W. R. BONHAM.

CALCULATING MACHINE.

APPLICATION FILED APR. 6, 1905.

908,731. Patented Jan. 5, 1909.

Fig. 1.

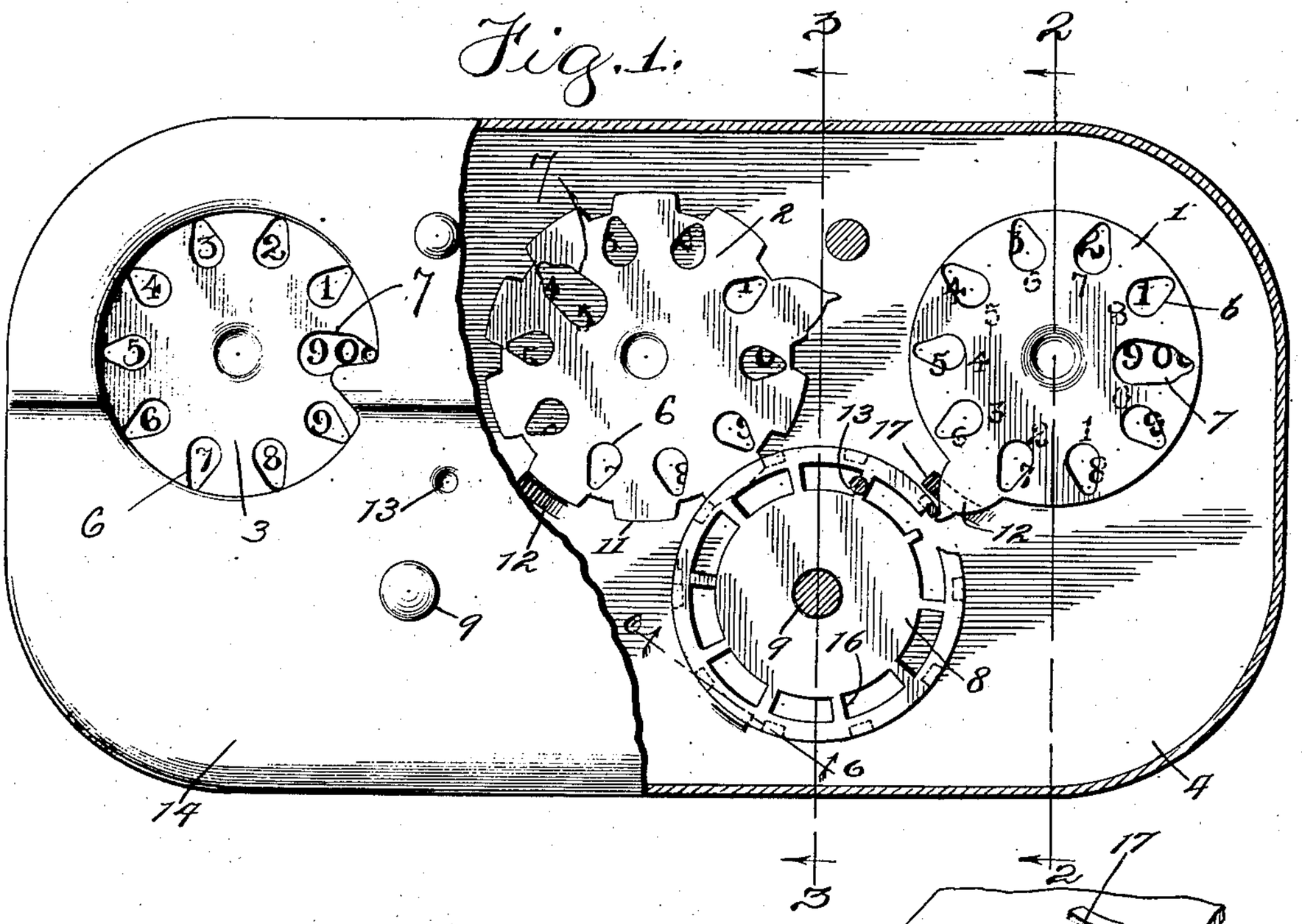


Fig. 2.

