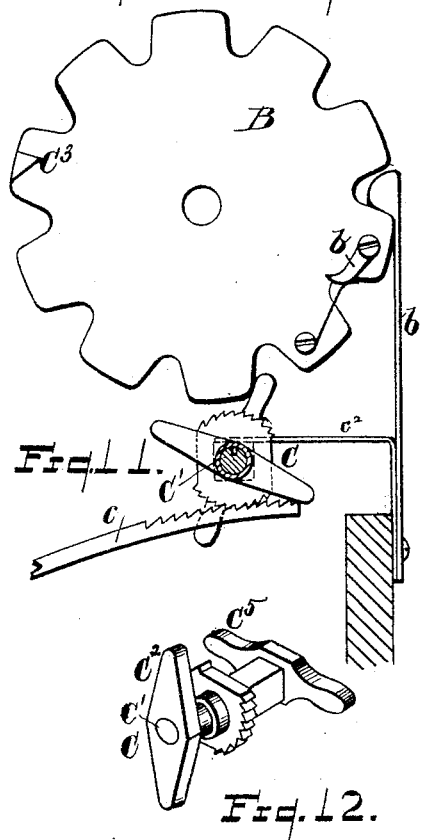
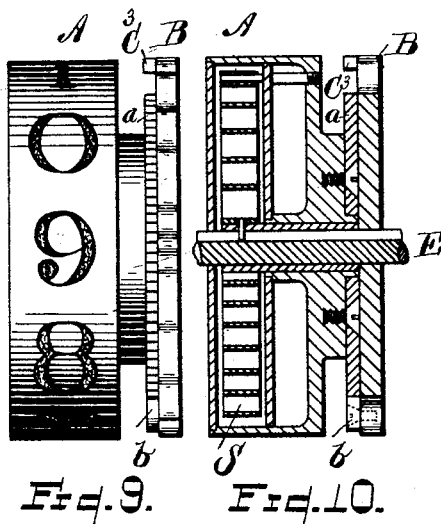
7 Sheets—Sheet 4.

No. 455,111.

Patented June 30, 1891.



WITNESSES
Wm S. Huggitt
Effie J. Loft



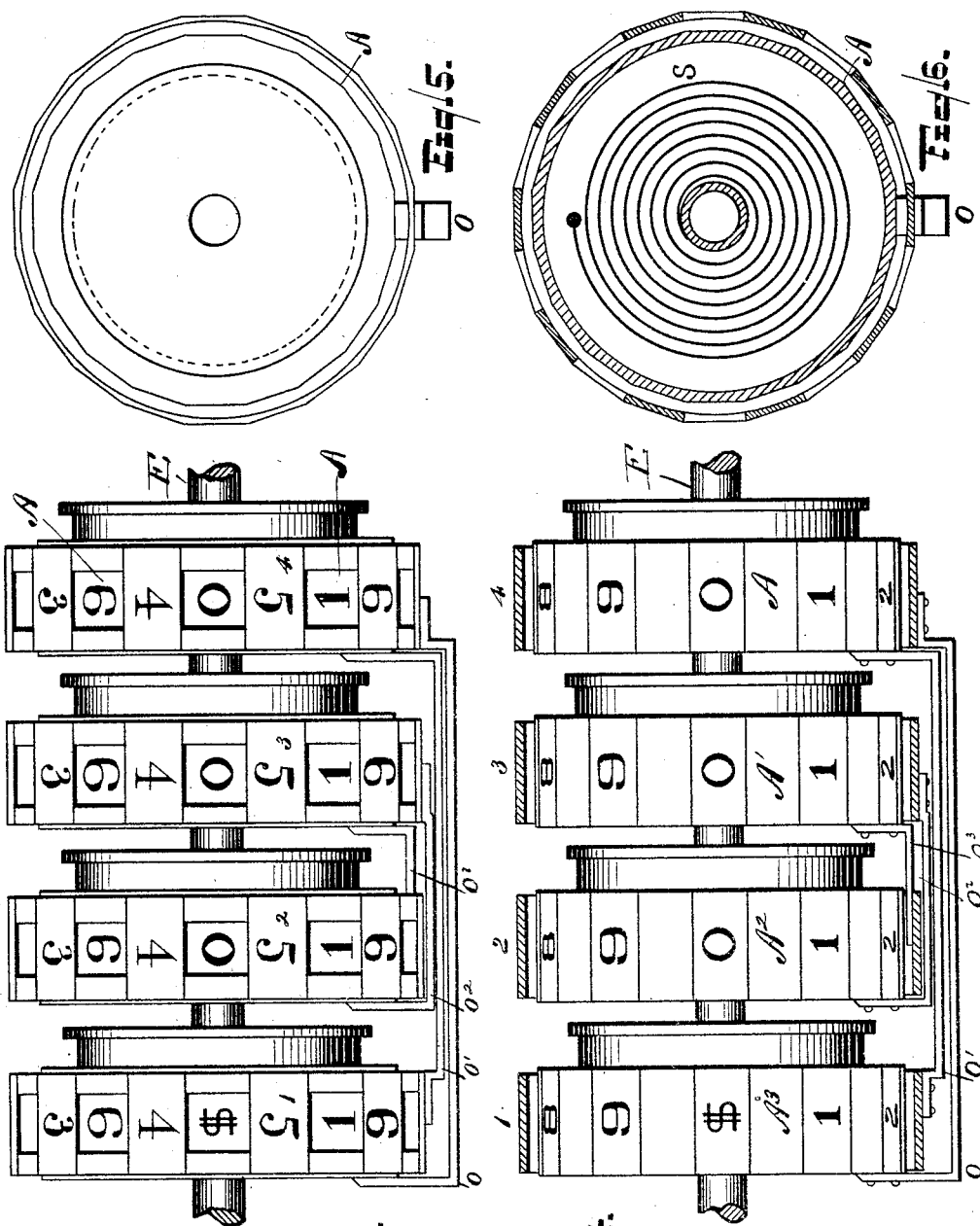
INVENTOR

Francis C. Osborn
by Parker & Boston
his Attorneys.

F. C. OSBORN.
CASH REGISTER AND INDICATOR.

No. 455,111.

Patented June 30, 1891.



