

Dec. 2, 1958

D. N. MacDONALD
ELECTRICAL KEYBOARD

2,862,664

Filed Oct. 31, 1955

2 Sheets-Sheet 1

FIG. 1.

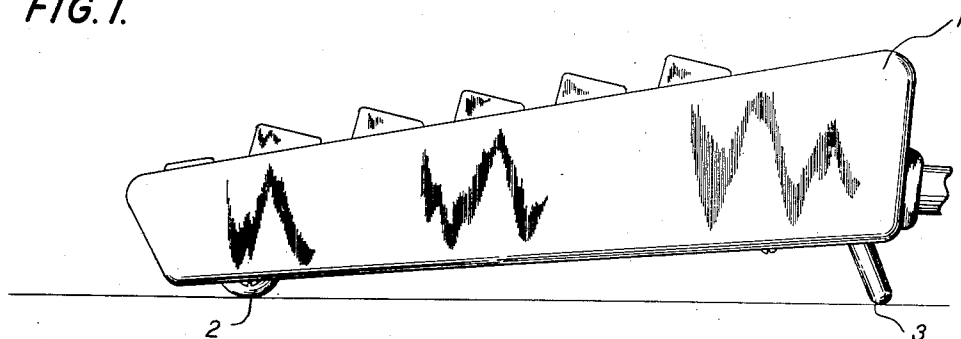


FIG. 2.

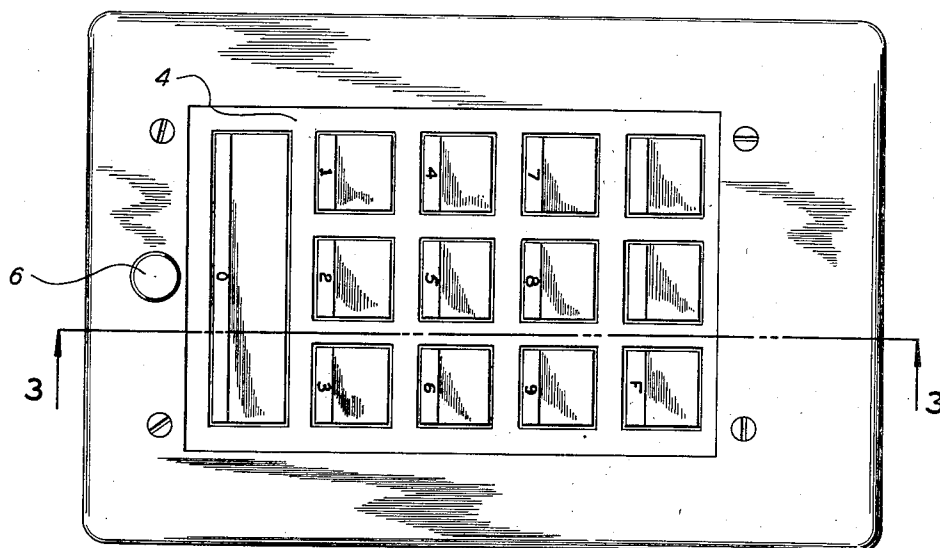
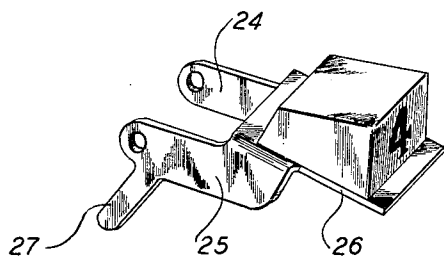


FIG. 6.



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2 Sheets-Sheet 2

FIG. 3.

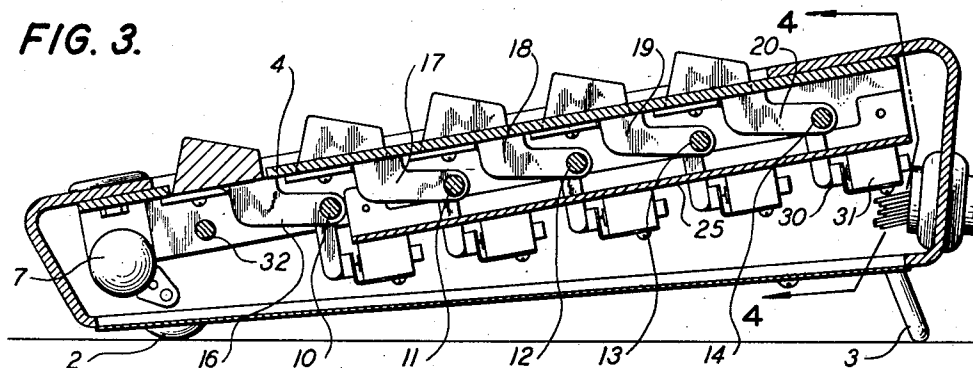


FIG. 4.