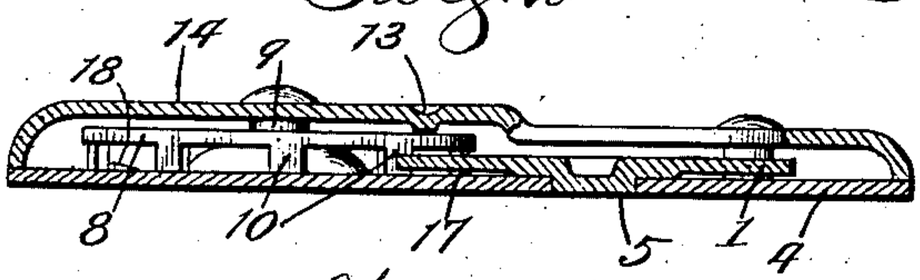


Fig. 4.

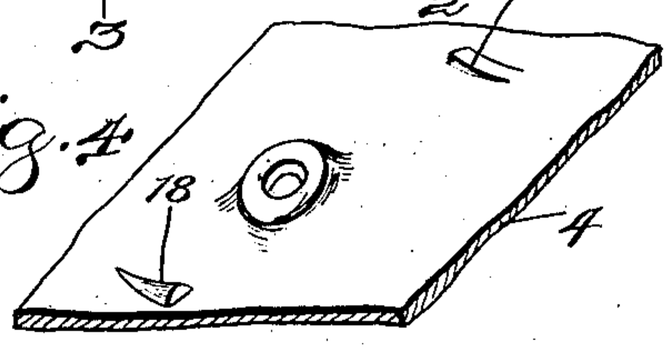


Fig. 3.

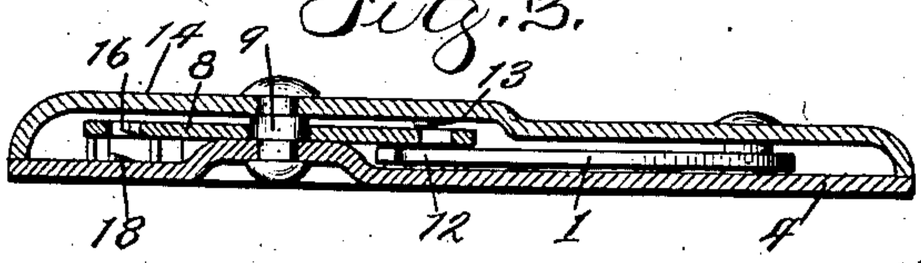


Fig. 6.

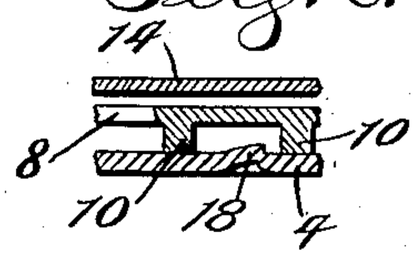
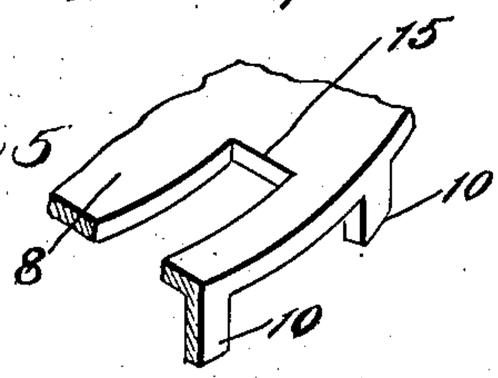


Fig. 5



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UNITED STATES PATENT OFFICE.

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CALCULATING-MACHINE.

No. 908,731. Specification of Letters Patent. Patented Jan. 5, 1909.

Application filed April 6, 1905. Serial No. 254,080.

To all whom it may concern:

Be it known that I, WALTER RICHARD BONHAM, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Calculating-Machines, of which the following is a full, clear, and exact specification.

This invention relates to improvements in calculating machines, in which is employed a plurality of indicator disks, and carrier disks interposed between the indicator disks for transmitting the motion of one of the indicator disks to the other, and the present improvements have more special reference to means for controlling the rotation of the carrier or carriers and the invention has for its primary object to provide an improved, simple and efficient means for preventing the carrier from moving accidentally beyond the position to which it is positively moved by one of the indicator members.

