W. P. QUENTELL.

ADDING MACHINE.

APPLICATION FILED SEPT. 10, 1918.

1,286,769.

Patented Dec. 3, 1918.

2 SHEETS—SHEET 1.

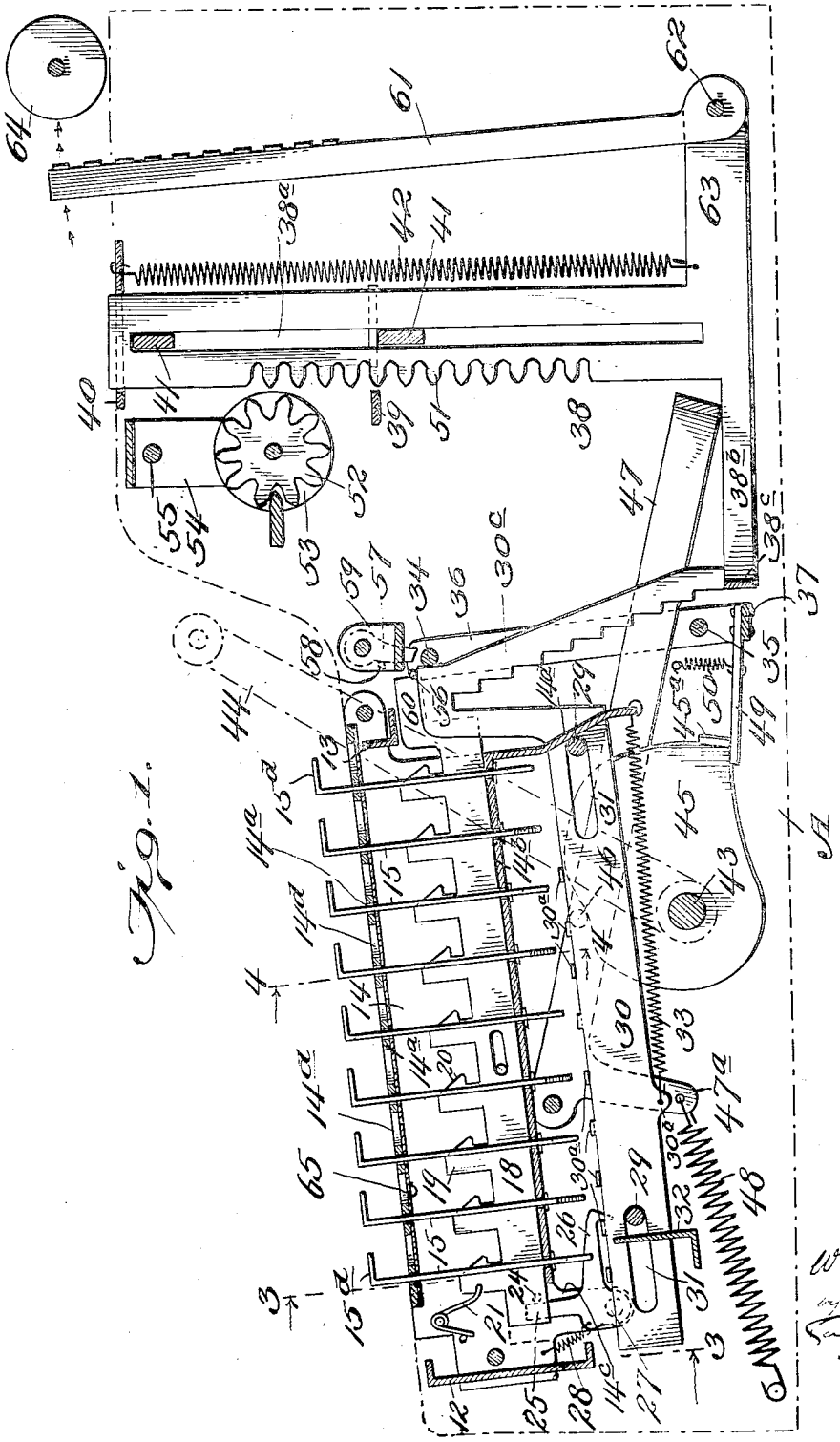

Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

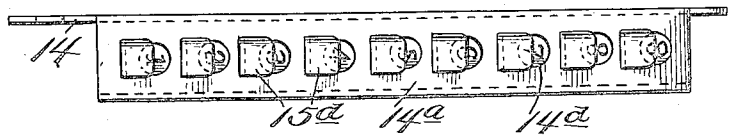


Fig. 3.

