No. 640,850. Patented Jan. 9, 1900.

# B. & G. WORK.

## ADDING MACHINE.

(Application filed Nov. 2, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

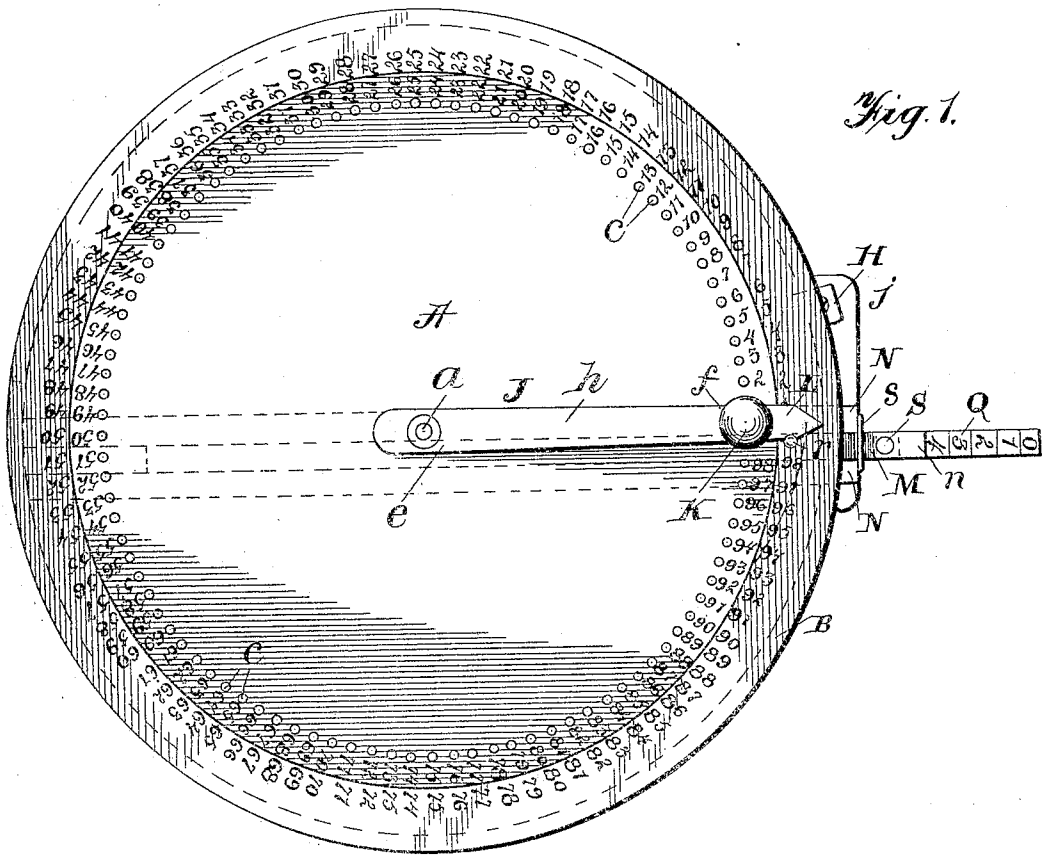
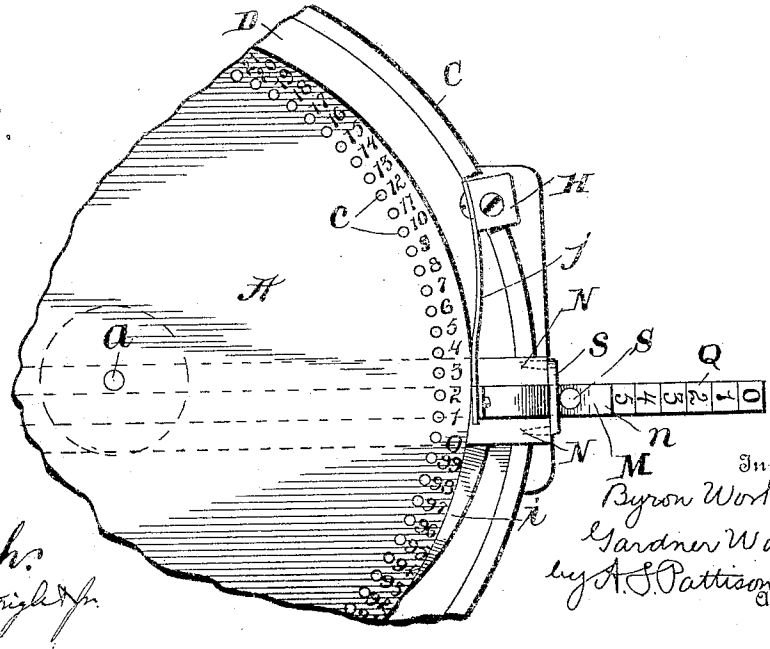



Fig. 2.




