(No Model.) 2 Sheets—Sheet 1.

E. H. MURDOCK.

CASH REGISTER AND INDICATOR.

No. 480,957. Patented Aug. 16, 1892.

FIG. 1.

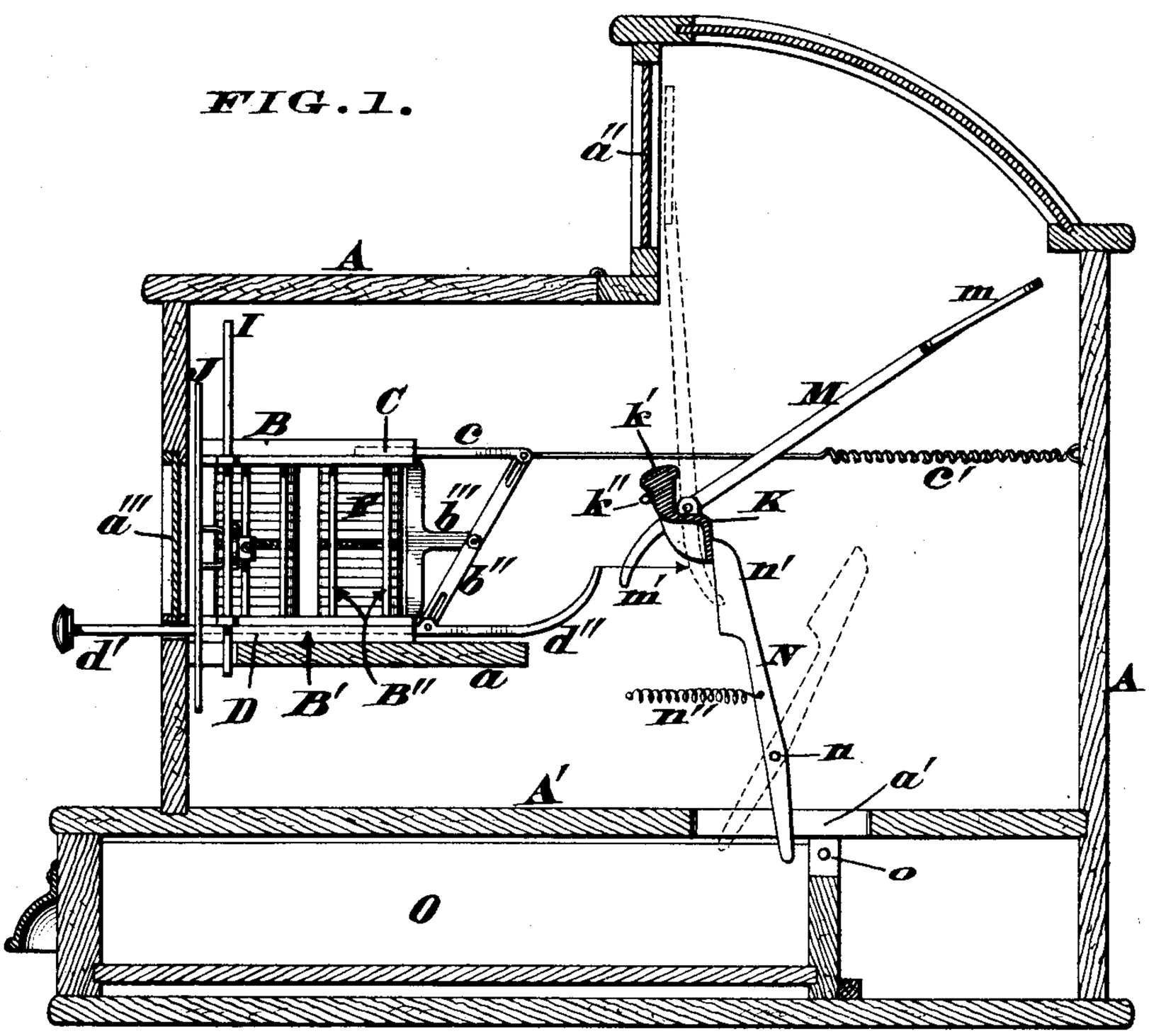
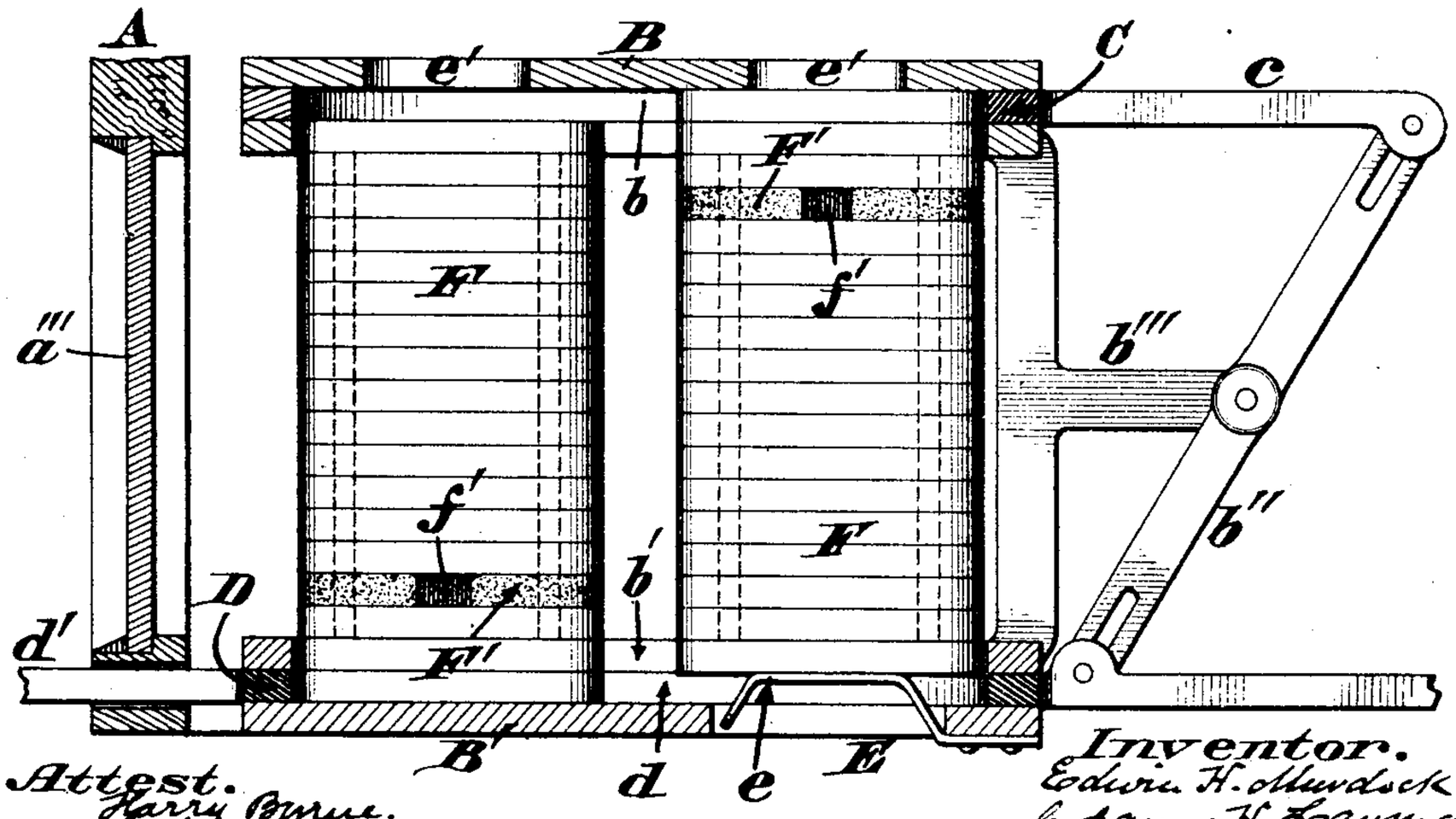


