(No Model.) 6 Sheets—Sheet 1.

E. B. HESS.

CASH REGISTER AND INDICATOR.

No. 590,946. Patented Sept. 28, 1897.

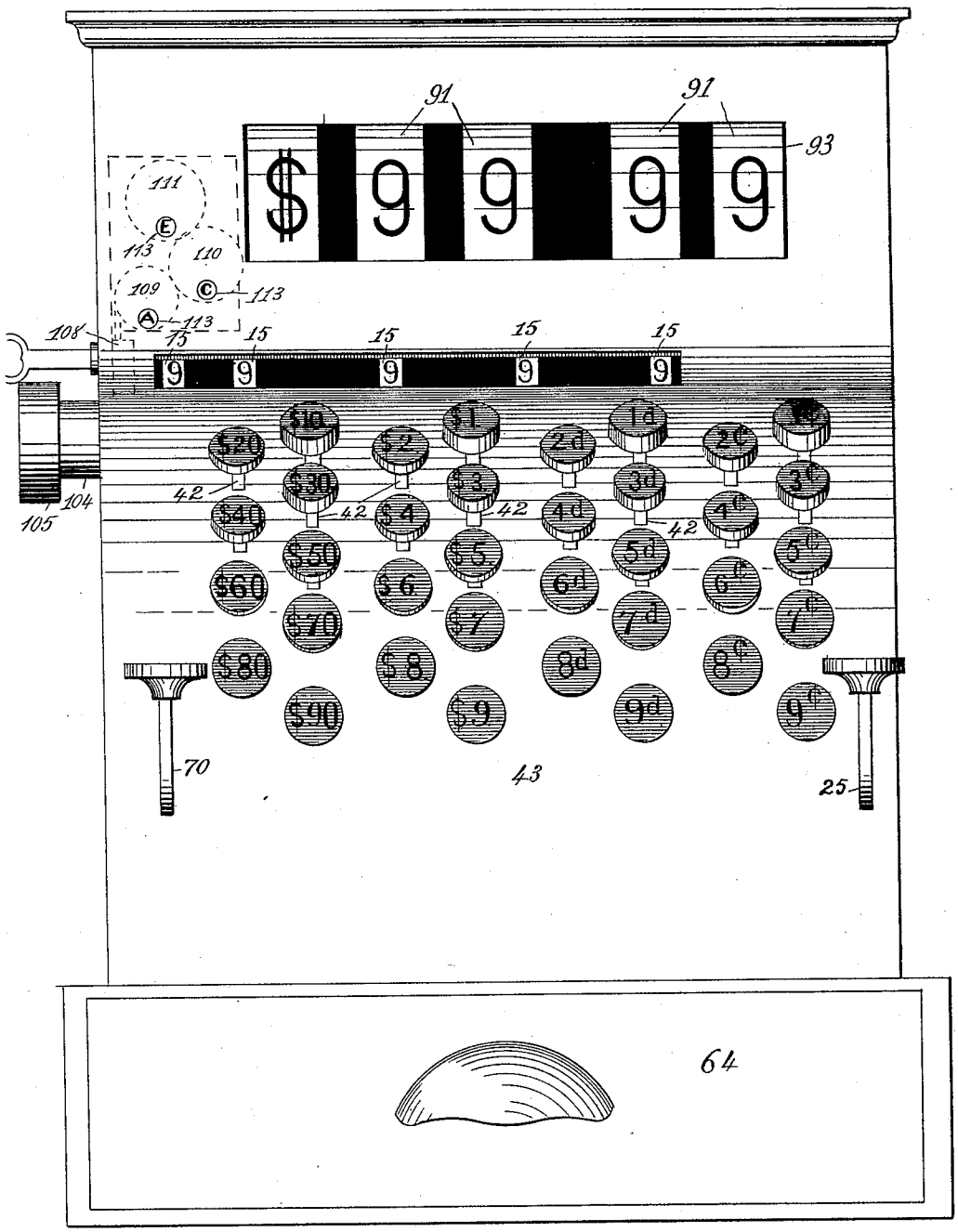


Fig. 1.

WITNESSES
J. H. Truett
Wm. A. Bates

E. B. Hess.
INVENTOR;
By D. B. Gallatin.
Attorney

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Fig. 2.

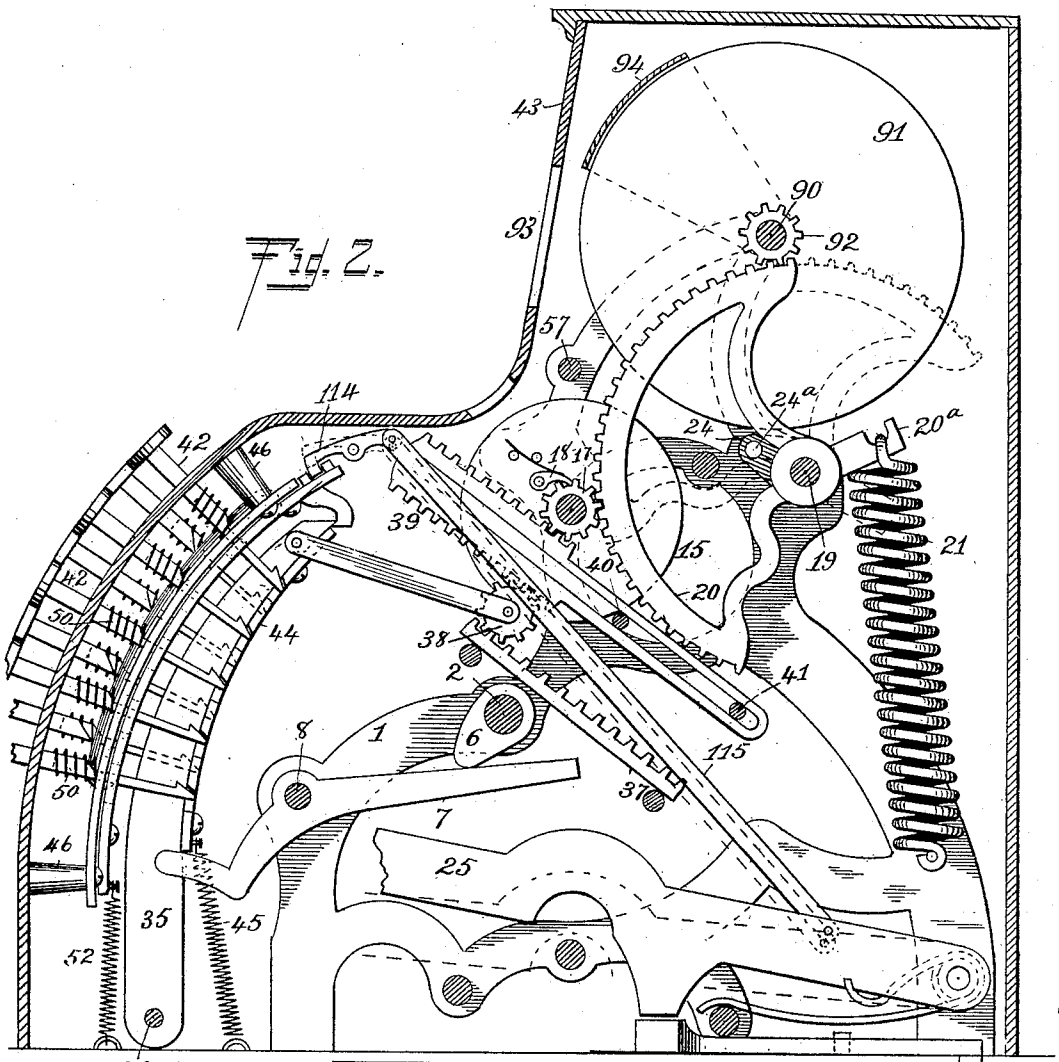


Fig. 8.

