(No Model.) 3 Sheets—Sheet 1.

E. H. MURDOCK.

CASH REGISTER AND INDICATOR.

No. 484,917. Patented Oct. 25, 1892.

FIG. 1.

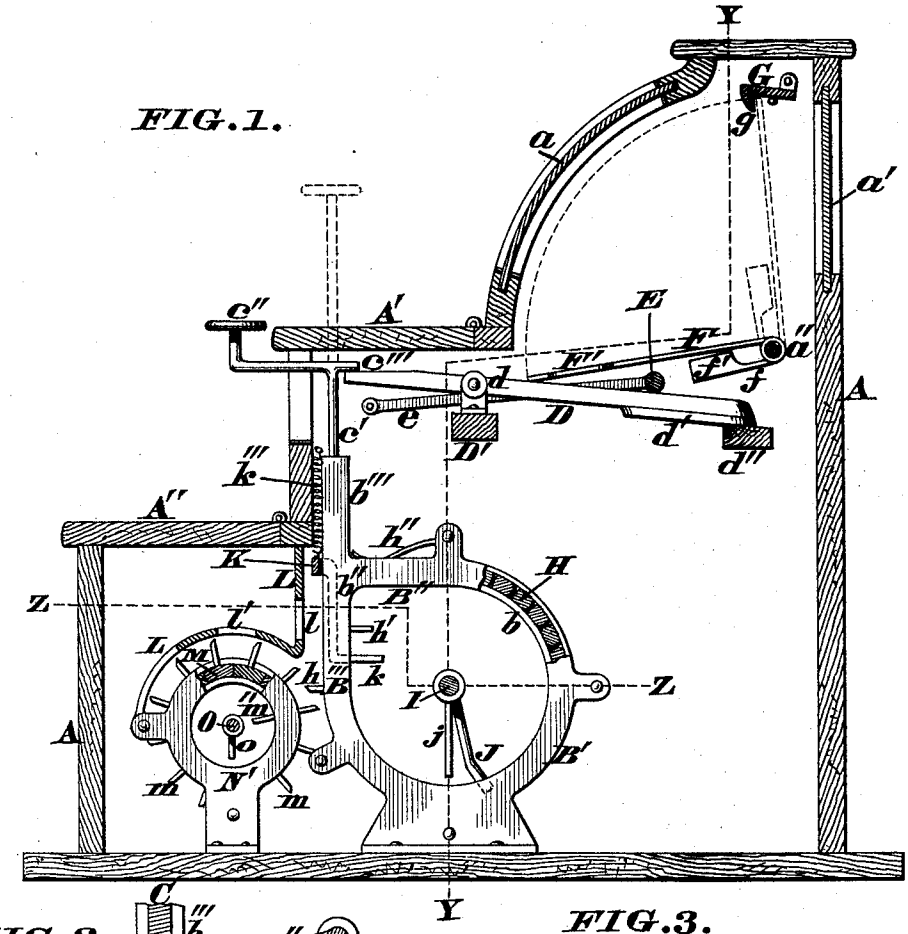


FIG. 2.

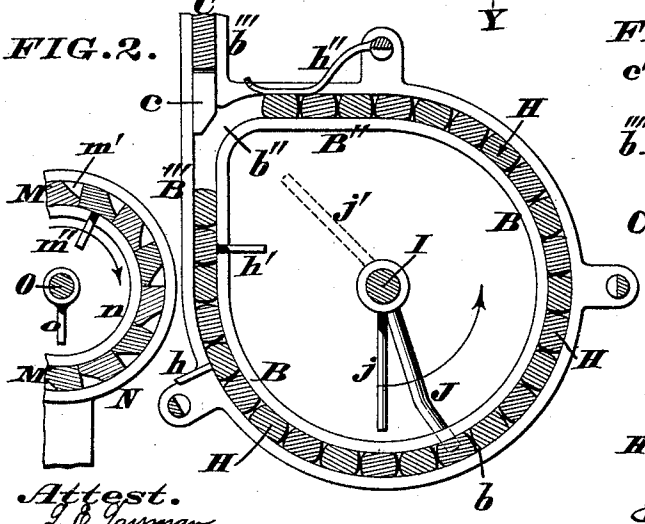
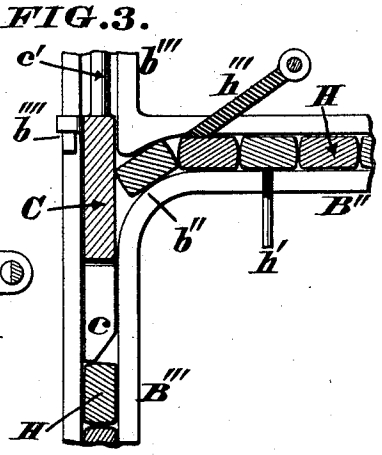


FIG. 3.