FIG. 2.



Attest.
Harry Byrne.
J. W. Layman

Inventor.
Edwin H. Murdock.
by James N. Layman.
Atty.

(No Model.) 2 Sheets—Sheet 2.

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FIG. 3.

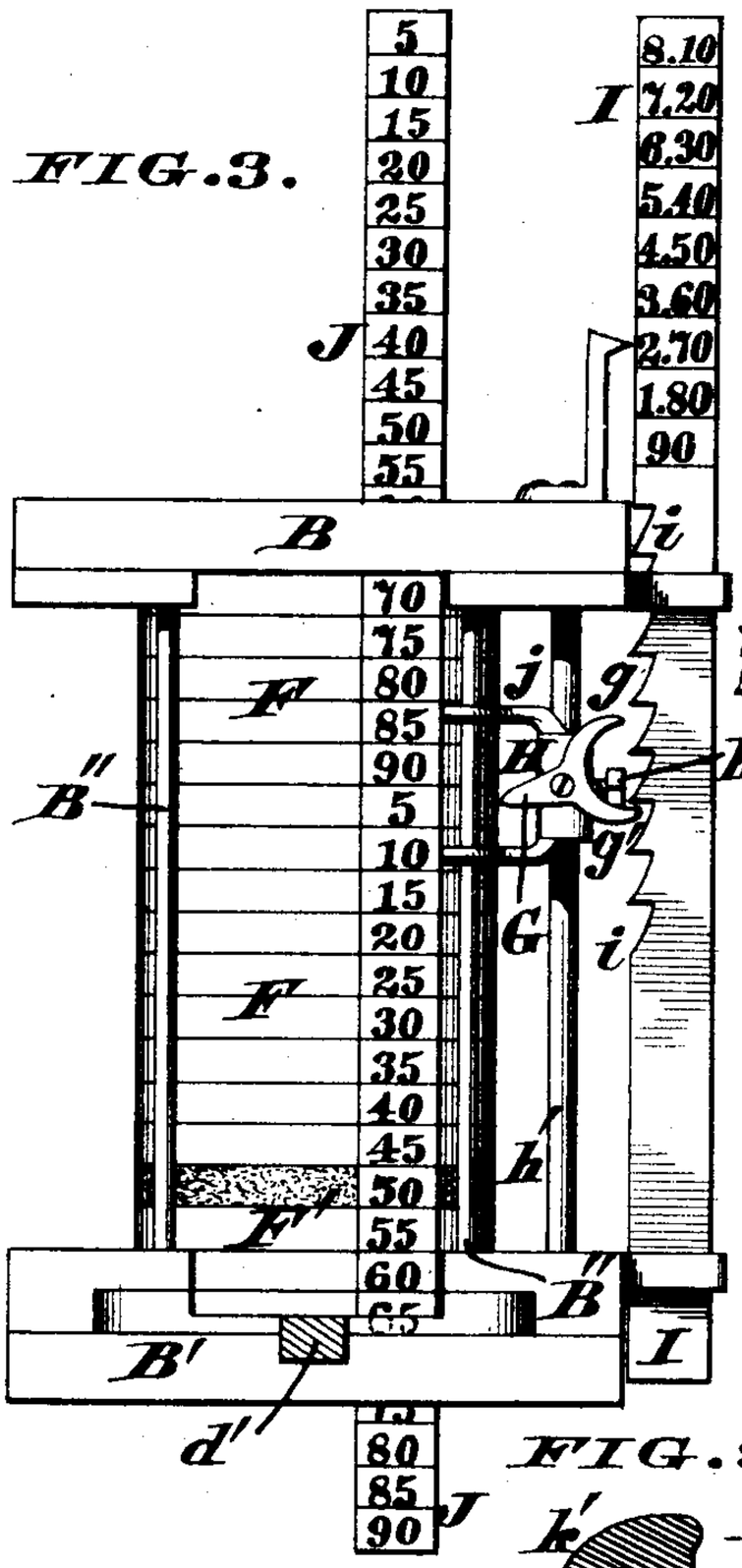


FIG. 6.

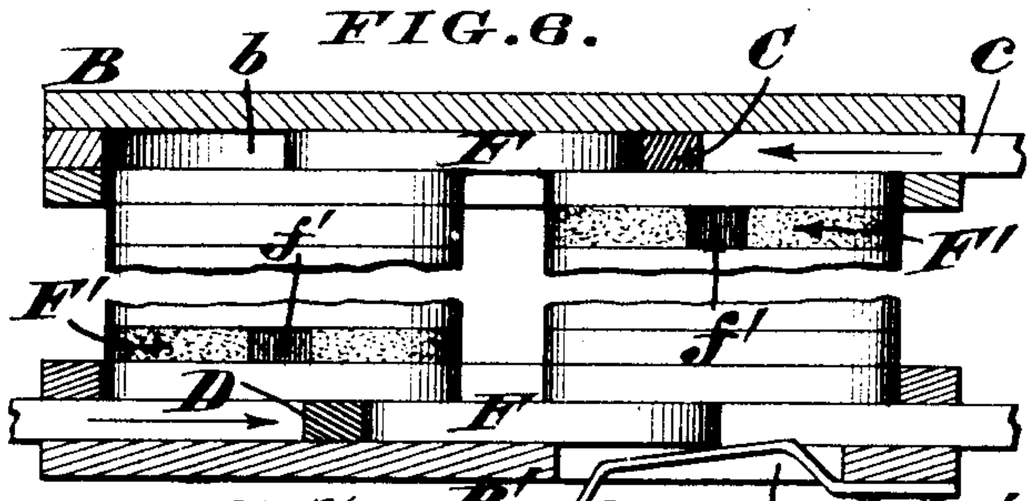


FIG. 7.

