No. 836,389. PATENTED NOV. 20, 1906.

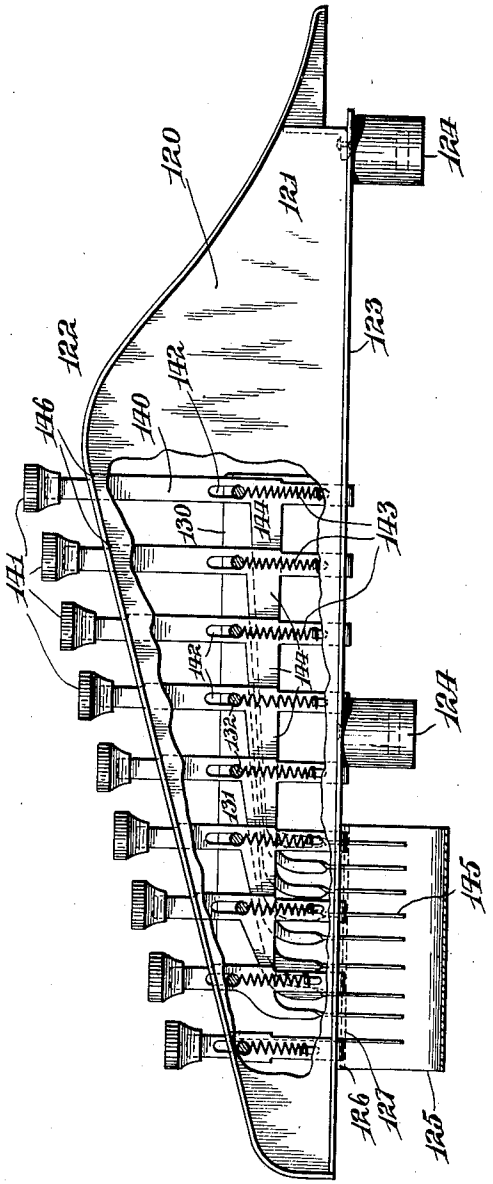
J. C. LOTTERHAND.

SEPARABLE KEYBOARD FOR ADDING MACHINES.

