No. 731,944. PATENTED JUNE 23, 1903.

# E. PEYCKE & L. SONNENSCHEIN

## CALCULATING MACHINE.

APPLICATION FILED SEPT. 16, 1901.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.

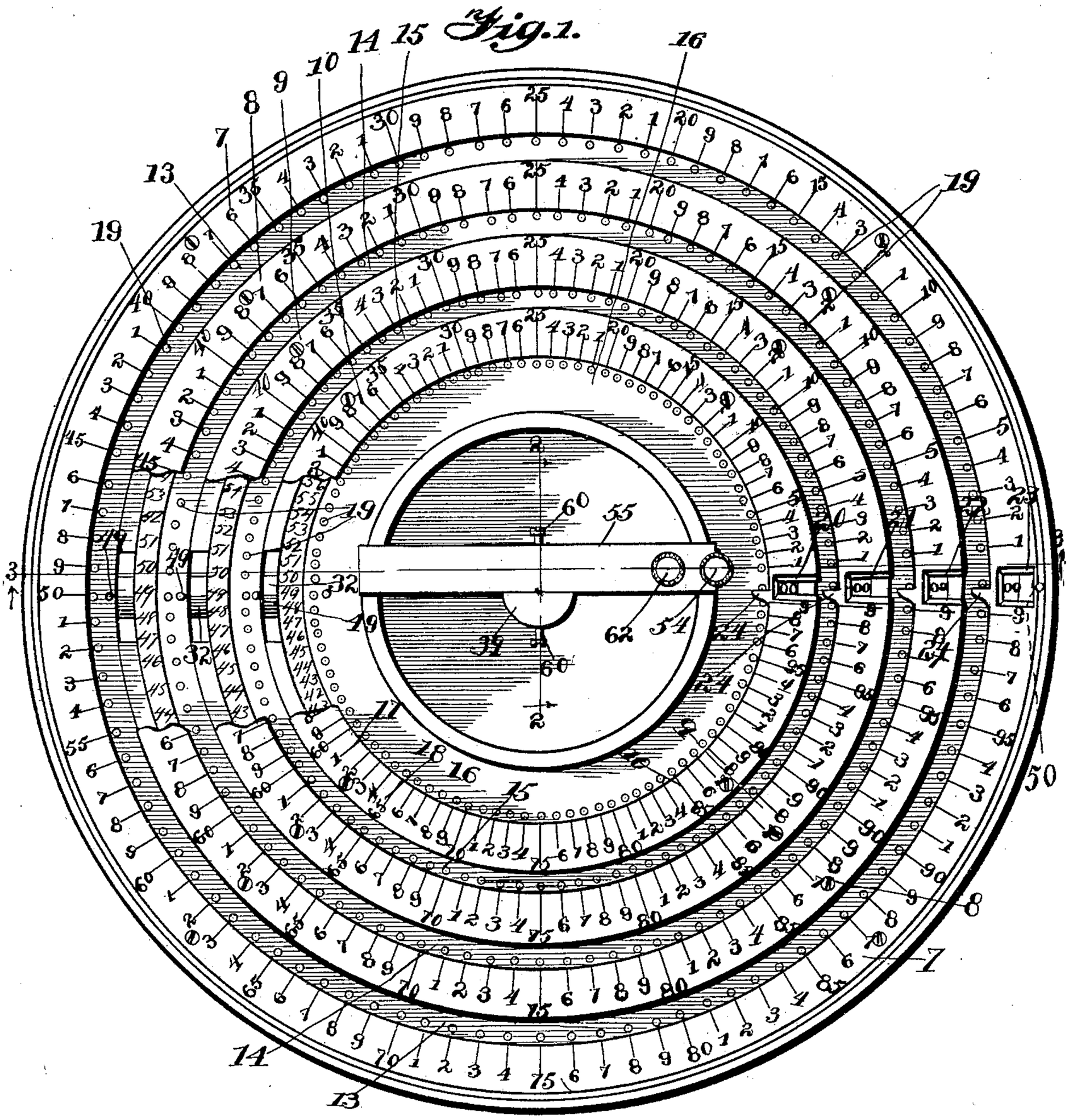
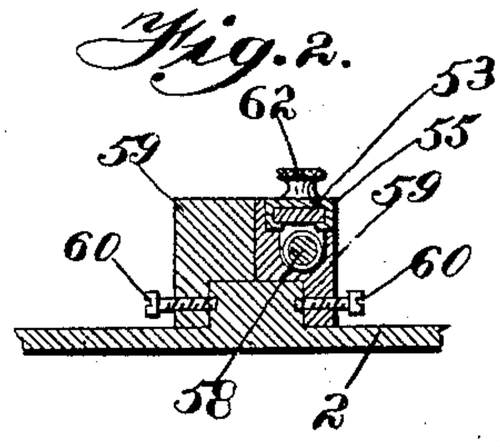


Fig. 2.