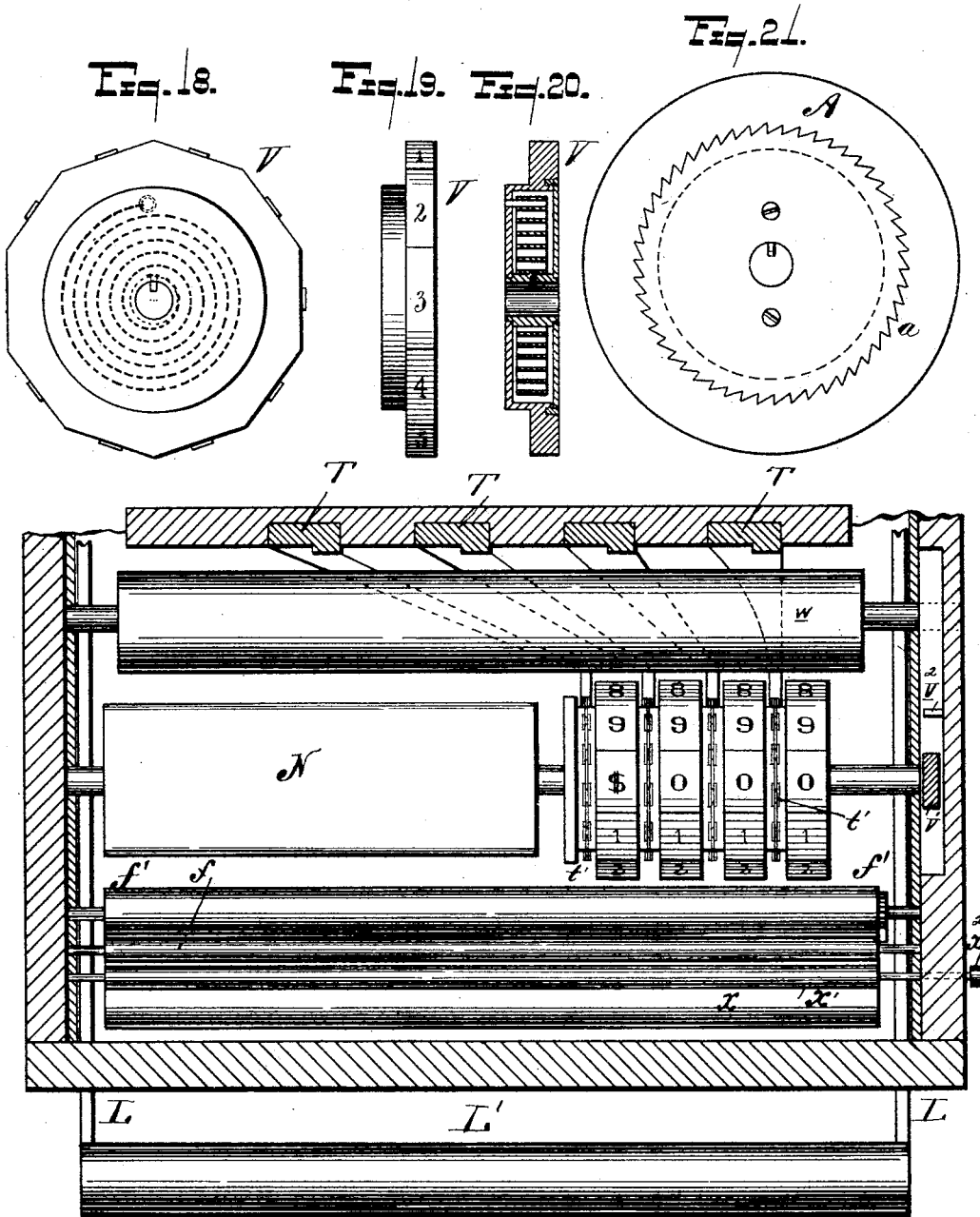
WITNESSES
Office of
Samuel E. Thomas
Fig. 7.

INVENTOR
Francis C. Osborn
by Parker D. Burton
his Attorneys.
Fig. 8.

F. C. OSBORN.
CASH REGISTER AND INDICATOR.

No. 455,111.

Patented June 30, 1891.



WITNESSES
Effie J. Coft
Samuel E. Thomas

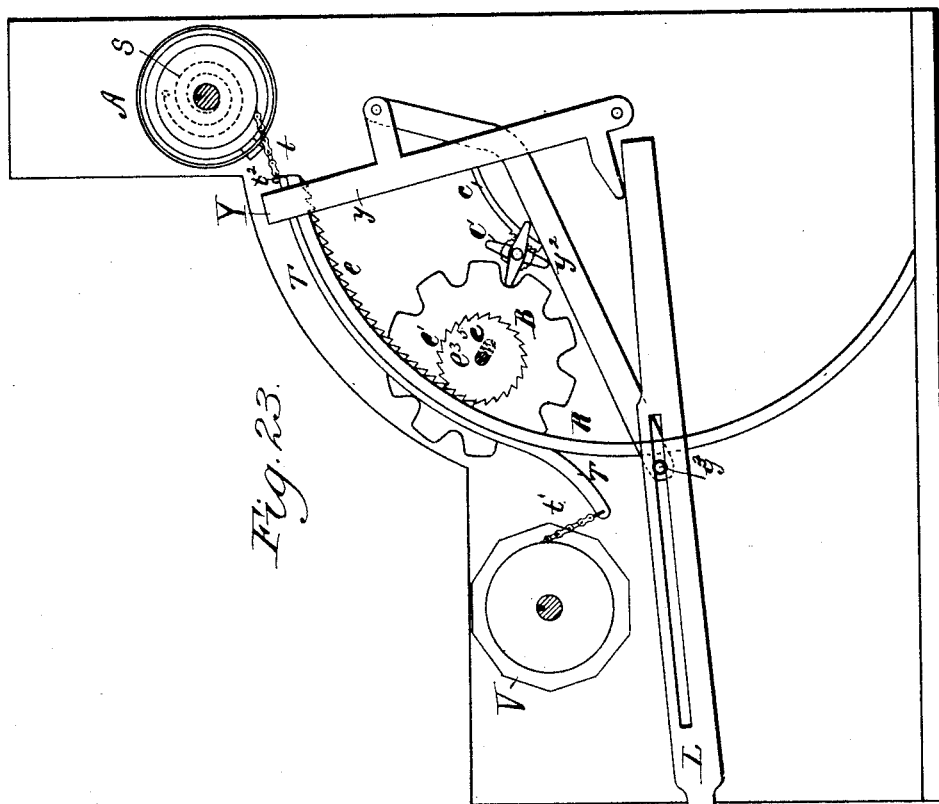
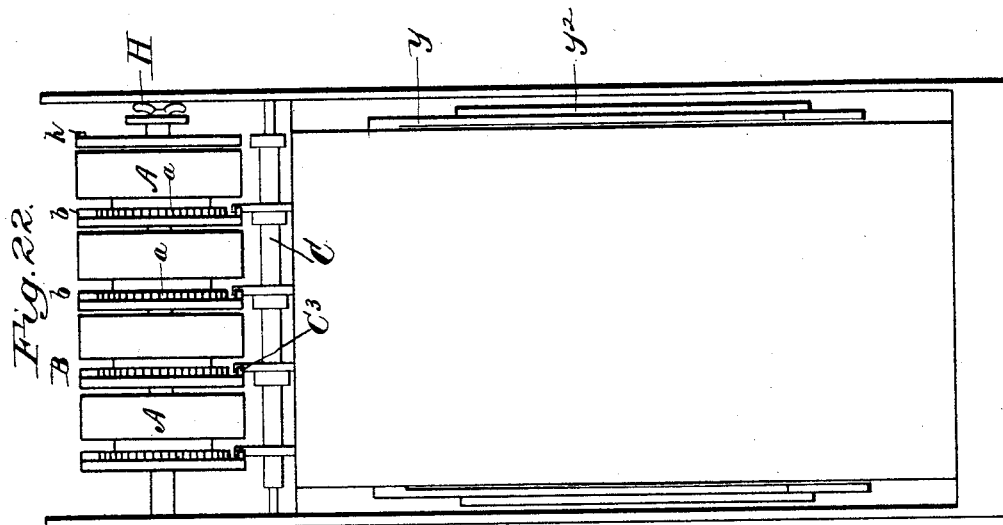
Fig. 17.

