

(No Model.)

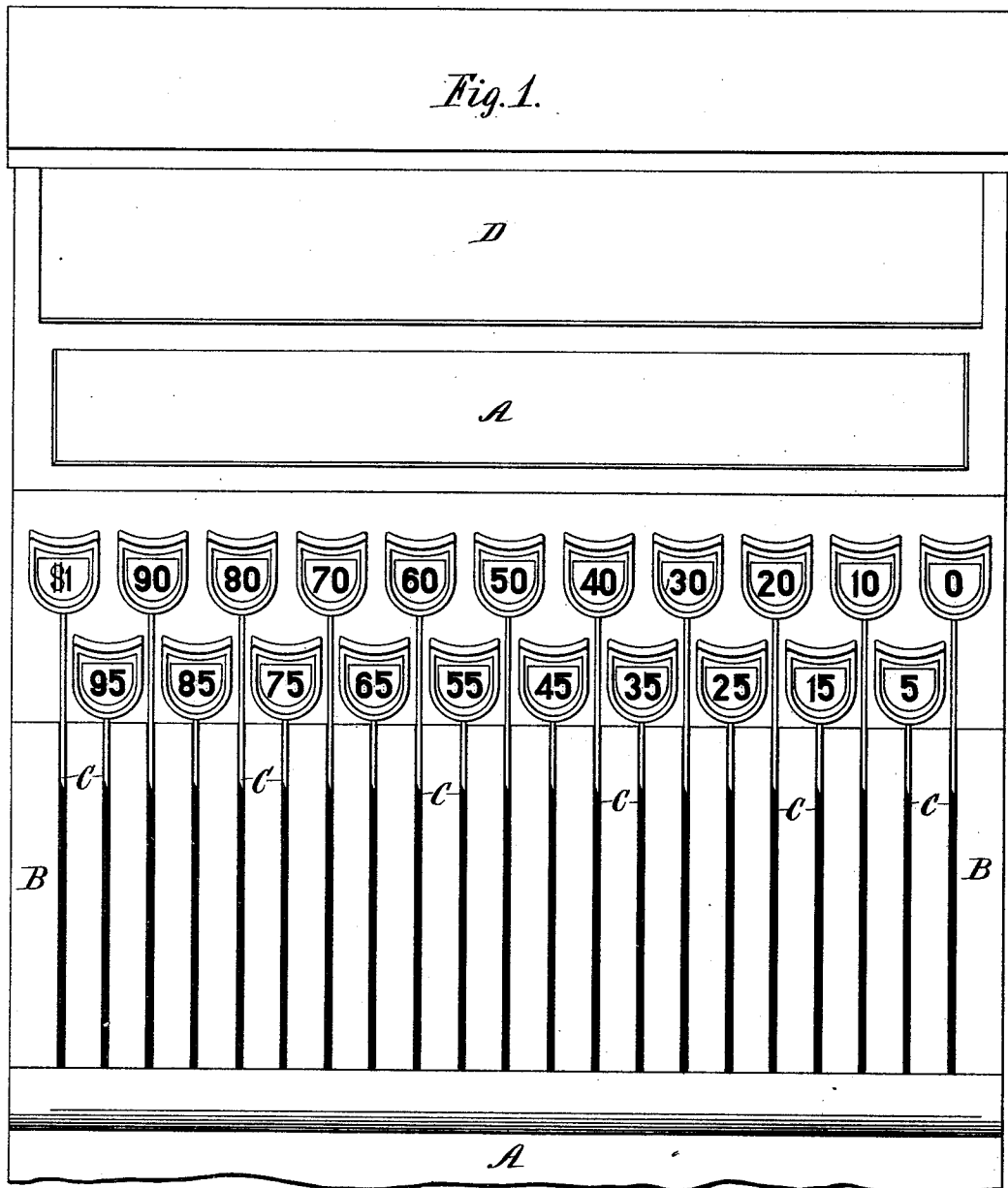
2 Sheets—Sheet 1.

I. D. BOYER.

CASH REGISTER AND INDICATOR.

No. 414,010.

Patented Oct. 29, 1889.



Witnesses:
W. C. Jirdinston.
Charles Billou

Inventor.

