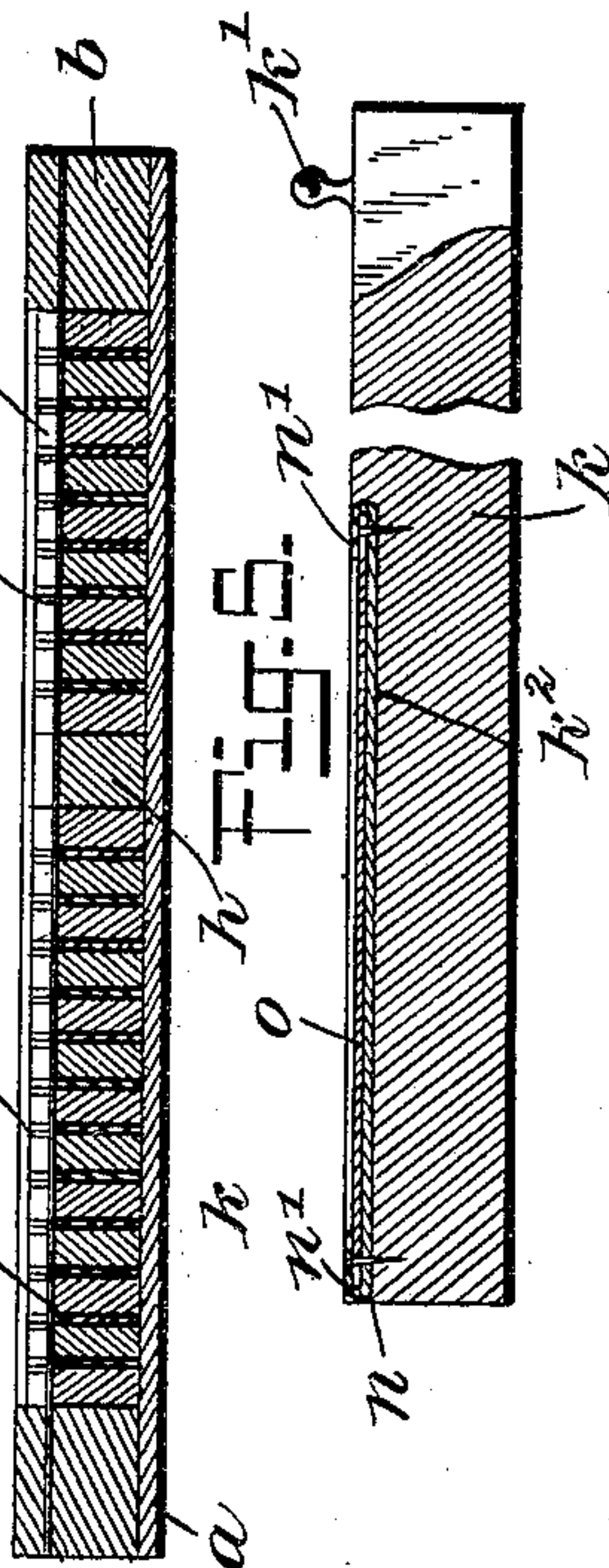
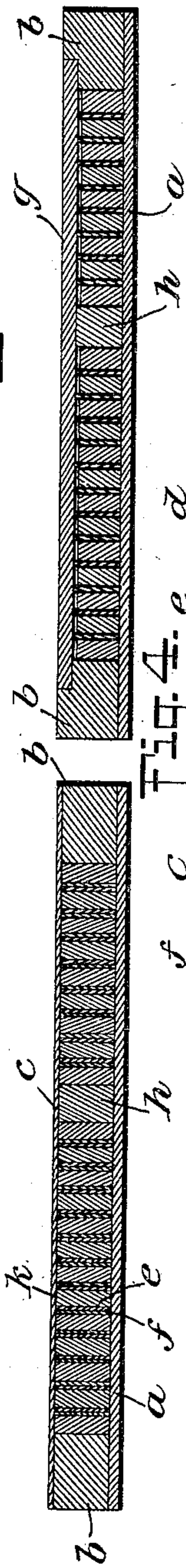
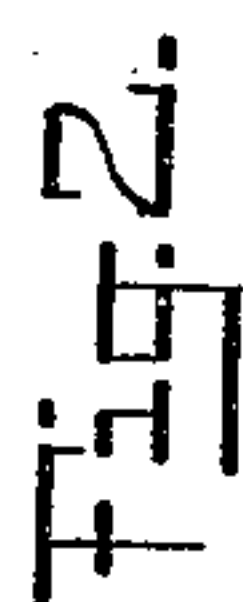
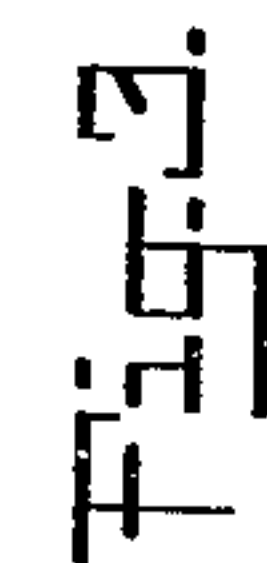