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(No Model.) 2 Sheets—Sheet 2.

Fig. 3.

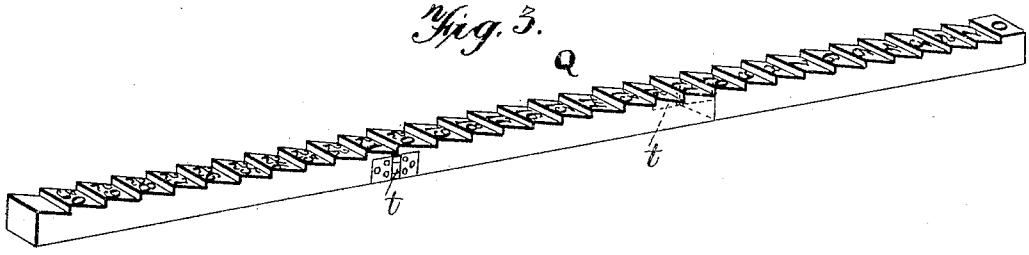
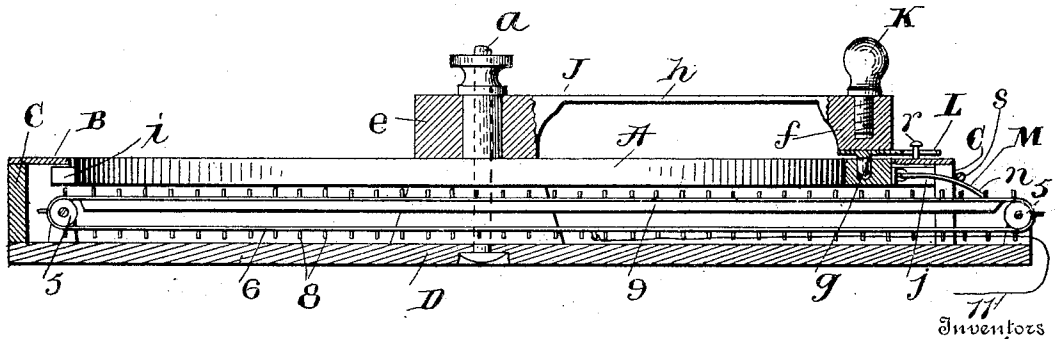



Fig. 4.




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# UNITED STATES PATENT OFFICE.

BYRON WORK, OF ANGOLA, INDIANA, AND GARDNER WORK, OF WACO, TEXAS.

## ADDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 640,850, dated January 9, 1900.

Application filed November 2, 1899. Serial No. 735,622. (No model.)

*To all whom it may concern:*

Be it known that we, BYRON WORK, residing at Angola, in the county of Steuben and State of Indiana, and GARDNER WORK, residing at Waco, McLennan county, Texas, citizens of the United States, have invented new and useful Improvements in Adding-Machines, of which the following is a specification.

Our invention relates to improvements in adding-machines, which will be fully described hereinafter and particularly pointed out in the claims.

Our invention pertains to an adding-machine comprising a rotating disk which has its edge divided into one hundred equal parts and a surrounding numeral member having its edge adjacent the rotating disk divided into parts corresponding with the divisions upon the rotary disk, the said members being used to add the units, and a simple means for registering the hundreds by the revolution of the said disk.

In the accompanying drawings, Figure 1 is a plan view of a machine embodying our invention. Fig. 2 is a partial plan view in section showing the construction for registering the hundreds. Fig. 3 is a detached view of the rod which registers the hundreds. Fig. 4 is a vertical sectional view showing a modified form of construction for registering the hundreds wherein a rotating belt is used in place of a rod.

Referring now to the drawings, A indicates a rotating disk which is journaled upon a vertical rod *a*, projecting upward from the base D. This base D may be of any desired contour without in any manner affecting our invention, though it is preferably circular, as here shown. Projecting from the periphery of the base D is a vertical flange C, and secured to this flange C and projecting inward adjacent the periphery of the disk A is a horizontal flange B.

The disk A is divided into one hundred equal parts, which are numbered from "0" to "99," as clearly illustrated, and at each of these divisions the disk is provided with a recess or opening *c*, the object of which will be explained presently.