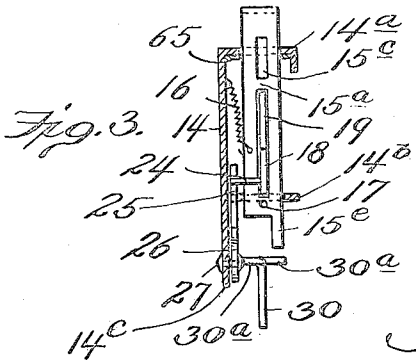


Fig. 4.

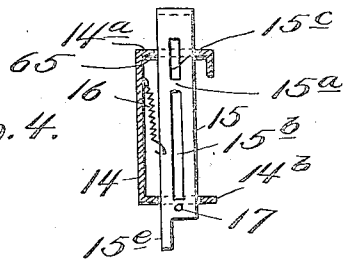


Fig. 5.

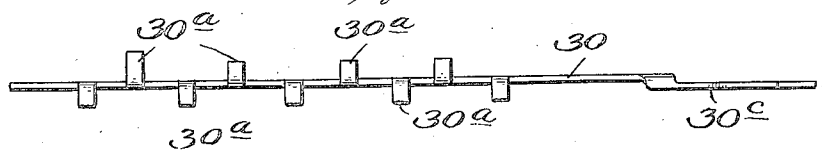
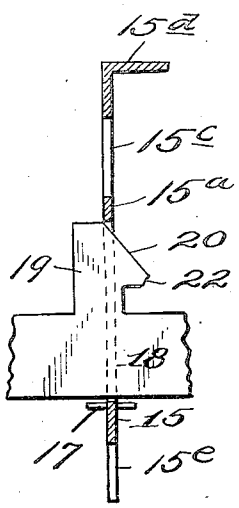


Fig. 6.



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UNITED STATES PATENT OFFICE.

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ADDING-MACHINE.

1,286,769. Specification of Letters Patent. Patented Dec. 3, 1918.

Application filed September 10, 1918. Serial No. 253,398.

To all whom it may concern:

Be it known that I, WILLIAM P. QUENTELL, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented or discovered certain new and useful Improvements in Adding-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to adding machines, and more particularly to the mechanism that measures the distance which the adding parts have to travel to register the value indicated by any particular key which may be operated, the invention having for its object to simplify the mechanism referred to, thereby contributing to simplicity of construction, more particularly of machines of comparatively small size and light weight.

In the accompanying drawings Figure 1 is a vertical section showing certain parts of an adding machine embodying the present invention. Fig. 2 is a plan view of a single bank of keys shown in Fig. 1. Fig. 3 is a detail section on line 3—3 of Fig. 1, looking in the direction of the arrow adjacent said line, and Fig. 4 is a section on line 4—4, Fig. 1, looking in the direction of the arrow. Fig. 5 is a detail plan view of the control bar. Fig. 6 is an enlarged detail view of one of the latches on the key latch bar.

Referring to the drawings, the dotted line A denotes the outline of the left side of the frame of the machine, it being understood that all the mechanism of the machine is within the side frames and that the machine will include at its right hand side a frame part corresponding to that denoted by the dotted line A.

Extending transversely of the machine, near the front end of the side frame parts thereof, is a slotted bar 12 and further to the rear is a second transverse bar 13 preferably L-shaped in cross-section, and the upper flange of which is slotted, these bars, in connection with other suitable parts, connecting the two side frame parts of the machine.

Mounted in the transverse bars 12 and 13 is a key supporting bar 14 formed in cross section as shown in Figs. 3 and 4, and having upper and lower slotted horizontal members 14^a and 14^b in which the slotted keys 15 are adapted to slide vertically, each key being retained in raised position by a spring 16 attached to the bar 14 and to the body of the key. The upward movements of the keys 15 under the influence of the springs 16 are arrested by stop pins 17 on said keys.

Resting on the horizontal part 14^b of the bar 14 is a sliding latch bar 18 provided with a series of latches 19 having inclined faces 20 against which impinge cross parts 15^a of the keys 15, so that when one of said keys is depressed said latch bar will be forced forward against the stress of a spring 21, until said cross part 15^a has passed by the inclined shoulder 22 at the lower end of the incline 20 on the latch 19, when the said latch bar 18 will be urged rearward by said spring 21, so that the hooked portion of the latch 19, normally extending through the slot 15^b in the body 15 of the key, will enter the slot 15^c in the body of the said key and, by engaging the lower wall of said slot 15^c will retain said key in its depressed position until released. By providing the hooked portions of the latches 19 with the inclined shoulders 22 at the bases of the inclines 20, the latch bar will be forced slightly farther forward than will be necessary to permit said hooked portions of the latches to engage the cross-parts 15^a. The latch bar 18 carries a pin 24 which is in contact with the tail 25 of a retaining pawl 26 pivoted on a rivet 27 mounted in the hanger 14^e which is preferably formed as part of the bar 14. The pawl 26 is retained in its operative position by a spring 28 connecting said pawl 26 with the said bar 14.