INVENTOR
Francis C. Osborn
by *Parker & Burton*
his Attorneys.

F. C. OSBORN.
CASH REGISTER AND INDICATOR.

No. 455,111.

Patented June 30, 1891.



WITNESSES
Wm. S. Hayette
Samuel E. Thomas

INVENTOR
Francis C. Osborn
by Parker & Austin
his Attorneys.

UNITED STATES PATENT OFFICE.

FRANCIS C. OSBORN, OF DETROIT, MICHIGAN.

CASH REGISTER AND INDICATOR.

SPECIFICATION forming part of Letters Patent No. 455,111, dated June 30, 1891.

Application filed December 6, 1889. Renewed May 25, 1891. Serial No. 393,945. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS C. OSBORN, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement in Cash-Registers, of which the following is a specification.

This invention relates to cash-registers, and has for its object the production of an indicating and registering machine by means of which a salesman in a store can indicate in a conspicuous position the value of an article sold by him, and can by the same operation by which he indicates the value cause it to be added to the total amount designating the value of all articles sold since the machine was last set at the zero-point, and at the same time permanently record the amount indicated. The register consists of a register-case having a drawer in the lower part of it for the reception of money, mechanism inclosed in the case, which is operated by means of a lever or handle extending through walls of the case, inspection-slots through which numbers indicated on the internal wheels may be seen from the outside, and slots to permit the passage of paper from the inside to the outside of the case, and a slot through which the operator can write upon paper that is inside of the case. In the form shown in the drawings and described the operating-keys, of which there are four rows or files with nine in each row, are shown located on the curved surface lying on the front upper side of the case; but this curved surface for the reception of the keys is not essential, as the operating parts can readily be made to act over a straight surface in place of the curved surface.

In the drawings, Figure 1 is an isometrical view of the outside of my incased machine, the little door through which the last one of the registering-wheels is reached and adjusted being open. Fig. 2 shows the last one of the registering-wheels and the mechanism by which the machine discloses whether it has been tampered with or not by any person unable to reach the last registering-wheel through the little door shown in Fig. 1. Fig. 2^a shows the last registering-wheel and its connection with a controlling thumb-nut, which extends through the supporting-frame. Fig.

3 shows the interior mechanism from the right side, showing the general arrangement and location of all the working parts. Fig. 4 is a detail of the key-board, of the sliding bars under the key-board, and of the means by which the keys act upon the sliding bars and through them on the indicating-wheels to designate on the indicating-wheels the numerical position of the depressed keys. Fig. 5 is a sectional elevation of the same parts shown in Fig. 3, showing details of mechanism not fully shown in Fig. 3. Fig. 6 is a section through one key and through the sliding bars and the sliding yoke and the pawl acting between the yoke and the sliding bar. Fig. 7 is a top view of one of the sliding bars and of the sliding yoke and pawl, the yoke and pawl being shown in two positions, the full lines indicating its condition when it slides without moving the sliding bar, and the one in dotted lines its condition when it carries the sliding bar along with it. Fig. 8 is a top view of the slide, the yoke, the connecting-pawls, and of the indicating-wheels and registering-wheels. Fig. 9 is an elevation of one pair of indicating and registering wheels. Fig. 10 is a sectional view of the same part. Fig. 11 is a side view of a registering-wheel and the carrying-wheel connected with it for carrying tens. Fig. 12 is an isometrical view of the carrying-wheel, Fig. 11. Fig. 13 shows my reversed indicating-bands, by which the figures shown on the front of the case, as they appear in Fig. 1, are shown at the same time in their proper order on the rear of the same. Fig. 14 shows in elevation the indicating-wheels in section, portions of the reverse indicating device, showing the details of the connections by which the reverse reading is effected. Figs. 15 and 16 are respectively an end view and a sectional view of parts shown in Fig. 13. Fig. 17 is a top view of the printing-machine and of the various paper holding and feeding rolls. Figs. 18, 19, and 20 show details of the printing-wheels. Fig. 21 shows a detail side view of the ratchet-wheels of Figs. 9 and 10, the figure showing the ratchet-wheels projected on the end of the indicating-disk, the dotted lines showing the drum upon which the chain is wound. Fig. 22 shows a rear view of the indicating-wheels, registering-wheels, and carrying-

wheels. Fig. 23 shows a modified form, in which the registering-wheels are mounted upon an independent shaft from the indicating-wheels and the mechanism for moving the registering-wheels is modified somewhat. This construction is used in connection with the reverse reading-bands shown in Figs. 13, 14, 15, and 16.

In Fig. 3 the carrying-wheel is shown without the irregular middle wheel.

I employ the term "slide" to indicate the dented sliding piece T shown in Figs. 5, 8, and 22, the term "yoke" to indicate the sliding-bar cross-piece Y shown in Figs. 4, 5, 6, 7, and 8.

I employ the term "indicating-wheel" to designate the wheels on which are the figures which appear at the front of the register. They are designated by the letter A, as shown in Figs. 8, 9, 10, 13, 14, 15, 16, and 21.

