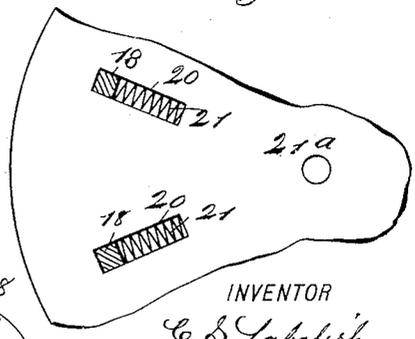
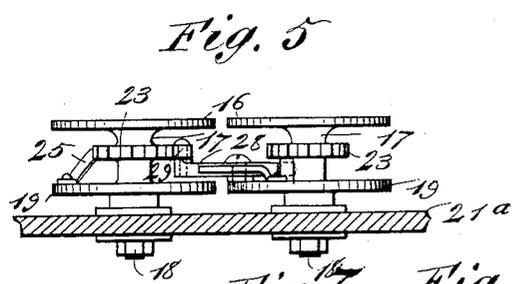
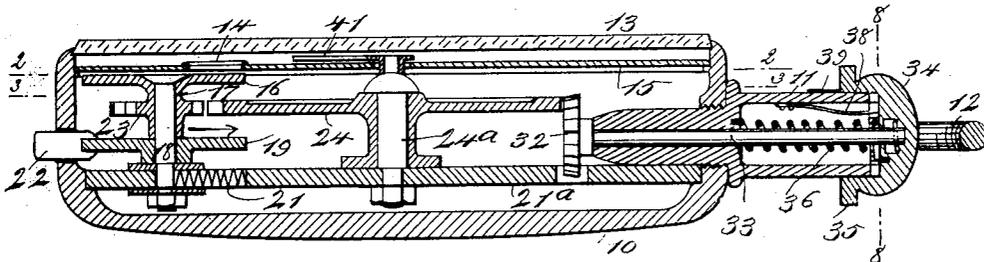
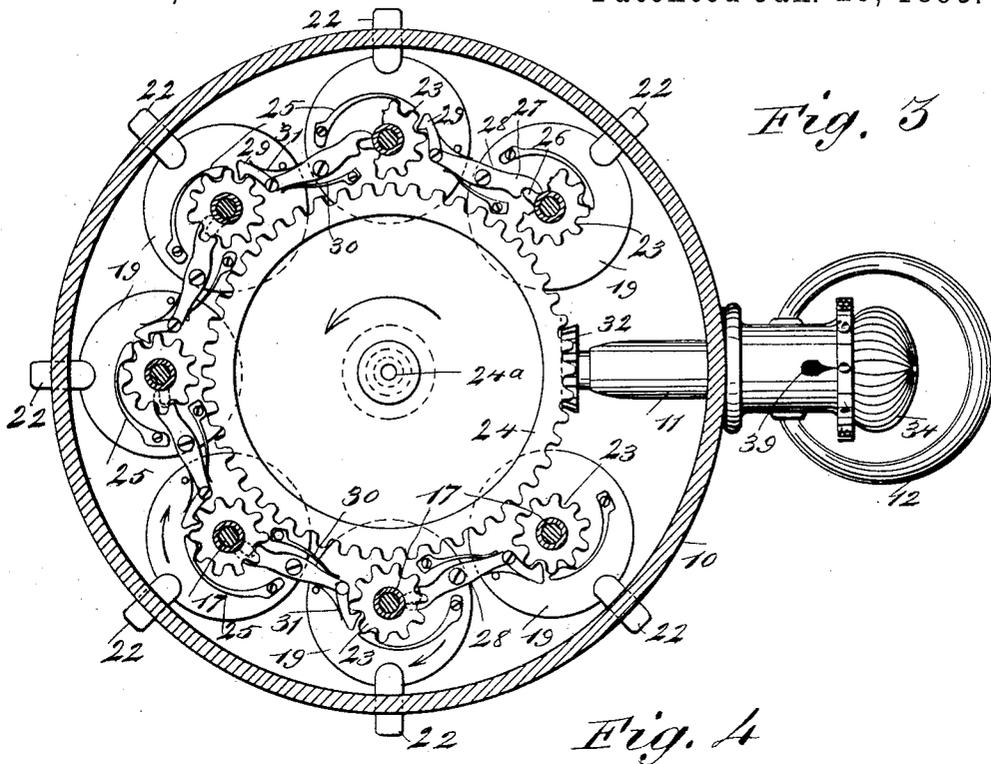


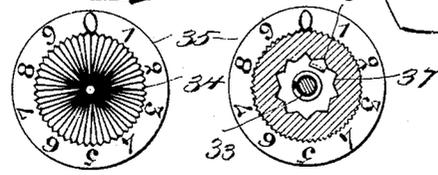
C. S. LABOFISH.
CALCULATING MACHINE.

No. 533,361.

Patented Jan. 29, 1895.



WITNESSES:
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CHARLES S. LABOFISH, OF TROY, NEW YORK.

CALCULATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 533,361, dated January 29, 1895.