Mounted on rods 29 extending transversely of the machine is a sliding control bar 30 provided with slots 31 which permit endwise movements of said bar 30 and which bar is steadied and guided laterally by a slotted L-shaped bar 32 near the front of the machine and which bar extends transversely of the machine, said bar 30 being also steadied and guided by a bifurcated downturned extension 14^d of the bar 14. The

sliding control bar 30 is provided with a series of stops 30^a preferably integral with said bar and staggered on opposite sides thereof, as clearly shown in Fig. 5. Said bar is also provided with a lug 30^b connected by a coil spring 33 with an extension 14^d of the bar 14, said spring tending to move the said control bar rearward when released. The sliding control bar 30 is normally held in the position shown in Fig. 1 by the pawl 26 which engages one of the stops 30^a on said bar. Said sliding control bar 30 is also provided at its rear end with a stepped extension 30^c the upper end of which is normally in contact with a rod 34 forming a part of a bail which is pivoted on a cross bar 35 and which bail comprises side bars 36 and a bottom bar 37. The rod 34 serves, at times, as a stop for said sliding control bar, as will be explained later.

Coöperating with the control bar 30 is an adding wheel actuator 38 which is guided vertically by slotted plates 39, 40, said actuator having a slot 38^a receiving transverse bars 41 extending from one side frame of the machine to the other, so that the said adding wheel actuator is properly steadied and guided in its vertical movements. Attached to the bar 40 and to the said adding wheel actuator is a coil spring 42 which tends to lift said actuator. The actuator 38 is provided with an extension 38^b having a lug 38^c which normally rests beneath the extension 30^c of the control bar 30, but when the said control bar is released from the pawl 26 and the stop rod 34, and is then free to be moved rearwardly by the spring 33, said lug 38^c, moving upward with the said actuator under the influence of the spring 42, will engage one of the steps in the said extension 30^c, depending upon which key has been depressed.

When the pawl 26 has been released from the control bar 30 by the forward movement of the latch bar 18 the said control bar will still be prevented from being moved rearwardly, by its spring 33, by the stop rod 34, against which the upper end of the extension 30^c of said control bar impinges, until the power shaft 43 is actuated by the operating lever 44. Mounted on said power shaft is a cam 45 which is engaged by a pin 46 on a bail 47, one member of the said bail 47 having an arm 47^a with which is connected a spring 48 tending to hold the bail 47 in its lowered position. The cam 45 and coöperating parts, including bail part 47, its arm 47^a, pin 46 and spring 48, herein shown as being at one side of the machine, will, in practice, be duplicated on the other side of the machine to balance the parts and avoid side strain.

The cam 45 is provided with a laterally extending lug 45^a which is in contact with an extension 49 attached to the lower cross bar of the bail 36. Each extension 49 is connected by a spring 50 with a pin on the side frame of the machine, so that when the lugs 45^a are lifted by the rotation of the cams 45 said bail 36 will be swung rearward, thus withdrawing the stop rod 34 from the extension 30^c of the control bar 30 and leaving the said bar free to move rearward until its movement is arrested by the engagement of one of the stops 30^a against a finger 15^c on the key which may have been depressed. This rearward movement of the control bar 30 will permit the adding wheel actuator to be lifted a distance corresponding to the value represented by the particular key which may have been depressed, as governed by the steps in the extension 30^c of the said control bar 30.

When the handle 44 is pulled forward and the cams 45 are partially rotated, the engagement of the said cams with the pins 46 will lift the bail 47 upward and thereby permits the adding wheel actuator 38 to rise, as just stated. The adding wheel actuator is provided with a rack 51 which, at times, engages a gear wheel 52 movable with an adding wheel 53 and which adding wheel is carried by a swinging frame 54 pivoted at 55, the gear wheel 52 being out of mesh with the rack 51 during the upward movements of the said actuator, and the engagement of the adding wheel actuator gear with said gear wheel 52 being subsequently effected, as is usual in machines of this kind. Also the mechanism for carrying the decimals from the lower orders to the higher orders in the adding wheels may be of any suitable or well-known construction and need not therefore be herein shown or described.

After the adding operation has been effected the keys, of the several banks of the machine, which may have been depressed will all be released at the backward movement of the lever 44. To this end the bail part 36 carries a pin 56 which, when the said bail is swung rearwardly, passes by a gravity pawl 57, but when the bail is returned to its normal position the said pin 56 will engage the said pawl, and by means of a pin 58 attached to a bail 59, will cause the lower cross bar of said bail to engage an extension 60 on each latch bar 18, thereby forcing the said latch bars forward a sufficient distance to release the said latches 19 from the parts 15^a of the keys 15 which may have been depressed. As the machine will include a number of banks of keys and a corresponding number of latch bars 18, this movement of the bail 59 will release all the keys which may have been depressed for an adding operation.