I employ the term "register-wheel" to designate the wheels used to show the total sum of all amounts indicated on the indicating-wheels since the register-wheels were last set at the zero-point. These wheels are shown at B in Figs. 2, 3, 5, 8, 9, 10, 11, and 23.

I employ the term "carrying-wheel" to designate the compound wheel shown in Fig. 12, and of which views are shown in Figs. 3, 5, 11, and 23.

In the complete machine a number of slides are acted upon by keys which are arranged in ranks and files on the curved upper and forward side of the register, occupying about half a quadrant of arc. There are four files shown in the drawings, and with this number any amount less than ten thousand can be indicated on the face of the register and any amount less than one hundred thousand can be registered. With each file of keys there is connected a slide, an indicating-wheel, a registering-wheel, a carrying-wheel, and a printing-wheel, and these are duplicates of each other. There is no carrying-wheel working into the registering-wheel on the right hand. There is also an additional registering-wheel on the left hand, registering units of an order higher than those indicated on the left-hand indicating-wheel. This extra registering-wheel is operated through the carrying-wheel connected with the left-hand registering-wheel.

I call the side of the case on which the handle L' is located the "front" side.

At the lower part of the main case is a drawer Z. This is pushed into the case and is locked into the case by the curved hook z, which is pinned to the main frame and drops by gravity with its detaining-hook over the upper edge of the inner end of the drawer. At the moment the drawer is pushed in so that this catch takes effect an alarm-bell z' is struck by its hammer z². An operating-lever L is fulcrumed on the drawer at l. The lever L has an arm on each side of the drawer, and the two arms are connected outside of the case by means of the cross-bar L', which

is utilized as the handle of the lever. On the inner end of the lever L is a pin l' lying under the projecting nose of the hook z, and operating to raise the hook z out of holding contact with the drawer Z when the handle L' is depressed. As soon as the hook z is raised out of holding contact with the drawer it comes in contact on its upper side with a stop-pin z³, and the lower side of the nose of the holding-hook, which has now been raised to a position such that it slants slightly upward and forward, operates to push forward the lever L as the pin l' rises along the oblique surface. The forward push of the lever L and the drawer to which it is connected is slight, but sufficient to project the drawer far enough to prevent the hook z from again catching over the rear end of the drawer and to allow the drawer and the lever L to be drawn forward. The depression of the handle L' and the rising of the inner end of the lever L operate to produce other results. As the inner end of the lever L rises it pushes a lock-arm y' out of locking contact with the yoke-arm y. It next comes in contact with the bell-cranked yoke-arm y, and turns the arm y on the journal and forces the yoke Y upward and backward until the yoke Y reaches the highest part of the curved surface of the slide-race R. In moving upward to the highest part of the slide-race R the yoke Y has carried with it all the slides T, and all the indicating-wheels have been turned backward to the zero-point by the force of the coiled springs S contained in them. At the same time the registering-wheels have been moved in the proper way by mechanism that will be described hereinafter. The upward movement of the yoke-arm y draws back a link y², which extends from the upper end of the yoke-arm y to the lever L. The link y² is hinged to the yoke-arm y near its upper end, and is connected to the lever L by a sliding joint, which allows the hinge y³ to slide along the lever L from near its front end to near its middle, the object being to allow freedom of movement of that end of the link, so that the drawer can be pushed in for some distance or entirely closed, while the yoke is permitted to remain at the lowermost point of its throw along the race R; but on opening the drawer after the yoke has been thrown to its uppermost position by the depression of the lever-handle L' the yoke-arm y and the yoke Y are pulled forward and downward. As the yoke Y reaches the uppermost part of its throw, the hanger y⁵ operates a hammer to strike a bell y⁶ and announces the arrival of the yoke at the upper part of the race R.

Underneath the yoke Y and above the race R are the slides T. On the under side of the yoke Y, adjacent to each slide T, is a pawl d, pinned to the yoke and held by friction in such position as it may be placed. It turns on the pin d'. Its lower or forward end engages in serrations in the slide T when it is pushed around toward the slide and into en-

gagement. On its lower or forward end each pawl d has a lug rising above the plane of the upper side of the yoke. This lug comes against the lower end of the first one of the
 5 file of pins that may have been pushed down through its holding-nipple p . The forward side of the lug which comes against the lower end of the pin P is oblique, so that a pressure exerted by the pin against the lug causes the
 10 pawl to turn on its holding-pin d' and forces the point of the pawl into engagement with that one of the serrations on the slide which lies opposite to and corresponds numerically with the depressed pin. The head of the pin
 15 P permits it to be depressed only sufficient to come in front of the elevated part or lug on the point of the pawl d , but not sufficiently to interfere with the main part of the yoke Y . Immediately under the file of pins across the
 20 yoke is a curved cam-surface, which comes under the end of the pin P and pushes it back up through the nipple p as the yoke moves forward and downward, and at the same time, the pawl having been thrown into
 25 engagement with the proper serration on the slide, the forward and downward movement of the yoke Y compels a similar forward and downward movement of the slide T and unwinds the chain t from the drum of the indi-
 30 cating-wheel A , revolves the indicating-wheel, and turns that through a portion of a circle corresponding in amount to the distance traversed by the slide T . The total movement of the slide T from its uppermost to its lower-
 35 most position produces nine-tenths of a complete revolution of the indicating-wheel and brings into consecutive view the ten characters by which amounts are indicated.

A chain t' , connecting the lower end of the
 40 slides T with the printing-wheel V , causes the printing-wheel V to rotate as the slide T is moved and brings under the printing-cam K a number corresponding to the number shown on the indicating-wheel.

Both the indicating-wheel and the printing-wheel are held against rotation by the springs included in a barrel surrounding the hub of each, and the force of the coiled spring in each returns the wheel to the zero-point when
 50 allowed to do so by the return of the slide T to the uppermost part of its travel, and the force of the coiled spring in each wheel aids the yoke Y in returning the slide T to the uppermost part of its throw. When the slide
 55 T is at the upper part of its throw the indicating-wheel connected with it shows a zero through the slotted face-plate of the case, and the printing-wheel V presents a zero to the printing-cam K . The movement of the yoke
 60 Y forward and downward is without effect upon any of the slides T , so long as the pins P are not pushed inward, but the yoke Y begins to operate to carry forward and down with it the slides T as soon as it comes to a
 65 pin that has been pushed inward, and has the pawl upon it brought into engagement with the serration of the slide through the instru-

mentality of the inner end of the pin, and consequently the motion of the slide T and the rotation of the indicating-wheel B and the printing-wheel V always correspond and
 70 bring to sight on the indicating-wheel and to printing position on the printing-wheel the number which corresponds with the pin that has been pushed inward.

