(No Model.) 3 Sheets—Sheet 1.

H. E. MARSHALL.

CASH REGISTER AND INDICATOR.

No. 482,375. Patented Sept. 13, 1892

Fig. 1.

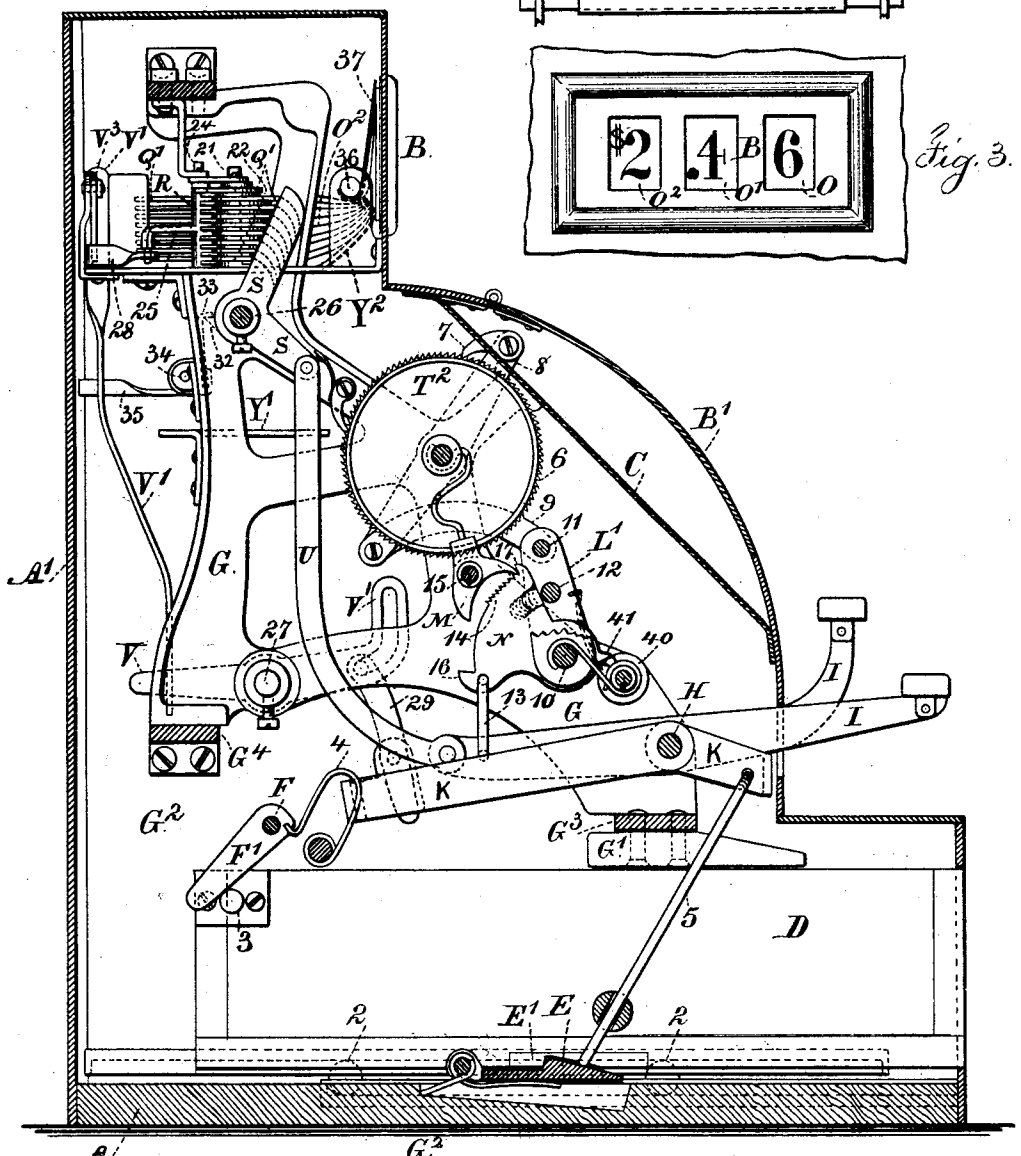


Fig. 4.

