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L. FOURNIER ET AL

KEYBOARD OF CALCULATING MACHINES

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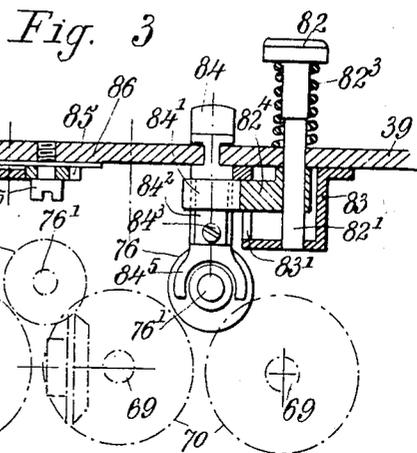
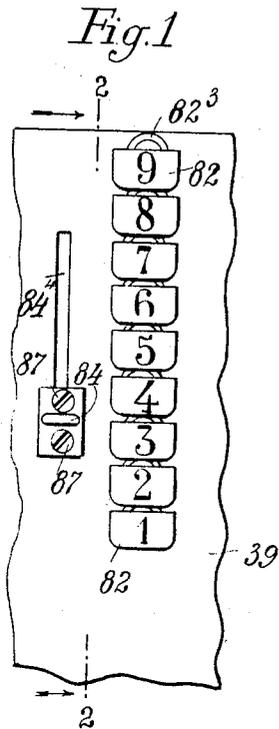
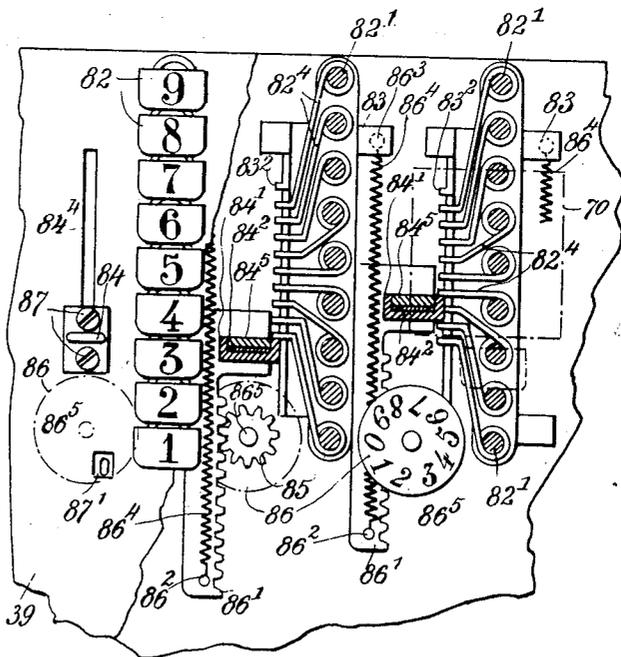
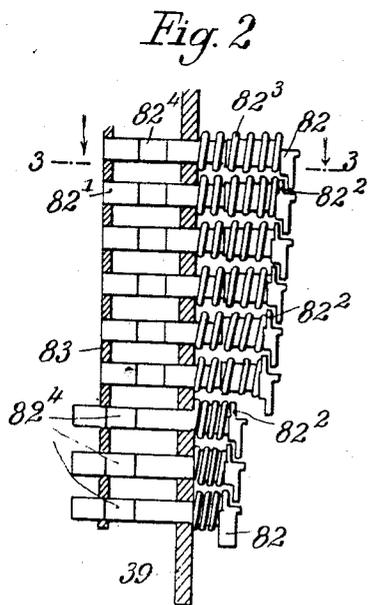


Fig. 4



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# UNITED STATES PATENT OFFICE.

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## KEYBOARD OF CALCULATING MACHINES.

Original application filed September 2, 1919, Serial No. 321,045. Divided and this application filed November 25, 1921. Serial No. 517,614.

*To all whom it may concern:*

Be it known that we, LOUIS FOURNIER and GÉRARD MANG, citizens of the Republic of France, both residing at 207 Faubourg Saint Antoine, Paris, France, have invented new and useful Improvements in the Keyboards of Calculating Machines (for which we have filed applications in Great Britain, filed January 14, 1921, No. 2100 of 1921; France, filed August 25, 1920, No. 522856; Switzerland, filed September 17, 1921, Serial No. 93611; and Germany, filed September 1, 1920, Serial No. 354,899), of which the following is a specification.

The present invention relates to computing machines.

