V. A. MAYER.

CALCULATOR.

APPLICATION FILED OCT. 20, 1916.

1,312,797. Patented Aug. 12, 1919.

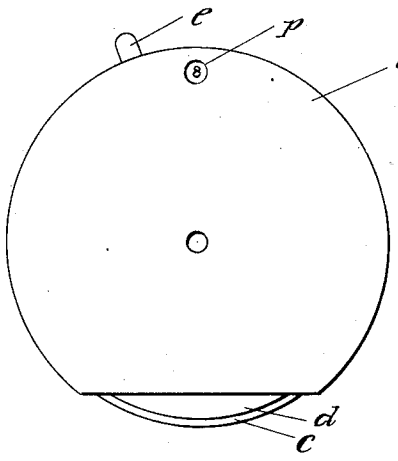

FIG. 1.

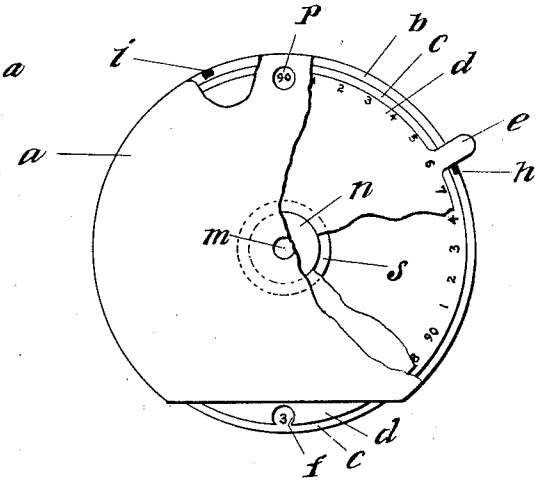

FIG. 2.

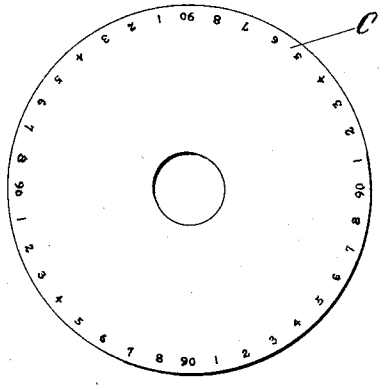

FIG. 3.

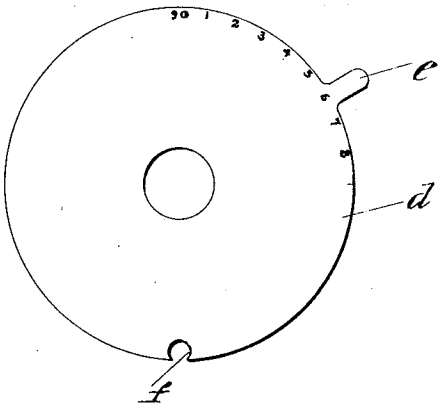

FIG. 4.

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CALCULATOR.

1,312,797. Specification of Letters Patent. Patented Aug. 12, 1919.

Application filed October 20, 1916. Serial No. 126,673.

To all whom it may concern:

Be it known that I, VIRGINIUS A. MAYER, a citizen of the United States, residing at Wollaston, in the county of Norfolk and State of Massachusetts, have invented new and useful Improvements in Calculators, of which the following is a specification.

The subject of the present invention is a calculator or calculating device, which in the present embodiment is equipped with means for achieving a special result, fully explained and described in the following specification, but of which its mechanical features are adapted to be applied to the general purposes of arithmetical calculations in addition, subtraction, multiplication, and division. Accordingly I claim herein as my invention not only the calculator organized for the special purpose referred to, but also the calculator having the characteristics hereinafter described for all purposes to which it may be adapted by the application on the parts thereof of proper numerical, or other, symbols and characters.

The particular purpose for which the instrument organized as shown and described in detail herein, is designed, is that of apparently determining a certain number which is known only to a person other than the operator of the instrument. To explain this statement let it be assumed that the person referred to is instructed to fix in his mind a number, which may be any number composed of two or more digits; then to subtract from that number the sum of the digits composing the number, drop from the remainder one of the digits of the remainder, and disclose to the manipulator of the device the remaining digits of such remainder. The manipulator then by appropriate manipulation of the calculator is able to discover and disclose the digit thus dropped. The characteristics of the instrument by which it is possible to obtain the results indicated, together with the mechanical characteristics which are of general utility for a numerical calculator and are included in the present invention, are explained in the following detailed description of the particular embodiment of the invention herein presented.

In the drawings forming a part of the present application,

Figure 1 shows a front elevation of the instrument referred to.

Fig. 2 is a similar view with parts broken away to show all of the elements of the calculator.

Figs. 3 and 4 are detailed elevations showing the two movable disks of the calculator separated from all other parts.

The same reference characters indicate the same parts in all the figures.

