

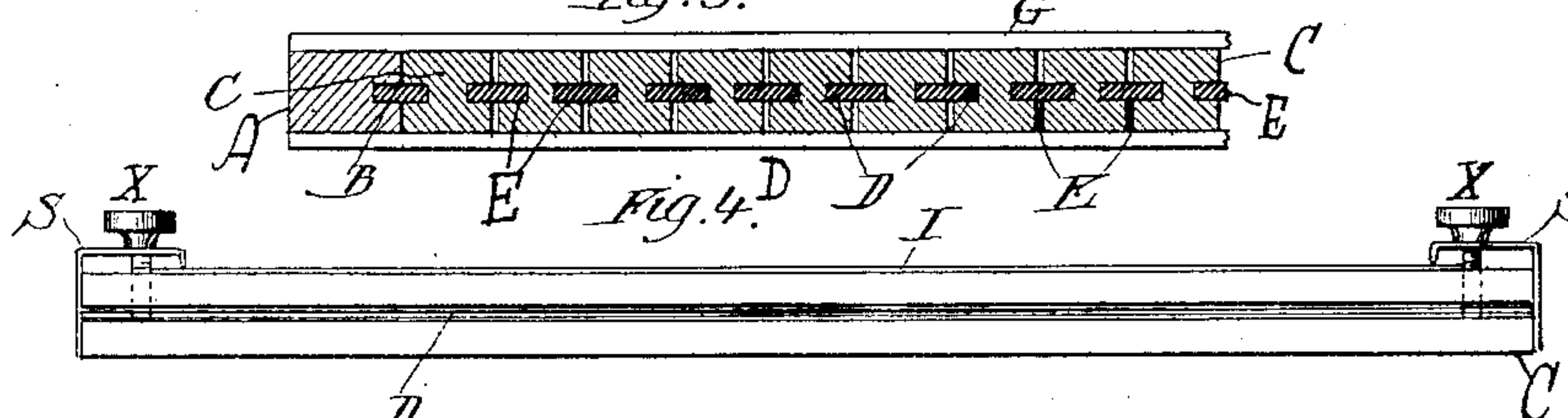
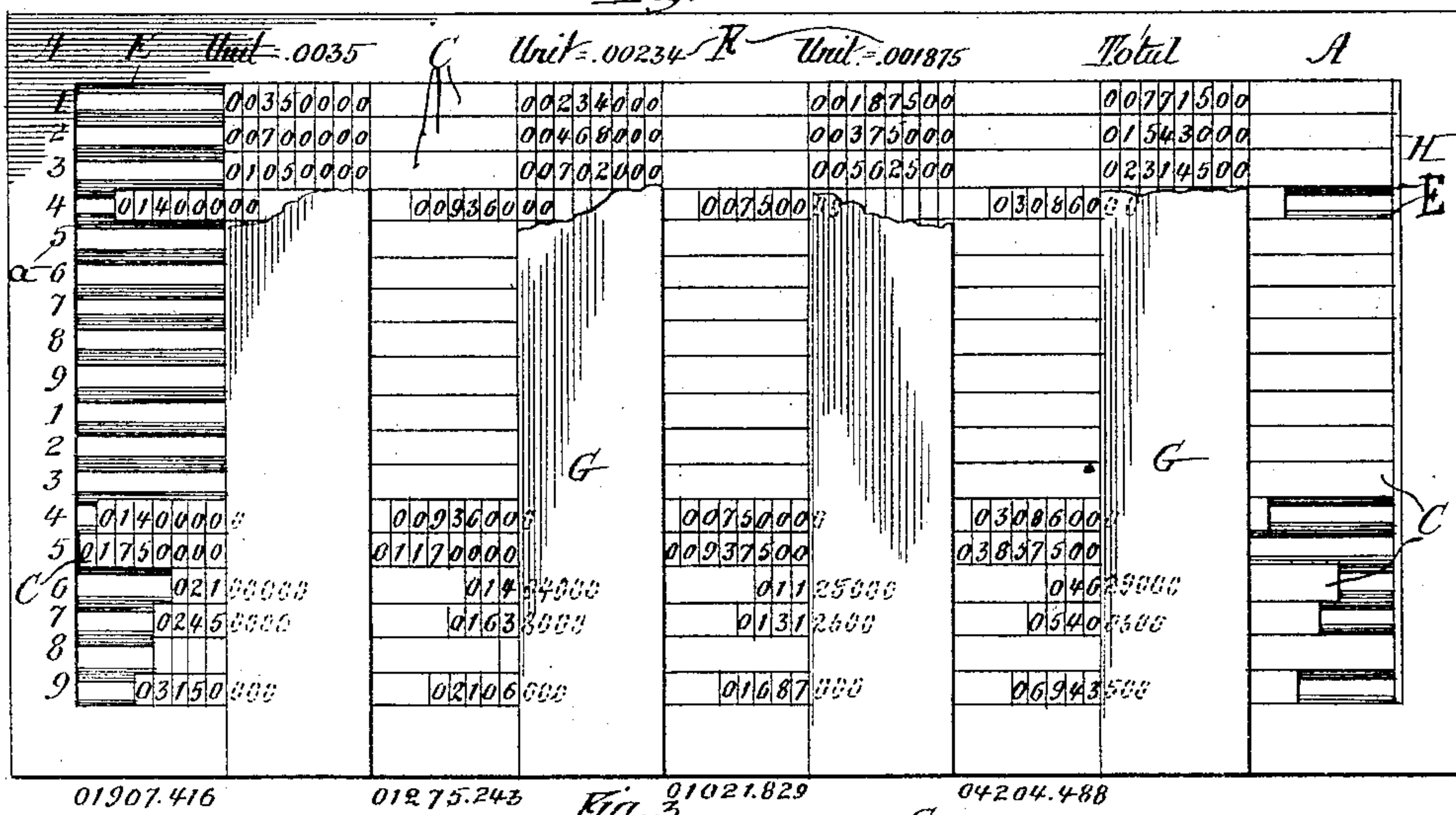
