No. 757,508. PATENTED APR. 19, 1904.

J. A. SCOTT & W. F. TAYLOR.

COMPUTING MACHINE.

APPLICATION FILED FEB. 24, 1903.

NO MODEL.

Fig. 1.

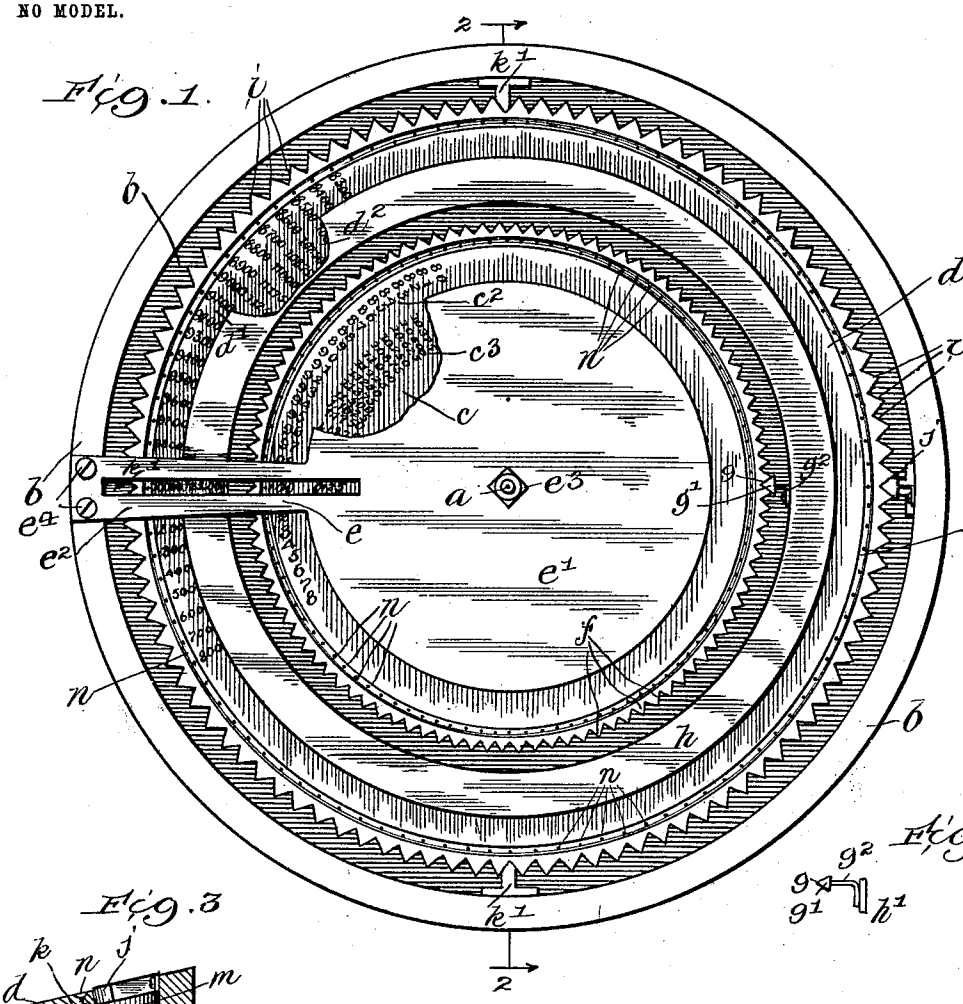


Fig. 4.

Fig. 3.

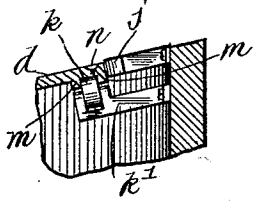
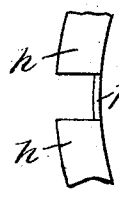


Fig. 2.

Fig. 5.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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UNITED STATES PATENT OFFICE.

JAMES A. SCOTT AND WILLIAM F. TAYLOR, OF CHICAGO, ILLINOIS.

COMPUTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 757,508, dated April 19, 1904.

Application filed February 24, 1903. Serial No. 144,684. (No model.)

To all whom it may concern:

Be it known that we, JAMES A. SCOTT and WILLIAM F. TAYLOR, citizens of the United States, residing in the city of Chicago, county of Cook, and State of Illinois, have invented a new and useful Improvement in Computing-Machines, of which the following is a specification.

