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SLIDE DISK CALCULATOR.  
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1,075,124.

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Fig. 1.

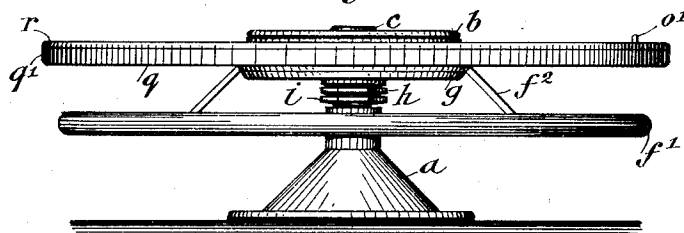


Fig. 2.

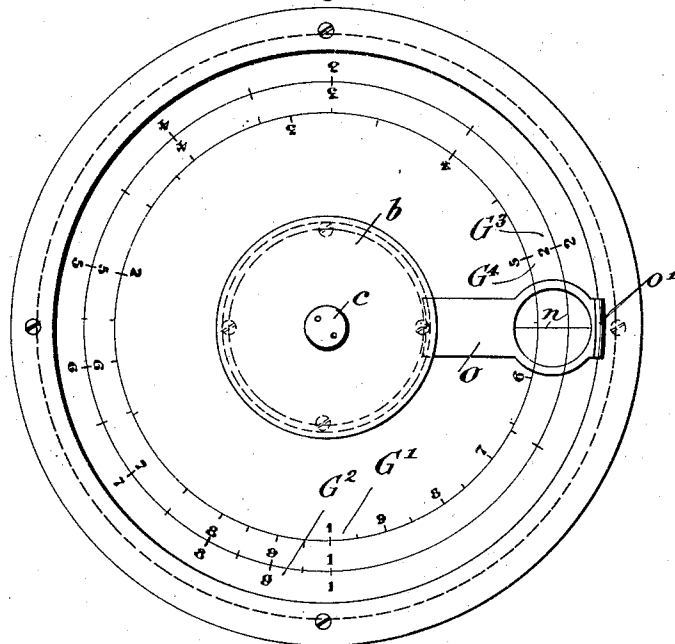
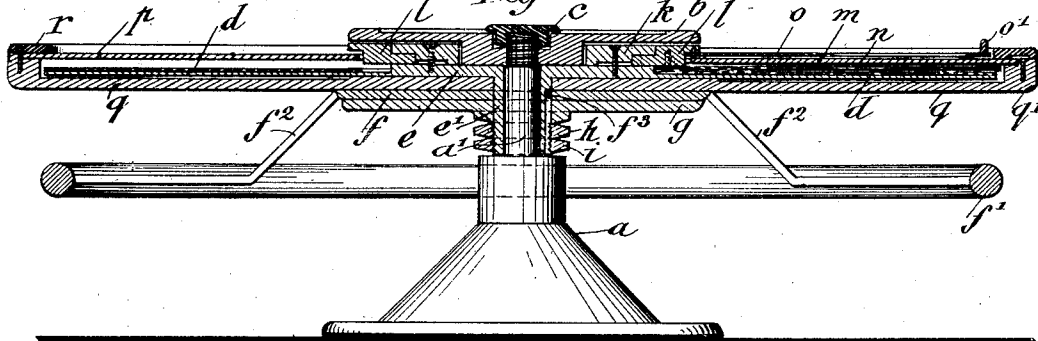


Fig. 3.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

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## SLIDE-DISK CALCULATOR.

1,075,124.

Specification of Letters Patent.

Patented Oct. 7, 1913.

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*To all whom it may concern:*

Be it known that I, JOHN ADOLPH SCHEIBL, a citizen of the United States of America, residing at West New York, in the county of Hudson, State of New Jersey, have invented a new and useful Slide-Disk Calculator; and I do hereby declare the following to be a full, clear, and exact description of the same.

