(No Model.) 2 Sheets—Sheet 1.

I. D. BOYER.

CASH REGISTER AND INDICATOR.

No. 457,249. Patented Aug. 4, 1891.

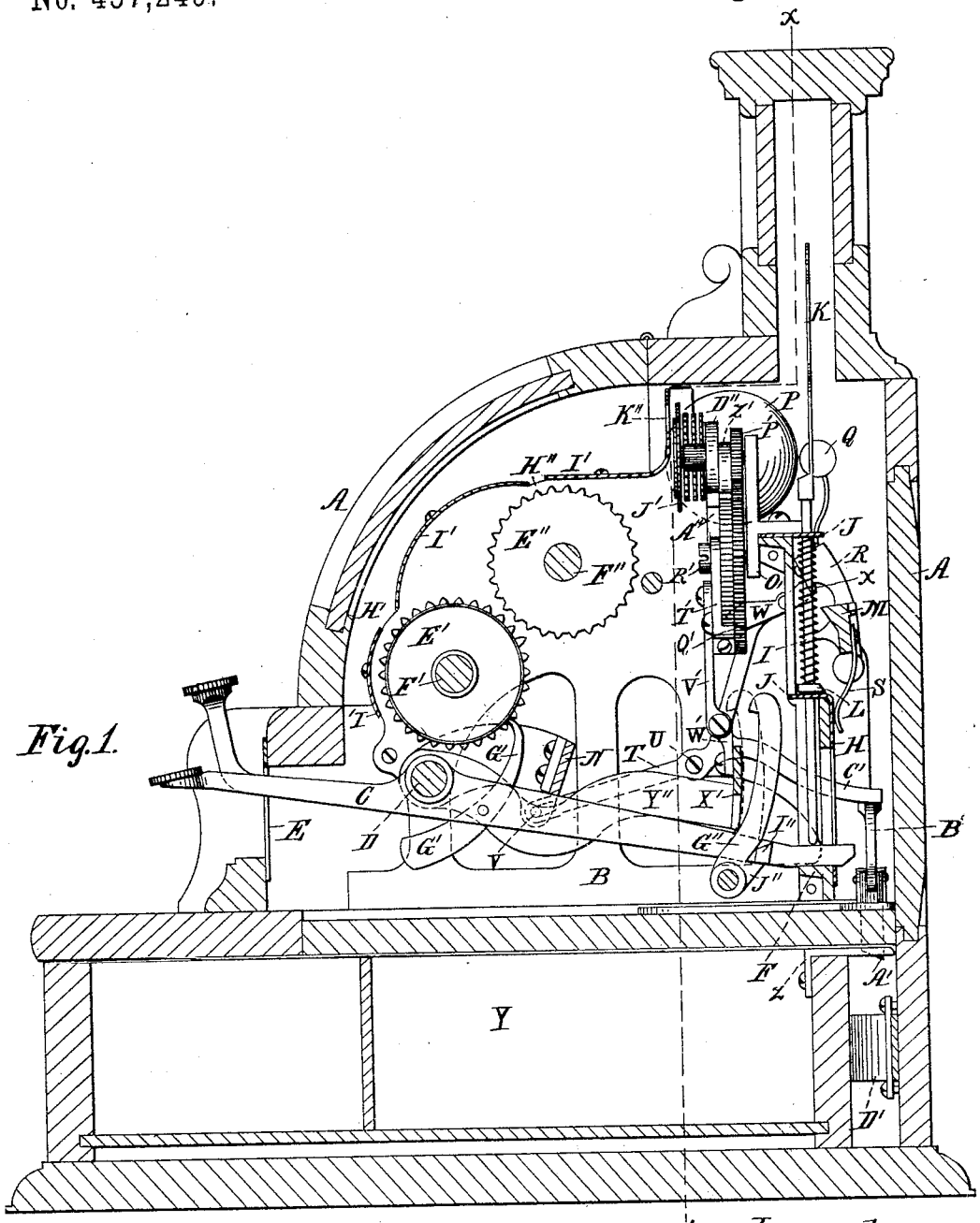


Fig. 1.