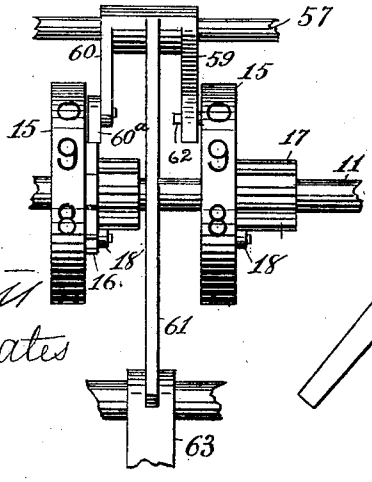
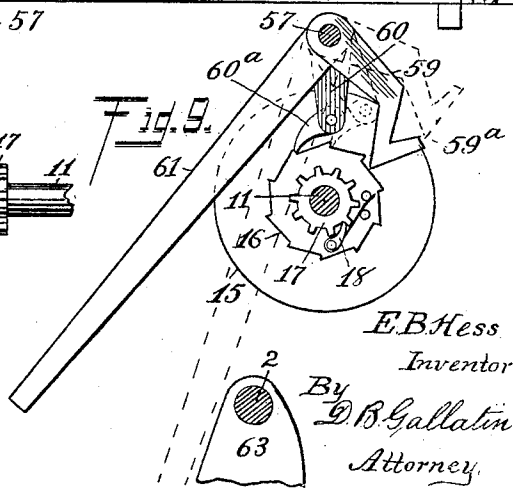


Fig. 9.



Witnesses;
J. H. Truett
Wm. A. Bates

E. B. Hess
Inventor
By D. B. Gallatin.
Attorney.

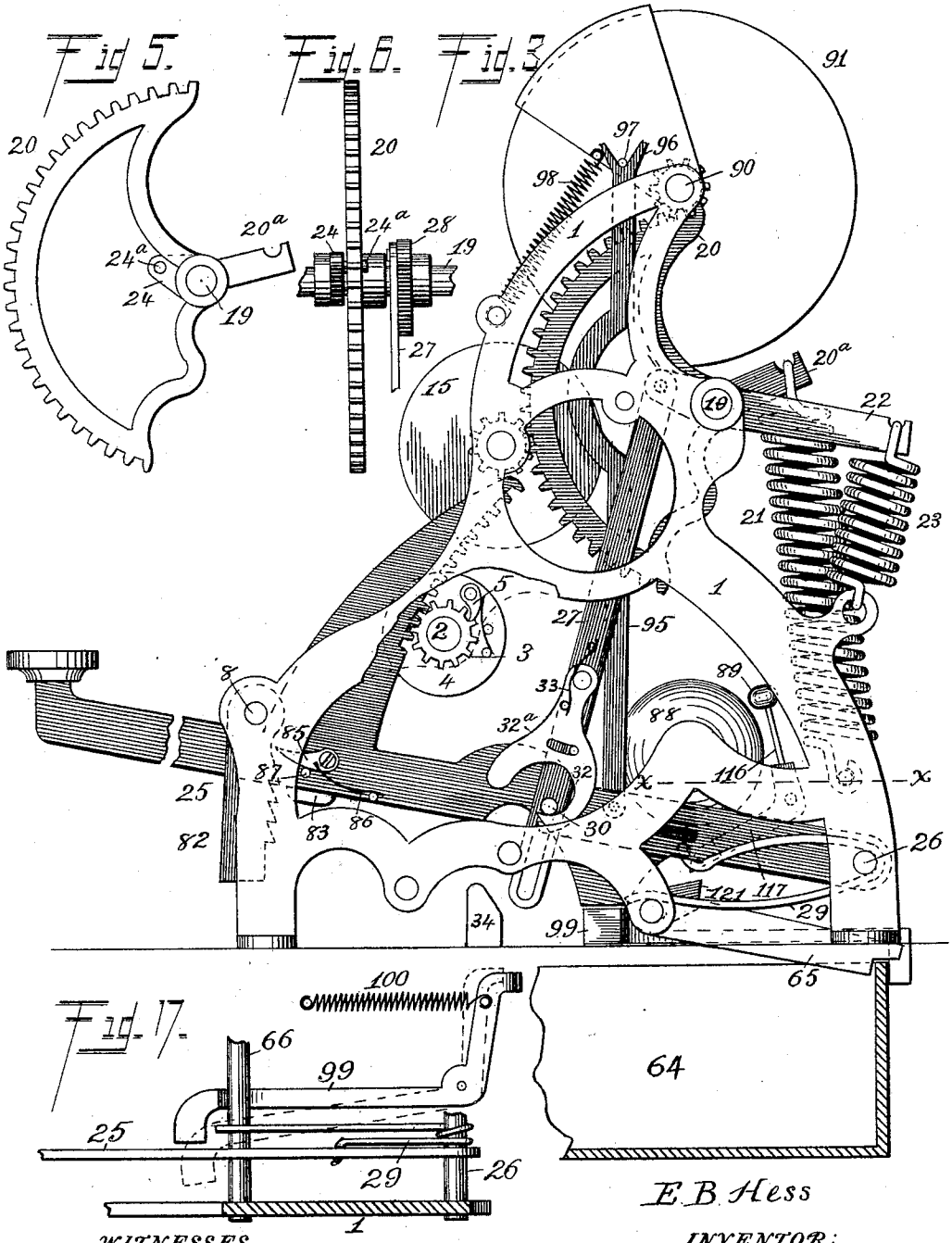
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E. B. HESS.

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No. 590,946. Patented Sept. 28, 1897.