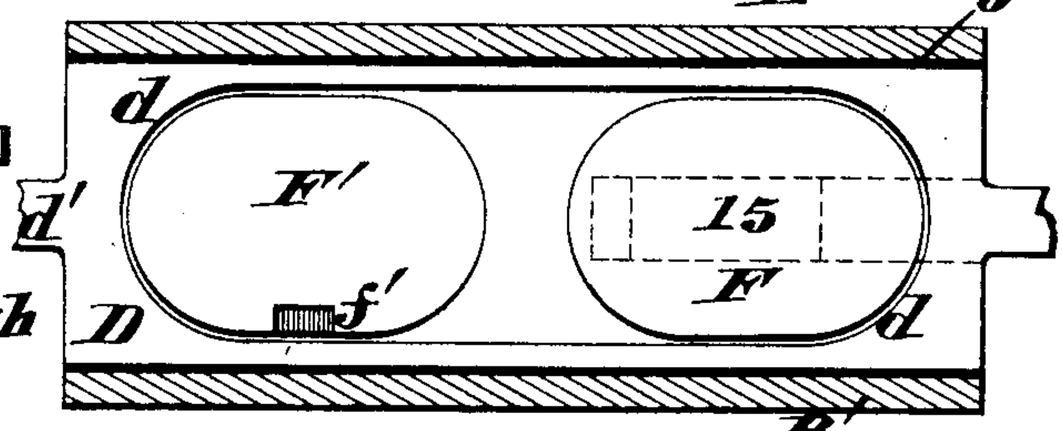


FIG. 8.

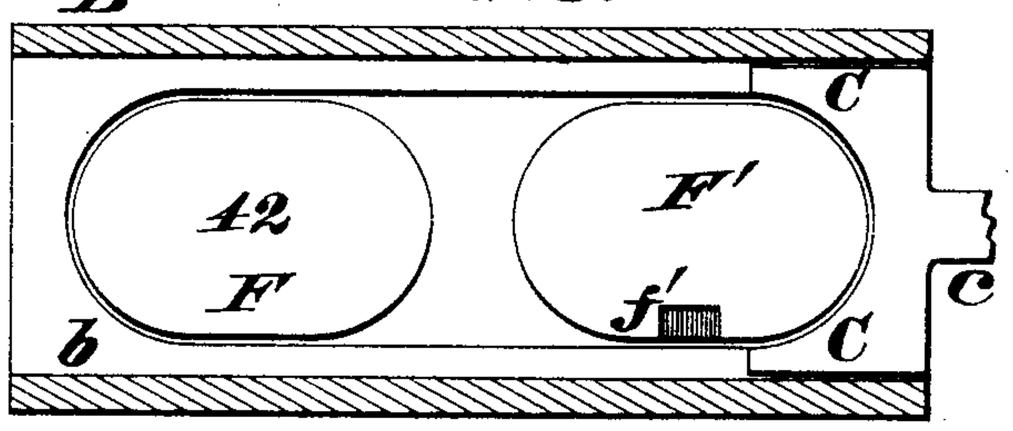


FIG. 12. FIG. 13.

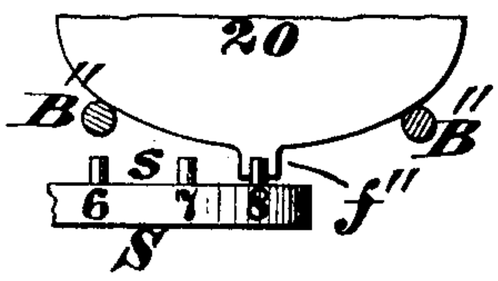


FIG. 15.

FIG. 9.

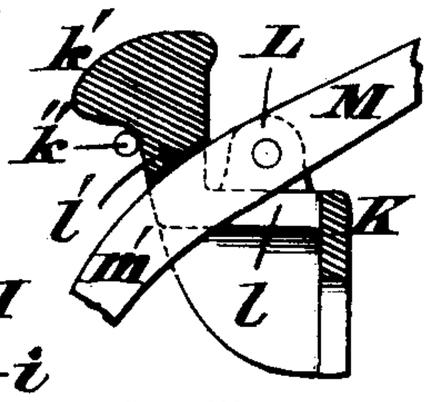


FIG. 10.

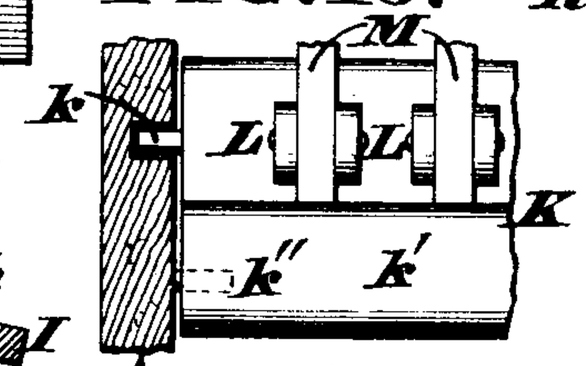
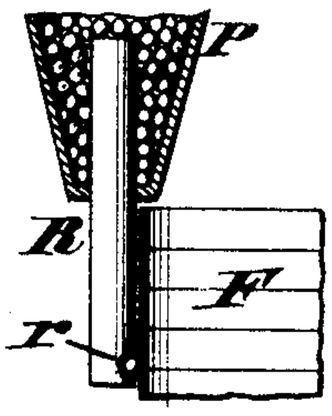


FIG. 14.