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(No Model.) 3 Sheets—Sheet 2.

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FIG. 4.

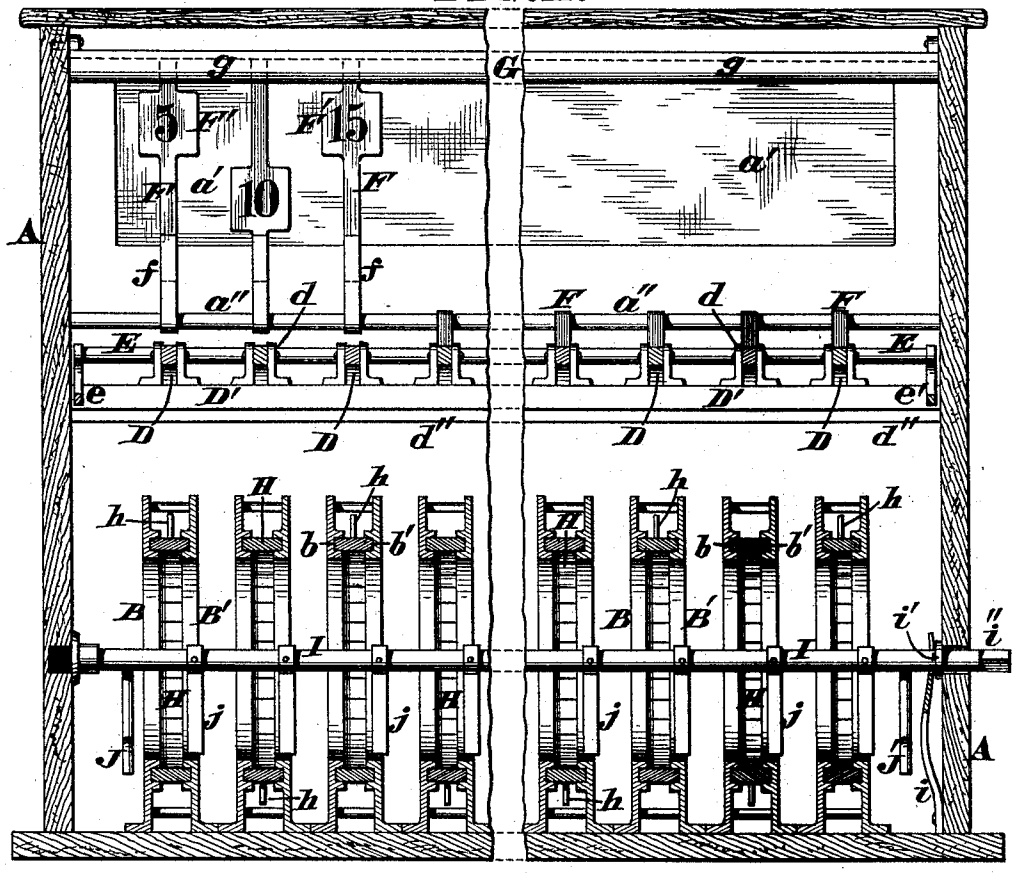

FIG. 5.