It is characterized by an arrangement of the keyboard, according to which each key, when depressed, takes down with it the next key of a lower numerical value. In this way, the key-board can be made very much more compact than would be possible if each key were independent of the others, as it is of no importance whether or not the finger of the operator simultaneously covers two or more keys, provided he does not operate a key of a higher numerical value than is required.

In the accompanying drawing:

Fig. 1 in top view shows a portion of the top plate of the key-board of a calculating machine, sufficient for the comprehension of the invention.

Fig. 2 is a sectional view on the line 2—2 of Fig. 1, looking in the direction of the arrows.

Fig. 3 is a fragmentary sectional elevation on the line 3—3 of Fig. 2, looking in the direction of the arrows.

Fig. 4 is a fragmentary top view of Fig. 3, partly in section.

The machine comprises a number of series of keys, one only being shown in the drawing. Each series comprises as usual, a set of keys 82 each key provided with its spring 82<sup>s</sup> for returning it to its initial position.

The stem 82<sup>t</sup> of each key is guided at its middle portion in the top plate 39 of the machine, and, at the bottom, in a guide 83 fastened to the said plate (Fig. 3), and each key is provided with a spur 82<sup>2</sup> (Fig. 2) so situated that it is adapted to be engaged by the adjacent key of a higher numerical

value, the arrangement being such that, on depressing one key, say the key corresponding to numeral 3 (Fig. 1), the said key will carry along with it and depress the adjoining key of a lower numerical value, viz. key corresponding to numeral 2, which, in turn, will actuate the key corresponding to numeral 1, while, if key corresponding to numeral 1 is depressed, it will obviously not actuate any other key. It will thus be seen that, by this arrangement, the operator is not compelled to exercise any care in depressing his keys; for instance he need not exercise care in depressing only the key corresponding to numeral 3, but may put his fingers on keys corresponding to numbers 1, 2, and 3. The advantage of this arrangement resides in the compactness of each series of keys.

The stems 82<sup>t</sup> of the keys 82 are each provided with a horn 82<sup>4</sup>. The free end of each horn 82<sup>4</sup> passes through a slot 83<sup>1</sup> (Fig. 3) made in a guide 83 and the row of horns occupies a position in a line with an abutment 84<sup>1</sup> (Fig. 4) mounted on a leaf-spring 84<sup>2</sup> fastened to a fork 84<sup>5</sup> by a screw 84<sup>3</sup>.

When the keys 82 are in normal position, each horn 82<sup>4</sup> is in line with an abutment 84<sup>1</sup> (Fig. 3) on a cursor 84 and prevents any movement of this latter. As each key is depressed, its horn 82<sup>4</sup> recedes from engagement with the abutment 84<sup>1</sup> and the cursor 84 is free to slide under the action of a spring 86<sup>4</sup> taking with it the usual setting pinion 76 by an amount dependent upon the number of keys 82 which have been depressed. The movement of the setting pinion 76 on its shaft 76<sup>1</sup> is effected by the action of the said spring 86<sup>4</sup> upon a fork 84<sup>5</sup> integral with the cursor 84 and adapted to engage the setting pinion 76, which is operated by the usual stepped drum 70 fast on a shaft 69, as in an ordinary computing machine.

The cursor 84, which projects above the top plate 39, is fitted in a slot 84<sup>4</sup> (Fig. 4) of the latter and is connected to a fork 84<sup>5</sup> (Fig. 3) adapted to engage the movable setting pinion 76, so as to enable the latter to be slid on its shaft 76<sup>1</sup>. Integral with the cursor 84 and fork 84<sup>5</sup> is arranged a rack 86<sup>1</sup>, which is fastened by means of screws 87. The said rack is subjected to

the action of the spring 86<sup>4</sup> which, being fastened to a pin 86<sup>2</sup> on the rack 86<sup>1</sup>, tends to normally pull the latter back towards a pin 86<sup>3</sup> on the guide 83.

5 Each rack 86<sup>1</sup> engages a pinion 85 (Figs. 3 and 4) loose on a stud 86<sup>5</sup> and carrying the usual number wheel 86, one of the numerals of each of which, say 0, as in Figure 4, is made to appear through an aperture  
10 87<sup>1</sup> in the plate 39.

I claim:

A key-board for mechanically operated

calculating machines comprising a number of keys adapted to be depressed, a spur on each key extending over the key of the next lower numerical value and adapted to engage therewith when depressed, horns fitted on said keys and obstructing the passage of a sliding pinion when in the raised position and allowing it to pass when de- 15  
20 pressed.

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