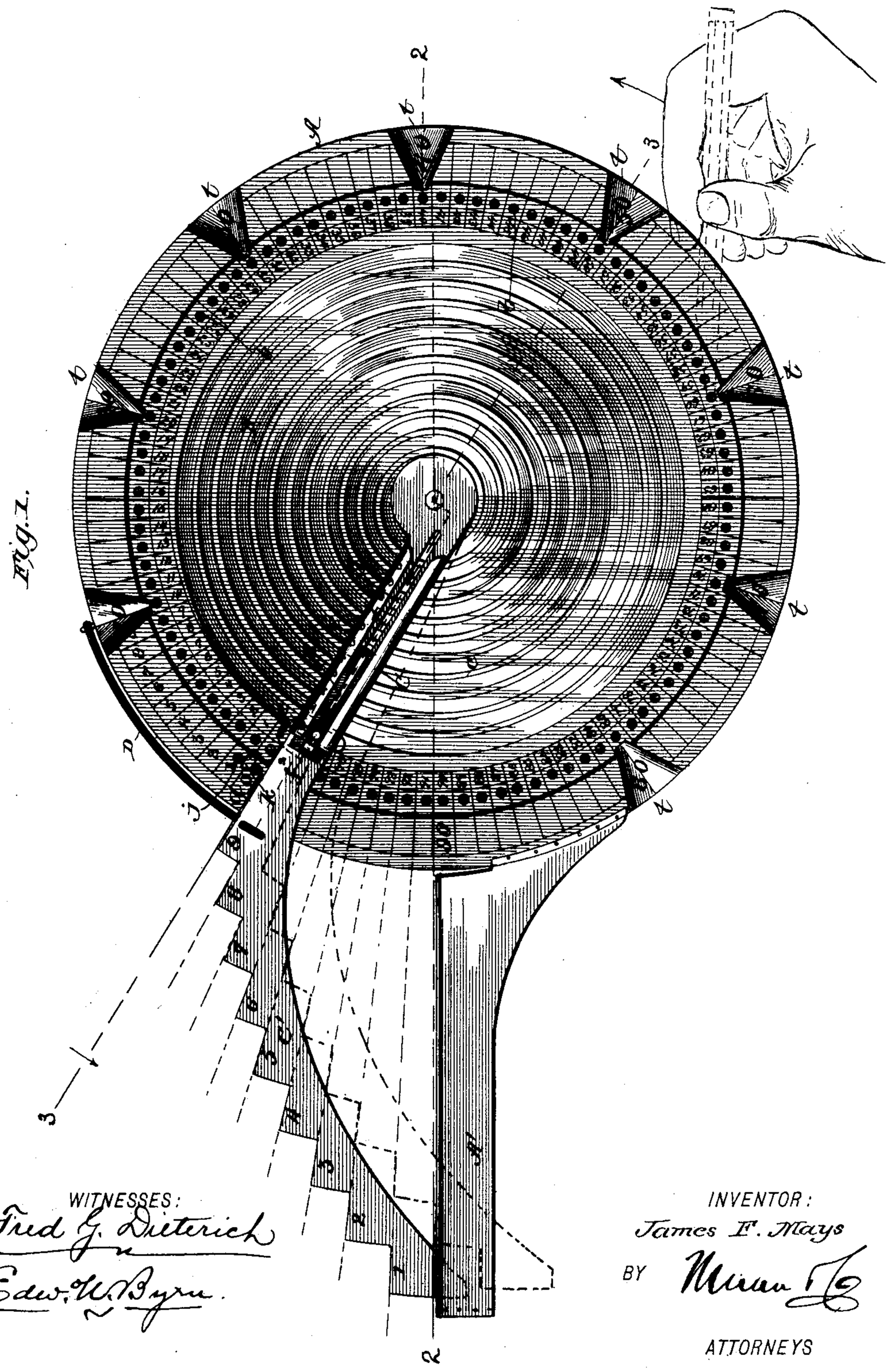
(No Model.) 2 Sheets—Sheet 1.

# J. F. MAYS.

## ADDING MACHINE.

No. 424,932. Patented Apr. 1, 1890.



WITNESSES:
Fred G. Dieterich
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James F. Mays
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(No Model.) 2 Sheets—Sheet 2.