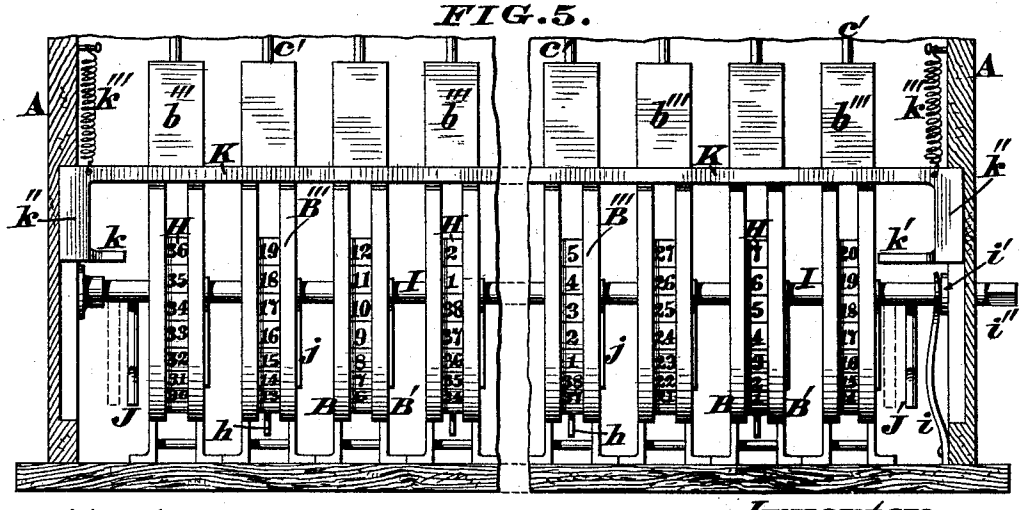

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FIG. 6.

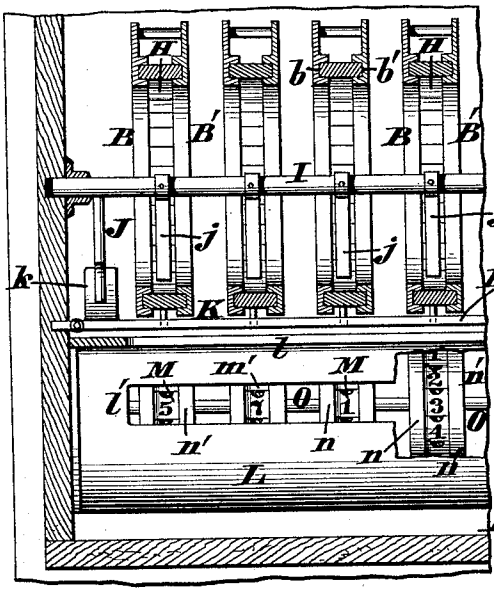


FIG. 7.

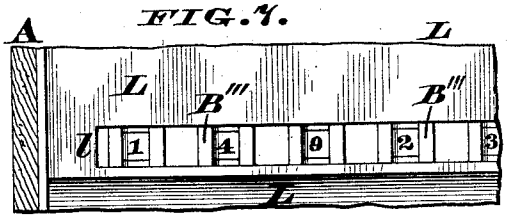


FIG. 8.

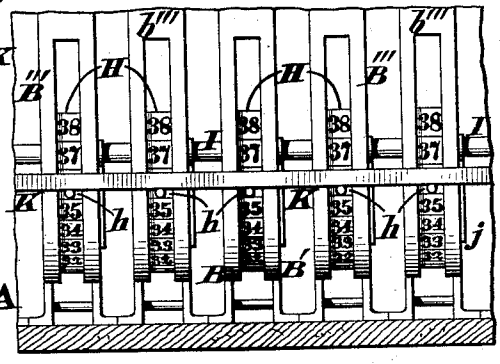


FIG. 9.

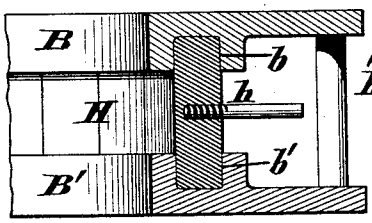


FIG. 11.

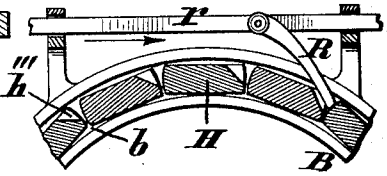


FIG. 12.