APPLICATION FILED NOV. 16, 1903. RENEWED OCT. 5, 1906.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses
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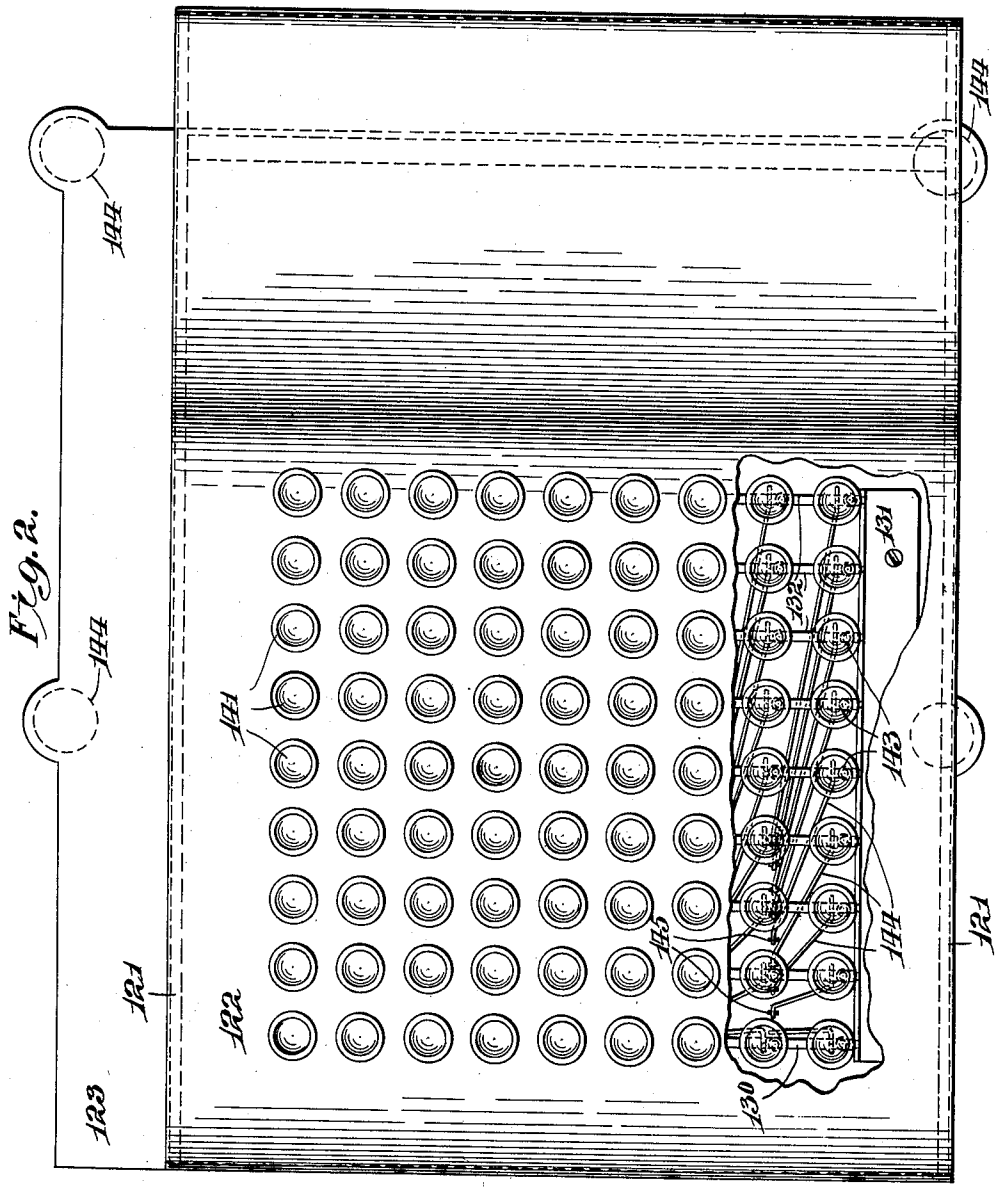
4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 3.

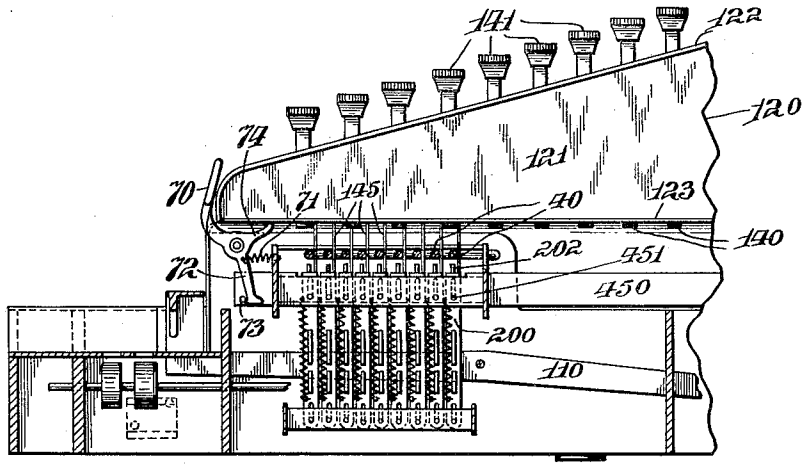
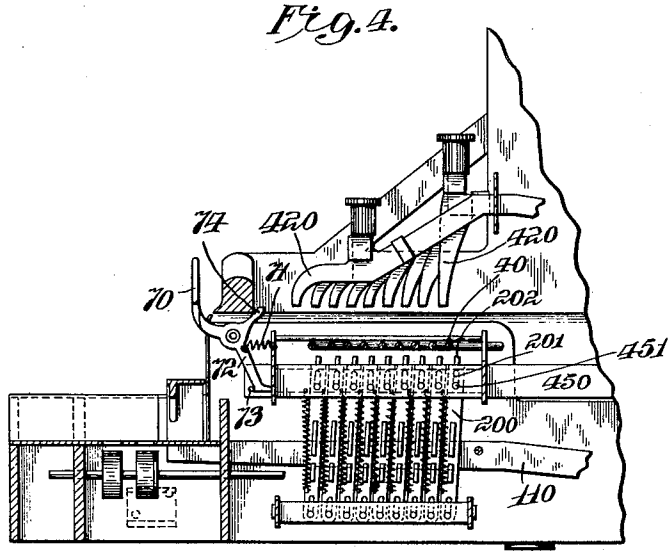


Fig. 4.



