

J. H. Childester.

Computing Mach.

N^o 60,475.

Patented Dec. 18, 1866.

Fig. 1.

Fig. 5.

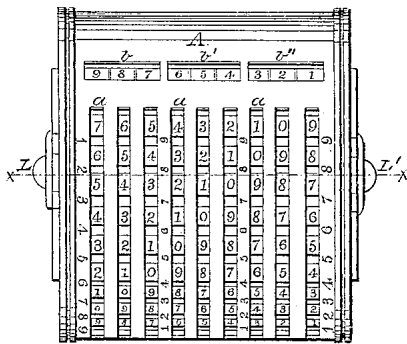
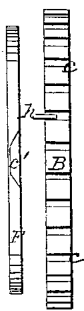


Fig. 6.

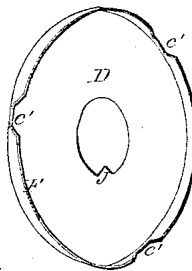


Fig. 2.

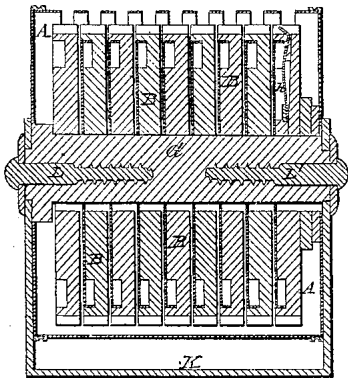


Fig. 3.

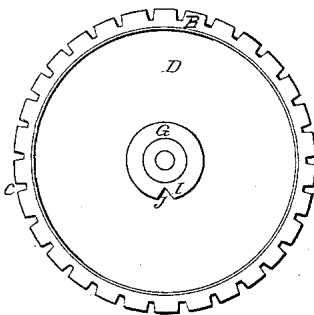
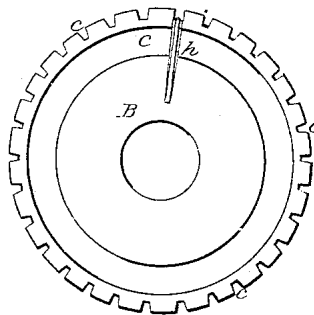


Fig. 4.



Witnesses:

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Inventor:

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IMPROVEMENT IN COMPUTING MACHINES.

JOHN H. CHIDESTER, OF CLEVELAND, OHIO.

Letters Patent No. 60,475, dated December 18, 1866.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, J. M. CHIDESTER, of Cleveland, in the county of Cuyahoga, and State of Ohio, have invented certain new and useful improvements in Computing Machines; and I do hereby declare that the following is a full and complete description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a partial top and front view.

Figure 2 is a longitudinal sectional view of fig. 1, in the direction of the letters *xx*.

Figures 3, 4, 5, and 6 are detached sections, fig. 5 being a view of the edge or face of figs. 4 and 6.

Letters of reference refer to like parts in the several views.

A, fig. 1, is a brass cylindrical case, sections of which are cut out in the direction of its circumference, leaving openings, *aa*, etc., nine in number, the purpose of which will hereafter be shown; *bb* are also openings which will be referred to hereafter. B, fig. 4, is a wheel, on one side of which is cut a square recess or groove, C, and on its periphery thirty square notches *c*, of equal size and of equal distance from each other. D, fig. 6, is a disk, made of tin, or other suitable material, having its edge turned down, forming a rim or flange, F; in the edge of this flange are cut three long notches *c'* of equal size, also equidistant, on the flange. G, fig. 2, is a shaft, passing through the cylinder or case, and upon which the wheels B and the disks D are placed, in the order shown in fig. 2. The disk D is made to fit closely into the recess or groove of the wheel B, but not so closely that it will not easily turn. Fig. 5 shows the relation of the disk to the wheel, and fig. 3 shows the disk in the groove *h*. Fig. 4 is a spring, the lower end of which is fastened in a slot in the side of the wheel, the other extending up to the outer curve of the groove C; the upper end of this spring is bent in a right angle, so that the end may reach over the edge of the disk when the disk is in its proper position in the wheel. The order in which the wheels and disks are arranged upon the shaft is as follows: An angular groove I is cut along the length of the shaft; a corresponding point J is left on one side of the hole in the disk; the disk is then placed upon the shaft with point in the groove; this point prevents the disk from being turned round upon the shaft; the shaft is also prevented from being turned in the case, by its ends being secured to the ends of the case by screws or any other suitable means. A wheel is first placed upon the shaft, and on which it is allowed to turn; a disk is then placed next the wheel with its back toward it; another wheel is then placed next the disk, with the grooved side facing the disk, and into which groove the flange passes. The order of their arrangement, as above stated, is shown in fig. 2: from the right hand, first a wheel, then a disk, next a wheel, etc.: there being nine wheels and eight disks. The several wheels and disks, on being properly arranged upon the shaft, are then placed in the case, and the whole placed in the stand K, fig. 2, and in which it is firmly secured by the screws LL', fig. 2, which are driven into the shaft through the stand and the end of the case, as shown in the figure. As above said, there are thirty notches cut in the periphery of the wheel; as a consequence, there are also thirty teeth or faces; these faces are numbered from one to nine, then a cipher; again from one to nine, then a cipher; and so on, making three divisions of ten each—three ciphers and twenty-seven numerals—which are seen through the slots *dd* above described. The movement of this machine is as follows: The first wheel on the right hand is turned by a pointed pin being inserted into one of the notches between the figures; as the wheel turns, the spring *h* will drop into one of the notches in the flange of the disk; the hook or finger at the end of the spring will then catch into a notch in the second wheel, and as the first wheel continues to move round, it carries the second with it the length of the notch in the flange, which distance is equal to one numeral or figure; the spring is then forced back out of the notch by the shoulder of the notch, it being made rounding and slanting for that purpose. On continuing the revolution of the wheel, the spring slides along against the edge of the flange the distance of nine figures; it then reaches the next notch, into which it falls, as it did in the first; when the second wheel has thus been carried round and far enough, the spring in the second wheel falls into the notch in the flange of the second disk, and the hook or finger into a notch in the third wheel, as did the hook in the first; the third wheel is then carried round the same distance and in the same manner as was the second, and so on through all the case of wheels and disks. The exact relation the several parts hold to each other is as follows: The spring *h* is on the left hand-side of the wheel, in line with one of the notches; the figures are placed on the face of the wheels, commencing with a cipher on the first space after the spring, in the direction of the arrow; the case is

