

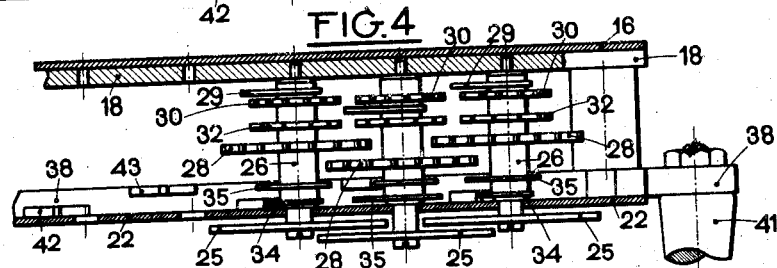
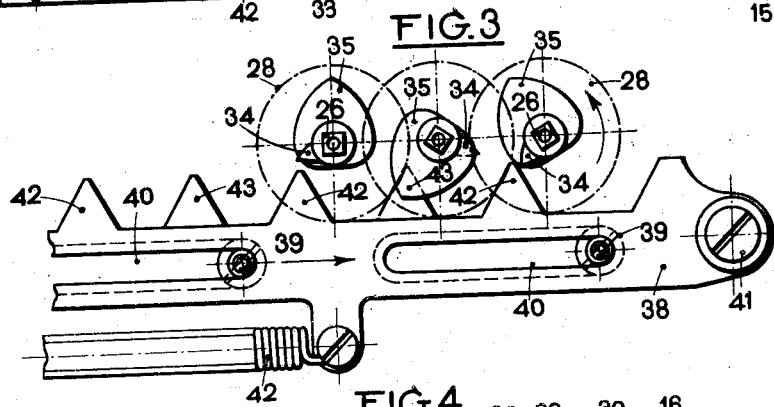
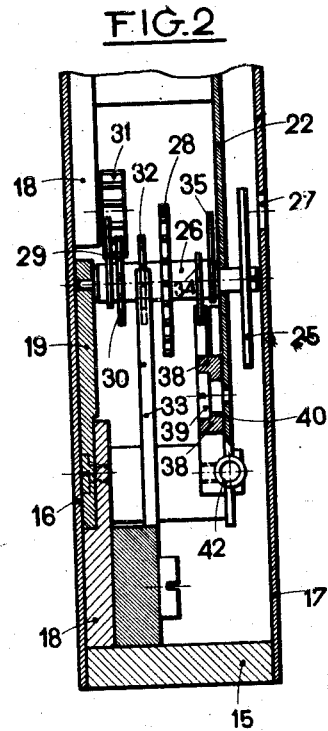
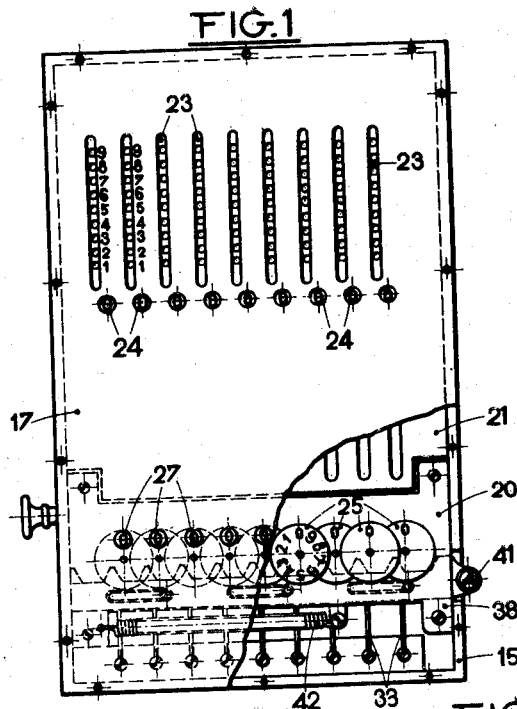
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ZERO RESETTING MECHANISM FOR ADDING MACHINES

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ZERO RESETTING MECHANISM FOR ADDING MACHINES

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The present invention relates to an adding machine of the type having a totalizing mechanism, the counting or number discs of which are simultaneously returned to their zero position by means of a slide moved rectilinearly by hand, in opposition to the action of a spring, and which manually operable resetting means carries out its action through the intermediary of heart-shaped cam discs.

In the use of known zero resetting devices of such type, it may quite frequently occur, dependent upon the instantaneous position of the individual number of discs, that the tooth or the like of the manually operable resetting means engaging the corresponding heart-shaped cam disc does not engage the same under the most favorable conditions. In the instant that a number of such discs are simultaneously in a position giving rise to such unfavorable conditions for the engagement of the tooth acting on the heart-shaped cam, a large amount of power will be necessary to actuate the zero setting device.

