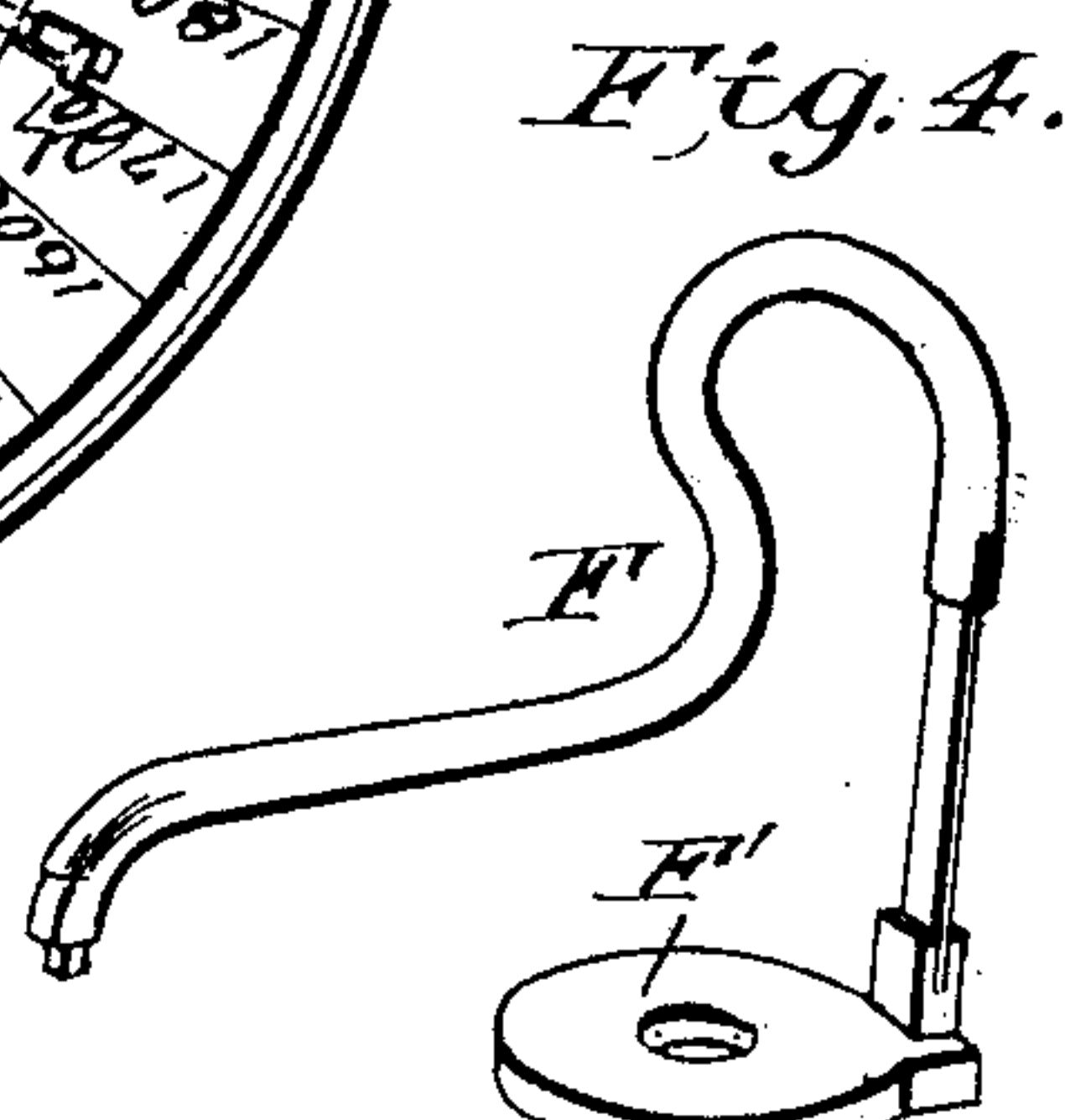