The inwardly-projecting flange B is divided into a hundred equal parts and which divisions correspond with the divisions upon the disk A, and these divisions of the flange B are numbered also from "0" to "99."

The standard or shaft *a* projects above the outer face of the disk A and has secured thereto a lever J, which is adapted to freely rotate thereon. The outer end of this lever is provided with a pointer L and also with a knob or handle K, by which it is operated. The inner end of this lever J is vertically elongated, preferably, as shown at *e*, to afford a long bearing to firmly hold the lever in its proper position, and the outer end of the lever which carries the pointer L and the knob K is also elongated and enlarged, as shown at *f*, for the purpose of bringing the pointer down upon the base of the disk A and affording sufficient body for firmly attaching the knob K thereto. Projecting from the under side of this portion *f* is a pin *g*, so situated as to register with the openings in the face of the disk A and adapted to engage therewith for the purpose of rotating the disk. This lever J is made thin at the point *h* between its ends, whereby it is a spring-lever and can be readily lifted vertically for disengaging the pin *g* from the openings in the disk A, and thus permit the lever to be freely rotated over the face of the disk for engagement with any of the openings at any of the divisions that may be necessary in making a calculation.

The disk A and the flange B may aptly be termed the "numeral members" for adding the units, and it is necessary to provide means for adding to the units the hundreds, and this means we will now explain. In Fig. 1 the mechanism shown for effecting this consists in providing the disk A at its edge with a cam *i*, having its abrupt edge in a direct line with the numeral "0." This cam *i* engages a tangentially-extending spring *j*, having one end connected with a block H, adjustably secured to the base D, whereby the tension of the spring can be readily regulated. Loosely connected with the opposite and free end of the spring is a spring-plunger M, the said plunger projecting outward between guides N and having its outer end *n* held downward normally in contact with the upper edge of

the hundreds-rod Q by means of a wire or other suitable device *s*, extending across the space between the said guides N. The upper face or edge of this hundreds-rod Q is provided with a plurality of notches, and the space between the notches is provided with numerals, beginning at the outer end with the numeral "1" and numbered consecutively inward. The number of notches in this bar is regulated according to the length of the rod and the space between the said notches. The projecting end of the spring-plunger is provided with an upwardly-projecting handle S, by means of which it can be lifted for the purpose of holding it out of contact with the upper edge of the rod and permitting it to be carried inward to its original or starting position. In operation, the disk being revolved, the spring-plunger is actuated every time the figure "0" of the disk registers with the figure "0" upon the flange B, and thus forces the rod Q outward one notch for registering the hundreds which have been added in the calculation in a manner which will be more fully set forth hereinafter.

For the purpose of enabling the rod Q to be folded as it is projected, and thus economize in the space occupied by the rod as it is being forced outward, the rod is made into a series of sections, as illustrated in Fig. 3, and provided with hinges *t*, the hinges at the joints of the sections being arranged at opposite sides thereof, which will enable the rod to be folded like an ordinary measuring-rule, as is well understood.

In operation for effecting an addition the the disk A is set with the numeral "0" registering or opposite the corresponding "0" upon the projecting flange B. Assuming that it is desired to add the numerals "62," "75," "88," and "47," the operating-lever J is lifted and the pin thereof placed in the opening at the numeral "62" upon the disk and the disk then rotated around to the right in engagement with the stop *r* to the numeral "0" upon the edge of the flange B. The pointer or lever is then disengaged from the disk and carried to the figure "75" upon the flange B and the disk again rotated until the pointer is at the numeral "0," when it will be found that the rod Q has been moved one notch to bring the numeral "1" beyond the outer end of the spring-plunger and that the numeral "37" is opposite the numeral "0" upon the disk A, thus indicating an addition of "137." The lever J is then disengaged from the disk and carried to the numeral "88" upon the flange B and the disk is then again rotated until the pointer is at the numeral "0" upon the flange B, when the operator again disengages the lever from the disk A and carries it to engagement with the opening in the said disk A which is opposite the numeral "47" upon the flange B and again rotates the disk until the pointer is at the numeral "0" upon the flange B, when it will be found that the numeral "2" is exposed upon the hundreds-rod Q and that the number "72" upon the disk A is opposite the numeral "0" of the disk, thus indicating the result to be "272." In this calculating operation the cam upon the disk has twice actuated the spring-plunger by engagement with the spring, which has moved the numeral-rod two notches. In the above manner any desired numbers can be quickly and accurately added.

