R. F. ROCHE.

Adding-Stick.

No. 206,136. Patented July 16, 1878.

Fig. 1.

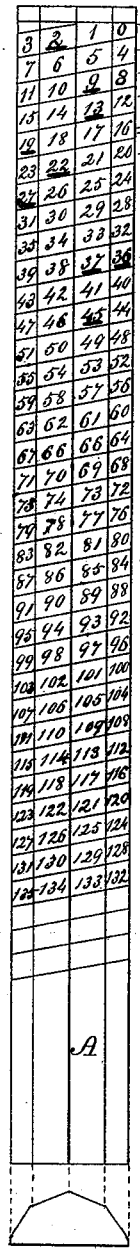
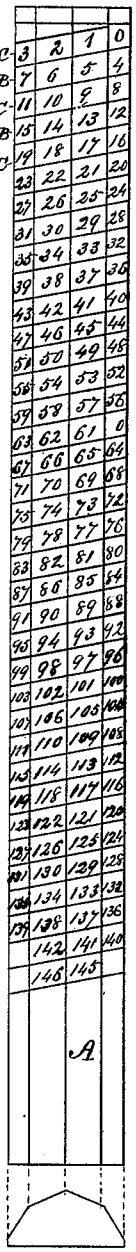


Fig. 2.



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ROBERT F. ROCHE, OF UNITED STATES ARMY.

IMPROVEMENT IN ADDING-STICKS.

Specification forming part of Letters Patent No. **206,136**, dated July 16, 1878; application filed June 17, 1878.

To all whom it may concern:

Be it known that I, ROBERT F. ROCHE, of the United States Army, stationed at Fort Foote, Maryland, have invented a new and Improved Adding-Stick; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1 is a view of one side of the adding-stick cut longitudinally; and Fig. 2 is a view of the other half turned around so that its numbers face in the same direction as in Fig. 1.

My invention consists of a stick or ruler, made in the shape of a polygon or cylinder in cross-section, on the periphery of which numbers, from zero upward, are written consecutively in two spirals, whereby from certain movements of the thumb thereon, in accordance with a known key, a column of figures may be accurately added without mental effort, and without danger of forgetting the aggregate amount of a portion of a column if attention should be called from the work.

In the drawing, A represents the adding-stick, made of an octagonal shape, and provided upon its periphery with two spirals, B and C, of figures ranging from zero upward, and winding around the stick side by side. These spirally-arranged figures are also arranged to coincide in rows longitudinally with the stick, and, as the ciphers of each spiral are upon opposite sides of the stick, the difference between the figures in the longitudinal rows will be four. There being two spirals of figures, it will only be necessary to see one side of the stick, or four longitudinal rows of figures, in adding any number—that is to say, there is no necessity for turning the stick around for the figures on the opposite side.

In operating the stick, the key explaining its use is as follows: To add 1, follow the spiral down one space; to add 2, follow the spiral down two spaces; to add 3, move obliquely down to the right in the first spiral below; to add 4, move one space down the longitudinal rows; to add 5, move one space obliquely to the left in the next lower spiral; to add 6, move two spaces obliquely to the left in the next lower spiral; to add 7, move obliquely one space to the right in the second lower spiral; to add 8, move two spaces down the longitudinal column; and to add 9, move obliquely to the left one space in the second lower spiral, or three spaces to the right in the third lower spiral. Thus, in adding the column 2 7 4 6 3 5 9 1 8, we find the first figure (2) at the head of the stick; adding 7, we move obliquely to the right one space in the second lower spiral, making 9, at which the thumb is placed; adding 4, we move one space down the column, making 13, which is again held with the thumb; adding 6, we move obliquely two spaces to the left in the next lower spiral, making 19; adding 3, we move obliquely one space to the right in the next lower spiral, making 22; adding 5, we move one space obliquely to the left in the next lower spiral, making 27; adding 9, we move three spaces to the right in the three lower spirals, making 36; adding 1, we follow the spiral down one space, making 37; and adding 8, we move two spaces down the vertical column, making 45 as the total of the column.

By means of this stick it will be seen that the numbers are held as fast as added by the thumb, and, there being no tax of memory, what is ordinarily a mental operation is converted into a mechanical one, which not only greatly relieves the accountant, but facilitates the work, and reduces the possibility of errors.

As each figure in a column is read the movement is made with the hand on the adder, which shows the totals as each figure is added.

The operation can be performed with either hand, and soon becomes so easy that the movement is made by habit when a figure is read.

This instrument has the advantage that, having no movable parts, and being all in one solid piece, it cannot get out of order.

The movements of the fingers for adding the same figure are identical for the same figure always, a three being added to a seven in the same way as a five or a nine by going with the eye or finger a certain direction and distance on the adder.

This method can be used in conjunction with mental addition, and is calculated to teach one to add mentally. Addition can also be learned by it without slate or pencil.

The same instrument which is used as a spiral adder can also be used for an office-

ruler and a measuring-stick without much additional cost; or it could be impressed on pencils, walking-sticks, &c.

It is an excellent device for teaching numbers and addition to children at home or in school.

As it can be made on a paper cylinder, it can be sold very cheaply in this form; also, colors can be used to further simplify the movements on the adder—for example, using three colors, so that 3, 6, or 9 could be added without change of color.

This instrument can also be used as a tally-stick, for which purpose it is specially convenient, as several things can be counted on it at once and the total be known by simple inspection, if necessary. The number could be marked by a peg or other contrivance.

Having thus described my invention, what I claim as new is—

An adding-stick having two spiral rows of figures from 0 upward upon its periphery, with the figures so coincident as to form also longitudinal rows, substantially as described.

The above specification of my invention signed by me this 6th day of June, 1878.

ROBERT F. ROCHE.

Witnesses:

SOLON C. KEMON,

CHAS. A. PETTIT.