Application filed December 23, 1893. Serial No. 494,526. (No model.)

To all whom it may concern:

Be it known that I, CHARLES S. LABOFISH, of Troy, in the county of Rensselaer and State of New York, have invented a new and Improved Calculating-Machine, of which the following is a full, clear, and exact description.

My invention relates to improvements in calculating machines; and the object of my invention is to produce a very simple and efficient machine of this kind, which may be made in the form of a watch and conveniently carried in the pocket, which operates without keys, which is not likely to get out of order or make mistakes, and which may be easily operated to perform the various operations in addition, subtraction, multiplication, and division.

To these ends my invention consists of certain features of construction and combinations of parts, which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which the same figures of reference indicate the same or corresponding parts in all the views.

Figure 1 is a face view of the machine embodying my invention. Fig. 2 is a sectional plan view on the line 2—2 of Fig. 4. Fig. 3 is sectional plan on the line 3—3 of Fig. 4. Fig. 4 is a cross section on the line 4—4 of Fig. 1. Fig. 5 is a detail sectional elevation of two of the number wheels and the mechanism connecting them, so that the rotation of one shall move the next one. Fig. 6 is a broken sectional plan, showing the manner in which the arbors of the number wheels are held to slide in the base or back plate of the machine. Fig. 7 is a detail end view of the crown head and the numbered collar or band thereon; and Fig. 8 is a cross section on the line 8—8 of Fig. 4.

The machine is provided with a suitable case 10, which is preferably similar to a watch case, to the end that it may be conveniently carried in the pocket, and the case has on one side a stem 11, also substantially like a watch stem, and this is provided preferably with a ring 12 of the usual kind, so that, if desired, a chain may be attached to the machine.

The case is of the open face type having a glass or crystal 13, through which may be seen

the circumferentially arranged sight slots 14, which are shown clearly in Fig. 1 and which are made in the face plate 15. These sight slots are preferably of elliptical form, so that two rows of figures may be seen in each slot as is clearly illustrated in Fig. 1, and beneath the slots turn the number wheels 16, each number wheel having on its face concentric rows of figures from 0 to 9, the rows being arranged in reverse order, with their 0's on the same radial line as shown clearly in Fig. 2, and the rows of figures on each wheel are dissimilar, preferably both in style and color, so that one row may be readily distinguished from the other. The object of this reverse arrangement is to enable one row of numbers to be used in addition and multiplication, and the other row to be used in subtraction and division.

Each number wheel 16 has, on its under side, a barrel 17 which turns loosely on an arbor 18, this being carried by a base 19 upon which the barrel rests, and the arbor projects downward through the base 19 and slides in a radial slot 20 in the back plate 21, the arbor and base 19 being normally pressed outward by a helical spring 21 which is held in the slot. There is a number wheel and arbor and also a sliding base for each sight slot, the number wheels and their accessories being arranged as illustrated in Fig 2. Each base 19 has attached to its outer edge a push button 22, which projects through the shell of the case, and by pressing this button, the base the arbor, and the number wheel may be pushed against the tension of the spring 21.

The barrel 17 of each number wheel is provided with a pinion 23, which is arranged opposite a main gear wheel 24 turning centrally in the case, and when the base 19 is pushed in the pinion 23 meshes with the gear wheel 24 so as to be driven thereby and thus turn the number wheel. The gear wheel 24 turns on a suitable arbor 24*. The pinions 23 are each engaged by a detent 25, which is secured to the adjacent base 19 and which is adapted to prevent the pinion and its number wheel from turning after the pinion has been released from the driving gear 24.

The number wheels are arranged to represent units, tens, hundreds, &c., as shown clearly in Fig. 1, and any necessary number of them

may be used. In order to provide for carrying "one" in working the machine, it is necessary to have means for turning one wheel a distance of one number at each rotation of the adjacent wheel representing a lower denomination, and to this end each barrel 17 has on one side a projecting stud or tooth 26, which is adapted to engage the notched or forked end 27 of a lever 28, which is pivoted on the base 19 just below the pinion 23, and the lever projects over the next adjacent base and is provided with a pivoted pawl 29, which is adapted to engage the pinion of the next number wheel, as clearly illustrated in Fig. 3, the lever and its pawl being held in engagement with the stud and the pinion by springs 30 and 31.

The gear wheel 24 is turned by a pinion 32, which is carried at the inner end of the stem 11 and is driven by a spindle 33, which turns longitudinally in the stem, the spindle having secured to its outer end the crown head 34, which turns in substantially the usual way, and on the neck of the crown head is a collar or band 35, which is numbered from 0 to 9, as shown clearly in Figs. 1 and 7, the numbers being placed on both the circumference and outer side of the collar or band, as shown. The number of teeth on the pinion 32 corresponds with the numbers on the collar or band 35, and the arrangement of the teeth on the gear wheel and on the pinions 23 is such that when the crown head 34 and collar 35 are turned a distance corresponding to certain numbers, the number wheel 16, which is in gear with the main gear wheel 24 will be turned a similar distance.

