H. ENDERS.

CALCULATING MACHINE.

APPLICATION FILED DEC. 8, 1919.

1,364,624.

Patented Jan. 4, 1921.

2 SHEETS—SHEET 1.

Fig. 1.

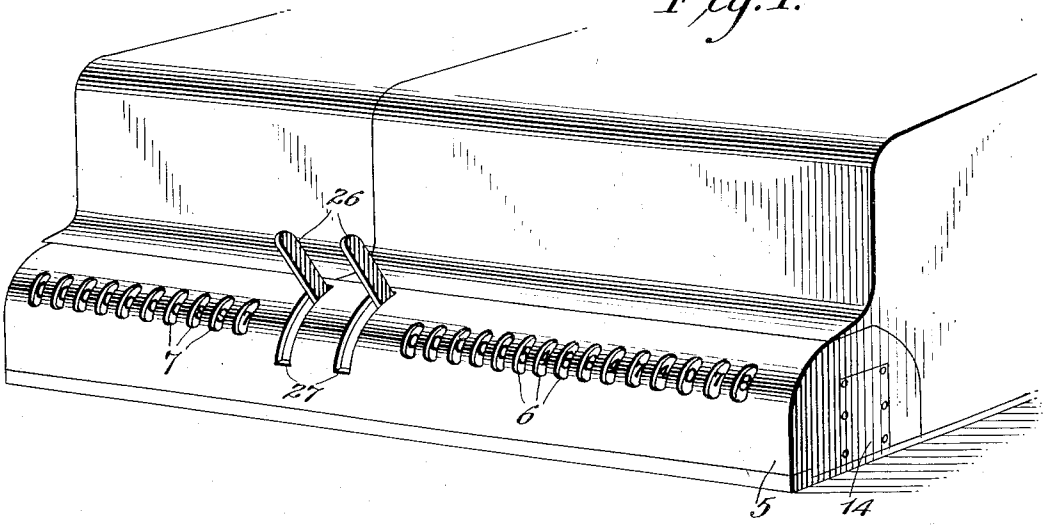


Fig. 2.

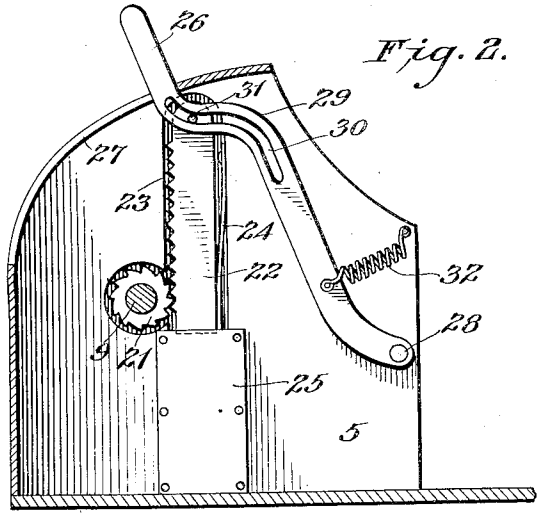
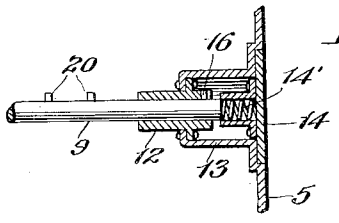


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 3.

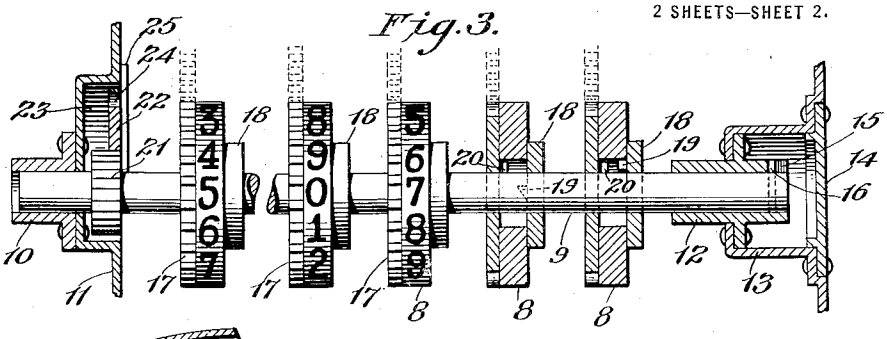


Fig. 4.