Rectilinear computing rules are, even in the greatest known lengths in which they are constructed and used, too inexact or illegible in their graduations for most purposes, since on account of the lack of space in the short distance from the beginning to the end of the rule, a fine and legible division is impossible. Circular computing rules of a diameter of the length of those longest rectilinear computing rules are, on the contrary, not only very easily handled, but, on account of their 3.14 longer peripheral measurement, make possible a graduation more exact to that very extent. In contrast to the circular, the rectilinear computing rules also have the disadvantage that, according to the size of the result to be read, a second displacement of the rule in one direction or the other is necessary when computing, so that the result will not pass beyond the scale.

With the circular computing rules this disadvantage is done away with, since here a continuous scale can be employed. The circular computing rules on the other hand having only two gradually adjacent edges are limited to fewer possibilities of computing with direct reading of the results than the rectilinear rule, while the rectilinear computing rules have the advantage of being so arrangeable that by employing two pairs of mutually movable edges provided with graduations, and by one adjustment of the rule, the result of two computing processes, for instance, the product of three numbers, can be arrived at.

The purpose of the present invention is to combine the advantages of the rectilinear and the circular rules. The simple transfer of the rectilinear arrangement to the circular form would not result in a handy construction or one operating in a manner permanently free from objection, since the rule would have to be constructed circular and be exactly fitted inside as well as outside. This disadvantage would be present especially in

the larger computing rules which are required in the large majority of cases, since they are absolutely necessary for computation of comparatively precise exactness.

In the slide disk calculator according to the present invention, the graduations are placed on superposed disks, the upper of which, at least, is transparent.

A device embodying the invention is shown, by way of example, in the accompanying drawing, in which—

Figure 1 shows a side elevation of the device; Fig. 2, a plan view thereof, and Fig. 3 shows a partial vertical section on a larger scale.

A pair of graduations, an inner and an outer graduation  $G^1$ ,  $G^2$ , is placed upon the transparent disk  $p$ . This disk is fastened to the crown  $q'$  which provided with the covering ring  $r$  also serves as a handle to rotate the disk  $p$ . Between the disk  $p$  and the ring  $q$  is another disk  $d$  which is attached to the ring  $e$ . Upon the disk  $d$  are placed outer and inner graduations,  $G^3$  and  $G^4$ , which in the present case are alike and one of which is adjacent to the inner and the other to the outer graduation of the disk  $p$ . All these logarithmic graduations as is apparent from Fig. 2, run continuously in the same way around the circumference, but the inner graduation upon disk  $p$  is directed oppositely to the others. The hub  $e'$  carrying the ring  $e$  and in turn the disk  $d$  is rotatable upon the axis  $a'$  of the stand  $a$ . The stand can be attached to a desk, not shown, rotatable about a horizontal axis. A hand wheel  $f'$  serves to rotate the disk  $d$ , which wheel is supported on arms  $f^2$  carried by the wheel ring  $f$ , in turn engages by means of a lug  $f^3$ , with a recess in the hub  $e'$  integral with the ring  $e$ . By a nut  $h$  with counter nut  $i$  the ring  $g$  is pressed against the hand wheel ring  $f$ . The latter is pressed against the ring  $q$  which in its turn is pressed against the ring  $e$ . The disk-supporting ring  $q$  is therefore clamped between the disk-supporting ring  $e$  and the hand wheel ring  $f$ . The pressure can be regulated by adjusting the nuts  $h$ ,  $i$ . The result of this arrangement is that, upon rotating the hand wheel  $f'$ , in addition to the disk  $d$ , the crown  $q'$  and the disk  $p$  are carried along by friction, in case the two latter parts are not prevented from rotating by holding fast the crown. And

vice versa, upon rotation of the crown  $q'$ , in addition to the disk  $p$ , the disk  $d$  is also rotated by friction in case the hand wheel  $f'$  is not held fast.