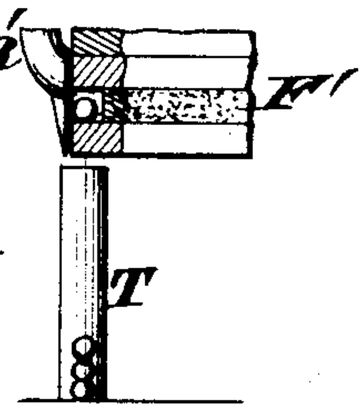


FIG. 4.

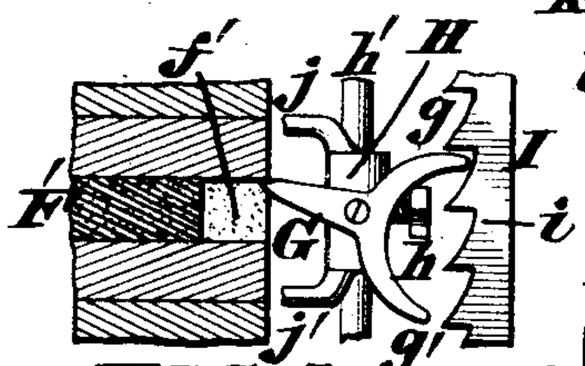


FIG. 5.

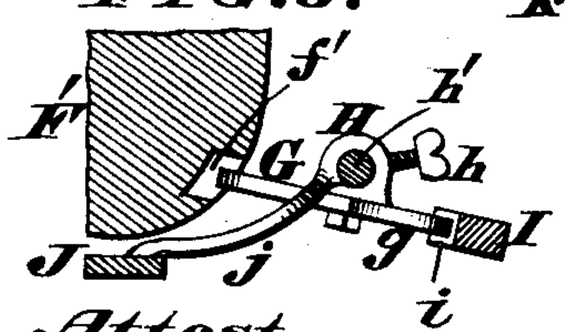
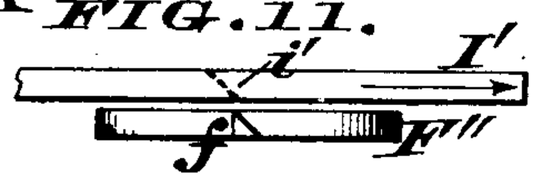
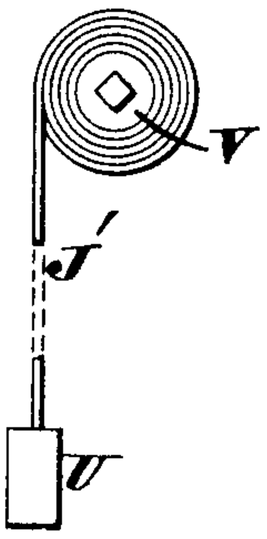


FIG. 11.





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J. H. Layman.

Inventor.
Edwin H. Murdock.
by James H. Layman.
Atty.

UNITED STATES PATENT OFFICE.

EDWIN H. MURDOCK, OF CINCINNATI, OHIO.

CASH REGISTER AND INDICATOR.

SPECIFICATION forming part of Letters Patent No. 480,957, dated August 16, 1892.

Application filed April 23, 1892. Serial No. 430,311. (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.

This invention relates to the peculiar form of cash indicators and registers seen in Letters Patent No. 471,342, granted to me March 22, 1892; and my present improvement comprises a novel construction of parts whereby the counters or check-pieces are never withdrawn from the machine, but are compelled to perform an endless circuit consisting of an ascending and descending column, as hereinafter more fully described.

My improvement also comprises a novel combination of devices for recording the passage of one or more special checks or counters as they circulate through said ascending and descending columns, as hereinafter more fully described.

In the annexed drawings, Figure 1 is a vertical section of an indicator and register embodying my present improvements, said section being taken in the plane of one of the push-stems and the tablet of said stem being in its normal or concealed position. Fig. 2 is an enlarged vertical section through two of the columns or stacks of counters and the slides that operate them. Fig. 3 is an enlarged front elevation of one of the front columns and its registering devices. Fig. 4 shows the escapement mechanism of said registering devices. Fig. 5 is a horizontal section through said escapement. Fig. 6 is a vertical section through the upper and lower heads that hold the stacks of counters, a number of the latter being seen between said heads. Fig. 7 is a horizontal section through the lower head. Fig. 8 is a similar section through the upper head. Fig. 9 is an enlarged transverse section of the rocking bar, to which the tablet-stems are pivoted. Fig. 10 is a plan of one end of said bar. Figs. 11, 12, 13, 14, and 15 show various modifications of my invention.