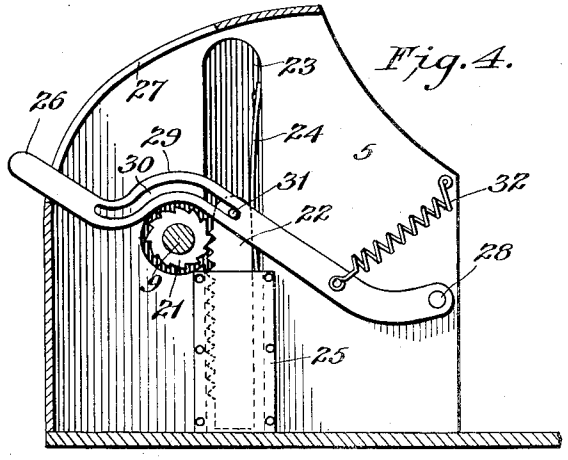


Fig. 6.

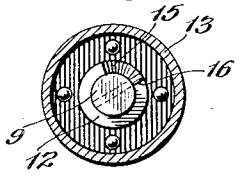


Fig. 5.

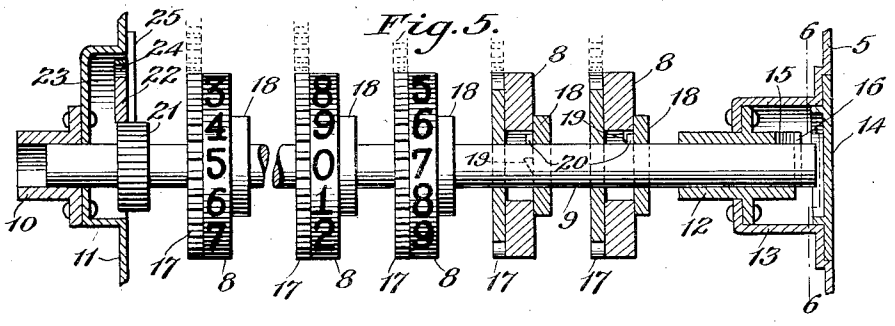


Fig. 7.

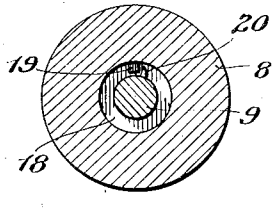
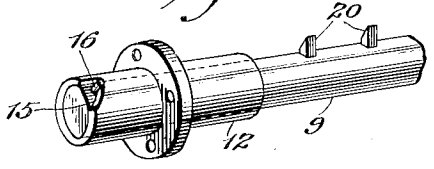


Fig. 8.



Inventor

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UNITED STATES PATENT OFFICE.

HUGO ENDERS, OF LEHIGHTON, PENNSYLVANIA, ASSIGNOR TO THE LEHIGH CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

CALCULATING-MACHINE.

1,364,624. Specification of Letters Patent. Patented Jan. 4, 1921.

Application filed December 8, 1919. Serial No. 343,325.

To all whom it may concern:

Be it known that I, HUGO ENDERS, a citizen of the Republic of Germany, and a resident of the town of Lehighton, county of Carbon, State of Pennsylvania, have invented certain new and useful Improvements in Calculating-Machines, of which the following is a specification.

This invention relates to calculating machines, and has for its primary object to provide improved means for resetting the factor or product digit wheels of the machine to zero position.

To the above end, my invention contemplates the provision of a resetting mechanism of simple and reliable construction which may be actuated to return all of the digit wheels in the series to zero position by a single operation of a conveniently located pivoted lever.

The present improvement also provides a very compact mounting and arrangement of the several elements, so that the mechanism will not be liable to get out of order or require frequent repair.

With the above and other objects in view, the invention consists in the provision of an improved resetting mechanism for calculating machines as above characterized, and in the form, construction, and relative arrangement of its several parts as will be hereinafter more fully described, illustrated in the accompanying drawings, and subsequently incorporated in the subjoined claims.

In the drawings wherein I have illustrated one practical embodiment of my invention, and in which similar reference characters designate corresponding parts throughout the several views,

Figure 1 is a fragmentary perspective view of a calculating machine of a well-known type, which is equipped with the present improvements.

Fig. 2 is an enlarged transverse sectional view.

Fig. 3 is a longitudinal section showing the normal position of the digit wheel shaft.

Fig. 4 is a section on the line 4—4 of Fig. 3, showing the relative positions of the parts after the shaft has been rotated and the wheels reset in zero position.

Fig. 5 is a fragmentary longitudinal section with the shaft in the position seen in Fig. 4.

Fig. 6 is a section taken on the line 6—6 of Fig. 5.

Fig. 7 is a transverse section taken on the line 7—7 of Fig. 5.

Fig. 8 is a detail perspective view of certain of the parts.

Fig. 9 is a detail section illustrating a slight modification.