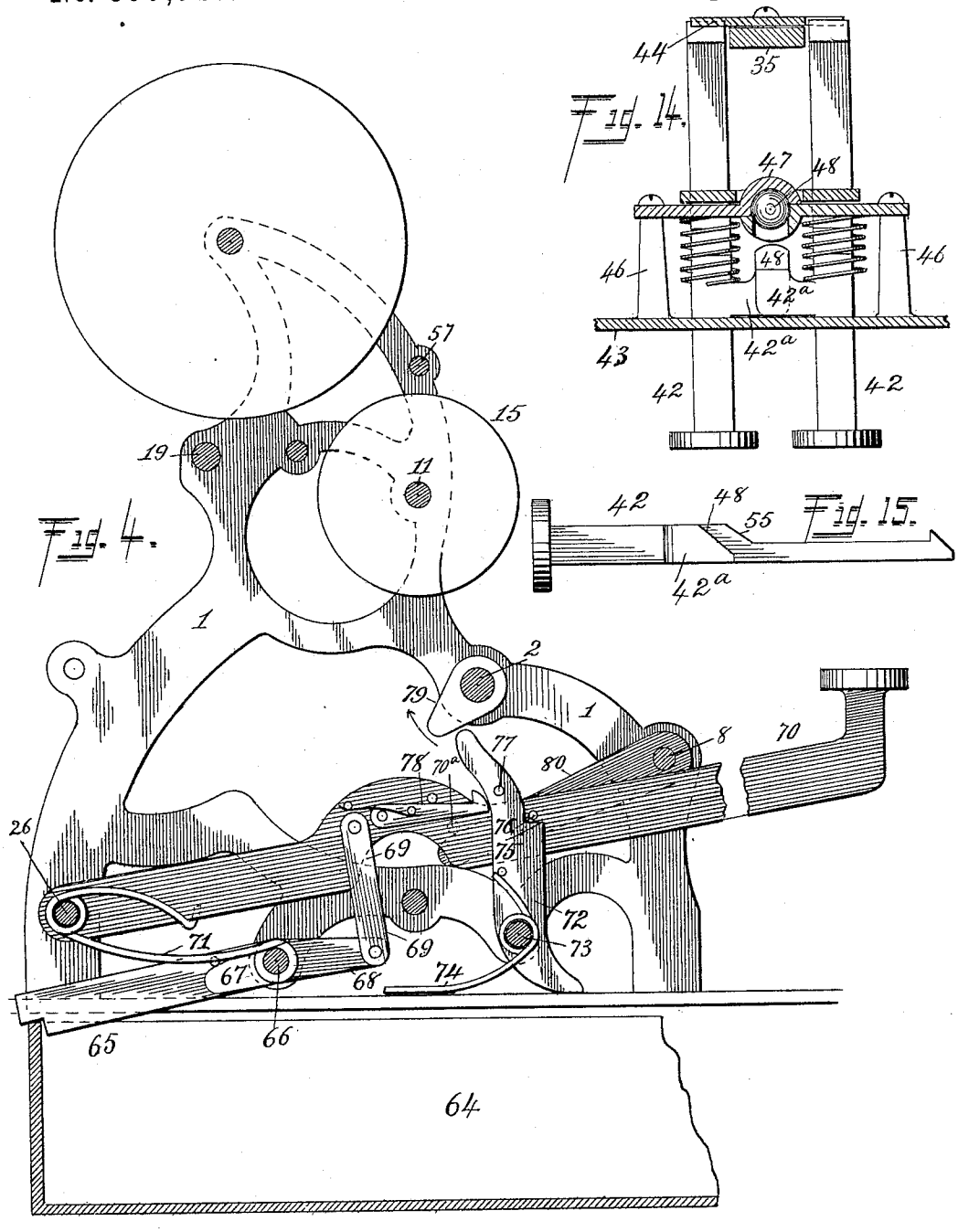
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E. B. HESS.

CASH REGISTER AND INDICATOR.

No. 590,946. Patented Sept. 28, 1897.



Witnesses:
J. H. Truitt
Wm. H. Bates

E. B. Hess
Inventor:
By D. B. Gallatin,
Attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

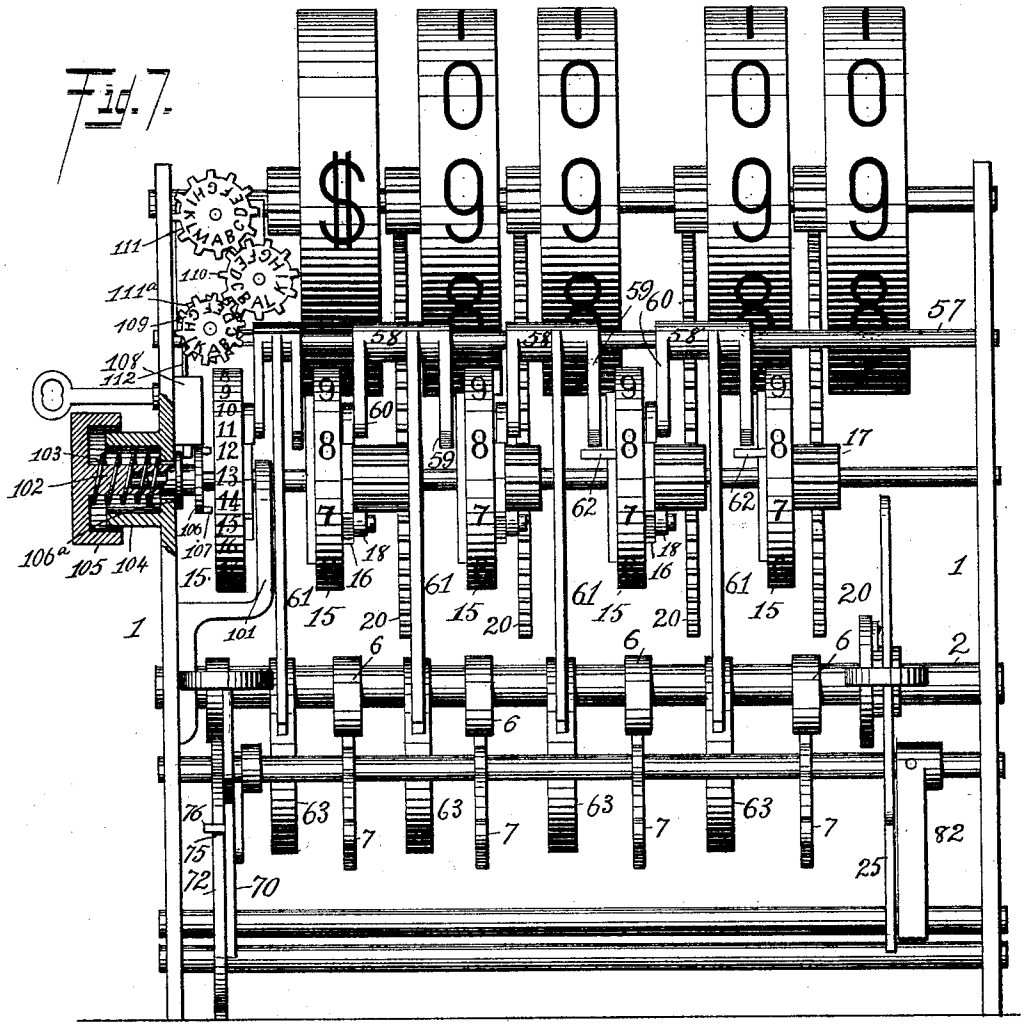
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E. B. HESS.

CASH REGISTER AND INDICATOR.

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Fig. 7.



Witnesses:

J. J. Frueh

Wm. H. Bates

E. B. Hess,
Inventor;

By D. B. Gallatin.
Attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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E. B. HESS.

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Fig. 10.

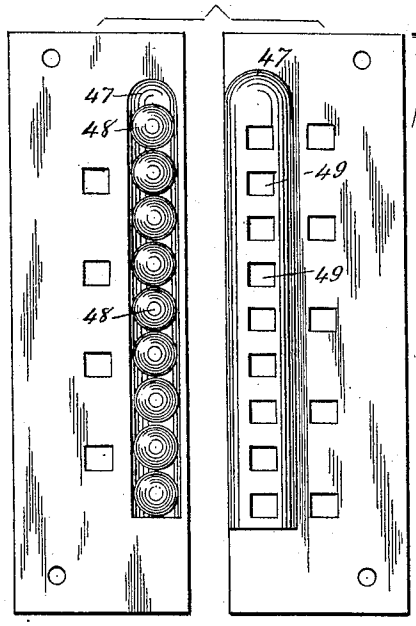


Fig. 11.

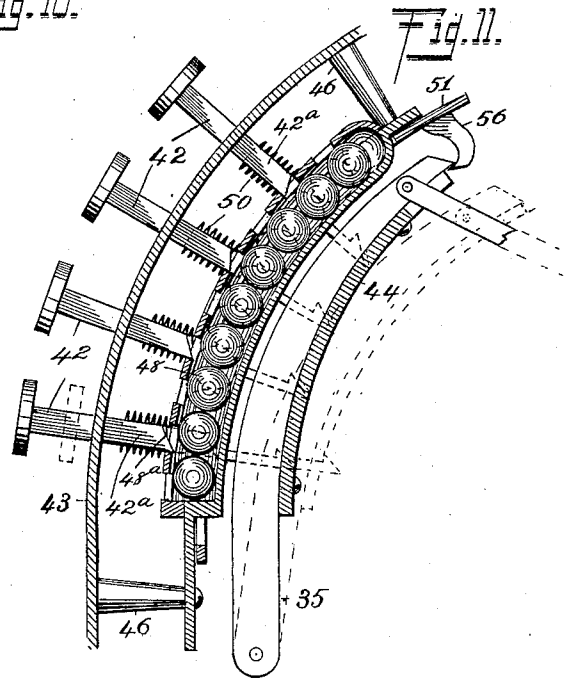


Fig. 12.

