

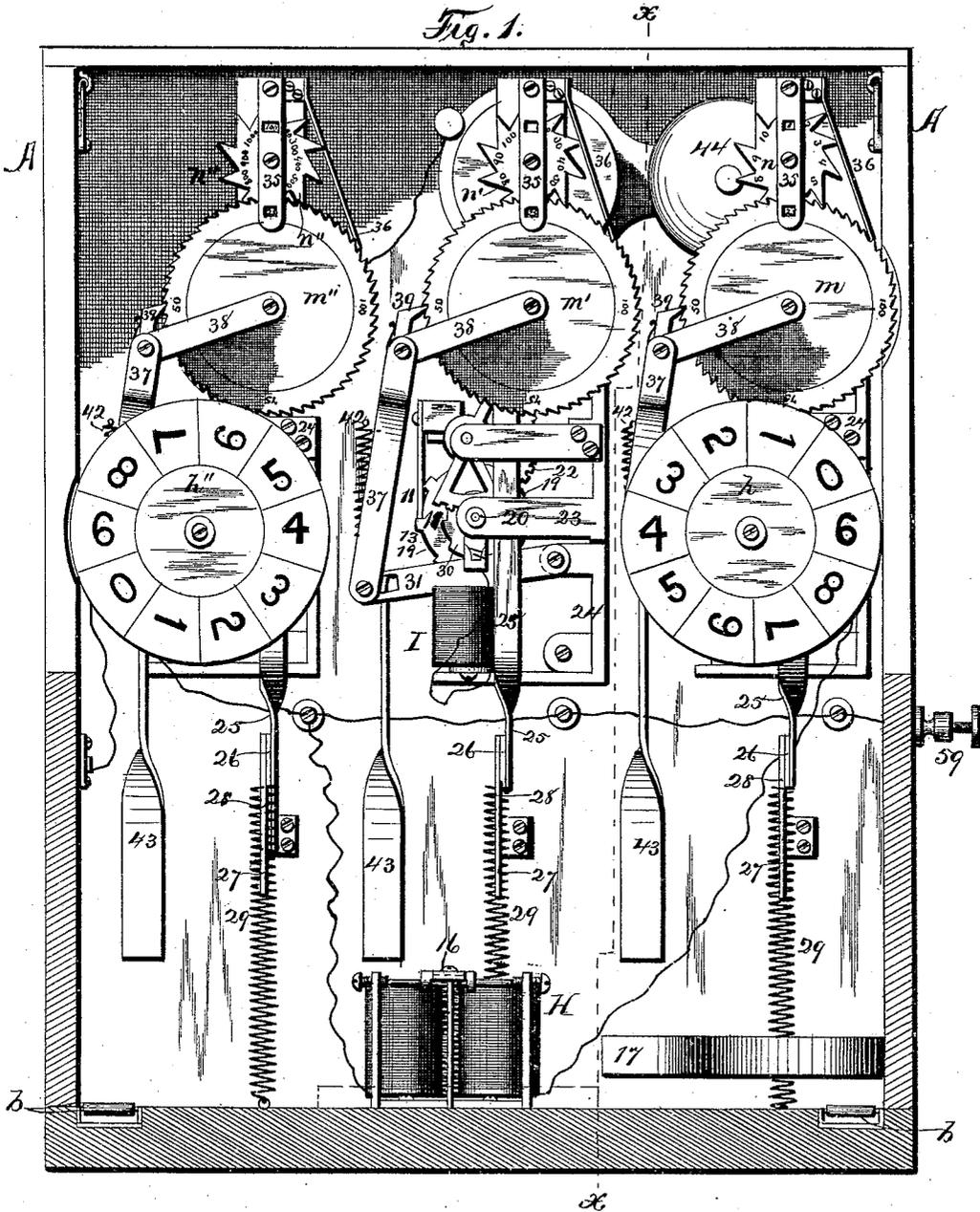
(No Model.)

9 Sheets—Sheet 1.

W. L. BUNDY.  
ELECTRIC CASH REGISTER.

No. 443,475.

Patented Dec. 23, 1890.



