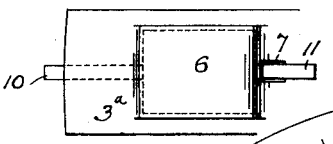
R. LANDENBERGER.

CALCULATING DEVICE.

APPLICATION FILED NOV. 27, 1909.

997,680. Patented July 11, 1911.

Fig. 1.



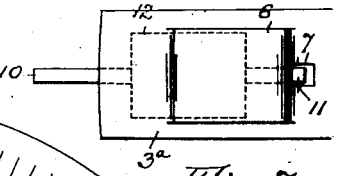


Fig. 6

Fig. 7.

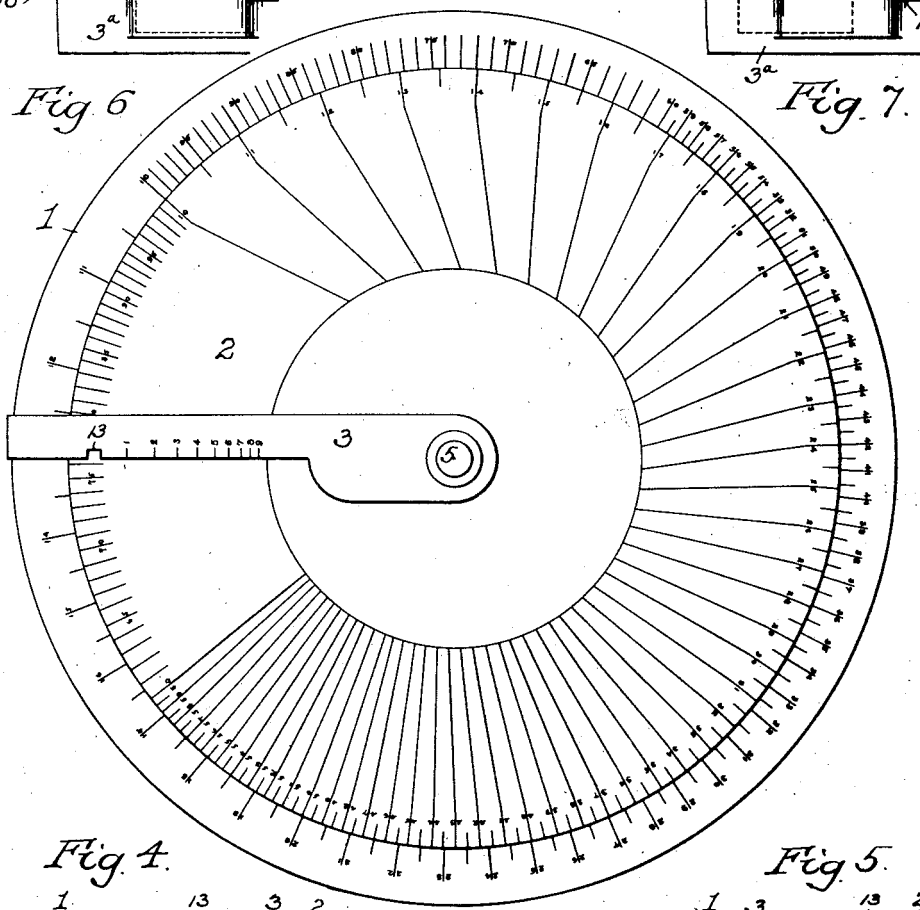


Fig. 4.

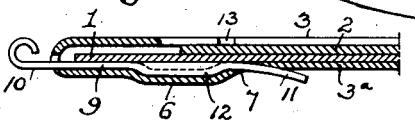


Fig. 5.

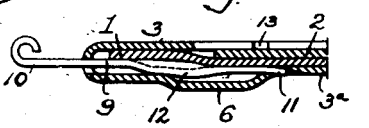
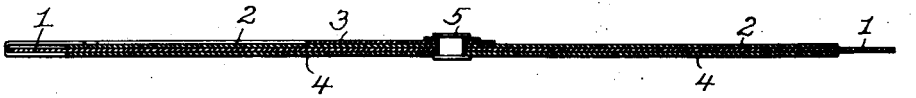


Fig. 2.