With a view to the attainment of these ends and the accomplishment of certain other objects which will hereinafter appear, the invention consists in the features of novelty which will now be described with reference to the accompanying drawings and then more particularly pointed out in the claims.

In the said drawings Figure 1 is a plan view of my improved machine with a part of the top plate broken away. Fig. 2 is a cross section thereof on the line, 2, 2, Fig. 1. Fig. 3 is a similar section on the line 3, 3, Fig. 1. Fig. 4 is a detail perspective view of a part of the back plate. Fig. 5 is an enlarged detail perspective view of the edge of one of the carriers; and Fig. 6 is an enlarged detail section taken on the line 6, 6, Fig. 1.

1, 2, 3, represent respectively the indicator members or disks which stand for the units, tens, and hundreds, and it will be understood of course that any desired number of these indicator members or disks may be employed, the three shown in the drawing being sufficient for the purposes of illustration. As these indicator members are or may be duplicates of one another the description of one will suffice for all. They are pivoted to the back plate, 4, by means of journals, 5, which are preferably formed on the disks themselves in the shape of bosses struck up therefrom and engaging in suitable apertures in the back plate, and they are provided with a series of apertures, 6, through which the outer circle of numerals indicated on the back plate, 4, are visible, and an elongated aperture, 7, through which the numbers of both the inner and outer circle of numerals on the back plate may be seen in pairs successively as the indicator disk is rotated, the two circles of numerals on the back plate being arranged reversely of each other, or in other words, reading respectively counter-clockwise and clockwise. These disks 1, 2, 3, are thus situated on the back plate, 4, at proper distance apart and arranged between them are the carrier disks, 8, which are pivoted on suitable pivots, 9, one only of these disks, 8, being shown in the drawing, but it will nevertheless be understood that the other one pivoted on the pivot 9 bears the same relation to the disks 2, 3, as does the disk 8 to the members 1, 2.

The edge of the disk or carrier 8 is provided with depending teeth or lugs, 10, arranged at suitable intervals apart for interme hing with teeth 11 formed on the peripheries of the indicator disks 1, 2, 3. In the drawing the teeth 11 are omitted from the disk 1 because they would have no function on the units disk but in practice the disks may be duplicates of each other and the presence of such teeth, 11, on the units disk would not interfere with the operation of the device. Each of the indicator disks, 1, 2, 3, however, excepting the last one of the series, is essentially provided with a projecting lug or tooth, 12, which extends beyond the outer edges of the teeth 11, and is adapted to engage with the depending lugs, 10, on the carrier disk adjacent thereto and thereby impart a tenth of a rotation to the carrier disk, the latter being provided with ten of the teeth or lugs, 10, and consequently impart a tenth of a rotation to the next one of the indicator disks in the series, by virtue of the engagement of the teeth 11 between the teeth 10, hence it is seen that for each complete rotation of the units disk, 1, tens disk, 2, will receive a tenth of a rotation and the hundreds disk, 3, for each complete rotation of the tens disk, 2, will likewise receive a tenth of a rotation, and so on throughout the series. With such a construction it is obvious that should the carrier, 8, continue to rotate after the tooth 12 leaves it, it would place the tens disk, 2, in a false position, and in order to guard against this and positively lock the carrier after it has been moved the predetermined distance by the

