

(No Model.)

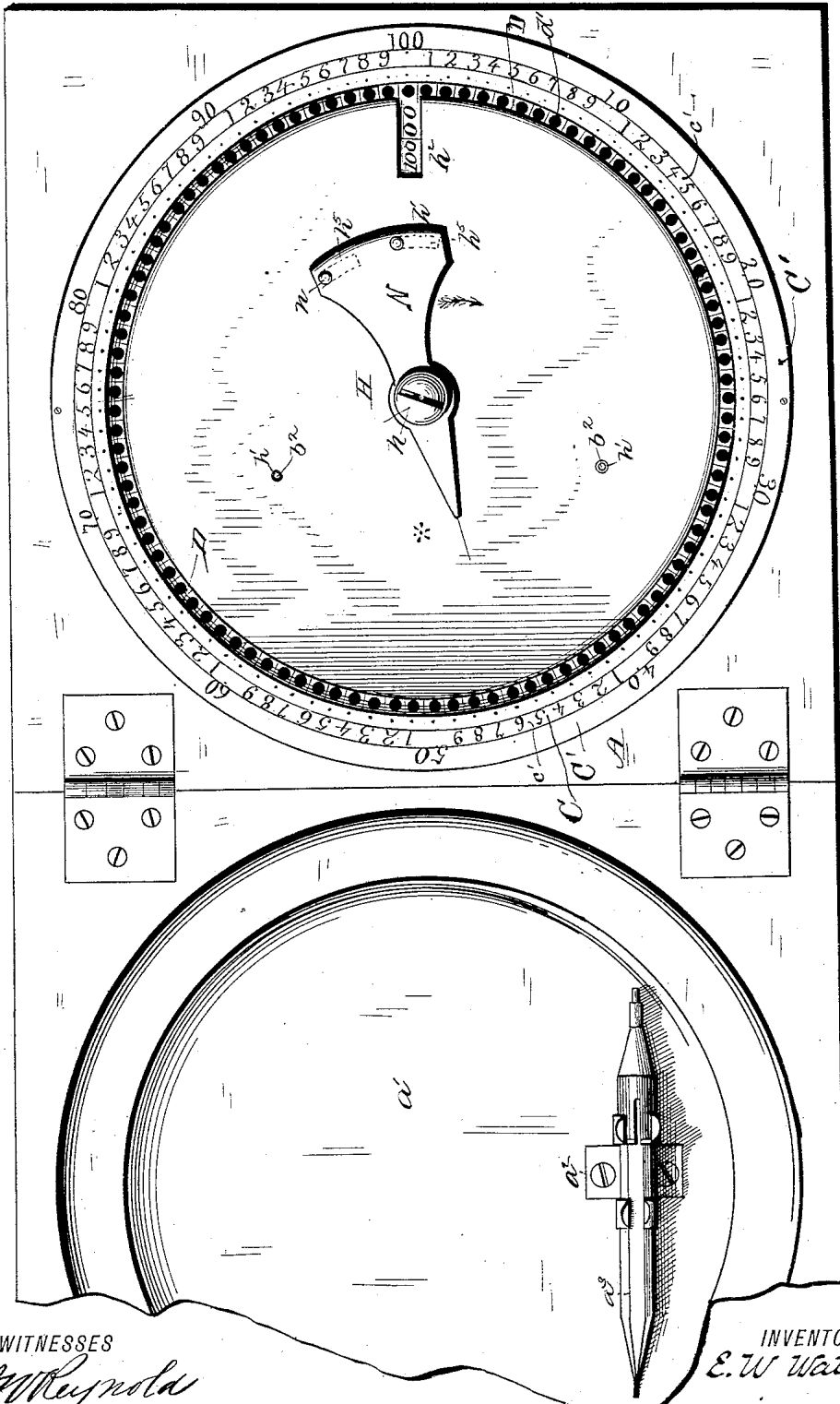
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E. W. WATSON.
CALCULATING MACHINE.

No. 334,064.

Patented Jan. 12, 1886.

Fig. 1.



WITNESSES
W. Reynolds
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INVENTOR
E. W. Watson
 By his Attorneys
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(No Model.)