A represents the case or cabinet of my register, and *a* is a horizontal partition therein to support the columns or stacks of counters or check-pieces, which columns are arranged to travel freely within a cage composed of an upper head B and lower head B′, united by a system of tie-rods B″, the heads being provided with horizontal grooves or guides *b b′* (seen more clearly in Figs. 7 and 8) to permit an easy reciprocation of slides C D. Slide C is quite short, as seen in Fig. 8, is concave in front, and has at rear a shank *c*, coupled to the upper end of a lever *b″*, the latter being pivoted to a bracket *b‴*, that assists in uniting said heads B B′. The lower end of lever *b″* is coupled to the slide D, which has a long slot *d*, (seen in Fig. 7,) and in front a push-stem *d′*, terminating with a knob or button to enable its ready operation, the knob being numbered to agree with the tablet that is raised when said slide is pushed in. The rear end of this slide is bent upwardly at *d″* to operate the tablet-stem. Normally said slide is returned and the upper slide C retracted by a pulling-spring *c′*.

E is a slot in the lower head B′ to permit vertical play of a spring *e*, which spring is bent in the manner shown and is sufficiently stiff to support one column or stack of counters, as seen in Fig. 2.

e′ e′ are openings which may be made in the upper head B to permit inspection of the counters in a simple form of the machine. These counters or checks usually consist of oblong metallic pieces F, placed one upon the other and so arranged as to ascend and descend smoothly within the inclosing cage or housing, there being usually as many pieces in one column or stack as in the other. Furthermore, the cage must not be packed full of these pieces, but room must always be left at the top of one column for one more counter, and a similar space must be left at the bottom of the other column. Each column preferably has a specially-designed counter F′, generally distinguished by its color or some peculiarity of its periphery, and the edge of this special counter must be notched, as seen at *f′*, the object of this notch being to operate the lever G of an escapement, having a pair of teeth *g g′*. Escapement G *g g′* is pivoted to a slide H, having a set-screw *h*, wherewith it is adjustably secured along a rod *h′*, fastened to

the heads B B′, the teeth *g g′* of said escapement being adapted to engage with a series of notches *i* in the edge of a gravitating registering-bar I, suitably guided to move in a vertical path. The upper portion of this bar is numbered, as shown, the peculiar arrangement of said numbers being hereinafter more fully explained. Projecting laterally from slide H are arms *j j′*, supporting a vertically-shiftable strip J, by which means said strip is raised and lowered in unison with said slide. The exposed face of this strip has a duplicate set of numbers arranged in a vertical column, and in the present illustration running from "5" to "90," as seen in Fig. 3. These numbers increase five each time and stop at "90," because there are eighteen counters in the column shown in said illustration, and each counter represents a value of five cents; but if this had been the dime column the numbers on the strip would increase ten each time, while a twenty-cent column would increase twenty each time, and so on for every column in the register, it being understood that the machine may have as many columns for cents and dollars as will answer all the demands for a daily run of business. Furthermore, the strip J is twice as long as one of the columns, and although the numbers on said strip are exactly duplicated the numerals exposed between the heads B B′ are never repeated, because each numeral occupies the same space as one counter. This arrangement prevents confusion in resetting the machine.

K is a rocking bar pivoted across the cabinet, one of the bearings of said bar being seen at *k* in Fig. 10 and the part *k′* being somewhat heavy to hold said bar in its normal position and cause it to rest against a stop-pin *k″*. The upper surface of the bar has ears L, arranged in pairs, and is slotted at *l* and provided with bearings *l′*—one for each pair of ears—the latter being arranged to support the freely-swinging stems M, whose upper ends carry tablets *m*, while their lower ends *m′* are curved to allow the bent portions *d″* of the slides to act against with comparatively little friction. Adapted to bear against the back of this bar is a lever N, pivoted to the case at *n* and held in its normal position either by a weighted end *n′* or by a spring *n″*, or by both of these devices. The lower end of this lever projects down through a slot *a′* in a partition A′ of the case and is adapted at the proper moment to be struck by a pin *o* of the sliding money-drawer O.

a″ is a window, at which the raised tablets are exposed, and *a‴* is another window that permits inspection of the bar I and strip J.