On the upper end of each slide is a lug l^2 , against which the yoke Y comes as it moves upward and backward. The yoke Y , pressing against the lugs l^2 , forces the slides upward and backward until they reach the upper
 80 part of their throw. The springs S in the barrels of the indicating-wheels assist in this return movement of the slides; also the constant backward tension of the springs on the slides compels the operator to force the
 85 yoke forward and downward as far as it will go, in order that it may be caught by the lock-arm y' and held stationary with the indicating-figures in view.

The registering mechanism is shown in detail on Figs. 8, 9, 10, 11, and 12. An arbor E
 90 supports both the indicating-wheels and the registering-wheels. This arbor passes across the frame above and to the rear of the keys. Each indicating-wheel has on its hub a drum,
 95 upon which winds the chain t . The drum is on the right-hand side of the indicating-wheel, and beyond the drum still on the right-hand side is a ratchet-wheel, and beyond that, loosely mounted on the arbor, a registering-
 100 wheel upon the periphery of which are ten figures used to indicate numbers. The registering-wheel carries a pawl b , engaging in the teeth of the ratchet-wheel a . The serrations of the ratchet-wheel a and the pawl b engaging in them permit the registering-wheel B to be moved forward with respect to the indi-
 105 cating-wheel, but they do not permit it to be moved backward with respect to that wheel. The registering-wheel is toothed or dented between its consecutive numbers and a spring stop or catch b' , extending from any convenient place on the main frame, engages in the
 110 dents, and prevents the registering-wheel B from moving backward with the indicating-wheel when the indicating-wheel is returned to the zero-point, as has been previously described. The spring-stop b' during the return movement of the indicating-wheel holds the registering-wheel in the position it has
 115 moved to as it moved forward with the indicating-wheel with the last forward and downward movement of the slide. The spring-stop b' allows the forward movement of the registering-wheel by being forced out of engagement by the shape of the contact-surface of the stop and the wheel.

On an arbor C' , lying below the registering-wheels, is mounted the carrying-wheel C . This is a compound wheel having a long hub,
 120 on the middle point of which is an irregular wheel divided into four segments, two of which are toothed and two of which are straight and untoothed. The portion of the

hub between this middle tooth and the left end of the wheel C is a square prism, upon which rests a spring-holding bar c^2 . At either end of the hub of the wheel is a cross-piece or two-toothed wheel, and of these that on the right end C^2 engages with a single tooth or projection C^3 , extending outward from the side of the registering-wheel B. The other one C^5 engages with the dents or teeth of the wheel B of the second one of the series of registering-wheels. A toothed arm c , reaching backward from the yoke arm y , comes into engagement with the toothed part of the irregular wheel at the middle of the compound wheel C, and as the arm c is moved backward it turns the compound wheel a quarter of a revolution and until the flat smooth part of the middle part of the compound wheel comes over the toothed part of the arm c . The carrying-wheel remains in this position unaffected by subsequent motions of the arm c until the first wheel B has been turned by means of its connection with the indicating-wheel and the projection C^3 is brought around against the tooth C^2 . A further movement of the registering-wheel B moves the carrying-wheel a quarter of a revolution, when the teeth C^3 and C^2 pass out of engagement and the tooth C^5 has been brought into position for engagement with the teeth of the next registering-wheel. This change of position of the carrying-wheel was made while the wheel B was making a forward motion and while the slides were being pulled forward and downward. On the return of the slides and the yoke Y the toothed arm c engages with the toothed part of the middle wheel of C, turns the carrying-wheel a quarter of a revolution, and moves forward the second registering-wheel one space. The toothed arm c is made of resilient material to enable it to make its return movement in all cases.

It sometimes happens in "carrying" from one wheel onto the wheel registering the next higher order of units that the carrying-wheel between the second and third wheels is in such a position that the turn of one-fourth of a revolution then given to it leaves it in engagement with its own toothed arm c . The resiliency of the toothed arm allows the toothed arm c to slip down and forward over the wheel. The carrying-wheel C is thus operated upon intermittently by the toothed arm c and by the registering-wheel at its right end. A similar carrying-wheel connects the second and third registering-wheels and another similar one the third and fourth and the sequence could be carried on indefinitely, so as to register any amount. In practice it will generally be sufficient to have the number of registering-wheels one greater than the number of indicating-wheels.

In the form of the device shown in Fig. 23 the registering-wheels are mounted on an arbor separate from the arbor on which the indicating-wheels are mounted and rotated by

means of a rack e , formed integral with the slide T and extending through slots in the race R. In this case the arbor upon which the registering-wheels are mounted is carried in a sliding box, as indicated at e^3 , the motion of the box being on the radius of the curvature of the slide and permitting the ratchet-wheel e' to move out of engagement with the rack on the under side of the slide-bar T when the slide-bar is returned upward and backward, while the spring e^5 forces the ratchet-wheel into connection with the rack when the slide is drawn forward and down. The carrying mechanism is the same as that which has been previously described.

The printing mechanism is shown in detail in Figs. 3, 5, 17, 18, 19, and 20. The printing mechanism consists of a series of wheels upon the periphery of which are raised figures or type from zero to nine, each wheel having the ten figures extending in regular order around the circumference. Each printing-wheel is hollow, and contains within the hollow or barrel part a spiral spring, that is put under tension as the wheel is rotated by means of a chain t' connecting with the lower end of the slide T. The movement of the printing-wheels due to a movement of the slides is precisely similar to the movement of the indicating-wheel due to the same movement of the slide, and the numbers are so arranged that the figures are presented under the printing-platen k that are at the same time presented to view through the view-slot in the front of the case. The platen k , above the uppermost of the type of the wheel V, is immediately underneath a rolling pressure-cam K, turning on a pin v and turned by a depending arm v' , that hangs downward and is moved by a lug v^2 on the side of the drawer Z. The rolling cam K exerts a pressure on the platen k when the lower end of the arm v' is swung inward as the drawer is pushed in and the lug v^2 pushes against the lower end of the swinging arm v' . When the lug v^2 passes so far inward with the drawer that the arm v' swings over it and back out of engagement, the pressure on the platen is relieved and the platen rises. When the depending arm v' swings the other way, as the drawer is drawn out, the rolling cam K does not act to depress the platen. The lower end of each one of the sliding pieces T, except the one at the right, is bent laterally so as to crowd their lower extremities together and permit the printing-wheels V to be mounted in a considerably narrower space than that occupied by the registering-wheels or the raceways of the slides. It is desirable that the figures on the indicating-wheels be large enough to be readily seen from some distance away, and consequently those wheels are made with broad surfaces. It is also desirable that the printing-wheels be placed close together, and that the figures on them be smaller, so that the imprint from them will occupy only a portion of the width across the paper employed as a

record-sheet, and this paper should be no wider than the width of the machine. It is a part of my invention to arrange this record-sheet in such a way that the imprint from the type-wheels may be placed on the right-hand side of the paper, opposite a blank to be filled by the one operating the machine, and I accomplish this result by crowding the printing-wheels together on the right-hand side of the machine and connecting each wheel with its proper indicating-wheel by means of the chains t' t^2 and these laterally-bent curved slides T , each slide having a laterally-bent lower extension extending from its own vertical plane to a point opposite its proper type-wheel. This construction affords a place for the tablet N by the side of the printing-wheels, and enables me to carry out this object of my invention. The platen k is held to its place by means of the corrugated suspension-springs v^3 and v^5 .