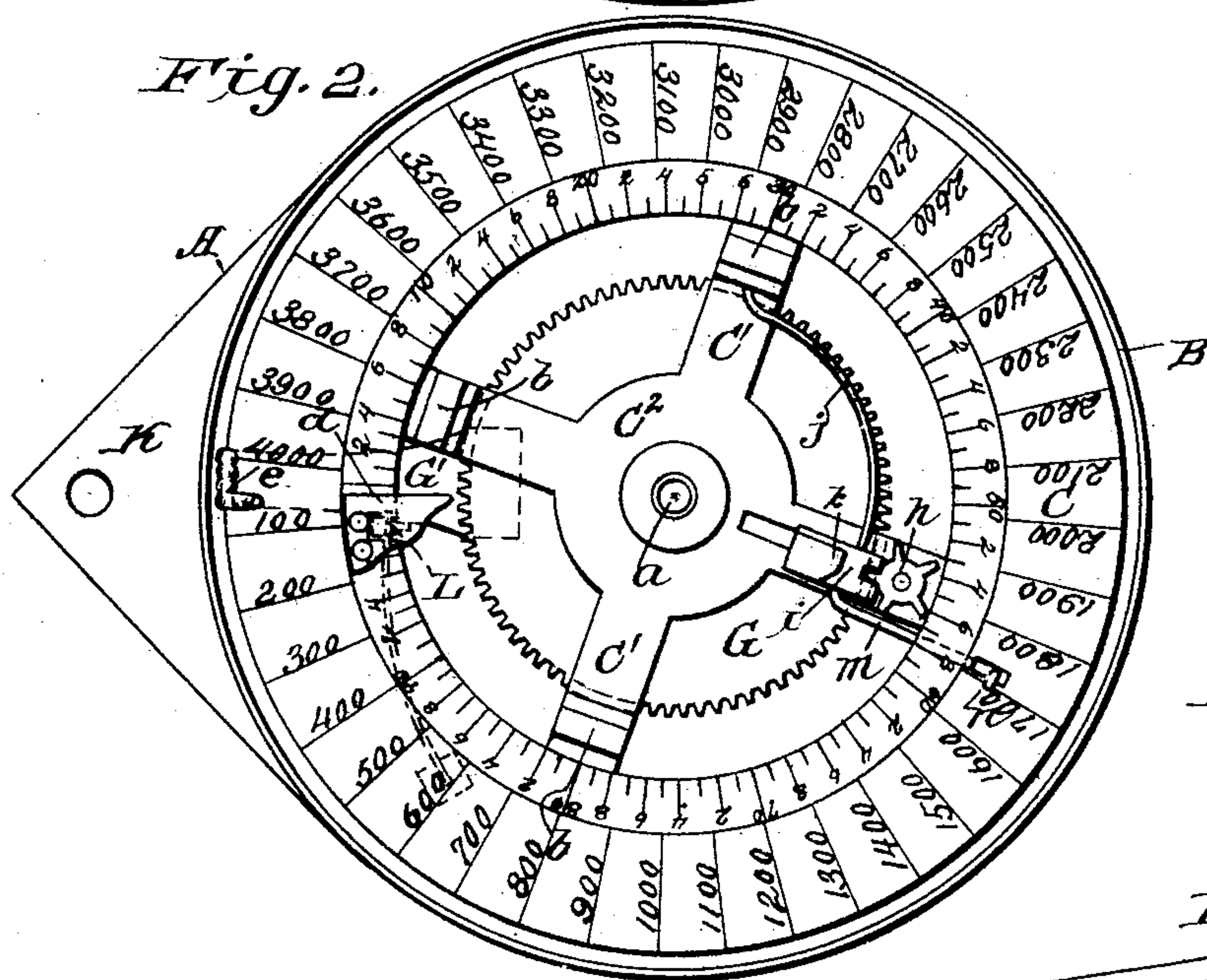