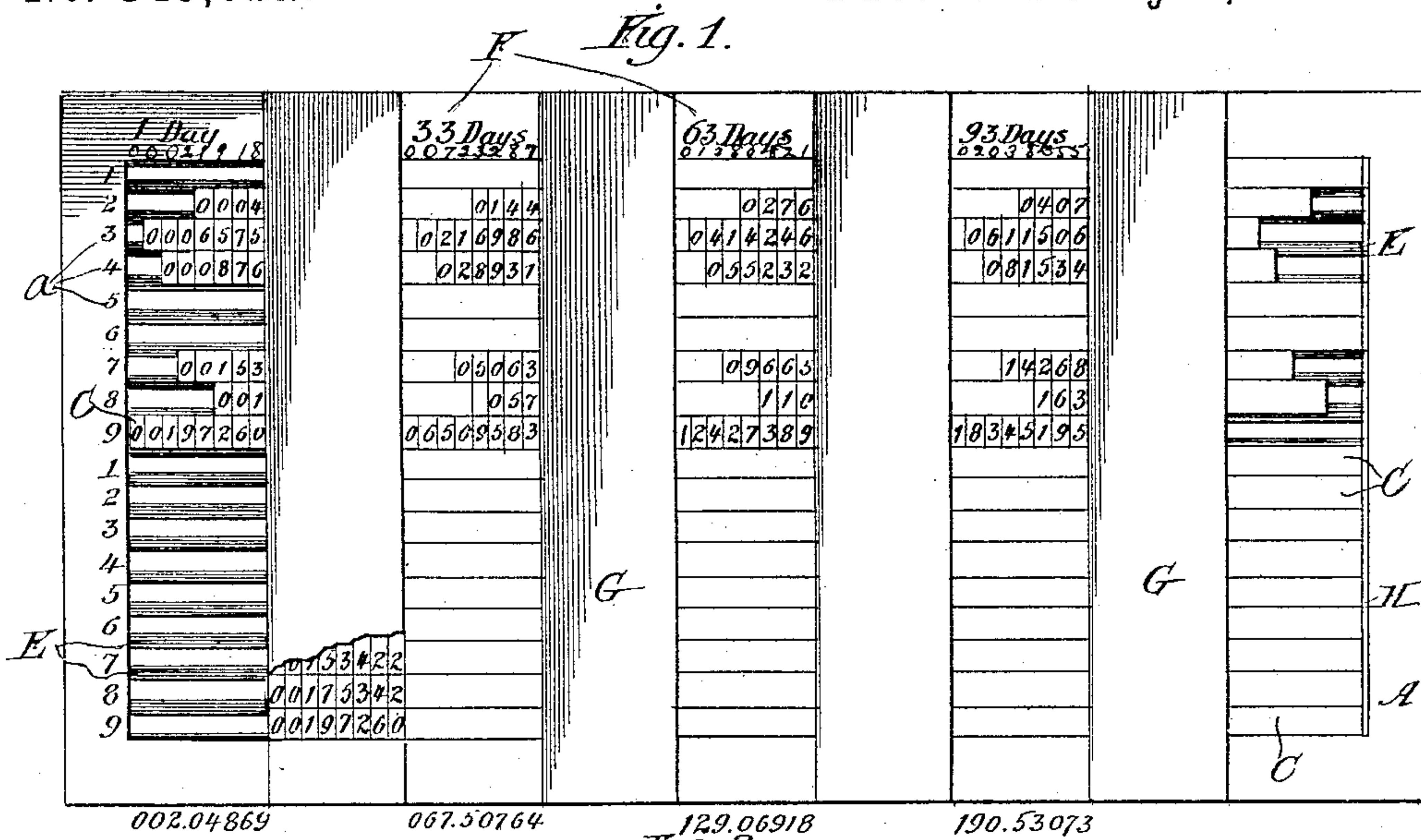
(No Model.)