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W. L. Donnan
A. T. Fay

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Lorenzo D. Roberts

Truman

ATTORNEYS

UNITED STATES PATENT OFFICE.

LORENZO D. ROBERTS, OF SHAWANO, WISCONSIN.

CALCULATOR.

990,779.

Specification of Letters Patent.

Patented Apr. 25, 1911.

Application filed December 21, 1905. Serial No. 292,714.

To all whom it may concern:

Be it known that I, LORENZO D. ROBERTS, a citizen of the United States, and a resident of Shawano, in the county of Shawano and State of Wisconsin, have invented a new and Improved Calculator, of which the following is a full, clear, and exact description.

There are several kinds of calculations which have to be made upon a comparatively large scale that involve merely the multiplying of a series of numbers by a constant multiplier or one which remains constant for a large number of operations. It is customary in performing some of these calculations to use tables which have been prepared for this purpose. This necessitates, however, the writing of each result and, as in the majority of cases, as, for example, the preparation of tax reports and the like, these results have then to be added together, it is a matter which requires a great deal of time and is open to the serious objection that in copying these many numbers mistakes are very likely to occur.

It is the principal object of my invention to provide a substitute for these tables which will do away with the necessity of writing down the numbers and furnish the results in a convenient and orderly form so that the additions can be made directly, doing away with a large percentage of the work which is at present done in such cases.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is the plan of an instrument constructed in accordance with the principle of my invention for the above-named purpose; Fig. 2 is a sectional view of the same on the line 2—2 of Fig. 1; Fig. 3 is a sectional view on the line 3—3 of Fig. 1; Fig. 4 is a sectional view on the line 4—4 of Fig. 1, and Fig. 5 is a longitudinal sectional view of one of the elements of the device.

I have shown the device supported by a frame consisting of a base *a* and side and end pieces *b* and *c*, projecting upwardly from the base. The end pieces are raised

from the base and supported by a series of blocks *d* mounted below them. These blocks are separated by strips *e* of paper or other thin material, and they are also further separated by guide strips *f*, the purpose of which will be explained below. The blocks and strips together surmounted by the piece *c* practically constitute the end wall of the frame. I have also illustrated a cross bar *g* located near the center of the frame and extending from one side to the other above the tops of the strips *f*, and a longitudinal bar *h* which may be duplicated one or more times upon the frame in accordance with the extent of the operations which are to be performed thereon. The elements, so far described, provide a supporting structure for a series of elements *k* which are movably mounted between the strips *f*, which extend from one end of the frame to the other. Each of the elements *k* is provided with a projection *k'*, by means of which it can be slid longitudinally in the channels between the strips *f*. The separating strips *f* are preferably of flexible metal, whereby they will give slightly as the bars *k* move between them, so as to prevent binding or sticking of the latter. It will be obvious that the provision of these strips acts to prevent the slides from engaging each other and, consequently, permits each one to be moved independently without any danger of dislodging another from its position, also the cross bar *g* acts to hold the sliding elements down and assists in guiding them and holding them in the frame. These sliding elements constitute means for carrying a series of digits represented in a section C of the frame. This section of the frame is distinguished by the fact that a plurality of cross wires or strings *l* extend from one side of the frame to the other at this point, the wires being spaced apart so that ten spaces are provided in the present instance, although the number of spaces, and, consequently, the number of wires is controlled by the size of the numbers, which are to be calculated upon the device. Each one of these spaces is located in a vertical column which represents a certain order of numerals and, in the present in-

stance, I have designated each one of the columns in such a way as to indicate the purpose for which each one is intended.