Witnesses  
*Harry S. Roberts*  
*Walter Allen*

*Willard L. Bundy* Inventor  
By his Attorneys  
*Smith & Denison*

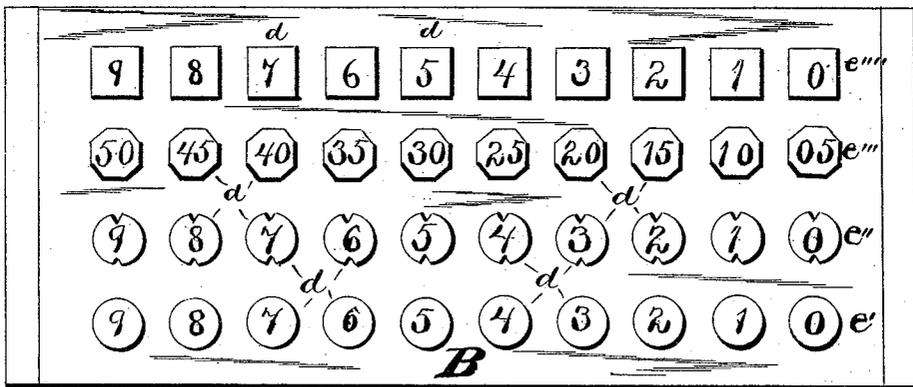
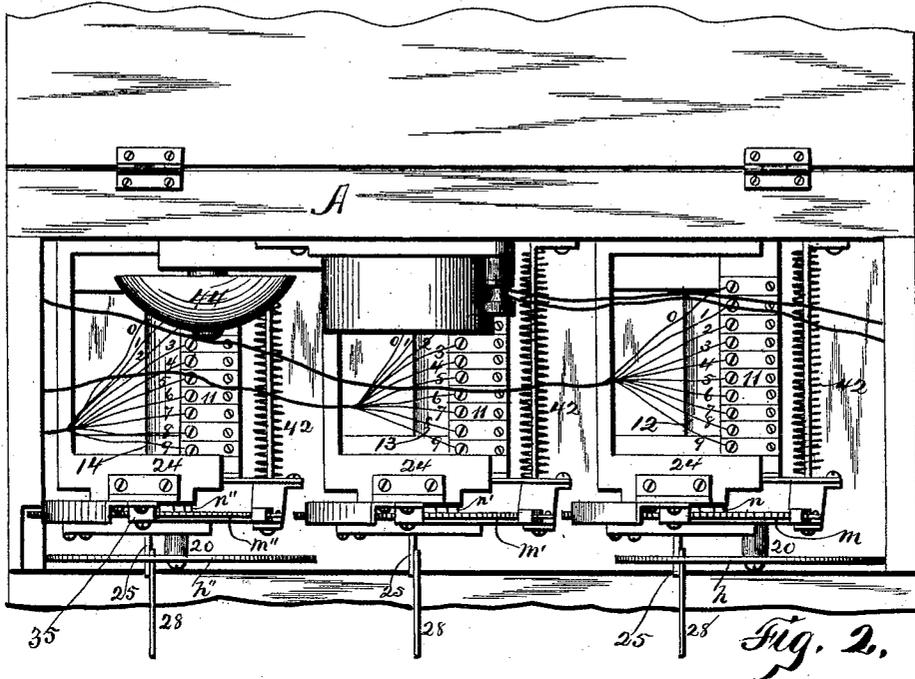
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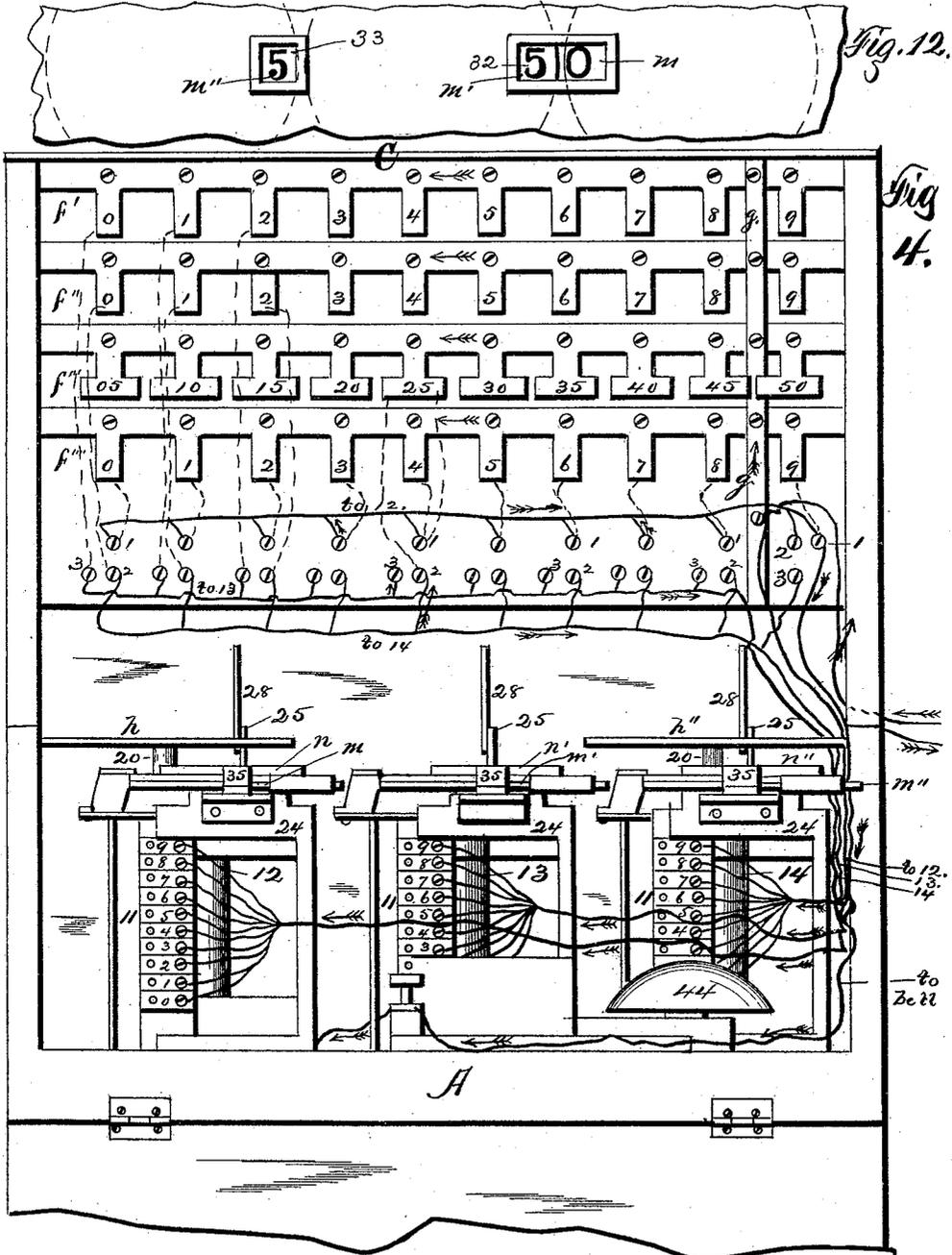
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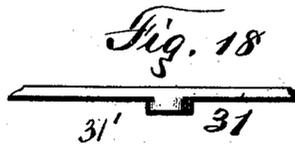
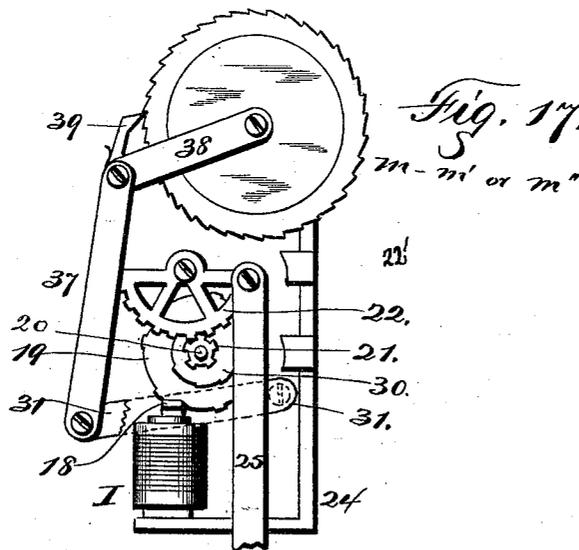
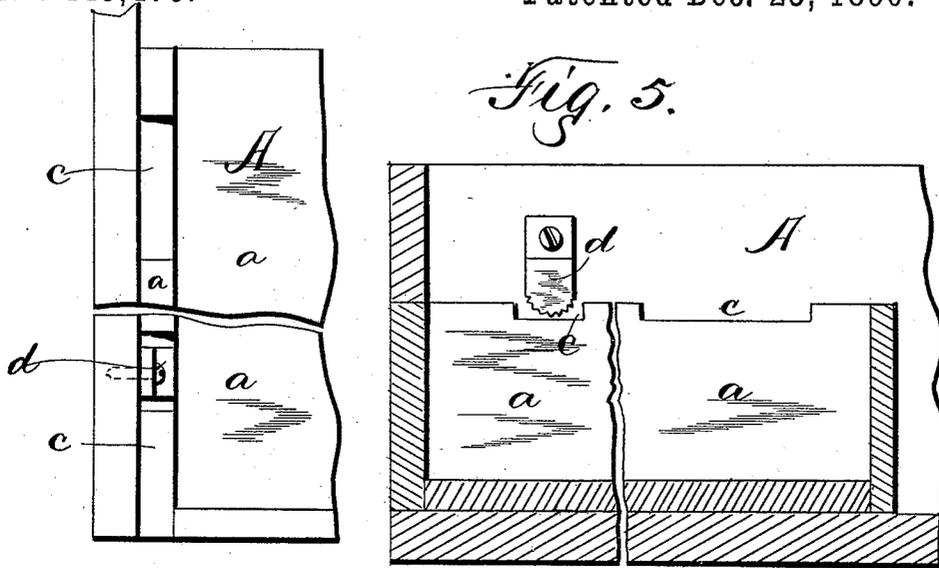
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9 Sheets—Sheet 4.

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Fig. 6.

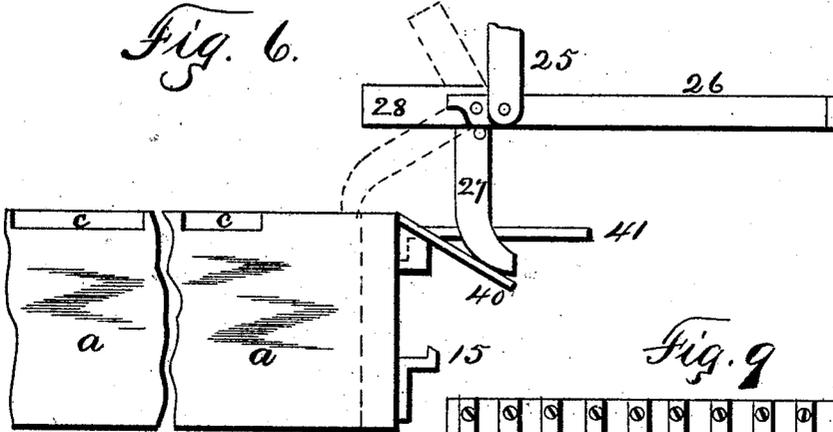


Fig. 9.

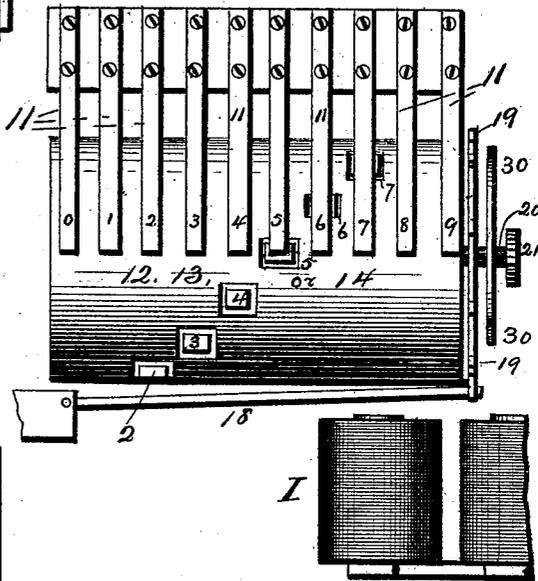


Fig. 8.

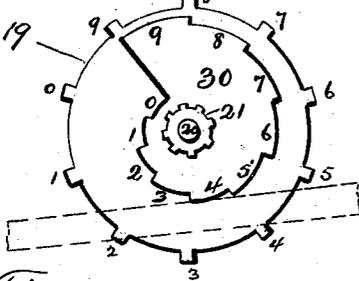


Fig. 7.