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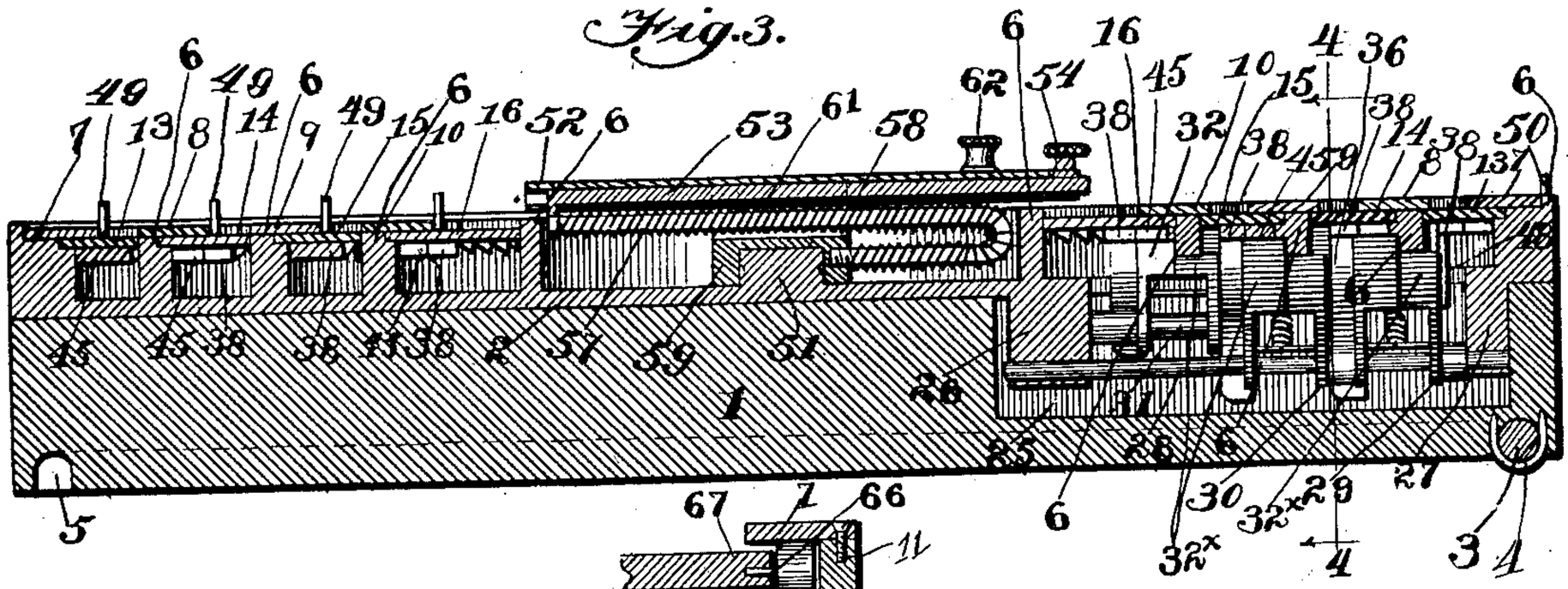
NO MODEL. 3 SHEETS—SHEET 2.

Fig. 3.



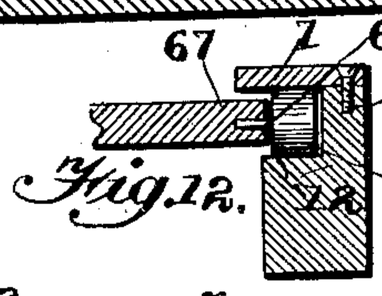




Fig. 12.

Fig. 4

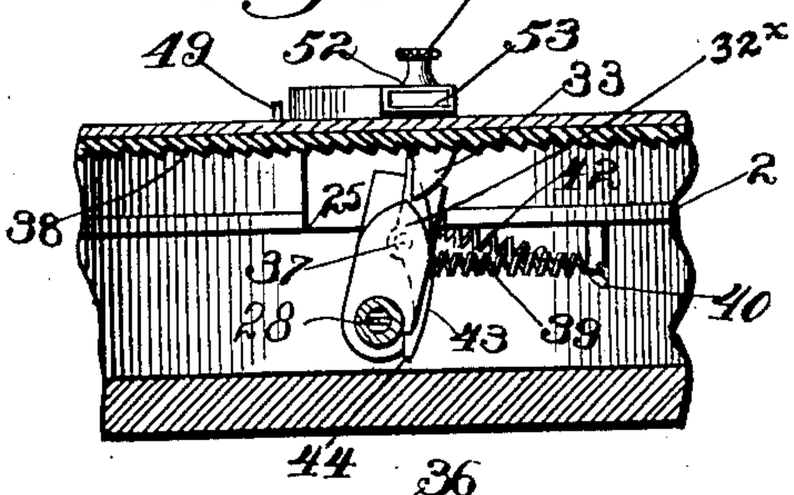
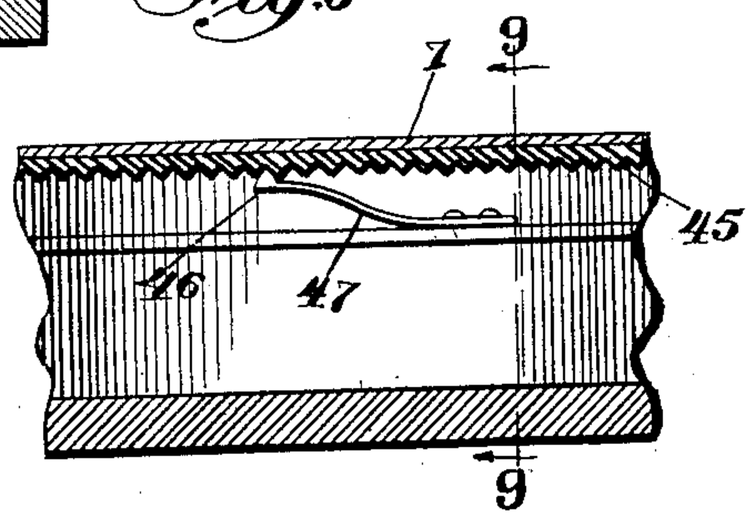