so adjusted that when the spring rests on the apex of the shoulder of the notch in the flange of the disk, the lower end of the opening in the case, whereby the wheels are moved, will be on a line with the lower edge of the notch on the wheel between the units 8 and 9, and then fastened at the end of the case, (the end that is not movable) in the manner as shown in the drawing. In order to operate the machine for computing, place it with the openings facing you, in the position shown in fig. 1; now turn the wheels until the ciphers are seen through the index openings $b b' b''$, which may be done the most readily by placing the point or pin in the notches between the figures 8 and 9 on the wheels, and turn from you to the end of the opening toward the index, holding the pin in the radius of the shaft. The machine is now ready for adding. Suppose we take the following numbers to be added:

| |
|------|
| 5000 |
| 1358 |
| 3064 |
| 9422 |

You may now commence at the top of this column, either on the right or left-hand side, or on either side at the bottom. Suppose we commence on the top left-hand side; place the point in the notch on the fourth wheel through the fourth opening in the case, which agrees with the fourth column in the column of figures, opposite the figure (5) on the case; turn the wheel toward you until the pin stops by meeting the case. Now commence on the right-hand side on the next line; place the point through the first opening on the right-hand side in the case, opposite the figure (8) on the case, bring it down as before. Now take the next figure (5,) place the point opposite the (5) on the case in the second opening from the right-hand side, and bring it down as before; now three (3) in the next opening, and one in the next, or fourth opening from the right; now three (3) again in the same opening, (pay no attention to the figures on the wheel, but work by the figures on the case.) Next as you proceed toward the right-hand side, you see is cipher; you must not move the wheel for a cipher, for it stands right. Next is six (6) in the line of ten; place the point opposite (6) on the case and bring it down; in this case the spring on this wheel catches into one of the notches on the next left-hand wheel, and carries it forward the width of one space or figure, by means of the notch in the flange of the disk; the spring is then forced out of this notch by the inclined shoulder; it then rests against the edge of the flange, along which it slides the space of nine figures; next bring four (4) in the line of units; this wheel will carry the next as before described, because it passes a cipher. The result of this operation will be seen in the index, also in the first line in the openings at the bottom, which is found to be 9422. The machine works subtraction simply by reversing the order of working the machine. From the numbers on the machine, 9422, subtract 5105: place the point in the notch opposite the figures on the left-hand side of the case, which it will be seen is numbered in the same way, (only from the upper end of the opening down,) turn it from you; this figure being greater than the one on the wheel, consequently it will carry the next wheel one space back, in the manner heretofore described; it consequently throws one off the subtrahend, which is equivalent to carrying one to the minuend; next is a cipher; you must not turn the wheel here as in addition; next is one (1;) turn back one notch as before; also the same with five on the next wheel. The result will be the answer, and seen as was the result in the addition, 9317.

What I claim as my improvement, and desire to secure by Letters Patent, is—

1. I claim the series of disks D, and toothed wheels B, arranged upon the shaft G, in combination with the case A, index openings $b b b'$, and numeral openings $a a$, arranged and for the purpose set forth.
2. I claim the notches c and flange F of the disks, and wheels B, provided with a series of numerals, in combination with the spring h , recess C, and shaft G, arranged in the manner and for the purpose set forth.
3. I claim a computing machine, when constructed, arranged, and operating in all its parts substantially as herein set forth.

JOHN H. CHIDESTER.

Witnesses:

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