July 6, 1926. 1,591,664

A. EKMAN

ADDING MACHINE

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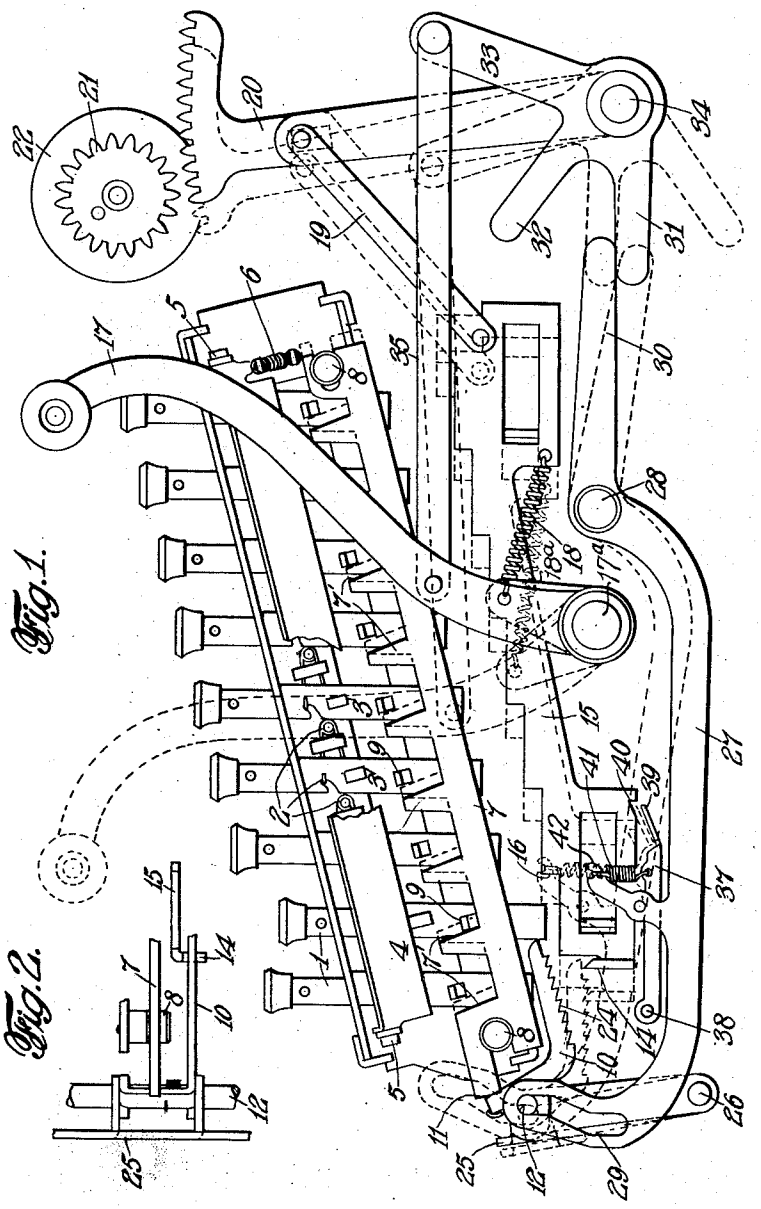

Fig. 1.

Fig. 2.

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ANDREW EKMAN, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO BLEICK SYNDICATE, COMPOSED OF WILLIAM D. BLEICK AND D. H. CONNOR, BOTH OF NEWARK, NEW JERSEY, AND F. J. PARKER AND J. J. HARRIS, BOTH OF MONTCLAIR, NEW JERSEY.

ADDING MACHINE.

Application filed November 14, 1921. Serial No. 514,882.

My invention relates to adding machines and more particularly to such machines in which a new item may be set up in the keyboard before the mechanism has returned to normal position.

The principal object of the invention is to provide improved means for preventing the travel of the indexing mechanism forwardly beyond indexed position after the release of the keys or stops of the machine. Other objects, features and advantages of my invention will appear more fully in the following detailed description and appended claims.

The accompanying drawing forming a part of this specification illustrates one embodiment of my invention.

