

(No Model.)

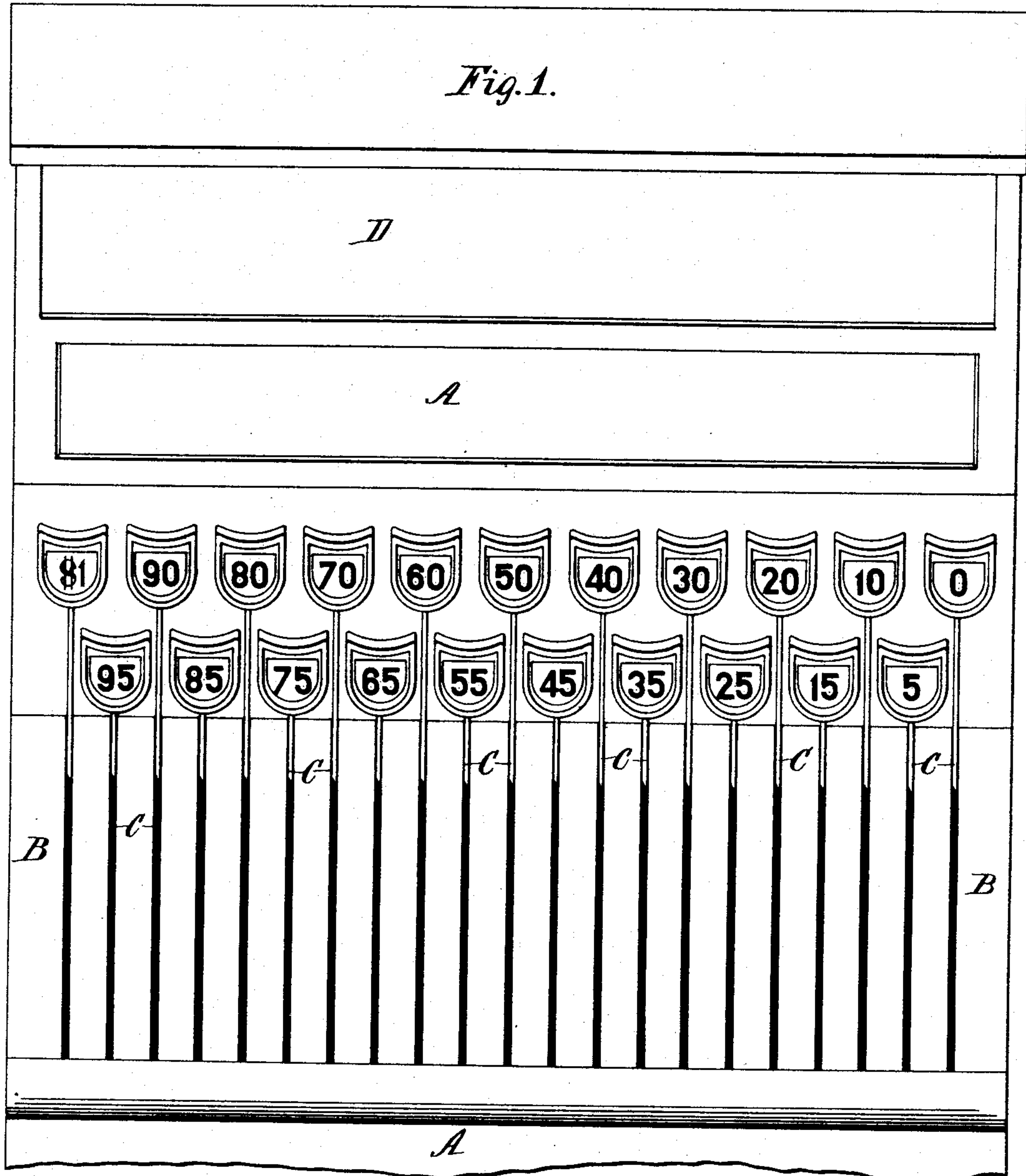
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I. D. BOYER.

CASH REGISTER AND INDICATOR.

No. 414,009.

Patented Oct. 29, 1889.



