

(No Model.)

5 Sheets—Sheet 1.

L. S. BURRIDGE & N. R. MARSHMAN.
CASH REGISTER.

No. 574,302.

Patented Dec. 29, 1896.

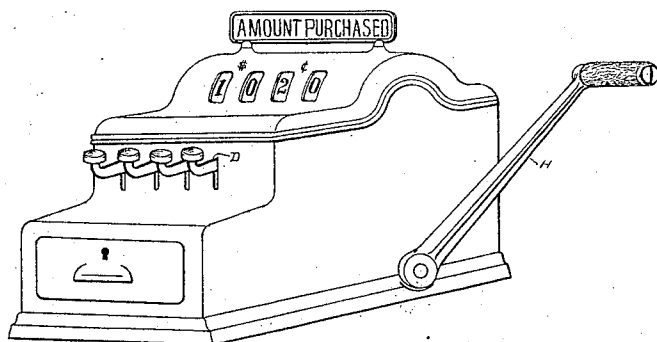


FIG. 1.

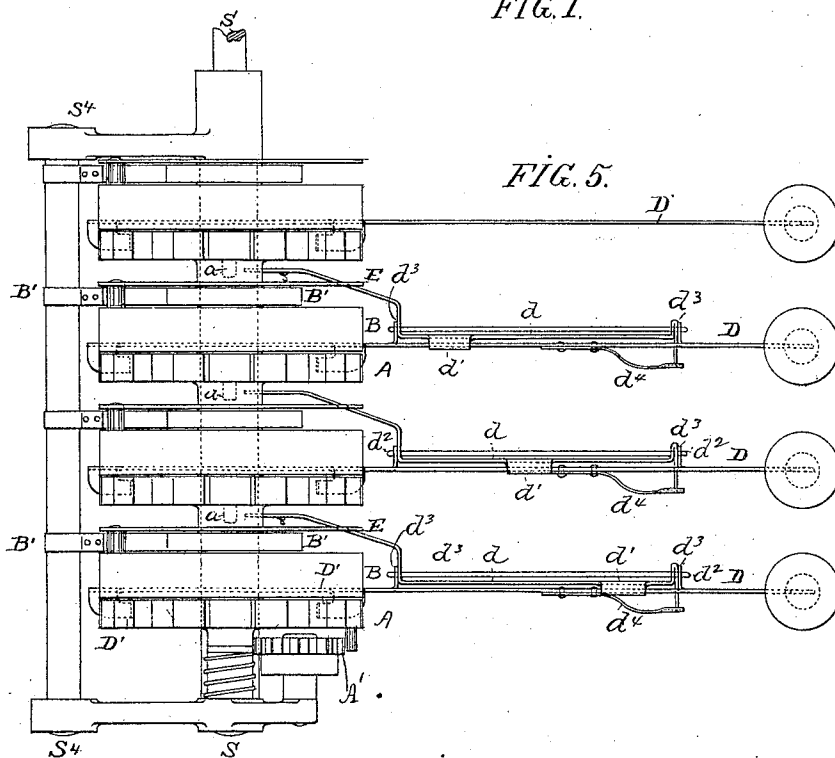
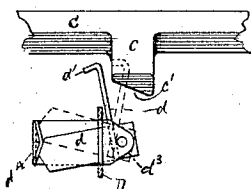


FIG. 6.