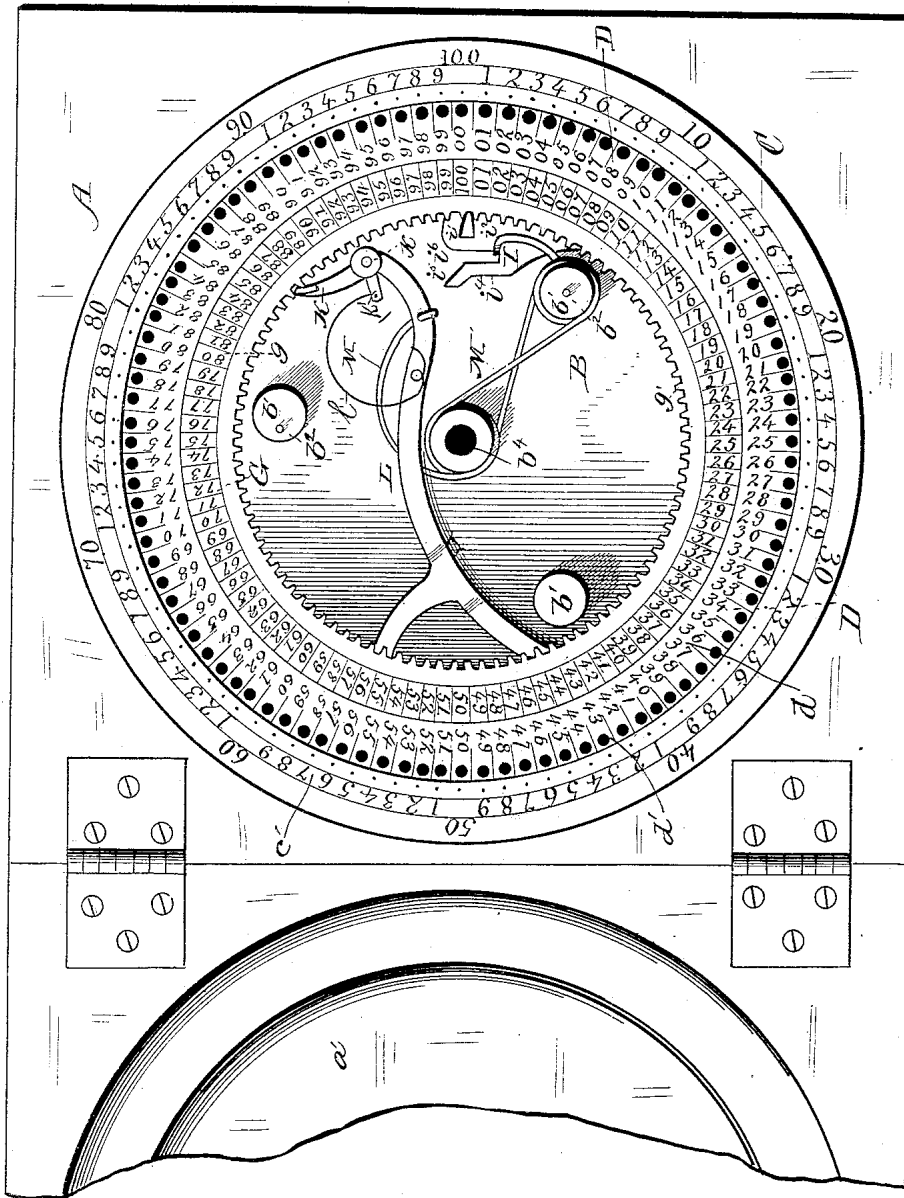
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Fig. 2.



WITNESSES

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Fig. 3.