Witnesses:
W. C. Jirdinston.
Charles Billon.

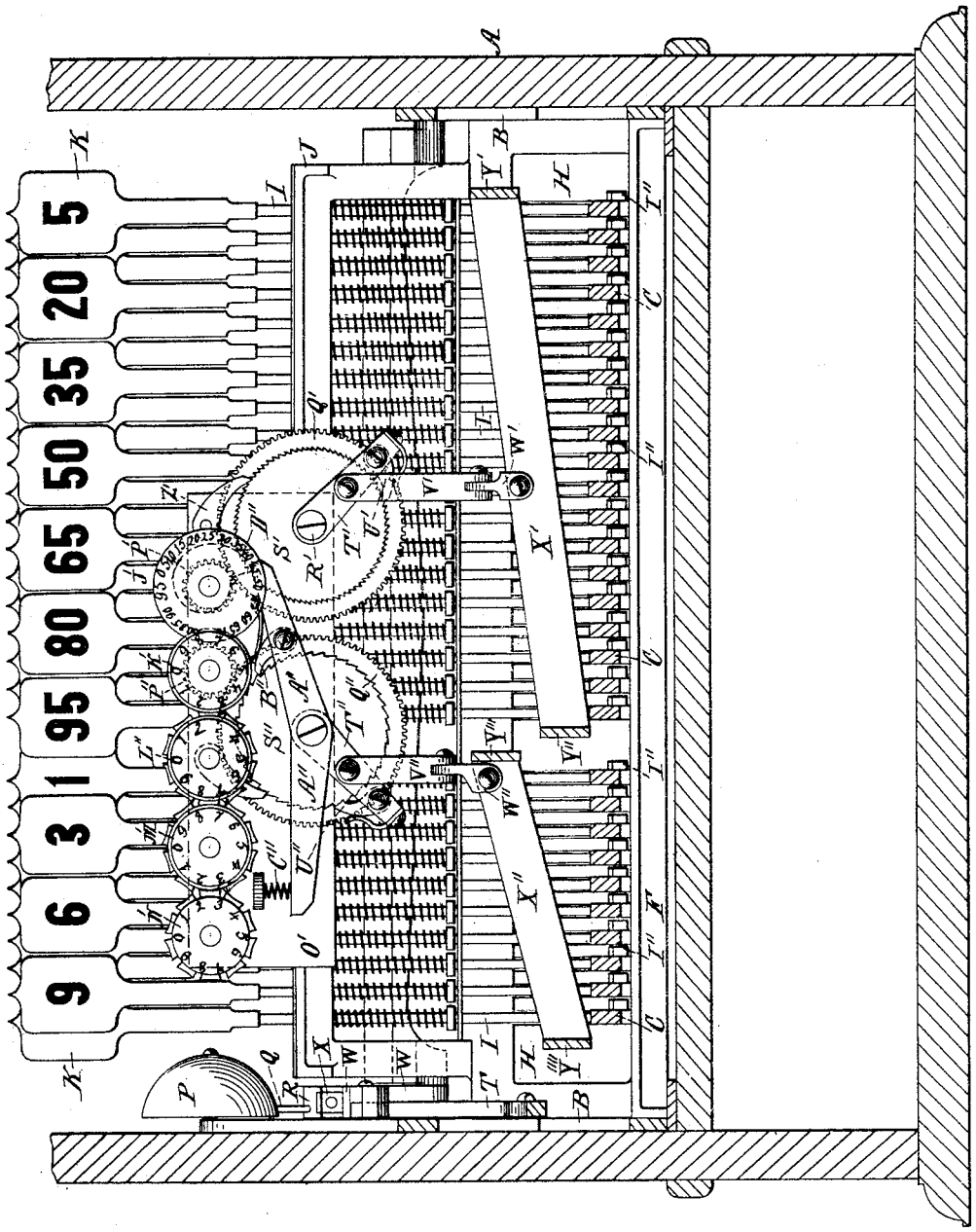
X Inventor:
Israel D. Boyer
by Peck & Rector
his Attorneys.