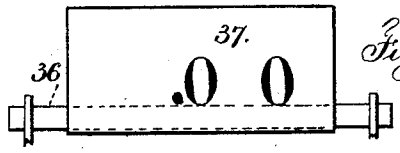
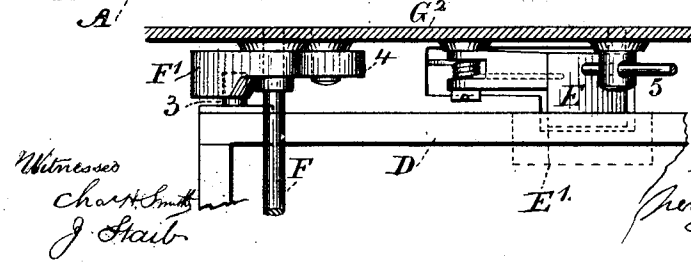


Fig. 3.

Fig. 10.



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(No Model.) 3 Sheets—Sheet 2.

H. E. MARSHALL.

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Fig. 2.

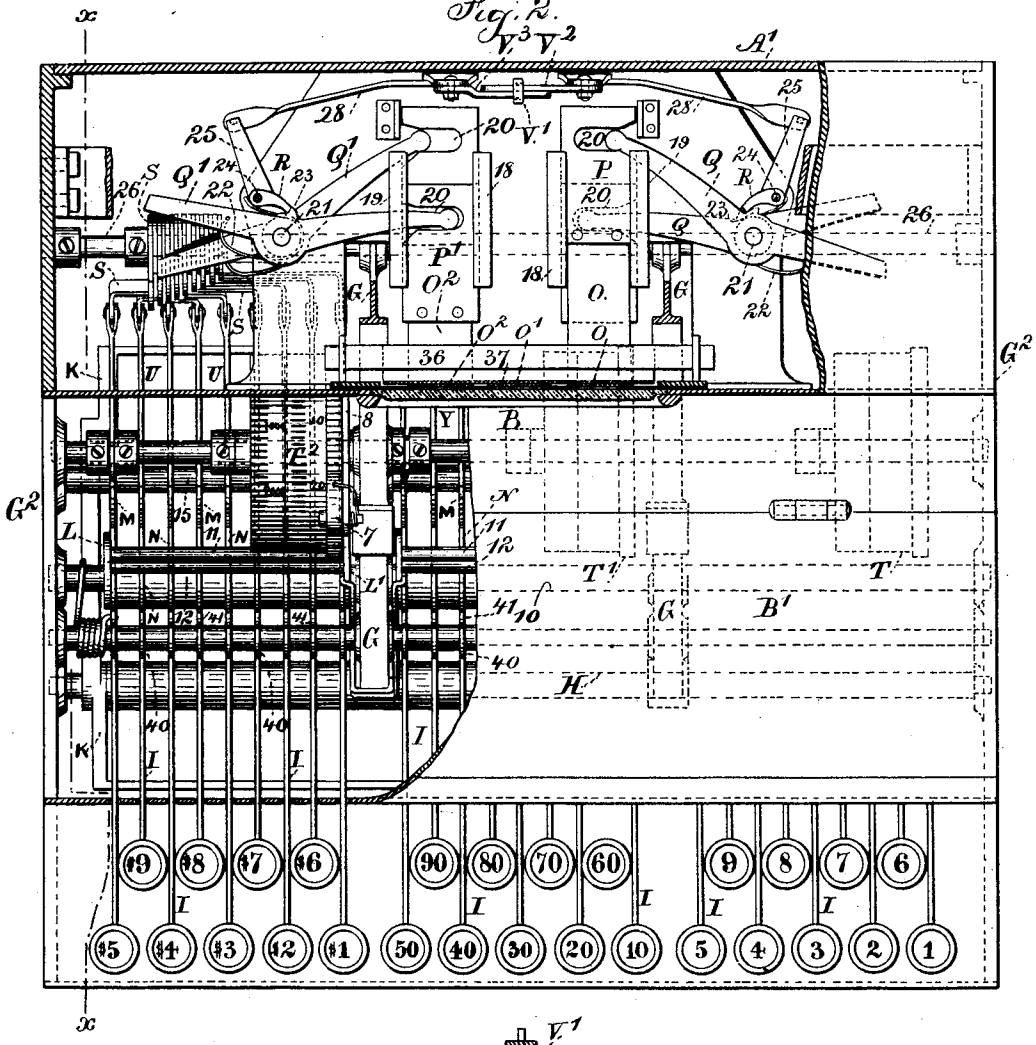

Fig. 6

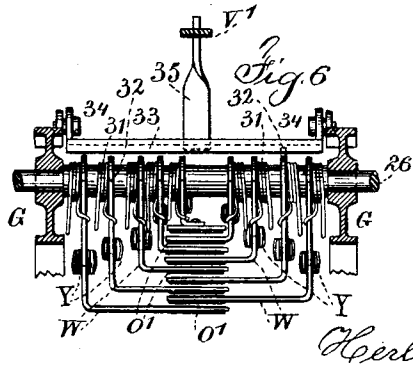

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Fig. 5.

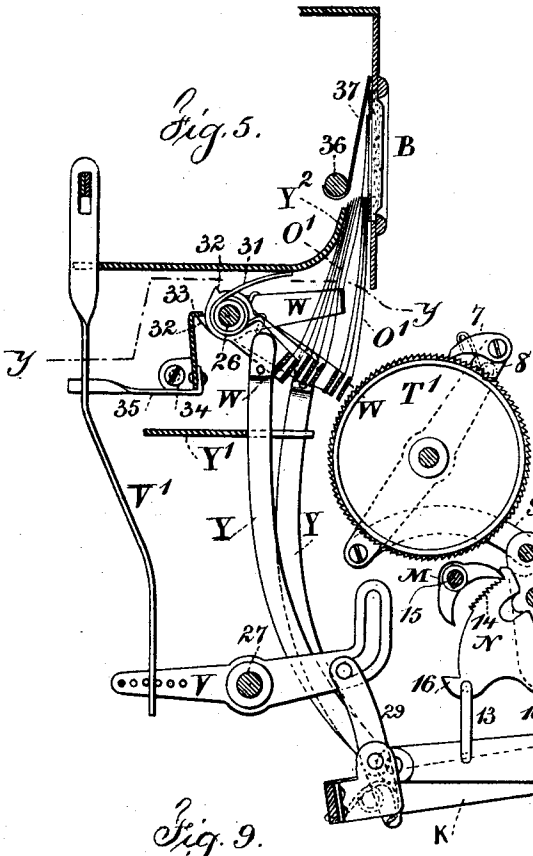


Fig. 7.

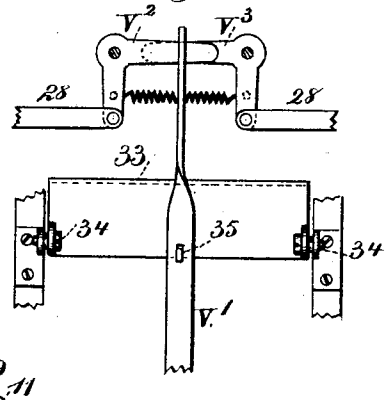


Fig. 9.

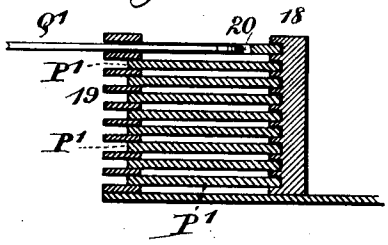
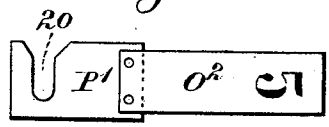


Fig. 8.



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UNITED STATES PATENT OFFICE.

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CASH REGISTER AND INDICATOR.

SPECIFICATION forming part of Letters Patent No. 482,375, dated September 13, 1892.

Application filed January 25, 1892. Serial No. 419,100. (No model.)

To all whom it may concern:

Be it known that I, HERBERT E. MARSHALL, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Registering Apparatus, of which the following is a specification.

This invention is primarily intended for denoting and registering cash payments and is a modification of the device represented in my patent granted September 30, 1890, No. 437,441.