In the drawing, Fig. 1 is a side view of the said embodiment of the invention; and Fig. 2 is a fragmentary plan view thereof.

The specific mechanism shown and described herein is adapted primarily for use in connection with the general adding machine construction shown in the patent to Edgar Maynard Camp, No. 1,556,756, granted Oct. 13, 1925, but it is to be understood that my inveition is not limited to that type of machine.

Referring to the drawing, the keyboard is made up of columnar units each comprising a single series of vertical key stems 1 mounted in suitable frames. The key stems are supported in normal or elevated position in the frames by springs 2. When the keys are depressed lugs 3 thereon pass under the lower edges of a flexible shutter 4 of which there is one for each bank or column of keys. These shutters, as shown, are pivotally mounted at 5 and are yieldingly held in operative position by springs 6. Adjacent the key stems of each column is a longitudinally slidable plate or slide 7 which, as shown, is mounted for forward and backward movement on headed studs 8. This plate or slide, which is herein called the initial stop slide, is provided with nine cam faces 7′ coacting with lugs 9 on the respective key stems, the lugs and cam faces being so arranged as to produce, upon the depression of any key in the series, a forward movement of the slide 7. A spring (not shown) tends to return the slides 7 to their natural positions.

Each column of keys is provided with an initial stop 10 which is contacted at 11 by the initial stop slide for that column. The initial stops are pivotally mounted side by side upon a transverse shaft 12 and are designed to act as detents coacting with lugs 14 on index slides 15 to limit the forward movement or travel of the index slides, as will be more fully described. Normally when the machine is at rest the initial stop occupies a lowered or operative position so that it will limit the movement of an index slide forwardly of the initial or zero position. In Fig. 1 an index slide is shown in solid lines in its normal position. The depression of a key, however, will move the initial stop slide 7 forwardly and rotate the corresponding initial stop 10 about its axis 12 from the path of the lug 14 on the corresponding index slide and allow the said slide, when the handle is operated, to travel to a position determined, as will be explained, by the depressed key. Each of the index slides is designed with a series of stop faces 16 which respectively engage the lower rear edges of the depressed key stems or stops, which thereby limit the forward travel of the index slides when the latter are released by the initial stops and the handle or operating member 17 is actuated. As explained in the said application of Edgar Maynard Camp, the ninth key stem may have no corresponding stop on the index slide, the ninth stop for the index slide being a fixed part of the machine. The amount of the forward travel of the index slide will depend upon which key is depressed, the forward movement of the index slide before it is stopped be proportional to the unit for which the key is depressed. The forward movement of the index slides is accomplished as shown by a series of springs 18 connecting the shaft 17^a of the handle 17 with each index slide. This is done by means of a series of extensions or levers 18^a fixedly mounted on said shaft, to each of which a spring connects its corresponding index slide. Forward movement of each index slide is transmitted as by a link 19 to a sector 20 arranged to coact with pinion 21 upon the numeral wheel 22. The means for effecting engagement of the sectors and numeral wheel pinion are

not parts of the present invention and will accordingly not be described herein.