(No Model.) 2 Sheets—Sheet 2.

I. D. BOYER.

CASH REGISTER AND INDICATOR.

No. 457,249. Patented Aug. 4, 1891.



Witnesses:
W. C. Tirdinston.
Charles Billon

Fig. 2.

Inventor:
Israel D. Boyer
by Peck & Victor
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. 457,249, dated August 4, 1891.

Application filed August 30, 1889. Serial No. 322,400. (No model.)

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 sectional side elevation of a cash register and indicator embodying my invention. Fig. 2 is a sectional front elevation of the same through the dotted lines *x x* of Fig. 1.

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

The general construction of the machine illustrated in the drawings is well known and may be briefly described.

The registering and indicating mechanisms are inclosed in the usual case or cabinet A and are supported in a suitable frame-work B. The operating-keys C are pivoted on a shaft D, extending across the front portion of the machine. Their front ends project through a slotted guide-plate E in the front side of the case, and are provided with finger-buttons bearing numbers indicating the values of the respective keys, while their rear ends normally rest on a cross-piece F of the frame-work, and in operation play up and down in the slotted guide-plate H. Resting on the rear ends of the keys are vertical tablet-rods I, guided in cross-pieces J of the frame-work and carrying at their upper ends the usual indicating-tablets K, bearing numbers corresponding to the values of the respective keys. The tablet-rods I are provided with the usual collars or shoulders L, which are engaged by the pivoted wing M, operated in the usual way by means hereinafter referred to, to hold up a tablet-rod and tablet which have been raised by the operation of their corresponding key.

N is the usual vibrating-bar or key-board hung by side arms O on the shaft D and extending across the entire series of keys.

P is the gong, and Q its hammer, secured to an upward extension R of the wing M, the gong-hammer and wing being held in and returned to their normal position by a spring S, secured to the back of the wing and bearing against the upper rear side of the plate H. They are actuated upon the operation of any key, the gong-hammer to strike the gong and the wing to engage the shoulder of the elevated tablet-rod by means of the bell-crank T, pivoted to the frame-work at U, connected at its lower forward end to the vibrating bar or key-board N by slot-and-pin connection at V, and carrying at its upper rear end a tripping-dog W, which engages a wiper-block X, secured to the wing-extension R. When any key is operated and the bar N and forward end of the bell-crank T are thereby lifted, the tripping-dog W, bearing against the wiper-block X, pushes back the gong-hammer and wing until, the collar on the elevated tablet-rod having passed above the upper edge of the wing, the nose of the dog W slips past the lower end of the wiper-block and the spring S returns the gong-hammer and wing to normal position, causing the former to strike the gong and the latter to move beneath the shoulder on the elevated tablet-rod to support the latter when its key is released and returned to normal position, all in the usual well-known manner.

The case A is provided in its lower portion with a drawer-compartment, in which is fitted the usual money-drawer Y, having at its upper rear side a locking-plate Z, which, when the drawer is pushed in, is engaged by a locking-bolt A′ to hold the drawer closed. This bolt A′ is carried on the end of pivoted lever B′, whose upper end at the side of the machine is engaged by the rear extension C′ of the bell-crank T, which depresses this end of the lever whenever any key is operated and the key-board N is lifted, thereby lifting the bolt A′ to release the drawer Y, which is thereupon propelled from its compartment by the spring D′, which is secured to the inner side of the wall of the compartment and bears against the rear side of the drawer.