In the drawings, Figure 1 is an elevation of the mechanism, the case and the supports and shafts being in section near the line X X of Fig. 2. Fig. 2 is a general plan view with the case broken open and portions of the frame removed. Fig. 3 is an elevation of the indicating-window. Fig. 4 is a detached view of the blank behind the indicating-window. Fig. 5 is a partial elevation with the shafts and crank-plate lifters in section. Fig. 6 is a sectional view near the line Y Y, Fig. 5. Fig. 7 is a rear elevation of the levers represented in Fig. 5, and Fig. 8 is an inverted plan view of one of the number-slides. Fig. 9 is a cross-section of the number-slides in an enlarged size, and Fig. 10 is a detached plan of the latch at one end of the cash-drawer.

The inclosing case of the apparatus is made in any suitable manner. I have represented the same with a base A, a back A′, ends G^2, and inclosing front with a window at B and a curved swinging cover B′, which should be provided with a suitable lock for securing the same in position, and within the curved cover B′ is a diagonal dust-plate C for covering up the mechanism; but in this dust-plate are to be openings through which to observe the numbers indicated on the computing-wheels, hereinafter referred to.

In the lower part of the inclosing case is a cash-drawer D, which for convenience is made to move upon balls 2, placed in suitable ways upon the bed A, and similar ways should be provided on the under side of the drawer, and the drawer when closed is held by a spring-latch E, engaging a latch-plate E′ upon the drawer.

In order to project the drawer when it is unlatched, I make use of a cross-shaft F, to which the push-levers F′ are permanently attached, and these levers act against studs 3 upon the drawer, and there is a suitable spring 4 that tends to rotate the cross-shaft F and swing the push-levers, and thus move the drawer forward and parallel. These push-levers might be separate at each back corner of the drawer, if desired, instead of being upon one cross-shaft.

In Fig. 10 I have represented a detached plan of the latch at one side of the drawer, and I prefer to make use of similar latches, one at each side of the drawer, and there are above the drawer cross-bars G^3 G^4 and frames G, that support the mechanism, and guide-pieces G′ are preferably provided on the bar G^3 above the top edges of the sides of the drawer for retaining the drawer in position. The cross-shaft H serves as a pivot for the key-levers I and also for the rocker-frame K. There are push-pins 5 pivoted at their upper ends to this rocker-frame K, with their lower ends over the latches E, so that when either key-lever I is depressed and the rocker-frame moved the push-pins simultaneously unlatch the two latches E at the respective sides of the drawer and allow such drawer to be moved forward by the push-levers F′.

It is advantageous to make use of two frames G and the ends G^2 of the inclosing case, as the means for supporting the respective parts of the mechanism, as illustrated in Fig. 2; but there may be four frames G instead of using the ends of the case as supports. The registering apparatus is divided into three sections—one for cents, another for dimes, and the third for dollars—and this arrangement necessitates the use of nine levers in each section, numbered, respectively, as indicated; but where only dimes and cents are made use of in the registering apparatus two sections only need be employed, and the key-levers and the devices immediately connected with the same are similar in each section of the registering mechanism. Hence it will only be necessary to describe the mechanism with reference to one section, and it is to be borne in mind that computing-wheels T T′ T^2 are to be employed for computing cents, dimes, and dollars, and where the wheels are made double, as represented in my afore-

said patent, the computation of cents upon the wheels T will be from one cent to one hundred dollars, upon the wheels T′ from one dime up to one thousand dollars, and on the wheels T^2 from one dollar up to ten thousand dollars. In each of these instances the ratchet-wheel connected with each computing-wheel is provided with one hundred teeth, and the adjacent wheel moves one tooth for every complete revolution of the ratchet-wheel.

The ratchet-wheel 6 of the computing-wheel is represented as acted upon by a pawl 7 upon a lever 8, and the link 9 connects the lever 8 to the arm L upon the shaft 10, and in each section of the apparatus a similar arm L′ at the opposite part of the section is connected to the arm L by the rod 11, that forms the pivotal connection for the link 9, and by the rod 12 that is firmly secured at its ends to such arms L and L′, so as to be acted upon by the key-levers to swing the arms L L′ upon the shaft 10 the proper extent to take up ratchet-teeth corresponding in numbers to the respective keys that may be depressed.