Witnesses:
W. C. Jirdinston.
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Inventor

Israel Donald Boyer
by Peck & Rector
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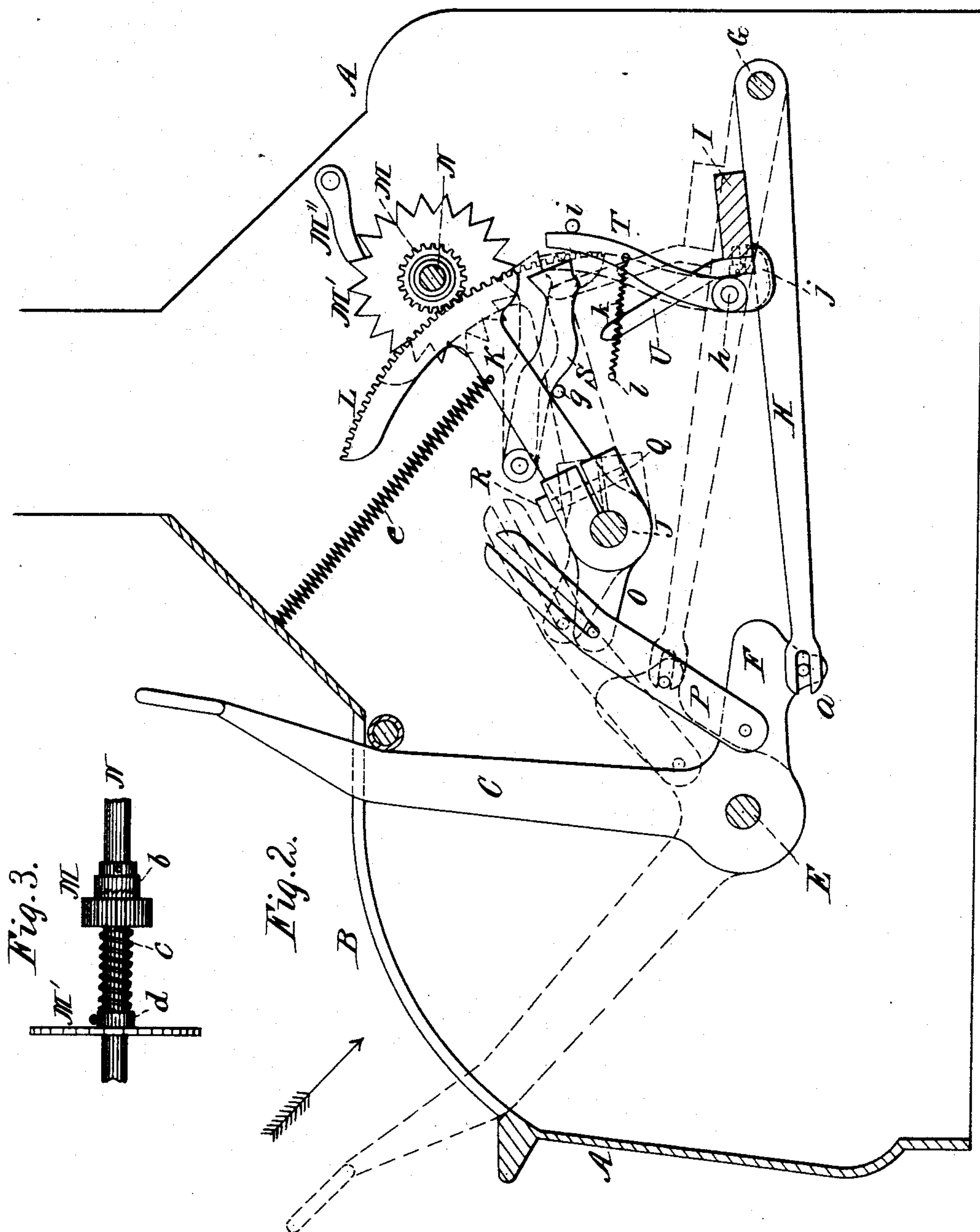
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UNITED STATES PATENT OFFICE.

ISRAEL DONALD BOYER, OF DAYTON, OHIO, ASSIGNOR TO THE NATIONAL CASH REGISTER COMPANY, OF SAME PLACE.

CASH REGISTER AND INDICATOR.

SPECIFICATION forming part of Letters Patent No. 414,009, dated October 29, 1889.

Application filed July 8, 1889. Serial No. 316,749. (No model.) Patented in Canada July 12, 1889, No. 50,411.

To all whom it may concern:

Be it known that I, ISRAEL DONALD BOYER, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Cash Registers and Indicators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

The novelty of my invention will be herein set forth, and specifically pointed out in the claims.

In the accompanying drawings, Figure 1 is a front view of a portion of a machine embodying my improvements, looking in the direction of the arrow in Fig. 2. Fig. 2 is a side elevation, in section, of a portion of the same. Fig. 3 is a detail in front elevation of a portion of the registering-shaft, the ratchet and driving-pinion thereon, and the clutch between the pinion and shaft.