Fig. 5



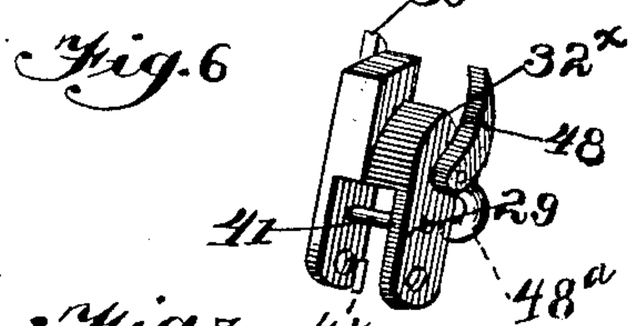




Fig. 6

Fig. 7.

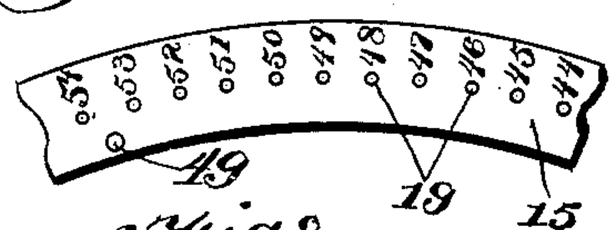



Fig. 8.

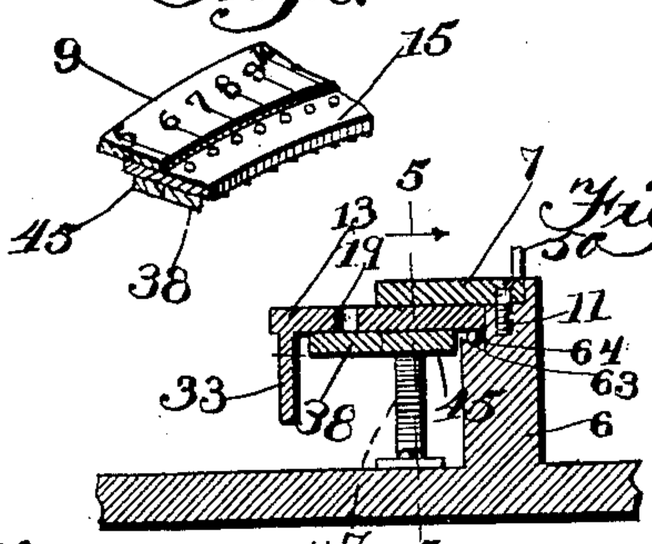
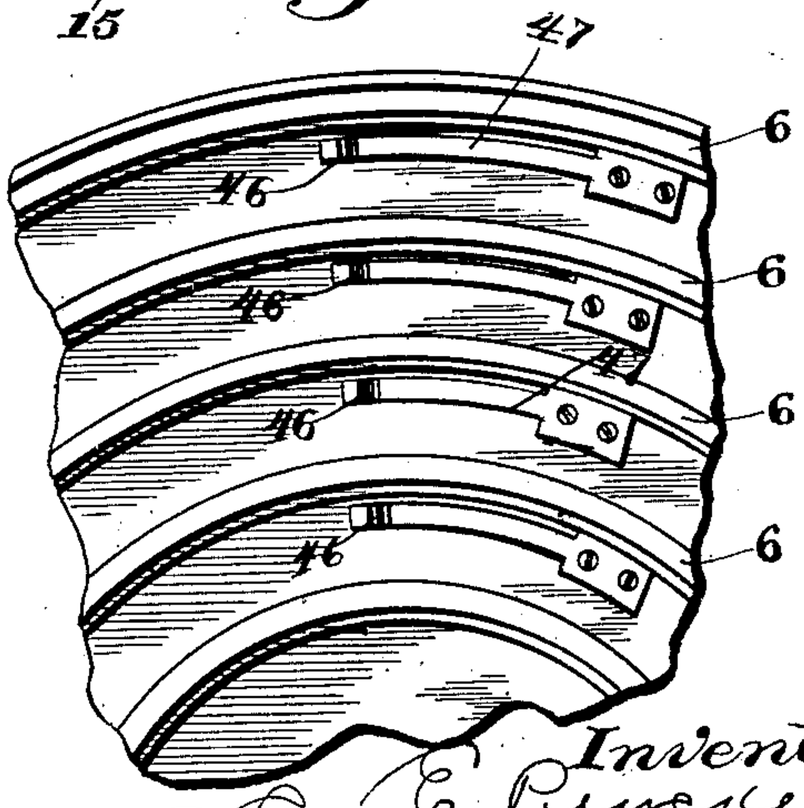



Fig. 9.

Fig. 10.


Fig. 11.

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CALCULATING MACHINE.

APPLICATION FILED SEPT. 16, 1901.

NO MODEL. 3 SHEETS—SHEET 3.

Fig. 13.