Upon the shaft 10 there are sectors N, corresponding in numbers to the keys, and the respective sectors are connected to the corresponding keys by the links 13, and a corresponding downward movement is to be given to each key-lever by the pressure of the finger upon the finger-piece at the end of such lever; but a greater or less motion is given to the rod 12, arms L L′, link 9, and pawl 7, according to the shape of the sector N at the side of such sector that is adjacent to the rod 12—that is to say, the sector which is connected with the 9 key is not notched, but is in contact with one side of the rod 12, so that when the 9 key is depressed the pawl 7 will be moved nine teeth, and the sector N, that is connected with the 1 key, is notched at the side adjacent to the rod 12, so that it is moved by the key almost a complete motion before it comes in contact with the rod 12 and only gives to the pawl 7 a movement equal to one tooth, and the intermediate sectors between the 1 key and the 9 key are notched in proportion, so as to give the correct movement to the pawl and to the ratchet-wheel to take up the number of teeth corresponding to the number upon the key-lever.

Under all circumstances it is important to prevent a key being partially depressed and then returning to a normal position. To prevent a false registration, which might be made if a key could be partially depressed and returned to the normal position, I make use of teeth at 14 on the sectors N and double-acting spring-pawls M upon the cross-shaft 15, and there are one or more springs serving to hold either one end or the other end of the double pawls toward the sector N. These pawls in each section of the apparatus may move together, in consequence of being fastened to the shaft 15, or a separate pawl and spring may be provided for each sector. At the ends of the arc-shaped edge of each sector pawl-shifters 16 and 17 project, and in the normal position the shifter 17 has thrown one end of the double pawl M into contact with the teeth upon the pawl, and there should be eight of such teeth, as represented, and the distance between the pawl-shifters 16 and 17 is such that the pawl-shifter 17 will come into contact with one end of the pawl M and throw that end down and the other end up at the time the key has been moved downwardly its full extent, and in so doing the elevated end of the pawl will be out of contact with the rack-teeth upon the sector and allow the sector to return to its normal position with the key; but should there be an attempt to raise the key before it has been fully depressed the parts will be held by the pawl against the teeth and a complete movement must be given to the key before it can be returned to its normal position. Any suitable springs may be made use of with these pawls, so as to hold the pawls in either one position or the other and to allow the pawls to spring as the teeth are moved beneath and in contact with the forward ends of such pawls.

Difficulty has heretofore been experienced in introducing number-plates into a small space and actuating such number-plates to expose the proper numbers behind the indicating-window. To obviate this difficulty, I make use of number-plates of celluloid or similar material that is durable, flexible, and sufficiently thin to occupy but little space, so that the number-plates lie closely together, and either one can be moved up into position to be visible at the indicating-window, and the rigid actuating mechanism of the number-plates can occupy more space than the number-plates themselves and be properly connected with the sets of keys in the respective sections of the registering apparatus. I have represented three sets of number-plates O O′ O^2, one set of plates being adapted to cents, the other to dimes, and the third to dollars. The number-plates O and O^2 are represented in Fig. 2; but the intermediate number-plates O′ and their actuating devices are omitted from this figure and represented in Figs. 5 and 6, so as to avoid confusion, and the number-plates O′ are raised and lowered vertically and between the number-plates O and O^2, and these number-plates O and O^2 are connected with horizontal slides, and the ends of the number-plates are turned upwardly, as indicated in Fig. 1, so that when the slide to which the number-plate is connected is moved horizontally toward the indicating-window the end of the number-plate slides upwardly and the number appears behind the window. The same operation takes place in connection with the number-plates O′; but these are moved upward by the swinging arms to which they are connected, as hereinafter described.

The number-slides P P′ are made of suit-

able metallic plates, with which the respective flexible number-plates are connected at the ends, and these number-slides P P′ are supported in suitable guides or frames, so as to lie as closely together as may be convenient, and the endwise motion by which the number-plates are rendered visible behind the indicating-window or are removed therefrom may be given by any suitable mechanism. I have represented the number-slides P P′ as supported at one edge in the grooved frames 18 and at the other edge by the bars 19, and as a convenient way for giving motion to the number-slides I have represented levers Q Q′, the ends of the levers passing between the bars 19 and into mortises 20 in the respective number-slides P or P′.