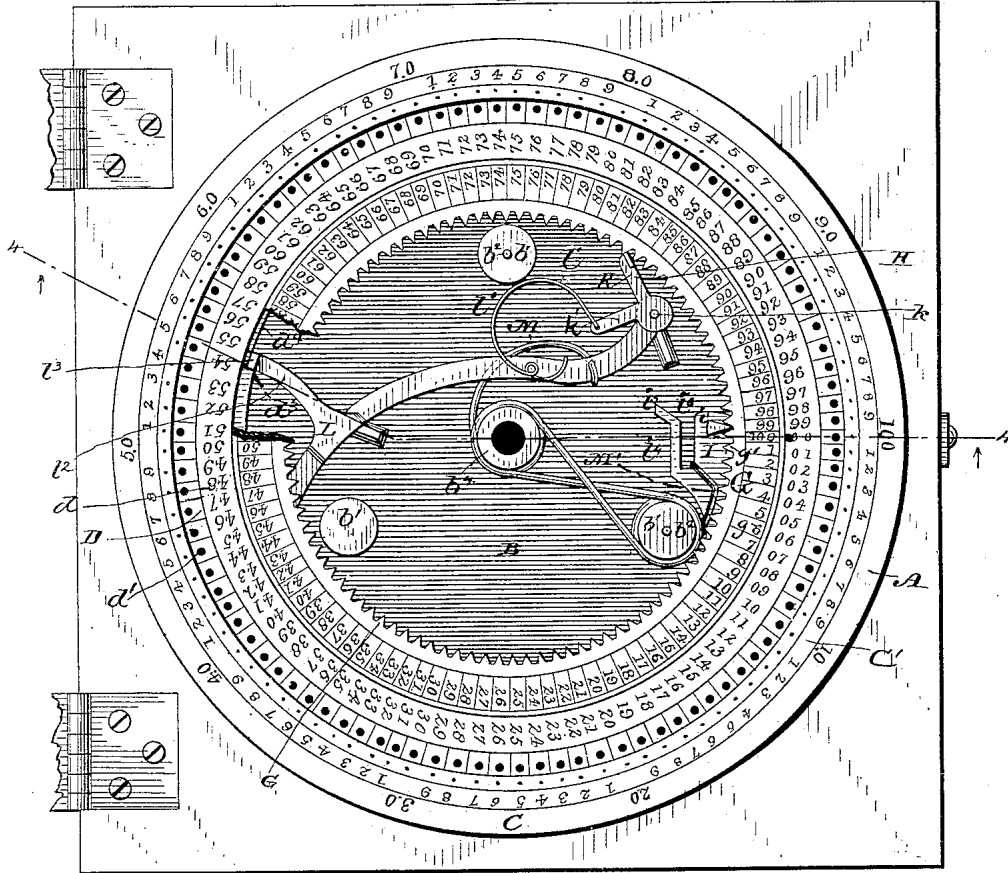


Fig. 4.

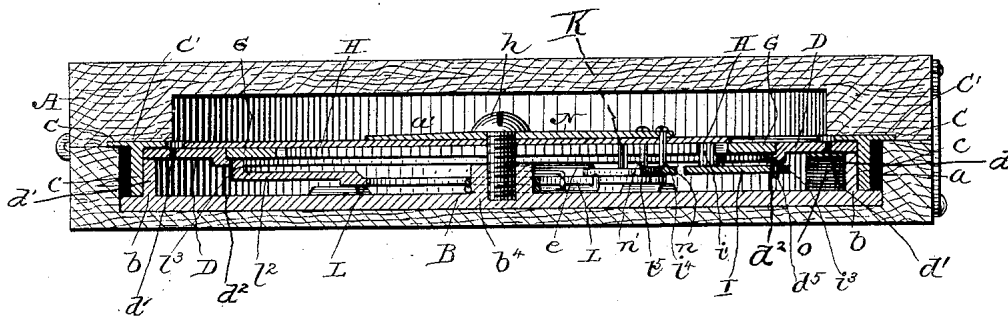
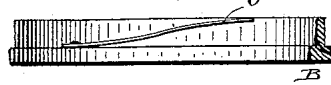


Fig. 7.



Witnesses.

H. W. Elworth.
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Inventor:

E. W. Watson.

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(No Model.)