The instrument or calculator comprises a casing consisting of a front plate *a*, and a back plate *b*, and two movable disks *c* and *d*, the latter disk having an operating handle *e* and having also in or near its periphery a notch or opening *f* which serves as a sight opening or window. The walls of the casing are preferably circular in form and are arranged concentrically with the two movable disks, the handle *e* of the disk *d* projecting from the periphery of the casing in easily accessible position between two stops *i* and *h* which limit the angular movement of this disk.

A washer *n* is located between the casing members *a* and *b* at the center thereof and is fastened thereto, either by adhesive or other means, or by an eyelet which may be placed in a hole *m* passing through the common center of the casing and washer and headed over on the outer faces of the casing. The washer *n* is of slightly greater thickness than the combined thickness of the disks *c* and *d* and serves as a bearing on which said disks may turn, the latter having central holes which fit the periphery of the washer. Between the disks and surrounding the washer *n* is a spacing washer *s* to prevent frictional contact between the disks, whereby one may be turned without turning the other. The casing plates may be connected to one another at their peripheries as well as at their centers, and the stops *i* and *h* are preferably made as connecting elements also. Any means suitable for the purpose of securely connecting the plates *a* and *b* together and at the same time leaving space enough between them so that the disks *c* and *d* may be freely turned independently of one another, may be provided within the scope of this invention.

The casing is cut away at one side, substantially as shown, so as to expose a part of the periphery of the disks to enable the user to grasp and turn these disks, and the disk *d* is preferably of smaller diameter than the disk *c*, so that the latter may

be turned independently of the former. There is a sight opening *p* in the plate *a* diametrically opposite to the cut away side of the casing.

On the face of the disk *c* near the periphery thereof is a series of equally spaced numbers running consecutively from 1 to 9. Beside the "9" of this series and occupying part of the space provided therefor is a zero. The use of the instrument for the special purpose indicated is facilitated by having this series of numbers repeated two or more times, and I have shown four sets of such numbers occupying the entire periphery of the disk and spaced ten degrees apart. It is to be understood, however, that I do not limit the invention to any particular number of series or sets of these numbers, it being sufficient for my purpose if there is at least one set of such numbers, and that however many there may be, the numbers must be equally spaced and must extend entirely around the periphery of the disk. These numbers read from left to right at the bottom of the disk.

On the disk *d* is a single series of numbers reading from left to right at the top of the disk and spaced equally with the numbers on the disk *c* The numbers on disk *d* are as follows. "9" "0" in one space, "1", "2", "3", "4", "5", "6", "7", and "8" in the succeeding spaces. These numbers are so placed that the "9" and "0" will appear simultaneously through the window *p* when the arm is against the stop *h*, and the other numbers may be placed one at a time in view through this window by turning the disk; the stop *i* being located to arrest the handle *e* when the last number of the series is so exposed to view. The numbers on the disk *c* are placed so that they may be similarly exposed to view through the sight opening or window *f* of the disk *d*, and the latter window is located to be exposed below the cut away side of the casing when the handle *e* is against the stop *h*.

The manipulation of the instrument requires both disks to be turned in unison at certain times, and the disk *d* to be turned independently at other times. Therefore I provide means for impeding the rotation of the disk *c* and relieving it of frictional contact with the disk *d*. Part of this means consists in giving the disk *c* a dished or concave formation, and another part consists of the washer *s*. Thereby the disk *c* bears against the backwall of the casing at its periphery and bears against the disk *d* only through the narrow area at its center which is in contact with the washer *s*. In consequence it is possible to turn the disk *d* back and forth freely by means of its handle *e* without danger of moving disk *c*.

The use of the calculator may best be described with reference to a specimen example. The person operating the instrument, who may be called the "manipulator", instructs the other person, who may be called the "subject", to select any number at random, for example 7438, then to add the values of the digits of this number, the sum of which is 22; then to subtract 22 from the number, which leaves as the remainder 7416; and finally to drop one of the digits from the remainder, for instance, the digit 4, leaving as the final result the digits 716. This last result, namely the digits 7, 1, and 6, are disclosed to the manipulator, and these are the only numbers of the whole operation thus disclosed. The manipulator then places the disks *c* and *d* so that the numbers "9" "0" appear through both windows *p* and *f*. Then he turns both disks in unison until the number "7" appears at the window *p*, then reverses disk *d* by means of the handle *e* until the latter brings up against the stop *h*, then moves both disks in unison until the digit "1" appears at the window *p*, then returns the handle *e* to the stop *h*, then moves both disks together until "6" appears at the window *p*, and finally returns the handle *e* to the stop. Then the number "4" appears in view through the window *f*, and this number is the digit which was dropped as above described, by the subject. In this manner the instrument may be used for the purpose of apparent mind reading.