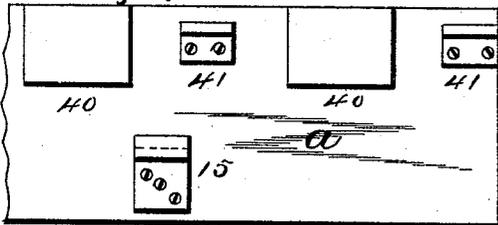


Fig. 14.

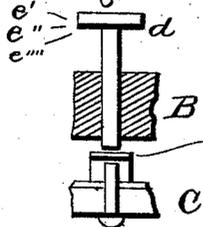
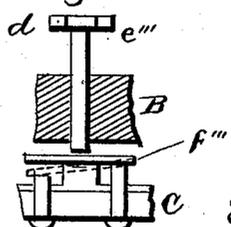


Fig. 15.



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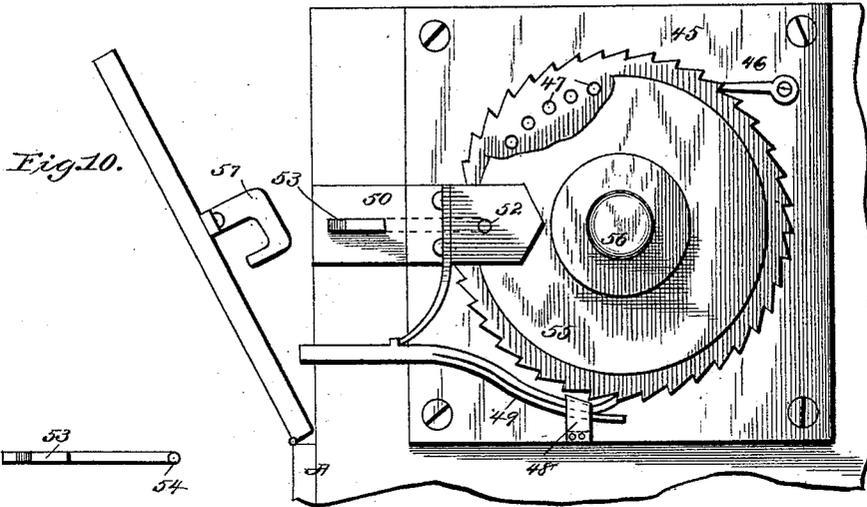


Fig. 11.

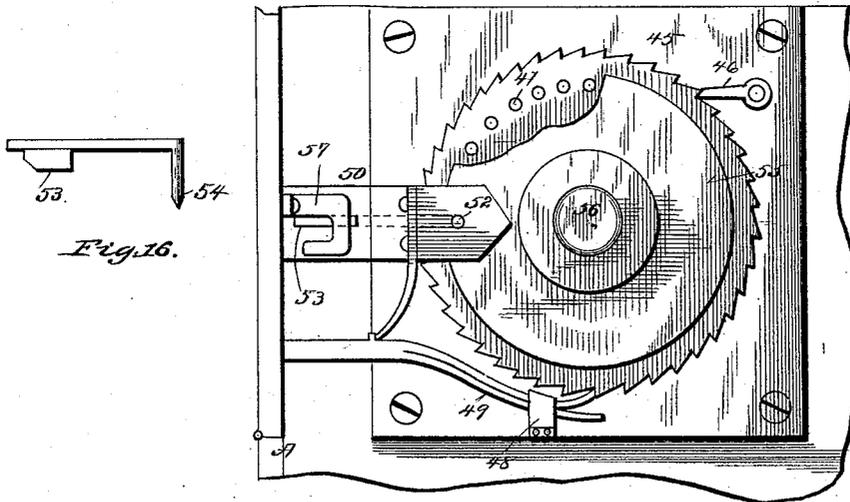
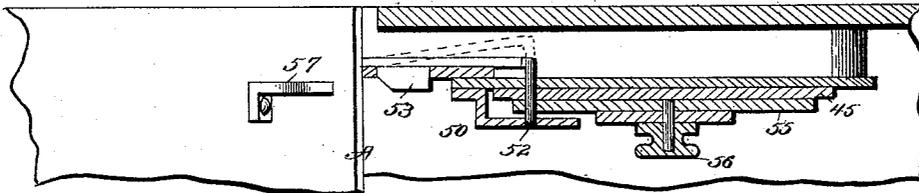


Fig. 16.

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(No Model.)

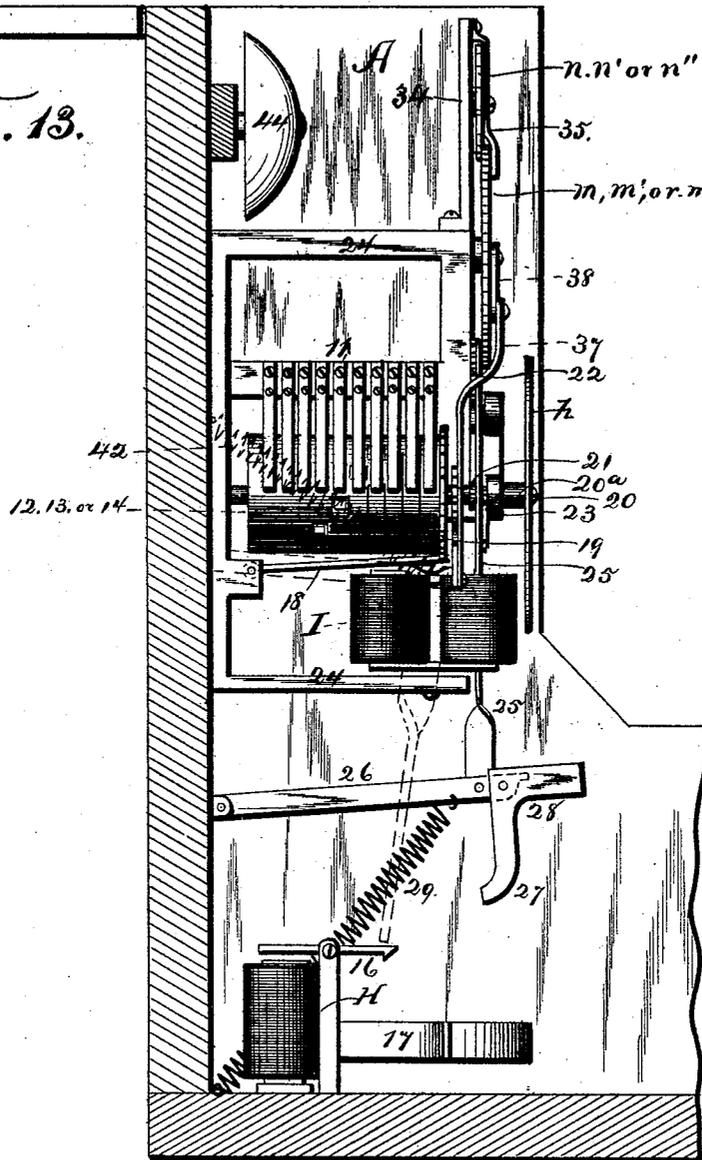
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Fig. 13.