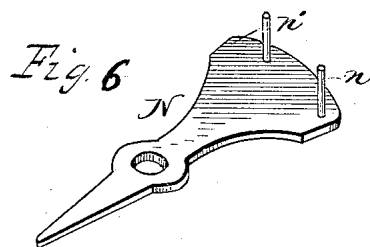
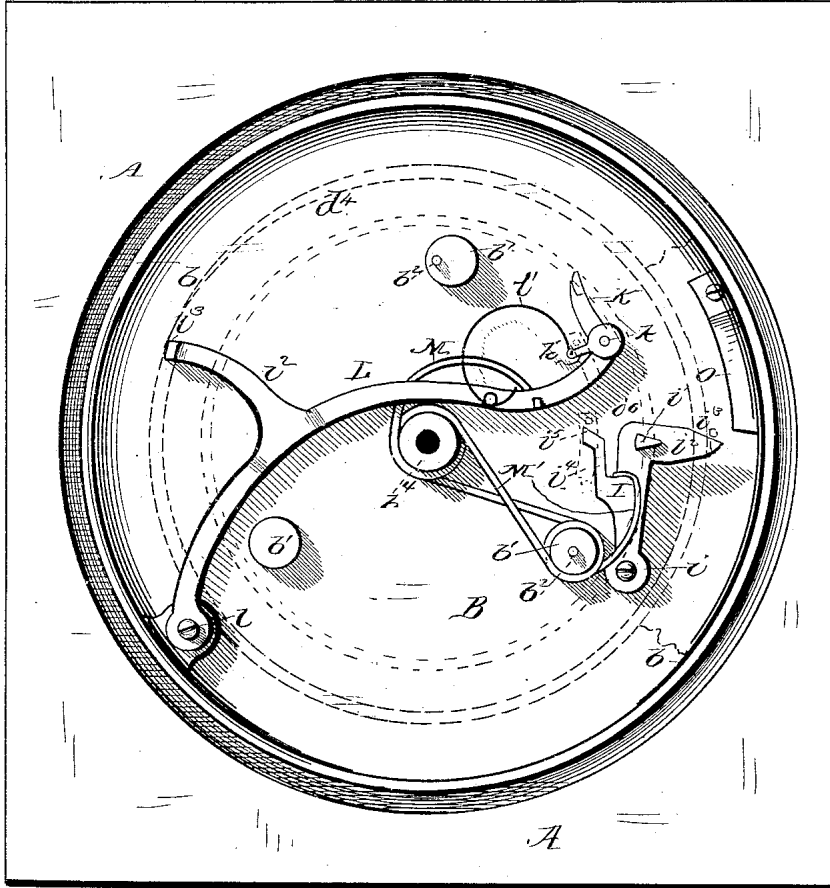
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Fig. 5.



WITNESSES
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UNITED STATES PATENT OFFICE.

ELIJAH W. WATSON, OF McLEAN, NEW YORK.

CALCULATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 334,064, dated January 12, 1886.

Application filed May 9, 1885. Serial No. 164,914. (No model.)

To all whom it may concern:

Be it known that I, ELIJAH W. WATSON, a citizen of the United States, residing at McLean, in the county of Tompkins, and State of New York, have invented new and useful Improvements in Adding or Calculating Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to adding-machines; and the novelty consists in the construction, arrangement, and adaptation of parts, as will be more fully hereinafter set forth, and specifically pointed out in the claims.

The object of the invention is to provide an adding-machine which will be uncomplicated in construction, simple in operation, and efficient for the purpose indicated.

The device has a capacity of adding any sets of figures whose sum is less than ten thousand.

The invention is fully illustrated in the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a face view of the machine in a position for use. Fig. 2 is a plan view with the face-plate removed, the rings being set at a normal point. Fig. 3 is a plan view similar to Fig. 2, but with the inner ring removed. Fig. 4 is a vertical section of the machine with the case closed, taken on the line 4 4 of Fig. 3. Fig. 5 is a detail perspective of the operating levers and pawls in their relation to the well. Fig. 6 is a perspective view of the lever N. Fig. 7 is a detail.

Referring to the drawings, A designates each part of the hinged base or frame. It has in each section a well, one of which, *a*, receives a stationary base, B, and the operating parts of the machine, and the other, *a'*, is provided with a spring-catch, *a²*, for holding an operating-awl, *a³*, or similar pointed implement. The base B has an upwardly-projecting annular flange, *b*, and three upwardly-projecting triangularly-arranged posts, *b'*, which support the face-plate H, to be described, pins *b²* op-

erating in such face-plate to insure the proper relation of the parts.

C designates a circular stationary gage or register, the face *C'* of which is secured to the frame A, and it has a downwardly-projecting annular flange, *c*, which fits snugly between the flange *b* and the wall of the well *a*, and the upper surface of the face is provided with a scale, *c'*, of one to one hundred.