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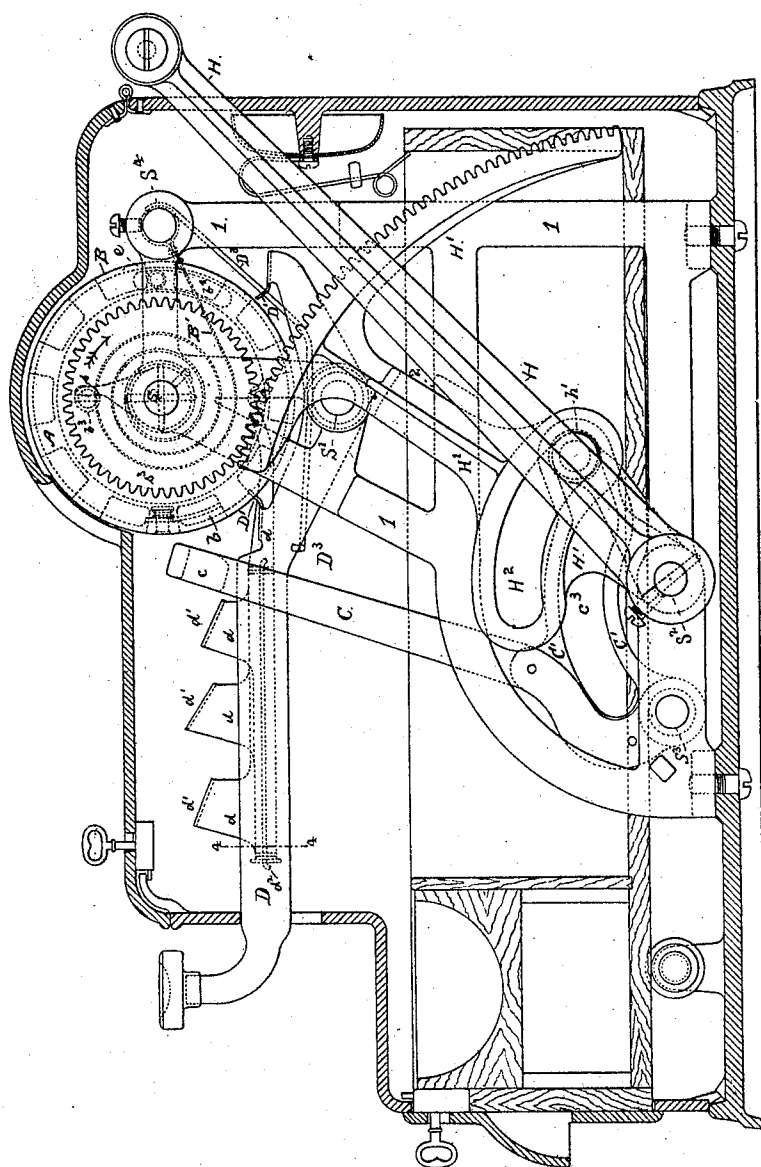


FIG. 2.

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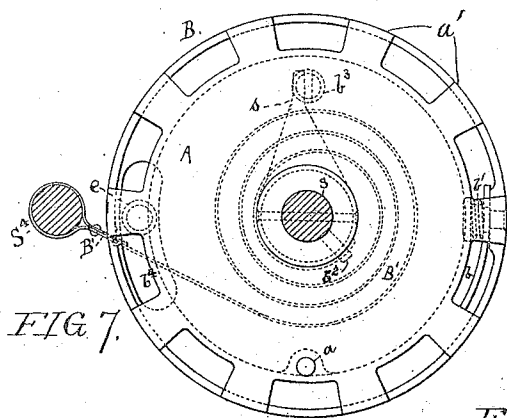


FIG. 7.

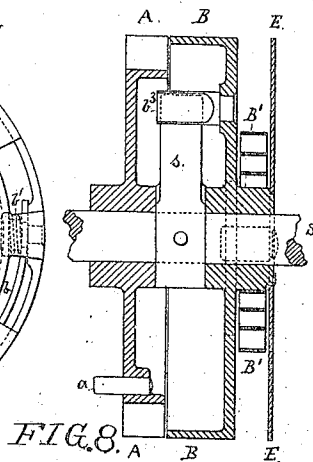


FIG. 8.

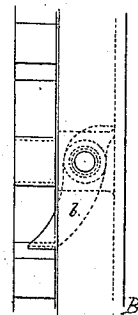


FIG. 9.