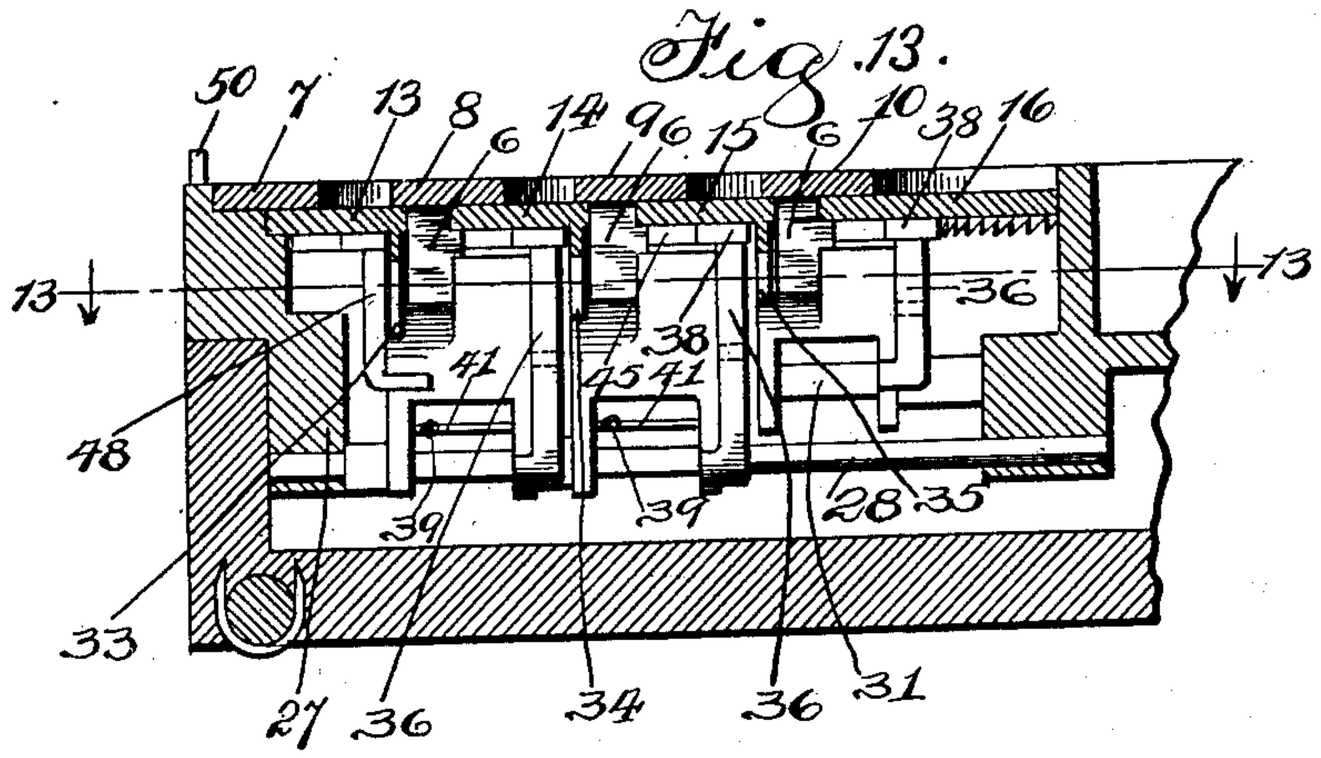
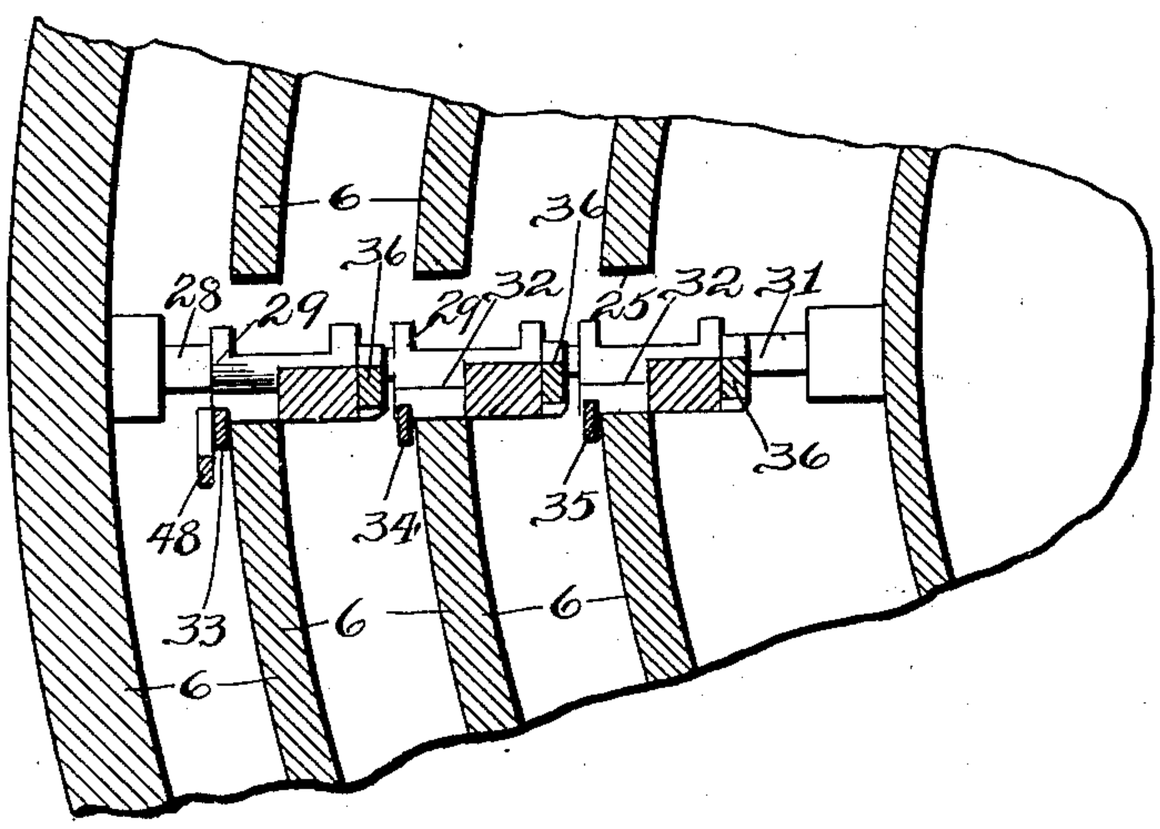