Witnesses  
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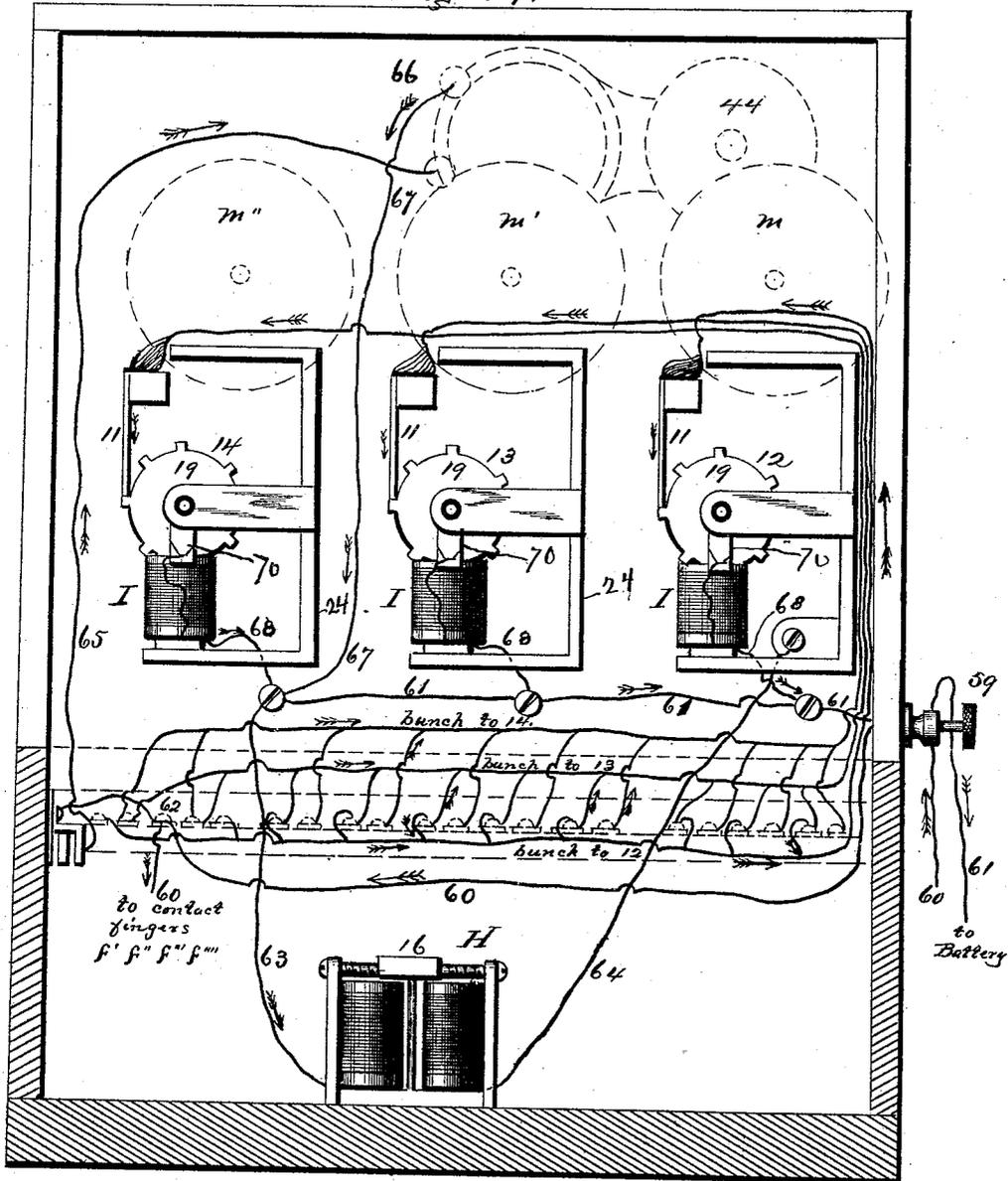
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Fig. 19.



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Fig. 20.

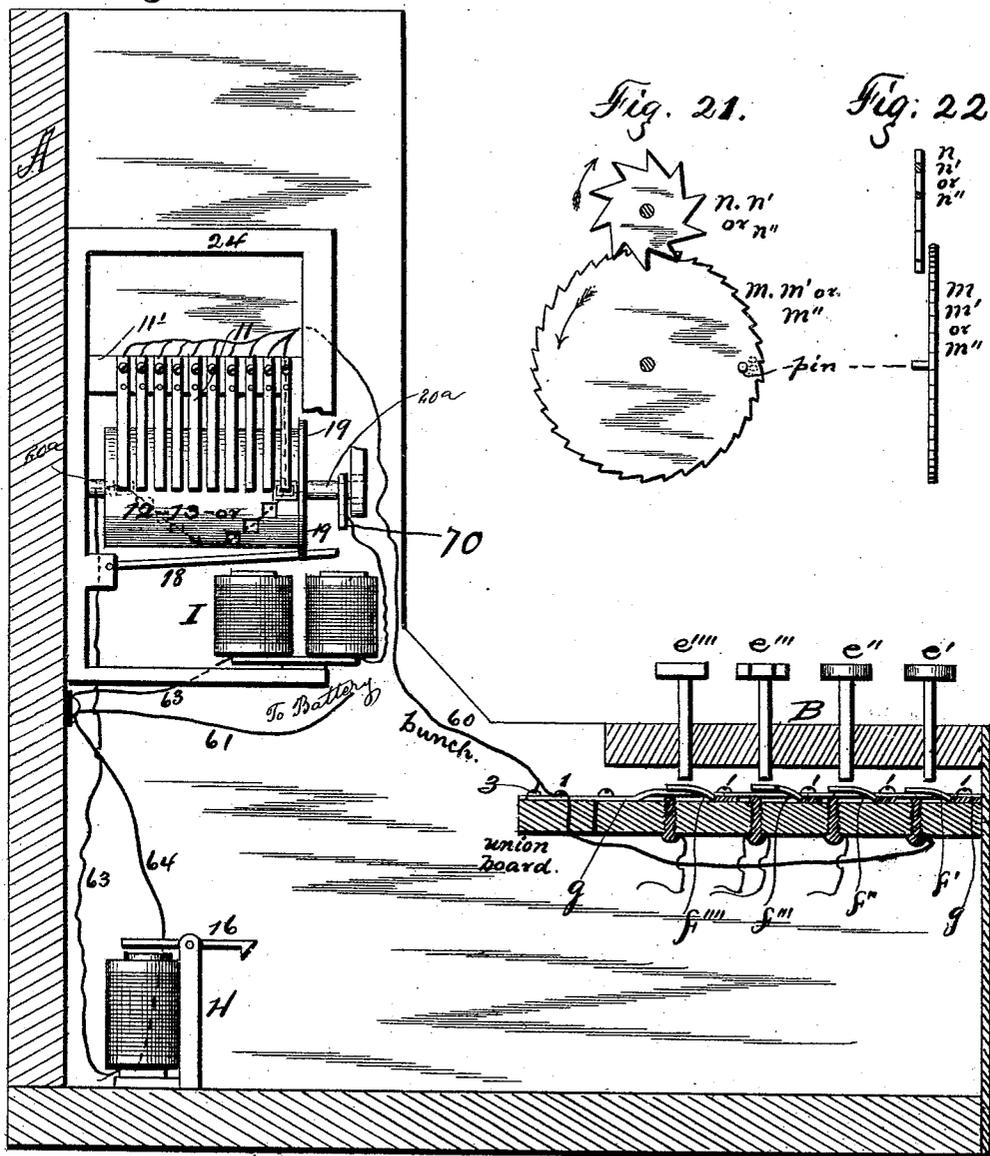


Fig. 21.

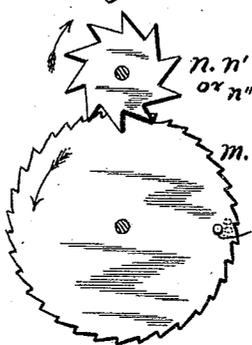
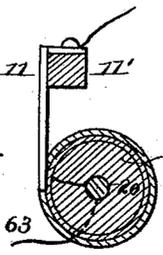


Fig. 22.



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# UNITED STATES PATENT OFFICE.

WILLARD L. BUNDY, OF AUBURN, NEW YORK.

## ELECTRIC CASH-REGISTER.

SPECIFICATION forming part of Letters Patent No. 443,475, dated December 23, 1890.

Application filed September 30, 1889. Serial No. 325,472. (No model.)

*To all whom it may concern:*

Be it known that I, WILLARD L. BUNDY, of Auburn, in the county of Cayuga, in the State of New York, have invented new and useful Improvements in Electric Cash-Registers, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to electrically-actuated cash drawers or registers designed for use in stores by cashiers, and which are adapted to indicate the amount placed in the drawer each time it is opened and also to add the several amounts together automatically.

My object is to procure such a cash-register and combining with it an adding-machine to add the amounts each and every time a button or buttons are pressed to make up the sum placed in the drawer, at the same time to indicate and display the amount of each purchase on one or more dials, one dial indicating units, another tens, a third hundreds or dollar-units, and so on; also to provide means by which two or more dials can be operated to indicate a large amount by actuating two or more buttons in succession; to release the drawer by the making of a circuit; to automatically throw the drawer open; to provide means to prevent the reopening of the drawer after being fully closed or to prevent its being reopened after being partly closed without the drawer is first fully closed and then reopened by the pressure upon a button; to provide a double-figure button operating to open the drawer by making a double contact successively and simultaneously operating the disk of units and the disk of tens; to provide means for registering each and every time the front of the case is opened, whereby access is obtained to the registering-dials; to ascertain the total amount taken in; to provide means by which the amount of each purchase is displayed upon the back of the apparatus to show the customer the registry when the back is toward him, and to actuate all of the several mechanisms by the electrical contact of any of the single or double buttons.