The digits which appear in section C after the slides are moved originally appear in section A of the instrument when they are in their normal positions and not intended to register or calculate at that time. In a section B of the frame is a second series of cross wires or strings m corresponding in a general way to the other section described above, but it may have either more or less spaces, and they may be designated in a different way according to the kind of calculations which are to be performed. In the position of the parts shown in Fig. 1, the first sliding member or bar k at the top is in normal position, the digit 1 thereon appearing in section A, and no numbers whatever appearing in sections B and C. At the left of the elements k , however, is a depression k^2 adapted to receive and support a holder n . This holder is bent upward at its two outside ends n' in order to receive a tablet o . This tablet is preferably formed of paper, celluloid, or some flexible sheet material, and bears upon it a series of numerals which are arranged in a manner which will be described below. The tablet can be readily placed in position by bending it out of the flat position and inserting its ends under the inwardly extending ends of the projection n' , and when once in position will remain until removed in a similar manner or otherwise. The holders are secured to the sliding members k in any convenient manner, and the tablets can be readily removed and replaced at the will of the operator.

The use of the apparatus is a very simple matter. The digits appearing normally in section A are, of course, placed in regular order by preference, although that is not an absolutely essential feature, and when it is desired to calculate percentages or to multiply numbers by any constant amount, a series of tablets is prepared in accordance with the digits, each tablet representing the product produced by multiplying the corresponding digit by the constant number or percentage. For the purpose of illustration, I have chosen the number 010133642. The tablet with this number is placed in the holder on the element k which bears the digit 1 in section A. On the next sliding element, which bears the digit 2, a tablet is placed representing twice this number, and so on. When it is desired to find the product of this number with any other number as, for example, 2345, the respective sliding elements or bars which carry the numbers 2, 3, 4 and 5 are moved to the right until the numbers appear in their proper columns in section C. The sections B and C are placed the same distance apart as the distance between

the digit and the right hand figure of the numbers on the tablets and, consequently, the several tablets will be placed in the section B at such a point as to indicate the amount obtained by multiplying the constant multiplier by the numbers 2, 3, 4 and 5 respectively. Moreover, on account of the positioning of these numbers in their respective columns in the section C the number will be multiplied by 10, 100, or 1000, etc., in an obvious manner, according to the position which each digit occupies in the number to be multiplied. Then the sum of these numbers can be produced readily by adding the figures appearing in section B.

It will be seen that with an instrument constructed strictly in accordance with the description so far given, and having only nine slides representing the nine digits, a number could not be directly multiplied if any digit occurred twice in it. In most cases this could be overcome by making two or more operations, or by making simple mathematical calculations and multiplying the slides in accordance therewith. I prefer, however, to provide additional slides in sections below the first section, which can be used to represent the numerals when they occur twice in the same number. It will be obvious that it is not necessary for each section to be complete, that is, one or more sections may be formed with only the first three or four digits of the nine, if desired. This is a matter of convenience, and the additions will have to be made at times when the same digit is represented an unusual number of times.

It will be noted that in each of the sections B and C the cross pieces l and m respectively are represented differently at different points. For example, the third from the right in section C and the fourth in section B are shaded in a certain way, while the next three to the left of this are shaded in another, the next three in still a different way, and the last one is also distinguished from the others. The different representations on the drawing represent colors or other forms of distinguishing the several columns of figures from each other. This feature may be accomplished by the colors simply or, in practice, some of the cross pieces may be wires, others strings or cords, and, in fact, any convenient way may be employed to provide this distinction which is made for an obvious purpose.

Having thus described my invention, I claim:

A calculator, comprising a frame having two sections fixed with respect to each other, each section being provided with cross pieces spaced from each other to form columns, the columns of one section being parallel with those of the other section, and a series

of slides mounted to move across said sections, each of said slides having two sets of numerals, the numerals being so spaced on the slides, that when one set registers with
5 the columns of one section the other set will register with the columns of the other section.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LORENZO D. ROBERTS.

Witnesses:

CHARLES A. STIER,
MARY GORDON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