With a view to permitting the setting up of new items in the keyboard before the mechanism has returned to normal position, all of the shutters 4 are operated (by means not shown) to release any of the keys which may have been depressed. Suitable means for this purpose are shown in the patent of Edgar Maynard Camp, Number 1,556,756, dated October 13, 1925, in which means are shown for releasing the keys during the return stroke of the handle 17. This release of the keys with the resulting movement of the latter upwardly to normal position removes the depressed key stems from such stop faces 16 of the index slides as were in engagement with the key stems. The result is a tendency of the index slides 15 to travel forwardly under the influence of the springs 18 beyond their indexed positions. To avoid this objection I have provided means for arresting the index slides against objectionable forward movement after the release of the keys. To this end, each of the initial stops 10, as shown, is provided with a serrated lower edge 24 which is adapted to coact with the lug 14 of the corresponding index slide at whatever position the said slide may have been arrested by a depressed key stem to prevent further forward movement of the index slide. I prefer for sureness of operation to have the stops 10 move to operative relation with respect to the corresponding index slides before the keys are released. In the construction shown the stops are moved during the latter portion of the forward movement of the handle to operative position with respect to such slides as have been advanced beyond the initial or zero position. To accomplish this result I have provided means for shifting the pivotal axis of the stops 10 forwardly so that the stops may fall into operative position even though the corresponding slides 7 are held in forward position by the depressed key stems. The mechanism shown for shifting the pivotal axis of the stops comprises a bail 25 which is pivoted at 26 and supports the shaft 12 constituting the pivot for the stops 10. The bail 25 is moved about its axis by means of lever 27 pivoted at 28 and having in its forward portion cam slot 29 coacting with a portion of the shaft 12. The forward arm of the lever 27 tends to remain, as by gravity, in its lowermost position. The other arm 30 of the said lever is arranged between the fingers 31 and 32 on a lever 33 which is pivoted at 34 and connected by link 35 with the handle 17. When the handle is moved forwardly the finger 31 moves out of contact with the arm 30 of the lever 27. When the handle is near the end of its forward stroke the finger 32 engages the arm 30 and further forward movement of the handle causes the finger 32 to depress the arm 30 and elevate the cam slot 29 to move the bail 25 and the stop 10 forwardly. This bodily forward movement of the stops together with their pivots permits the toothed portion 24 of the stops to fall into operative relation to any of the advanced index slides which have been arrested by the depressed key stems. On the return stroke of the handle the keys are released; but when this takes place the stops 10 are in operative relation to the index slides of all columns where a key has been depressed. The release of the keys results in the return or rearward movement of the initial stop slides 7 so that these are no longer in position to hold the said stops elevated or inoperative even when the forward end of the lever 27 is permitted by the finger 31 to drop to its lowermost position.

In the drawing the handle or operating member and the parts operated thereby are shown in solid lines in their normal positions and in dotted lines in positions occupied by them at the end of the forward movement of the handle.

The bodily forward movement of the initial stops 10 by the cam slots 29 moves from operative position with respect to the corresponding index slide all initial stops 10 in columns in which no key has been depressed. In order to prevent objectionable advance movement of the index slides in these columns while the initial stop is thus rendered inoperative, there is provided a bail 37 which is pivoted at 38 and has a stop portion 39 adapted to engage shoulders 40 upon the index slides. A spring 41 arranged between the bail 37 and an arm 42 on the member 27 lifts the said bail into operative relation to the index slides 15 which have not been advanced beyond the initial positions upon the elevation of the forward arm of the lever 27. Such index slides are accordingly detained or arrested by the coaction of the part 39 with the shoulder 40.

It is to be understood that many modifications may be made in the form of my invention described without departing from the spirit of my invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. The combination of a series of keys, adding mechanism controlled by the keys and including a traveling indexing member, an initial stop normally in operative relation to said member and adapted to arrest said member in different positions, means controlled by the keys for rendering said stop inoperative upon the depression of a key, and means for rendering said initial stop operative while a key is depressed to prevent movement of said member beyond indexed position.

2. The combination of a series of keys,

adding mechanism controlled by the keys and including a traveling indexing member, an initial stop normally in operative relation to said member and adapted to arrest said member in different positions, means controlled by the keys for rendering said stop inoperative upon the depression of a key, operating means for said mechanism, and means controlled by said operating means for rendering said initial stop operative while a key is depressed to prevent movement of said member beyond indexed position.

3. The combination of a series of keys, adding mechanism controlled by the keys and including a traveling indexing member, a stop adapted to arrest said member in different positions, means controlled by the keys for rendering said stop inoperative upon the depression of a key, and means for rendering said stop operative while a key is depressed to prevent movement of said member beyond indexed position.

4. The combination of a series of keys, adding mechanism controlled by the keys and including a traveling indexing member, a stop normally in operative relation to said member and adapted to arrest said member in different positions, means controlled by the keys for rendering said stop inoperative upon the depression of a key, operating means for said mechanism, and means controlled by said operating means for rendering said stop operative while a key is depressed to prevent movement of said member beyond indexed position.