The same letters of reference are used to indicate identical parts in all the figures.

The operating parts of the machine are inclosed in a suitable case or cabinet A, having its upper front portion formed of a slotted plate B, through the slots in which extend and play the upper ends of the operating-key C, and provided at its upper central or rear portion with a glass-covered reading-opening D, through which suitable indicating-tablets are exposed to view. The operating-keys C, of the shape shown, are pivoted on a shaft E, extending across the machine, and have rearward extensions F, the vertical portion of each key and its rear extension F forming a bell-crank lever, as shown.

Pivoted on a shaft G at the rear of the machine are a series of levers H, one for each key C, and each connected at its forward end to the extension F of its corresponding key by slot-and-pin connection at a, so that when any key is operated by pulling its upper end forward to the end of its slot in the plate B its lever H is lifted to the position shown by the dotted lines in Fig. 2. Extending across all of the levers H, in front of their pivotal shaft G, is a vibrating bar I, supported in any suitable manner, as by side arms hung on the shaft G. This bar I rests on the tops of the

levers H, and whenever any key is operated is lifted to the position shown by the dotted lines in Fig. 2.

Rigidly secured to a central shaft J, extending across the machine and supported in suitable bearings, is an arm K, carrying at its upper end a segment-rack L, which meshes with a pinion M on the registering-shaft N, journaled in the upper rear part of the machine. The pinion M is loose on the shaft N, and one end of its hub is provided with clutch-teeth arranged to engage corresponding teeth on the adjacent end of the hub b, which is rigidly secured to the shaft N. (See Fig. 3.) A coiled spring c surrounds the shaft N between the pinion M and a collar d, secured upon the shaft N, and serves to press and normally hold the hub of the pinion M against the hub b and their teeth in engagement to effect a clutch between them, so that when the pinion M is turned forward by the downward movement of the rack L the shaft N is turned with it. The teeth of the clutch are made of the shape shown, so that in the backward turning of the pinion M on the return-stroke of the rack L the teeth of its hub can slip freely over those of the hub b against the pressure of the spring c and the shaft N remain stationary.

The registering-shaft N is connected to and actuates any suitable or well-known registering mechanism, whose particular construction forms no part of my invention, and which I therefore consider it unnecessary to illustrate or describe.

Rigidly secured to the shaft J are a series of forwardly-projecting arms O, one for each key C, and each connected to the rear extension of its appropriate key by a slotted link P, pivoted at its lower end to the extension F, and engaging by the slot at its upper end with a pin on the arm O. The arms O may be rigidly secured to the shaft J in any suitable manner. In the drawings they are shown as secured thereto by split hubs Q, each integral with its arm O, which hubs embrace the shaft J and are clamped thereto by screws R, passed through the split ends of the hubs. In this manner the arms O may be secured upon the shaft J in different positions and adjusted as desired. It results from this con-

struction and arrangement of the parts that when a key C is operated by pulling its upper end forward to the end of its slot in the plate B, and its rear extension is thereby
 5 lifted, the shaft J will be rocked in its bearings, the rack L vibrated, and the pinion M and shaft N turned to actuate the registering mechanism, all as shown by the dotted lines in Fig. 2. A coiled spring *e* serves to return
 10 the rack L to and yieldingly hold it in its normal position.

To avoid confusion in the drawings, I have shown in Fig. 2 only one key G and its associated parts; but it will be understood that
 15 the keys are arranged to move the shaft J and rack L different degrees, according to the values of the keys, and in the construction shown in the drawings this is accomplished by pivoting the lower ends of the
 20 links P to the extensions F of the keys at different distances from the pivotal shaft E of the keys, those of the keys of lowest value being pivoted nearest said shaft and those of the highest value farthest from it. Thus the
 25 key shown in Fig. 2 represents one of about the middle value of the series, and its link P is pivoted to its extension F at such distance from the shaft E that the full operation of the key moves the segment-rack L about one-
 30 half its full limit. It will readily be seen that the operation of a key whose link is pivoted to its extension F nearer the rear end of the latter will move the rack L farther and make a higher registration.

35 As illustrated in the drawings, the pinion M has twenty teeth.

The keys C represent multiples of five, from 0 to \$1.00, and are arranged to turn the pinion M one tooth for each five of their values.
 40 Thus the five-cent key will turn the pinion M one tooth, the twenty-five-cent key five teeth, and the fifty-cent key ten teeth, thereby actuating the registering mechanism to register five, twenty-five, and fifty cents, respectively,
 45 and this variable registration is brought about by the adjustment of the links P on the extensions F, as above described. This differential adjustment may be aided, if desired, by adjusting the arms O in different positions on
 50 the shaft J, as before explained, and by varying the length of the slots in the upper ends of the links P, as will be readily understood.