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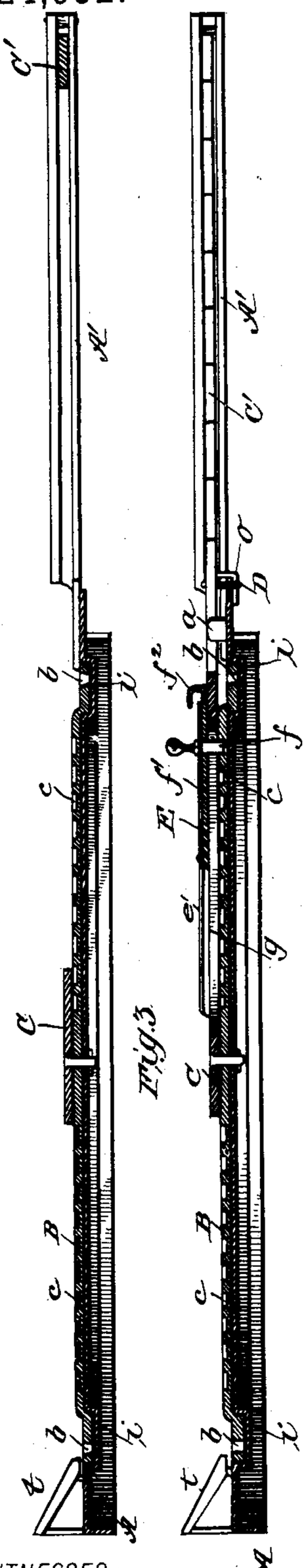

Fig. 2.



Fig. 3.

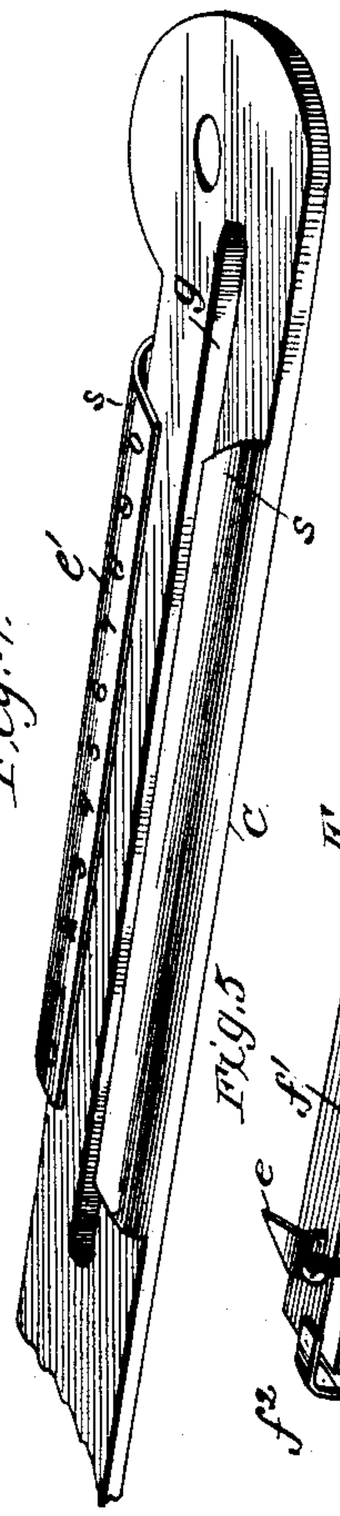

Fig. 4.

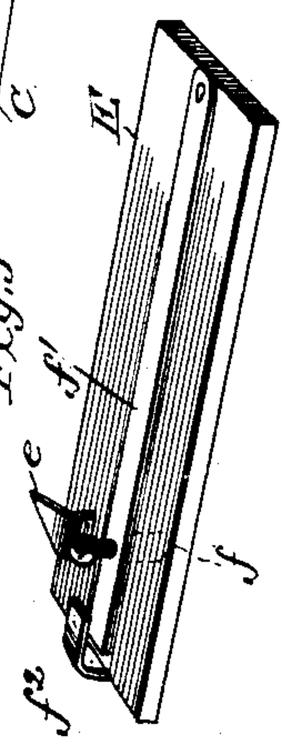

Fig. 5.

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# UNITED STATES PATENT OFFICE.