My invention consists in the several novel features above outlined, and also in the other novel features of construction and operation hereinafter described, and specifically set

forth in the claims annexed hereto. It is constructed as follows, reference being had to the accompanying drawings, in which—

Figure 1 is a sectional elevation of the apparatus, the front cover being removed, also the central dial-plate, and the button-board and drawer portion being left off. Fig. 2 is a top plan view of that part of the apparatus shown in Fig. 1, the cover being raised. Fig. 3 is a top plan view of the button-board. Fig. 4 is a top plan view of the contact-board, showing the spring contact-fingers, which correspond to the several buttons and are depressed to form an electrical contact when any button is operated. Fig. 5 shows details of the drawer-holding button and mechanism preventing its being reopened. Fig. 6 is an enlarged detail of the mechanism at the rear end of the drawer operated by its inward movement and released by its outward movement. Fig. 7 is a rear elevation of the drawer. Fig. 8 represents an elevation of the escapement-wheel and multiple-cam on the face thereof, showing the cam at the four-point. Fig. 9 is a side elevation of the switch mechanism, switch-gear, and cam, and electromagnet, with the armature engaged with a switch-gear tooth. Fig. 10 is an enlarged front elevation of the mechanism to indicate and register the opening of the front of the apparatus to obtain access to the dial. Fig. 11 is a top plan view thereof, partly in section. Fig. 12 is an elevation showing the dial-openings displaying the amount of each purchase upon the front side of the machine, there being also like openings upon the back when desired, duplicate dials being mounted just within the back and arranged to rotate simultaneously with those in front. Fig. 13 is a sectional elevation on a line  $x x$  in Fig. 1, showing a side elevation of the unit mechanism. Fig. 14 is a sectional elevation of a single figure-key and the contact-point. Fig. 15 is a sectional elevation of a double figure-button, showing the double spring-finger and double contact-points and by the dotted lines the manner in which the contacts are successively made when the button is operated. Fig. 16 is an elevation of the mechanism closed, which is shown as open in Fig. 10. Fig. 17 is a detail showing the positions as-

sumed by the crank-gear, multiple cam, switch-gear, pawl, lever, and armature when a button has been depressed and the switch rotated until the circuit is broken, rotating the cam and gear, as shown. Fig. 18 is a detail of the pawl-lever 31, showing the same with a beveled lug 31' on one side, with which the multiple cam engages. Fig. 19 is an elevation showing all of the circuit-wires and closing and shunting devices in rear of the key and contact board in full lines and the principal feature of the units, tens, and hundreds mechanisms in dotted lines. Fig. 20 is a vertical section on a line along the edge of the bar *g* of the casing, the union-board, and contact-board, and showing in elevation the buttons, the contact-fingers, one of the rotary switches, and the electro-magnets and a single wire from a contact-finger to the surface of the switch, and from this to the magnet I, and also the shunt-circuit and wire to the magnet II, and thence the return-wire to the battery. Fig. 21 is a plan view of the rear of an adding-dial and a footing-dial, showing the pin on the adding-dial which engages with the footing-dial. Fig. 22 is a side elevation thereof. Fig. 23 is a detail vertical transverse section of the switch.

A is the outer casing, having a vertical back and having the lower part of the front projecting horizontally. The upper part of the front is suitably inclosed by a detachable cover locked and secured in any ordinary manner, and the top is hinged and secured by inside hooks, as shown in Fig. 1. The lower front portion is also adapted to receive the drawer *a*, sliding upon friction-rollers *b*, and in the upper edge of one of its sides I cut notches *c*, Figs. 5 and 6.

*d* is a button pivoted upon the casing and having its lower end curved and the curved portion serrated transversely, as shown in Fig. 5. This button operates as follows: When the drawer is closed, it hangs free in the front notch *c*. When it is open, it hangs free in the rear notch *c*, and when the drawer is partly closed, after having been opened, it lies in an inclined position, with its lower end toward the back of the drawer, so that whenever I then try to pull the drawer open the serrations will bite into its upper edge and hold it so that it cannot be opened until it has been fully closed, and when so closed it can only be opened as hereinafter described, and accompanied by the sounding of an alarm.

The upper face of the front projection of the casing is occupied by the key-button board B, Fig. 3, in which the front row *e'* indicates units, the second row *e''* tens, the third row *e'''* indicating double figures, units, or tens, and the last row *e''''* indicating hundreds or dollars. The first and second rows are marked from 0 to 9, as shown, the third row with any combination of double figures, those shown being multiples of 5 up to 50, and the fourth row is marked from 0 to 9, as

shown. When I wish to increase the capacity, I either add another row of buttons or substitute a hundreds row for the third or double figure-row *e'''*, use the fourth row for thousands, or tens of dollars, and so on, changing the mechanism connected to and operated by the buttons to correspond with the change in the rows of buttons.

C is the contact-board, consisting of spring-fingers, (shown in Fig. 4 as arranged in rows,) the first row *f'* so disposed and mounted as to coincide with the first row of buttons, the second row *f''* with the second row of buttons, the third row *f'''* with the third row of buttons, and the fourth row *f''''* with the last row of buttons. For perspicuity I have in the drawings numbered these contact-fingers to correspond with the rows of buttons, as shown in Figs. 3 and 4. The board itself, upon which these series of contact-fingers are mounted, consists of a piece of wholly or partly non-conducting material, through which the contact-points are vertically inserted projecting above the top of the board, there being one under each of the single fingers and two under each of the double fingers, and wires are connected to the heads under the board, which I shall hereinafter call "button-wires." The points under the double fingers are arranged so that one projects farther above the board than the other, so that when a double button is pressed the unit arm or end will make the contact first, and then as the button-pressure continues the other or tens arm by the torsion upon the shank of these double fingers will also make a contact, or the operation may be reversed so as to operate the tens first and then the units. All of these fingers are in electric circuit by means of a wire and bar *g*, connected to the bodies from which the fingers spring and leading to a battery or electro-magnet.

All of the wires from the contact-heads beneath the contact-board are conducted to the contact-board, which consists of a cross-bar back of and parallel with the contact-board and in substantially the same plane and being wholly or partially constructed of non-conducting material; or it may be integral with the contact-board, and it is provided with insulated screws, (shown in Fig. 4 as arranged in sets,) the wires from the first row of buttons leading to the unit-screws 1, those from the second row to the "tens-screws" 2, those from the third row as follows: those from the right arm of each double finger to the unit-screw 1 and those from the left arm to the tens-screw 2, and the wires from the fourth row to the "hundreds" or dollar screws 3. Whenever a naught appears on a double button, the wire from the naught side is connected to the naught-screw. These bunches or sets of wires are numbered, respectively, 1 2 3 4 5 6 7 8 9 0. From these sets of screws these different sets of wires are conducted, the unit-wires to the fingers 11 upon the unit switch or shunts 12, the tens-wires to

the fingers 11 upon the tens switch or shunts 13, and the hundreds (or dollars) wires to the fingers 11 upon the hundred switch or shunts 14. These switches are all of the same construction, consisting of a cylinder provided with a surface of conducting material, which is in electrical connection with the battery, (not shown,) and each is secured upon a shaft 20, journaled in the front and back of the frame of the indicator. Each cylinder is provided with a series of shunts 0 1 2 3 4 5 6 7 8 9, one for each of the fingers 11, arranged in a spiral course upon the cylindrical surface, so that the fingers 11 are successively shunted as the cylinder revolves, and they are thus insulated from the rest of the conducting-surface of the cylinder. There is a finger 11 for each wire of each and every set of wires, and they are mounted upon a cross-bar 11' above and parallel to the switch-shaft 20. The motor to rotate these switches or each of them consists of a pinion 21, Fig. 17, rigidly mounted upon the switch-shaft 20, a gear 22, (called herein the "crank-gear" for clearness of identity,) mounted loosely upon an arbor above the pinion 21 and meshing therewith and provided with a crank-pin 22', as shown, a rod 25 having its upper end pivoted upon the crank-pin, a bar 26, (see Fig. 13,) substantially horizontal, having its outer end pivotally connected to the lower end of the rod 25 and having its inner end hinged to the casing, as shown in Fig. 6, and a spring 29 having its upper end connected to the bar 26 adjacent to its front end and its lower end secured to the casing, substantially as shown in Fig. 13. This spring is normally under tension, exerting a downward pull upon the bar 26 and rod 25, so that when released, as hereinafter described, it will pull the rod 25 down, rotating the crank-gear 22, and this rotates the pinion 21, the shaft 20, and the switch which is upon that particular shaft until the proper finger 11 is shunted upon the switch, all as hereinafter described. A weight suspended beneath the bar 26, adjacent to its outer end, will operate the same as the spring.

When a unit-button is operated and contact is made with a unit-wire and through it with a unit-finger 11, the unit-switch is rotated by the motor mechanism until this finger closes the circuit at its shunt on the switch and rests upon the shunts, and this switches the current from the electro-magnet I, which is the motor-magnet to the electro-magnet H, which is the drawer-magnet.

