March 3, 1936. H. T. AVERY 2,033,088

CALCULATING MACHINE

Filed Dec. 7, 1931

FIG. 1.

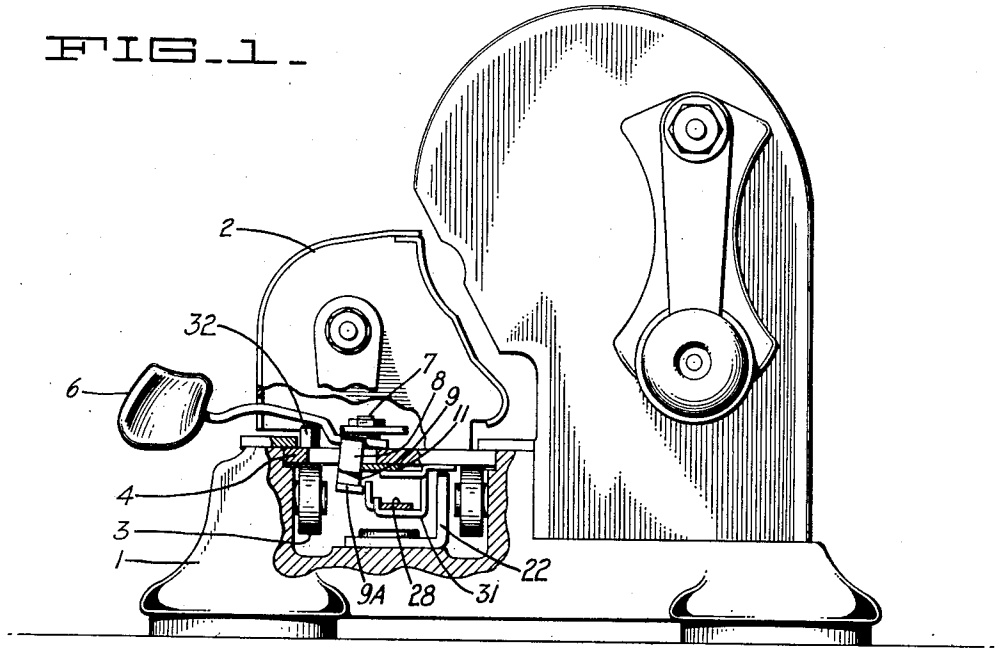


FIG. 2.

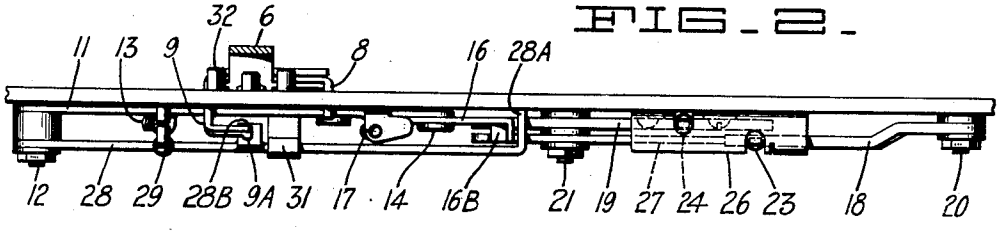
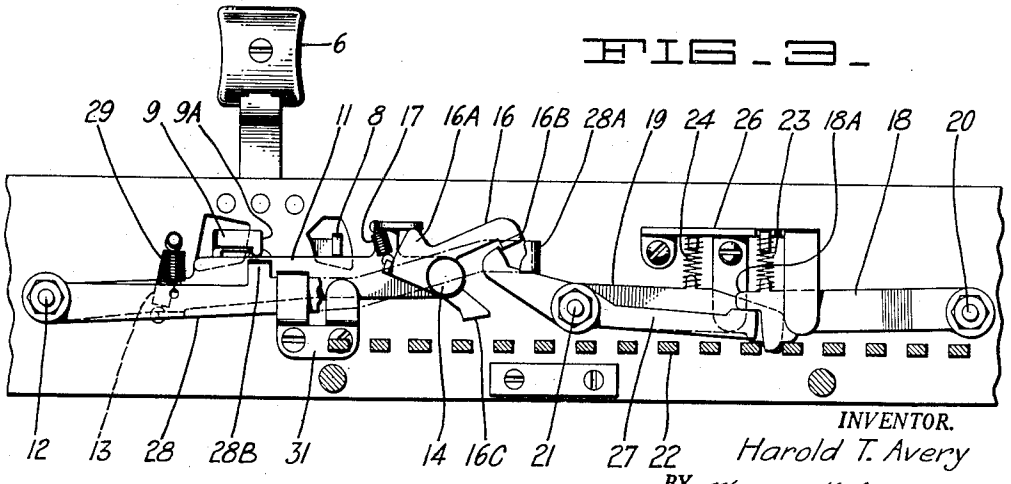


FIG. 3.