Fig. 14.

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No. 731,944. Patented June 23, 1903.

# UNITED STATES PATENT OFFICE.

EDMUND PEYCKE AND LEOPOLD SONNENSCHEIN, OF CHICAGO, ILLINOIS.

## CALCULATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 731,944, dated June 23, 1903.

Application filed September 16, 1901. Serial No. 75,585. (No model.)

*To all whom it may concern:*

Be it known that we, EDMUND PEYCKE and LEOPOLD SONNENSCHEIN, citizens of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Calculating Machines, of which the following is a full, clear, and exact specification.

Our invention relates to that class of calculating-machines in which a plurality of concentric rings are employed for carrying the numbers in combination with mechanism whereby the relative movement of one ring will be imparted to another when the first has made a complete rotation or made a number of partial rotations equal to the lowest number on the next adjacent ring; and our invention has for its primary object to provide an improved and simple form of calculating-machine of this character in which a large number of rings may be employed, so that the capacity of the machine may be greatly increased over that of prior constructions without making the machine too complicated, bulky, or cumbersome to be commercially successful.

Another object of our invention is to provide an improved and simple device whereby all of the number-rings may be conveniently and instantly reset to zero.

With these ends in view our invention consists in certain features of novelty in the construction, combination, and arrangement of parts by which the said objects and certain other objects hereinafter appearing are attained, all as fully described with reference to the accompanying drawings, and more particularly pointed out in the claims.

In the said drawings, Figure 1 is a plan view of our improved calculating-machine, showing certain portions broken away. Fig. 2 is a detail transverse section of the resetting-arm, taken on the line 2 2, Fig. 1. Fig. 3 is a transverse section of the machine, taken through the center thereof at right angles to the section-line 3 3. Fig. 4 is a vertical detail section taken on the line 4 4, Fig. 3. Fig. 5 is a vertical detail section taken on the line 5 5, Fig. 9. Fig. 6 is a perspective view of one of the tumblers hereinafter described. Fig. 7 is a detail face view of a part of one of the number-rings. Fig. 8 is a perspective view of a part of one of the number-rings and of one of the stationary register-rings. Fig. 9 is a detail transverse section taken on the line 9 9, Fig. 5. Fig. 10 is a bottom view of a part of one of the number-rings, showing the two different forms of teeth carried thereby. Fig. 11 is a plan view of a part of the bed or base frame with the register-rings and number-rings removed. Fig. 12 is a detail sectional view similar to Fig. 9, showing a slight modification in the antifriction devices hereinafter described. Fig. 13 is an enlarged detail sectional view taken vertically through the center of the device, showing all of the lugs on the under side of the rings arranged in line, as hereinafter described; and Fig. 14 is a plan section taken on the line 14 14, Fig. 13.

1 is a block which is preferably circular to conform to the shape of the general outline of the device and which is provided for the purpose of affording a level support for a bed or base frame 2, which supports and carries the operating mechanism. This block 1 may be provided on one side with a U-shaped or semicircular bar 3, pivoted at its mid-length by means of staple 4 or other suitable device to the block and embedded in a groove 5 therein, so that when desired the extremities of the bar 3 may be pulled out of the groove and utilized as legs for supporting the apparatus in an inclined position during use.

The base-frame 2 is provided with a number of circular concentric flanges 6, to the upper edge of each of which is secured one of a plurality of register-rings 7 8 9 10, in the example of the invention shown in the drawings four of such rings being employed, but, as will hereinafter appear, the number may be increased or diminished, as desired. Each of these register-rings is rigidly fixed to its respective flanges 6 by countersunk screws 11 or other suitable devices, and each is numbered and marked with graduations from "0" to "99." Each of these flanges 6 is provided on its inner side with a shoulder 12, and supported upon each of these shoulders is one of the aforesaid plurality of number-rings 13 14 15 16, which are numbered to correspond with the numbers of their respective register-rings 7 8 9 10, below which they are arranged, the numbers on the number-rings being ex-