Upon the rear of the drawer *a* I secure a latch-hook 15, Fig. 6, which when the drawer is closed engages with a like latch upon the outer end of the armature 16 of the magnet H, Fig. 13. Then when the current is switched, as aforesaid, to this magnet the armature-latch is disengaged from the drawer-latch, and then a single leaf-spring 17, Figs. 13 and 1, having one end secured to one of the side walls of the case and standing out horizontally and inwardly, its free end normally adapted to

engage with the back of the drawer, and which is compressed by the pressure of the back of the drawer against it, when it is closed, throws the released drawer quickly outward upon the rollers *b* and opens it far enough to give free access to the interior. When thus being opened, the lock-button *d* rides freely from the front notch *c* into the rear one along over the top edge of that side of the drawer.

Simultaneously with the operation of a button, the contact-fingers being connected to the battery by the positive wire 60, Fig. 19, a circuit is made through one of the contact-fingers, as *f'*, Fig. 4, its contact-point, and one of the bunches of wires to one of the sets of switch-fingers, and through the finger connected by the wire leading from the button operated to the finger corresponding in number to that of the single-figure button operated. These fingers are normally in circuit with the switch-casing or outer surface, which is of conducting material, the gear 19, sleeve 20<sup>a</sup>, and the arm 70 dependent from the sleeve is in communication with the electro-magnet I. This sleeve is insulated from the frame-work which carries the switch and in which the shaft is journaled. When a button is operated and through the spring-finger beneath it makes a circuit through the unit branch of wires and fingers, for instance, and the unit-switch and electro-magnet I, the armature 18 is released from its engagement with the tooth of the gear 19 and drawn down into contact with the magnet and is held there until the circuit is broken, as hereinafter explained. The disengagement of the armature releases the switch, so that the motor rotates it until the circuit is broken by the finger meeting its shunt on the switch, when the spring beneath the armature throws it up into engagement with the gear 19 encountering the tooth corresponding in number with the fingers and button operated and stops the rotation of the switch.

The lower end of the rod 25, Fig. 13, is pivotally connected to the horizontal bar 26, the rear end of which is hinged to a bracket upon the casing, so as to permit it to play vertically, and upon its outer end I form a projecting point, and beneath that a rounded shoulder, as shown in Fig. 6, and a crank, of which 27 is the lower arm and 28 the upper one, is pivoted upon this shoulder.

Upon the shaft 20, adjacent to the gear 19, I mount my multiple cam 30, consisting of a piece of sheet metal of substantially the form shown in the drawings, Fig. 8, its periphery comprising a series of ten cam faces and stops, each upon a radius of graduated increasing length in regular succession, and for greater perspicuity I have numbered these cams 0 1 2 3 4 5 6 7 8 9 to correspond with the numbers upon the buttons in the first, second, and fourth rows. A lever 31 extends across the front of the frame 24, and one end thereof is pivoted upon said frame and provided on its inner face with a projecting beveled lug 31', as

shown in Fig. 18, and this lug is under the cam and is always in contact with one of its cam-faces. Their joint operation is hereinafter described.

5 A display-dial is mounted upon the front end of the shaft 20, (and also upon its rear end, if desired,) to display in front and rear, and rotates with the switch, *h* being the unit-dial, *h'* the tens-dial, *h''* the hundreds or  
10 dollar dial, and the figures thereon showing the amount of each purchase are displayed through openings 32 and 33, Fig. 12, the opening 32 being a double one for showing the units and tens upon these two dials. Upon  
15 the top of each frame I mount an adding-dial, adapted to be rotated, *m* being the unit-dial, *m'* the tens-dial, and *m''* the hundreds or dollar dial. Each dial has a hundred notches or teeth upon its periphery, and each tooth is  
20 numbered from 1 to 100.

An arm 34, Fig. 13, is erected upon the top of the frame 24, and is provided with an outward projection at its top, upon which I secure a downward arm 35, Figs. 1 and 13, in  
25 which is an opening near its lower end, through which I read the figures upon the adding-dial, and above the center with a reading-aperture for reading the figures upon the footing-dial *n*, (or *n'* or *n''*), which is pivoted  
30 between the arms 34 and 35. A spring-pawl 36, Fig. 1, secured to the arm 34 and extending down and engaging with the teeth of the adding-dial *m*, *m'*, or *m''*, prevents the backward rotation of the dial.

35 A stud or pin projects from the rear face of the adding-dial *m* directly in line with the tooth marked 100 in such manner as to engage with a tooth upon the footing-dial (see Figs. 21 and 22) whenever the 100 on the dial  
40 *m* comes opposite the reading-aperture or passes it. There are ten teeth on the edge of each adding-dial, and those upon *n* indicate dollars, and whenever the 100 pin or dial *m* engages with a tooth on dial *n* and the dial  
45 *m* is rotated past the 100 to show 1 2 3 4, &c., such rotation will rotate the dial *n* a single tooth (or figure) and change the number visible in the upper reading-aperture.

A rod 37, Figs. 1 and 17, is pivotally connected at one end to the lever 31 and at the  
50 other to the swinging bar 38, the inner end of which is pivoted upon the shaft of the dial *m*, *m'*, or *m''*, and 39 is a spring-pawl pivoted upon the upper end of the rod 37 and adapted  
55 to engage with the teeth upon the dial.

Each of the dials is operated in the same manner and as follows: When I depress a unit-button—say 4—I make a circuit-contact of the spring-finger 4 with the point making  
60 a circuit with the unit-wire 4, the union board, (unit-screw 4) and through the unit bunch or set of wires to the electro-magnet 1, drawing the armature 18 down from its engagement with the tooth 0, tooth of the switch-gear 19  
65 upon the end of the switch 12 thus releasing the switch-rotation mechanism, and then the spring 29 pulls down the bars 26 and the rod

25, Figs. 1, 13, and 17, and this rotates the crank-gear 22, which through the pinion 21  
70 rotates the switch 12 until the finger 4 shunts up the shunt 4, which breaks the circuit and the armature flies up into engagement with the fourth tooth of the gear 19 and stops the rotation of the crank-gear, pinion, and switch. Simultaneously with the rotation of the  
75 switch the multiple stepped cam is also rotated, and this cam being normally in frictional engagement with the lever 31 through the lug upon its inner face, the spring 42 operating to hold it up yieldingly against the  
80 face of the cam at the naught-step thereon, this rotation of the cam causes the steps 1, 2, 3, and 4 to successively bear upon the lever, each one depressing the left-hand end of the lever a graduated distance lower than  
85 the preceding one, thus drawing down the rod 37 and the swing-bar 39, the pawl snapping from one tooth to another as each successive cam depresses the lever 31, until in this instance when the switch stops the pawl has  
90 dropped four teeth upon the adding-dial *m*. This pawl, the lever, the cam, the switch-gear and pinion, and the crank-gear remain in this position until the drawer, which is now open, as above described, is closed. The closing of  
95 the drawer compresses the ejector-spring 17, brings the top of the inclined bars 40, Fig. 6, secured upon the top of the back of the drawer, into contact with, and they wedge under, the crank 27, which forces the rod 25 upward,  
100 and this reversely rotates the crank-gear, the pinion, the switch-gear, and cam back to the naught position ready to be again operated, and the motor-spring 29 is again under full tension. Simultaneously with this backward  
105 rotation of the cam and reduction of downward cam-pressure upon the lever the spring 42, one end of which is secured to the casing and the other to the lever 31 or bar 37, and which was strained down by the depression  
110 of the lever, reacts and raises the lever and pawl and rotates the dial *m* the distance of four teeth, thus adding four upon the dial; also, as the drawer closes, the straight bar 41, secured to the top of the back of the drawer  
115 and projecting backward therefrom engages with and pushes back the swinging bar 43, which is pendent from the lever 31, and as the spring 42 raises the lever the bar 43 will swing forward and stand upon the top of the  
120 bar 41 and lock the lever 31, so that neither it nor the pawl can be levered or depressed until a button is operated and the drawer is reopened. With the forward rotation of the switch 12 the disk *h* is rotated, bringing the  
125 figure 4 opposite the right-hand end of the double aperture 32.

The operation of displaying and adding a ten by operating a button in the second row is the same as that of a unit, the ten figure being displayed in the left-hand end of the opening 32. In this mechanism the footing-dial *n'* is marked from 10 up to 100, and the adding-dial *m'* is provided with a pin on

the back side at 10, 20, 30, 40, 50, 60, 70, 80, 90, and 100, so that as soon as 10 tens are added onto the dial  $m'$  the dial  $n'$  will be rotated one tooth.