Heretofore machines of this class have been provided with a single registering mechanism, consisting either of a series of individual

registering-wheels, one for each key and each registering only the operations of its key, or else a single registering-wheel common to all of the keys and actuated to different degrees by keys of different values and usually connected to a train of supplemental wheels to which the amounts registered by the revolution of the primary wheel were transferred. Each of these forms of registering mechanism possesses advantages over the other. In the former the total amount registered by each key is preserved and the proprietor at the end of a day's business is enabled to judge of the character of the sales made and can ascertain just how many sales of each value there were, while in the latter the total amounts registered by all the keys are added together and the proprietor is unable to tell anything about the character of the sales made during the day. In the former mechanism the total amounts indicated on the respective wheels have to be added together in order to get the aggregate amount of the sales of the day, while in the latter they are all added together on the registering mechanism of the machine and the total can be read off at a glance. In my present machine I have the advantages of both these forms of mechanism; and to that end one feature of my invention consists in combining with a single set of operating-keys and their indicating-tablets two sets of registering mechanisms, both actuated by the same keys, the one consisting of a series of individual registering-wheels which preserve a separate registry of the total amount registered by each key, and the other a self-adding mechanism which adds into one common total the amounts registered by all the keys, so that when any key of the series is operated its corresponding indicator is exposed to view and its value is registered on its individual registering-wheel and also added in the common total on the self-adding mechanism. The first of these sets of registering mechanisms is illustrated in Fig. 1, where E′ E″ represent two banks of individual registering-wheels strung on shafts F′ F″, extending across the machine. There are as many wheels in each bank as there are operating-keys, each wheel of the lower bank being turned one number by each operation of its corresponding key, through the medium of the pivoted weighted dogs G′, carried by the operating-keys and engaging the ratchets of the wheels. The wheels of the lower bank bear on their peripheries a series of numbers in multiples of the values of their corresponding keys, while those of the upper bank bear on their peripheries a series of numbers in multiples of the total amounts registered by complete revolutions of their corresponding wheels in the lower bank. The ratchet on each wheel of the lower bank has one tooth larger than the rest to engage the ratchet of its corresponding wheel in the upper bank and turn it one notch at each complete revolution of the wheel of the lower bank. Suitable reading-openings H′ H″ in the covering-plate I′ extend across each bank of the wheels and enable the total registered amounts registered on the wheels to be read off and added up.

The above constitutes the individual registering mechanism, which preserves separately a record of the sales of each value, so that at the end of the day's business the proprietor is enabled to tell from the wheels E′ E″ of the five-cent key just how many five-cent sales have been made, from those of the ten-cent key just how many ten-cent sales have been made, and so on through the entire series.

The self-adding registering mechanism, in which the registrations of all the keys are added into one common total, is shown more particularly in Fig. 2, where J′, K′, L′, M′, and N′ are a set of registering-wheels carried on a supporting-plate O′, and adding one onto the other and indicating, respectively, cents, dollars, and tens, hundreds, and thousands of dollars. The wheels K′ L′ M′ N′ are an ordinary set of Geneva-stop wheels bearing on their faces multiples of one from 0 to 9, inclusive, the wheel L′ being turned one number at and by each complete revolution of the wheel K′, the wheel M′ being actuated in a similar manner by the wheel L′, and the wheel N′ by the wheel M′. The dollar-wheel K′ is turned one number at each complete revolution of the cent-wheel, which latter bears on its face a series of numbers in multiples of five from 0 to 95, and is also actuated directly by the operation of the keys of the dollar set at the left-hand side of the machine, all in the manner and by the means hereinafter described. Secured to the shaft of the wheel J′ is a pinion P′, having twenty teeth and meshing constantly with a larger gear-wheel Q′, carried on a spindle or stud R′, screwed into the plate O′ and having in this instance eighty teeth. Secured upon the face of the wheel Q′ is a ratchet-wheel S′, also having eighty teeth. Loosely hung on the supporting-stud of the wheel Q′ is an arm T′, carrying at its outer end a pawl U′, normally pressed into engagement with the teeth of the ratchet S′ by a spring secured to the outer end of the arm T′. This arm T′ is connected by a pivoted link V′ to an arm W′, pivoted to an inclined bar X′, extending across the right hand or cent set of keys and hung by side arms Y′ Y″ on the pivotal shaft D′ of the operating-keys C. The inner supporting-arm Y″ of the bar X′ has a downward bend forward of its central portion, as shown in Fig. 1, to enable it to clear the vibrating bar or key-board N, which extends entirely across the machine. The inclination of the bar X′ relatively to the plane of the keys is such that the operation of any key will lift the bar a distance proportionate to the value of the key. The keys of the left-hand set, over which this bar extends, indicate multiples of five from 5 to 95, inclusive, beginning with 5 at the right and ending with 95 at the left. The left-hand