W is a trough holding a roll of paper w , of which the web passes between the type-wheel and the platen k , the free end passing between the feed-rolls $f f'$, and thence down into a receptacle formed for it.

The feed-rolls $f f'$ are rotated by means of a snatch-arm f^2 , of which the upper end is hooked and engages in a ratchet on the end of the feed-roll f' , and the lower end is hooked to receive the lever L , when that lever is depressed in operation. The snatch-arm f^2 is held to the frame by pins passing through the slot f^3 .

The cover Q is rectangular in its general shape, and has a portion q located directly over the printing-wheels raised into a hood form. The hood, except at its point of support q' , is separated from the remainder of the cover, so as to allow the passage under it and over the general surface of the cover of the two webs of paper coming from the rolls $x x'$. There is also through the cover an opening above the tablet N , located in line with the line of figures across the printing-wheels. Two long and narrow slots $m m'$ near the front edge of the cover permit the ends of the webs of paper to pass up from the rolls $x x'$ through the cover, whence they may be passed backward under the hood and over the tablet into position to be printed upon and to be written upon. The rearmost one of these long paper slots m' is designed to be used for carbon paper, and the forward one m is designed to be used for a web of paper upon which appropriate printed headings have been placed. The roll x' is controlled by a thumb-nut x^2 , and the papers are drawn off from both this roll and the roll x by the operator as he uses it, the main use of the thumb-nut being to draw back the carbon paper if it has been accidentally drawn back too far. The carbon paper lies between the webs of paper from rolls w and x , and furnishes a pigment for making an impression on the web of paper w , over the type of the wheels V and over the tablet N . Just

behind the slot through which the paper from roll x passes up through the cover is a valley n , having a sharp cutting-edge on its forward side and furnishing a ready means of cutting off from the web of paper that portion which has passed up through the slot m beyond the valley n and been used. The cutting is accomplished by pushing the finger-nail, or a pencil-point or any similar article along the paper and pressing it against the cutting-edge.

The indicating-wheels and the type-printing wheels are placed at the zero-point by returning the yoke to the highest point of its travel.

The registering-wheels are seen through a slot in the case lying in front of them, in whichever of the two positions hereinbefore described they may be placed. If they are placed on the same arbor with the indicating-wheels the total amount registered by them would be read through the same opening as that through which is read the amount on the indicating-wheels. If placed in the position shown in Fig. 23 they would have their proper slot near the bottom of the keyboard.

The registering-wheels are set at the zero-point by first reading the amount registered on them, then pressing down those pins that will cause the registering-wheels to register zeros on all except the last registering-wheel. The last registering-wheel is set at the zero-point by opening the door at the left and turning the last registering-wheel B , by means of the handle H , turning it forward until it registers zero. In making this movement a lug h on the registering-wheel comes against a hanger h' , and pushes that and a shield which it carries up in front of the registered number, preventing it from being seen through the inspection-slot. When the shield is in this position, the upper end of the hanger is caught and held by the hook h^2 . In order that the registered number may be seen through the inspection-slot, the hanger must be released and the shield allowed to drop, and this can only be done by one who is able to open the door. Thus the shield h^2 indicates by its position any attempt that has been made to set the registering-wheel at the zero-point by operating it through the instrumentality of the keys. It is not necessary that this shield be arranged to cut off the view of the figure on the registering-wheel, as any change in the position of the shield will indicate that the registering-wheel has passed the point at which in its rotation it operates the shield, and so, too, it is not necessary that the shield be always in the shape shown, as any visible indicating-point operating the same way will accomplish the result of indicating to an observer that the last one of the registering-wheels has passed a given point and commenced a new count.

In some cases it is desirable to indicate on

both the front and rear sides of the register the same number, and to accomplish this result I employ in connection with the indicating-wheels the devices shown in Figs. 13, 14, 15, and 16. To each indicating-wheel I attach an arm which holds a ring concentric to the arbor upon which the indicating-wheels are placed, and the relative position of all the rings is exactly the reverse of the indicating-wheels. The arm O is attached to the indicating-wheel A³ and extends across to and holds the ring 4. The arm O' is attached to the indicating-wheel A and extends to and holds the ring 1. The arm O² is attached to the indicating-wheel A², and extends to and holds the ring 3. The arm O³ is attached to indicating-wheel A', and extends to and holds the ring 2. The arms are looped or bowed to permit the free passage of one by the other, the length of the respective bows being such that the longer arms will pass entirely clear of and outside of all the shorter ones. Each ring has ten openings, through which the numbers of the indicating-wheel can be seen, and each wheel has ten cross-bars, on which are the ten figures in reverse position, but in the same order as that on the indicating-wheels. As the indicating-wheel is revolved so as to present a given number on the wheel A at the inspection-slot a corresponding number is presented at the opposite side of the case and is seen on the ring 1. The indicating-wheel A being on the right hand, the number upon it would designate the number of cents and the number seen through the slot in the front of the case would be seen in the proper position to indicate cents. So, too, the same number appearing at the slot through the rear of the frame would be in the proper position to indicate the same number of cents. When this reverse-reading mechanism is employed, the registering-wheels must be mounted on a separate arbor, in order that the carrying-wheels may not interfere with the arms O O', &c.

The described arrangement, by means of which I indicate, register, and print or record a given number in three places at the same time, affords an absolute safeguard against all improper tampering with the register.