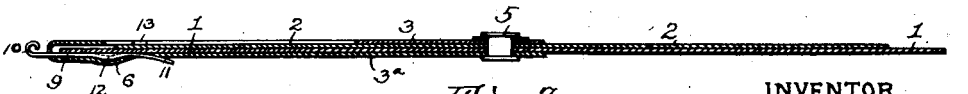


Fig. 3.

WITNESSES

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RALPH LANDENBERGER, OF CHICAGO, ILLINOIS.

CALCULATING DEVICE.

997,680. Specification of Letters Patent. Patented July 11, 1911.

Application filed November 27, 1909. Serial No. 530,083.

To all whom it may concern:

Be it known that I, RALPH LANDENBERGER, a citizen of the United States, residing in Chicago, Illinois, have invented certain Improvements in Calculating Devices, of which the following is a specification.

The object of my invention is to provide a calculating device operating on the general principle of the slide rule but serving to solve, in the simplest manner, the problems for whose solution it is intended, the device being such that a novice can readily grasp the principle of its operation and mistakes of the eye and hand will be reduced to a minimum. This object I attain in the manner hereinafter set forth, reference being had to the accompanying drawing, in which—

Figure 1 is a face view of a calculating instrument constructed in accordance with my invention; Fig. 2 is a transverse section of the same; Fig. 3 is a similar view, illustrating another, and for some reasons, a preferable form of runner for use in connection with the device; Figs. 4 and 5 are sectional views, on an enlarged scale, of parts of the latter device, and Figs. 6 and 7 are rear views of the same.

The instrument consists of a pair of disks 1 and 2, pivotally connected together at the center, the upper disk 2 being of somewhat less diameter than the lower disk so as to permit of the exposure of a logarithmic scale formed adjacent to the outer edge of said lower disk. The upper and smaller disk also has a logarithmic scale formed around its outer edge, this scale adjoining that upon the lower disk but being disposed reversely thereto. Likewise pivotally mounted upon the connecting device at the center of the disks is a runner 3, which, by preference, envelops the outer edge of the lower disk, and may, if desired, be connected to a disk 4 on the back of the same so as to increase its stability and maintain the face member of the runner in reasonably close contact with the face of the upper disk 2. In most cases, however, I prefer to use the construction of runner shown in Figs. 3 to 7. This runner is made of sheet metal or other relatively rigid material, and comprises connected front and back members 3 and 3^a, both hung to the central pivot 5. In the back member 3^a near the outer portion of the same is a dished or struck-up portion 6, having in its inner edge an opening 7, and between said back member and the rear disk 1 is interposed a slide 9 with projecting tongues 10 and 11, the outer tongue extending through an opening in the outer connecting portion of the runner, and the inner tongue projecting through the opening 7. On the slide 9 is formed a cam-like enlargement 12, which, when the slide is pushed inward, enters the dished portion 6 of the runner, the slide being then free from operative contact with the disk 1, as shown in Figs. 4 and 6. If, however, the slide is pulled outward, the cam 12 contacts with the inner face of the outer portion of the rear member 3^a of the runner and forces the slide against the rear face of the disk 1, so as to clamp the same to the runner and retain the latter in the position to which it has been adjusted in respect to the disk, while still permitting free rotation of the disk 2, as shown in Figs. 4 and 7. The inner or guiding tongue 11 may be omitted, if desired, and a simple opening in the rear member of the runner may, in some cases, take the place of the raised or dished portion 6 of the same.

The runner 3 has, on its forward or reading edge, a graduated scale running from 1 to 9, with the higher number at the inner end of the scale, this scale coöperating with diagonal lines extending inwardly from the numbers of the logarithmic scale at the edge of the disk 2, for the indication of fractional results, or the third figure if the final result is to be read in three figures. In the drawing, these diagonal lines are shown as ending at the number 60 of the scale, which is about as far as they need be carried for practical purposes, although they may, in devices of the larger size, be extended inwardly from all of the numbers of the scale up to 99.