5. The combination of a series of keys, adding mechanism controlled by the keys and including a traveling indexing member, a stop normally in operative relation to said member and adapted to arrest said member in different positions, means controlled by the keys for rendering said stop inoperative upon the depression of a key, oscillatory operating means for said mechanism, and means controlled by said operating means for rendering said stop operative during the initial stroke of said operating means and while a key is depressed to prevent movement of said member beyond indexed position.

6. The combination of a series of keys, adding mechanism controlled by the keys and including a traveling indexing member, a pivoted stop adapted to arrest said member in different positions, means controlled by the keys for rendering said stop inoperative upon the depression of a key, and means for shifting the pivot of said stop to render the stop operative while a key is depressed to prevent movement of said member beyond indexed position.

7. The combination of a series of keys, adding mechanism controlled by the keys and including a traveling indexing member, a pivoted initial stop normally in operative relation to said member and adapted to arrest said member in different positions, means controlled by the keys for rendering said stop inoperative upon the depression of a key, operating means for said mechanism, and means controlled by said operating means for shifting the pivot of said stop to render the stop operative while a key is depressed to prevent movement of said member beyond indexed position.

8. The combination of a series of keys, adding mechanism controlled by the keys and including a traveling indexing member, a pivoted initial stop normally in operative relation to said member and having a serrated portion adapted to arrest said member in different positions, means controlled by the keys for rendering said stop inoperative upon the depression of a key, operating means for said mechanism, and means controlled by said operating means for shifting the pivot of said stop to render the stop operative while a key is depressed to prevent movement of said member beyond indexed position.

9. The combination of a series of keys, adding mechanism including a traveling indexing member controlled through said keys, a stop adapted to arrest said member in different positions, a second stop, each of said stops adapted to prevent movement of said member from initial position, operating means for said mechanism, means controlled through said keys for rendering said first named stop inoperative, and means for rendering the second stop operative to prevent advance movement of said member from initial position when said first named stop is rendered inoperative.

10. The combination of a series of keys, adding mechanism including a traveling indexing member controlled through said keys, a plurality of stops, each adapted to prevent movement of said member from initial position, operating means for said mechanism, means controlled through said keys for rendering one of said stops inoperative, and means for rendering the other stop operative to prevent advance movement of said member from initial position while rendering said first named stop operative to prevent advance movement of said indexing member from other indexed positions.

11. The combination of a series of keys, adding mechanism including a traveling indexing member controlled through said keys, a plurality of stops, each adapted to prevent movement of said member from initial position, operating means for said mechanism, means controlled through said keys and said operating means for rendering one of said stops inoperative, and means controlled by said operating means for rendering the other stop operative to prevent advance

movement of said member from initial position when said first named stop is inoperative.

12. The combination of a series of keys, adding mechanism including a traveling indexing member controlled through said keys, a plurality of stops, each adapted to prevent movement of said member from initial position, operating means for said mechanism, means controlled by said operating means and said keys for rendering one of said stops inoperative, and means for rendering the other operative to prevent advance movement of said member from initial position while rendering said first named stop operative to prevent advance movement of said indexing member from other indexed positions.

13. The combination of a series of keys, adding mechanism including a traveling indexing member controlled through said keys, a purality of stops, each adapted to prevent movement of said member from initial position, operating means for said mechanism, means controlled by said keys for rendering one of said stops inoperative, and means for rendering the other stop operative to prevent advance movement of said member from initial position while rendering said first named stop operative to prevent advance movement of said indexing member from other indexed position.

14. The combination of a series of keys, adding mechanism including a traveling indexing member, a pivoted stop for said member, means for rendering said stop inoperative, and means for bodily shifting the pivotal axis of said stop to render the same operative.

15. The combination of a series of keys, adding mechanism including a traveling indexing member controlled through said keys, a stop for said member, means controlled through said keys for rendering said stop inoperative, and means for thereafter rendering the same operative while a key is depressed.

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

ANDREW EKMAN.