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Fig. 2.

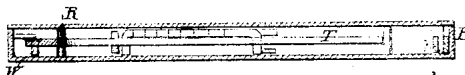


Fig. 1.

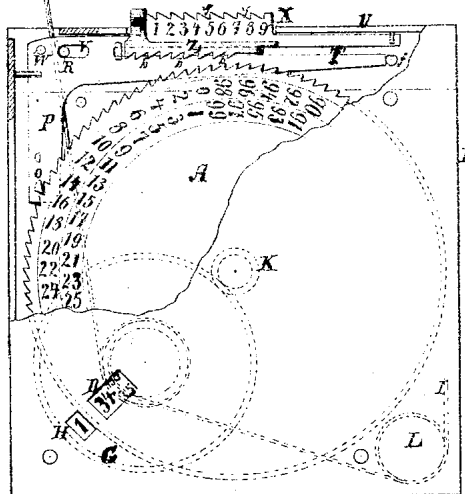


Fig. 3.

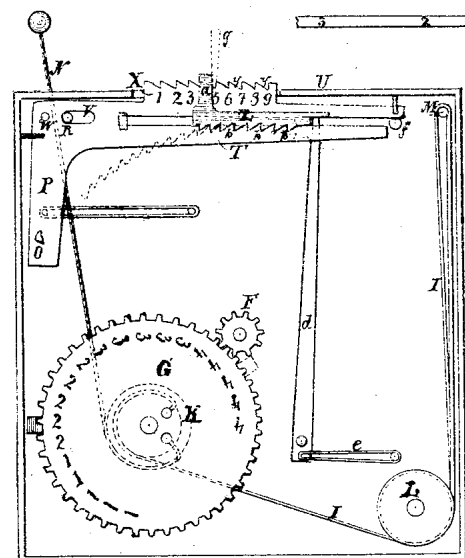
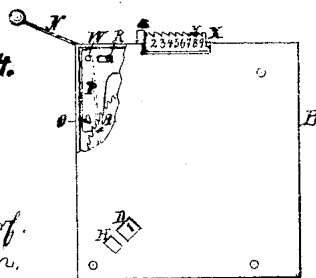


Fig. 4.



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EMERY M. HAMILTON, OF NEW YORK, N. Y.

IMPROVEMENT IN ADDING-MACHINES.

Specification forming part of Letters Patent No. 117,169, dated July 18, 1871.

To all whom it may concern:

Be it known that I, EMERY M. HAMILTON, of New York city, in the county and State of New York, have invented a new and Improved Adding-Machine; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification.

This invention relates to improvements in machines for adding, tallying, registering, and the like; and it consists in the following-described arrangement of apparatus—

Figure 1 in the drawing being partly a plan view and partly a horizontal section. Fig. 2 is a transverse section through the machine taken on the line *xx* of Fig. 1. Fig. 3 is a horizontal section. Fig. 4 is a plan with a part of the case broken out; and Fig. 5 is a plan, showing a slight modification of a part of the apparatus.

Similar letters of reference indicate corresponding parts.

A is a large circular disk arranged on a pivot in a rectangular case, B, of any suitable kind, and having one hundred notches and teeth in the periphery, which notches are correspondingly numbered on the margin of the upper side of the wheel. These numbers I have arranged in two columns, in which the figures of one are opposite the spaces between those of the other, as shown, by which I am enabled to have them twice as large as they would be if arranged in one column, so that they may be seen more distinctly in reading them through the aperture D in the case, which, because of this arrangement, is made long enough to expose the figures of both columns to view, but, being only as wide as the height of the figures, will expose in full those figures to be read, while only parts of two numbers of the opposite column will be seen. If, however, it be desirable not to expose the figures at all which are not to be read, I propose to arrange a slide or cover of any kind, to be shifted from end to end of the opening D, according to which column is to be exposed, for hiding the other, said cover or slide to be actuated in any way by the disk or other means. If the disk be employed for the purpose it may have a zigzag groove corresponding to the two rows of figures; and the slide may have a pin

working in said groove to move it back and forth; or any other equivalent means may be adopted for working said slide. The disk A has a small pinion, F, which gears with a toothed wheel, G, about half the diameter of A, or a little more, arranged under it and covering a column of figures—say from one to ten on its upper margin—to be read, in connection with those on the disk A, through an aperture, H, in the case, coinciding radially with the one D. In consequence of the said wheel G being geared with A so as to move a small amount at each movement of A, each figure of the column on it is repeated, as shown, so as to read the same until disk A has turned a whole revolution, when the next higher figure is brought to view. This change takes place when figure one of the column on A is brought to view through aperture D. If I wish to enlarge the capacity of the machine I add another wheel similar to G, numbered in the same way, and driven, by a pinion on it, so as to make one revolution to ten of said wheel G. These wheels are to be caused to be turned by a watch or other spring attached to one or the other end and wound up for the purpose. In this example I have represented an elastic India-rubber spring, I, as the means of operating them, said spring being attached to a drum, K, on the under side of wheel G, and shown dotted, and stretched over a guide-pulley, L, to a stud-pin, M, to which the other end is connected; and for winding up or stretching the said spring I use a small cord, N, also wound on the drum K, but in the opposite direction to that of the spring, so that, by pulling cord N outward, it will wind the spring upon the drum ready for turning it backward in operating the machine when said disk is let free from its holder. The said holder consists of a slotted pin, O, on a bell-crank, P, held in the notches C of said disk A by a spring, Q. This bell-crank is pivoted, near the apex of its angle, on a stud-pin, R, so that the long arm T lies just inside of the wall U of the case, and the hole V through it for the pivot-pin is elongated to allow it to move on said pin for releasing the disk A when it is to be wound up, and engaging it again when wound up to hold it. The disengaging of the said stud-pin from the wheel is effected by the act of pulling out the cord N for winding by drawing it to the left against the pin W, which causes the bell-crank to slide on