The invention is intended to eliminate this drawback and to provide an apparatus, which, although of compact construction, ensures the proper engagement of the teeth acting on the heart-shaped cam in all possible positions of the counting discs, so that the zero resetting almost invariably requires substantially the same minimum expenditure of power. According to the present invention this object is obtained by the provision of a slide having two rows of teeth lying in different parallel planes, and which successively engage with two cam discs mounted adjacent each other on the axis of each number disc and which are angularly staggered or relatively displaced with respect to each other. The order of the cams on the successive number disc axis is reversed, so that where in one instance the large cam is placed in front of the smaller cam and in the next adjacent instance the smaller cam is placed in front of the larger cam.

An object of my invention is to produce a new form of zero re-setting mechanism for an adding machine;

Another object is to produce a zero re-setting mechanism for an adding machine comprising a novel form of rack.

Another object is to produce in a zero re-setting mechanism for an adding machine, a novel cam arrangement for the spindles of the number discs.

Another object is to produce a zero re-setting mechanism for an adding machine comprising a novel form of rack in combination with a novel arrangement of cams on the spindles of the number discs.

Still another object is to produce, in a zero re-setting mechanism for an adding machine, having a rack, a novel means for guiding the rack in its rectilinear movement.

Yet another object is to produce, in a zero re-setting mechanism for an adding machine, and having a rack, a novel means for moving and returning the rack.

Other objects and advantages will more fully appear hereinafter.

One form of my invention is illustrated by way of example in the accompanying drawing wherein the invention is depicted as employed in combination with a small portable adding machine of the type having sliders. It is to be clearly understood, however, that the zero re-setting mechanism is not limited to machines of the said type.

In the drawing, Fig. 1 is a front elevation of the machine, the front cover of the case being partially broken away for illustrating a portion of the interior mechanism;

Fig. 2 is a sectional view through the axis of a numeral disc or wheel, and illustrates the lower part of the machine on a larger scale than that of Fig. 1;

Fig. 3 is a front view of a portion of the zero re-setting mechanism for the totalizing mechanism; while

Fig. 4 is a partial cross section through the axes of the numeral discs or wheels.

In the preferred form the machine comprises a case formed by a rectangular frame 15, a back cover 16 and a front cover 17, these covers being fixed to the rectangular frame by means such as screws. The frame proper which supports the entire mechanism is fitted in the case and is preferably formed by a plate 18 together with cross members 19, 20, 21, and 22 assembled by suitable means such as pillars and screws.

In the present instance, the adding mechanism comprises sliders arranged behind the sight openings 23 and 24 formed in the front cover 17. The sliders are movable in a rectilinear movement relative to the elongated sight openings 23 and are adapted for downward operation by means of a spindle such as a pin or peg engaging in any of the holes one to nine arranged on the respective spindles, the pin or peg being inserted in the said holes through sight openings 23. The spindles are adapted to form the numbers to be added in the conventional manner and represent from right to left in Fig. 1 the single units, tens, hundreds, etc.

The number which is set up by means of actuation of the sliders by pegs or the like is visible in the sight openings 24 and is transferred to the totalizing mechanism in suitable manner as for instance by rack gear not shown.

The totalizing mechanism comprises rotary numeral discs or wheels 25, each keyed to an axis or spindle 26 and disposed in the rear of the corresponding sight openings 27 formed in the cover 17. Each disc or wheel 25 is controlled in suitable manner by the corresponding spindle, as for instance, through the medium of the mechanism comprising a counting wheel 28 keyed to the axis or spindle 26, so that the total of the operation is indicated by the numerals visible through the sight openings 27. The transfer of the units of a number from one disc or wheel to the other is effected in any desired manner as by means of a finger 29 keyed to the axis or spindle 26 and acting on a counting wheel 30 keyed to the next adjacent axis or spindle through the medium of means such as a gear 31.

The exact construction of a totalizing mechanism does not form an essential feature of the present invention, so that the disclosure thereof is in no greater detail than is absolutely essential.

On each axis or spindle 26 is preferably keyed a star wheel 32 in the teeth of which engages means such as a pick 33 for ensuring the maintenance in desired position of the axis or spindle 26 of the corresponding numeral disc or wheel 25.