5 The operation of the hundreds or dollar mechanism is like unto the unit mechanism, the dial  $n'$  being numbered from 100 to 1,000, so that when the dial  $m''$  adds 100 the dial  $n''$  is shifted by a pin on dial  $m''$ , as in the  
10 unit device.

It will be observed that when the unit-dials have added up to \$10.00 the adding and footing dials start at one automatically. That when the tens-dials indicate \$100 they start  
15 again automatically, dial  $m'$  at 1 and  $n'$  at 10, and that when the "dollars-dial" indicate \$1,000 they automatically start again at the starting-point, dial  $m''$  at 1 and dial  $n''$  at 100.

20 When a double button is operated, the contact is first made on the unit side and starts the unit adding and display mechanism, and an instant later the tens contact is made, starting the tens adding and displaying mechanism, and thus almost simultaneously displaying  
25 both figures in the aperture 32. In fact I can operate all three of the display-dials and adding mechanisms simultaneously, or nearly so, and display and add units, tens,  
30 and dollars by simple operation of the unit, tens, and hundreds buttons in such quick succession as to be substantially simultaneous.

The alarm-bell 44 is always rung when any  
35 button is operated by any ordinary electrical means or whenever the drawer is opened, as may be desired.

It will be observed that when the naught-button on either row is operated the switch  
40 does rotate sufficient to display a naught, but nothing is added or done except to open the drawer and sound the alarm.

As a guard against the surreptitious opening of the front of the case, affording access  
45 to the adding and footing dials and to prevent any tampering with them by letting the pawl and spring out of engagement and then turning them backward either before or after the abstraction of money from the drawer, I  
50 use the following mechanism to indicate the number of times the front of the case is opened by any person.

Upon the inner face of one side of the casing A, and adjacent to the top thereof, I  
55 mount a toothed wheel 45 and a pawl 46 engaging therewith, and this wheel is provided with a full row of perforations 47 adjacent to its periphery.

At 48 I mount a bracket below the wheel,  
60 slotted to receive a push-pawl 49, the rear end of which engages with a tooth of the wheel, and is held in engagement by a spring, and the arm of this pawl extends outward far enough, so that the front door of the casing,  
65 when it is being closed will strike or bear against it and push the pawl in and rotate the wheel one tooth.

A plate 50, with a slot 51, is secured upon the inner face of the case, having the inner end extending over beyond the perforations  
70 47, and it is perforated at 52, which perforations coincide with or are in line with each of the perforations 47. This plate 50 covers a groove or recess cut in the inner face of the casing, and I secure the outer end of a spring-bar to  
75 the outer face of this plate near its outer end, so that the free end of this spring can play outwardly in this recess. This spring-bar carries on its free end a pointed stud 54, and between that and the secured end a wedging-  
80 lug 53, both projecting from the same side or edge of the bar, the wedge passing through a slot in the plate 50 and projecting inwardly beyond the inner face thereof. This bar is  
85 so located that the stud 54 will pass freely through any of the perforations 47 as the wheel is rotated, and when it so passes through will always enter the perforation 52, and when  
90 a paper disk 55 is placed upon the front of the wheel and secured there by the thumb-screw 56 a part of this disk will lie between the inner end of the plate 50 and the face of the wheel, and so that the punch-stud 54 will  
95 perforate the paper each time it passes through the holes 47 in succession.

57 is an arm secured to the front door of the casing and standing at right angles to the  
100 inner face of the door, and so arranged that when the door is closed this arm will swing concentric with the door-hinge and come in contact with the wedge 53 and force it and  
105 the spring back, withdrawing the punch from the hole 47 in the wheel of 45, and when the door is closed this arm will lie on top of the wedge, holding it and the punch back so long  
110 as the door is closed, and when the door is opened the arm will move outward off from the wedge and release it, and then the released spring will throw the punch out through the hole 47 and through the paper,  
115 and this paper perforation will indicate that the door has been opened.

A flat spring is secured at its upper end upon the plate 50, and projects downward  
120 therefrom in such manner that its lower end engages with a lug on top of the pawl-arm, (see Figs. 10 and 16,) and this spring is compressed by the closing of the door, which encounters the outer end of the pawl, pushing  
125 the pawl inward, and then as the door is again opened this spring throws the pawl outward again the distance of one tooth on the wheel and ready to be pushed in again as the door is closed.

It will be observed that the number of holes  
125 in the paper will correctly indicate the number of times the front door has been opened, and that it cannot be closed without registering the closing by a hole in the paper.

The battery (not shown) is connected to the  
130 button 59 by the positive wire 60 and the negative wire 61 in the ordinary manner, and, as shown in Fig. 19, the wire 60 is carried across over to the binding-screw 62, whence a branch

conducts a positive current to the contact-fingers *f' f'' f''' f''''*, and this current, when a circuit is made by the operation of any button, is carried to the union-board and thence into one of the bunches, which carries the current to the fingers 11 and through them into the peripheral cover of the switch and gear 19, and so long as the armature 18 is in engagement with this gear the circuit is broken; but when the button is operated the armature, becoming positive, is drawn down into contact with the negative pole of the electro-magnet I, making the circuit there, and thence the wire 68 conducts the current to the negative wire 61, leading to the battery, and the wire 63 conducts a current to the electro-magnet H, making a circuit there, operating the armature to unhook it from the catch on the drawer, unlocking the drawer, and the wire 64 conducts the current to a ground, here shown as the wire 61, leading back to the battery.

The wire 65 carries a positive current to the bell mechanism 44 and the binding-screw 66, Fig. 19, and the wire 67 completes the circuit by its connection to the negative wire.

The binding-post 59 is of any ordinary construction.

The dotted line in Fig. 20, extending diagonally across the rotary switch, indicates a wire within and insulated from the outer casing and extending across each of the shunt-openings therein, so that all of the fingers successively come into contact with it as the switch rotates, and the fingers which correspond to the buttons operated will make a circuit with said wire and shunt the current through this wire, passing out through the rear end of the switch, and thence follow said wire down to the magnet H. This shunting to the magnet H is the same as is shown in my patent, No. 358,645, in Fig. 4, for shunting the current from the switch to the magnet C therein.

What I claim is—

1. The combination, with a rotating multiple switch and contact-fingers engaging therewith and push-buttons arranged in decimal sets electrically connected at will to the fingers, of an electro-magnet and its armature, adapted to release the switch when the circuit is made by operating a button and to lock it when the circuit is broken by the rotation of the switch.

2. The combination, with a rotating multiple switch and contact-fingers engaging therewith and push-buttons arranged in decimal sets electrically connected at will to the fingers, of an electro-magnet and its armature, adapted to release the switch when the circuit is made and lock it when the circuit is broken by the rotation of the switch, and a motor arranged to rotate the switch when a button is operated.

3. The combination, with the rotating multiple switch and a gear secured upon the end thereof and contact-fingers engaging with

the periphery of the switch, of the armature of an electro-magnet engaging with the gear to lock the switch when the circuit is broken and releasing it when a circuit is made through the electro-magnet, as set forth.

4. A rotating multiple switch, a pinion upon its arbor, a dial with figures upon the same arbor, and a crank engaging with the pinion and connected to a motor and arranged to rotate with the switch and dial, in combination with an electro-magnet the armature of which is arranged to release the switch for rotation when the circuit is made and lock it when it is broken automatically.

5. A rotating multiple switch and means to rotate it, a multiple stepped cam mounted upon and rotating with the switch-arbor, and a lever depressed by its rotation, a swinging pawl connected to the lever and engaging with the teeth of a rotating adding-dial and drawn down over the teeth with the lever-depression, and means to raise the pawl and lever when the stepped cam is rotated backward, in combination, as set forth.

6. A rotating multiple switch and a multiple stepped cam upon its arbor, an electro-magnet releasing the switch whenever a circuit is made and locking it when it is broken, and a motor to rotate the switch, in combination with a swinging pawl depressed by the rotation of the stepped cam and engaging with teeth upon a rotating adding-dial, and means to raise the pawl and rotate the dial as the cam is rotated backward, and a footing-dial actuated by the rotation of the adding-dial, as set forth.

7. A rotating multiple switch carrying a pinion, and a multiple stepped cam upon its arbor, a crank-gear engaging with the pinion and connected to a motor, a swinging pawl depressed by the rotation of the stepped cam and engaging with the teeth upon a numbered adding-dial, and a rotating adding-dial, in combination with an electro-magnet having an armature arranged to release the switch when a circuit is made and lock it when it is broken, and a set of buttons electrically connected to the electro-magnet, as set forth.