E. P. BEACH.

CALCULATOR.

No. 345,022.

Patented July 6, 1886.



Witnesses:
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UNITED STATES PATENT OFFICE.

EDWARD P. BEACH, OF CHICAGO, ILLINOIS.

CALCULATOR.

SPECIFICATION forming part of Letters Patent No 345,022, dated July 6, 1886.

Application filed July 31, 1885. Serial No. 173,136. (No model.)

To all whom it may concern:

Be it known that I, EDWARD P. BEACH, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Calculators, of which the following is a specification.

My improvements relate to calculators such as may be used for calculating interest, taxes, percentages, and the like; and the object thereof is to provide a device, which, by the movement of its product-bearing slides, will throw into one column for addition the several products of the constant multiplier and the digits in the number to be calculated upon.

My invention is illustrated in the accompanying drawings, wherein Figure 1 is a plan view of my calculator, showing a problem in interest worked out. Fig. 2 is a plan view of the reverse side of the calculator, showing a problem in taxes worked out. Fig. 3 is a cross-section, and Fig. 4 is a detail view, of one slide.

Like parts are indicated by the same letter in each figure.

A is the frame, rectangular in form, and having the interior grooves, B, in its pieces.

C are the slides, having figures on their surfaces, as shown, and grooves on their sides, as indicated by D D.

E E are rods or guides, extending from end to end of the machine and resting in the grooves B and D.

The slides are shorter than the frame, so as to be capable of being reciprocated therein. The slides are ruled into sections by vertical lines, each section being of a suitable size to contain a digit. This ruling is so done as that the digits on the slides fall into vertical columns, when the machine is out of use, units of like value being found in the same column. On one side of the frame are the digits or constant factors 1 2 3 4 5 6 7 8 9, as at *a*. There may be several series of these digits running up to 9, or the series may extend to 100, or any other number. I prefer one or more series of the nine digits.