To illustrate the operation of my machine, I will first describe the simple form of the same seen in Fig. 2, it being supposed that each stack or column is composed of eighteen plain counters or checks, the notched counters F′ not being necessary in this case; but the upper surfaces of the counters should be numbered consecutively or otherwise inscribed to indicate their special values, as suggested at 15 in Fig. 7, at 42 in Fig. 8, and at 20 in Fig. 13. Reference to Fig. 2 shows that the front column or stack rests directly upon the head B′, while the rear column or stack is supported by the spring *e*, the top counter in said rear stack being in contact with the upper head B; but sufficient space is now left between said head and the top counter of the front stack to admit one more counter. Reference to Fig. 7 shows that the slot *d* of slide D takes in the bottom counters both of the front and rear columns, while Fig. 8 indicates that the back of the top counter of the rear column is in contact with the concave end of slide C. Such being the normal position of all the operative parts, it is evident that when the stem *d′* is pushed in the proper distance the slide D will force back the lower counter of the rear column, the spring *e* bending down sufficiently to permit this rearward sliding of said counter, as seen in Fig. 6. Simultaneously with the backward travel of slide D the other slide C advances and forces the upper counter of the rear column forward, thereby causing said counter to become for the time being the top counter for the front column. As soon as pressure is removed from the push-stem *d′*, the spring *c′* instantly returns the slide D and retracts the slide C, the result being to drop the front column the thickness of one counter and to raise the rear column a similar distance, the lifting of this rear column being effected by the spring *e*. Consequently the reverse reciprocation of these slides forces the bottom counter of the front column in under the rear column, and at the same time shifts the top counter of said rear column forward and deposits it upon the front column, the repetition of which movements will cause every counter to descend the front column and ascend the rear one. Therefore by looking through either of the openings *e′* of the head B and noticing the numbers or other characters on the upper surfaces of the top counters or checks it will be known exactly how often the push-stem has been operated and without removing either of said counters. It is evident a limited number of such counters will be sufficient to register ten or twenty dollar sales in small stores; but for general purposes a much greater number of counters must be employed if it is desired to have them make but a single circuit through the two columns; but the employment of numerous counters would render the cages inconveniently high and cause the machine to be large and unpopular; but by adopting the expedient seen in Fig. 3 a limited number of counters can be made to register for an indefinite length of time. In this construction a special counter F′ is inserted both in the front and back columns and at equal distances from each other, as seen in Fig. 2, and when the special counter of the front column has descended far enough the lever G swings into the notch *f′* of said special counter, as

represented in Fig. 4, and allows the registering-bar I to drop one notch. When the special counter in the rear column passes over to the front column and then descends to a proper place, the escapement G *g g'* again operates and drops said bar another notch, which act is repeated every time a notched counter traverses said front column and passes this place. Fig. 3 shows by the pointer that the bar I has dropped three times and indicates "$2.70," while the special counter F' is in line with number "50" on the strip J, thus making the machine read "$2.70" plus 50, or, in other words, the total is $3.20; but if the special counter had been opposite the number "20" on said strip the reading would then be "$2.70" plus 20. Again, if this counter had been opposite the number "85" on said strip the reading would then be "$2.70" plus 85, and so on for whatever position said special counter F' may occupy when the machine is inspected.

After noting the reading at the end of a day the machine is reset in the following manner: The screw *h* is first loosened and the slide H run either up or down, as the case may be, until either of the numbers "90" is directly in line with the special counter F', one of which is always in sight in the front column, and then said screw is tightened and the slide held in place. The registering-bar I must now be raised completely, so as to allow it to drop one notch when the succeeding special counter has reached a position where it will operate the escapement G *g g'*, as previously described. The raising of the tablets is the same, no matter whether the plain or notched counters are used, and is effected in the following manner: Reference to Fig. 9 shows that the shorter end *m'* of tablet-stem M normally rests against the bearing *l'* of rocking bar K; but when this end is struck by the curved termination *d''* of slide D said stem swings up to the position indicated by dotted lines in Fig. 1 and exposes the tablet *m* at a window *a''*. The tablet remains in this position until the drawer O is pulled out and again shoved back, which backward movement causes the drawer-pin *o* to strike the lower end of lever N, and so operate said lever as to rock the bar K on its pivots and throw the tablet-stem back to its original position.

The above is a description of the preferred form of my invention; but it is apparent the construction of the register may be greatly varied to suit circumstances, an evident modification being seen in Fig. 11, where the special counter F'' has an inclined spur *f*, adapted to bear against a similar shoulder *i'* of the registering-bar I'. By this arrangement the ascent of said counter will drive said bar horizontally in the direction of the arrow, and thus indicate how often the counter and its companion have traversed the two columns; but in Fig. 12 a fixed hopper P is provided for each of the front columns of the machine, which hopper is charged with shot, that run down a vertically-shiftable tube R, the latter being closed at bottom, but having a side opening *r*, that allows but one shot to escape at a time, and this can take place only when the notch of a special counter is opposite said opening. This shot is then carried down and dropped in a locked receptacle for the purpose of showing that the counters have made one complete round. The tube R is made adjustable in order that the opening *r* may be brought opposite the counter-notch every time the machine is reset.