Our invention relates to computing-machines embodying one or more numerical tables; and the objects of the invention are, first, to provide means whereby at any one time a portion only of said table or tables is exhibited or in sight, and, second, to provide convenient and expeditious means for exhibiting or bringing into sight the required result-number. We attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the device. Fig. 2 is a sectional view thereof, taken on the line 2 2 of Fig. 1. Fig. 3 is a fragmentary view showing the method of supporting the outer disk, also the click or spring-detent operative thereon. Fig. 4 is a fragmentary view showing said click in plan, and Fig. 5 is a fragmentary view showing a portion of the rim of the outer screen at the point beneath the "sight" where said rim is cut away for exhibiting the figures on the outer number-disk.

Similar reference characters denote similar parts throughout the several views.

The axle a is rigidly secured within the casing b by means of the set-screw a', screwing in the boss b' in the bottom of said casing, or said axle may be secured in any other suitable manner. It is desirable that said axle be considerably inclined from the vertical in order that the number-disks c d may be correspondingly inclined from the horizontal, to thereby facilitate the manipulation of the device. Said casing consists of a box or housing for the rest of the mechanism and is preferably circular in outline.

Near its upper portion the axle a is provided with a fixed collar a^2, which, in conjunction with said axle, forms a pivot-bearing for said revoluble disk c. The hub c' on said disk operates to steady the same and cause it to lie at all times in a plane at right angles to said axle a. Said hub also acts as distance-piece to hold the inner screen e at the proper height above the inner number-disk c above mentioned. Said number-disk has on its face two series of numbers arranged in concentric circles c^2 and c^3. There are one hundred numbers in said outer number-circle running from "1" to "100" and progressing, preferably, in an anticlockwise direction, so that when said disk is rotated in a clockwise direction, which ordinarily is most convenient for the operator, the numbers passing any given point will be ascending in value, it being usually more convenient to read on an ascending scale than on a descending scale. On the inner number-scale c^3 there are also one hundred numbers which in the present device represent the product obtained by multiplying the corresponding number in the outer circle c^2 by a given multiplier. Our mechanism is well adapted for use in an assessor's office for computing taxes, and to facilitate explanation an example of the use of the mechanism in this connection will be described. The numbers running from one to one hundred ("1" to "100") in the outer circle c^2 represent the valuations, and the numbers in the inner circle c^3 represent the assessment obtained by using the tax rate as a multiplier. For instance, if the tax rate is one dollar and twenty-five cents per hundred dollars the number in the inner circle adjacent to the number "100" of the outer circle will be "$1.25," while the number in the inner circle adjacent to the number "50" of the outer circle will be "$0.625."

The disk c has preferably upon its periphery a set of serrations f, which in the present device are one hundred in number. These serrations are engaged by the click g, which is here shown to consist of a head g', mounted upon the flat steel spring g^2, said spring being fixed to one of the legs h' of the outer screen h. The parts are so related and constructed that said click will yield and permit the disk c to be rotated to the desired point by hand; but when said point is reached the stiffness of said click will retain the disk at such desired point and will thereby prevent accidental rotation. Moreover, by preference the head g' of the click and the serrations f of the disk

are accurately formed, so as to prevent backlash, and as the serrations occupy a definite location in the periphery said disk is self-adjusting—that is to say, when the disk is rotated by hand to approximately the right position (within the limit of the proper serration) the click will correct the inaccuracy by rotating the disk slightly forward or backward, as the case may be, so that only one product number or assessment will be exhibited at a time, thus avoiding doubt on the part of the operator as to what number is to be read off.

The screen e above mentioned lies above the disk c and consists of the disk portion e' and the extension e^2, which latter forms the sight. Said disk portion is secured to the top of the axle a by means of the washer e^3, but may be held rigid in any other suitable manner. By preference the sight is also secured to the casing b by means of the screws e^4. The diameter of the disk portion e' of the screen e is great enough to cover the inner number-circle c^3 and hide the numbers thereof from view without covering the outer number-circle c^2.

The outer number-disk d bears upon its surface the outer number-circle d' and inner number-circle d^2, which correspond, respectively, to the number-circles c^2 and c^3 of the disk c. On said disk d, however, the numbers on the outer circle progress by hundreds and run from "100" to "10,000." The numbers of the inner circle are the products obtained by multiplying the outer numbers by the given multiplier, or in a tax-computing machine the numbers of the outer circle represent the valuation and the numbers of the inner circle represent the assessment. The disk d also has preferably upon its periphery a series of serrations i, engaged by the click j in a manner similar to and for the same purpose as the serrations f are engaged by the click g. Said click j is mounted by preference upon the casing b. Said disk d is revolubly supported by means of rollers k, mounted upon suitable fixed brackets k'. In order to retain said disk in position upon said rollers, a track is formed upon said disk, the preferred construction being here shown in which two concentric flanges m m are formed upon the under side of said disk in such a manner as to engage said rollers k, but prevent eccentric motion of said disk. This construction has the advantage that the disk may be simply lifted from its place when the screen h is removed.