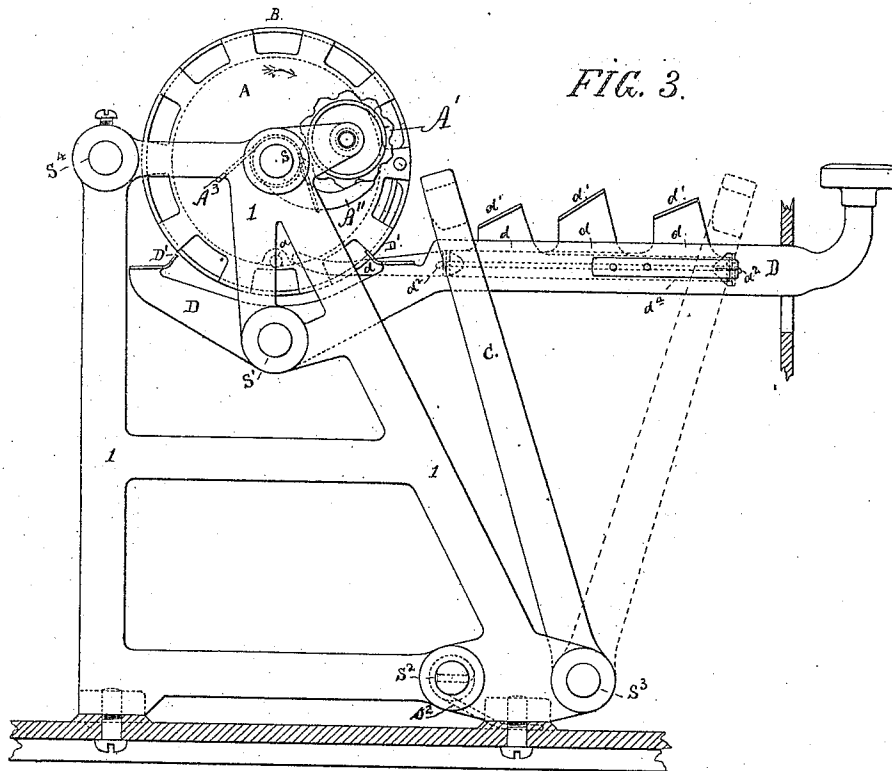


FIG. 3.

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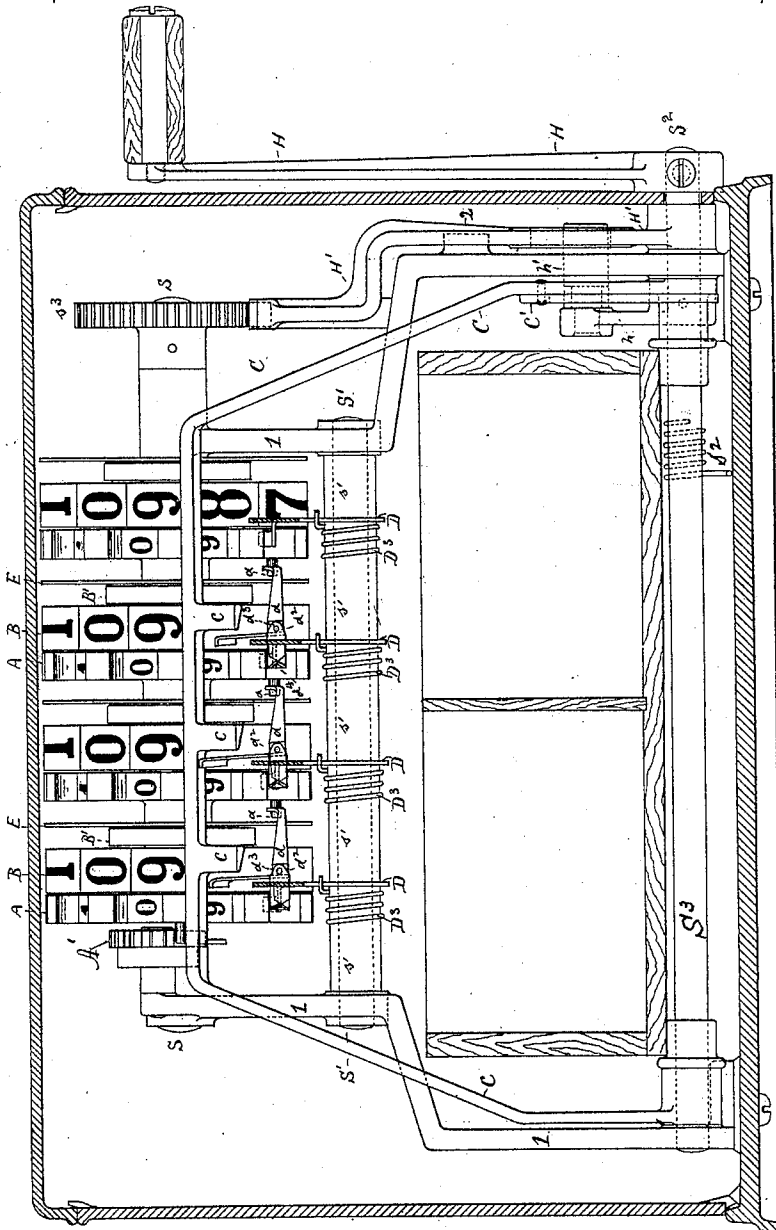