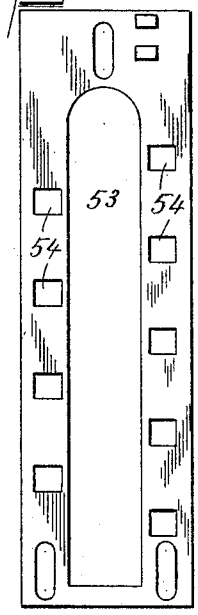


Fig. 13.

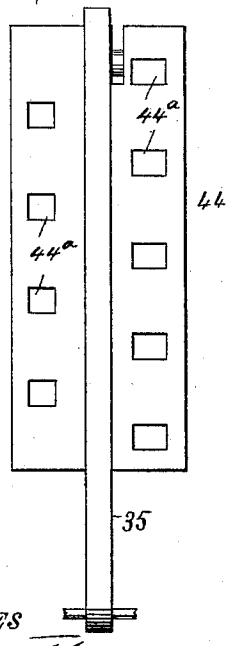
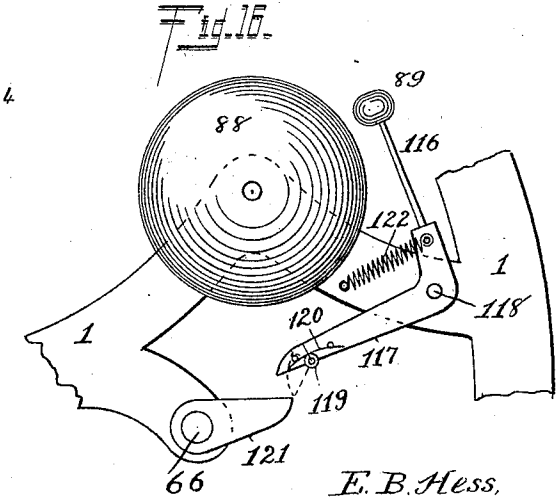


Fig. 16.



WITNESSES

J. H. Emmett

Wm. A. Bates

E. B. Hess,

INVENTOR;

By D. B. Gallatin,

Attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EDWARD B. HESS, OF NEW YORK, N. Y., ASSIGNOR TO THE CENTURY MACHINE COMPANY, OF SAME PLACE.

CASH REGISTER AND INDICATOR.

SPECIFICATION forming part of Letters Patent No. 590,946, dated September 28, 1897.

Application filed October 19, 1896. Serial No. 609,365. (No model.)

To all whom it may concern:

Be it known that I, EDWARD B. HESS, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Cash Registers and Indicators; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to that type or style of machines in which rotary register-wheels are controlled by longitudinally-movable pins, there being a series of pins for each wheel and each series adapted to be manipulated, one at a time, to limit the movements of the respective wheels according to the relative values of the pins.

Heretofore, so far as I am aware, the register-wheels of machines of the type to which this invention appertains have been actuated to effect registration by or through a manually-operated shaft provided with a crank-handle, the push-pins or keys having for their function merely to limit the angular movements of the register-wheels to set up the required amount. I now propose to operate the register-wheels by spring-actuated driving mechanism and to give the push-pins the additional function of holding said driving mechanism out of action and of releasing the same to put it in action, the object being to simplify and improve the construction and operation.

In the accompanying drawings, Figure 1 represents a front view of the machine; Fig. 2, a vertical section through the machine from front to rear, showing the spring-actuated driving mechanism and the means for holding the same out of action and for releasing it to throw it into action. Fig. 3 is a right-hand side view of the machine without the case. Fig. 4 is a vertical sectional view showing the means for locking and unlocking the release-key. Fig. 5 is a side view, and Fig. 6 a front elevation, of the driving segment-gear and connections for resetting the same. Fig. 7 is a front view of the registering and indicating mechanisms, certain portions being omitted to avoid confusion. Fig. 8 is a front view, and Fig. 9 a side elevation, of the carrying or transferring mechanism. Figs. 10, 11, 12, 13, 14, and 15 are detail views of portions of the mechanism hereinafter fully described, Fig. 11 being a vertical section and Fig. 14 a horizontal section through the same parts. Fig. 16 is a view in side elevation of the bell and bell mechanism. Fig. 17 is a broken section on the line $x\ x$ in Fig. 3.

Referring to the drawings, 1 1 designate the end standards, which, together with the shafts and transverse rods that support the operating mechanisms, constitute the frame of the machine.

15 designates the register-wheels, (five being shown,) loosely mounted on a rod 11, so as to be capable of rotating freely thereon. These register-wheels are numbered on their peripherical surfaces, as usual, and, commencing at the right, are intended to register, respectively, cents, tens of cents or dimes, dollars, tens of dollars or eagles, and hundreds of dollars. Each register-wheel except the first or lowest is provided at the side thereof with a ratchet-wheel 16, the purpose of which will be explained hereinafter. Adjacent to each ratchet-wheel except that at the left, and also adjacent to the lowest or right-hand register-wheel, is a pinion 17. These pinions are separate from the register and ratchet wheels and are capable of independent backward rotation, independent forward rotation being prevented by pawls 18. Thus when the pinions are driven in a forward direction they impart movement also to the register-wheels, but when driven backward they turn independently of the register-wheels, the latter remaining at rest. Obviously any suitable clutch mechanism may be substituted for the pawls 18.

In rear of and somewhat above the rod 11 is a parallel shaft 19, on which are loosely mounted segment-gears 20, formed with rearwardly-extending arms 20^a, to which springs 21 are applied to throw the gears backward, as indicated by broken lines in Fig. 2.

The segment-gears 20 mesh with the pinions

17, there being a gear for each pinion, and under the influence of the actuating-springs 21 exert a constant tendency to drive the pinions in a forward direction. The relative sizes of the pinions 17 and segment-gears 20 and the throw of the latter are such that the register-wheels may be advanced at a single throw from the lowest to the highest position—that is to say, from "0" to "9," or through nine-tenths of a rotation. After each registration the segment-gears require to be reset. This is accomplished by the following means: The shaft 19 carries a rigid arm 22, to which is applied a spring 23, that acts constantly to turn the shaft backward. The shaft also carries at the side of each segment-gear a short rigid arm 24, provided with a laterally-projecting pin 24^a, which overlies an arm of the gear, (see Figs. 2, 6, and 7,) so that when the shaft is rocked forward in the manner to be described presently the arm 24 and its pin or lug 24^a will turn the gear 20 forward to normal position and put its spring 21 under tension preparatory to a new registration. During the forward movement of the gears 20 from the position indicated by broken lines in Fig. 2 to that indicated by full lines the pinions 17 rotate idly, leaving the register-wheels in undisturbed position.