If it be desired to make a record of the numbers registered a type carrier can be con-

nected with the adding wheel actuator in any suitable manner, for example, as shown in Fig. 1, where a type bar 61 is shown as being pivoted at 62 to an extension 63 on the actuator 38, said type bar coöperating with a platen or printing cylinder 64 in a well-known manner.

Attached to the under side of the slotted upper part 14ª of the key support 14 is a thin strip 65 of celluloid or other suitable material bearing numerals 1 to 9 inclusive, and which may be seen through openings 14ᵈ formed in said part 14ª, and the finger pieces 15ᵈ of the keys 15 will be of such shape and size as not to seriously obscure said numerals, which, it will be understood, indicate the value represented by the respective keys adjacent said numerals. By the form of keys shown less space is required for the fingers of the operator than would be the case if conventional key buttons were attached to the keys. Also by forming the finger pieces 15ᵈ integral with the bodies of the keys less expense of manufacture is involved as will be obvious.

It will of course be understood that the single bank of keys and coöperating parts, including the adding wheel and its actuator shown in Figs. 1 and 2 represent only one of several such elements or mechanisms, and that the complete machine will contain as many banks of keys and coöperating parts as may be necessary, according to the desired capacity of the machine.

The operation of the machine is as follows: First, a key is depressed. This moves the latch bar 18 forward and latches the depressed key, so that, when the finger is taken off the key the latter remains in depressed position. As the latch bar moves forward, it lifts the retaining pawl 26 away from the control bar 30. No other parts move until the main shaft 43 is rotated by the lever 44. Second, the lever 44 is pulled forward as far as it is intended to go. During this forward movement of the said lever 44, the cam finger or lug 45ª moves away from extension or arm 49 and permits the spring 50 to rock the bail 36, 37 rearward, thus moving the cross-rod 34 rearward away from the extension 30ᶜ of the control bar 30, and thereby permitting the said control bar to move rearward until it is stopped by one of its lugs or stops 30ª striking the finger 15ᶜ of the depressed key. Shortly after the control bar has started rearward the cam 45 lifts, through the pins 46, the bail 47, thus permitting the actuators 38 to rise in response to their springs 42 until their arms 38ᵇ strike the desired steps on the extensions 30ᶜ of the control bar. These steps represent the values of the keys depressed and therefore the actuators are properly positioned to give the desired extent of rotation to the adding wheels in accordance with the values represented by the particular keys depressed. After the lever 44 has been moved forward to set the parts for the adding operation, the gears 52 on the adding wheels 53 will, (by suitable means forming no part of the present invention) be thrown into mesh with the racks 51 on the actuators 38, so that when said actuators are returned to their normal lowered positions on the backward movement of the said lever 44, the adding wheels will be rotated to effect the adding operation.

Having thus described my invention I claim and desire to secure by Letters Patent:

1. In an adding machine, the combination with keys, of an adding wheel, an actuator for said wheel, a control bar for said actuator and movable independently thereof, a spring for moving said control bar to operative position, a detent for holding said control bar in non-operative position against the action of said spring, means for disengaging said detent from said control bar, said control bar having stop means, to be engaged directly by said keys, when the latter are operated, to limit movement of said control bar under the influence of said spring, and differential stop means, comprising two coöperating parts, one carried by said control bar and the other by said actuator, for limiting the movement of said actuator in one direction.

2. In an adding machine, the combination with keys, of an adding wheel, an actuator for said wheel, a control bar for said actuator and movable independently thereof, a spring for moving said control bar to operative position, a detent for holding said control bar in non-operative position against the action of said spring, means for disengaging said detent from said control bar, said control bar having stop means, to be engaged directly by said keys, when the latter are operated, to limit movement of said control bar under the influence of said spring, and differential stop means, comprising two coöperating parts, one carried by said control bar and the other by said actuator, for limiting the movement of said actuator in one direction, and means for moving said actuator relative to said control bar.

3. In an adding machine or the like, the combination with a series of keys, of separated upper and lower guiding members slotted for the passage of said keys, said upper member having a series of openings adjacent said keys, and a plate beneath said upper member having characters showing through said openings and indicating numeral values represented by the respective keys.

4. In an adding machine or the like, the combination with a series of keys, of sepa-

rated but connected upper and lower guiding members slotted for the passage of said keys, said upper members having a series of openings adjacent said keys, and a plate beneath said upper member having characters showing through said openings and indicating numeral values represented by the respective keys.

In testimony whereof I affix my signature.

WILLIAM P. QUENTELL.

Witness:
ROSE M. SEFTON.