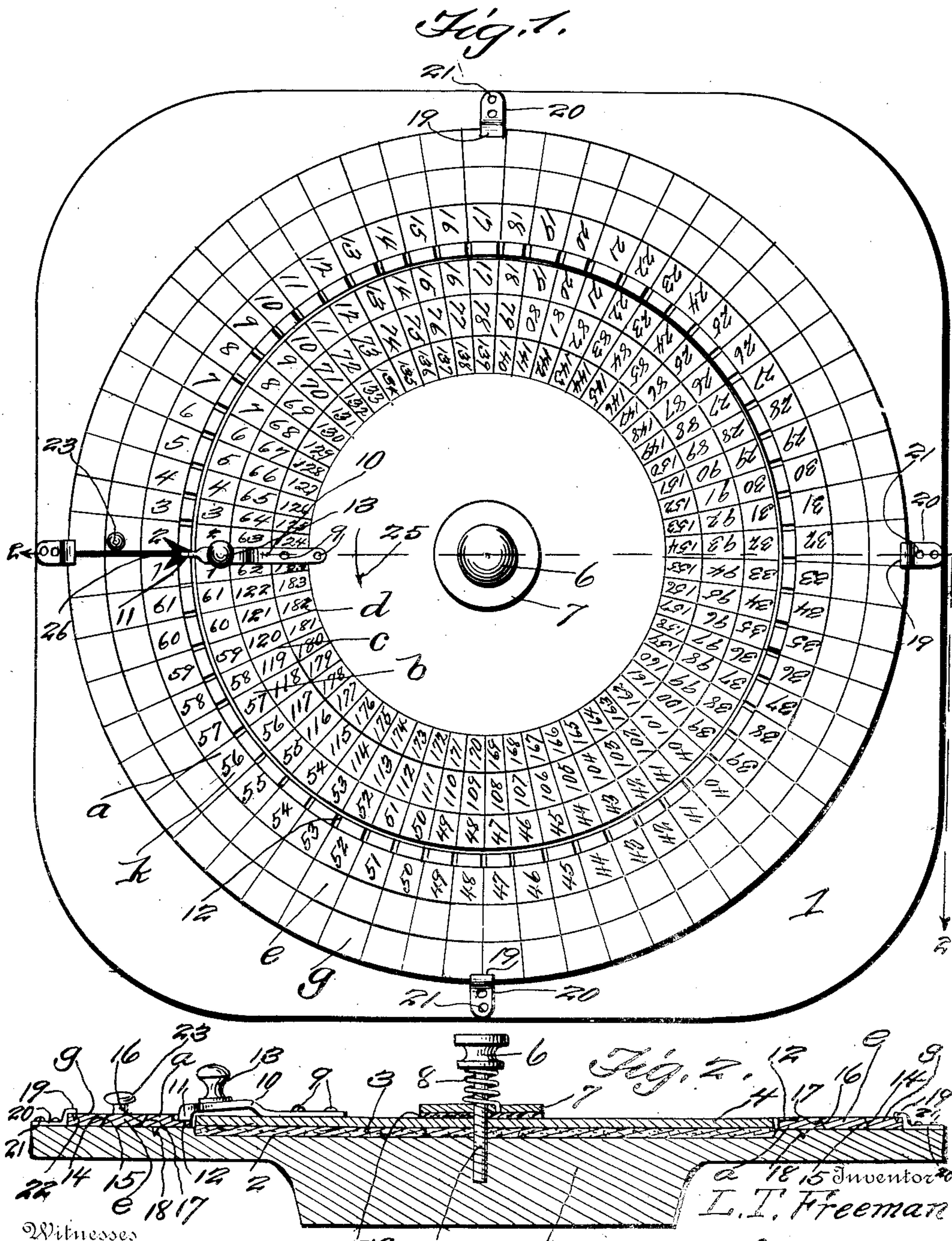


L. T. FREEMAN.
EDUCATIONAL APPLIANCE.
APPLICATION FILED OCT. 3, 1910.

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Patented July 18, 1911.

3 SHEETS—SHEET 1.



Witnesses

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EDUCATIONAL APPLIANCE.

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To all whom it may concern:

Be it known that I, LABAN T. FREEMAN, a citizen of the United States, residing at Brookville, in the county of Noxubee and State of Mississippi, have invented a new and useful Educational Appliance; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention belongs to the art of calculating devices, and it refers particularly to a new and useful gearless device, capable of being made very cheaply and operated without difficulty.

The invention in its broadest aspect aims to provide a device comprising a series of numbered members, arranged in such a manner that sums in addition, division, subtraction and multiplication can be effected without difficulty, the members being manually operated.

Another object of the invention is the construction of a calculating device constructed without gears and complicated mechanisms, and furthermore to provide a device which will occupy but a very little space when in use.