Fig. 4.

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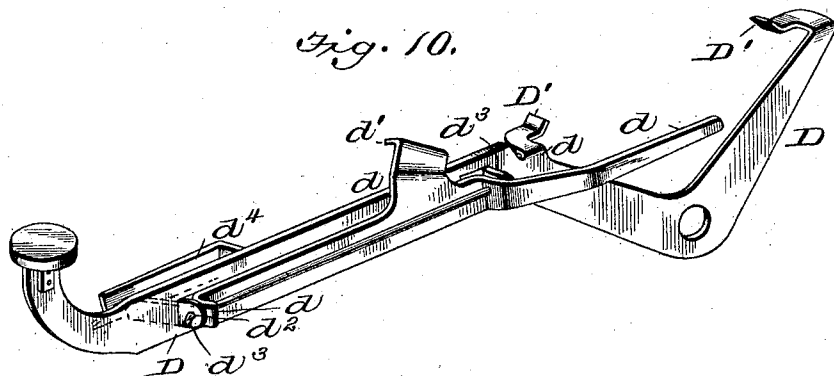


Fig. 11.

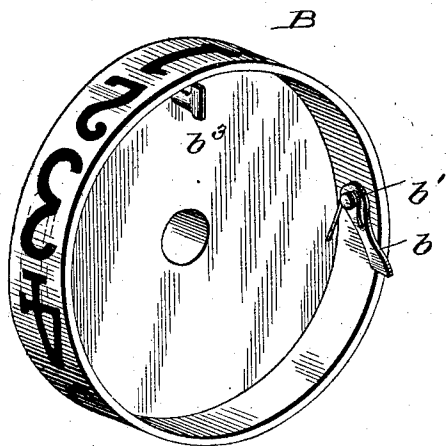
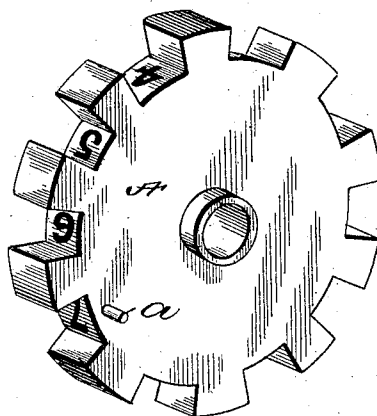


Fig. 12.



Witnesses

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UNITED STATES PATENT OFFICE.

LEE S. BURRIDGE AND NEWMAN R. MARSHMAN, OF NEW YORK, N. Y.

CASH-REGISTER.

SPECIFICATION forming part of Letters Patent No. 574,302, dated December 29, 1896.

Application filed December 16, 1893. Serial No. 493,867. (No model.)