The resetting of the segment-gears 20 is effected by or through a lever 25, fulcrumed in the lower rear part of the frame, as at 26, and connected by a coupling-bar 27 with a forwardly-extending arm 28 of shaft 19. The lever 25 is normally held up by a spring 29, and it carries a laterally-projecting pin 30, which works in and extends through a slot 31 in the lower end of the coupling-bar 27. On said coupling-bar is pivoted a swinging hook 32, which is adapted to engage the pin 30, and which is drawn into engagement therewith by a spring 33. When the lever is depressed, the hook connection 30 32 draws the coupling-bar 27 down and rocks the shaft 19 forward, thereby causing the arm 24 and its pin 24^a to rock the segment-gear 20 forward in opposition to its spring 21, putting the latter under tension, as above explained. As the lever 25 approaches the limit of its downward movement an arm 32^a of the hook 32 strikes a cam 34, which forces the hook out of engagement with the pin 30, whereupon the shaft 19 returns to normal position under the influence of its spring 32. When the lever 25 is released, it is thrown up by its spring 29 and connection with the hook 32 is automatically reëstablished, the lower end of the hook being rounded or beveled to enable the pin 30 to pass. As soon as the pin passes the point of the hook the latter is drawn into engagement therewith by a spring 33.

The machine having been set or reset, as above explained, its operation in registering is as follows:

35 designates a swinging or vibrating arm pivoted at its lower end, as at 36, and arranged to swing back and forth. There is one of these arms for each of the first four register-wheels from the right, all connected in the same manner and all performing the same functions in connection with their respective wheels. It will therefore be sufficient to describe one of said arms and the connections and devices through which it controls its wheel.

37 designates a stationary rack suitably mounted in the frame of the machine, preferably in an inclined position, as shown. A small gear or pinion 38, coupled with the arm 35 at or near the top thereof, runs back and forth on this rack. Between the gear 38 and the pinion 17 and in gear with both is a double traveling rack 39, slotted longitudinally and mounted on and sustained by rods 40 41, which extend through the slot therein, the arrangement being such that the rack 39 stands and moves in a plane parallel to that of the stationary rack 37.

The machine having been set as already explained and the parts standing as indicated in full lines in Fig. 2, the springs 21 will be under tension, and their force will be transmitted through the segment-gears 20, pinions 17, racks 39, and gears or pinions 38 to the swinging arms 35, with a constant tendency to draw the latter back. It is therefore necessary to provide means for holding and releasing the arms 35 and means for controlling and regulating the extent of their movement in order to give to the register-wheels the proper amount of angular movement to effect the desired registration. The mechanism which I have devised for this purpose is as follows: Each swinging arm is controlled by push-pins 42, arranged in series, as represented in Figs. 1 and 2. Each series comprises nine pins representing different values from one to nine, inclusive, and for convenience I arrange them in two vertical rows, the pins of the two rows alternating with each other, as shown in Fig. 1. These pins project through the curved or rounded front of the register-case 43 at opposite sides of the swinging arms 35, and they are formed with hooked inner ends. On the inner side of each arm 35 is mounted a vertically-movable detent-plate 44, which is normally held down by a spring 45. These detent-plates are broader than the arms on which they are mounted, so that both edges project laterally beyond the arms, and they are formed with notches or openings 44^a for the reception of the hooked ends of the push-pins, the said notches or openings being so disposed that the beveled hooks in passing into and through the same lift the plates in opposition to the force of their springs 45. As soon as the hook of any pin passes through its opening in the detent-plate the latter is drawn down by its spring 45 and the hook and plate become interlocked, the movement of the arm 35 being then governed by the pin, the length or rather the range of movement of which after it becomes interlocked with the detent-

plate determines the range of movement of the arm. All the pins are approximately of the same length, but by reason of their being arranged at different distances from the pivot of the arm 35 they permit different degrees of movement of the latter, the lower pin giving the greatest movement and the upper one the least.

To prevent operation of two or more pins or keys at the same time—that is, in the same series—I provide the following controlling devices: Mounted on studs 46, projecting from the inside of the case 43, is a tubular chamber 47, extending vertically between the two rows of pins, which chamber contains a series of spherical balls 48 of a size corresponding with the vertical space occupied by one pin. The pins 42 are formed with arms 42^a, which project toward the ball-chamber and have their ends beveled, as at 48^a, and the ball-chamber is slotted or has openings 49 therein for the reception of the arms 42^a. The push-pins or keys are normally held outward by springs 50, and when pushed in the beveled ends of the arms 42^a enter the ball-chamber and, passing between the balls, spread the latter apart. The chamber should contain nine balls—one for each pin—and its length should be such that the pushing in of one pin and the separation of the balls by its arm 42^a will fill it and prevent a second pin from being pushed in. It is necessary that the arm 35 be held against movement while the pins 42 are being pushed in until the hooks on the latter pass through the detent-plate 44 and become interlocked therewith. This I accomplish by means of a vertically-movable plate 51, mounted on the flanges of the ball-chamber 47, whereby the latter is attached to the studs 46, said plate being normally held down by a spring 52. This plate 51 has a longitudinal opening 53 for the reception of the ball-chamber in order that it may lie close against the flanges of the latter, and it has openings 54, through which the push-pins 42 extend, the flanges of the ball-chamber being also provided with corresponding openings. The push-pins are formed with beveled shoulders 55, located with respect to the plate 51 so that as the pins approach the limit of their inward movement they raise the plate in opposition to its spring 52. At the upper end of the plate 51 is a hook 56, which engages the upper end of the arm 35 and holds the latter in its forward position. When any pin 42 is pushed in, it raises the plate 51 and releases the arm 35, leaving the latter free to swing inward under the influence of the actuating-spring 21, as already explained. Both the hook 56 and the end of the arm 35 are beveled, so that when the latter returns to normal position under the influence of the resetting mechanism it will raise the hook and pass thereunder automatically.

The machine having been operated to make a registration, it is necessary to disengage the detent-plate 44 from the hook of the operated push-pin in order that the arm 35 may return to normal position. This is effected as follows: On the resetting-lever 25 is formed a segmental rack 25^a, and on a transverse shaft 2 is loosely mounted a small gear or pinion 3, which meshes with said rack. At the side of the gear 3 is a flange or rim 4, fast on the shaft and carrying a pawl 5, which engages the pinion, the arrangement being such that when the lever 25 is depressed the gear and shaft will rotate together in a forward direction, but when the lever returns to normal position under the influence of its spring 29 the pinion will rotate backward independently of the shaft, the latter remaining at rest. Manifestly any suitable clutch mechanism may be substituted for the pawl 5. The shaft 2 also carries a cam 6, which operates a lever 7, fulcrumed on an axis 8, the front end of which lever underlies the detent-plate 44, the arrangement being such that the cam 6 operates the lever 7 at the initial movement of the lever 25 to break the connection between the detent-plate and the operated push-pin. The connection having been broken, the push-pin is retracted by its spring 50 and the arm 35 returns to "normal" gradually under the influence of the resetting mechanism—that is, during the continued downward movement of the lever 25.

The front end of the lever 7 is curved concentrically with the axis of arm 35, so that it will always bear the same relation to the detent-plate in whatever position the arm 35 may stand.

It may be proper to state here that I find it convenient to make the ball-chamber 47 in two parts, each comprising one-half of a hollow cylinder with a flange projecting from one side thereof, as shown in cross-section in Fig. 14, the two parts when put together constituting a tubular chamber with oppositely-extending flanges adapted to be bolted to the studs 46.