its pivot at the same time that the wheels are set in motion for winding up; and the reverse movement is effected by the spring Q, and takes place as soon as the strain on cord N is released. The long arm T of the bell-crank has a long projection, X, on the upper edge, extending through a long slot in the wall U of the case. Said projection has nine notches, Y, in the outer edge, which are numbered from one to nine, consecutively, beginning at the end nearest to the pivot R. Said notches have the same pitch that the notches C of the disk A have. Z is a bar arranged on the long arm T of the bell-crank to slide forward and backward along the notches Y. It has a projection, *a*, extending from the upper edge along the surface of the notched projection X beyond the said notches, and the lower edge is provided with notches *b* on the lower or inner edge, which will be engaged with the notches of disk A when the long arm T of the bell-crank is pushed inward, so that the said bar Z will be moved to the right along the notches Y by the turning of the disk. The said notched bar Z is moved back to the left again by the lever *d* and the spring *e* when disengaged from the disk. The arm T of the bell-crank is allowed to vibrate toward and from the disk enough to engage the teeth of slide Z with it while disengaging pin O, and vice versa, the amount of said vibration being limited by the wall U of the case and the stud-pin *f*. The movement toward the wheel is caused by pushing on the notched projection X by hand, and in the other direction by the springs Q.

The operation is as follows: A pencil or other small or pointed pusher, represented by the dotted lines *g*, Fig. 3, being placed in a notch, *y*, opposite the number (say five) on projection X of the bell-crank, which is to be added to the number seen through aperture D, (say thirty-four,) and the bell-crank being pushed inward thereby so that stud-pin O is disengaged from the disk and the notched bar Z engaged with it, the disk A will be free to be turned by the spring I, and it will move slide Z to the right until projection *a* comes against the pencil resting in notch number five, when it and the disk will be arrested, and, as the movement of the disk at the part having the numbers on it is the same as that of the slide, it will have moved so as to show thirty-nine, being the sum of five added to thirty-four. The pencil now being removed and the stud-pin O brought back into a notch of disk A, and the notched bar disengaged therefrom by the spring *e*, the disk will be prevented from further movement, and the slide Z will be moved back to the left ready for another operation by spring *e* and lever *d*, which operation may be represented, as before, as many times as there are figures in the column to be added. When the sum of figures

added has amounted to more than one hundred, a figure one will be seen through aperture H, which, being read with those seen through aperture D, will give the sum of the column added.

Instead of the wheel G for carrying the hundreds, I have used a tape for the purpose, the said tape being also used for winding up the spring and setting the disk, being wound upon a hub of the disk containing a coiled spring, and having a column of figures marked on it beginning near the end attached to the drum, and so arranged in respect of the distance apart that a number will be brought to the aperture in the case through which the tape works each time the disk A has made one revolution; and this aperture is arranged near the one D so that the figures may be conveniently read together. This arrangement is represented in Fig. 5, where A is the disk and N the tape for winding up the spring, setting the disk, and carrying the hundreds.

I propose to make use of either of these modes of adding the hundreds in connection with the other apparatus, as may be required by the nature of the case in hand.

It will be understood that the column of figures on the disk A, the said disk, and the carrying apparatus may be arranged for any measure or table, either for adding, tallying, or registering, as may be required for different branches of business or calculations.

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

1. The combination of the disk A, bell-crank, and slide Z, the disk being provided with a spring for actuating it, either being directly applied to it or to another wheel gearing with it, also being notched and figured as described; the bell-crank being provided with the stud-pin O and the notched and figured projection; the slide being notched as described, and having a spring for working it in one direction; and all being arranged relatively to each other and operating substantially as specified.

2. The arrangement of the bell-crank on its pivot and with the disk A, for sliding the pin O from and to the said disk for releasing and engaging it when winding up the actuating-spring of said disk, substantially as specified.

3. The arrangement of the said sliding bell-crank and the spring-winding cord N, whereby the disk is disengaged simultaneously with and by the application of the power for winding up the said actuating-spring of the disk, substantially as specified.

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Witnesses:

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ALEX. F. ROBERTS.