JAMES F. MAYS, OF BIRMINGHAM, ALABAMA, ASSIGNOR OF ONE-HALF TO I. BERRY & CO. AND DE KALB TURBEVILLE, OF SAME PLACE.

## ADDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 424,932, dated April 1, 1890.

Application filed October 17, 1889. Serial No. 327,372. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES F. MAYS, of Birmingham, in the county of Jefferson and State of Alabama, have invented a new and useful Improvement in Adding-Machines, of which the following is a specification.

My invention is an improvement in adding-machines designed to add two columns of figures at the same time.

It is an improvement upon that form of adding-machine in which a rotating disk is provided with numbers, arranged in a circle, from 1 to 100, and each number has a hole to receive a pencil-point, the disk having on its face also a spiral groove, which, as the disk is rotated by successive additions, causes an indicator traveling in said groove to move up and register on a scale the amounts added.

My invention consists in the peculiar construction and arrangement of parts acting upon the above general principle, which I will now proceed to describe with reference to the drawings, in which—

Figure 1 is a plan view of the instrument. Fig. 2 is a section of the same through line 2 2. Fig. 3 is a similar section through line 3 3. Fig. 4 is a perspective detail of the radial part of the gage-arm, and Fig. 5 is a perspective detail of the gage-slide.

A represents a circular frame having a radial handle A′ projecting from one side. The face of this circular frame is recessed to receive the adding-disk B. This disk has at its outer periphery a series of figures, from 1 to 100, spaced an equal distance apart, and each figure or figures representing a fraction of a hundred has a hole *b*, adapted to receive a pencil-point, by which it is to be rotated. This disk is pivoted at its center to the frame upon a stem or axis, and the entire face of said disk is wrought into a single volute spiral cam-groove *c*. The edge of the circular frame just outside of the disk is also provided with aliquot divisions of one hundred arranged in tens, as 10, 20, 30, 40, &c., and the first division of tens is also subdivided into units, from 1 to 10. Upon the upper face of the disk and frame there plays a gage-arm C C′, which is pivoted centrally to the axis of the disk, and is arranged to swing over one-tenth portion of the circumference of the frame. This gage-arm is composed of a straight radial portion C, which extends from the center to a short distance beyond the circular frame, and the other portion C′ of which gage is curved and has on its outer face a series of nine steps or notches numbered from 1 to 9, whose faces are short sections of so many radii struck from the center of the disk, and which notches are spaced a distance apart coinciding with the subdivisions of units on the disk—*i. e.*, the radial lines from the center of the disk, which form the subdivisions of units or the disk also, as they further diverge, (see dotted lines,) coincide with the faces of the steps on the gage-arm. This gage-arm lies normally upon the frame against a stop pin or lug *a*, being pulled against the same by a spring D, formed of a gum band or helical wire. This arm is prevented from rising by a hook *o*, Fig. 3, on its under side that hooks under the edge of the frame.

The handle A′ of the frame is made hollow or with a top and bottom plate, (see Fig. 2,) and the outer end C′ of the gage-arm C C′ rests and plays between these two plates. The faces of these notches of the gage-arm are adapted to be brought against the side of the handle, so as to coincide therewith, and when so adjusted the number indicated by that notch represents the number of unit subdivisions on the disk and frame that the gage-arm travels over in that movement. On the part C of the arm there is an indicator-slide E, whose pointer *e* moves over a scale *e′* on the arm, and which indicator-slide has a pin or stud *f*, Fig. 3, that passes through a longitudinal slot *g* in the arm and enters the spiral groove of the disk. The distance between the figures of the scale *e′* is just equal to the spacing of the channels or threads of the spiral groove, so that one complete rotation of the disk causes the spiral groove to adjust the indicator-hand *e* the distance of one figure on the scale *e′*.

I will now describe the general operation of the device and then proceed to give the details of construction of the various parts.