tooth 12, I provide a stop therefor in the form of a lug or pin, 13, which for convenience may be produced in the form of a boss directly on the inner side of the face plate 14. The ends of the teeth, 10, are in close propinquity to the inner face of the back plate, 4, and when in that position the disk 8 is a little to one side of the plane in which the end of the lug or stop 13 is situated so that while in that position the disk 8 will be free to rotate. As shown in Fig. 2, however, the disk 8 is allowed a slight lateral movement on its pivot, 9, and consequently may be moved toward the end of lug or stop 13 which is situated inwardly with respect to the circumference of the disk 8 and directly in line with a circular series of slots, 15, cut round the edge of the disk 8 and forming crossbars, 16, the slots being of sufficient width to receive the end of the pin 13, so that when the disk 8 is moved towards the pin 13 the latter will engage in the slots, 15, and prevent further rotation of the disk 8 as soon as one of the crossbars, 16, encounters said stop 13. These slots and crossbars, 16, are so situated and proportioned that the disk 8 may be given a tenth of a rotation by the tooth 12, and at the completion of that tenth the crossbar, 16, will be about to engage with the stop 13 so that when the tooth 12 lets go the stop 13 will control and prevent further rotation of the carrier. The lateral movement for thus bringing the carrier disk 8 into engagement with the stop 13 is preferably produced by an incline, 17, formed on the back plate, 4, in the line of movement of the tooth 12 and which causes the tooth 12 and its indicator disk 1, 2 or 3 to lift or move laterally with relation to the back plate, and the tooth 12 being under the edge of disk 8 at that time it also lifts the disk 8. As soon as the tooth 12 passes the incline, 17, thereby permitting disk 8 to drop back into place, another tooth, 10, on the disk 8 falls just at the end of a stop 18 formed on the back plate in the line of movement of the tooth 10, said stop, 18, being beveled on one side to facilitate the passage of the tooth, 10, thereover. This prevents any retrograde movement of the disk 8 after it is released by the tooth 12, while the stop 13 prevents it from rotating forwardly under the impulse it receives from the tooth 12.

Having thus described my invention, what I claim as new therein and desire to secure by Letters Patent, is:

1. In a calculating machine the combination of a plurality of rotary indicators, a carrier independent of and disposed between the indicators, said carrier being adapted to engage one of the indicators for imparting the movement of another of said indicators to the first indicator, means on said other indicator for engaging the carrier whereby the movement of the last said indicator is imparted to the carrier, stop means for resisting the movement of the carrier when the last said means ceases to act thereon, and independent means for preventing retrograde movement of the carrier.

2. In a calculating machine the combination of a plurality of rotary indicators, a carrier for imparting the movement of one of said indicators to the other, a stop normally out of the plane of movement of the carrier, and means for moving the carrier into the plane of the stop as the carrier rotates.

3. In a calculating machine the combination of a plurality of rotary indicators, a carrier for imparting movement of one of said indicators to the other, said carrier being free to rotate in one plane, means for forcing the carrier into another plane as it rotates and means for preventing its rotation in said other plane.

4. In a calculating machine the combination of a plurality of rotary indicators, a carrier for imparting the movement of one of said indicators to the other free to rotate in one plane in one direction but not reversely, means for forcing the carrier into another plane as it rotates, and means for preventing its rotation in said other plane.

5. In a calculating machine the combination of a plurality of rotary indicator disks, a rotary carrier disposed between the disks for transmitting the motion of one of said disks to the other, a stop for limiting the rotation of the carrier, means on one of said indicators for directly engaging and rotating said carrier into engagement with the stop, and means on another of said indicators engaged by the carrier for receiving the rotation of said carrier.

6. In a calculating machine the combination of a plurality of rotary indicators movable laterally or axially, teeth projecting from said indicator, inclines with which said teeth engage for moving the indicators laterally, rotary carriers for imparting the movement of one of said indicators to the other, and under which said teeth engage, said carriers being axially movable, crossbars on said carriers, stops arranged in the line of movement of said crossbars but normally out of the plane thereof and adapted to be engaged by said crossbars when the carriers are moved axially towards them.

7. In a calculating machine the combination of a plurality of rotary indicators, a carrier consisting of a rotary disk for imparting the movement of one of said indicators to the other, teeth projecting laterally from the edge of said disk, a tooth on one of said indicators adapted to engage with said teeth, means for moving said disk axially by the movement of said tooth, crossbars carried by said disk, and a stop fixed with relation to said crossbars and normally out of the

plane of movement thereof but adapted to be engaged thereby when said disk moves laterally.

8. In a calculating machine, the combination of a plurality of rotary indicators, a carrier for imparting the movement of one of said indicators to the other, a stop normally out of the plane of movement of the carrier, and means for moving the carrier into the plane of the stop as the carrier rotates, said means serving to prevent a retrograde movement of the carrier in the first said plane of its movement.

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