D designates the outer one of two movable rings, and it has a bearing upon the flange *b*, being held, when in operative position, against any but a rotary movement by the face *C'* and annular flange *c* of the stationary scale C. The face of this ring is divided into one hundred equal portions, numbered gradually from one to one hundred, as seen at *d*, to form a scale arranged on corresponding radial lines with the scale on the stationary part C. In this ring D, between these radial lines, are also arranged a series of holes, *d'*, into which the awl is placed when it is desired to change the position of the ring. The inner edge of this ring D is formed with a rabbet, *d²*, into which is received the inner ring, G, and this portion *d²* is cut away to form an abrupt shoulder, *d³*, in one direction and a cam-surface, *d⁴*, in the other direction, the purposes of which parts will appear presently, as will also that of a pin, *d⁵*, which projects downwardly from the lower face of this ring D. The inner ring, G, has its bearing in the circular rabbet *d²*, and has a scale, *g*, radially arranged to correspond with the scales *d* *c'* and the holes *d'*, and its inner edge is provided with one hundred teeth arranged in the same radial proportion, as seen at *g'*. The face-plate H is centrally secured by a screw, *h*, which operates in a threaded socket formed in a post, *b⁴*, which forms a central part of the base B, and this plate is held in a normal position by the pins *b²*, which project through holes *h'* therein. The diameter of the face-plate is such as to cover both scales *d* and *c'*, and leaves the series of holes *d'* exposed between the outer edge of the face-plate and the inner edge of the stationary scale C.

When the several parts thus far described are in position for operation, the zero-point on the stationary scale C is opposite a vision-slot, *h²*, in the face-plate, through which one set of figures only of both scales *d* and *g* can

be seen, the other figures being covered by the face-plate. I have shown this zero-point to the right of the device, and will thus describe it; but it will be understood that its location has no bearing on the principle of the invention.

The inner ring, G, has two spring-pawls, I and K, engaged with its teeth g' , and these pawls have peculiar and important functions. The pawl I is pivoted to the base B at i and has a tooth, i' , which engages the said teeth g' to hold the ring G in any set position. It has an arm, i^2 , with an incline, i^3 , (see Fig. 5,) which projects under the rings G and D, the incline lying in the path of the pin d^3 , which projects beneath the ring D. The pawl I has an arm, i^4 , with an incline, i^5 , and a "holding-slot," i^6 . The other pawl, K, is pivoted at k to a lever, L, pivoted at l to the base B, and a spring, l' , serves with a constant force to hold this pawl into engagement with the teeth g' . The lever L has an arm, l^2 , with a lug, l^3 , which lug is arranged to lie in the path of the shoulder d^3 and cam-surface d^4 of the ring D, and a spring, M, serves to hold the lever L with its lug l^3 against the inner edge of the rabbet d^2 .

M' designates the spring which serves to hold the pawl I into engagement with the teeth g' .

N designates a lever, which, having its center or fulcrum on the screw h , is provided with two downwardly-projecting arms, n and n' . These arms have free oscillatory movement in segmental slots h^5 in the face-plate H. When the lever N is first moved in a proper direction, the pin or arm n engages an arm, k' , on the pawl K, and forces said pawl out of engagement with the rack g' , and at the same time the arm n' has engaged the incline i^3 , to similarly operate the pawl I. When these two pawls are entirely clear of the rack g' , the arm n bears against the lever L, and a further movement of lever N in the same direction serves to disengage the lug l^3 from the shoulder d^3 , the arm n' passing idly in the slot i^6 , to hold the pawl I against movement. When the pawl I is thus held out of engagement with the teeth or rack g' , it is also out of the path of the pin d^3 of the ring D. A spring-stop, O, is secured to the base, and, lying in the path of the series of holes d^4 , it serves to engage the point of the awl, which projects through the ring D, and stop said ring with the engaged hole opposite zero on the scale c' , but allows the awl to pass freely in the opposite direction. The action of these parts will be better understood if cited in connection with the objects and operation of the invention.