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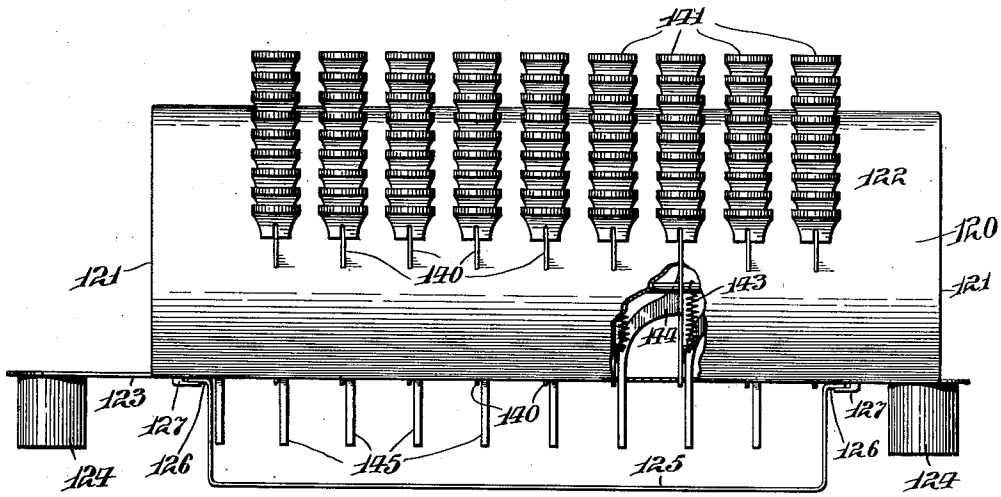
4 SHEETS—SHEET 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

JASON C. LOTTERHAND, OF NEW YORK, N. Y., ASSIGNOR TO ADDER MACHINE COMPANY, OF KINGSTON, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

SEPARABLE KEYBOARD FOR ADDING-MACHINES.

No. 836,389. Specification of Letters Patent. Patented Nov. 20, 1906.

Application filed November 16, 1903. Renewed October 5, 1906. Serial No. 337,624.

To all whom it may concern:

Be it known that I, JASON C. LOTTERHAND, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Separable Keyboards for Adding-Machines, of which the following is a specification.

My invention relates to separable keyboards for adding-machines; and its novelty consists in the construction and adaptation of the parts, as will be more fully hereinafter pointed out.

On January 13, 1903, there were issued to me Letters Patent of the United States No. 718,486 for an adding-machine. On the 30th of July, 1903, I made application (Serial No. 167,527) for Letters Patent of the United States for an improved means whereby to combine this adding-machine with any type-writing machine, so that the numeral-keys of the latter became for the time being a unitary structure with the adding mechanism.

The subject-matter of the present application is closely related to that of the last-mentioned application and comprises the means employed to use and actuate the adding-machine when the type-writer has been removed, and it comprises fundamentally a separable keyboard and connections between its keys and the adding-key stems of the adding mechanism.

In the drawings, Figure 1 is a side elevation of the separable keyboard, part of the side wall being cut away to show concealed parts. Fig. 2 is a top plan view of the same with part of the cover cut away to show concealed parts. Fig. 3 is a side elevation, upon a smaller scale, of the separable keyboard and its connections with the adding mechanism. Fig. 4 is a similar view, upon the same small scale, of the adding mechanism when the same is connected to and adapted to be operated by the numeral-keys of a type-writing machine; and Fig. 5 is a front elevation of the separable keyboard.