Both the inner and outer disks c and d are provided with a series of pockets or apertures n n, adapted to partially receive the point of a lead-pencil, so that the operator may readily rotate the disks to the proper position with the means in hand.

The disk d is annular in the present machine—that is to say, the central portion thereof is removed to admit the legs h', whereon the screen h is mounted, as above mentioned. Said screen h is so constructed as to cover all of the inner number-circle d^2 on the disk d, except at the sight e^2, at which point said screen is cut away, as best shown in Fig. 5.

To illustrate the operation of the device, let it be supposed that it is to be used for computing taxes and that the tables or number-circles d^2 and c^3 are calculated on a tax-rate or multiplier of one dollar and twenty-five cents per hundred dollars valuation, and let it be further supposed that it is required to find the assessment on a valuation of two thousand four hundred and thirty-five dollars. The outer disk is rotated by the operator until the number exhibited on the outer number-circle d' through the sight e^2 is "2,400." The number on the inner number-circle d^2 on disk d will be "$30.00." By reason of the click j the disk d will then remain in the position thus reached. The operator next rotates the inner number-disk c until the number "35" is exhibited on the outer number-circle c^2 through the sight e^2. The number consequently exhibited on the inner number-circle c^3 through said sight will be "$0.4375" or forty-three cents seven and one-half mills, which is the assessment on thirty-five dollars. The operator now has "$30" and $0.4375" exhibited on the two inner number-circles c^3 and d^2. These amounts are then added together and the complete assessment is found to be "$30.4375," or, in round numbers, thirty dollars and forty-four cents.

It will be, of course, understood that this machine is best adapted for use under conditions in which the same multiplier or rate-factor is employed for a series of computations. For this reason the machine is particularly suited for computing assessments, because the tax rate remains the same for all the computations in any given district at any single levy.

We propose to provide substitute number-disks to permit the selection of disks in which the product numbers are computed on the required basis or rate.

It is evident that, if desirable, the number-circles may be printed on sheets of paper or other light material and pasted or otherwise fastened upon the surfaces of the disks. Moreover, it is not essential that the products or assessment-circles have a smaller diameter than the multiplicand or valuation circles.

By properly shifting the decimal-point in reading the results the machine may be used for numbers either greater or less in value than the numbers appearing on the disks.

What we claim as new, and desire to secure by Letters Patent, is—

1. In a computing-machine, the combination of an annular number-disk, the central portion whereof is removed; a plurality of number-circles on said number-disk; a screen above

said disk covering one of the series of numbers on said number-disk, and legs for supporting said screen, said legs passing through the central aperture of said number-disk.

2. In a computing-machine, the combination of a rotating number-disk having number-circles thereon, a screen for covering one of the number-circles on said disk, rollers for supporting said number-disk, and a track on said number-disk for engagement with said roller to prevent eccentric rotation of said number-disk.

3. In a computing-machine, the combination of two independently-movable number-disks, each of said disks bearing upon their surface two series of numbers, one series on each of said disks representing multiplicand and the other series representing products, and the numbers in one multiplicand series progressing by units from one to one hundred and the numbers in the other multiplicand series progressing by hundreds from one hundred upward.

4. In a computing-machine, the combination of an annular number-disk, the central portion whereof is removed; a plurality of number-circles on said number-disk, and a ring concentric with said number-disk constituting a stationary screen, said screen being supported above said number-disk and the outer diameter of said screen being sufficiently great to cover one of said number-circles.

5. In a computing-machine, the combination of two rotatable number-disks, each bearing a plurality of number-circles thereon, a pivot for centrally supporting the inner one of said number-disks, and rollers for supporting the outer one of said number-disks.

6. In a computing-machine, the combination of two independently-movable number-disks, each of said disks bearing upon their surface two series of numbers, one series on each of said disks representing multiplicands and the other series representing products; and the numbers in one multiplicand series progressing by a common difference equal to the difference between the highest and lowest numbers in the other multiplicand series.

7. In a computing-machine, the combination of two independently-movable number-disks, each of said disks bearing upon their surface two series of numbers, one series on each of said disks representing multiplicands and the other series representing products; and a sight for exhibiting one at a time the numbers in the multiplicand series.

8. In a computing-machine, the combination of an annular number-disk, the central portion whereof is removed; a plurality of number-circles on said disk; a screen above said disk covering one of the series of numbers thereon; legs passing through the central aperture of said number-disk for supporting said screen; a second rotating number-disk having the same axis of rotation as said annular number-disk; a plurality of number-circles on said second number-disk; a screen above said second disk for covering one of the series of numbers thereon; and pockets in each of said disks for receiving a pencil or other implement for rotating said disks.

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