In a normal or starting position, the 100 on the ring G and the 00 on the ring D are visible in the slot h^2 , and that slot is on the same radial line with the zero-point on the scale c' . In this condition the ring G is held stationary by the pawls I K, and the lug l^3 and shoulder d^3 are engaged. To add together thirty, thirty-five, and thirty-five, the operator places the point of the awl in the hole which is oppo-

site the 30-mark on the scale c' , and turns the ring D until the point of the awl engages the stop O, leaving 30 visible in the slot h^2 . He removes the awl and engages it with the hole opposite the 35-mark on the scale c' , and turns the ring D until it is again stopped by the stop O. This action brings 65 visible at the zero-point, and thirty and thirty-five make sixty-five. Again removing the awl and engaging the hole opposite 35, turn the ring D until the stop O is engaged and 100 visible in the slot h^2 , which is the sum sought; but in the accomplishment of this the ring G is brought into operation, the pin d^3 having acted on the incline i^3 to throw the pawl I out of engagement, and the lever L, through the pawl K, having forced the ring G forward one notch by the lug l^3 dropping behind the shoulder d^3 . To add one hundred to this sum, the ring D would be given a full revolution, and during that revolution the lug l^3 , riding up the cam-surface d^4 , would throw the lever L and pawl K back into normal position, the pawl K automatically engaging the tooth to the rear. At the last step the ring G is forced one notch ahead, and the parts come to a rest with 200 visible, which is the sum sought. To add three hundred and forty-five to this two hundred, engage the awl with the 45-hole and revolve the ring D three times and until it is stopped the fourth time, which will bring the 545—correct sum—visible. To restore the rings to a normal position, the lever N is forced in the direction indicated by the arrow. The first result of such movement is to withdraw the pawls I and K, thus unlocking the ring G; and a further movement of the lever N serves to force the lever L against the action of its spring until the lug l^3 is disengaged from the shoulder d^3 . By means of the awl the disk D is then carried backward, carrying with it the ring G, until the 100 is visible in the slot h^2 . The lever N is then released to lock the ring G, and the ring D given further backward movement until the lug l^3 and shoulder d^3 again engage. This brings the 00 on the ring D opposite the 100 on the ring G, and both radially in line with the zero on the scale c' , as in the beginning.

The pin d^3 is arranged opposite the zero-point of the ring D, and serves to liberate the ring G just at the moment necessary to carry 100, while the shoulder d^3 is so arranged as to engage the lug l^3 just at the instant the zero of the ring D is in its proper position with relation to the slot h^2 and the zero on the scale c' .

The stop O acts as a stop only in one direction, assuming that the chosen number shall stop at zero; but in a reverse movement it springs out of the way of the point.

The holes being arranged in a groove formed by the face-plate H and gage C' , insures the ready engagement of the awl.

Having thus described the invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination with a stationary scale,

as c' , and a movable scale, as d , having a corresponding series of holes, as d' , a stop, as O, adapted to stop the said scale in one direction, and a shoulder, as d^2 , and a detachable lug engaging therewith adapted to check the scale in the opposite direction when the zeros in the two scales correspond, as specified.

2. In an adding-machine as described, the combination, with the ring D, having pin d^5 , shoulder d^3 , and cam-surface d^4 , and with the ring G, having teeth g' , of the pawls I and K, the lever L, and springs i M M', as and for the purposes set forth.

3. In an adding-machine as described, the combination, with the ring D, having pin d^5 , shoulder d^3 , and cam-surface d^4 , and with the ring G, having teeth g' , of the lever L, pawl K, pivoted on said lever, and the pawl I, having tooth i' and arm i^2 , with incline i^3 , as and for the purposes set forth.

4. In an adding-machine as described, the combination, with the stationary scale and with the rings D and G, constructed as set forth, of

the lever L, the pawls I K, and the lever N, having arms n n' , as and for the purposes specified.

5. The base-plate B, having annular flange b , and the stationary ring C, having flange c , and face C' , the ring D, having rabbet d^2 , the ring G, having its bearings in said rabbet, and the face-plate H, having vision-slot h^2 , all adapted to serve in an adding-machine as set forth.

6. The combination, with the stationary scale, the rings D and G, as described, the lever L, and pawls I and K, of the lever N, having arms n and n' , adapted to engage first the pawls I K and then to liberate the lever L, as and for the purposes specified.

In testimony whereof I affix my signature, in presence of two witnesses, this 21st day of October, 1884.

ELIJAH W. WATSON.

Witnesses:

JOHN W. SUGGETT,
FRANK PLACE.