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B. F. STUMP.

CALCULATING MACHINE.

APPLICATION FILED APR. 8, 1907.

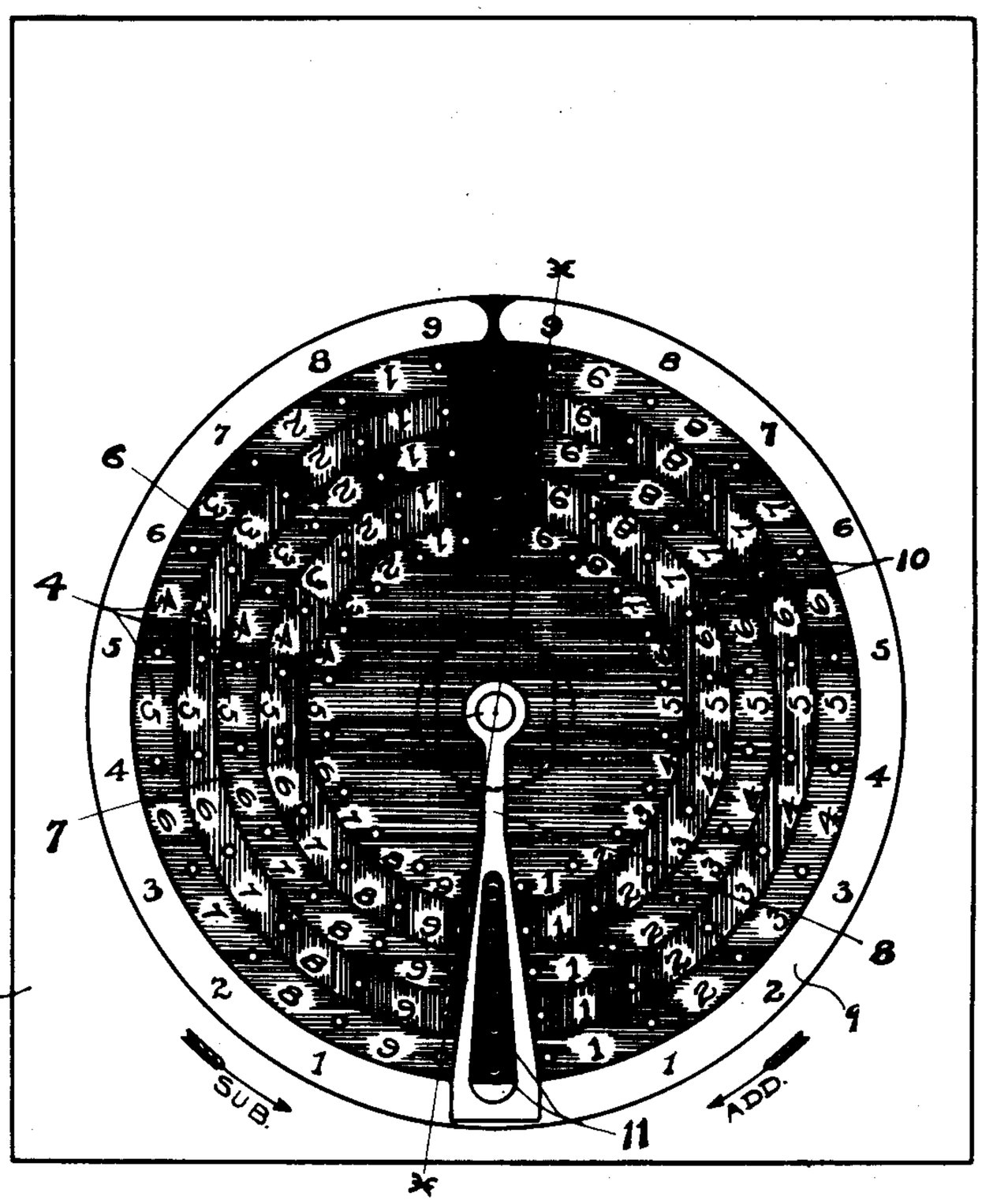

Fig. 1.