Referring to Fig. 4 of the drawings, 200 repsents the key-stems of the adding mechanism, each of which is vertically slotted at 201 near its upper end and narrowed at its extremity 202 to admit of the passage of digit-bails 40 between such key-stems. Converging bars 450, called "oscillators," corresponding in number and position to the rows of adding-key stems, representing the denominations of the figures to be added, are each provided with projecting pins 451, engaging in the slots 201 of the adding-key stems, so that when an oscillator is moved toward the left the entire corresponding row of adding-key stems is moved with it and the uppermost members 202 of such key-stems are brought into alinement with the digit-bails, which are arranged in series corresponding to the nine numerals of the keyboard and are depressed when the digit-bails are actuated.

The means employed to move the oscillators 450 are a series of bell-crank levers 70, called "denomination-levers," each pivotally mounted in bearings at the front of the frame and each normally held outward by a coiled spring 71. A leg 72 of each lever is adapted to be brought into contact with a pin 73, projecting laterally from each oscillator 450 to move the latter. A coiled spring attached to the oscillator at any convenient place (and not shown on the part of the mechanism illustrated in the drawing) serves to retract it to its normal position after it has been pushed toward the left to bring the adding-key stems into alinement with the digit-bails.

110 is the operating-bar lever of the adding mechanism and forms no part of the subject-matter of the present application.

Finger-pieces 420 are secured to and depend from the numeral type-writer keys extending from some one of the moving parts of each of such keys to such a position with respect to the proper digit-bails so that when any numeral-key of the type-writer is depressed it will depress the proper digit-bail and key-stem of the adding-machine in alinement therewith.

All of the parts above mentioned, and described and illustrated in Fig. 4, are set out in detail in the application for a patent, Serial No. 167,527, above referred to. Together with the other parts of the mechanism described in that application these parts serve to unite the type-writer numeral-keys and the adding-machine key-stems into a unitary mechanism.

If now the type-writing machine and its numeral-keys with their depending fingers be removed from above the adding mechanism, the latter is deprived of its key system and is

practically inoperative. It is the purpose of the present invention to provide means whereby the missing parts of the adding-machine constituting the keyboard can be supplied quickly and efficiently to again make the adding-machine practically operative.

It might be supposed that appropriate finger-pieces could be added directly to the key-stems of the adding mechanisms; but the system of these key-stems was condensed and they were arranged in front of the other parts of the adding mechanism in order to bring such system into a suitable position with respect to the type-writer numeral-keys and the related mechanism, and therefore the adding-key stems are placed too close together to admit of such a simple solution of the problem, and means must be employed to separate and spread out the finger-tops into convenient locations harmonizing with the positions of the finger-tops of the usual type of adding-machine, so that an operator accustomed to use the latter can use the mechanism referred to without difficulty and without special training. To that end there is provided a keyboard-frame 120, consisting of two upright side pieces 121 121, a top piece or cover 122, and a bottom plate 123. Mounted transversely across this frame is a grating 130, comprising longitudinal slats 131 and cross-rods 132, and which, together with the apertures in the cover 122 and the bottom plate 123, constitute guideways and stops for the stems of the keys of the keyboard and govern the direction and limit the extent of their motion.

Mounted to reciprocate vertically within the keyboard-frame are keys 140, provided with finger-tops 141, each displaying appropriate numbers. These keys are arranged in rows of nine corresponding to the nine digits, as many rows being employed as there are denominations in the figures to be manipulated. Each key is vertically slotted at 142 to engage with the cross-rods 132, the extent of the downward vertical movement of each key and of its upward movement when retracted being determined by the rod to which that particular key appertains and is measured by the length of the slot 142. Each key is likewise provided with a coiled spring 143, secured thereto at any convenient point and also secured to the cross-piece 132 or some other fixed portion of the frame, whereby as the key is moved downward the spring is stretched, and when the pressure on the key is released the spring retracts it to its normal position. The upper part of each key-stem is adapted to pass through an aperture in the cover of the keyboard-frame and the lower part of each key-stem vertically beneath the rod to which it appertains is adapted to pass through a similar aperture in the bottom piece of the keyboard-frame. A shoulder 146 on each key-stem striking against the inner edge of the cover 122 serves to limit the upper movement of the key also. The finger-tops 141 are placed upon the upper extremities of the key-stems above and beyond the cover so that they are entirely outside of the latter. Each key is likewise provided with an extension-piece 144, made integral therewith and terminating in a downwardly-projecting member 145, which passes through a slot in the bottom plate 123. These extension-pieces and their projecting members are so arranged that the members 145 are immediately above and coincide with the positions of the adding-key stems to which they relate. In order to accomplish this, the extension-pieces are bent and caused to converge toward the front and middle of the keyboard, thus forming an operative connection between the widely-spaced finger-tops 141 and the narrowly-spaced key-stems 200 of the adding-machine mechanism.