To all whom it may concern:

Be it known that we, LEE S. BURRIDGE and NEWMAN R. MARSHMAN, citizens of the United States, residing at New York, in the county and State of New York, have invented a new and useful Cash-Register, of which the following is a specification.

This machine is a modified form of our invention for which was granted Patent No. 513,452, dated January 23, 1894, bearing Serial No. 478,146, under title of "Adding-machine."

Referring to the drawings, Figure 1 is a view of the machine with case and cover closed. Fig. 2 is a side elevation, looking toward the right, with side of case and cover removed. Fig. 3 is a side elevation, looking toward the left. Fig. 4 is a front elevation with front of case and cover removed and a section of key-levers, taken on lines 4-4 of Fig. 2. The large numerals 7 and 8 are not shown on all wheels for the better illustration of the several working parts. Fig. 5 is a partial plan view, no numerals being marked on the wheels. Fig. 6 is a detail view of a trip-lever with a portion of the frame and finger that acts upon it. Fig. 7 is a side elevation of an adding-wheel and indicator-wheel with details more clearly shown. Fig. 8 is a sectional front elevation of parts shown in Fig. 7. Fig. 9 is a detail view of pawl on indicator-wheel engaging in adding-wheel. Fig. 10 is a perspective view of one of the key-levers and its connected parts. Fig. 11 is a similar view of one of the indicating-wheels detached. Fig. 12 is a similar view of an adding-wheel.

Referring now to the details of the drawings by letters and figures, 1 1 are standards secured to a suitable base and drilled to receive shafts or round bars S , S' , S^2 , S^3 , and S^4 . On said shaft S are loosely mounted adding-wheels A and indicator-wheels B . Fixedly mounted on the same shaft are four fingers s and a gear-wheel s^3 . Around the hubs of the wheels B and connected thereto by a pin b^2 , projecting from said hubs, are springs B' , whose outer ends are formed into loops which encircle the rod S^4 . On the extreme ends of the hubs are loosely mounted sheet-metal disks E , which serve to keep the springs B' in position, and each carries a pin e , that projects through a slot b^4 in the next indicating-

wheel. On the shaft or bar S' is mounted a series of key-levers D , which are spaced and held in position by sleeves s' , set on said shaft S' between said key-levers.

There are four sets of the key-levers, indicating-wheels, adding-wheels, disks, fingers, and springs, so that a description of one set and its attachments or connecting parts will answer for all. Any number of such sets may be used at the will of the maker or user, but an apparatus having four sets will be sufficient for ordinary business uses, when provided with a tally-wheel, as hereinafter described.

Each of the indicator-wheels is provided with the Arabic numerals from "0" to "9" as large as they can be conveniently made on its periphery or rim, which is made of good width for that purpose. On a projection on the inside of said rim (see Fig. 11) is pivoted a pawl b , having a spring b' acting on it to engage with the teeth in the next adding-wheel A , as indicated in Figs. 7 and 9.

At b^3 is shown a pin which is fast in the web of the indicating-wheel and projects sufficiently to be engaged by the nearest of the fingers s .

Each adding-wheel A carries a pin a , which as the wheel rotates comes in contact with a trip-lever D , as and for a purpose hereinafter described, and is provided with ten teeth a' , between which are the adding-numerals, as indicated in Figs. 4 and 12.

When the parts are assembled, the springs are wound up, so as to be under tension with a tendency to revolve the indicating-wheels in the direction indicated by the arrow in Fig. 3, but as the pawls b' are engaged with the adding-wheels they cannot move forward without said adding-wheels moving with them, although they may be moved backward, as will be hereinafter shown. The adding-wheels are normally held against the power of the springs B' by anchors or pallets D' , formed on the key-levers D by bending portions of the metal of said key-levers at a right-angle and then bending the extremities of said bent portions at a slight angle to the rest, as shown in Figs. 3 and 10. By pressing on a key-lever the front pallet is depressed and the back one raised, whereby the tooth until then engaged with the front pallet is allowed to es-

cape, the wheel of which it forms part being impelled by the pawl b on the wheel B , which in turn is driven by the spring B' , so that every motion of a key-lever causes a motion of its corresponding adding-wheel A and its indicating-wheel until the latter reaches its stopping-point, as hereinafter described. As the front pallet falls the rear one rises, and thus prevents the rotation of the wheels more than one tooth or numeral space at a time.