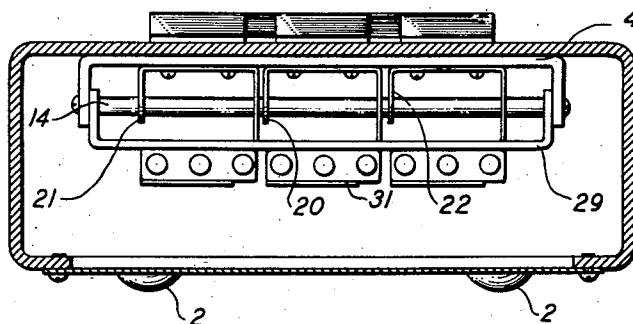
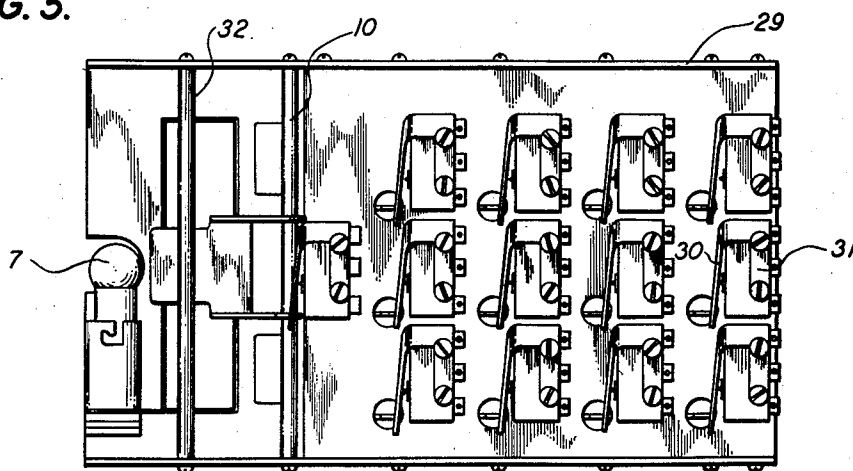


FIG. 5.



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Application October 31, 1955, Serial No. 543,862

2 Claims. (Cl. 235—145)

This invention relates to a keyboard, and more particularly to an improved keyboard mechanism of the type in which the actuation of a key provides an electrical circuit connection.

In adding machines and calculators, it has long been known to enter digital information by means of a keyboard which is mechanically linked to displace elements corresponding to the digital information. It will be appreciated that such mechanical linkages are relatively complex and bulky.

With present day electrical and electronic techniques for handling digital information, it is no longer necessary to store digital information by the displacement of mechanical elements. Instead, information may be stored by means of special electrical and electronic circuits. Consequently, in present day electronic digital equipment, the entry of numerical information may be accomplished merely by closing an electrical circuit.

In one embodiment of the invention the keys are arranged in rows and columns, a separate support rod is provided for each of the rows, and key supporting yokes or brackets are strung along the support rods. Each of the yokes or brackets includes a key platform to which is attached an actuating button or key, and a pair of lever arms which are spaced apart to accommodate in nested fashion the key platform of a yoke in the same column in an adjacent row. In addition, a separate actuating arm is attached to one of the lever arms of each of the yokes for actuating a switch when the key is depressed.

An understanding of the construction and operation of an embodiment of the invention may be had from the following specification taken in conjunction with the drawings, in which:

Fig. 1 is a side view of a keyboard in accordance with the present invention;

Fig. 2 is a top view of the keyboard of Fig. 1;

Fig. 3 is a sectional view taken along line 3—3 of Fig. 2;

Fig. 4 is a sectional view taken along line 4—4 of Fig. 3;

Fig. 5 is a bottom view of the switch plate and certain other parts of the keyboard of Figs. 1, 2, 3 and 4; and

Fig. 6 is a perspective view of a key attached to a key yoke for use in the keyboard of Figs. 1—5.

Referring to the drawings in detail, Figs. 1 and 2 show in side elevation and in top view, respectively, a keyboard comprising a casing 1 which rests upon a pair of cushions 2 and a pair of support legs 3. Attached to and supported by the casing 1 is a frame 4 which holds keys corresponding to the numerals 0—9 and three special purpose keys.

The 1—9 keys and the three special purpose keys are arranged in rows of three and columns of four, with the 0 key extending adjacent the lowest ordered row. At the front of the keyboard adjacent the 0 key there is an open-

ing covered with a lens 6, below which may be mounted an indicator light 7 (Figs. 3 and 5).

The internal mechanism of the keyboard of Figs. 1 and 2 is shown in the sectional views of Figs. 3 and 4 and the partial bottom view of Fig. 5. Mounted to the frame 4 are parallel rods 10, 11, 12, 13 and 14. Strung along the rods are rows of yokes, one of which corresponds to each of the keys. The keys of the central column are shown in Fig. 3 with their associated yokes 16, 17, 18, 19 and 20. The yokes which are strung along the key support rod 14, corresponding to the three special purpose keys, are shown in Fig. 4 with their associated yokes 20, 21 and 22.