The projecting members 145 are each made of such a size that they readily pass between the digit-bails 40 and impinge upon the tops of the adding-key stems 200 when the latter are in a vertical position. As the key-stems 140 are guided in their movement by the apertures in the cover 122 and of the bottom plate 123, and as the projecting members 145 are each similarly guided by the apertures in the bottom plate 123 through which they pass, and as each key-stem is slotted and engages with its appropriate cross-rod and the whole piece—key-stem and projecting member—is made integral, the movement of each member 145 is positive and sure and yet strictly limited. Feet 124 124, made of rubber or other suitable material, are attached to the bottom plate 123 of the keyboard. They correspond in number and position to the similar feet usually attached to a type-writing machine and are adapted to rest upon and in suitable depressions formed in the frame of the adding mechanism, thus constituting a simple means of registering the positions of the parts and bringing them into working relations. A guard 125, secured to the bottom plate 123 by any suitable means, as flanges 126 126, and slideways 127 127, serve to surround the rows of projecting members 145 and to protect them from injury when the separable keyboard is not in use.

In order that the depending members 145 may be brought into alinement with the adding-key stems 200 and the latter be secured in a working position beneath the former, means must be provided to swing the adding-key stems forward into a vertical position. For that purpose each bell-crank lever 70 is provided with a third leg 74, projecting upward. This leg when the separable keyboard is placed in proper position above the adding mechanism is thus brought into contact with the bottom piece 123 and is moved

by the latter, so that each pin 73 is pushed to the left, each oscillator 450 is thereby moved, and thus the entire system of adding-key stems is brought into a vertical position and continued locked in that position so long as the weight of the keyboard depresses the third leg 74 of the bell-crank lever.

What I claim as new is—

1. The combination with the key-stems of an adding-machine, of a separable keyboard provided with keys comprising finger-tops and normally out of alinement with the adding-machine key-stems, and means for moving the latter into and retaining them in alinement therewith.

2. The combination with the key-stems of an adding-machine of a separable keyboard provided with keys comprising finger-tops, and normally out of alinement with the adding-machine key-stems, and means for moving the latter into and retaining them in alinement therewith comprising reciprocating oscillators engaging with rows of the adding-key stems, levers adapted to move the oscillators and means to hold the levers in place after such movement.

3. The combination with the key-stems of an adding-machine of a separable keyboard provided with keys comprising finger-tops, and normally out of alinement with the adding-machine key-stems and means for moving the latter into and retaining them in alinement therewith actuated by the weight of the separable keyboard.

4. The combination with the key-stems of an adding-machine of a separable keyboard provided with keys comprising finger-tops, and normally out of alinement with the adding-machine key-stems, means for moving the latter into and retaining them in alinement therewith comprising reciprocating oscillators engaging with rows of the adding-key stems and levers adapted to move the oscillators, each lever being provided with a leg adapted to be held against the frame of the separable keyboard to move the oscillators and key-stems into actuating position and hold them there by the weight of the separable keyboard.

5. In an adding-machine adapted to receive and removably connect with a type-writing machine, and provided with a separable and removable adding-machine keyboard, a key therein comprising a finger-top, a depending stem or guiding member, and a laterally and downwardly extending member attached to the guiding member.

6. In a separable and removable keyboard for an adding-machine, a key comprising a finger-top, a depending stem or guiding member, and a laterally and downwardly extending member attached to the guiding member, in combination with means for guiding and limiting the reciprocation of the key-stem.