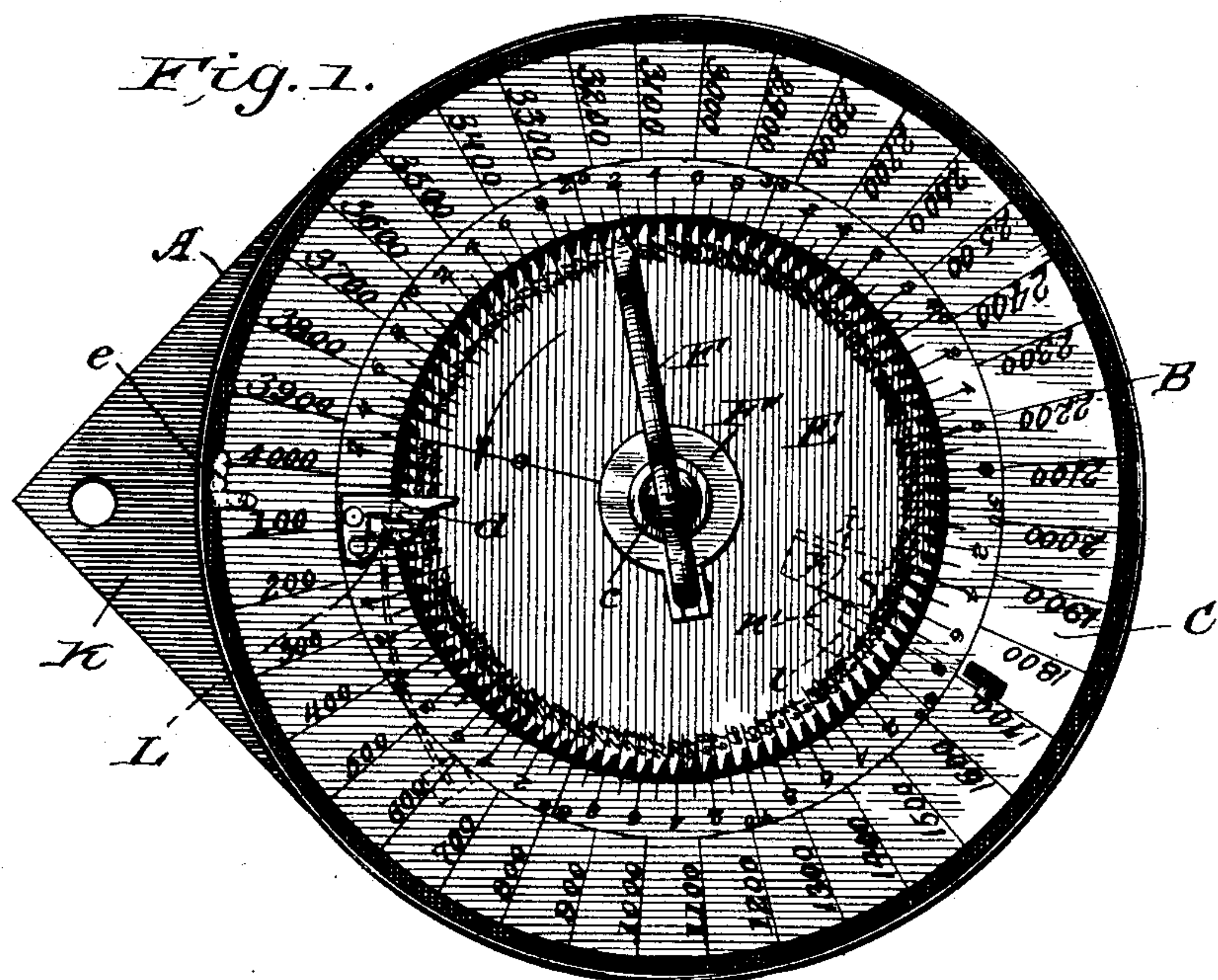