Referring in detail to the drawings, 5 designates the case or housing which is mounted upon a suitable base and incloses two series of wheels which indicate respectively one of the factor numbers in the problem to be calculated and the product number. It is the purpose of my present improvements to provide an individual resetting means for these two series of wheels whereby they may be instantly reset to zero position. It will be understood that the calculating machine which I have represented partially in Fig. 1 of the drawings, is merely illustrative and that the present invention is not limited to use in connection with this specific type of machine. The front wall of the machine case 5 is provided in the usual manner with the sight openings shown at 6 and 7 respectively, through which the numerals on the peripheral faces of the two series of digit wheels are visible.

As the resetting mechanism for each series of wheels is identical with that for the other series, the following description of one of these mechanisms will suffice for both. The digit wheels 8 are loosely mounted for relative rotation on a shaft 9. This shaft at one of its ends is journaled in an elongated bearing 10 provided on a transverse frame plate 11. The other end of the shaft 9 is mounted in a sleeve bearing 12 which extends through the end wall of an indented portion 13 of the end wall of the casing 5 and is suitably fixed thereto. The outer end portion of this bearing sleeve is housed within the tubular portion 13 of the casing wall, the open end of which may be closed by the plate 14, which at its edges is countersunk in the face of the casing wall and suitably secured thereto. The outer end of the bearing sleeve 12 has a notch or recess therein provided with the cam face 15 with which the projecting end of a pin 16 fixed in the shaft 9 coacts.

Each of the digit wheels 8 is of annular form and the usual cog gear 17 is suitably

fixed to one side face of each wheel with which the rotation transmitting pinions engage. To the opposite side face of the wheel 8 a metal plate 18 is fixed and loosely surrounds the shaft 9. A stud 19 projects longitudinally of the shaft from the inner face of this plate. On the shaft 9 are provided the spaced studs or teeth 20 which, in one position of said shaft are adapted to coact with the respective studs 19 of the wheels 8.

Upon the end of the shaft 9, which is mounted in bearing 10, a ratchet toothed pinion 21 is fixed. The teeth of a vertically movable rack 22 are engaged with the teeth of this pinion for the purpose of rotating the shaft 9 in one direction. The rack 22 and the pinion 21 are disposed within a depressed or channeled portion 23 of the frame plate 11, and it will be noted that the peripheral face of the pinion 21 is of appreciably greater width than the thickness of the rack 22, so that the shaft 9 may shift axially in its bearings without disengaging the pinion from the teeth of the rack.

The rack is yieldingly held in operative engagement with the pinion by means of a leaf spring 24 which is interposed between the untoothed vertical edge of said rack and the opposed side wall of the channel 23. It will be seen that this spring normally urges the toothed edge of the rack against the teeth of the pinion 21, but will permit of the upward movement of the rack without rotating the pinion. The rack 22 is retained in the channel 23 by means of a guide plate 25 which is fixed to the frame plate 11 and extends over the lower portion of said channel.

The operating lever 26 extends through a slot 27 in the front wall of the casing 5 and at its lower end is pivotally mounted as at 28 upon the frame plate 11. This lever intermediate of its ends is curved as at 29 to accommodate the pinion 21 when the lever is moved downwardly in the slot 27. This curved portion of the lever is provided with a longitudinal slot 30 to receive the pin 31 which is fixed in the upper end of the rack 22. A spring 32 normally urges the lever 26 and the rack 22 upwardly, it being understood of course, that this spring is sufficiently strong to overcome the resistance offered by the action of the leaf spring 24.

In the operation of the mechanism as above described, it will be understood that normally, the shaft 9 merely acts as a support for the digit wheels which are freely rotatable relative to each other upon said shaft, but are held against casual rotating movement by the interlocking engagement of the cog gears 17 with the transmission gears or pinions. When it is desired to reset the digit wheels so that the zero on each wheel will appear in the sight openings of the casing, the operator simply engages the upwardly projecting end of lever 26 with his finger and forces the same downwardly in the slot 27 to the lower end thereof. In this movement of the lever, the rack 22 is moved downwardly and the teeth on this rack engaging the pinion 21 rotate the shaft 9. Initially, or at the start of this rotative movement of the shaft, the pin 16 riding upon the cam surface 15 of the bearing sleeve 12 imparts an axial movement to said shaft, so that the teeth or studs 20 on the shaft are moved into contact with the inner faces of the plates 18 on the wheels 8 and into circumferential alinement with the studs 19 projecting from these plates. Therefore, upon the continued rotation of the shaft 9, the teeth 20 will engage the studs 19 of the respective wheels and rotate said wheels. The downward movement of the rack 22 is just sufficient to effect one complete rotation of the shaft 9 at which time, the zero on the peripheral face of each wheel will appear in the sight openings. When pressure on the lever 26 is released, the spring 32 immediately acts to return said lever to its normal position, and the rack 22 is moved upwardly, the teeth of said rack moving freely over the teeth of the pinion 21 against the action of the leaf spring 24. The lugs 19 on the wheels 8 are beveled on one side and when any one of these wheels completes a rotation on the shaft during the operation of the machine, said beveled face of the lug striking against one of the teeth 20 will shift the shaft axially to its normal position. However, in Fig. 9 I have shown a spring 14′ mounted upon the inner face of the plate 14 which acts against the end of the shaft 9, so as to positively urge said shaft to its original position immediately upon the completion of the resetting operation.