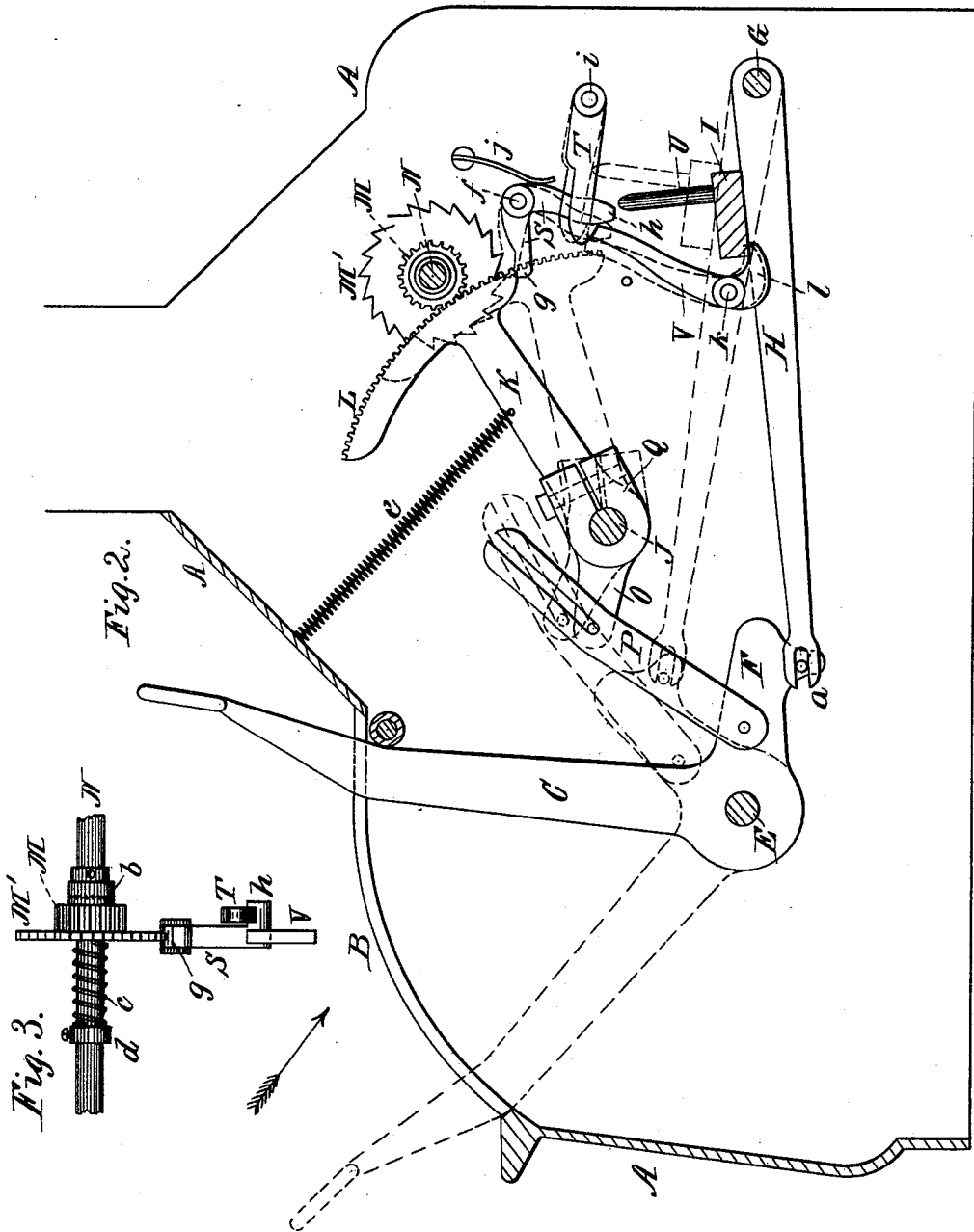
Israel Donald Boyer
by Peck & Nector
his Attorneys.

I. D. BOYER.

CASH REGISTER AND INDICATOR.

No. 414,010.

Patented Oct. 29, 1889.



Witnesses:
 W. C. Jurdinston.
 Charles Billou

Inventor:
 Israel Donald Boyer
 by Beck & Acker
 his Attorneys.

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. 414,010, dated October 29, 1889.

Application filed July 8, 1889. Serial No. 316,750. (No model.) Patented in Canada July 12, 1889, No. 50,412.

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 driving-pinion and ratchet, the clutch between the pinion and shaft, and the devices associated therewith.

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-keys 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.) Secured to or integral with the pinion M on its side opposite the clutch is a ratchet M'. A coiled spring *c* surrounds the shaft N between the ratchet 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 construction 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 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 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 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 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 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-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.

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. Thus the five-cent key will turn the pinion M one tooth, the twenty-five-cent key five and teeth, the fifty-cent key ten teeth, thereby actuating the registering mechanism to register five, twenty-five, and fifty cents, respectively, 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 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 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 understanding of my own invention, which consists in the