A brief description of the operation of the machine will fully explain how these operations check one another. When the register is ready for operation at the beginning of a day's work, it would usually be set with the indicating and registering wheels all at zero, and the drawer would be closed, the locking-hooks in locking position, the yoke Y at the forward and lower part of the key-board, the operating-lever L held up by the spring V'. The salesman having received a sum of money, which he desires to register, first depresses the handle L' of the lever L. This causes a slight forward movement of the drawer Z and throws the yoke Y to the upper and rearmost part of the key-board. The salesman next pushes in, through the nipples

μ, the keys of the proper ranks and files to cause to be indicated the amount he desires to register, and pulls the lever L and the drawer out. This pulls the yoke to the lower and forward part of the key-board and at the proper place in its forward movement. The pawls on the yoke engage in the slides and carry the slides forward and downward with the yoke, causing the indicating-wheels, the registering-wheels, and the printing-wheels all to move at the same time and the same distance, and there is now indicated at the inspection-slot and appears at the given line on the register-wheels and on the printing-wheels under the platen the amount which the salesman has received and which he places in the drawer. The salesman now closes the drawer, and this operation records the amount received on the paper w and on the superposed sale-slip z. The salesman now writes on the sale-slip and through the carbon paper on the record anything that he may be required to write, such as the name of the article sold, or the address of the purchaser, or any other proper statement, detaches the sale-slip, and complies with such order as may have been given him respecting that. He then pulls forward the sale-slip paper for the next impression. The succeeding depression of the handle L' moves forward the record-paper one step, and the remainder of the operation for registering a second amount is a repetition of what was done in registering the first amount. The amount appearing on the register-wheels, however, is now the sum of the amounts which have been indicated. If, however, the salesman attempts to tamper with the machine it will of itself produce such a record as to cause the act to be detected, for the drawer can only be pulled out a very short distance before the pin v² passes under the end of and to the forward side of the printing-lever v', and the return of the drawer will operate to print on the record-paper. If in the interim the drawer has not been pulled entirely out and the yoke and slides pulled forward and locked, the number printed will be zero, the number indicated will be zero, and the number added on the register-wheels will depend on whether the slides have been moved at all, and, if so, how much, and this will indicate that the machine has been operated without pressing down any of the keys or without pulling the yoke forward far enough to cause the machine to indicate the amount registered. In either case a comparison of the record and the register-wheels would show at what time the trouble occurred and will show if any keys were depressed, and, if so, what they were, and will render it possible to hunt up the sale-slip and identify either the purchaser or the article sold, or both, and from the fact that the record is duplicated on the sale-slip it will be exceedingly improbable that the salesman would take risk of operating the wrong keys and of thus indicating, registering, and recording the

wrong number. It is only when the keys are employed, the yoke thrown entirely forward, and the yoke-arm locked and the indicating-wheels and printing-wheels brought into position and kept there that the parts work in harmony and there is found on the paper *w* a continuous record preserving the consecutive numbers that have been shown through the inspection-slot on the indicating-wheels, and of which the total sum is equal to the amount shown on the register-wheel.

The details of the subordinate parts may be varied, and some such variations are pointed out. Others will be obvious; but the main object that I desire to attain is to produce such a register that if it is operated at all it must be operated in such a way as to faithfully indicate the transaction which is to be recorded by it, and such a machine that if a dishonest operator attempts to make it record a transaction different from that which actually occurred it will indicate the attempt and enable it to be discovered and generally insure its discovery, and such a machine I have produced by the use of the combined indicating, registering, recording, and printing devices that I have combined for the purpose of working together harmoniously to produce that result.

In place of the compound carrying-wheel described having the irregular middle wheel, a simpler wheel, omitting the middle irregular wheel, may be used, and in this case the arm *c* would not be serrated, but so placed on the yoke-arm that it would strike directly against the end of the tooth of the two-toothed part *c*³. Such a construction is shown in Fig. 3.

The setting-handle *H* is made with a hollow stem *h*⁵. This stem forms a hollow journal, within which is received the end of the arbor *E*. The handle itself is rigidly attached to the wheel *B*, and the portion *h*⁵, passing through the frame-work *h*⁷, forms the journal for the wheel *B*.

Having thus described my invention, what I claim as novel, and desire to have secured to me by Letters Patent, is—

1. In combination with the registering-wheel of a cash-register, a lug on said wheel, a shield arranged to be forced by said lug into position before the visible register-number and to obstruct the view of the number, and a detaining-hook arranged to hold said shield in its obstructing position.

2. In combination with the last one of two or more registering-wheels, a swinging indicator, a projection on said wheel arranged to come against said indicator and change its position, and a detaining-hook, all inclosed in a locked case and arranged to retain the said indicator in its second position so long as the case remains locked, substantially as and for the purpose described.

3. In a cash-register, in combination with a wheel or a series of wheels used for registering totals, and of which the last wheel regis-

ters units of an order higher than the highest order indicated upon the indicating part of the register, a lug or projection located on said last wheel, and a swinging shield operated by said lug, and a retaining-hook, substantially as and for the purpose described.

4. In a cash-register having the registering mechanism inclosed in a locked case, a movable indicator combined with moving and holding mechanism, whereby the indicator is changed in position automatically by the movement of the registering mechanism, and whereby the indicator is held in its second position until released therefrom by the operator, substantially as and for the purpose described.

5. In a cash-register, a drawer, a locking-hook engaging the rear of the drawer, in combination with a lever hung upon said drawer and arranged to bear against said locking-hook, and first lift it out of locking contact with said drawer and then press against the hook, and thereby throw the drawer forward out of position to be relocked by the dropping of the locking-hook.

6. In a cash-register, a curved sliding bar, a numbered indicating-wheel arranged to rotate in either direction, and a spring arranged to rotate said indicating-wheel in one direction and to be placed in operative tension when the indicating-wheel is forcibly rotated in the opposite direction, and a yoke swinging on a shaft concentric to the said slides and operating the same, all combined and operating substantially as described.

7. In a cash-register, the combination of a curved sliding bar, a curved race concentric with the curved sliding bar, an indicating-wheel rotating in either direction in unison with the movement of the bar, and a spring operating to move said wheel in one direction and put into a state of tension when the indicating-wheel is forcibly rotated in the opposite direction, and a yoke swinging on a shaft concentric to said slides and operating the same, all combined and operating substantially as described.

8. In a cash-register, a serrated curved sliding bar combined with a curved race and an arm swinging on the center of the arc of the curved sliding bar and carrying on its outer end a pawl meshing into the serrations of said curved sliding bar, substantially as and for the purpose described.

9. In a cash-register, the combination of two or more serrated slides with an equal number of curved races, a swinging arm, and a yoke carrying pawls equal in number to the curved slides, substantially as and for the purpose described.

10. In a cash-register, a serrated slide combined with a swinging yoke and a pawl movable with and on said swinging yoke, and a file of nine pins consecutively numbered, operating, as described, to throw the pawl into one of the serrations of the slide.