A further object of the invention is to provide novel means for mounting the various disks or annular members, and, furthermore, to devise means to afford friction for the various members, in order to retard them to a certain extent, when rotating them, and hold them in the desired positions.

The invention aims as a further object to provide a resilient member, carried by the central annular disk, which will engage the adjacent surrounding annular member, and hold the central disk or member in the position desired, said central annular member may only be moved a notch at a time.

A further feature of the invention is to provide one or more annular rings surrounding the central disk, so constructed as to hold the intermediate annular ring of the three from upward displacement, the other two being secured in position as shown in Fig. 2. The drawings, however, only disclose one form of the invention, but in practical fields this form may require certain alterations, to which the applicant is entitled, provided the alterations are comprehended by the appended claim.

Other features and combinations of parts

will be hereinafter more fully set forth, shown in the drawings and claimed.

In the drawings, Figure 1 is a plan view of the device, showing the various moving parts thereof in their normal positions. Fig. 2 is a sectional view on line 2—2 of Fig. 1, showing the detailed structure of the various outer annular rings in order to hold them in place, and to illustrate the means to provide friction for the central annular disk. Fig. 3 is a view similar to Fig. 1, showing the central annular disk or member in such a position that five (5) is opposite one (1) of the annular ring *a*, in order to show the result of four plus four, the result of which is eight, eight being found opposite four of the annular ring *a*. To obtain this result, the central annular member is rotated in order that the resilient device carried by the central disk or member engages four distinct notches, exclusive of the starting notch, which will bring eight (8) opposite four (4). Fig. 4 is a view similar to Figs. 1 and 3, illustrating the fact that fifty-seven (57) has been added to fifty-nine (59), the result of which is one hundred and sixteen (116), said result being indicated in column *c* of the annular disk or member. This result appears opposite fifty-nine (59) of the annular ring *a*; in obtaining this result, the annular disk or member has to be rotated so that the resilient device will engage fifty-seven distinct notches exclusive of the starting notch, which will bring fifty-eight (58) of the column *b* opposite one (1) of the annular ring *a*.

Referring to the drawings, in which the preferred form of the invention is illustrated, 1 denotes a supporting board or base, on which the various members are arranged. This supporting board or member is recessed, as shown at 2, to receive a disk of felt 3, which affords friction for the annular rotating disk 4. Penetrating the annular rotating disk 4 and the felt, and into the supporting board or base, is the shank 5 of the thumb screw 6, by which, together with the disk 7, the annular rotating disk 4 and felt 3 is held in place, there being a spring 8 coiled about the shank and located between the disk 7 and the head of the thumb screw, in order to hold the various parts down upon the base or board 1. The spring 8 is anchored to the disk 7, as seen in Fig. 2, there being a piece of felt

9 arranged between the disk 7 and the annular rotating disk 4. By this structure, friction is afforded for the annular rotating disk 4. This annular rotating disk 4 has
 5 secured to it, by means of rivets 9, a spring or resilient device 10, the nose 11 of which is designed to engage any one of the various notches 12 of the annular ring *a*. This spring or resilient device 10 is provided with
 10 a thumb piece 13, by which the annular rotating disk 4 may be rotated. Furthermore, by this thumb piece, the spring or resilient device 10 may be raised, so as to remove its nose from any one of the various
 15 notches.

There is provided a plurality of annular rings which surround one another and the annular disk or rotating member 4. These plurality of annular rings are designated by
 20 the characters *a*, *e* and *g*. The annular ring *g* has its inner periphery beveled, as indicated at 14, which engages the bevel 15 of the annular ring *e*. The inner periphery of the annular ring *e* is also provided with
 25 a bevel 16 similar to the bevels 14 and 15, in order to engage the beveled outer periphery 17 of the annular ring *a*. It will be observed, however, that the annular ring *e*, by these various bevels, is prevented from
 30 upward displacement, while the annular ring *a* is prevented from rotating by the lugs 18, which penetrate into the supporting base or board. The annular ring *a* is not only prevented from rotating, but is also prevented
 35 from upward displacement by the cooperating bevels 16 and 17. The annular outer ring *g* is prevented from upward displacement by the turned over portions 19 of the plates 20, which are secured to the board or
 40 supporting base by means of small bolts 21, as seen in Figs. 1 and 2, as well as the other views of the device. The portions 19 of the plates 20 are provided with downwardly extending pointed lugs 22, which enter the
 45 outer annular ring *g*, in order to prevent rotating of the said ring. The intermediate annular ring *e* is permitted to rotate, when it is so desired, and is accomplished by gripping the knob 23. This intermediate annular ring *e* is only rotated, however, when
 50 there is one or more columns of figures to be added, say for instance, if there are three columns of figures to be added, you add the first column by the use of the annular ring
 55 *a*, which is cooperated with any one of the columns of figures upon the annular disk 4, but, however, especially by the column *b*. To add the second column, you utilize the column of figures upon the annular ring *e*,
 60 with which any one of the columns of figures upon the disk 4 may cooperate, it being understood, however, that the annular ring *e* in this instance is not moved. However, the annular ring *e* is utilized, by moving the
 65 same, in order to add the third column of