Suppose the numbers to be added are 62, 37, and 64. The disk is first adjusted so that fig-

ure 1 of the disk is opposite figure 1 of the frame, as shown in Fig. 1. The pencil (in the right hand) is then placed in the hole of the disk opposite 60 of the scale on the frame A, and the face of notch number 2 on the gage-arm is brought by the thumb and finger of the left hand against the handle of the frame, as shown in dotted lines, Fig. 1. The disk is then turned by the pencil in the direction of the arrow until the pencil strikes the arm C. This, it will be seen, causes the disk to be turned the distance of sixty and two subdivisions, and the figure showing at the zero-point *a* will be 62. To add 37 the pencil is put in the hole of the disk opposite 30 of the tens-scale on the frame and notch 7 of the gage-arm is brought against the handle. The pencil being now brought around until it strikes the gage-arm, the number on the disk opposite the zero-point *a* will show 99. To add 64 the pencil is placed in the hole of the disk opposite 60 of the tens-scale on the frame, and the notch 4 of the gage is brought against the handle and the pencil brought around as before. The result will be 163. The 1 will be read on the hundreds-scale *e'* of the arm by reason of the complete rotation of the disk and the movement by the cam-groove of the indicator-hand *e* one space on the scale, while the 63 will be read on the disk at the zero-point.

To add units the gage-arm need not be touched, as the pencil may be put in the holes of the disk opposite the unit subdivisions of the first divisions in tens of the frame. In adding multiples of ten, also, the gage-arm is not used. After the first two columns of figures are added the result is set down in two figures, and the number representing hundreds is (if the example runs into higher denominations) to be carried on to the next addition of the hundreds columns. Before making an addition of the figures representing hundreds, however, the disk is readjusted to zero, and the number to be carried is first added in, and the two columns of hundreds and tens of hundreds are then added in the same way.

In constructing the frame A it is preferably made of sheet metal stamped to shape with an annular groove *i* near its edge just below the row of holes in the disk B, which groove *i* gives room for the end of the pencil to pass well through the holes in the disk and travel around in the groove. The handle A' of the frame is made of two thicknesses and is chambered to form a space into which the gage-arm passes, as seen in Figs. 2 and 3, the chamber being made of a depth to receive the gage-arm, and having the front edges of the said chamber flanged to make an easy bearing for the fingers in operating the arm. The frame also has in its periphery at the zero-point two holes *j*, and the rotating disk has a stop-lug *k* projecting from its edge. These holes *j* are adapted to receive the pencil in resetting the disk, the lug *k* on the disk serving to strike against the pencil when placed in said holes, and thus limit its motion to the proper stopping-point.

In arranging the indicator-slide E upon the gage-arm C the edges of the latter are turned up and over to form retaining-flanges *s s*, (see Fig. 4,) between which the slide E, Fig. 5, is retained. On one of these flanges is arranged the hundreds-scale *e'*. The slide E has its stud or pin *f* attached to a flat spring *f'*, attached to the slide, which spring normally holds the pin down into the spiral cam-groove of the disk. This pin has a knob or head at its upper end, by which it may be raised against the tension of the spring out of the cam-groove in resetting the device. A lip or flange $f^2$ prevents the pin from being raised too far.

To facilitate the guiding of the pencil-point to the right hole of the disk, I construct on the outer periphery of the frame at each of the graduations by tens an inclined trough *t*, whose outer end is arranged at a higher elevation, and whose inner end descends and converges to the hole of the disk opposite the figures 10, 20, 30, 40, or other tens mark on the frame. By this construction the pencil may be quickly and without close attention placed in the pencil-guide and slipped down into the right hole of the disk, thus facilitating the work and avoiding mistakes.

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

1. The combination, with the outer frame having handle A' and the rotating disk subdivided into one hundred spacings and provided with corresponding figures and holes, and cam-groove, of a gage-arm pivoted to the center, so as to oscillate, and having at its outer end a series of notches, and an indicator-slide arranged in the arm and adjusted by the cam-groove, substantially as shown and described.

2. The curved gage-arm CC', having stepped notches on its outer curved surface at its outer end, in combination with the main frame A, having a chambered handle and a stop *a*, the disk B, the indicator-slide E, and spring for holding the arm against the stop *a*, substantially as shown and described.

3. The combination, with the disk B, having the spiral cam-groove, of the gage-arm C, having flanges *s s* and slot *g*, and the slide E, having spring *f'*, carrying pin *f*, extending through the slot into the cam-groove, substantially as shown and described.

4. The combination, with the disk B, having numbered subdivisions with corresponding holes, of the frame surrounding the same, and provided with guides for directing the pencil or stylus into the holes, as described.

JAMES F. MAYS.

Witnesses:
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C. M. FAY.