The totalizing mechanism is combined with means for re-setting the same to zero,

whereby all of the numeral discs or wheels 25 may be simultaneously returned to their original or zero position, prior to being actuated by the mechanism. The resetting means in the preferred instance comprises two cams 34 and 35 for each axis or spindle 26, the cams of the particular spindle being arranged on the axis thereof at an angle of approximately 90° relative to each other. These two cams, one of which preferably is smaller than the other, are disposed in two parallel planes, but the order of arrangement of the cams on their particular spindle is reversed from spindle to spindle, so that while the small cam 34 of the odd axes or spindles is disposed in one plane, the small cams of the even spindles are disposed in the other plane. The same applies for the large cams 35, the order of their arrangement of course being reversed with respect to that of the small cams.

The two cams 34 and 35 are adapted to be actuated for the purpose of re-setting the numeral discs to zero by means such as a rack 38 mounted in any suitable manner against the inner face of the cross member 22, as by means of screws 39 each extending through a groove 40 formed in the rack. This rack is adapted for rectilinear movement relative to the screw 39, and in the preferred instance is controlled for this purpose by means of a button 41 suitable for manual operation or the like. A biasing spring 42 is preferably employed, and through its connection with the rack continuously tends to turn the latter to its original position as shown in the drawing. The rack has a plurality of teeth 42 and 43 shown as having the form of a slightly truncated triangle. The teeth are preferably arranged in two parallel rows, the planes of which coincide with the planes of rotation of the cams 34 and 35. Dependent upon the angular position of the numeral disc or wheel the return to zero of the latter is caused either by the action of a single tooth of the rack or by the cooperation of two teeth, one in the first row and the other in the second row of the rack, the two teeth of course being adjacent to each other.

When the numeral disc or wheel 25 occupies its original position, as shown in the instance of the third disc on the left in Fig. 3, the two cams 34 and 35 occupy the positions shown therein. At such times, when the rack is drawn to the right as indicated by the arrow, the teeth of the rack move freely beneath the cams under consideration and do not contact therewith. If however, the cams occupy the positions corresponding to the spindle position shown in connection with the second numeral disc from the left in Fig. 3, the tooth 43 still moves freely beneath the small cam 34 without contacting therewith. The large cam, however, remains in the path of the tooth 42 of the rack, and upon movement of the rack,

the tooth returns the large cam, together with its spindle, to its original or zero position. Finally, when the position of the cams corresponds to the spindle position shown in the right hand instance in Fig. 3, the movement of re-setting the disc to zero is accomplished in two separate steps, by imparting through the teeth 42 and 43, two successive angular movements of the axis or spindle. To this end, the tooth 42 first acts on the small cam 34 to shift the spindle through a certain angular distance, limited by disengagement of the tooth and the cam. Since the rack 38 continues its movement towards the right the tooth 43 now contacts with the large cam 35, which had initially been out of the path of the tooth and by means of the small cam 34 has now been brought into the path of the tooth 43. Then, the rack 38 being moved still further towards the right, the tooth 43 impels the cam 35 through an angular distance sufficient to return the disc to zero.

The result of this device as set forth is that the numeral discs or wheels invariably rotate in the same direction, as indicated by the arrow in Fig. 3, during such times as they are being re-set to zero.

It is obvious that the device for re-setting to zero is of very simple and sturdy construction and has a very small compass; that it can be readily mounted and is quite reliable in operation. It is further obvious that it is applicable to numerous other types of adding machines than the type described herein by way of example.

The invention claimed is susceptible to numerous modifications and adaptations without departing from the spirit thereof, and it is intended that it be limited only by the scope of the appended claims.

I claim:

1. An adding machine comprising a totalizing mechanism having rotary numeral discs or wheels, and means for simultaneously re-setting the numeral discs to zero, the said means comprising a linearly movable rack having teeth arranged in two parallel rows, the teeth of one row being staggered relative to those of the other row, a biasing spring tending to re-set the rack after movement thereof, cams arranged one in advance of the other on each spindle of the numbered discs, so that cooperating teeth of the said rack are adapted to cooperate with the cams of the corresponding spindle for imparting to the spindle one or more successive angular impulses for re-setting the discs to zero, the number of impulses being determined by the angular position of the disc being re-set, the cams of each of the discs being reversed on their spindle with respect to the arrangement of the cams of the adjacent spindles.

2. In an adding machine having a total-

izing mechanism with a plurality of number discs, a zero resetting device for simultaneously returning the said number discs to their zero position, comprising two angularly displaced cam discs mounted one in the rear of each other on the axis of each number disc, a slide having two rows of teeth lying in different parallel planes, the said rows of teeth engaging successively the corresponding cam discs on the axis of each number disc, the longitudinal position of the cam discs along the axis of the number discs being reversed between any two adjacent number discs.

In testimony whereof I have signed my name to this specification.

ALBERT STEINMANN.

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