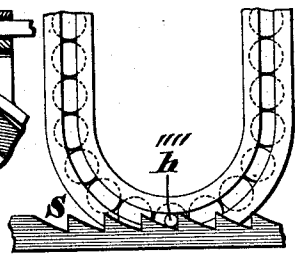
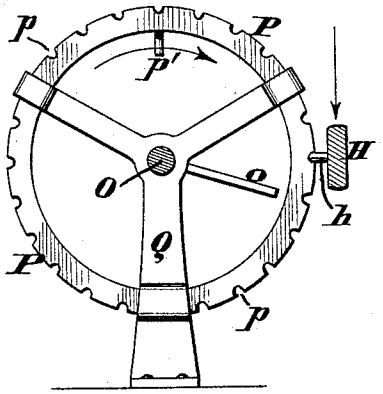


FIG. 10.



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UNITED STATES PATENT OFFICE.

EDWIN H. MURDOCK, OF CINCINNATI, OHIO.

CASH REGISTER AND INDICATOR.

SPECIFICATION forming part of Letters Patent No. 484,917, dated October 25, 1892.

Application filed July 5, 1892. Serial No. 438,938. (No model.)

To all whom it may concern:

Be it known that I, EDWIN H. MURDOCK, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Cash Indicators and Registers; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the annexed drawings, which form part of this specification.

My invention comprises a cash indicator and register in which a series of numbered counters is caused to travel a continuous forward path within a housing, the latter being so arranged as to permit a ready inspection of said numbers, and the counters being usually employed in connection with a device that shows how often they have completely traversed said housing. By this construction the counters are never withdrawn from the housing. Neither are they shifted from one column to another, and the path described is preferably as nearly circular as circumstances will permit, as hereinafter more fully explained.

My invention further comprises certain minor improvements in the construction of the machine, the details of which features are hereinafter more fully described.

In the annexed drawings, Figure 1 is a vertical section of the upper portion of a cash-indicator embodying my various improvements, said section being taken in the plane of one of the push-stems, which latter is in its normal or elevated position, and part of a housing being broken away to expose some of its counters. Fig. 2 is an enlarged vertical section through one of the housings and its accessories, the plunger of said housing being elevated. Fig. 3 is a still greater enlarged vertical section through the upper part of said housing, the plunger thereof being fully depressed. Fig. 4 is a vertical section of the indicator taken at the line Y Y of Fig. 1, the central portion of the machine being removed and three tablets being elevated. Fig. 5 is a vertical section of the lower part of the cabinet or case, the housing being seen in elevation. Fig. 6 is a horizontal section of a part of the machine, taken at the line Z Z of Fig. 1, a bar that completes the resetting of the counters being lowered to bear upon the outer pins of said counters. Fig. 7 is an elevation of a portion of a slotted screen that facilitates the reading of the various numbers on the counters. Fig. 8 is an elevation showing the resetting-bar completely lowered. Fig. 9 is an enlarged transverse section through a portion of one of the housings. Figs. 10, 11, and 12 show three different modifications of my invention.

A represents the upper portion of a cash-indicator cabinet. A′ A″ are hinged lids of the same, and *a a′* are windows at which the elevated tablets are exposed. Firmly secured within this cabinet are the housings previously alluded to, the preferred construction of said housings being more clearly seen in Figs. 2 and 9. Reference to these illustrations show that each housing is composed of a pair of annular plates or rings B B′, secured a suitable distance apart and provided with annular grooves *b b′*, which serve as a guiding track or race for the numbered counters to travel in. Usually each housing has a horizontal portion B″, joined to a vertical portion B‴ by a short curve *b″*, the part B‴ being prolonged upward, as at *b‴*, to serve as a guide for a reciprocating plunger C, having a slot *c* at its lower end and provided at top with a push-stem *c′*, whose shape may be varied to suit the special form of cabinet. The push-stem terminates with a button *c″*, that is numbered the same as the tablet to be operated by said stem, a spur *c‴* of the latter being adapted to bear upon the short end of a lever D, pivoted in standards *d*, projecting from a common bearer D′. The longer or rear end of this lever is loaded at *d′* and normally supported by a rest-bar *d″*, which normal position of said lever may be rendered still more positive by a rod E, applied to arms *e e′*, pivoted to the inner side of the cabinet, one of said pivots being seen in Fig. 1. Rod E must be so arranged as to rest upon all the levers C when they are supported by the bar *d″*, while at the same time this rod must be free to swing upward when said levers are operated.

Secured across the cabinet is a rod *a″*, upon which the tablet-lifters F are pivoted, each lifter being provided with a tail-piece *f*, loaded

at f', so as to compel the free ends of said lifters to normally rest upon their respective levers.