From the foregoing description considered in connection with the accompanying drawings, the construction, manner of operation and several advantages of my improved resetting mechanism for calculating machines will be readily understood. As the operating levers are arranged at the front of the machine case and the shaft 9 is wholly inclosed within said case, there are no projecting parts at the side of the case which constitute an obstruction to the free manipulation of the operating crank or handle whereby the calculating mechanism is actuated. The resetting operation may be very quickly effected, as only a single downward movement of the lever 26 is required. The mounting and arrangement of the several elements within the case 5 is such as to necessitate no material alterations in the present case construction. The various parts are also of simple form and so arranged

that they will not become displaced or require frequent repair. I have above described one construction and arrangement of the operating means for the resetting shaft which has been found very satisfactory in practical operation. It is, however, possible that other alternative lever operated means may be devised for accomplishing the same result. Therefore it is to be understood that, while I have herein disclosed one practical and preferred embodiment of the invention, the device may nevertheless be exemplified in numerous other constructions, and I accordingly reserve the privilege of adopting all such legitimate changes in the form, construction and arrangement of the several elements as may be fairly embodied within the spirit and scope of the invention as claimed.

I claim:

1. In a calculating machine, a rotatable and axially movable shaft, a series of digit wheels loosely mounted on said shaft, said wheels and the shaft having means to coact in one position of said shaft and cause a rotation of said wheels with the shaft, and resetting means for the digit wheels including a pinion rotatable with said shaft, a rectilinearly movable rack coacting with said pinion when moved in one direction to rotate the shaft, a spring yieldingly urging the rack into operative engagement with the pinion but permitting of its movement in an opposite direction with respect thereto, manually operable means connected to one end of the rack to actuate the latter, and means operable upon such rotation of the shaft for initially imparting a limited axial movement thereto to position the coacting means on said shaft and digit wheels for operative engagement with each other.

2. In a calculating machine, a rotatable and axially movable shaft, a series of digit wheels loosely mounted on said shaft, said wheels and the shaft having means to coact in one position of said shaft and cause a rotation of said wheels with the shaft, and resetting means for the digit wheels including a pinion rotatable with said shaft, a rectilinearly movable rack coacting with said pinion when moved in one direction to rotate the shaft, a spring yieldingly urging the rack into operative engagement with the pinion but permitting of its movement in an opposite direction with respect thereto, an operating lever for the rack, a pin and slot connection between said rack and lever, and means operable upon such rotation of the shaft for initially imparting a limited axial movement thereto to position the coacting means on said shaft and digit wheels for operative engagement with each other.

3. In a calculating machine, a rotatable and axially movable shaft, a series of digit wheels loosely mounted on said shaft, said wheels and the shaft having means to coact in one position of said shaft and cause a rotation of said wheels with the shaft, and resetting means for the digit wheels including a pinion rotatable with said shaft, a rectilinearly movable rack coacting with said pinion when moved in one direction to rotate the shaft, a spring yieldingly urging the rack into operative engagement with the pinion but permitting of its movement in an opposite direction with respect thereto, an operating lever for the rack, a pin and slot connection between said rack and lever, a spring coacting with the lever and urging the same to its normal position, and means operable upon such rotation of the shaft for initially imparting a limited axial movement thereto to position the coacting means on said shaft and digit wheels for operative engagement with each other.

4. In a calculating machine, two alined rotatably and axially movable shafts, a series of digit wheels loosely mounted on each of said shafts, said wheels and the corresponding shaft having means to coact in one position of the shaft and cause the rotation of the wheels with the shaft, a housing inclosing said digit wheels and the shafts and having openings through which the digit wheels may be observed, vertically extending slots disposed adjacent each other and the adjacent ends of the two shafts, resetting means for the digit wheels including a lever actuated means for rotating each shaft, said lever actuated means being disposed at the inner end of the corresponding shaft and extending out through said slots in the housing, and means operable upon such rotation of the shaft under the action of the lever actuated means for initially imparting a limited axial movement to the shaft to position the coacting means on the shaft and digit wheels for operative engagement with each other.

In testimony that I claim the foregoing as my invention, I have signed my name.

HUGO ENDERS.