As an example of the use of the calculator it may be supposed that it is desired to ascertain the weight of a ream of paper whose sheets are 25x38 inches in size, it being known that a ream of the same paper whose sheets are 22x28 inches in size weighs 70 pounds. One of the disks is moved in respect to the other until the number 22 on one scale corresponds with the number 28 on the other and the disks are then held in this relation while the runner is moved until its forward edge coincides with the number 70 on the inner scale. The runner is then held in this position and the disk 2 is moved

until the numbers 25 and 38 of the two scales coincide. It will then be found that the forward or reading edge of the runner is between the numbers 10 and 11 on the inner scale and that the diagonal line running inwardly from the number 10 intersects the forward or reading edge of the runner at the number 8 of its scale, thus indicating 108 pounds as the weight of a ream of paper having sheets of the larger size.

As another example, suppose that 100 sheets of paper whose size is 22x28 inches cost $2.40, and it is desired to ascertain the cost of 100 sheets whose size is 24x36 inches. The two disks are first adjusted until the numbers 22 and 28 of the two scales coincide, the runner is then adjusted until its forward face coincides with the number 24 on the inner scale and the runner is then held in position and the disk 2 moved until the numbers 24 and 36 of the two scales coincide, whereupon it will be found that the reading edge of the runner is between the numbers 33 and 34 of the inner scale and that the diagonal line extending inwardly from the number 33 of said scale intersects the forward or reading edge of the runner at the number 6 of the scale thereon, thus indicating $3.36 as the price of the sheets of the larger size.

The graduations of the scale on the forward edge of the runner are unequally spaced, as is necessitated by the straight lines extending diagonally inward from the numbers of the scale on the disk 2. If the graduations of the scale on the runner were equally spaced the intersection lines on the disk would be formed on proper parabolic curves. The runner 3 has, at its forward or reading edge, a notch 13 so as to expose a number corresponding with a graduation of the scale on the disk 2 with which said forward edge of the runner may be in line.

In some cases I may provide a disk 2 on each side of the disk 1, the scales on one side of the instrument being used for computations of one character and those on the other side of the instrument being used for computations of a different character, and although I have described my invention in connection with, and prefer to embody it in, an instrument of the rotary disk form, it may be applied to straight scales as well, the essential features of the invention being the intersection lines coöperating with a scale on the forward or reading edge of the runner.

In order to prevent the soiling of the graduated face of the runner 3, the same may have a covering of celluloid or other transparent material and such covering may also be applied to the disks 1 and 2, or to those portions of the same on which the scales are formed.

I claim:

1. A calculating device comprising two members, one movable relatively to the other, each of said members carrying a logarithmic scale, and one scale being reversely disposed in respect to the other, in combination with a runner having its reading edge disposed so as to register with the graduations of the scales, said reading edge also carrying a graduated scale, and one of the members of the device having intersection lines leading from the graduations of its scale and coöperating with the scale on the runner for indicating fractional results, or the third figure, in results reading into three figures.

2. A calculating device comprising two disks pivotally connected at the center and one superposed upon the other, the upper disk being of lesser diameter than the lower, and each disk having adjacent to its edge a logarithmic scale, one of said scales being disposed reversely to the other, in combination with a runner, likewise pivoted at the center of the disks but having its reading edge disposed so as to register with the graduations of the scales, said reading edge having a graduated scale thereon and the inner disk having intersection lines leading from the graduations of its scale and coöperating with the scale of the runner for indicating fractional results, or the third figure in results reading into three figures.

3. A calculating device comprising two members, movable relatively to one another, and carrying logarithmic scales, one reversely disposed in respect to the other, in combination with a movable runner having a recess therein, and a movable slide with enlargement, movable into and out of said recess, and serving to lock the runner to or release it from one of the members of the device.

4. A calculating device comprising two members, movable relatively to one another and carrying logarithmic scales, one reversely disposed in respect to the other, in combination with a movable runner having a recess therein, and a movable slide with enlargement, movable into and out of said recess, and serving to lock the runner to or release it from one of the members of the device, said slide having a guiding finger thereon.

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

RALPH LANDENBERGER.

Witnesses:

H. W. HAWKINS,

MYRA C. LANDENBERGER.