March 21, 1961 G. SCHENK 2,975,971

CALCULATING MACHINE WITH DIGIT KEYS AND FUNCTION CONTROL KEYS

Filed Nov. 9, 1955

FIG. 1

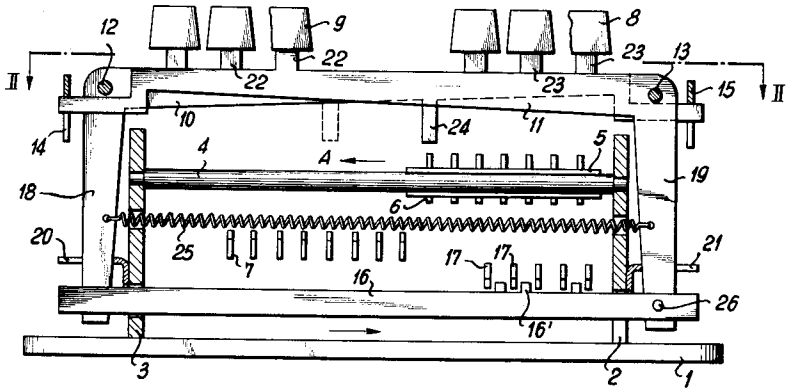


FIG. 2

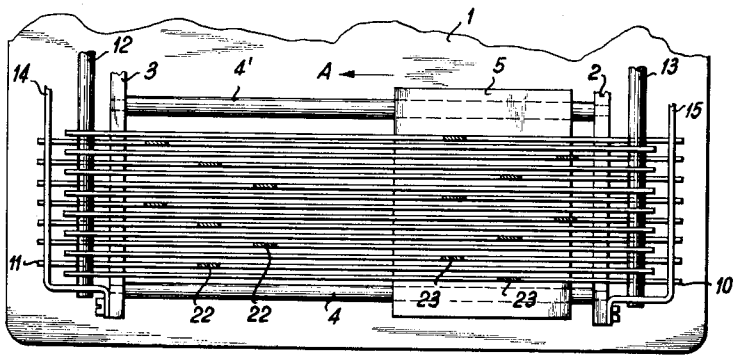
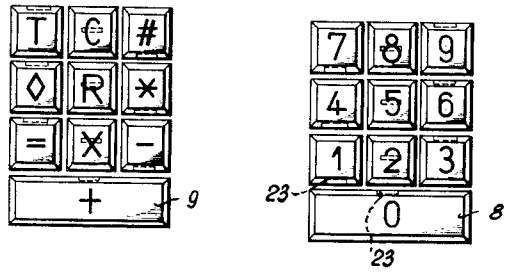


FIG. 3



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CALCULATING MACHINE WITH DIGIT KEYS AND FUNCTION CONTROL KEYS

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1 Claim. (Cl. 235—145)

The invention relates to an arrangement of the keys of a pair of ten-key keyboards for respectively setting the digits of a factor and controlling the machine functions in calculating machines. It more particularly relates to such arrangements of the keys in calculating machines with a ten-keyboard and a pin carriage.

In such machines with horizontal arrangement of the pin carriage, the keys with their vertically guided key shanks are placed above the transversally movable pin carriage. Below this carriage are disposed the longitudinally movable differential racks controlled by the pins of the pin carriage and serving to transfer the digits to the accumulator. In order to keep constructional height of the machine as low as possible, the guides of the key shanks usually are shortened as far as possible, but that prejudices the accuracy of the guides.

In a vertical arrangement of the pin carriage, the pin carriage is situated behind the key-board so that cumbersome arrangements for the transfer of the key motions to the pin carriage are necessary. Besides, in this way the length of the machine is increased.

In known arrangements the key shanks often are bent in a complicated manner which results in rendering more difficult their production and in lessening the clearness of the machine.

The object of the invention is a key arrangement which is more simple, clearer and saves more space than the known key arrangements.

The key arrangement according to the invention is hereafter described referring by way of example to a calculating machine with ten-key keyboards, which is diagrammatically shown in the accompanying drawing, omitting all parts not necessary for understanding the invention.

Fig. 1 is a sectional view of the front part of the machine,

Fig. 2 is a section on line II—II of Fig. 1, and

Fig. 3 is a top view of the digit and function keyboards.

The calculating machine shown has a base plate **1** with two lateral walls **2** and **3**. In these are fixed two axles **4** and **4'** on which a pin carriage **5** with setting pins **6** is movably arranged. It is usual on setting the digits to move the pin carriage **5** step by step in the direction of the arrow A, to transfer the value thus set up to the result register, to return the pin carriage in the direction opposite to that of the arrow A into its initial position and to cancel the set pins simultaneously. Mechanism to perform these functions are generally known in the art.