(No Model.)

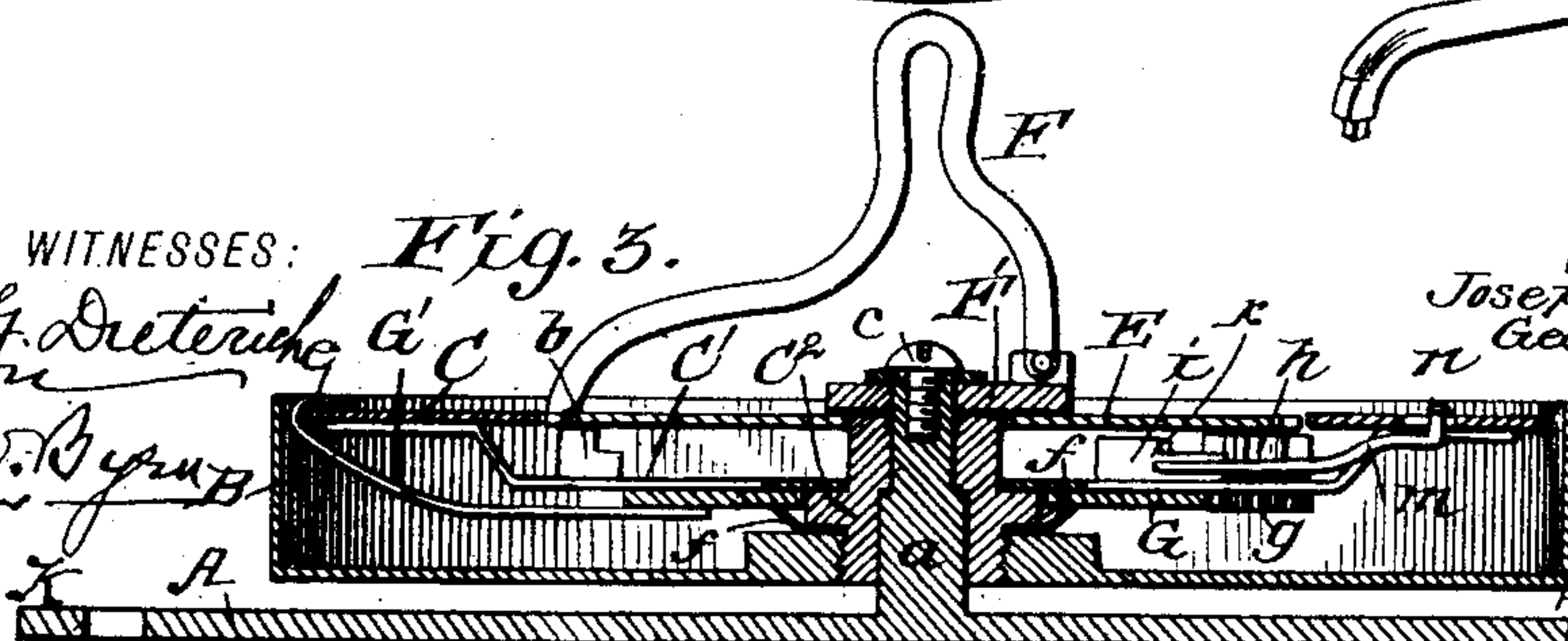
J. E. BLACKSHAW & G. H. ROGERS.  
ADDING MACHINE.