end of of the bar X′ in normal position rests directly on the ninety-five-cent key, so that the bar is given its full movement by the operation of that key, while its lower edge is normally at such distance above the five-cent key that the operation of the latter moves the bar only one-nineteenth, as far as the ninety-five-cent key. The adjustment of the parts is such that the lifting of the bar X′ by the operation of any key moves the wheel Q′, through the medium of the arm W′, link V′, arm T′, pawl U′, and ratchet S′, just as many teeth as there are fives in the value of the operated key, thereby turning the pinion P′ on the shaft of the wheel J′ a corresponding number of teeth and registering the value of the key on said wheel, all as will be readily understood.

Z′ is a holding-dog pivoted to the plate O′ and engaging the ratchet S′ to prevent said ratchet and the wheel Q′ moving backward as the pawl U′ slips up over the teeth of the ratchet upon the lifting of the bar X′ by the operation of a key. The ratchet and wheel are turned to effect the registration upon the return stroke of the key and resetting of the bar X′. The shaft of the wheel K′ also has secured to it a pinion P″, having twenty teeth and constantly meshing with a gear-wheel Q″, carried on a stud R″, screwed into the plate O′, and having secured upon its face a ratchet S″. The wheel Q″ has eighty teeth, the same as the wheel Q′; but the ratchet S″ has only forty teeth, so that the turning of the ratchet one tooth will turn the wheel Q″ and the pinion P″ two teeth each; but as the latter has twenty teeth, while the wheel key K′, to whose shaft it is secured, has only ten numbers, the turning of the wheel Q″ and pinion P″ two teeth will turn the wheel K′ only one number, and thus the latter is turned one number for each tooth of the ratchet S″. Loosely hung on the stud R″, which carries the wheel Q″, is a lever A″, one of whose arms carries a pawl B″, spring-pressed into engagement with the ratchet S″. The end of this arm of the lever is normally pressed by a spring C″, engaging its opposite end against a snail-cam D″, secured to the shaft of the wheel J′, as shown in dotted lines in Fig. 2. As the wheel J′ is revolved the cam D″ gradually depresses the end of the lever A″ and moves the pawl B″ backward over one tooth of the ratchet S″ until just as the wheel J′ completes a revolution and its 0 is brought to its reading-opening the end of the lever A″ slips off the cam and is thrown upward by the spring C″, pressing its opposite end downward, causing the pawl B″ to turn the ratchet S″ forward one tooth, thereby turning the wheel S″ and pinion P″ two teeth and the wheel K′ one number, and thereby adding one dollar to the amount registered on the latter. In this manner at each complete revolution of the wheel J′ the wheel K′ is turned one number, and the dollar registered by one complete revolution of the wheel J′ is added onto the wheel K′ and the registry on the wheel J′ begins at zero again. The wheel K′ is also actuated directly by the keys of the dollar set, in the same manner that the wheel J′ is actuated by the wheels of the cent set, through the medium of an arm T″, loosely hung on its supporting-stud and carrying a pawl U″, engaging the ratchet S″, a link V″ connecting said arm to an arm W″, pivoted to an inclined bar X″, extending across the keys of the dollar set and hung by side arms Y‴ Y⁗ on the shaft D. There are reading-openings K″ in the rear vertical portion of the covering-plate I′, just in front of the wheels J′, K′, L′, M′, and N′, through which the uppermost numbers on the latter can be seen.