Above the pin carriage are arranged side by side two groups of block-formed keys, the figure keys **8** and the function keys **9**.

By means of strips **23**, the figure keys **8** are rigidly connected to two-armed key levers having arms **10** directed about horizontally to the right and arms **18** directed about vertically downwards. These key levers arranged parallelly one to another are turnable around an axle **12**, supported by a U-shaped bracket **14** fixed to

the left lateral wall **3**. The horizontal arms **10** have, at their lower end, projections **24** situated one behind the other which, on depressing the figure keys **8** and their lever key arms **10**, press the corresponding pins **6** of the pin carriage **5** downwards.

By means of strips **22** the function keys **9** are rigidly connected to two-armed levers having arms **11** directed about horizontally to the left and arms **19** directed about vertically downwards. These key levers arranged parallelly one to another are turnable around an axle **13** supported by a U-shaped bracket **15** fixed to the right lateral wall **2**.

The horizontal arms of the key levers **10**, **18** of the figure keys **8** are guided by U-shaped bracket **15**, which for this purpose is of comb-shape, whilst angular brackets **20** of comb-shape and fitted to the left lateral wall **3** guide the vertical arms of said levers. In the same way are guided the key levers **11**, **19** of the function keys **9** by the comb-shaped bracket **14** and by a comb-shaped angular bracket **21** fitted to the right lateral wall **2**.

As will be clear from Figs. 1 and 2, the key levers **18**, **10** and **19**, **11** are arranged alternately and oppositely side by side. Each of a pair of opposite vertical lever arms **18**, **19** are connected one to another by means of a common spring **25**.

Underneath the pin carriage on the left side are arranged side by side in the longitudinal direction of the machine differential actuator racks **7** which after the pin carriage has been set will be lifted and moved rearwardly. They will be stopped in the positions corresponding to the set digits by the depressed pins **6** of the pin carriage **5**, and they will transfer the set digits into an accumulator (not shown).

At the right side of the racks **7** are arranged side by side slides **17**, movable in the longitudinal direction of the machine, and transferring the set functions into the gearing of the calculating machine. These slides can be stopped or released by stops **16'** of transverse slides **16** which are linked by bolts **26** to the vertical arms **19** of the key levers **11** connected with the function keys **9**. The means by which the longitudinally movable slides **17** transfer the functions into the machine gear are not an object of the invention and therefore are not represented.

By arranging the key levers of the figure keys and of the function keys according to the invention an extremely clear construction is reached which facilitates essentially the assembling of the machine. Particularly there is provided a control of the pins of the pin carriage and more especially of the function slides avoiding all design detours and ensuring a troublefree operation of the machine.

The totality of all key levers provides, as seen from the front, a gate or arch-like space in which the pin carriage **5**, the racks **7**, the longitudinally movable slide **17**, and the transversally movable slides can be easily placed without requiring any additional space liable to increase the constructional height. The keys and their key levers are perfectly guided.

It is an essential advantage of the invention that the key levers all are of practically identical shape. Thus only one cutting tool is necessary for manufacturing them.

What I claim is:

In a calculating machine, indexing mechanism comprising a pair of transversely spaced ten-key keyboards composed, respectively, of digit keys and function control keys, a horizontally disposed transversely shiftable pin carriage below said keyboards, vertically adjustable pins in said pin carriage, a pair of spaced parallel, horizontal axles above said pin carriage disposed normal to the direction of movement of said pin carriage, said key-

boards being disposed intermediate said axles, a first group of substantially L-shaped key levers pivotally supported at their apices on one of said axles and having horizontal arms directed towards the other axle and vertical arms directed downwardly, the digit keys of one of said keyboards being attached to the distal ends of said horizontal arms intermediate said axles, a second group of substantially L-shaped key levers pivotally supported at their apices on the other of said axles and having horizontal arms directed towards said one axle and vertical arms directed downwardly, the function control keys of said other keyboard being attached to the distal ends of the horizontal arms of said second group of levers intermediate said first keyboard and said one axle, the horizontal arms of one group of key levers being disposed between and parallel to the horizontal arms of the other group of key levers, downwardly directed means on the horizontal arms of said first group of key levers for adjusting said pins in said pin carriage, a plurality of function control slides below said pin carriage and movable longitudinally parallel to said axles, means connected to the downwardly directed arms of said second group of key levers for controlling the movement of said slides, said key levers by their shape and disposition embracing a gate-shaped space in the upper part of which is arranged the pin carriage and in the lower part of which are arranged the function control slides, and a plurality of springs in the space between said pin carriage and said function control slides connected at opposite ends to the downwardly directed arms of a pair of key levers one from each of said groups.

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