figures, and in so doing, the numerals indicated upon this annular ring *e* cooperate in conjunction with the numerals on the stationary annular ring *g*. The intermediate annular ring *e* and the outer annular ring *g*
 70 are not provided with a series of numerals, as shown in the drawings, in order to obviate the possibility of complicating the device, insofar as illustrations and explanations are concerned, for the reason that the procedure
 75 in regard to adding with these members is the same as with the numerals of the annular ring *a* and the disk 4.

The annular disk 4 is provided with an annular column of numerals ranging from
 80 123 to 183. It is also further provided with two annular columns *b* and *c* of figures ranging from 1 to 61 and from 62 to 122 respectively, while the annular ring *a* is provided with a column of numerals *k* rang-
 85 ing from 1 to 61.

The annular member 4, the means for holding the same in place, and the spring or resilient device 10, together with the board or support 1, upon which the various
 90 annular rings are mounted, constitute the complete device.

When it is desired to add a given sum, the various members are arranged so that the numerals thereof are in alinement, as
 95 shown in Fig. 1, in which the initial positions of the movable members are disclosed. Suppose it is desired to add the sum of four (4) plus four (4). The central disk or annular member 4 is moved to the left in the
 100 direction of the arrow 25, until the numeral five (5) of the first outer annular column of figures of the rotating member 4 passes the black arrow 26 and arranges opposite the numeral one (1) of the annular ring *a*. By
 105 looking at the numeral 4 of the annular ring *a*, to which numeral 4 the other four (4) is added, you will find the numeral 8 appearing opposite to it, which numeral 8 is in the first outer column of numerals of the
 110 annular rotating member 4. To add an additional numeral four (4) to the sum of eight, the central rotating member or disk 4 is again moved so that the spring or resilient device engages four distinct notches
 115 exclusive of the second starting notch, and you will find the numeral 12 of the outer annular column of numerals of the disk 4 appearing opposite the numeral 4 of the annular ring *a*. This further movement,
 120 however, is not disclosed. The process of subtraction is carried out by reversing the process necessary to add. As for instance, when the numeral twelve (12) is opposite the numeral four (4), as above stated, and
 125 it is desired to take four (4) from twelve (12); the annular rotating member 4 is moved to the right so that the spring or resilient device engages four distinct notches, and you will find the numeral 8 of the annu-
 130

lar outer column of numerals of the member 4 opposite the numeral 4 on the annular ring *a*.

If it is desired to add fifty-seven (57) and fifty-nine (59), the result of which is one hundred and sixteen (116), found in column *c* of the annular member 4, you rotate the annular member 4 until one more than the number you are adding, say for instance 58, is brought opposite the numeral 1 of the member "*a*". In using this device, you only add numbers, that are in the range of the numbers upon the annular member 4, that is numbers which when added will give a result found upon the annular disk 4. It being understood, however, that by increasing the diameter of the member 4, and increasing the number of columns of numerals thereon, more than 2, 3, 4, or 5 or more items may be added. As herein before stated, the result of adding two numbers, is found opposite to one of the numbers on the member *a*, as in the case of 116 appearing in registration with the number 58, which is the particular reason why the member *a* is provided with the numerals 1 to 61 inclusive. After arranging the numeral 58 in registration with the numeral one (1) of the annular ring *a*, you will find one hundred and sixteen (116) of column *c* of the annular disk 4 opposite fifty-nine (59) of the annular ring *a*, to which numeral fifty-nine (59) the numeral fifty-seven (57) has been added. In adding any two numerals, the result of which would appear in column *d* of the disk 4, the pro-

cedure is identical with that previously named.

The invention having been set forth, what is claimed as new and useful is:—

In combination, a base member having a central recess, an annular disk of felt arranged in the recess, a central annular member rotatable on the felt and provided with annular columns of numerals, a smaller disk of felt arranged on and above the central annular member, a small metal disk arranged above the second disk of felt, a screw passing through the disks and felts, a spring interposed between the head of the screw and the second metal disk, said central annular member having a resilient device, an inner and outer annular ring and an intermediate ring, said rings having inter-engaging beveled surfaces, constituting means for holding the intermediate ring in position, said inner ring having lugs to engage the base and provided with notches to be engaged by the resilient device, plates having overhanging portions to engage the outer ring, said overhanging portions having lugs penetrating the outer ring, said intermediate ring being movable for the same reason that the central member is movable.

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

LABAN TAYLOR FREEMAN.

Witnesses:

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J. C. NANCE.