Pivoted between the keys C, just in rear of the bars X′ X″, Fig. 1, are a series of hooks G″, whose rear sides rest against lugs I″, projecting from the sides of the keys. These lugs normally rest on rearward projections J″ of the hooks G″ and hold the latter thrown backward; but the adjustment and shape of the parts are such that when any key is operated its lugs I″ strike the curved rear side of its hook G″ and throws the upper end of the hook forward over the path of travel of the bar X′ or X″, as seen by the dotted lines in Fig. 1, so that the upper side of the bar strikes the hook and is arrested by it. When the hooks are thrown forward, the surface of the rear sides from a point just above the normal position of the lugs I″ to their upper ends is the arc of a circle struck from the center of the shaft D, on which the keys are pivoted, so that after the rear end of a key starts to rise and throws its hook forward into the position shown by the dotted lines its lug moves up its rear side and holds it in such position until the key is reset. By the employment of these hooks I prevent any over-registration from the momentum of the bars X′ X″ in their upward travel. The hooks are all of the same length, since the upper sides of the bars X′ X″ are inclined as well as their lower, so that the space between the upper sides of the bars and points of the hooks varies in width just as does the space between the lower sides of the bars and the tops of the keys. To avoid confusion in the drawings, the hooks have not been shown in Fig. 2.

My invention is not limited to the employment of the inclined bars X′ X″ for actuating the registering-wheels J′ K′ to different degrees, for any well-known or suitable means may be employed for that purpose; nor is it limited to the particular form of the self-adding registering mechanism, as other convenient styles may be substituted for that illustrated in the drawings.

Any suitable stops (not shown) may be employed for the purpose of preventing the operation of two or more keys at once.

Having thus fully described my invention, I claim—

1. In a cash register and indicator, the combination of a series of operating-keys provided with finger-buttons representing different values, a series of indicators representing corresponding values actuated thereby, an actuating-pawl for each key, a series of registering-wheels, one for each key and actuated by its pawl to preserve a separate registry of the operations of each key, and a registering-wheel common to all of the keys of the same series and actuated thereby to different degrees by different keys to afford a total registry of the values of all of the operated keys, whereby upon operating any key of the series it actuates its individual registering-wheel to register its value thereon, and also actuates the common registering-wheel to the proper degree to add its value upon the total registry, substantially as described.

2. In a cash register and indicator, the combination of the registering-wheel J′, pinion P′, cam D″, gear-wheel Q′, meshing with the pinion P′, registering-wheel K′, pinion P″, gear-wheel Q″, meshing with the pinion P″, ratchet S″, and lever A″, actuated by the cam D″ and carrying the pawl B″, engaging the ratchet S″, substantially as and for the purpose described.

3. In a cash register and indicator, the combination, with the operating-keys C and inclined bar X′, of the registering-wheel J′, pinion P′, cam D″, gear-wheel Q′, meshing with the pinion P′, registering-wheel K′, pinion P″, gear-wheel Q″, meshing with the pinion P″, ratchet S″, lever A″, actuated by the cam D″ and carrying the pawl B″, engaging the ratchet S″, and mechanism interposed between the bar X′ and gear-wheel Q′ for turning the latter, substantially as and for the purpose described.

4. In a cash register and indicator, the combination, with the operating-keys C and inclined bars X′ X″, of the registering-wheel J′, pinion P′, cam D″, gear-wheel Q′, meshing with the pinion P′, ratchet S″, registering-wheel K′, pinion P″, gear-wheel Q″, meshing with the pinion P″, ratchet S″, lever A″, actuated by the cam D″ and carrying the pawl B″, engaging the ratchet S″, the arms T′ T″, carrying the pawls U′ U″, engaging the ratchet S′ S″, and the links V′ V″ connecting the arms T′ T″ to the bars X′ X″, substantially as and for the purpose described.

ISRAEL DONALD BOYER.

Witnesses:
THOMAS CORWIN,
HENRY STODDARD, Jr.