7. In a separable and removable keyboard for an adding-machine, a key-stem comprising a guiding member, and a laterally and downwardly extending branch or member made integral with said stem.

8. In a separable and removable keyboard for an adding-machine, having an inclosed cover-frame, a key-stem mounted to reciprocate in said frame and provided with a laterally and downwardly extending branch or member within said frame and projecting below the bottom thereof, and a finger-top above said frame.

9. In a separable and removable keyboard for an adding machine, a cover-frame therefor, a series of key-stems extending through the bottom and top pieces of said cover-frame, each key-stem provided with a laterally and downwardly extending member, and a finger-top, in combination with means for limiting the extent of movement of the keys.

10. In a separable and removable keyboard for an adding-machine, a cover-frame therefor, a series of key-stems each provided with a laterally and downwardly extending member adapted to reciproctate between the top and bottom pieces of said cover-frame, each key being provided at its uppermost extremity with a finger-top.

11. In a separable and removable keyboard for an adding-machine having an inclosing cover-frame, a series of key-stems each provided with a laterally and downwardly extending member adapted to reciprocate between the top and bottom pieces of said cover-frame and each key being provided above said cover-frame with a finger-top, in combination with means within the cover-frame for limiting the extent of movement of the keys.

12. In a separable and removable keyboard for an adding-machine having an inclosing frame, a plurality of series of key-stems each provided with a laterally and downwardly extending member, and a longitudinal slot adapted to reciprocate between the top and bottom pieces of the cover-frame and having a finger-top, in combination with cross-rods engaging in said slots, and springs adapted to retract each key-stem to position after depression.

13. The combination with a separable keyboard comprising a series of key-stems symmetrically arranged certain distances from each other, of an adding-machine comprising a second keyboard comprising series of key-stems equal in number to that of the former series and also symmetrically arranged but at distances from each other different from those of the first series, and connections between the stems of the two series whereby when the key-stems of one series are moved the corresponding key-stems of the other series are actuated.

14. The combination with a separable keyboard comprising a series of key-stems sym-

metrically arranged certain distances from each other, of an adding-machine comprising a second keyboard comprising series of key-stems equal in number to that of the former series and also symmetrically arranged but at distances from each other different from those of the first series, and connections between the stems of the two series whereby when the key-stems of one series are moved the corresponding key-stems of the other series are actuated, such connections comprising members secured to the key-stems of the first series and extending therefrom to the corresponding key-stems of the second series.

15. The combination with a keyboard comprising series of key-stems symmetrically arranged certain distances from each other, of a second keyboard comprising series of key-stems equal in number to that of the former series and also symmetrically arranged but at distances from each other different from those of the first series, and connections between the stems of the two series whereby when the key-stems of one series are moved the corresponding key-stems of the other series are actuated, such connections comprising members secured to the key-stems of the first series and extending therefrom to the corresponding key-stems of the second series, and means for securing the alinement of such connections with the key-stems of the two series.

16. The combination with a keyboard comprising series of key-stems symmetrically arranged certain distances from each other, of a second keyboard comprising series of key-stems equal in number to that of the former series and also symmetrically arranged but at distances from each other different from those of the first series and connections between the stems of the two series whereby when the key-stems of one series are moved the corresponding key-stems of the other series are actuated, such connections comprising members secured to the key-stems of the first series and extending therefrom to the corresponding key-stems of the second series, and means for guiding the movement of the key-stems of the actuating series.

17. The combination with a keyboard comprising series of key-stems symmetrically arranged certain distances from each other and placed within a separable frame and each key provided with a finger-top, of a second keyboard comprising series of key-stems equal in number to that of the former series and also symmetrically arranged but at distances from each other different from those of the first series, and connections between the stems of the two series whereby when the key-stems of one series are moved the corresponding key-stems of one series are moved, the corresponding key-stems of the other series are actuated.

Witness my hand this 14th day of November, 1903, at the city of New York, in the county and State of New York,

JASON C. LOTTERHAND.

Witnesses:

HERMAN MEYER,

ESTELLE M. TITUS.