application to such machine of novel and improved means for locking the 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 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, 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 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 present invention to prevent this "pumping" of the machine, and I have devised novel means for this purpose. (Shown more particularly in Fig. 2.) Pivoted at *f* to any suitable support is a bell-crank S, the end *g* of whose upper horizontal arm is adjacent to and suitably shaped to act as a pawl for the ratchet M', and whose lower vertical arm has a lateral projection *h*, with which engages a latch T, pivoted at *i*. A flat spring *j*, bearing against the vertical arm of the bell-crank S, tends to press the pawl *g* into engagement with the teeth of the ratchet M', while the latch T normally holds it out of such engagement against the pressure of the spring. Secured to and projecting upwardly from the bar I beneath the latch T is a trip rod or arm U, which, just at the moment an operated key reaches its limit of movement and its lever H and the bar I reach their highest position, strikes and lifts the latch T, thereby releasing the bell-crank S, whose spring *j* immediately throws the pawl *g* into engagement with the ratchet M'. It results from this construction and arrangement of the parts that when any key is operated, and the rack L thereby moved downward, the pinion M and ratchet M' are free to be turned forward to revolve the registering-shaft N and actuate the registering mechanism to register the value of the key; but just as the key reaches its limit of stroke and its full value is registered the pawl is released and pressed into engagement with the ratchet, as shown by the dotted lines in Fig. 2. As the key and rack L move back to normal position the pawl *g* slips freely over the teeth of the ratchet; but if the key be stopped at any point before being completely reset and it be attempted to pull it forward from that point the pawl engages a tooth of the ratchet and locks the keys from such movement. To disengage the pawl from the ratchet when the key has been completely reset to normal position and latch it out of engagement, to permit the operation of the next key, I provide a lever V, pivoted at

5 *h* between the key-levers *H*, and having a rearwardly-bent lower end *k*, upon which rests the bar *I*, which normally holds the upper end of the lever pressed rearward against the lower end of the vertical arm of the bell-crank *S*.
 10 When a key is operated and the bar *I* lifted, the upper end of the lever is free to be pressed forward to the position shown by the dotted lines in Fig. 2 by the bell-crank *S* when the
 15 latch *T* is tripped by the rod *U*; but when the key is reset the bar *I*, as it reaches its normal position of rest, bears down on the horizontal end *l* of the lever and throws its upper end rearward against the vertical arm of the bell-
 20 crank *S*, thereby throwing the pawl *g* out of engagement with the ratchet *M'* and the projection *h* back under the beveled nose of the latch *T*, which thereupon engages it and holds the pawl out of engagement with the ratchet *M'*.

My invention is not limited to any particular construction and arrangement of the ratchet and pawl and their co-operating devices, since these may be largely varied without departing from the invention.

25 In another pending application, filed simultaneously herewith and bearing Serial No. 316,749, I have described and claimed, broadly, a ratchet on the registering-shaft, whether it
 30 be tight on said shaft, as illustrated in that case, or loose on said shaft and secured to the driving-pinion, as in this case, in combination with a locking-dog which is engaged with
 35 said ratchet at the completion of the registering-stroke of a key, and disengaged therefrom at the completion of the opposite stroke of the key, and to that extent, therefore, the claims in the present application are subordinate to those in that case.

40 Having thus fully described my invention, I claim—

1. In a cash register and indicator having a series of operating-keys, the combination of a registering-shaft, a driving-pinion loose
 45 thereon, a clutch between said pinion and shaft, a ratchet secured to said pinion, and a pawl which is free from said ratchet during the registering-stroke of the operating-keys and engaged therewith during the opposite
 50 stroke of said keys, substantially as and for the purpose described.

2. In a cash register and indicator having a series of operating-keys, the combination of a registering-shaft, a driving-pinion loose
 55 thereon, a clutch between said pinion and

shaft, a ratchet secured to said pinion, a pawl arranged to engage said ratchet, a latch for holding the pawl out of engagement with the ratchet during the registering-stroke of the keys, and a trip for said latch, substantially as and for the purpose described.

3. 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 operation of the different keys
 65 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 secured to the driving-pinion, and a pawl which is free from said ratchet during the registering-stroke of the operating-keys
 70 and engaged therewith during the opposite stroke of said keys, substantially as and for the purpose described.

4. 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 operation of the different keys of said series, a registering-shaft, a driving-pinion loose thereon and meshing with the
 80 rack, a clutch between the pinion and shaft, a ratchet secured to the driving-pinion, a pawl arranged to engage therewith, a latch for holding the pawl and ratchet out of engagement during the registering-stroke of the keys,
 85 and a trip for said latch, substantially as and for the purpose described.

5. In a cash register and indicator having a series of operating-keys of different values, the combination of the rack *L*, actuated to different degrees by the different keys of said
 90 series, the shaft *N*, pinion *M*, loose on said shaft, the clutch between said pinion and shaft, ratchet *M'*, secured to the pinion *M*, pawl *g* on the bell-crank *S*, latch *T*, and trip
 95 *U*, substantially as and for the purpose described.

6. In a cash register and indicator, the combination of the operating-keys *C*, levers *H*, rack *L*, arms *O*, rigid therewith, links *P*,
 100 registering-shaft *N*, pinion *M*, the clutch between said pinion and shaft, ratchet *M'*, pawl *g* on bell-crank *S*, latch *T*, bar *I*, trip *U*, and lever *V*, substantially as and for the purpose described.

ISRAEL DONALD BOYER.

Witnesses:

THOMAS CORWIN,
 HENRY THEOBALD.