The next feature of my invention to be described is the carrying or transferring mechanism whereby the "tens" are carried or transferred from one register-wheel to the next higher wheel. This mechanism is illustrated in Figs. 7, 8, and 9, and the construction and operation thereof are as follows: Above and between each two register-wheels is mounted a sleeve 58, which carries three rigid arms or levers 59 60 61. The arm 59, which stands at the side of the primary register-wheel—that is, the wheel of lower order—has a cam 59^a thereon, which normally stands in the path of a laterally-projecting pin 62 on said primary wheel. This pin 62 is located with respect to the cam 59^a and to the numerals on the wheel so that during the movement of the wheel from its highest to its lowest position—that is, from "9" to "0"—the pin passes under the cam and raises the arm 59 to the position indicated in Fig. 9 by broken lines. The arm 60 carries a pawl 60^a, which engages the ratchet 16 of the sec-

ondary or higher wheel, and the relations and proportions of these several parts are such that when the arm 59 is raised by the pin 62 the pawl 60^a is retracted and brought into engagement with the next tooth of the ratchet, the arm 61 being at the same time thrown toward the shaft 2, on which is a cam 63 in position to act on said arm when the shaft is rotated in the operation of resetting the actuating mechanism, as already explained. It will be understood, then, that the carrying or transferring is not effected by or during the movement of the lower wheel in making a registration, but during the operation of resetting, when the cam 63 returns the arms or levers 59 60 61 to normal position, (indicated by full lines in Fig. 9,) such return causing the arm 60 and its pawl 60^a to advance the secondary wheel one step.

This machine, like others, is provided in the base thereof with a sliding cash-drawer or till 64 for the reception of money received and registered. This drawer is locked in closed position by a gravity-latch 65, which drops automatically into engagement with the rear end thereof when the same is closed. The latch is loosely mounted on a shaft 66 at the side of a short arm 67, which is fast on the shaft and which underlies a laterally-projecting pin 65^a on the latch. The shaft 66 has also a rigid forwardly-extending arm 68, which is coupled by a link 69 with a lever 70, (which I denominate the "release-key,") fulcrumed at the rear of the machine, preferably on the rod 26, which forms also the fulcrum of the resetting-lever 25. (See Fig. 2.) This lever 70 is normally held up by a spring 71, and when depressed it rocks the shaft 66, throwing up the arm 67, lifting the latch 65, and releasing the drawer, which is then free to move forward and open. Normally the lever 70 is locked by a swinging dog 72, fulcrumed on a rod 73 and thrown forward into locking position by a spring 74. The dog 72 is formed with a shoulder 75, which when the lever 70 is in its normal position and the dog in action underlies a laterally-projecting pin 76 on the lever to prevent the latter from being depressed. The dog 72 also has a laterally-projecting pin 77, which when the dog is swung back is engaged by a spring-hook 78, pivoted on the side of the lever 70, to hold the dog out of action.

The operation of these devices is as follows: In resetting the actuating mechanism of the machine, as already explained, the shaft 2 is rotated in a forward direction. This shaft carries a cam 79, which acts against the upper end of the dog 72 and turns same backward until the hook 78 engages the pin 77, after which the cam passes the dog, the latter being then retained in inoperative position by the hook. The lever 70 is now free to be depressed to unlock the drawer, but by such depression the hook 78 is carried down out of engagement with the pin 77, leaving the dog free to respond to its spring 74. The dog then rests against the pin 76, and as soon as the lever is released and resumes its normal position the shoulder 75 passes under the pin 76 and locks the lever, so that it cannot be again operated without first operating the resetting mechanism. The cam 79 is so arranged on the shaft 2 that it operates the dog 72 during the final movement of the shaft, which also completes the resetting operation. This prevents any possibility of the drawer being opened before the machine is fully reset.

8 designates an oscillating shaft mounted in the front of the frame-standards and provided with a rigid backwardly-extending arm 80, which stands at the side of and in close proximity to the lever 70, and the free end of which underlies a laterally-projecting pin 70^a on the lever, (see Fig. 4,) the arrangement being such that when the lever 70 is depressed the shaft 8 is rocked backward and such that the lever may return to normal position independently of the arm 80. Manifestly the pin 70^a might be on the arm 80 and underlie the lever 70, in which case the operation would be precisely the same. The shaft 8 has also fast on it a depending arm 82, which stands and swings in a plane at the side of the resetting-lever 25, which latter is provided with a laterally-extending lug or projection 83, with which the arm 82 is adapted to engage and hold the lever down after it has been operated to reset the machine, and it remains in this position until the release-lever is operated to unlock the till. The depression of the lever 70 rocks the shaft 8 and throws the arm 82 out of engagement with the lug 83, permitting the lever 25 to respond to its spring and return to normal position. On the back of the arm 82 are formed downwardly-pointing teeth 84, (shown in broken lines in Fig. 3,) and on the side of the lever 25 is mounted a spring-pressed catch 85, arranged to ride down over the teeth 84 when the lever is depressed. The catch is free to turn upward in opposition to its spring 86, but is prevented from turning downward by a stop-pin 87. This arrangement is intended to prevent fraudulent manipulation by compelling the lever 25 to be moved through the whole range of movement before it can return to normal position.

In the practical operation of this machine it is intended that after registering a sale and depositing the proceeds in the cash-drawer it shall remain unset until the next transaction and that the resetting be done preparatory to registering the next sale. It will be understood from the foregoing description that there is an interdependence between the two levers 25 and 70 in that the release-lever 70 is unlocked in the operation of resetting the actuating mechanism and in that the resetting-lever 25 is unlocked in the operation of unlocking the cash-drawer, so that either of

said levers having been operated it cannot be operated again until after the other has also been operated.

In the top of the machine, on a rod 90, I mount a series or rotary indicators 91, which correspond with the register-wheels 15 and are intended to prevent fraudulent registration by indicating to the purchaser or to others in the establishment the amount registered, which is of course the amount of the sale. These indicators are provided with pinions 92, fast thereon and corresponding in size with the pinions 17 of the register-wheels below. The pinions 92 are also in mesh with the segment-gears 20, so that synchronous movements are imparted to corresponding register and indicator wheels by the same actuating mechanism.

The indicators show through a sight-opening 93 in the front of the case, and they are provided with a movable screen 94, adapted to be moved to positions to hide or expose them, as usual. The screen is operated by the resetting-lever 25, through a connecting-rod 95, which when the lever is released and is thrown up by its spring 29 raises the screen to expose the indicators. Heretofore the rod 95 has been positively connected with the screen, so that the latter was absolutely under the control of the actuating devices when moving in either direction. I find it expedient to provide a separable connection between the screen and the actuating-lever, for the reason that violent manipulation is liable to break or injure the ordinary pivot connection and render the screen inoperative. I therefore form at the upper end of the rod 95 a fork 96, which receives a pin 97, projecting from the ear of the screen, and I apply to the screen a spring 98, which has a constant tendency to draw it down. If, therefore, the lever 25 be violently operated, the connection between the screen and the rod 95 will be broken temporarily, but the screen under the influence of its spring 98 will follow the rod and connection will be reëstablished. It is desirable that the resetting mechanism be locked and rendered incapable of operation while the drawer is open, and for this purpose I provide the following devices:

On the base of the machine is pivoted a lever 99, one end of which projects down into the path of the drawer, and the other is adapted to move under and away from the resetting-lever 25. A spring 100, applied to the lever 99, has a constant tendency to throw one end toward the drawer and the other under the lever 25. When, therefore, the drawer is opened, the spring 100 throws the lever 99 around into locking position, and the resetting mechanism is then incapable of being operated so long as the drawer is open, but when the drawer is closed it turns the locking-lever back to normal position and leaves the resetting mechanism free to be operated.