F′ are the numbered tablets, arranged as seen in Fig. 4, but placed as close together as the size of the cabinet will permit.

G is a locking-plate pivoted across the cabinet and having in front a depending flange g, behind which the upper ends of the tablet-lifters engage at the proper moment.

H are the counters, usually of metal and of any desired size and shape that will secure their free passage through the passage $b\ b'\ b''$ and yet prevent them turning crosswise of the same, each distinct set of counters being provided with one outwardly-projecting pin h and another inwardly-projecting pin h', which latter is a few counters in the rear of pin h when taken in the direction of travel. Furthermore, the outer surfaces of these counters are so numbered as to read consecutively when they drop down the vertical portion B‴ of the housing, as seen in Figs. 5 and 8, in which illustrations thirty-eight of said counters are supposed to be contained in each housing. The invention, however, is not limited to any exact number of said counters, nor to any special characters for designating them. A spring h'' (seen in Figs. 1 and 2) may be employed for preventing accidental shifting of the counters, or the same result may be accomplished by a heavy gravitating-flap h''', as shown in Fig. 3.

Arranged across the cabinet is a shaft I, occupying a central position with reference to the various housings, and normally forced in one direction by a spring i, bearing against a collar i' fastened to said shaft. In addition to this collar the shaft is provided near its opposite ends with bent levers J J′, and between these levers it has short levers j, one for each housing in the machine, the levers j being adapted to operate the inner pins h' of the counters, while the other levers are designed to bear upon lugs $k\ k'$, projecting laterally from the guides k'' of a vertically-acting bar K, which is normally elevated by pulling-springs k''' or otherwise. Secured in front of the housings is a screen L, having a pair of longitudinal slots $l\ l'$, the vertical one of which l facilitates the proper reading of the numbers on the counters H, as seen in Fig. 7, while the horizontal slot l' enables an inspection of the devices that register each complete circuit made by each set of counters. (See Fig. 6.) These registering devices operate in practically the same manner as the counters M in Figs. 2 and 6, being a series of pieces capable of being readily moved within a circular track formed by two rings N N′, having, respectively, annular flanges $n\ n'$. Each piece may have an outwardly-projecting pin, as seen at m in Fig. 1, or said pieces may be notched, as represented at m' in Figs. 2 and 6, the object of these pins or notches being to permit a ready engagement of the driving-pins h of the counters H, it being understood that each set of counters is provided with a registering device.

m'' is a pin projecting inwardly from either of the pieces M, which pin can be operated by a lever o of a resetting shaft O, the latter being arranged axially with reference to the rings N N′ and capable of shifting longitudinally and turning in the same manner as shaft I.

In fitting up the above described preferred form of my machine the housings B B′ are not filled completely with counters H, a sufficient number of them being omitted to afford space for the proper play of plunger C. The relative size of this space is substantially shown in Figs. 2 and 3, and reference to Fig. 2 indicates that when the plunger is in its normal or elevated position the first counter to be operated on occupies the vertical portion B‴ of the housing, while the last counter in the series is situated in the horizontal part B″ of said housing. Consequently when this plunger is depressed it drives the first counter still farther down within the vertical portion B‴, and as the edges of all the counters are in contact with each other this movement of said first counter compels the entire series to travel around the circuit formed by the grooves $b\ b'$. As soon as the plunger is fully depressed and arrested by the stop b'''', (seen in Fig. 3,) the entire series of counters will have been advanced so far as to shift the first counter in the horizontal part B″ to the position represented in said illustration. Reference to this illustration shows that said first counter now occupies the bend b'' of the guiding-groove, but can travel no farther, because it is in contact with the back of the plunger. Therefore when the plunger is elevated there is nothing to retain this counter and it instantly drops down into the vertical portion B‴ of the housing and occupies the same position as the counter previously shifted by said plunger.