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CALCULATING MACHINE

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2 Claims. (Cl. 235—63)

The present invention relates to calculating machines of the type embodying a displaceable carriage, and more particularly to mechanism for displacing said carriage from order to order.

It is an object of the invention to provide a shifting mechanism having a single manipulable member which is adapted to control an ordinal step-by-step movement in either direction.

Another object of the invention is to provide shifting mechanism having a single manipulable control member adapted to control ordinal step-by-step movement in either direction and to control free movement of the carriage in either direction for a plurality of ordinal steps.

Another object of the invention is to provide shifting mechanism for a displaceable carriage in which said carriage is normally locked in position, said lock being released under control of a member which is adapted to determine a plurality of types of shifting operations.

Another object of the invention is to provide a simple shifting mechanism which is easily assembled and which is reliable in its operation.

Other objects will appear as the description progresses.

The invention possesses a plurality of advantageous features, some of which will be set forth at length in the following description where that form of the invention which has been selected for illustration in the drawing accompanying and forming part of the present specification, shall be outlined in full.

In the accompanying drawing the invention is shown embodied in a calculating machine of the general type disclosed in the British patent to Friden, Number 185,852 accepted September 14, 1922, to which reference is made for a disclosure of such mechanisms as are not described herein. While one form of apparatus embodying the invention has been shown, it is to be understood that the invention is not limited to that particular form, since the invention, as set forth in the claims may be embodied in a plurality of other forms. It is evident that the invention may be embodied in any calculating machine having a displaceable carriage.

In the accompanying drawing forming a part of this specification,

Figure 1 is a right side elevation of a calculating machine with part of the casing broken away to disclose the shifting mechanism.

Figure 2 is a front view of the base plate of a displaceable carriage, showing the shifting mechanism mounted thereon.

Figure 3 is a bottom plan view of the displaceable carriage showing the shifting mechanism mounted thereon, the rack with which said shifting mechanism cooperates being shown in section.

The calculating machine comprises a base 1, in which suitable selecting mechanism is mounted, as disclosed in the above-mentioned patent to Friden, and a displaceable carriage 2 in which the registering mechanism is mounted. The carriage 2 is slidably supported upon rollers 3 journaled in the base of the machine and which contact the base plate 4 of the carriage.

A single manipulable control means is provided for controlling lateral displacement of the carriage. Said means comprises the handle 6 which is loosely pivoted at 7 to the base plate 4 of the carriage and extends forwardly through an opening in the carriage cover plate. The pivoting of handle 6 on the stud 7 is sufficiently loose to allow it to be moved vertically through a considerable angle, said handle being maintained in its upper position by means to be described hereinafter. The handle 6 near its pivot point is provided with two depending ears 8 and 9 which extend downwardly through suitable apertures in the base plate 4 and lie immediately in front of a lever 11 which is pivoted on the under side of the base plate 4 at 12 (Figure 3). Said lever 11 is maintained in its forward position by a spring 13 tensioned between said lever and a stud on the base plate. Pivoted to the free end of lever 11 at 14 is a bellcrank 16 which is normally held by spring 17 in the position shown in Figure 3 in which a forward extension 16A of said bellcrank is positioned against the lateral extension of said lever 11.

The said lever 11 and bellcrank 16 pivoted thereon provide means for controlling the release of the carriage locking mechanism during step-by-step movement of said carriage, as will be more fully described hereinafter.

Means are provided for locking the carriage in any ordinal position thereof, said means comprising a pair of locking dogs or pawls 18 and 19 pivoted to the under side of the base plate of the carriage at 20 and 21, respectively. Said dogs are provided with oppositely beveled noses which are adapted to engage in the same notch in a rack 22 secured to the base plate of the machine, being maintained in engagement with said rack by a pair of compression springs 23 and 24, respectively, which are compressed between said dogs and suitable extrusions on guiding member 26 (Figure 3). Said guiding member 26 is provided with a pair of rearwardly extending fingers which lie on opposite sides of said dogs and prevent vertical displacement thereof. It will be noted in Figure 3 that the dog 18 prevents lateral displacement of the carriage to the left, while dog 19 prevents lateral displacement thereof to the right.

Means are provided for releasing the locking means to permit step-by-step movement of said carriage in either direction. Said means comprises the lever 11 and bellcrank 16 pivoted to the free end thereof as previously described. Said

bellcrank 16 is provided with a lateral extension 16B which overlies and is adapted to engage the tails of dog 19 and a pawl 27 pivoted at 21 (Figure 3), the other arm of said pawl being provided with a nose which lies between one tooth of rack 22 and a leftward extension 18A on the locking dog 18. The arrangement is such that movement of lever 6 in either direction through ear 8 or 9 rocks said lever 11 rearwardly about its pivot 12, lateral extension 16B on bellcrank 16 serving to depress the tails of pawls 19 and 27, thereby raising the noses of locking pawls 18 and 19 from engagement with the carriage rack 22 so that the carriage is free to be moved.