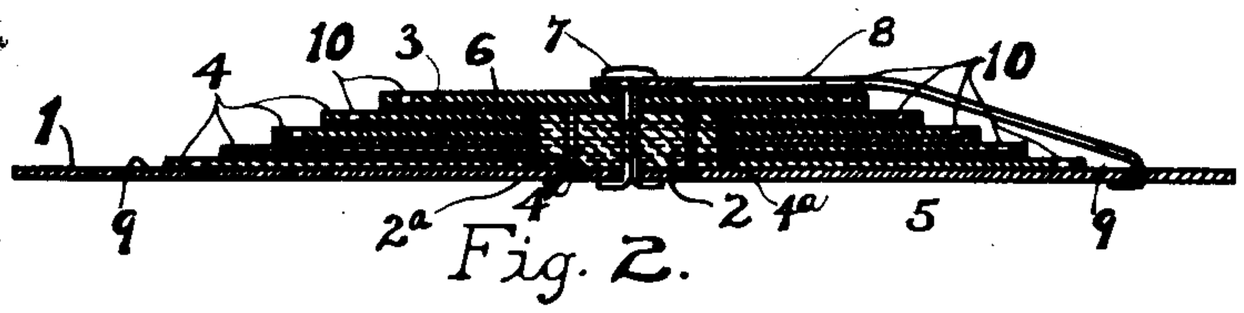

Fig. 2.

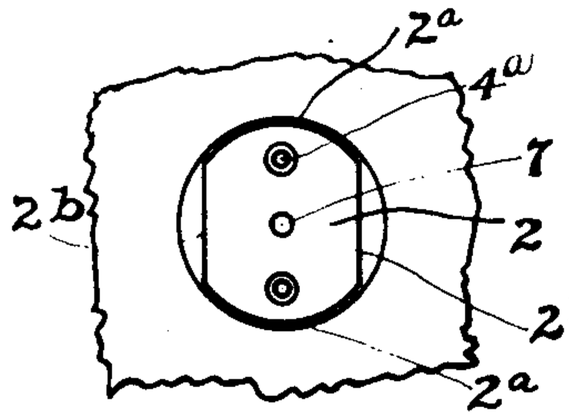

Fig. 3.

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CALCULATING-MACHINE.

No. 865,808. Specification of Letters Patent. Patented Sept. 10, 1907.

Application filed April 8, 1907. Serial No. 367,104.

To all whom it may concern:

Be it known that I, BENJAMIN F. STUMP, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Calculating-Machines, of which the following is a specification.

My invention relates to improvements in calculating machines, and the primary object of the invention is to provide a device of this class which will be exceedingly simple in construction, cheap of manufacture, efficient in use, and much better adapted to its intended purposes than any other device of the same class with which I am acquainted.

The present embodiment relates more particularly to that class of calculating machines known as "concentric-disk adding and subtracting machines", comprising, in the present instance, five concentric disks mounted on a back-plate by means of a trunnion or axle-stud, secured to and extending above said back-plate, and a pivot or axle-pin, said disks being separated so as to allow or permit of independent movement or rotation upon the trunnion and axle-pin by means of stationary or non-rotatable washers or separating-disks.

The back or base-plate and the concentric rotatable computing-disks are preferably made of card-board, and the washers or separating-disks of heavy paper, the device being admirably adapted for use as an advertising novelty.

With the above mentioned and other objects in view, the invention consists in the novel construction, arrangement and combination of parts, hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims.

Referring to the drawings, Figure 1, is a plan view of a machine embodying my invention, the computing-disks being shown in normal position. Fig. 2, a cross sectional view taken through line x—x, of Fig. 1. Fig. 3, a top plan view of the back-plate trunnion or axle-stud portion, the top computing disk, and top or cap separating-disk being removed for the purpose of clearer illustration.

Similar characters of reference designate like parts throughout all the figures of the drawings.

The improved calculating device comprises a back or base-plate 1, provided with a trunnion or axle-stud 2, carrying a top or cap separating-disk 3, the latter being secured to the trunnion or stud 2, in any suitable and convenient manner, but, preferably by means of retaining-pins or rivets 4, passing through the trunnion or stud 2, and also securing the latter to the back or base-plate 1, as shown in the drawings. The trunnion or stud 2, however, may be made integral with the base or back-plate 1, or built up therefrom by means of layers of card-board pasted or glued together.