The key-levers D project through slots in the front of the case, which slots limit the extent of the key-levers' motions. These levers are normally held upward, or in the position shown in Figs. 1, 2, and 3, by springs D^2 , coiled around the sleeves s' , which springs are bent at right angles at one extremity to bear against the key-levers, as shown at Fig. 4, and whose other ends are carried backward under the rod S^4 . (See Fig. 2.) Each of these keys except the first to the right carries a trip-lever d , preferably made of sheet metal, bent as shown in Figs. 5 and 10, and is pivoted to the key-lever by a wire d^2 , which runs through holes drilled in said trip-levers and in ears d^3 , punched out of the key levers D and bent at right angles.

One end of the trip-lever extends between the adding-wheel A and disk E , and is held normally in the path of the pin a . Its other end is bent at right angles to its length and projects through the opening made by punching out the ear d^3 and terminates in a flattened V-shaped end, as shown in Figs. 6 and 10. On the side of the key-lever opposite the trip-lever is a spring d^4 , having also (in cross-section) a flattened V-shaped end which bears against the V-shaped end of the trip-lever, and will tend to hold said lever either in the position shown in full lines or in that shown in dotted lines in Fig. 6. Owing to the inclined position of both contacting points with relation to each other, the spring will have a tendency to force the trip-lever to the extreme limit of its motion in either direction (which is governed by the size of the slot through which the V-shaped end passed) when the trip-lever has been started in motion.

At d' on each trip-lever is shown a projection which has an inclined face and rises above the key-lever and extends partly over the same when in its normal position. These projections are acted upon by fingers e , formed on the under side of the horizontal bar of an oscillating frame C , and are provided with inclined sides e' , (see Fig. 6,) for a purpose hereinafter described.

On the left-hand end in front of shaft S is a small tally-wheel A' , on which are shown the numerals from "0" to "9," which wheel is operated by the pin a on the adding-wheel next to it, and is held from revolving too far by means of a pawl A'' and spring A^3 , mounted on said shaft S .

The gear or pinion s^3 on the shaft S meshes with a toothed sector H' , loosely mounted on

a shaft S^2 , on which is also mounted (rigidly) a lever H , having a handle and a short arm h , the latter carrying a pin h' , that works in a slot H^2 in the arm of the sector H' and also through a slot c^3 , cut in a piece C'' , fixedly attached to the oscillating frame C , mounted on the shaft S^2 . A spring s^2 is wound around the shaft S^2 and tends to keep the handle in the position shown in Figs. 1 and 3 when no force is exerted on said handle and so returns the same after it has been brought forward by hand.

A money-drawer Z is provided, as shown in Fig. 2 and 4, which passes between the standards 1 1 and the arms of the frame C , both of the latter being spread widely to receive as large a drawer as possible. The drawer runs on rollers mounted on the shaft S^3 , so as to move easily.

We do not show any connection between the lever H and money-drawer for the purpose of opening it when the former is operated, as several known and simple devices would suggest themselves to any mechanic.

The operation is as follows: Suppose all the figures are at zero and a customer has purchased goods to the amount of twelve dollars and thirty-five cents. The clerk may press down the first key to the right five times, the next key may be depressed three times, the third key twice, and the last once. At every stroke one tooth of the adding-wheel would be allowed to slip past the front pallet D and the corresponding indicating-wheel would move with it, both being impelled by the spring B' acting directly on the indicator-wheel B , and the latter driving the adding-wheel A by means of the pawl b acting on the teeth of said wheel A , so that by this operation on the keys the numerals "1," "2," "3," and "5," representing twelve dollars and thirty-five cents, will appear in the openings in the top of the case through which the indicating-wheels are seen, and at the same time corresponding figures would appear on the adding-wheels in the line immediately above the horizontal bar of frame C , which is the reading-point of the adding-wheels. This, however, is a comparatively slow mode of operating, as it takes eleven strokes, but it may be done with five strokes by first striking all the keys at once, then the three to the right, next the two to the right, and then striking the units-key twice. Any other purchase may be indicated in a similar way.