11. In a cash-register, two or more serrated

slides combined with a yoke movable over the face of said slides, and pawls equal in number to the said slides, and files of numbered pins also equal in number to said slides, arranged to operate on said pawls and bring them into operative engagement with said serrated slides, substantially as and for the purpose described.

12. In a cash-register arranged to indicate, register, and print an indicated amount, the combination of indicating-wheels, printing-wheels, and slides connecting the two, arranged, as described, to move both wheels synchronously, the said slides being laterally bent at the ends, which are connected with the printing-wheels, whereby the printing-wheels are arranged in a narrower space than the indicating-wheels, substantially as and for the purpose described.

13. In a cash-register, the combination of one or more serrated slides, a sliding yoke, pawls hinged on said yoke, files of pins movably mounted in the register-case and extending through from the outside to the inside of the same and arranged to force the pawls into operating engagement with the proper serration upon said slides, substantially as and for the purpose described.

14. The combination of one or more slides, a sliding yoke and pawls operating, as described, to move the slides, a lever operating through the case to force said sliding yoke toward one end of race on which said slide moves, and a linkage connecting the said sliding yoke and the drawer, whereby the yoke is forced toward the opposite end of the race on which the slides move, substantially as and for the purpose described.

15. The combination of one or more slides, a swinging yoke and yoke-arm, indicating-wheels connected with and operated by said slides, springs operating, as described, to return said indicating-wheels, and a locking-hook interlocking with said yoke-arm and preventing while so locked the return movement of said slides, substantially as and for the purpose described.

16. The combination of one or more slides, a swinging yoke and yoke-arm, indicating-wheels, returning-springs, locking-hook, and unlocking-lever extending through the register-case, substantially as and for the purpose described.

17. In a cash-register, the combination of the described serration-slides, a movable yoke carrying pawls, and the lugs t^2 on the upper rear end of said slides.

18. In a cash-register, the combination of a key-board having pins or keys extending therethrough, a sliding yoke movable under said key-board and above the wheel-controlling slides, pawls hinged to said sliding yoke arranged to be operated by said keys, and a cam on said yoke arranged, as described, to force upward any of said keys that have been pushed down in front of the moving yoke.

19. In the carrying mechanism of a cash-register, the compound wheel C, having two spokes or teeth at either end of a hub, combined with two consecutive registering-wheels, and a movable rack-arm arranged, as described, to give to said compound wheel an intermitting motion.

20. In the carrying mechanism of a cash-register, the described compound wheel C, operating between two consecutive registering-wheels and having a prismatic hub, combined with a pushing rack-arm and the holding-arm c^2 , substantially as and for the purpose described.

21. In a number registering and printing mechanism, the combination of indicating-wheels and printing-wheels, moving bars connecting the indicating and printing wheels, and a yoke operating all the moving bars contemporaneously, as described, and for the purpose specified.

22. The compound carrying-wheel C, having a central intermitting wheel, a prismatic hub, and the two-toothed wheel on either end, as described.

23. In combination with an indicating-wheel of a cash-register, an indicating-band concentric with the indicating-wheel and having numbers thereon in the same order, but in reverse position from the numbers on the indicating-wheel.

24. In combination with two or more of the indicating-wheels of a cash-register, an equal number of indicating-bands having numbers in the same order, but in inverse position, each indicating-band being connected and moving with that one of the indicating-wheels which is numerically indicated the same distance removed from the middle indicating-wheel and on the opposite side therefrom.

25. In combination with the indicating-wheels of a cash-register, an indicating-band concentric with the axle of the indicating-wheel, having openings through it and numbers on the intervals between said openings, substantially as and for the purpose described.

26. In combination with the case of a cash-register, indicating-wheels and indicating-bands concentric to the same arbor, and arranged, as described, to present at opposite inspection-slots through said case the same number, arranged at each inspection-slot in its proper order.

27. In combination with the indicating-wheels of a cash-register, indicating-bands equal in number and connecting, as described, to the indicating-wheels, the said bands being numbered in reverse order and placed in reverse position to the indicating-wheels, to which they are severally attached, and the connecting-arms between the wheels and bands being looped or bowed, as described, to permit the free passage of one by the other, substantially as and for the purpose described.

28. In combination with the serrated slide located immediately beneath the cover of a cash-register, mechanism, substantially as de-

scribed, for moving said slide, a line of openings through said cover opposite said serrations, and a line of pins operating through said openings and held by frictional contact between the pins and the walls of the openings, substantially as and for the purpose described.

29. In a cash-register, the described numbered pins, in combination with a serrated slide mechanism, substantially as described, for moving the same, a perforated case, movable pawls, and returning-cams, substantially as shown and described.

30. In a cash-register, indicating-wheels, printing-wheels, and a recording web of paper, a feed-roll, and ratchet or snatch arm, all combined with and operated by a single operating-lever through the described connecting-links, substantially as and for the purpose described.

31. In a cash-register, the combination of a sliding drawer, a pivoted lever attached thereto, a record-paper feed-roll, and a ratchet-arm operated by the depression of said lever and operating to move said feed-roll, substantially as and for the purpose described.

32. In combination with the described yoke and yoke-arm, the link y^2 , attached by a sliding joint to the lever L, fulcrumed on the drawer Z, substantially as and for the purpose described.

33. In combination with the indicating-wheels of a cash-register, printing-wheels operating, as described, in unison with said indicating-wheels a continuous record-paper, and mechanism for moving it over said print-

ing-wheels, all being inclosed in a case and combined with a tablet within said case adjacent to said printing-wheels and immediately below an opening through said case, substantially as and for the purpose described.

34. In combination with the case of a cash-register having the described raised part or hood, and the passage-way thereunder, a printing-platen within said hood, and printing-wheels located below said hood, substantially as and for the purpose described.

35. The case of a cash-register having the passage-ways $m m'$, the raised hood q , combined with a printing-platen within said hood and printing-wheels located thereunder, substantially as and for the purpose described.

36. In combination with the case of a cash-register having openings therethrough, operating-pins extending through said openings and held by friction in said openings, and a movable slide-bar within said case, and a movable pawl arranged, as described, to be brought into operating contact with the said slide, substantially as and for the purpose described.

37. The combination and arrangement of two or more registering-wheels B, slides T, and the interposed means of communicating motion from the slides to the register-wheels, the carrying-wheel C, sliding yoke Y, and arm c, all operating as described, and for the purpose specified.

FRANCIS C. OSBORN.

Witnesses:

CHARLES F. BURTON,
CHARLES H. FISK.