No. 463,027.

Patented Nov. 10, 1891.



WITNESSES:  
*Fig. 3.*  
Fred G. Dietrich  
Edw. W. Byrnes



INVENTORS:  
Joseph E. Blackshaw  
George H. Rogers.

*Munn & Co.*  
ATTORNEYS



# UNITED STATES PATENT OFFICE.

JOSEPH E. BLACKSHAW, OF PITTSBURG, PENNSYLVANIA, AND GEORGE H. ROGERS, OF BIRMINGHAM, ALABAMA.

## ADDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 463,027, dated November 10, 1891.

Application filed October 15, 1890. Serial No. 368,223. (No model.)

*To all whom it may concern:*

Be it known that we, JOSEPH E. BLACKSHAW, of Pittsburg, in the county of Allegheny and State of Pennsylvania, and GEORGE H. ROGERS, 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.

10 The object of our invention is to provide a convenient and accurate adding-machine, in which the hundreds shall be indicated upon a circular scale.

15 It consists in the peculiar construction and arrangement of parts, which we will now proceed to fully describe.

Figure 1 is a face view of the instrument. Fig. 2 is a similar view with the toothed disk removed. Fig. 3 is a central cross-section, and Fig. 4 is a detail in perspective of a modification.

In the drawings, A represents a circular base-plate, having a central fixed pivotal pin *a*.

25 B is a hollow metal inclosing case of circular form, with a wall or flange extending upwardly all around its edge. This case has a thickened hub portion which surrounds the pivotal pin *a*, but does not approach it closely.

30 C is a graduated metal ring mounted upon radial arms C', connected at the center to the hub C<sup>2</sup>. The lower end of this hub is screw-threaded externally and screws into an internal thread of the hub of the containing-case B. Through the hub C<sup>2</sup> of the graduated ring there extends the reduced end of the pivotal pin *a*. Around the upper end of the hub C<sup>2</sup> there turns a toothed disk E, which near its periphery rests upon the lugs *b* (see Fig. 3) on radial arms C' to hold it level.

40 Above this disk and turning upon the pivotal pin *a* is the adjusting-arm F, by which the disk is turned.

The ring C is graduated in two series of figures and subdivisions. The inner series is from 0 to 100, extending around the circumference. To save the crowding of figures, only the progression in tens is marked, as 10, 20, 30, &c., and the single figures indicating the digits are placed between. The outer series of graduations is in hundreds, as 100, 200, 300, &c. The disk E is graduated and

numbered with one hundred equal subdivisions extending around the entire circumference, and its periphery is cut with one hundred teeth corresponding to the graduations. The adjusting-arm F is jointed at the inner end to a collar F', rotating on the central stem or pivotal pin *a*, so as to rock in a vertical plane, and its outer end is constructed as a tooth adapted to reach to the row of teeth on the edge of the disk E and drop into the notches formed thereby. This arm is bent up to form a handle and then outwardly, and may, if desired, have a spring connection with its collar F' to permit its rocking action in entering or withdrawing its tooth from the notches of the disk. Such spring connection is shown in Fig. 4. A washer placed above the collar and a screw *c*, entering the central pin *a*, serve to hold the adjusting-arm in place, but still allow it to rock vertically and swing radially. The operation of this part of the device is as follows: The zero-point of the disk is placed opposite the zero-point of the graduated ring, which latter is indicated by a pointer *d*. Now, if the figures to be added be 12, 26, and 34, the tooth of the arm F is placed in the notch of the disk opposite the twelfth graduation on the inner side of the ring, and the arm is swung around to the zero-point in the direction of the arrow. The tooth of the arm is next placed in a notch of the disk opposite the twenty-sixth graduation in the inner side of the ring and the arm swung back to zero again. The tooth of the arm is then placed in the notch of the disk opposite the thirty-fourth graduation on the inner side of the ring and the arm again swung back to zero, which thus causes these numbers to be stored up, as it were, in a cumulative way upon the disk, which then shows at the pointer *d* the sum 72, which is the result of the addition of the foregoing numbers.

When the successive additions amount to more than one hundred and involve more than a complete revolution of the disk, the complete revolutions of said disk are indicated upon the outer scale of the ring by means of a movable hand *e* and intermediate gears, which I will now describe.