From the above description it is evident that by depressing the plunger once for every counter contained within the housing the entire series will make a circuit through the guiding-groove $b\ b'$ and each complete circuit will be duly registered. This registration is effected by the outwardly-projecting pin h coming in contact with one of the pins m of the pieces M and shifting them all around within the rings N N′ a distance equal to the width of a single piece. Simultaneously with the depression of the plunger the spur c''' of the push-stem c' bears upon the lever D and so operates the latter as to raise its loaded end d', thereby causing it to strike the tail-piece f of tablet-lifter F, the result being to swing this lifter up to the position indicated by the dotted lines in Fig. 1. When it reaches this position, the free end of the lifter momentarily raises the locking-plate G, and then said plate instantly swings down and causes said lifter to engage behind the flange g. Here the lifter is retained, but has a natural tend-

ency to fall forward, because of its inclined position and the location of weight f'. Therefore when a second lifter is swung up the first one falls, and on this account there is but one tablet exposed at the windows a a', unless a number of push-stems should be operated at the same time.

Fig. 4 shows how the lifters would be arrested in case the five, ten, and fifteen cent buttons should be simultaneously depressed. With every rising of the rear portions of levers D the weight-rod E is elevated accordingly, and by coupling this rod to suitable locking devices the money-drawer may be released when either button is depressed.

A complete circuit of all the counters in either housing can be effected only when shaft I occupies the position seen in Figs. 4 and 5, because the various levers j are then at one side of each housing and do not interfere in the least with the free travel of the inwardly-projecting pins h'; but when it is desired to reset the counters, or, in other words, to turn them all back to the starting-point, a key is applied to the square end i'' of said shaft, and the latter is then forced along to the left, which act brings the long levers J J′ in line with the lugs k k' and disposes the short levers j in the center of the housings. (See Fig. 6). The shaft is then turned in the direction of the arrow seen in Fig. 2, thereby causing the levers j to catch as many of the inwardly-projecting pins h' as are included in the sweep of said levers; but as the housings B B′ depart from a true circle where the portions B″ B‴ are located these short levers j will not carry said pins h' as far as necessary. As soon, however, as said levers become inoperative the long levers J J′ come into service, and by striking against the lugs k k' they depress the bar K and pull it down to the position seen in Fig. 8, the descending bar being thus brought in contact with any of the outwardly-projecting pin or pins h that may be in its path. By simply turning this shaft around a sufficient number of times all the pins will be eventually brought to the position seen in said illustration, thereby resetting the machine.

As previously stated, there are supposed to be thirty-eight counters in each housing, (seen in Figs. 5 and 8,) and therefore when the machine is completely reset all the upper counters will display the numeral "38," and the other numbers will diminish in regular order around the guiding-groove b b'. Immediately on the liberation of bar K the springs k''' k''' pull it up to the normal position seen in Figs. 1 and 5, and then when either plunger is operated a counter with number "1" on its face will drop down and rest on number "38." This is clearly seen in the fourth housing in Fig. 5, where counter "1" rests upon counter "38," and counter "2" rests upon "1," thus showing that the plunger of this housing has been operated twice; but in the fifth housing in said illustration counter "5" is on top, thus showing that the plunger of said housing has been operated five times since resetting the machine. From this description it will be apparent that the act of resetting the machine is initiated by the individual levers j of each housing bearing against the inner pins h' of the counter series and is completed by the bar K, bearing down on the outer pins h of the series, the relative distance between said pins being governed by the diameter of the guiding-groove b b' and the number and size of the counters adapted to traverse it. By constructing the machine in such a manner as to normally hold the shaft I in such a position as to bring the short levers j about to the place indicated by the dotted line j' in Fig. 2 two complete revolutions of said shaft will be sufficient to reset any possible number of counters.

Before resetting the machine, the reading of the various sets of counters is taken off at the slot l, as seen in Fig. 7, which slotted screen prevents the confusion incidental to the display of a great assemblage of numbers. Similarly the reading of the registering-counters M is readily taken off at the other slot l' of said screen, as represented in Fig. 6.

A modification of this registering device is seen in Fig. 10, where a ring P is mounted in a frame Q, that also carries the resetting-shaft O, the outer periphery of said ring being grooved at p to admit at the proper moment the outwardly-projecting pin h of a descending counter H. This ring is numbered in regular order between said grooves and has an inwardly-projecting pin p', adapted to be operated by the resetting-lever o of shaft O.