A series or plurality of concentric computing-disks 4, are rotatably-mounted upon the trunnion or axle-stud 2, and, in order to provide for the independent movement or rotation of the several disks so that the movement of any one disk will not in any way cause the movement of another or adjacent disk, a series or plurality of stationary or non-rotatable separating-disks 5, are mounted upon the trunnion or axle-stud 2, and interposed between the computing-disks 4.

As a means for providing for the rotation of the computing-disks 4, and of preventing the rotation of the separating-disks 5, the trunnion or axle-stud 2, is provided with diametrically-opposite rounded axle-bearing sides 2^a, for taking into the central round or bearing opening of the disks 4; and diametrically-opposite flat sides 2^b, for impinging against corresponding sides of a central opening of the separating-disks 5, said opening of the separating-disks 5, being of a shape or outline corresponding with the form or contour of the trunnion or axle-stud 2. When the top or cap separating disk 3, is secured in proper position to the top of the trunnion 2, it will retain the computing-disks 4, in proper position about the trunnion 2, as well as separate the top or cap computing-disk 6, from the next lower computing-disk 4. The last or cap computing-disk 6, is retained in position by means of a pivot or axle-pin 7, passing through a central opening of the trunnion 2, and riveted or otherwise secured to the back or base-plate 1, said axle-pin being preferably in the form of an ordinary paper-fastener as shown, and an indicator stop-plate 8, hereinafter more fully described, the upper portion of which extends to the center of the disks and is secured in position at its upper end by means of said axle-pin 7, and at its base portion is preferably passed through the base-plate 1, and riveted or turned over as shown.

An annular index space 9, is provided on the base-plate 1, surrounds the largest or base computing-disk 4, and is divided into twenty equal spaces two of which are diametrically-opposite each other and form zero spaces at the base and top, the intervening spaces on each side being numbered consecutively from 1 to 9, inclusive, commencing with the spaces on each side of the zero space at the base and numbered in opposite directions. Said numerals are known as "index numerals" and it will be observed that they are placed on the marginal edges of the spaces they designate as shown most clearly in Fig. 1, of the drawings.

The computing-disks 4, are divided into an equal number of spaces defined by a series of radially-ex-

tending alining index perforations or openings 10, registering with the index numerals or digits in the annular index space 9, the spaces of the disks, however, having their numerals at the center as shown.

It will be observed that the shank portion of the indicator stop-plate 8, corresponds in its outline to the spaces of the disks defined by the radially-extending alining index-perforations 10, so that when the disks are in their normal position, preparatory to making a mathematical calculation, the zero space will appear immediately below the corresponding portion of the indicator stop-plate and the "0" marks, at the center, will appear through the indicator sight-opening 11, as shown. The zero spaces are preferably black in color, while the computing-disks are preferably of alternating blue and red, commencing with the base or unit disk, as indicated in the drawings. The base or largest disk designates units; the next, tens; the next, hundreds; the next, thousands; and the next or last or cap disk, tens of thousands. While I have shown but five disks, it is evident that the number may be increased or decreased as desired.

When it is desired to make a mathematical computation, the computing-disk corresponding to the position of the figure is moved by means of a pointed instrument, such as the pointed end of a pencil or the like, inserted in the index-perforations 10, in alinement with the radially-extending perforations designated by a like index-numeral in the annular index-space 9, and in adding, the disk is moved from right to left, while in subtracting, it is moved from left to right, as indicated in the drawings, until the instrument strikes the side of the indicator-stop-plate 8, when the figure to the left or right of the engaged index-perforation, as the case may be, will appear in the indicator sight-opening 11, care being taken, if adding, to move the next higher disk one space should the black zero space of the moving disk pass in or through beneath the sight-opening 11, in moving to the desired position, while, if subtracting, the next higher disk must be correspondingly moved should the black zero space of the moving disk pass through beneath the indicator sight-opening 11. For example, to add 127+37, the third or hundreds disk is moved by engaging the index-perforation of the same in radial alinement with index-numeral 1, and moving the disk from right to left until the engaging instrument, as a pencil or the like, strikes the right side of the indicator stop-plate 8, thus bringing the numeral 1, to appear in indicator sight-opening; then move the second or hundreds disk; and, finally, the last or units disk, the numerals 127, appearing in the indicator sight-opening 11; then move the second or tens disk, by engaging the perforation of same in radial alinement with index numeral 3; then move the units or first disk by engaging perforation of same designated by index-numeral 7, and, as the black zero space of this disk was passed through beneath the sight-opening, the next higher or hundreds disk is moved one space, the sum of 164, appearing in sight-opening as the sum total of the two numbers. To subtract, take for example the same number,—127—37, the first number 127, is secured in the sight-opening as before indicated; then move the second or hundreds disk from left to right, by engaging perforation of same in radial alinement with index-numeral 3, this brings 9, to appear in indicator sight-opening and as black zero space passed through before, move next higher disk one space which brings black zero space in sight-opening above the 9; then move last or units disk which brings black zero space in sight immediately below the 9, showing sum left by subtracting, —90, as shown through indicator sight-opening.