After each sale the lever H must be drawn forward, when, owing to the peculiar shape of the slots H^2 and c^3 , the frame C is first pushed forward, as shown in dotted lines in Fig. 3, and then the sector H' , which latter causes the gear s^3 , shaft S , and the fingers s to rotate in the direction of the arrow in Fig. 2, and the fingers s coming in contact with the pins b^3 on the indicating-wheels will force all the latter back until the pins e contact with the springs B' and the front ends or walls of the slots b^1 touch said pins e , which will

carry the indicating-wheels back to zero and a little beyond, because it is necessary for the adding process that the pawls *b* shall surely catch on the teeth of the adding-wheels, so as to impel them in their next forward movement. As soon as the pressure on the handle or lever *H* is released the spring *s*² forces it backward, carrying with it the arm *h* and pin *h'*, which operates on the frame *C* and sector *H'*, moving them backward in succession, the frame *C* going first and the sector *H'* afterward, such successive movements being due to the peculiar slots *c*³ and *H*², until the arm of the sector comes in contact with a projection 2 on one of the standards 1. As the lever *H* begins to move backward the pressure of the springs *B'*, acting on the indicating-wheels, causes them to move slightly forward until the pawls *b* catch on the teeth of the adding-wheels, when they are arrested by said adding-wheels, the latter being held from rotating by the front pallets *D'* on the key-levers, and the zero or cipher line of figures is brought directly in line with the sight-openings in the casing. As the sector *H'* moves backward it rotates the gear *s*³, the shaft *S*, and fingers *s* until the latter reach the position shown in Figs. 2 and 7 and are in contact with the pins *b*³.

We have so far described the operation of the indicating mechanism and will now refer more particularly to the adding and carrying mechanism. As each adding-wheel except the last to the left revolves, its pin *a* comes in contact with the next trip-lever and throws the projection *d'* from its normal position (shown in full lines in Fig. 6) to its tripped position, (indicated in dotted lines,) so that when the frame *C* is moved forward one of the fingers *c* rides over and presses upon the projection *d'* that has been tripped and causes the key-lever carrying it to be depressed, which allows the adding-wheel connected with said key-lever to be moved one tooth, thus effecting the carrying over of the ten due to a complete rotation of the adding-wheel carrying the pin that operated the trip-lever.

We have shown four sets of indicating and adding wheels, but as many more sets may be added as desired. The four sets of wheels will add to ninety-nine dollars and ninety-nine cents, but by the use of the tally-wheel *A'*, set at the left of the last adding-wheel, we can add up to nine hundred and ninety-nine dollars and ninety-nine cents, for as the pin *a* on said adding-wheel comes in contact with the teeth of said tally-wheel *A'* it is caused to move one tooth for each revolution of said adding-wheel.

After the trip-lever has accomplished its function it must be carried back to its normal position, which is done by the inclined side *c''* of the finger *c* coming in contact with the side of the projection *d'* as the frame *C* makes its return motion, thus pushing said trip-lever back to its former place ready to be struck

again by the pin *a* to carry forward another ten, hundred, or thousand, as the case may be.

The projections *d'* on the trip-levers are arranged in different positions on each to allow of their being acted on successively, the projection on the first trip-lever (on the second key-lever from the right) being nearest the wheels and the others at increasing distances therefrom, so that they are acted on successively. We will suppose the reading-line of the adding-wheels to be "99.99." If, now, the first key to the right is depressed, the first trip-lever (which is on the second key-lever) will be tripped and when the crank-arm *H* is drawn over the first finger *c* on frame *C* will depress that key, which will allow its corresponding wheels to move the distance of one numeral-space, and thus trip the trip-lever on the third key, when the second finger will depress the third key, causing the wheels connected with it to also move the distance of one numeral-space, and so on until all the wheels have been moved, when the adding-wheels will show "0000" at their reading-line.