The parts of the machine thus far described are old and not of my invention, and the same
 55 is true of the indicating mechanism, which consists of a series of figured tablets supported in the upper central portion of the case and actuated in any suitable manner to expose their respective numbers at the reading-opening D. It is therefore thought unnecessary to describe the old parts of the machine any further in order to give a clear
 60 understanding of my own invention, which consists in the application to such machines of novel and improved means for locking the
 65 registering mechanism from operation during the resetting of an operated key.

In machines of this character, where a series of keys of different values actuate a common registering mechanism to different degrees to
 70 register the values of the respective keys, there is usually provided a key-arrester, which arrests a partially-operated key and prevents it being reset until it has been operated to its full extent and its full value registered,
 75 whereupon the arrester is thrown out of operation to permit the key to be reset to normal position. During this resetting of the key, unless special means be provided to prevent
 80 it, the key will be free to be "pumped" back and forth from a point near its normal position to the limit of its stroke and the registering mechanism be thereby actuated to register an indefinite amount. It is the object of my
 85 present invention to prevent this "pumping" of the machine, and I have devised novel means for this purpose. (Shown more particularly in Fig. 2.) Tightly secured upon the
 shaft N in any suitable manner, as by making it integral with the collar *d*, so that the latter
 90 forms its hub, is a ratchet M', having preferably twenty equidistant teeth corresponding to the gears of the pinion M. A weighted holding-dog M'', engaging the ratchet, permits its free forward movement with the shaft N
 95 upon the registering-stroke of a key and downward movement of the rack L, but holds the ratchet and shaft from backward movement upon the return-stroke of the key and rack L. Pivoted to any suitable support at *f*
 100 is a locking-dog S, normally resting against a stop-pin *g*, with its engaging-point adjacent to but free from the teeth of the ratchet M'. Pivoted at *h* to a suitable support between
 the key-levers H is a latch T, extending up
 105 behind the rear end of the dog S and normally held back against a stop-pin *i* by the bar I, resting on its lower rearwardly-bent end *j*. A coiled spring *k*, secured to the latch T
 110 and to a fixed point at *l*, normally tends to pull the upper end of the latch T forward against the rear end of the dog S. Secured to the forward side of the bar I is an upwardly and forwardly extending arm U in line with
 115 and beneath the dog S. It results from this construction and arrangement that, the parts being in their normal position of rest, (shown by the solid lines in Fig. 2,) when the upper
 end of any key C is pulled forward at the beginning of its operation and its lever H and
 120 the bar I thereby lifted, the spring *k* will pull the latch T forward against the rear end of the dog S. As the key C is pulled farther forward in its operation and its lever H and the
 bar I continue to rise, the upper end of the
 125 arm U strikes the under side of the dog S, and the adjustment of the parts is such that just as the key C reaches the forward limit of its stroke and its full value has been registered the arm U in its upward travel presses
 130 the dog S into engagement with the ratchet, while the latch T is pulled by its spring *k* beneath the rear end of the dog to hold it in such engagement. The ratchet and register-

ing-shaft are thereby locked from movement in either direction. As the key and rack L move back to normal position the pinion M turns freely backward on the shaft N, the teeth of the clutch slipping over each other against the pressure of the spring c; but if the key and rack be stopped at any point in their return-stroke and it be attempted to pull the key forward from that point the clutch is immediately engaged and the key arrested by the locking of the ratchet and registering-shaft, as before explained. Just as the key reaches its normal position of rest the bar I strikes and bears down on the lower bent end j of the latch T and throws the upper end of the latch rearward from beneath the end of the dog S, which immediately falls by gravity against the pin g and releases the ratchet and registering-shaft, so that they are free to be turned forward upon the operation of the next key. It will thus be seen that after a key has completed its forward registering-stroke it has to be completely reset to normal position before the registering mechanism can be actuated either by that key or any other one.

While I have shown my invention as applied to a machine having a registering-shaft driven by a pinion meshing with a segment-rack which is moved to different degrees by keys of different values, it is not limited in its application to machines of this character. For instance, it may be applied to machines which have no registering-shaft, pinion, and rack, in which case the ratchet could be secured directly to a registering-wheel actuated from the keys in any well-known or suitable manner, and the locking-dog and associate devices be applied to the ratchet, as they are in the machine illustrated in this case.