It is sometimes desirable to reset the register to zero before it has been operated through the whole range of movement—that is, before the limit of registering capacity has been reached—and for this purpose I provide the following means:

The left-hand end of shaft 11, which sustains the register-wheels, projects into or through an enlarged opening in the frame-standard and has its bearing in a bracket-arm 101 at the right of the last or highest register-wheel. On the projecting end of the shaft is loosely sleeved a key 102, capable of rotating thereon and of moving longitudinally into and out of engagement with the last register-wheel. The key is normally out of engagement with the register-wheel, being pressed and held out by a spring 103, located on the shank or stem thereof within a housing 104, which may be formed on the frame-standard 1 and project out through an opening in the case 43, or it may be formed on or attached to the case, as may be found most expedient. The outer end of the key has a flanged head 105, whereby it is adapted to be turned, the flange overlapping and forming a telescopic joint with the housing 104. The bit of the key comprises a disk 106, with one or more projections 107 thereon, which when the key is pressed in engage the register-wheel. Then by turning the key the register-wheel may be set to zero, or to any position desired. The other wheels, which are controlled by the keys, are conveniently and expeditiously brought to zero by ordinary manipulation, and therefore require no resetting mechanism.

The outward movement of the key 102 is limited by a collar 106^a, which serves also to prevent inward movement when engaged by the sliding bolt of a lock 108, the key of which is supposed to be in the possession of the proprietor or his authorized agent. When the lock-bolt is retracted, the key 102 is free to be operated, but when it is shot the key is locked in inoperative position to prevent the register from being reset or tampered with surreptitiously by unauthorized persons.

When the removable key of the lock is entrusted to a subordinate, the proprietor may from time to time desire to know how many times the register has been reset during his absence, and that this may be ascertained I provide a telltale mechanism, which comprises a series of lettered (or numbered, if preferred) wheels 109, 110, 111, preferably of unequal sizes, geared together as shown, one wheel of the series being provided with a ratchet 111^a, which is engaged and operated by the projecting end of the lock-bolt 112 when the latter is retracted to release the resetting-key 102. The letters on the telltale-wheels show through openings 113 in the front of the register-case, (see Fig. 1,) so that whenever the combination of letters is changed by unlocking the resetting-key the fact will be shown by the new combination brought into view. The number and the order of the let-

ters on the several telltale-wheels being known the number of times the key 102 has been unlocked may easily be determined. It is desirable that the push-pins or keys be locked and rendered incapable of being operated during the interval between the opening of the cash-drawer and the resetting of the actuating mechanism, and for this purpose I provide the following devices: A pivoted dog 114 is arranged in such relation to the detent-plate 51 that it may be turned into and out of engagement therewith, as indicated by full and broken lines in Fig. 2. This dog is coupled with the resetting-lever by a coupling-rod 115, the arrangement being such that when the said lever is up the dog is in engagement with the detent-plate and prevents movement thereof, so that the keys cannot be pushed in, but when the lever is down the dog will be out of engagement, leaving the detent-plate free to move when a key is operated. It will be remembered that when the resetting-lever 25 is depressed to reset the actuating mechanism it is engaged and held by the swinging arm 82, and remains down until the release-lever is operated to open the till; also, that in use it is designed that the actuating mechanism shall remain unset after a transaction or sale has been registered until the next sale has been made and that the resetting is preliminary to and immediately precedes a registration. It will therefore be understood that during the interval between the opening of the till to deposit the proceeds of a sale or transaction and the resetting of the actuating mechanism the detent-plate 51 is locked so that it cannot yield when a pin or key is pressed and that the time during which the push-pins or keys are free to be pushed in is the time between resetting and opening the drawer or till. It will be seen, therefore, that after a sale has been registered and the proceeds deposited in the till the machine is absolutely inoperative so long as its actuating mechanism remains unset, and that there is therefore no danger of false or fraudulent registration either by accident or design during the absence of the clerk or salesman or while his attention is directed elsewhere.

This machine, like others, is provided with an alarm-bell, which rings at the opening of the till to prevent surreptitious opening of the latter. In this instance the bell also gives notice that the machine has been properly operated to release the resetting-lever 25 and lock the push-pins or keys, as above set forth.

88 designates the bell, which is mounted at any suitable or convenient point on the frame of the machine, and 89 is the bell-hammer, which is carried by the resilient arm 116 of an angular lever pivoted at 118. The other arm 117 of this lever is jointed at 119, the end piece being capable of turning down, as indicated by broken lines in Fig. 16, and being held up by a spring 120. This jointed piece stands in the path of an arm 121, rigid on shaft 66, the arrangement being such that when said shaft is rocked forward by the depression of the release-lever 70 in the operation of opening the till, as heretofore explained, the arm 121 will raise and then pass the arm 117, whereupon the bell-hammer is thrown against the bell by a spring 122. On the return movement of the arm 121 it depresses and passes the jointed part of arm 117, which then resumes its normal position under the influence of the spring 120.

Many modifications in the mechanisms above described will suggest themselves to the skilled mechanic, and I therefore do not limit myself to the exact details of construction as described, but wish my claims construed to cover such changes and modifications as fall fairly within the scope of my invention. For instance, I may dispense with the stationary rack 37 and the traveling pinion 38 and couple the arm 35 to the traveling rack 39. So, also, I may apply the actuating-spring 21 to the lever 35 or to the traveling rack 39 without in any manner changing the operations described, or I may divide the spring-power, applying a portion thereof to the segment-gears and the balance to the arms 35.

Having now described my invention, I claim—

1. The combination with the indicator-wheel and its actuating gear and spring, of an oscillatory shaft and means thereon for moving the actuating-gear in opposition to its spring, a hand-lever having a laterally-projecting pin, a connecting-rod coupled with an arm of said shaft, a spring-pressed hook pivoted on said connecting-rod and adapted to swing into and out of engagement with the pin on the hand-lever, and a cam arranged to throw the hook out of engagement with the pin during the movement of the lever, whereby the shaft, after having been rocked to move the actuating-gear is permitted to return to normal position.

2. The combination with the indicator-wheel and its actuating gear and spring, of an oscillatory shaft, means on said shaft for moving the gear in opposition to its spring, a hand-lever, means for holding and releasing the same, a separable connection between said hand-lever and an arm of said shaft, and means for automatically breaking the connection during the movement of the lever.

3. The combination of an indicator-wheel provided with a pinion at the side thereof, a spring-actuated gear in mesh with the pinion, a second pinion also in mesh with said gear, a double-faced traveling rack in mesh with the second pinion, a stationary rack, a traveling gear between the stationary rack and the traveling rack, and means for limiting the range of movement of said traveling gear, the whole operating to limit the movement of the indicator-wheel.

4. The combination with the indicator-wheel and the spring-actuated gear for driving the same, of a stationary rack, a traveling rack, a pinion between the traveling rack

and the spring-actuated gear, a traveling gear between the stationary and movable racks, and means for limiting the movement of the traveling gear.

5. The combination with the indicator-wheel and the gear for driving the same, a swinging arm, gear connections between said arm and the indicator-wheel, a detent to engage and hold the arm in its forward position, push-pins arranged to operate the detent and release the arm, and means for locking the push-pins and the arm together to limit the swinging movement of the latter.

6. The combination of a spring-actuated indicator-wheel, a swinging arm geared therewith by traveling connections, means for holding and for releasing said arm, and means for determining the movement thereof.

7. The combination of a spring-actuated indicator-wheel, a swinging arm geared therewith and moved thereby, and a series of longitudinally-movable finger-keys having substantially uniform ranges of movement arranged to engage the arm at varying distances from its pivot for varying the throw of the arm and the angular movement of the indicator-wheel.