By reference to Fig. 1 it will be seen that the numeral-rod Q moves between two guides N, secured to the upper face of the base D and that the said rod is thus guided to one side of the shaft or standard *a* at the center of the base, which will permit the rod to be moved entirely across the face of the base D, thus enabling us to make a numeral-rod of the longest possible length, and consequently a rod having the greatest possible number of notches, and enabling us to make the largest possible calculation upon a machine of this character.

While we have shown and described the disk A as being provided with recesses or openings to receive the pin *g* of the lever J, it will be readily understood that instead of openings projections may be provided upon the face of the disk or any desired form of shoulders for the engagement of the pin carried by the lever J, and thus affording means for rotating the disk by means of the lever. It will also be noted that the hundreds-rod Q passes under the disk A and that the disk A is supported above the base D sufficiently to permit the passage of the said rod.

We show another modification of the means for registering the hundreds, which consists of providing the base with two rollers 5, one of the rollers being situated under the disk A and the other outside of the said disk, and passing an endless tape 6 around the said rollers. This tape is provided with projections 8 upon its outer side, with which the outer end of the spring-plunger shown in Fig. 1 will engage in the same manner that it engages with the rod Q. In this instance there will be a supporting-web 9 between the parallel portions of the tape for supporting that portion of the tape which is engaged by the outer end of the spring-plunger to prevent the tape from falling under the pressure of the outer end of the spring-plunger, and thus insuring the positive engagement of the projections upon the tape with the plunger, and consequently the positive movement of the tape at each movement of the spring-plunger.

For the purpose of enabling the tape to be returned to its original position—that is, the numeral "0" exposed—we attach to the tape a second tape or string 11, which as the endless tape is being rotated will carry the second tape or string under around with it and afford means by the pulling of which the tape can be drawn back to its normal or original position, with the figure "0" exposed beyond the outer end of the spring-plunger.

By means of a machine of the above-de-

scribed construction additions can be accurately and quickly made, and a machine at comparatively small cost is provided.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. An adding-machine comprising a base, a revoluble disk supported by the base, a horizontal flange supported by the base and in a horizontal plane with the outer face of the disk, the said disk and flange being divided into one hundred parts numbered consecutively, a vertically-movable lever having one end connected with the journal of the disk and its opposite end provided with means for engagement with the disk, an endwise-movable hundreds member provided with divisions numbered consecutively, said member extending under the said disk, a spring-actuated plunger engaging and adapted to actuate said hundreds member and a cam carried by the disk for actuating the said plunger and thereby the endwise-movable hundreds member, substantially as described.

2. An adding-machine comprising a base, a revoluble disk supported thereby, the base having a horizontal flange surrounding the disk, the flange and the disk divided into one hundred divisions numbered consecutively, the disk provided with a shoulder for each division thereon, a vertically-movable lever having its inner end connected at the center of the disk and its outer end projecting beyond the periphery of the disk, and the said flange having a stop at zero or the numeral "0," a hundreds member, and means actuated by the revolution of the disk for registering each revolution of the disk upon the hundreds member, substantially as described.

3. An adding-machine comprising a rotatable disk, a base, the base having a flange supported at a point thereabove and surrounding the said disk, the base and disk having each one hundred divisions numbered consecutively, an endwise-movable rod supported and guided by the base and movable under the said disk, a spring having one end connected to the base outside of the periphery of the disk, the disk having a cam adapted to engage the free end of the spring, a plunger connected with the free end of the spring, a guide for the plunger, the upper end of the rod provided with a series of notches numbered consecutively, substantially as and for the purpose described.

4. An adding-machine comprising two units members one of which is a revoluble disk and the other a stationary member surrounding the disk, the disk and the stationary member divided into one hundred divisions numbered consecutively, the disk having at its edge a cam, means for rotating the disk, an endwise-movable rod, the base having guides beneath the disk for said rod, the guides being at one side of the center of the disk for permitting it to move entirely across the base, and means actuated by the cam for moving the said rod at each revolution of the disk, substantially as described.

5. An adding-machine comprising a base, a rotatable disk, the disk and the base provided with one hundred divisions numbered consecutively, a hundreds member, the disk having a cam, a spring-plunger actuated by the cam, a member holding the spring-plunger in contact with the hundreds member, the spring-plunger provided with means at its outer end for lifting it out of engagement with the hundreds member, substantially as and for the purpose described.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

BYRON WORK.
GARDNER WORK.

Witnesses:
WM. WICKWIRE,
CHAS. V. FOULK.