In the modification seen in Fig. 13 an ascending counter has a tooth *f''*, adapted to strike either one of a set of pins *s*, projecting from the side of a disk or wheel S, the periphery of the latter being numbered consecutively to indicate how often its pins are thus acted on.

In another modification (seen in Fig. 14) the shot-tube R' is unshiftable, T being a glass tube or gage, within which the shot are dropped as soon as a notched counter reaches the bottom of the column.

Fig. 15 shows a flexible strip J', adapted to take the place of the rigid strip J, (seen in Fig. 3,) said flexible strip being kept taut by a weight U, secured to its lower end. This strip is capable of being wound around a drum V for the purpose of resetting the machine, as previously described.

In another modification the upper slide C can be arranged to push the counters back, while the lower slide D drives them forward, thus exactly reversing the action of the machine and causing the rear column to descend as the front column ascends. I have shown my method of counting applied to a cash-indicator, although the invention is not limited to any special purpose, but can be employed for recording the strokes or pulsations of machinery for registering the number of passengers in a car and for various other uses. Finally, where the expression "caged checks" occurs in this specification it is to be understood as referring to checks, counters, or other devices capable of moving as independent columns within a suitable housing or receptacle of any kind, but incapable of detachment therefrom, for the purpose of operating the register.

I claim as my invention—

1. The within-described method of counting, which method consists in inserting two independent columns of caged and numbered checks side by side within a housing and simultaneously shifting the end check of each column laterally and in opposite directions, whereby the checks are continuously moved forward in an endless circuit and without removing either of them bodily from said housing, substantially as herein described.

2. The within-described method of counting, which method consists in inserting two independent columns of caged checks within a housing, providing a special check, and shifting the checks from one column to another,

whereby said special check is caused to indicate its movements on a numbered strip, substantially as set forth.

3. The within-described method of counting, which method consists in inserting two independent columns of caged checks within a housing, providing a special check capable of operating a registering device, and shifting the checks from one column to another, whereby the same pieces are used continuously without removal and the special check is caused to make a record every time it traverses said columns, substantially as set forth.

4. The within-described method of counting, which method consists in inserting two independent columns of caged checks within a housing, providing a special check capable of operating an escapement and registering-bar, and shifting the checks from one column to another, whereby the same pieces are used continuously without removal, and the special check is caused to shift said bar a certain distance every time it traverses the ascending or descending column, substantially as set forth.

5. The combination, in a counting and registering apparatus, of a housing inclosing two independent columns of caged checks, a special notched check F′ *f′*, inserted in each column, an adjustable escapement G *g g′*, operated by said notched checks, a toothed and numbered registering-bar I *i*, supported by said escapement, a rigid strip J, carried by a slide, to which said escapement is pivoted, and a pair of reversely-acting coupled slides C D for shifting the upper and lower checks in the manner described, said strip J being provided with a double set of numbers, arranged as herein stated.

6. The combination, in a counting and registering apparatus, of an upper head B and lower head B′, united by suitable connections, slides C D, fitted within said heads and so coupled together as to act reversely, and a spring *e*, attached to said lower head and adapted to elevate a column of checks or counters, as herein described.

7. The combination, in a cash indicator and register, of the cage B B′ B″, two independent columns of counters inserted within said cage, slides C D, fitted within the heads B B′ thereof and so coupled together as to act reversely, a projection *d″* at the rear end of the slide D, and a swinging tablet-stem M, having a short arm *m′*, adapted to be struck by said projection *d″*, for the purpose described.

8. The combination, in a cash indicator and register, of a rocking bar K, journaled in the sides of the case and having pivoted to it the tablet-stems M, said bar being provided with a bearing *l′* for each stem, as herein described.

9. The combination, in a cash indicator and register, of a column of shiftable counters, a special check inserted in said column, and an adjustable numbered slip, said numbers being in duplicate and each of them occupying the space of one counter, for the purpose described.

10. A registering apparatus provided with two independent columns of checks or counters and devices that shift them in such a manner as to compel one column to ascend and the other to descend, substantially as described.

11. A registering apparatus provided with two independent columns of checks or counters, devices that shift them in such a manner as to compel one column to ascend and the other to descend, and a registering appliance automatically operated at regular intervals, substantially as described.

12. A registering apparatus provided with two independent columns of checks or counters, devices that shift them in such a manner as to compel one column to ascend and the other to descend, a registering appliance automatically operated at regular intervals, and an adjustable strip provided with a duplicate set of numbers, substantially as herein described.

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

EDWIN H. MURDOCK.

Witnesses:

JAMES H. LAYMAN,

ALFRED N. DAVIES.