cluded from view by the register-rings; but both the number-rings and register-rings are provided with radial graduations 17 18, respectively, which are visible at all times, and each of the number-rings is provided with a series of sockets or pin-holes 19, arranged in a circle concentric with and adjacent to the inner edge of the register-ring immediately over it, and these pin-holes 19 in each correspond in number to the number of the figures thereon, one of the pin-holes being located in a radial line with each of the figures or numbers between the graduations 17, so that when the graduations on the number-ring register with the graduations 18 on the register-ring one of the pin-holes 19 will be directly opposite the particular number or figure on the register-ring which the operater desires to add or otherwise use in the particular calculation being performed, the pin-holes 19 being utilized for the reception of the point of a pin or bar by which the number-ring is rotated until the number thereon comes opposite a suitable observation-aperture formed through the register-ring. These apertures are shown at 20 21 22 23, and in order that the ring may be automatically arrested when the number reaches the observation-aperture each of the register-rings is provided on its inner edge with a stop 24, against which the operating pin or bar will strike when the number comes opposite the observation-aperature, the stops 24 being arranged across the line of pin-holes 19, as shown in Fig. 1. In the example of the invention shown in the drawings the outermost ring 13 stands for units and tens of units, the next one, 14, for hundreds and tens of hundreds, the next for tens of thousands and hundreds of thousands, and the next or innermost one, 16, for millions and tens of millions, and hence it will be understood that when the outermost ring, or units and tens-of-units ring, makes a complete rotation, carrying its zero-mark from observation-aperture 23 back again, it imparts a single step to the next inner ring or moves it one figure, so that after registering ninety-nine it will again display its two ciphers (each of the number-rings being provided with two ciphers) and at the same time will shift the next ring one space, so as to display the numeral "1" thereon, thus registering one hundred on the two outer rings, and when the hundreds-ring has been rotated one hundred times by a hundred complete rotations of the units-ring the hundreds-ring would impart a sufficient movement to the tens-of-thousands ring to bring the numeral "1" opposite observation-aperture 21, and so on to the last or innermost ring 16, as will be understood, and this single-step motion imparted to one ring from the ring immediately outward therefrom will also be produced should the latter ring be rotated by hand by means of the operating bar or pin applied directly thereto in one of its pin-holes 19. The means for imparting this step-by-step motion to the rings will now be described.

At one side of the base 2 is formed a cavity or an aperture 25, and depending in this cavity are two hangers 26 27, in the lower ends of which is supported a shaft or bar 28, which constitutes a support for two tumblers 29 30, supported loosely thereon, so as to be capable of oscillation independently of each other, the shaft 28 being arranged on the radius of the number-rings, so that the tumblers will oscillate transversely of such radius and be capable of imparting rotation to or receiving rotation from such rings. Arranged immediately above the shaft 28 is a stud shaft or pin 31, secured in any suitable way in the hanger 26, and on this stud-shaft is journaled a third tumbler 32, which is similar in construction and operation to the tumblers 29 30, excepting that it is a little shorter, and consequently its axis of oscillation is located above that of the tumblers 29 30 in order that its upper end may be in substantially the same plane as the upper ends of the other tumblers and be capable of receiving motion from or imparting motion to one of the number-rings. All of these tumblers are the same in construction and operation, and one of them is shown in detail in Fig. 6. On the outer side of each of the tumblers is formed a beveled nose 32, and secured to each of the number-rings (excepting the innermost one 16) is a depending lug, these lugs being shown at 33 34 35 on the rings 13 14 15, respectively, and each being arranged in line with one of the nose-pieces 32, so that when the ring is rotated a complete rotation the lug will strike such nose-piece and deflect the tumbler to one side. This deflection of the tumbler is imparted to the next inner ring by means of a pawl 36, pivoted to the side of the tumbler opposite that on which the beveled nose 32 is formed, the pivot of the pawl being shown at 37 on a different center from the shaft 28 or 31, so that when the tumbler moves in one direction, or toward the left as viewed in Fig. 4, the point of the pawl will engage with one of a circular series of ratchet-teeth 38, formed on the under side of each of the number-rings, and thus advance the number-ring the distance of one tooth or of one graduation, and when the tumbler makes its return movement, or toward the right, the pawl will be deflected under the teeth 38 and produce no movement thereof. The return movement of the tumbler is produced by a suitable spring 39, secured in any suitable way to the tumbler at one end and to a hook 40, depending from the under side of base-frame 2, at the other end. A convenient way of attaching the spring to the tumbler is to provide the tumbler with a cross-bar 41, extending across the lower end thereof, which is bifurcated, as shown in Figs. 3 and 6, and to which bar the spring is hooked. The pawls are given their return movement on their independent pivots 37 by means of coil-springs 42, attached