5 In order to make possible the most exact reading, the indicator or runner  $m$  is not attached above the disks  $p$  and  $d$  but between them. The indicator is fastened to a ring  $l$ , which is pressed against the ring  $e$  by the ring  $k$  and hence through friction  
10 participates in the rotation of the disk  $d$ . After removal of the central nut  $c$  screwed onto axis  $a'$  and of cover plate  $b$ , the friction between ring  $l$  and ring  $e$  can be adjusted by means of the screws fastening ring  
15  $k$  to ring  $e$ . In order that the indicator may be rotated independently, an arm  $o$  is fastened to ring  $l$  above the indicator, the end of which arm is provided with a handle  
20  $o'$ . At the graduations the indicator  $m$  and the arm  $o$  are given a circular form and in the ring of the indicator is attached, for instance, a thread  $n$  formed of a fine metal wire or a hair-line upon a transparent plate.  
25 To carry out a computation, commencement is made either by rotating hand wheel  $f'$  while holding fast crown  $q'$ , or by rotating crown  $q'$  while holding fast hand wheel  $f'$ , or by simultaneous moving of both  
30 parts. When crown  $q'$  is left free, both disks are moved together by rotation on hand wheel  $f'$ . The movement of the disks can also be effected, of course, by rotation of the crown  $q'$ . In this way the slide disk  
35 calculator can be brought into such a position that the result will be directly in front of the person computing so that it will not be necessary for the computer to change his position, although the result of the computation is to be read, without rotation of the  
40 entire slide disk calculator, at a point lying opposite the person making the computation.

Instead of the graduations specially  
45 shown, graduations formed in a different manner may also be employed for different kinds of computations.

The graduation arrangement shown on the drawing can also be repeated, so that  
50 several pairs of graduations are arranged on one disk, adjacent to which are graduations arranged on the inside and outside of the other disk. Additional graduations can also be arranged on one disk which are  
55 not adjacent to the graduations on the other disk. The numbers on these graduations may be read off by employing the indicator.

It is understood that the word "disk" as used herein refers to the relatively movable  
60 parts of a calculator whether it be disk shaped or not.

I claim as my invention:

1. In a slide disk calculator, the combination of a pair of superposed graduated  
65 disks; a rotatable crown connected to one

of the disks; and a hand wheel connected to and remote from the other disk.

2. In a slide disk calculator, the combination of a pair of superposed graduated disks; a continuous rotatable crown  
70 secured to one disk; and a continuous hand wheel secured to the other disk and in a different plane therefrom.

3. In a slide disk calculator, the combination of a pair of superposed graduated  
75 disks; a continuous rotatable crown secured to one disk; and a continuous hand wheel secured to the other disk and in a different plane therefrom, said crown and wheel being separated a considerable distance from  
80 each other.

4. In a slide disk calculator, the combination of a pair of superposed graduated disks; a continuous rotatable crown secured to one disk; and a continuous hand wheel  
85 secured to and remote from the other disk, said crown and disk being disposed in widely separate parallel planes.

5. In a slide disk calculator, the combination of a stand; a pair of rings both rotatable on said stand; a pair of disks carried by the rings respectively; a crown connected to one disk; and a hand-wheel connected to the ring on which the other disk is  
90 carried.  
95

6. In a slide disk calculator, the combination of a support; a pair of co-axial disks rotatably mounted on said support; an indicator revolvably mounted on the support co-axially between said disks and spaced  
100 from both of them; and means holding said disks and indicator in spaced relation and yieldably connecting the disks, the indicator and the support.

7. In a slide disk calculator, the combination of a support; a rotatable disk having frictional engagement with the support; a second rotatable disk out of contact with the support and having frictional engagement with the first disk; and a revolving  
110 indicator having frictional engagement with the first disk and out of contact with the support.

8. In a slide disk calculator, the combination of a support; a rotatable disk mounted on said support; a second rotatable disk out of contact with the support and having frictional engagement with the first disk; and a revolving indicator associated with the disks.  
120

9. In a slide disk calculator, the combination of a support; a rotatable disk mounted on said support; a second rotatable disk out of contact with the support and having frictional engagement with the first disk; and a revolving indicator associated with the disks and having frictional engagement with one of the disks.  
125

10. In a slide disk calculator, the combination of a support; a rotatable disk having  
130

frictional engagement with the support; a second rotatable disk out of contact with the support and having frictional engagement with the first disk; a revolving indicator having frictional engagement with the first disk and out of contact with the support; means for adjusting the friction between the disks; and separate means for adjusting the friction between the indicator and the first disk.