The pivots 21 are suitably supported by the frame of the machine and they receive the respective groups of number-levers Q Q′. Each lever is provided with a spring 22, by which such number-lever and its number-slide is moved to draw the slide back and remove the number-plate and number from behind the indicating-window when such number-slide lever is not otherwise held, and upon each number-slide lever is a tooth 23, and there is a pawl-plate R, the edge of which stands vertical, and the pawl-plate is pivoted at its top and bottom ends upon the pivots 24, and connected with the pawl-plate is an arm 25, that is moved, as hereinafter described, to withdraw the edge of the pawl-plate out of contact with the tooth 23 upon whichever of the number-slide lever had been held by such pawl-plate, and thereby allow the lever, number-slide, and plate to return to the normal position by the action of the springs, and it will be apparent that when either of the number-slide levers Q or Q′ has been moved by the depression of a key, such pawl-lever and its slide is held by the pawl-plate and the number is left exposed until the pawl-plate is swung back and the tooth liberated.

In order to connect the respective number-slide levers with the keys, any suitable mechanism may be employed. I have represented a range of bent levers S upon a shaft or axis 26, and one lever is connected to each key by a link U, and the arrangement of these links and bent levers may be understood upon reference to Figs. 1 and 2. The upper ends of the bent levers are successively shorter, as indicated in Fig. 1, and the outer ends of the number-slide levers Q′ are successively shorter, so that the upper end of the bent lever S farthest from the pivot 21 acts upon the top number slide lever. The next bent lever S, which is shorter, passes below the top number-slide lever Q′ and acts upon the next number-slide lever, which is shorter, and so on, the shortest bent lever S acting upon the short arm of the bottom number-slide lever Q′, and by this arrangement uniformity of movements will be given to all the number-slides P′, because the short levers act nearest to the pivots and the proportionate length of the levers is maintained. The bent levers S′ and the number-slide levers Q′ are illustrated in Figs. 1 and 2 as applied to the keys in the dollar-section, and it is to be understood that these same devices are applied to the keys in the cent-sections; but these parts are not represented in Fig. 2 to avoid confusion.

It will be understood that a flexible number-plate is brought into view behind the indicating-window B when a key is depressed and that it is retained in that position, and it must be liberated and withdrawn, and this liberation and withdrawal of one number-plate takes place during the time that another number-plate is being brought into position and the parts are arranged as next described, so that if the same key is depressed a second time the number-plate will be liberated and partly withdrawn, and then it will be returned again and held in position. To effect this operation, I provide a rock-shaft 27 with a lever V thereon, and a connection from one end of this lever to the rocker-frame K, and I remark that there may be a rock-shaft 27 and a lever V with a separate connection in each section of the indicating apparatus; but I prefer to only employ one rock-shaft and lever for the whole apparatus, so that all the number-slides will be liberated if any one key is depressed, and that all the number-slides will be drawn back to their normal position and only the desired number slide or slides moved up to view.

From the lever V a link V′ extends to the pair of right-angled levers V^2 V^3, and these right-angled levers have links 28 to the arms 25 of the pawl-plate R, so that when the lever V is moved by the depression of either key the levers V^2 V^3 are caused to move the links 28, arms 25, and pawl-plates R, so that the respective number-slide levers that have been latched by the pawl-plates are liberated and return by the action of the springs to their normal positions. It is preferable to make use of a slot in the lever V and an arm 29 with a pin in the slot, such arm 29 being upon the rocker-frame K, and the slot in the lever F is shaped so that the lever is moved instantaneously with the movement of the rocker-frame K, so that the unlatching by the movement of the pawl-plate R is effected the first thing upon the downward movement of either key to liberate the parts and cause the number-plates to return to their normal positions, after which the pin upon the arm 29 moves in the vertical portion of the slot in the lever V and does not give to such lever V a greater movement than is necessary for the unlatching operation, and the link 29, being pivoted to the rocker-frame, swings and allows the pawl-plates to return to position instantly for engaging the teeth that hold the number-plates in view.