at one end to hook 40 and at the other end to the back of the pawl. The lower end of each pawl is provided with a tailpiece 38, having a laterally-projecting stop 44, which laps over the edge of one of the forks of the bifurcated end of the tumbler, as shown in Figs. 4 and 6, and thus limits the backward rotation of the pawl with reference to its tumbler, and consequently enables the pawl to subserve the further useful purpose of preventing retrograde movement of the number-ring with which it engages. These number-rings being of different diameters, and consequently requiring to be moved different distances, it is necessary that the oscillation imparted to the innermost tumbler 32 by the ring 15 be less than the oscillation imparted to tumbler 30 by ring 14, and for this reason the lugs 33 34 35 are graduated in lengths, and the same effect is accomplished for the innermost ring 16 by having the tumbler 32 shorter than the other tumblers and pivoted on a higher center, so that its throw will be much less than that of the others. The tumblers are limited in their backward movement by striking against the edge of the recess 25, as shown in Fig. 4. Each of the number-rings on its under side is also provided with a circular series of teeth 45, which constitute V-shaped notches and with each of which series engages a centering-dog 46, formed on or secured to suitable spring 47, attached to the top or base plate 2, as shown in Figs. 5 and 11, and serving to center the numbers on the number-rings with reference to the observation-apertures in the register-rings, while not interfering with the free rotation of the number-rings when desired, by means of the operating bar or pin. Inasmuch as the outermost number-ring 13 is not rotated through the action of any of the other rings, there is no necessity for one of the tumblers for imparting motion thereto; but the tumbler 29 may be provided on its outer side with an additional pawl 48, arranged to engage with the ratchet-teeth 38 on the under side of outermost number-ring 13 for preventing such ring from turning backwardly. In order that all of the number-rings may be quickly returned to zero—that is, to that position where their ciphers appear in the observation-apertures of the register-rings—each of the number-rings is provided with an upwardly-projecting pin 49, and at some fixed point, such as the outer edge of the outermost register-ring, is provided a rigid pin 50, so that by laying a straight-edge across all of the movable pins 49 and moving such straight-edge until one end thereof strikes the fixed stop 50 while the other end is directly across the center of the machine all of the rings will be simultaneously set at zero, it being understood that the pins 49 are so located as to pass the stops 24. In order that this simultaneous rotation of the number-rings may be conveniently effected, an extensible shifting-bar is pivoted at the center of the machine on pivot-post 51 in such a way as to not interfere with the ordinary manipulation of the number-rings, but to be accessible for use when desired. This extensible shifting-bar consists of two parts, preferably telescoped together and one of which is formed of a channel-bar 52, the other of a rod 53, inserted therein and having knob 54, whereby it may be readily withdrawn, so as to project across one or more of pins 49 and, if desired, also across the stop-pin 50, but when retracted into the member 52 will be entirely out of the way of all of said pins. The under side of the channel-bar has flanges 55 for supporting the rod 53 therein, and secured or formed on the end of rod 53 is a perforated lug 56, which runs between the flanges 55 and slides over a longitudinal rod 57, upon which is sleeved a coil-spring 58, the rod 57 being secured to a hub 59, which is pivoted on the post 51 and held in place by lateral screws 60, engaging in a groove in post 51, as will be understood. The bar 57 passes through a longitudinal passage 61 in hub 59, which is of sufficient size to permit lug 56 to also travel therethrough to the full length of bar 57, thus enabling the extensible bar 53 and the member 52 to be comparatively short, and in order that the spring 58 may have sufficient room within which to compress the end of the bar 57 is carried under in U-shape form, and thence attached to hub 59, as shown in Fig. 3. Member 52 may, if desired, be provided with a set-screw 62, whereby the extensible bar 53 may be locked in its extensible position.

In Fig. 9 of the drawings we have shown the shoulder 12 provided with a groove 63 for the reception of antifriction-balls 64, interposed directly under the revoluble number-rings, and in Fig. 12 we show a modification of these antifriction devices comprising small rollers 65, journaled on pins 66, secured in small bosses 67, formed on the edges of the number-rings at suitable intervals, so as to relieve the friction both above and below, the rollers 65 being arranged at the edge of the number-ring under the register-ring and supported on the shoulder 12 below.

With a calculating-machine thus constructed it will be understood that in addition the figures are added up in column in the ordinary way; but two columns are added at once—that is to say, the units and tens-of-units columns are added at one time, the hundreds and tens-of-hundreds next, the ten thousands and hundreds-of-thousands next, and millions and tens-of-millions next. For example, if it should be desired to add two million five hundred and twenty-five thousand three hundred and ten to three million four hundred and ten thousand two hundred and five it would be necessary to proceed as follows, to wit: All of the number-disks would be set at zero, as shown in Fig. 1, which may be conveniently done by means of the extensible shifting-bar 53. The operating bar or pin would then be placed in the hole 19 directly opposite the bar 5 or the graduation

leading from that bar and the ring then rotated until the operating-bar strikes the stop 24, thus presenting "05" through aperture 23. The operating-bar would next be placed in the hole 19 opposite the bar 10 in the same number-ring or ring 13 and the ring rotated until the bar again strikes the stop 24, thus adding up the two parts in the units and tens-of-units columns and presenting "15" through the observation-aperture 23. The next two columns, comprising the numbers "53" and "02," would be similarly added up on the next or inner ring 14, the ring being rotated twice—first by placing the operating-bar in the hole 19 opposite "2" and next by placing it in the hole 19 opposite "53"—thus presenting the number "55" through the observation-aperture 22. The tens-of-thousands column, containing the figures "52" and "41," will now be added by first placing the operating-bar in the hole 19 opposite bar 52 on ring 15 and pulling the ring until the bar strikes against stop 24, the same ring being a second time operated by placing the operating-bar in hole 19 opposite bar 41, thus presenting the number "93" in observation-aperture 21, and, lastly, the figures "2" and "3," comprising the millions-column, would be added by similarly operating the millions-ring 16, thus presenting the figure "5" in observation-aperture 20, and the figures appearing in all four observation-apertures when read from left to right will be the sum of the two numbers, or five million nine hundred and thirty-five thousand five hundred and fifteen.