Means are provided for limiting the lateral movement of the carriage to a single ordinal step when said handle 6 is oscillated. The bellcrank 16 is provided with a rearwardly extending arm which terminates in a cam 16C, and when the bellcrank 16 is moved rearwardly by slight movement of lever 6, the said cam end is moved into engagement with a notch of the rack 22, the said bellcrank having been rocked slightly in a counter-clockwise direction due to the resistance offered by springs 23 and 24. When the locking dogs 18 and 19 are free of the rack 22, the lateral pressure on handle 6 becomes operative to move the carriage laterally. As the carriage thus moves the cam 16C is forced past a tooth of the rack which rocks the bellcrank 16 in a counter-clockwise direction on its pivot 14. This movement carries the ear 16B clear of the tails of pawls 19 and 27, thus permitting the locking dogs 18 and 19 to fall into engagement with rack 22 under the pressure of springs 23 and 24. Due to the opposite beveling of the faces of the noses of said dogs, the locking dog designed to check movement in the direction in which the carriage is moving, will be in a position to enter the notch of the rack well in advance of the carriage coming to a full step position and therefore will be in position to block more than one step of movement of the carriage. When the full one-step movement is completed, the other dog is free to fall into the notch of the rack and prevent displacement of the carriage in the other direction.

Means are provided for completely releasing the displaceable carriage under the control of the manipulable member 6 to permit lateral displacement thereof through a plurality of ordinal steps in either direction. Said means comprises a lever 28 which is pivoted at 12 and is held by a tension spring 29 in engagement with an upward ear of a guide member 31. Said lever 28 is provided at its free end with a lateral extension 28A which lies immediately forward the tails of pawls 19 and 27, said lever 28 being also provided with an ear 28B intermediate its length, which lies immediately to the rear of a lateral extension 9A of ear 9 so that movement of said lever 6 downwardly, rocks lever 28 about its pivot causing the lateral extension 28A on the free end thereof to rock pawls 19 and 27 in a counter-clockwise direction to release locking dogs 18 and 19 from rack 22. Thus the carriage is free to be moved either to the right or to the left by pressure upon handle 6. Said handle, in its downward position, lies intermediate a pair of pins 32 which serve to prevent oscillation thereof on its pivot. Said pins also serve to prevent vertical movement of said handle in other positions than its central one.

The shifting mechanism operates in the following manner. To move the carriage step-by-step in either direction, pressure is applied to the handle 6 in the direction desired while it is in its upper position where it is maintained by the pressure of spring 13 acting on lever 11 and ears 8 and 9. Ear 8 or 9, depending upon the direction in which pressure is applied, becomes effective to rock lever 11 which, through lateral extension 16B on bellcrank 16, rocks pawls 19 and 27 to rock the noses of pawls 18 and 19 out of engagement with the rack. This movement also engages the rearward cam face 16C with a notch of rack 22 and upon the ensuing lateral movement, a tooth of rack 22 moves said cam face forwardly rocking the lever 16 counter-clockwise as viewed in Figure 3 to release pawls 19 and 27, thereby permitting the noses of pawls 18 and 19 to engage the tooth of rack 22. As the carriage moves by the first tooth the nose of pawl 18 in the shifting to the left falls into the notch due to the beveling of the right hand face of said nose, and the straight left face of said nose engages the next tooth 22 and limits the movement of the carriage to one ordinal step. At the completion of the movement, pawl 19 falls into the same notch in rack 22 and the straight face on the right side thereof prevents movement of the carriage to the right so that lateral pressure applied to handle 6 in either direction, with said handle in its upper position, results in a one-step displacement of the carriage in the selected direction.

To release the carriage for free movement in either direction, the handle 6 is moved to its lower position where it lies between the pins 32 which serve to prevent oscillation thereof on its pivot. Such downward movement causes oscillation of lever 28, the lateral extension 28A of which depresses the tails of pawls 19 and 27, causing disengagement of locking dogs 18 and 19 from rack 22 so long as the handle is maintained in depressed position, so that the carriage may be moved to any desired ordinal position. When the handle 6 is released as the carriage is entering the desired position locking dogs 18 and 19 engage the aligned notch in rack 22 thereby positioning the carriage in the selected position. Suitable means are provided for limiting the travel of the carriage in either direction to the range of its operative positions with respect to the actuator.

I claim:

1. In a calculating machine having a shiftable carriage, shifting mechanism for said carriage comprising carriage latching means, a first means for temporarily releasing said latching means, means automatically operated in response to carriage movement, for disabling said first means, a second means for releasing said latching means, and manipulative means movable in one direction to operate said first releasing means and in another direction to operate said second releasing means.

2. In a calculating machine having a shiftable carriage, shifting means for said carriage comprising mechanism including a cooperating pawl and rack for latching said carriage against movement, and manipulable means for releasing said latching mechanism including a single member operable in response to carriage movement in either direction for disabling said releasing means.

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