Fig. 11 shows another modification of my invention wherein the housing B is supposed to be a true circle or ellipse, the guiding-groove b of which is completly filled with numbered counters H, whose leading edges are notched at h''' to enable a pawl R to act against the trailing edge of the front counter. Pawl R is carried by a horizontally-reciprocating push-stem r, thereby indicating that the device which impels the counters may be applied in any position capable of affording the best results.

Fig. 12 shows the lower portion of a continuous housing having vertical sides and semicircular ends, said sides and ends being slotted to expose the counters, one of which has a pin h'''' projecting through said slot for the purpose of engaging with either tooth of a ratchet-bar S. This bar must be suitably numbered to register how often it is struck and advanced by pin h'''', which latter comes into service but once at every complete circuit, and then shifts said bar the length of a single tooth. Again, in some special cases the registering devices M may be located behind the housings B B′; but it is preferred to place them in front of said housings, because the readings can be so readily taken off after opening the lid A′. From the above description it is evident all these modifications embrace the leading feature of my invention—that is to

say, they include a single set of numbered pieces or counters which are caused to describe a continuous forward circuit by an impulse imparted to one of them and without employing special appliances for shifting them laterally.

I claim—

1. The within-described method of counting, which method consists in intermittently advancing a single set of disconnected numbered pieces along an endless circuit by an impulse imparted successively to each piece and indicating the passage of a certain piece at a definite place in said circuit, substantially as herein described.

2. The within-described method of counting, which method consists in intermittently advancing a single set of disconnected numbered pieces along an endless circuit by an impulse imparted successively to each piece and indicating said impulses, substantially as herein described.

3. The within-described method of counting, which method consists in intermittently advancing a single set of disconnected numbered pieces along an endless circuit by an impulse imparted successively to each piece, indicating the passage of a certain piece at a definite place in said circuit and indicating each of said impulses, substantially as described.

4. The combination, in a counting apparatus, of a housing provided with an endless circuit, a single set of disconnected numbered pieces inserted within said housing-circuit, a single plunger that advances said pieces successively, and a numbered tablet operated by said plunger, substantially as herein described.

5. The combination, in a counting and registering apparatus, of a housing provided with a pair of annular grooves *b b'*, a single series of numbered counters H, traversing said grooves, a reciprocating plunger C, that advances said counters one at a time, a lever D, operated by said plunger, and a swinging tablet-lifter F, actuated by said lever, substantially as herein described.

6. The combination, in a counting and registering apparatus, of a housing provided with a pair of annular grooves *b b'*, a single series of numbered counters H, traversing said grooves, a reciprocating plunger C, that advances said counters one at a time, a pin *h*, projecting outwardly from one of said counters, and a registering mechanism, consisting of a series of numbered pieces M, traversing a pair of annular grooves *n n'*, which pieces are successively operated by said pin *h*, for the purpose described.

7. The combination, in a counting and registering apparatus, of a housing provided with a pair of annular grooves *b b'*, a single series of numbered counters H, traversing said grooves, a reciprocating plunger C, that advances said counters one at a time, a lever D, operated by said plunger, a swinging tablet-lifter F, actuated by said lever, and a registering mechanism, consisting of a series of numbered pieces M, traversing a pair of annular grooves *n n'* and operated by one of said counters H, substantially as described.

8. The combination, in a counting and registering apparatus, of a set of housings each of which is provided with a pair of annular grooves *b b'*, a single series of numbered counters H, traversing each of said grooves, means for advancing said counters one at a time, a pin *h'*, projecting inward from one counter of each series, and a longitudinally shiftable and revolving shaft I, having levers *j* that strike said pins when said shaft is operated, as herein described.

9. The combination, in a counting and registering apparatus, of a set of housings each of which is provided with a pair of annular grooves *b b'*, a single series of numbered counters H, traversing each of said grooves, means for advancing said counters one at a time, a pin *h'*, projecting inward from one counter of each series, a longitudinally shiftable and revolving shaft I, having long levers J J' near its ends and a set of shorter levers *j* between them, and a vertically-reciprocating bar K, having lugs *k k'*, adapted to be operated by said long levers J J', in the manner described.

10. The within-described method of counting, which method consists in intermittently advancing a single set of disconnected numbered pieces along an endless circuit by an impulse imparted successively to each piece, substantially as herein described.

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

EDWIN H. MURDOCK.

Witnesses:

JAMES H. LAYMAN,

ALFRED M. DAVIES.