Fig. 6 shows the construction of one of the yokes. The yoke of Fig. 6 comprises a U-shaped bracket having a pair of lever arms 24 and 25 which are apertured to allow the yoke to be hinged to one of the rods 16—20. The yoke also includes a key platform 26 to which may be attached a wedge-shaped key as shown. The key may be mounted on the yoke so that a part of the key platform 26 extends forward of the key to limit the upward travel of the yoke and key in the keyboard by engaging the frame 4. Extending downwardly from the lever arm 25 is a switch actuating arm 27.

With respect to the column of keys shown in Fig. 3, it will be noted that the yokes are adapted to nest one within the other. That is, the key platform of the yoke 20 is adapted to be received between the lever arms of the yoke 19 when the key associated with the yoke 20 is depressed, the key platform of the yoke 19 is adapted to be received between the lever arms of the yoke 18 when the key associated with the yoke 19 is depressed, and so on.

By arranging the columns of keys in nestable fashion by means of the unique yoke construction shown in Fig. 6, a keyboard is provided which is shallow enough to allow it to rest directly on a table and to allow an operator to depress the keys with the heel of his hand resting on the table.

Attached to the frame 4 is a switch mounting plate 29. The plate 29 is adapted to support an individual switch for each of the keys of the keyboard. The switch actuating levers of each of the yokes extend downwardly into contact with separate leaf springs which urge the switch actuating arms away from the switches, thereby maintaining the key platforms of the yokes forward of the keys in engagement with the frame 4. For example, the switch actuating arm of the yoke 20 bears upon a leaf spring 30 which is attached to the switch 31.

When it is desired to close a particular one of the circuit connection devices, the proper key is depressed, thereby lowering the key platform of the particular yoke and causing the switch actuating arm to actuate an associated switch via the leaf spring which functions as a lever. It will be noted that the downward movement of the key platform of each of the keys is limited by the yoke supporting rod associated with the next lowest ordered row of keys. In the case of the 0 key an extra rod 32 is mounted in the frame to provide a stop for the key platform of the yoke 16.

Although the wiring of the circuit connection device is not shown in the drawings, one satisfactory wiring diagram for providing binary coded output signals from the keyboard of the present invention may be found in a co-pending application entitled "Code Converting Electrical Network," Serial Number 522,076, filed July 14, 1955 in the name of Walter F. Chamberlin.

I claim:

1. A keyboard assembly providing a plurality of keys in rows comprising a frame adapted to rest on a horizontal surface, the frame including a pair of spaced par-

3

allel members positioned at a slight angle from the horizontal, a plurality of rods extending between the spaced parallel members of the frame and supported thereby, a plurality of keys pivotally supported by each of the rods, each of the keys including a key platform projecting above the parallel members and projecting over the adjacent rod supporting the adjacent row of keys, and a U-shaped yoke providing a pair of projecting arms, the arms being spaced apart a distance slightly wider than the key platform and having holes through their ends for receiving the supporting rod, the U-shaped yoke of each key providing a space for receiving the key platform of a key in the adjacent row when the latter key is depressed, a plurality of switch means supported by the frame below and intermediate the rods, each key including a projecting tab extending below the supporting rod and engaging said switch means positioned below the key platform of the key in an adjacent row of keys, and spring means engaging the tab portion of each key for urging the keys into their normal operating position and to resist depression of the key platforms.

2. A keyboard assembly providing a plurality of keys in rows, a main frame, a channel member supported by the frame, the channel member being supported on a horizontal surface by the frame at an angle with the horizontal, the projecting edge portion of the channel member extending in a downwardly direction, a plurality of spaced parallel rods supported at their ends by the projecting portions of the channel member, a plurality of keys each having a key platform portion and U-shaped bracket portion, the projecting arms of the bracket portion extending outwardly below and to one side of the platform

4

portion and the space between the projecting arms being slightly greater than the width of the platform portion of the keys, the projecting arms of the bracket portion of the keys having holes therein in which the rods are journaled for pivotally supporting the keys, the rods being spaced apart a distance substantially less than the length of the keys including the platform portion and the bracket portion, whereby the platform portions of the keys overlies the rods and rest between the projecting arms of the adjacent row of keys, the channel member having openings therein for receiving a part of the platform portions of keys, whereby the platform portion of each of the keys projects above the channel member, a switch plate secured to the channel member below the keys, the bracket portion of each of the keys including a projecting tab, the switch plate having openings therein through which the tabs project, switch means mounted on the lower side of the switch plate, the projecting tabs engaging the switch means for actuating the switch means when the associated key platform is depressed, and spring means engaging the key tabs for urging the keys into their normal operating position and to resist depression of the key platforms.

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