8. The combination of a register-wheel, a pinion loosely mounted at the side thereof, a spring-actuated gear in mesh with said pinion, a clutch between the pinion and register-wheel arranged to cause the latter to rotate with the former in a forward direction and to permit independent backward rotation of the pinion, a reciprocating rack in mesh with said pinion, a stationary rack parallel to the reciprocating rack, a traveling gear between said racks, and means for limiting the movement of the traveling gear.

9. The combination of rotary registering and indicating mechanisms, means for actuating the same, a swinging arm connected with, and moved by, the actuating mechanism through intermediate connections, a series of numbered push-pins or keys arranged at varying distances from the pivotal point of said swinging arm, means for connecting the arm with said pins to limit the movement thereof, and means for holding and releasing the arm.

10. The combination of rotary registering and indicating mechanisms, means for actuating the same, a swinging arm connected with the actuating mechanism by intermediate gearing, a series of push-pins or keys arranged at varying distances from the pivotal point of said swinging arm and having hooks at their ends, a detent connected with said arm to engage said hooks, and means for disengaging said detent.

11. The combination of rotary registering and indicating mechanisms, means for actuating the same, a pivoted swinging arm connected with, and operated by, said actuating means through intermediate gearing, a series of push-pins or keys arranged at varying distances from the pivotal point of said arm and provided with hooked inner ends, a detent on said arm to engage said hooked ends, a detent for holding said arm, and cams on the pins for operating the last-named detent to release the arm.

12. The combination of rotary registering and indicating mechanisms, means for actuating the same, a pivoted swinging arm connected with, and operated by, said actuating means, a detent for holding said arm, and a push-pin provided with a cam for disengaging the detent and releasing the arm.

13. The combination of rotary registering and indicating mechanisms, means for actuating the same, a swinging arm connected with the actuating means, a spring-actuated detent for engaging and holding said arm, a series of push-pins or keys each having a cam for operating said detent to release the arm, and a second detent carried by the arm to engage the operated pin and limit the movement of said arm.

14. In a register and indicator the combination of a series of longitudinally-movable keys provided with longitudinally-extending arms, a ball-chamber with openings for the reception of said arms, a series of balls in said chamber, the length of the latter being such that the entrance thereinto of one of said arms will fill the chamber and prevent the operation of a second key, a swinging arm with means thereon for engaging and interlocking with the operated key to limit the movement of the arm, and registering and indicating mechanisms controlled by said arm, the several keys being arranged and adapted to arrest the movement of the arm at different points in the range of its movement.

15. The combination of a resettable indicating mechanism, a hand-lever for resetting the same after operation, and means for automatically engaging and holding said lever at the end of its operative movement, a release-lever and intermediate devices unlocking the resetting-lever, and devices under the control of the resetting-lever for automatically locking the release-lever after operation, the arrangement being such that each of said levers is unlocked by the other, and such as to require alternate operation of the two to restore them to operative condition.

16. The combination with a resettable indicating mechanism, of a pivoted swinging arm geared therewith, a detent on said arm, push-pins adapted to engage and interlock with said detent, a rotatable shaft and devices operated thereby to operate said detent and release the push-pins.

17. In a register the combination of primary and secondary register-wheels, that is to say, wheels of different orders, the primary wheel having a projection thereon and the secondary wheel a ratchet at the side thereof, and a carrying or transferring mechanism comprising a lever having two arms standing in different planes of movement, one of said arms carrying a pawl to engage the ratchet of the

secondary wheel, and the other standing normally in the path of the projection of the primary wheel and adapted to be operated thereby to retract the pawl and lever, and means for operating said lever to advance the secondary wheel.

18. The combination of primary and secondary register-wheels, the first having a projection thereon and the second a ratchet, of a carrying or transferring mechanism comprising a three-armed lever, one arm standing normally in the path of the projection on the primary wheel, the second arm carrying a pawl adapted to act upon the ratchet of the secondary wheel, and a rotatable shaft carrying a cam adapted to operate the third arm of said lever, the arrangement being such that the projection on the primary wheel will operate the lever and retract the pawl, and such that the said cam will restore the lever to normal position and cause the pawl to advance the secondary wheel.

19. The combination with the registering and indicating mechanisms, and with the driving-gear therefor, of a resetting mechanism comprehending a rotatable shaft, a vibrating lever, means for holding and releasing said lever, a rack connected with said lever, a pinion loose on said shaft, and a clutch mechanism arranged to permit independent rotation of the pinion in one direction but not in the other.

20. In a register the combination with the wheel of highest order, and with the shaft on which it is loosely mounted, of a longitudinally-movable key for turning said wheel mounted on the projecting end of the shaft and adapted to be moved into and out of engagement with the wheel, and a reciprocating bolt adapted to lock said key in inoperative position.

21. In a register the combination with the wheel of highest order, of a longitudinally-movable and rotatable key for turning the same, a spring for normally holding said key out of action, a telltale mechanism, and a reciprocating bolt arranged and adapted to lock the said key in inoperative position when moved in one direction and to operate the telltale mechanism when moved in the opposite direction.

22. The combination of an indicator, a movable screen for hiding and exposing the same, a swinging or vibrating lever, and a separable connection between the lever and the screen, whereby the lever is adapted to move in one direction independently of the screen.

23. The combination of an indicator, a spring-pressed screen for hiding and disclosing the same, a hand-lever, a push-bar positively connected with said hand-lever for moving the screen in opposition to its spring, and a separable connection between the screen and lever whereby the latter is permitted to move in one direction independently of the screen and whereby the push-bar is moved positively in both directions.

24. In a cash register and indicator the combination with the actuating and controlling mechanisms, of a detent for holding the actuating mechanism out of action, keys arranged and adapted to operate said detent to release the actuating mechanism, and a resetting lever or key, and devices controlled thereby for locking the detent against the operation of the keys.

25. In a cash register and indicator the combination with the registering and indicating mechanisms, and with the actuating mechanism therefor, of a detent for holding the actuating mechanism out of action, means for operating the detent to throw it out of action, a pivoted dog for locking the detent in active position, and a pivoted lever for operating said dog to throw it into and out of action.

26. The combination with the registering and indicating mechanisms and with the actuating mechanism therefor, of a swinging arm provided with a detent, movable keys adapted to engage said detent and limit the movement of the arm, a second detent arranged and adapted to hold the arm and to be thrown out of action by the keys after the latter become engaged with the first-named detent, a dog for locking said second detent in engagement with the arm, and a lever for throwing the said dog into and out of action.

27. In a cash-register the combination of an alarm-bell, a bell-hammer having a lever-arm, an oscillatory shaft having an arm arranged to engage the lever-arm of the bell-hammer to operate the latter, and a release mechanism comprehending a hand-lever for operating the same, said lever being coupled with an arm of said oscillatory shaft, whereby the release mechanism and the bell-hammer are operated simultaneously.

28. In a cash-register the combination of a sliding drawer or till, means for locking and unlocking the same, the unlocking means comprehending a hand-lever, a lever pivoted on the base of the machine in position to lock and unlock said hand-lever, and a spring to throw said locking-lever into action, the locking-lever being adapted to be thrown out of action by the drawer when the latter is closed.

29. In a cash-register the combination of a sliding drawer, means for automatically engaging and holding the drawer in closed position, means for releasing the drawer comprehending a hand-lever, a pivoted lever arranged to lock and unlock said hand-lever, and a spring for throwing it into action when the drawer is open, the said locking-lever having an arm projecting into the path of the drawer to be operated by the latter to unlock the hand-lever when the drawer is closed.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD B. HESS.

Witnesses:
WM. M. CHRISTIE,
D. B. GALLATIN.