Again, in machines similar to the one shown in the present case, the ratchet, instead of being rigidly secured to the registering-shaft, may be secured to or made integral with the driving-pinion, the teeth of the ratchet being so shaped that during the resetting of an operated key the locking-dog can slip over the teeth of the ratchet on the return-stroke of the rack L and backward turning of the pinion and ratchet, but engage therewith if it is attempted to turn the ratchet and pinion forward to actuate the registering mechanism; and in another application, filed simultaneously herewith and bearing Serial No. 316,750, I have illustrated and described and specifically claimed such an arrangement of the parts.

Having thus fully described my invention, I claim—

1. In a cash register and indicator having a series of operating-keys of different values and a registering mechanism actuated to different degrees by the different keys of said series to register their respective values, the combination, with said registering mechanism, of a ratchet secured to a primary moving part thereof and a locking-dog which is engaged

with said ratchet at the completion of the registering-stroke of an operated key and disengaged therefrom at the completion of the opposite stroke of such key, substantially as and for the purpose described.

2. In a cash register and indicator having a series of operating-keys of different values and a registering mechanism actuated to different degrees by the different keys of said series to register their respective values, the combination, with said registering mechanism, of a ratchet secured to a primary moving part thereof, a locking-dog which is free from said ratchet during the registering-stroke of an operated key, means for engaging said dog with the ratchet at the completion of the registering-stroke of such key, a latch for holding the dog and ratchet in engagement during the opposite stroke of said key, and a trip for said latch operated at the completion of such opposite stroke of the key, substantially as and for the purpose described.

3. In a cash register and indicator having a series of operating-keys of different values and a registering-shaft actuated to different degrees by the operation of the different keys of said series to cause the registering mechanism to register their respective values, the combination, with said registering-shaft, of a ratchet and a locking-dog which is engaged with said ratchet at the completion of the registering-stroke of an operated key and disengaged therefrom at the completion of its opposite stroke, substantially as and for the purpose described.

4. In a cash register and indicator having a series of operating-keys of different values and a registering-shaft actuated to different degrees by the operation of the different keys of said series to cause the registering mechanism to register their respective values, the combination, with said registering-shaft, of a ratchet, a locking-dog which is free from said ratchet during the registering-stroke of an operated key, means for engaging said dog with the ratchet at the completion of the registering-stroke of such key, a latch for holding the dog and ratchet in engagement during the opposite stroke of said key, and a trip for said latch operated at the completion of such opposite stroke of the key, substantially as and for the purpose described.

5. In a cash register and indicator, the combination of a series of operating-keys of different values, a rack actuated to different degrees by the different keys of said series, a registering-shaft, a driving-pinion loose thereon and meshing with the rack, a clutch between the pinion and shaft, a ratchet on said shaft, and a locking-dog which is free from said ratchet during the registering-stroke of an operated key and engaged therewith during its opposite stroke, substantially as and for the purpose described.

6. In a cash register and indicator, the combination of a series of operating-keys of different values, a rack actuated to different de-

grees by the different keys of said series, a registering-shaft, a driving-pinion loose thereon and meshing with the rack, a clutch between the pinion and shaft, a ratchet rigidly secured to said shaft, and a locking-dog which is free from said ratchet during the registering-stroke of an operated key and engaged therewith during its opposite stroke, substantially as and for the purpose described.

7. In a cash register and indicator, the combination of a series of operating-keys of different values, a rack actuated to different degrees by the different keys of said series, a registering-shaft, a driving-pinion loose thereon and meshing with the rack, a clutch between the pinion and shaft, a ratchet rigidly secured to said shaft, a locking-dog which is free from said ratchet during the registering-stroke of an operated key, means for engaging said dog with the ratchet at the completion of the registering-stroke of said key, a latch for holding the dog and ratchet in engagement during

the opposite stroke of said key, and a trip for said latch, substantially as and for the purpose described.

8. In a cash register and indicator, the combination of the operating-keys C, rack L, actuated thereby, shaft N, pinion M, loose on said shaft and meshing with the rack L, the clutch between said pinion and shaft, ratchet M', locking-dog S, latch T, bar I, and arm U, substantially as and for the purpose described.

9. In a cash register and indicator, the combination of the keys C, levers H, rack L, arms O, rigid therewith, links P, shaft N, pinion M, the clutch between said pinion and shaft, ratchet M', locking-dog S, latch T, bar I, and arm U, substantially as and for the purpose described.

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