11. In a slide disk calculator, the combination of a support; a rotatable disk mounted on said support; a second rotatable disk out of contact with the support and having frictional engagement with the first disk; a revolving indicator associated with the disks; and means for adjusting the friction between the disks.

12. In a slide disk calculator, the combination of a support; a rotatable disk mounted on said support; a second rotatable disk out of contact with the support and having frictional engagement with the first disk; a revolving indicator associated with the disks and having frictional engagement with one of the disks; and means for adjusting the friction between the indicator and said one of the disks.

13. In a slide disk calculator, the combination of a support; a rotatable disk having frictional engagement with the support; a second rotatable disk out of contact with the support and having frictional engagement with the first disk; a revolving indicator having frictional engagement with the first disk and out of contact with the support; and means for adjusting the engagement between the first disk and the support.

14. In a slide disk calculator, the combination of a pair of disks; an indicator therebetween; means for supporting the indicator and holding it out of contact with the disks; and separate means for rotating the first named means.

15. In a slide disk calculator, the combination of a pair of superposed disks relatively concentrically rotatable, one of which has a central opening; a support concentrically rotatable relative to said disks; an indicator between the disks secured to said support; and a strong arm secured to said support and disposed above the top disk.

16. In a slide disk calculator, the combination of a support; a pair of disks rotatably mounted thereon; an indicator between the disks; a ring supporting the indicator and holding it out of contact with the disks; a strong arm secured to the ring; and a non-rotatable top plate disposed higher than the disks and carried by said support.

17. In a slide disk calculator, the combination of a pair of disks and a ring rotatable about a common axis; a manipulating arm secured to said ring and having a handle; and an indicator secured to said ring in a

horizontal plane different from horizontal plane of the arm, and associated with one of the disks.

18. In a slide disk calculator, the combination of an upper disk; a lower disk beneath the upper disk; an arm above the upper disk; an indicator between the disks; and a member connecting the arm and indicator.

19. In a slide disk calculator, the combination of an upper disk having a central opening; a lower disk beneath the upper disk; an arm above the upper disk; an indicator between the disks; and a member disposed in said opening and connecting the arm and indicator.

20. In a slide disk calculator, the combination of an upper disk having a central opening therein; a lower disk beneath the upper disk; a ring in said opening; an indicator between said disks and secured to the ring; and an arm above the upper disk and secured to the ring, said disks and ring being rotatable about a common axis.

21. In a slide disk calculator, the combination of an upper disk; a lower disk; a ring plate below the lower disk and supporting the upper disk; a manipulating wheel below the ring plate and connected to the lower disk; an indicator between the disks; and an arm connected to the indicator and disposed above the upper disk, said disks, plate, wheel, indicator and arm being rotatable about a common axis.

22. In a slide disk calculator, the combination of an upper disk; a lower disk; a ring plate below the lower disk and supporting the upper disk; a manipulating wheel below the ring plate and connected to the lower disk; an indicator between the disks; an arm connected to the indicator; and a supporting member around the axis of which said disks, plate, wheel indicator and arm rotate.

23. In a slide disk calculator, the combination of a supporting shaft; a hub rotatably mounted thereon; a lower disk mounted on the hub; a ring plate rotatably mounted on the hub below the lower disk; an upper disk mounted on the ring plate and disposed above the lower disk and provided with a central opening; a ring rotatably mounted within said opening; an indicator carried by the ring and disposed between the disks; a manipulating arm carried by the ring and disposed above the upper disk; and a manipulating wheel below the ring plate and connected to the hub.

24. In a slide disk calculator, the combination of a supporting shaft; a hub rotatably mounted thereon; a lower disk carried by the hub; a ring plate rotatably mounted on the hub below the lower disk and provided with a peripheral crown; an upper plate mounted on said crown, above the

lower disk and having a central opening,  
a ring rotatably mounted within said opening;  
an indicator carried thereon between  
the disks; a manipulating arm mounted on  
the disk above the upper disk; and a manipulating  
ring below the lower ring plate  
and connected to the hub.

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

JOHN ADOLPH SCHEIBLI.

Witnesses:

FRANK H. LOGAN,

ALFRED R. ANDERSON.