Where there are only two number-slides and two sets of figures, the number-slides P P′ and their connected number-plates O O^2 only require to be made use of, and a third set of

number plates and slides similarly constructed might be employed where there is a third set of figures, and in this case the third set of number plates and slides might be arranged vertically instead of horizontally, so that the flexible number-plates would occupy the positions of the number-plates O′; but I have found it most convenient to arrange the middle set of number-plates with the flexible numbers O′ in the positions indicated in Figs. 5 and 6, in which the flexible number-plates O′ are held by crank-plates W upon the cross-shaft 26, and each crank-plate has a spring 31 to move it to the normal position and draw down the number-plate O′, with which it is connected, and upon each hub portion of the crank-plates there is a projecting tooth 32, and the rocker pawl-plate 33, pivoted at 34, engages the tooth that is brought into position to be taken by such rocker pawl-plate by the elevation of the number-plate O′ that is connected with the particular crank-plate, and there is a spring-arm 35, extending backwardly from the rocker-plate 33 through a mortise in the link V′. Hence the crank-plates W and flexible number-plates O′ are liberated simultaneously with the other number-plates when the link V′ is drawn down, so that all of the number-plates that have been visible are being returned to their normal positions during the depression of any one of the key-levers.

In order to give motion to the crank-plates, the pusher-bars Y are made use of. These pusher-bars are pivoted at their lower ends to the back ends of the key-levers and their upper ends are preferably formed as forks that receive the respective crank-plates, and these pusher-bars are preferably guided by a stationary notched plate Y′, and the notches in this plate are cut at greater or less depths, so that the upper ends of the pusher-bars may be nearer to or farther from the cross-shaft 26, so as to give to the flexible number-plates O′ a uniformity of upward movement—that is to say, with the shortest crank-plates W the pushers Y are to act nearest the cross-shaft 26, so as to give the same movement to the number-plate O′ that is connected with that crank-plate that is given to a longer crank-plate by a pusher-bar that acts farther away from the cross-shaft 26.

It is advantageous to have the edge of the plate Y^2 bent upwardly, as seen in Fig. 5, so as to form a guide to retain the number-plates O′ in their proper positions, and when the horizontal number-plates O and O^2 rest against similarly upwardly-curved portions of the plate Y^2, as shown in Fig. 1, such number-plates O and O^2 are guided in their upward movement as the corresponding slides are actuated, and it is advantageous to make use of a supporting-bar 36 and an inclined blank 37, shown in Fig. 4, which blank is behind the indicating-window B and has upon it two ciphers and a period, as shown, so that when a dollar-figure is moved up behind the indicating-window, the two ciphers will be visible when there is not any cent or dime figure displayed, and such cent or dime figure, passing in between the indicating-window and such inclined blank, covers up the ciphers and the proper figure is displayed at such indicating-window.

In registering apparatus difficulty sometimes arises in consequence of efforts being made to depress one key while another key in the same section is partially or wholly depressed. To prevent this being done and to insure an accurate registration of the amount represented by each key that is depressed, I make use of the rotary tumbler 40, having a longitudinal notch in its periphery, and there is one rotary tumbler to each section in the machine, and upon every one of the sectors N is a tooth 41, of a shape adapted to pass into the longitudinal notch or channel in the rotary tumbler. I have shown the notches in rings that project from a tube upon the supporting-shaft, but the slot may be in a single cylinder in each section. In the normal position the teeth 41 are immediately above the longitudinal notch in the rotary tumbler in the position indicated in Figs. 1 and 5, and the rotary tumbler could be partially revolved without being stopped by either of the teeth 41; but the moment any key-lever is depressed and its sector moved the tooth 41 upon that sector gives to the tumbler a partial rotation, turning such tumbler beneath all the other teeth 41. Hence no other key can be moved until the key that has been depressed is returned to its normal position and the rotary tumbler moved back again, so that its notch is in a position to receive either one of the teeth that may be depressed.

When all the rotary tumblers are permanently connected to the shaft upon which they are mounted, so that the rotary tumblers in all three sections move together, the keys to be acted upon in each section must be depressed simultaneously. This is an advantage, because it prevents any key in either section being depressed after any one key has been partially depressed without an entire movement being given to the same, and the rotary tumblers, moving all together, compel all the keys that have been partially depressed to move together the entire distance or stroke.

In consequence of the depression of any one key causing the return to a normal position of all previously-exhibited members, it is desirable that all the required keys for one sale should be simultaneously depressed, so as to remain in sight until the next sale is made.