8. A rotating multiple switch carrying a pinion, and a multiple stepped cam upon its arbor, a crank-gear engaging with the pinion and connected to a motor, a swinging pawl depressed by the rotation of the stepped cam and engaging with the teeth upon the numbered adding-dial; and a rotating adding-dial and a rotating footing-dial actuated by the rotation of the adding-dial, in combination with an electro-magnet having an armature arranged to release the switch when a circuit is made and lock it when it is broken, and a set of buttons electrically connected to the electro-magnet, as set forth.

9. A rotating multiple switch carrying a pinion, and a multiple stepped cam upon its arbor and also a display-dial thereon, a crank-gear engaging with the pinion and connected

to a motor, a swinging pawl depressed by the rotation of the stepped cam and engaging with the teeth upon a numbered adding-dial, and a rotating adding-dial, in combination

5 with an electro-magnet having an armature arranged to release the switch when the circuit is made and lock it when it is broken, and a set of buttons electrically connected to the electro-magnet, as set forth.

10 10. A rotating multiple switch carrying a pinion, and a multiple stepped cam upon its arbor and also a display-dial thereon, a crank-gear engaging with the pinion and connected to a motor, a swinging pawl depressed by the

15 rotation of the stepped cam and engaging with the teeth upon a numbered adding-dial, and a rotating adding-dial and a rotating footing-dial actuated by the rotation of the adding-dial, in combination with an electro-

20 magnet having an armature arranged to release the switch when a circuit is made and lock it when it is broken, and a set of buttons electrically connected to the electro-magnet, as set forth.

25 11. The combination, with the money-drawer provided with a latch upon its rear end, and an electro-magnet having an armature provided with a hook adapted to engage with the latch of a rotating multiple switch and

30 contact-fingers engaging therewith, and push-buttons arranged in decimal sets electrically connected at will to the fingers, and an electro-magnet and its armature adapted to release the switch and the money-drawer when

35 a circuit is made by operating a button, as set forth.

12. The combination, with the money-drawer provided with a latch upon its rear end, and an electro-magnet having an armature provided with a hook adapted to engage with the latch, of a rotating multiple switch and

40 contact-fingers engaging therewith, and push-buttons arranged in decimal sets electrically connected at will to the fingers, and an electro-magnet and its armature adapted to release the switch and the money-drawer when

45 a circuit is made by operating a button and to lock the switch when the circuit is broken by the rotation of the switch, as set forth.

50 13. The combination, with the money-drawer and an electro-magnet having an armature detachably engaging with the drawer, of a rotating multiple switch and contact-fingers engaging therewith, and push-buttons arranged

55 in decimal sets electrically connected at will to the fingers of an electro-magnet and its armature, adapted to release the switch and the money-drawer when a circuit is made and to lock the switch when the circuit is broken

60 by the rotation of the switch, and a motor arranged to rotate the switch when a button is operated.

14. The combination, with the money-drawer and an electro-magnet having an armature

65 detachably engaging with the drawer, of push-buttons arranged in decimal sets electrically connected to the electro-magnet and unlock-

ing the drawer when a circuit is made by the operation of a button.

15. The combination, with the money-drawer 70 and an electro-magnet having an armature detachably engaging with the drawer, of a rotating multiple switch, a pinion upon its arbor, a dial with figures upon the same arbor, a crank-gear engaging with the pinion and connected to a motor, an electro-magnet having

75 an armature arranged to release the switch and drawer when a circuit is made and lock the switch automatically when it is broken, and a motor arranged to rotate the switch and

80 dial when released.

16. The combination, with the money-drawer and an electro-magnet having an armature detachably engaging with the drawer, of a rotating switch and means to rotate it, a multiple 85 stepped cam mounted upon and rotating with the switch-arbor, and a lever depressed by its rotation, a swinging pawl connected to the lever and engaging with the teeth of a rotating adding-dial and drawn down over the

90 teeth with the lever depression, and means to raise the pawl and lever when the stepped cam is rotated backward, and push-buttons arranged in decimal sets electrically connected to the rotating switch and releasing the

95 drawer when a button is operated.

17. The combination, with the money-drawer provided with a latch upon its rear end, of an electro-magnet having an armature provided with a latch upon its outer end and adapted

100 to engage with the drawer-latch, as set forth.

18. The combination, with the money-drawer provided with a latch upon its rear end, of an electro-magnet having an armature provided with a latch upon its outer end and adapted

105 to engage with a drawer-latch, and a spring compressed by the closing of the drawer, as set forth.

19. The combination, with the money-drawer, of a bar 26, hinged to the casing, a motor-spring connected to the bar, and a crank-lever 110 pivoted upon the outer end of the bar and engaging with the drawer as it is being closed, as set forth.

20. The combination, with the money-drawer 115 provided with notches in the upper edge of one side, of a swinging button mounted upon the casing and provided with a curved and serrated lower end, as set forth.

21. The combination, with the money-drawer 120 provided with an inclined bar secured upon its inner end, and a crank-arm suspended from the casing, and a rod connected to the bar supporting the crank-arm and connected as a crank to the motor-gear, of a spring connected to the bar supporting such crank-arm, whereby the rotating mechanisms are returned to their normal positions, as set forth.

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22. A spring-motor normally rotating the cylindrical switch, the graduated cam, the display, adding, and footing dials to display and add together the successive amounts placed in the drawer whenever the buttons are operated and actuated to rotate the switch,

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the cam, and the display-dial back to their normal positions at naught by the closing of the drawer, in combination with the electromagnet provided with an armature arranged to lock and unlock the switch, and an electromagnet having an armature arranged to lock and unlock the drawer, both magnets being electrically connected to the buttons, as set forth.

23. The combination, with the series of double-figure buttons, mounted as shown, of a like series of double-arm spring contact-fingers beneath and actuated by the depression of any button and making a double circuit substantially simultaneously, as set forth.

24. The combination, with the button-board carrying series of buttons arranged in decimal sets and adapted severally to make an electric circuit when a button is depressed in any series, and thereby actuate a rotating switch, of a rotating switch, a motor actuating its rotation, and display-dials, each rotated by the switch and displaying units, tens, or hundreds singly or simultaneously, as set forth.

25. The combination, with the button-board carrying series of buttons arranged in decimal sets and adapted severally to make an electrical circuit when a button is depressed in any series, and thereby unlock a rotating switch, of a rotating switch, a motor actuating its rotation, and display-dials and adding-dials rotated by each switch and displaying and adding units, tens, and hundreds singly or simultaneously, as set forth.

26. The combination, with a button-board carrying a series of buttons arranged in decimal sets and adapted severally to make an electrical circuit when a button is depressed in any series, and thereby unlocking a rotating switch, of a rotating switch, a motor actuating its rotation, display-dials, adding-dials, and footing-dials actuated to rotate through the rotation of the switch and displaying each amount represented by the button or buttons operated and adding the successive amounts together.

27. The combination, with a rotating switch

and a motor, of a series of display-dials and of adding-dials actuated through the rotation of the switch and each successively rotated by the rotation of the preceding dial and registering the footings of the dials successively, as set forth.

28. The combination, with the casing and its drop front, of a toothed and perforated wheel mounted upon the casing, a push-pawl engaging therewith, plate slotted and perforated, as shown, and projecting over the edge of the wheel and secured to the casing, a spring provided with a wedging-stud fitting into the slot in the plate and with a punch arranged to pass through the perforations in the wheel and into that in the plate, and a disk of paper secured upon the wheel and between it and the plate, and a hook secured upon the drop front and arranged to wedge against the stud upon the spring when the front is being closed, throwing the punch out of the engagement with the plate and wheel, as set forth.

29. The combination, with the money-drawer and an electro-magnet having an armature detachably engaging with the drawer, of a rotating multiple switch and means to rotate it, a multiple stepped cam mounted upon and rotating with the switch-arbor, a display-dial mounted upon and rotating with the switch-arbor, a rotating adding-dial, a lever depressed by the rotation of the cam, a swinging pawl connected to the lever and engaging with the teeth of the adding-dial and drawn down over them by the depression of the lever, and means to raise the pawl and lever and rotate the adding-dial when the stepped cam is rotated backward, and push-buttons arranged in decimal sets electrically connected to the rotating switch and releasing the switch and money-drawer when a circuit is made by the operation of the button.

In witness whereof I have hereunto set my hand this 24th day of September, 1889.

WILLARD L. BUNDY.

In presence of--

C. W. SMITH,

HOWARD P. DENISON.