Upon the under side of the radial arms C'



and rotating upon the hub  $C^2$  is a toothed wheel  $G$ , having an arm  $G'$ , that reaches out to and carries the hand  $e$  at the outer periphery of the ring, as seen in Fig. 3. This wheel  
 5  $G$  is prevented from moving accidentally to a false position by a frictional contact secured by means of a spring or spring-washer  $f$ , clamped between the hub  $C^2$  and the hub of the case. In gear with the large wheel  $G$  is a  
 10 small pinion  $g$ , whose shaft extends through one of the radial arms and bears upon its upper end another pinion  $h$  with widely-separated teeth. The teeth of this pinion  $h$  are locked by a sliding detent  $i$ , which is guided  
 15 in a slot of the radial arm and is forced up to engagement with the pinion  $h$  by a spring  $j$ . On the upper side of the sliding detent is a cam  $k$ , which once in the revolution of the disk is acted upon by a cam  $k'$  on the under  
 20 side of the disk to withdraw the detent from the pinion, and at the same moment a lug  $l$  on the under side of the disk strikes one of the teeth of the pinion  $h$  and turns it one notch. This motion is transmitted to the  
 25 large wheel  $G$ , arm  $G'$ , and hand  $e$ , and the latter is shifted on the outer scale of the ring  $C$ , so as to mark a hundred for each complete revolution of the disk. To disengage the detent, so that the hand may be restored  
 30 to the zero-point, an arm  $m$  is attached to the detent and is bent up through a slot in the ring at  $n$  to permit the detent to be thus manipulated at will.

In making use of our invention we prefer  
 35 to have the case  $B$  and working parts pivotally mounted upon the plate  $A$ , so that the case may be turned instead of the arm  $F$  and for the further purpose of allowing the entire adding-machine to be readily turned around  
 40 to a new position without being lifted from the desk or table; but it is obvious that the adding-machine is complete and may be used without the plate  $A$  and pivotal mounting of the case  $B$ .

45  $K$  is an angular projection of the bottom plate or base of the device, which serves as a pointer to keep the place when stopping in the addition of a column of figures, and which projection is also perforated to permit the device to be hung up.  
 50

$L$  is a spring-detent to hold the disk  $E$  to its adjustment.

Having thus described our invention, what we claim as new is—

1. The combination, in an adding-machine, 55 of a ring  $C$ , graduated upon its outer edge with subdivisions and numbers representing hundreds and upon the inner edge with units extending around the circumference up to one hundred, a central toothed disk  $E$ , having 60 graduations and teeth corresponding in number and progression to those on the inner edge of the ring, means for rotating the disk, an index-hand at the outer circumference of the ring, and gears for connecting the disk to said 65 index-hand, substantially as shown and described.

2. The combination, in an adding-machine, of a ring  $C$ , graduated as described, the central toothed disk  $E$ , having a cam and actuating-lug on its under side, a spring-detent 70  $i$ , pinions  $g$  and  $h$ , the gear-wheels  $G$ , bearing-arm  $G'$ , index-hand  $e$ , and the friction spring-washer  $f$ , substantially as shown and described. 75

3. The combination, with the toothed disk and central pin, of the loose collar  $F'$  and the adjusting-arm  $F$ , connected thereto so as to rock, as described, and bent up to form a handle and then outwardly to engage the teeth 80 of the disk, substantially as shown and described.

4. The combination, in an adding-machine, of the central disk  $E$ , the ring  $C$ , graduated as described and provided with a slot in its 85 face, a train of gears connecting the disk with an index-hand moving over the ring, a detent arranged in said train of gears, and an arm  $m$ , connected to the detent and extending through the slot, substantially as shown and 90 described.

5. The combination of the base-plate  $A$ , having pivotal pin  $a$ , the containing-case  $B$ , the ring  $C$ , graduated as described and provided with radial arms  $C'$  and hub  $C^2$ , the 95 central toothed disk  $E$ , and the swinging adjusting-arm  $F$ , substantially as shown and described.

JOSEPH E. BLACKSHAW.  
 GEORGE H. ROGERS.

Witnesses to the signature of Blackshaw:  
 P. T. KILGOUR,  
 FRANCIS M. BIDDLE.

Witnesses to the signature of Rogers:  
 L. J. HALEY, Jr.,  
 OLIVER J. MILES.