On the inner side of the crown head are teeth 37, which are adapted to engage a spring detent 38, which is secured to the inside of the stem 11 and the detent, by engaging the teeth 38, holds the crown head in the position to which it is turned, thus making sure that it is held at the correct number, and preventing it from being accidentally turned back before one of the number wheels is released, as hereinafter described.

The crown head has a slight longitudinal movement, and when it is pulled outward slightly it is turned back, so as to bring the collar or band 35 to zero position, by a helical spring 36, which encircles the spindle 33 and is secured at one end to the spindle and at the other to the stem 11.

On the outer end of the stem 11 is a pointer 39, which points to the numbers on the collar or band 35, and when the machine is in normal position the zero mark is opposite the pointer.

On the face of the machine is a scale 40, numbered from 0 to 9, and a hand 41 moves opposite this scale, the hand being carried by the arbor 24, and consequently when the machine is operated, the hand moves over the scale and indicates the number of spaces that a number wheel is moved.

The machine is operated by turning the crown head 34, to the right as indicated by

the arrows in Figs. 1 and 7 whether numbers are to be added, multiplied, subtracted, or divided. In operating the machine, the number wheels to be moved are pressed inward by pushing one of the push buttons 22, thus throwing its pinion 23 into gear with the driving gear 24, and then, by turning the crown head 34, while the pinion is held in gear with the gear wheel the appropriate number wheel is rotated.

We will suppose, for instance, that the number 341 is to be added to the number already indicated on the face of the machine. The push button 22 opposite the units slot is pushed inward, thus throwing the units pinion 23 into engagement with the gear wheel 24, and the crown head 34 is pushed inward slightly and turned to the right a distance of one number, thereby turning the units wheel a corresponding distance by means of the gear connection described, and if the number 5 for instance has been previously shown in the said slot over the units number wheel, the number 6 will now appear and, after this, the pressure on the push button is removed and the crown head pulled out slightly so as to release it from the spring detent 38 and permit it to return to its normal position. The push button of the tens wheels is then pushed in, thus throwing the tens number wheel into gear and the crown head is then turned a distance of four numbers, thus moving the tens number wheel a corresponding distance and adding 4 to the amount already shown in the tens sight slot. The operation is then repeated on the hundreds number wheel, this being turned a distance of three numbers and the sum is then registered and exhibited in the sight slots. If the sum of any two numbers exceeds ten, the tooth 26 of the number wheel, being operated, is brought into engagement with the lever 27 which is tilted and turns the next number wheel of a higher denomination one notch or number. The sums in addition are exhibited by the inner row of figures in the sight slots, and if subtraction or division is performed, the result is shown by the outer row of figures.

In subtracting, the operation is exactly as in adding, except that reference is made to the outer row of figures in the sight slot, and if the crown head is turned to the right the outer row of numbers diminish at the same rate that the inner row increase. If then the number 341 is to be subtracted from the number already shown on the dial of the machine, the same steps are taken as above described, but in the units, tens, and hundreds sight slots numbers will appear which are 1, 4, and 3 respectively, less than the numbers previously shown.

As multiplication is successive additions and division successive subtraction, it will be readily seen that these operations may be performed by simply turning the crown head in a manner to repeat the additions or subtractions.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A calculating machine, comprising a suitable case having sight slots therein, a central driving gear in the case, a plurality of number wheels arranged around the driving gear and movable in and out in relation to the gear, pinions connected with the number wheels and adapted to engage the gear wheel, a stem on one side of the case, a revoluble crown head mounted on the stem, and an operative connection between the stem and the gear wheel, substantially as described.

2. A calculating machine, comprising a case having a plurality of circumferentially arranged sight slots in its face, number wheels slidable radially and arranged to turn beneath the sight slots, pinions connected to the number wheels and adapted to engage the gear wheel, push buttons arranged around the case opposite the number wheels, means for throwing the number wheels into gear with the driving gear by pressing the push buttons, a revoluble spindle on one side of the case, and an operative connection between the spindle and the driving gear, substantially as described.

3. The combination, of the case having sight slots therein, the central driving gear in the case, means for throwing each number wheel

into gear with the driving gear, a spindle mounted in one side of the case and geared to the gear wheel, a crown head on the outer end of the spindle, the crown head having a numbered collar thereon, and a detent to hold the crown head in a definite position, substantially as described.

4. The combination, of the main driving gear, the number wheels slidable in and out and adapted to be driven by the main gear, the revoluble stem in one side of the case, the stem being geared to the main gear, a crown head on the outer end of the spindle, the crown head having a numbered collar thereon, and means, as the spiral spring, for returning the crown head and spindle to normal position, substantially as described.

5. The combination, with the case having sight slots therein, the back plate in the case, the revoluble central driving gear in the case, the sliding bases held to move on the back plate, the push buttons connected with the bases, and the number wheels journaled on the bases beneath the sight slots and provided with pinions to engage the central gear wheel, substantially as described.

CHARLES S. LABOFISH.

Witnesses:

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