Owing to the contact between the pins *b*³ and fingers *s*, the indicating-wheels do not make a complete revolution from the starting or zero point, but to enable them to make as near a complete revolution as possible the ends of said pins and fingers are made as thin as is consistent with proper strength. On the return motion, however, the adding-wheels are carried back more than a revolution, which the slots *b*⁴ allow them to do. Were there no slots the pins *e*, which connect the disks and indicating-wheels, would, by coming in contact with the springs *B'*, prevent such backward motion for more than a revolution.

The springs *B'* serve to prevent the rotation of the disks and wheels beyond the desired points in either direction, because the pins *e* come in contact with said springs when the disks have revolved either backward or forward. These springs thus form stops in this connection.

We are aware that adding-wheels and indicators have been rotated by handles and by finger-keys in many different ways, but our peculiar combination of elements, consisting of a series of indicators, one for each column of figures, which means that one represents units, the next tens, the next hundreds, and so on, advanced one numeral-space at each successive depression of their respective finger-keys, is new and is an improvement over any other method, because it reduces the number of keys to a minimum, consequently making the mechanism simpler and infinitely more reliable, and the operation is much more rapidly acquired than looking to find one of many keys that will advance each indicator to the required distance or than moving a handle to one of ten positions.

Some of the features claimed herein are shown, but not claimed, in our previous patent, No. 513,492, before referred to.

What we claim as new, and desire to secure by Letters Patent, is—

1. The combination of a numeral-adding wheel having teeth cut in the periphery, with
5 an indicator on the same shaft having a pawl engaging in the teeth of the adding-wheel, and a spring impelling the indicator and thereby the adding-wheel substantially as shown and described.
2. The combination of the arm II, small arm *h* and pin *h'*, with the slotted frame C and slotted sector II', motion being imparted to the frame first and sector afterward as set forth.
3. In a carrying-over device the combination of a frame C having fingers *c*, with trip-levers adapted to be acted upon by said fingers substantially as shown and described.
4. In a cash-register having a series of adding-wheels and indicators, each marked with the numerals, the combination therewith of a crank-arm, mechanism intermediate of the crank-arm and indicators to return the latter to zero, and the frame C connected to the
25 crank-arm for advancing the adding-wheels, substantially as set forth.
5. The combination with the adding-wheel A, the indicator-wheels B having slots *b'*, the disks E having pins *e* and a series of stops arranged in the path of said pins *e* to arrest the indicator-wheels, substantially as shown and described.
6. The combination of the adding-wheels A, indicators B, mounted on the same shaft as
35 the wheels and key-levers D with the trip-le-

vers *d* and fingers *c* all coöperating substantially as shown and described.

7. In a carrying-over device, the combination of the oscillating frame C pivoted near the bottom of the frame of the machine, having fingers *c* depending therefrom, with trip-levers adapted to be acted on by said fingers, substantially as described.

8. In a cash-register having a series of adding and indicator wheels, each marked with numerals, the combination of a lever II, mounted on a shaft carrying an arm *h* and pin *h'*, and a frame C having fingers *c*, and a slot *c'* in which pin *h'* works, curved for a portion of its length corresponding to the path of said pin *h'*, with a series of key-levers adapted to be operated by the fingers *c*, substantially as described.

9. In a cash-register having a series of adding and indicator wheels, each marked with numerals, the combination of a lever II, a pin *h'* deriving motion from said lever, a sector II' having a curved slot II² and adapted to return the indicators to zero through intermediate mechanism, and an oscillating frame
60 Coperatively connected with said lever II and having fingers *c*, with a series of trip-levers adapted to be operated by the fingers *c*, substantially as described.

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