Across the top of the machine are placed the constant multipliers F F. These multipliers vary according to the use of the calculator. In an interest-table they may be the interest of one dollar at eight per cent. for one day, thirty-three days, sixty-three days, and nine-

ty-three days, as in Fig. 1 of the drawings; or they may be for interest on any sum of money at any rate for any period or periods.

Fig. 2, as stated, is the reverse side of the calculator shown in Fig. 1.

The slides carry different sets of figures on the two sides—one set forming an interest-calculator, as shown in Fig. 1, and the other a tax-calculator, as shown in Fig. 2. In the latter figure the upper ends of the strips or slats G are broken away, so as to show the arrangement of the figures on the three upper slides. Each of the numbers on the slides, on inspection, will be found to be the product of the digit opposite the slat and the unit or multiplier at the top of the column. As shown, each of these multipliers represents the tax on one dollar at a given rate, and the last multiplier is the sum of all the others. All the numbers on all the slides are similarly arranged; but only so much of them is shown as is necessary to work out the problems given in illustration. The slides have printed on their surfaces the products of these multipliers and digits or factors. These products are so arranged that each digit enters into every product on the slide opposite it, and each multiplier enters as a factor into each product in the column under it. Slats G are secured across the surface, so as to conceal the columns of figures not in use in any given calculation. These multiplications may be carried out to any desired length, though I have shown only eight places. On the left of each slat is an open and vacant column of equal width therewith. These slides may be moved backward or forward by any desired means. An awl may be used, and I have shown a bevel on the right-hand side of the frame, as H, to permit the awl to be inserted. Removable product-bearing slips I may be used; and in this case they may be clamped at each end to the surface of the slide by means of the spring S and set-screw X. In this case the right-hand vacant column should be somewhat wider than the other.

The use and operation of my invention are as follows: A table is made up, as shown in Fig. 2, for use in a tax-office, in calculating the tax on the assessed valuations for each fund or purpose, and also the total tax. The

slide opposite the first digit of the problem is drawn out its full length, and the slides opposite the other digits are drawn out successively, each a distance less by one section than its predecessor. The number to be calculated on in the table is \$544,976.00, and the sums drawn out on each slide will appear in the vacant column. They are then added up and the decimal-point is put a distance from the left, measured by a number of sections one less than the number of the digits in the whole number in the quantity to be calculated upon. Thus, at the foot of each column will be found the tax on the given amount for each purpose or at each rate, and in the last column the total tax. The slides are then all pushed to the right and the table is ready for use again.

On the opposite side of the slide is the interest-table for bankers, and here the use and operation is exactly similar. The use of several series of the nine digits is necessary to enable one to make a calculation on a large number, or one containing the same digit several times. The problem in the interest-table is the interest on \$9,347.28 at eight per cent., for one, thirty-three, sixty-three, and ninety-three days.

I claim as my invention—

1. The combination of a rectangular frame, longitudinally-reciprocating slides having on each of their sides the figures used in calculating, and transverse strips which conceal all

the figures on the slides when the same are in position for use.

2. A calculator composed of a frame and a series of laterally-reciprocating slides bearing on their surfaces, which lie in the same plane, a series of products derived from two sets of factors and so arranged that when the slides are in their normal positions the products will fall into columns at right angles to the length of the slides, and every product will contain both the factor at the top of its column and the factor at the end of its slide.

3. A calculator composed of a frame and a series of laterally-reciprocating slides, each bearing a series of products, which are arranged in vertical columns and derived each from the multiplication of the factor at the top of its column and the factor at the end of its slide, so that the value of each product may be varied, as by the movement of the decimal-point one place, with reference to the other products in the column by reciprocating its slide the distance of one figure.

4. In a calculator, the combination of reciprocating slides having at each end a clamping device and a removable product-bearing slip, which is secured to the slide by the clamps.

Chicago, July 24, 1885.

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Witnesses:

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