Having thus described our invention, what we claim as new therein, and desire to secure by Letters Patent, is—

1. In a calculating-machine, the combination of a plurality of concentric rotatable number-rings, a plurality of independent oscillatory tumblers pivoted on axes extending lengthwise of the radius of said rings, means on said rings for engaging and oscillating said tumblers, respectively, and means for transmitting the movement which is imparted to one tumbler by one of said rings, to the next adjacent ring, substantially as set forth.

2. In a calculating-machine, the combination of a plurality of concentric rotatable number-rings, a plurality of independently-deflectable tumblers pivoted on axes parallel with the radius of said rings, teeth on said rings, pawls pivoted to said tumblers, respectively, and engaging said teeth, the pivots of said pawls being eccentric to the center of oscillation of said tumblers, and lugs on said rings for engaging and oscillating said pawls, respectively, substantially as set forth.

3. In a calculating-machine, the combination of a plurality of concentric number-rings, a plurality of oscillatory tumblers engaging said rings, respectively, and pivoted on axes extending lengthwise of the radius of the rings and on different centers at different distances from said rings, pawls pivoted to said tumblers, respectively, teeth on said rings for the engagement of said pawls, respectively, and means on said rings for oscillating their respective tumblers, substantially as set forth.

4. In a calculating-machine, the combination of a plurality of concentric number-rings, a plurality of pivoted independently-oscillatory tumblers having their axes extending lengthwise of the radius of said rings and below said rings, means on said rings, respectively, for engaging and oscillating said tumblers, and means for imparting the oscillation of said tumblers to said rings, respectively, substantially as set forth.

5. In a calculating-machine, the combination of a plurality of concentric number-rings, an oscillatory tumbler pivoted on the radius of said rings below them and having the beveled nose 32, a lug carried by one of said rings for engaging with said nose and oscillating said tumbler, ratchet-teeth arranged around the under side of the other of said rings, and an independently-pivoted pawl carried by said tumbler and engaging said ratchet-teeth, substantially as set forth.

6. In a calculating-machine, the combination of a plurality of concentric number-rings, each having in the under side thereof an annular series of ratchet-teeth, and an annular series of V-shaped notches, a spring-actuated centering-dog engaging said V-shaped notches, a pivoted tumbler, means on one of said rings for engaging and oscillating said tumbler, and a pawl on said tumbler for engaging said ratchet-teeth, substantially as set forth.

7. In a calculating-machine, the combination of a series of concentric rotatable number-rings, means for imparting the movement of one of said rings to the other, projections on said rings, a fixed stop and an extensible pivoted shifting-bar adapted to project across said projections and stop, substantially as set forth.

8. In a calculating-machine, the combination of a series of concentric number-rings, means for imparting the movement of one of said rings to the other, a fixed stop, a projection on each of said rings, and a shifting-bar adapted to project across all of said projections and stop, substantially as set forth.

9. In a calculating-machine, the combination of a series of concentric number-rings, each having a projection, a fixed stop, and a pivoted telescopic shifting-bar having a movable portion adapted to project across all of said projections and stop, substantially as set forth.

10. In a calculating-machine, the combination of a series of concentric number-rings, a frame in which said rings are mounted, having a central cavity located within the inner one, an extensible shifting-bar pivoted in said cavity, a projection on each of said rings, and a fixed stop on said frame, said shifting-

bar being adapted to extend across all of said projections and stop, substantially as set forth.

11. In a calculating-machine, the combination of a series of concentric number-rings, each having a projection, a fixed stop, the pivot 51, an angle-bar secured to said hub, a rod inserted within said angle-bar, and a spring for withdrawing said rod into said angle-bar, said rod being adapted to extend across said projections and stop, substantially as set forth.

12. In a calculating-machine, the combination of a series of concentric number-rings, a projection on each of said rings, a fixed stop, and a pivoted shifting-bar having its edge arranged in line with said fixed stop and the center of said rings, substantially as set forth.

13. In a calculating-machine, the combination of a series of concentric number-rings, a projection on each of said rings, a fixed stop, a two-part pivoted shifting-bar adapted to project across all of said projections and stop, and a spring for retracting one part of said bar with reference to the other, substantially as set forth.

14. In a calculating-machine, the combination of a series of concentric number-rings, a projection on each of said rings, a fixed stop, a two-part pivoted shifting-bar, a U-shaped rod secured to one part of said bar and extending longitudinally thereof, a spring sleeved on said rod, and means connected with the other part of said bar for compressing said spring when the latter part of the bar is extended with reference to its component part, substantially as set forth.

15. In a calculating-machine, the combination of a series of concentric number-rings, a projection on each of said rings, a two-part pivoted shifting-bar for engaging said projections simultaneously, a spring for retracting one part of said bar with relation to the other, and means for holding the parts of said bar against relative movement, substantially as set forth.

16. In a calculating-machine, the combination of a plurality of concentric number-rings, a plurality of independently-oscillatory tumblers pivoted under said rings upon axes extending lengthwise of the radius of said rings, and having nose-pieces, lugs carried by said rings for engaging the nose-pieces on said tumblers, respectively, ratchet-teeth arranged around the under side of said rings and pawls carried by said tumblers for engaging said ratchet-teeth, respectively, substantially as set forth.

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