From the foregoing description, taken in connection with the accompanying drawings, the operation and advantages of my invention will be readily understood.

Having thus described my invention, without having attempted to set forth all the forms in which it may be made, or all the modes of its use, I declare that what I claim and desire to secure by Letters Patent, is,—

1. A calculating machine, comprising a base-plate provided with an annular space divided into twenty equal spaces two of which are diametrically-opposite each other and form zero spaces at the base and top, the intervening spaces being consecutively numbered on their marginal edges by index-digits from the zero space at the base, a plurality of concentric computing-disks rotatably-mounted and provided with spaces defined by a series of radially-extending alining index-perforations registering with said index-digits, a trunnion secured to said base-plate and provided with a series of stationary separating-disks interposed between said computing-disks, an indicator stop-plate mounted above and registering with the zero space of said base-plate and said computing-disks when the latter are in their normal position and provided with an indicator sight-opening, and an axle-pin securing the upper end of said indicator stop-plate to said trunnion of the base-plate.

2. In a calculating machine, the combination with a base-plate provided with an annular index-space, and a central trunnion provided with diametrically-opposite rounded axle-bearing sides and intermediate flat sides; of a plurality of computing-disks rotatably-mounted on said axle-bearing sides of said trunnion, a plurality of stationary-disks mounted on said trunnion by means of openings conforming to the contour of said trunnion, a stationary cap separating-disk mounted upon the end of said trunnion, and a rotatable computing-disk mounted above said cap separating-disk by means of an axle-pin passing through said trunnion.

3. A calculating machine, comprising a base-plate provided with an annular index-space divided by means of diametrically-opposite zero spaces, said index-space being divided into equal spaces by means of index-digits arranged in opposite directions from one of said zero spaces and terminating at the other, a series of concentric computing-disks rotatably-mounted within said annular index-space and divided into equal spaces by means of radially-extending alining index-perforations registering with said index digits and provided with digits at the center of said spaces corresponding with the index-digits, diametrically-opposite zero spaces formed on said computing-disks and registering with the zero spaces of said annular index-space, stationary dividing-disks interposed between said computing-disks, and an indicator stop-plate extending from above the center of said disks to one of said zero spaces of said annular index-space of the base-plate and corresponding in outline to the outline of the registering zero spaces of the computing-disks and having a central sight-slot.

4. In an adding and subtracting machine, the combination with a back-plate provided with an annular index-space provided with diametrically-opposite zero spaces and index-digits equally spaced and extending in opposite direc-

tions from one of said zero spaces, and a plurality of concentric computing-disks rotatably-mounted within said annular index-space and provided with zero spaces and numbered spaces defined by radially-extending aliuing index-perforations registering with said index-digits; of a plurality of stationary disks interposed between said computing-disks, and an indicator stop-plate extending from the center of said disks to one of said zero spaces of the back-plate said stop-plate being of a size and form corresponding with the registering zero spaces of the computing-disks when the latter are in their normal position and provided with an indicator sight-slot under which the numerals of the spaces are adapted to register when the spaces of the disks have been brought under said indicator stop-plate.

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

BENJAMIN F. STUMP.

Witnesses:

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