The principle on which the instrument operates as above described depends on the property of numbers, that when the sum of the digits of any number is substracted from the number the remainder is a multiple of 9, and the sum of the digits of the remainder is also a multiple of 9; wherefore if one of the digits of this remainder is dropped, the dropped digit can be determined by adding the remaining digits and substracting the sum thereof from the number which is the next larger multiple of 9. If the digit dropped is either zero or 9 the result is indeterminate because the sum of the remaining digits in the remainder is equal to a multiple of 9, and for this reason the digits "9" and "0" are placed in the same space so that when they appear through the window *f* the manipulator may inform the subject that the dropped digit is either 9 or 0. It is evident that the manipulation of the instrument as described subtracts the several digits given by subject from a multiple of 9 and that the digit which finally appears at the window *f* represents the number which if subtracted would leave zero. The result is certain to be accurate because the numbers on the disk *c* are arranged in multiples of 9.

It is evident that the instrument may also be adapted for the purposes of ordinary arithmetical calculations by providing a

consecutive series of numbers on the disk *c* running to any desired amount within the limits of the peripheral length of the disk.

The instrument is adapted to be made of any sheet material having enough stiffness to resist crumpling; such materials including stiff paper stock, celluloid, metals and so forth. It is also adapted to be made of relatively slight thickness, that is, not much more than four or five five times the thickness of a single sheet of stock used, wherefore it may be conveniently carried in the owner's pocket. I do not restrict the invention, however, to the features last mentioned, or indeed to any of the details of the construction hereinbefore described, since the invention in the broadest scope whereto I claim protection embraces any arrangement of movable number carrying elements with a casing or sight openings or windows, or equivalent sighting means, capable of operation in the manner and for the purpose hereinbefore indicated. For instance, I may make the disks of substantial thickness and carrying numbers on their peripheries, the casing then having a window or sight opening for each disk. Means for rotating the disk corresponding to disk *d* may be of other sorts than the handle *e*, as for example a knob connected coaxially with the disk, or a lug projecting from the face of the disk through the end of the casing.

What I claim and desire to secure by Letters Patent is:

1. A calculator comprising a casing having a window, a disk bearing a series of numbers arranged to appear at said window, and itself having a sight opening and a second disk having a series of numbers covered by said first disk and arranged to appear singly at said opening, the disks being coaxial and rotatable relatively to the casing and to one another and the casing formed to expose the peripheral parts of the disk elsewhere than at said window.

2. A calculator comprising a casing having a window, a disk bearing a series of numbers arranged to appear by rotation of the disk singly through said window, and itself having a sight opening, and a second disk coaxial with the first disk and covered thereby having a series of numbers arranged to appear at said opening, the disks being rotatable relatively to the casing and to one another, their peripheries projecting beyond a part of the casing whereby they may be grasped and simultaneously turned, the casing having stops spaced apart and the first-named disk having a handle extending from the casing between said stops, for turning and also limiting rotation of said disk.

3. A calculator comprising a casing, a disk rotatably mounted in said casing bearing a series of numbers equally spaced throughout its circular extent and running from 1 to 9, and a second disk having a series of numbers running from 1 to 8, in the opposite direction from the numbers on the first disk and spaced equally therewith; the second disk being arranged to cover the numbers of the first disk and having a sight opening through which said numbers appear singly, and the casing having a sight opening through which the numbers of the second disk singly appear, and being cut away to expose the zone of the second disk in which the sight opening in the latter is located.

4. A calculator comprising a casing, a disk rotatably mounted in said casing bearing a series of numbers equally spaced throughout its circular extent and running from 1 to 9, and a second disk having a series of numbers running from 1 to 8, in the opposite direction from the numbers on the first disk and spaced equally therewith; the second disk being arranged to cover the numbers of the first disk and having a sight opening through which said numbers appear singly, the casing having a sight opening through which the numbers of the second disk singly appear and being elsewhere cut away to expose the zone of said second disk in which the sight opening of the latter is located, and the casing and second disk having coöperating stops to arrest the disk in a given position with respect to the sight opening of the casing.

5. A calculator comprising two coaxial rotatable elements each having a series of numbers spaced equi-angularly about its axis, and a casing in which said elements are contained, having sighting means at which numbers on one of said elements may be singly exposed to view, the element last identified being arranged to cover the numbers on the other of said elements and having a sight opening through which single ones of such numbers may be exposed to view at the same time that a number on the previously identified element is exposed at the aforesaid sighting means.

6. A calculator comprising a rotatable member bearing a repeated series of numbers from 1 to 9 equally spaced about its axis and from its center, a second coaxial rotatable element having a series of numbers from 1 to 8 running oppositely to the numbers on the first element and having an angular spacing equal to the latter, a casing inclosing said elements, sighting means for exposing single numbers of the series on both elements at the same time, the other numbers being all covered, means whereby the elements may be turned together in one direction, and means whereby the second element may be turned alone in the opposite direction.

7. A calculator comprising two disks coaxially and rotatably mounted and a casing inclosing said disks entirely except parts

thereof which are exposed so as to be grasped and turned together, both disks bearing numbers in series, and the aforesaid exposed part of one disk having a sight opening through which the numbers on the other disk may be seen, the first named disk also having a handle by which it may be turned relatively to the second disk, and the casing having a window through which the numbers on said first-named disk may be seen.

In testimony whereof I have affixed my signature.

VIRGINIUS A. MAYER.