I claim as my invention—

1. The combination, in a registering apparatus, of flexible number-plates adapted to lie closely against one another and number-slides connected with the respective number-plates, key-levers and connections between the number-slides, and the key-levers for moving one number-slide and its flexible number-plate at a time into view, substantially as set forth.

2. The combination, with the flexible number-plates, of crank-plates with which the respective number-plates are connected, key-levers, and connections between the key-levers and the crank-plates for moving the same and bringing one flexible number-plate into view, substantially as set forth.

3. The combination, in a registering mechanism with the case and indicating-window, of three sets of flexible number-plates, two sets of number-slides connected with two of the sets of flexible number-plates, and mechanism for moving such number-slides toward and from the window to expose or retract the flexible numbers, and plates with which the third and intermediate set of flexible number-plates is connected, and mechanism for moving such plates and numbers up and down behind the window, substantially as specified.

4. The combination, with the key-levers, of a rocker-frame actuated by either key-lever, number plates and slides with which the number-plates are respectively connected, levers for moving the number-slides, each lever being provided with a tooth, a pawl-plate for engaging the tooth when the number-slide is projected, connections between the number-slide levers and the key-levers, and connections between the pawl-plate and the rocker-frame, whereby the pawl-plate is disconnected from the tooth when either key-lever is depressed, substantially as set forth.

5. The combination, with the flexible number-plates, of crank-plates with which the respective number-plates are connected, teeth or projections upon the crank-plates, a pawl-plate for engaging the tooth of the crank-plate when the number-plate is projected into view, a rocker-frame acted upon by either key-lever, and a connection between the rocker-frame and the pawl-plate for liberating the crank-plates and number-plates upon the depression of either key, and springs for returning the number-plates to their normal positions, substantially as set forth.

6. The combination, with three sets of key-levers in a registering apparatus, of three sets of flexible number-plates, number-slides and actuating-levers for two of the sets of number-plates, crank-plates for the third set of number-plates, teeth and pawl-plates for holding the projected number-plates, a rocker-frame actuated by the key-levers and connections from such rocker-plate for withdrawing the pawl-plates, and springs for returning the flexible number-plates and their connected parts to their normal positions, substantially as set forth.

7. The combination, in a registering mechanism, of key-levers, a rocker-frame, number-plates arranged in three groups, a holding-tooth for each number-plate and connections from the respective key-levers for moving the number-plates, three pawl-plates for retaining the respective number-plates that are moved into view, the lever V and connection to the rocker-frame, the link V′, connected to the lever V, and lever connections from the link to the respective pawl-plates for simultaneously disconnecting such pawl-plates from the respective teeth that hold the number-plates, substantially as set forth.

8. The combination, with the key-levers and indicating number-plates, of a computing apparatus having a ratchet-wheel, a pawl and lever for moving the same, arms connected with the pawl-lever, a supporting-shaft for such arms, sectors upon such shaft and connections from the same to the key-levers, there being ratchet-teeth and pawl-shifters upon each sector, and double-ended spring-pawls brought into action by the pawl-shifters and engaging the teeth upon the sectors to prevent such sectors or their connected levers being returned to their normal positions until after the respective key-levers have been fully depressed, substantially as set forth.

9. The combination, with the key-levers and the computing apparatus, of sectors and connections to the respective key-levers and rotary tumblers for engaging the projections upon the sectors to prevent more than one key in a section being depressed until the previously-depressed key in the same section has been restored to its normal position, substantially as set forth.

10. The combination, in a registering apparatus, with the key-levers and cash-drawer, of a holding-latch below the drawer, a rocker-frame beneath the key-levers, a push-pin from the same for unlatching the cash-drawer, a cross-shaft and pusher-levers thereon, and a spring for giving a parallel motion to the cash-drawer in opening the same, substantially as set forth.

11. The combination, in a registering apparatus having an inclosing case and indicating-window, of a blank behind such window, having ciphers and a period, flexible number-plates in groups, one group for each set of numbers, with the ends of the flexible number-plates lying close together adjacent to the blank behind the indicating-window, and mechanism, substantially as specified, for giving motion to the flexible number-plates and projecting them into view between the indicating-window and the stationary blank, substantially as set forth.

Signed by me this 19th day of January, 1892.

HERBERT E. MARSHALL.

Witnesses:

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ALICE M. OLIVER.