Sept. 11, 1951 R. T. BOZAK ET AL 2,567,870

SWITCH FOR ELECTRICAL MUSICAL INSTRUMENTS

Filed Sept. 7, 1946

Fig. 1

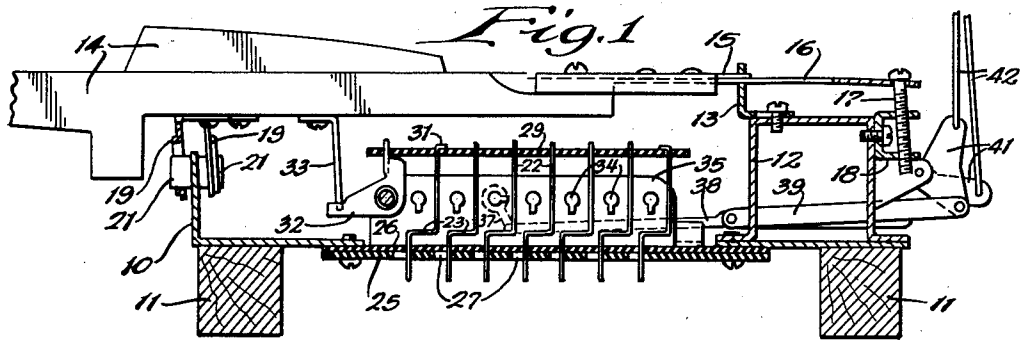


Fig. 2

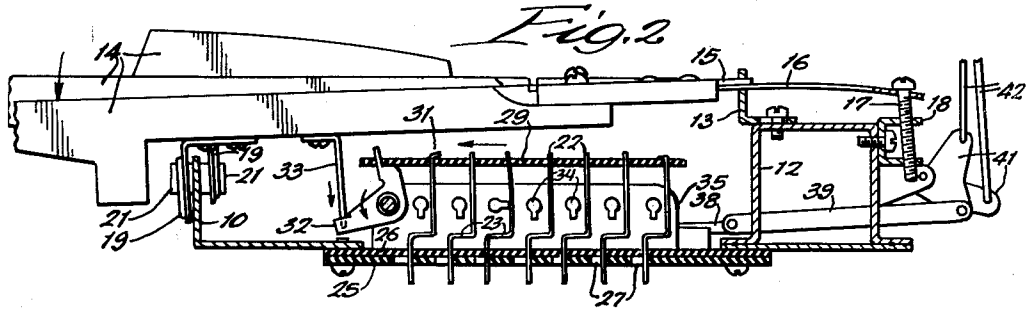


Fig. 3

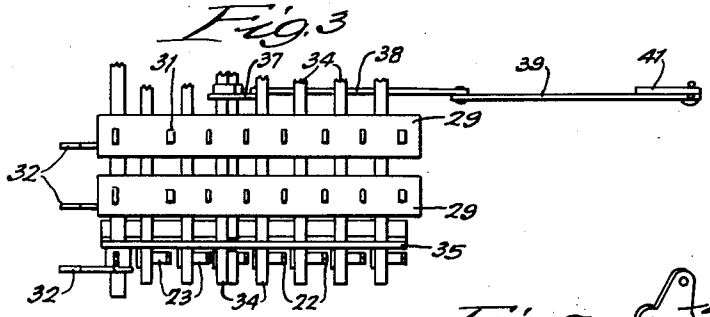


Fig. 4

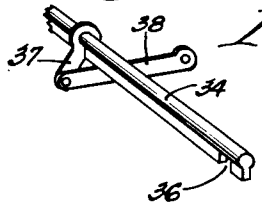


Fig. 5

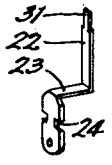


Fig. 6

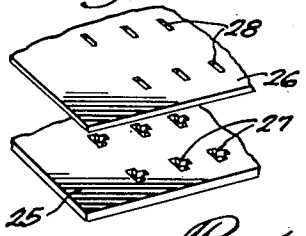
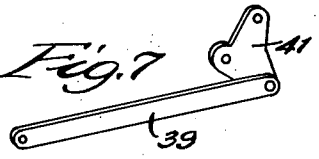


Fig. 7



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SWITCH FOR ELECTRICAL MUSICAL INSTRUMENTS

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3 Claims. (Cl. 200—1)

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This invention relates to keyboards for electrical musical instruments and more particularly to the construction and mounting of couplers for instruments of the organ type.

In electrical organs as heretofore constructed it has been customary to provide coupler switches by which certain groups of keys can be caused selectively to operate or control different organ stops. These couplers ordinarily comprise groups of switches which can be selectively set by the organist and have required a substantial amount of space in the organ console as well as a large amount of wiring.

It is one of the objects of the present invention to provide a keyboard which includes coupler means occupying a minimum amount of space and requiring a minimum amount of wiring.

Another object is to provide a keyboard in which coupler switches are arranged directly beneath the keys to be operated through direct connections with the keys.

Still another object is to provide a keyboard including coupler switches whose contact points are kept clean and in condition to make good contact at all times. This is accomplished by contact members so constructed as to wipe over each other when making or breaking contacts.

A further object is to provide a keyboard which is extremely simple and inexpensive to manufacture and assemble and which provides a flexible coupler mechanism.

The above and other objects and advantages of the invention will be more readily apparent from the following description when read in connection with the accompanying drawings, in which—

Figure 1 is a transverse section through a keyboard embodying the invention with parts in elevation;

Figure 2 is a view similar to Figure 1 showing a different position of the parts;

Figure 3 is a partial plan view of the coupler switch mechanism;

Figure 4 is a partial perspective of a contact rod;

Figure 5 is a perspective of a contact strip;

Figure 6 is a partial perspective of the mounting plates for the contact strips; and

Figure 7 is a partial perspective of the contact rod operating mechanism.

The keyboard as shown may be applied to any type of electrical keyboard instrument such as a conventional organ console or the console for an electronic type organ. As shown the keyboard comprises a frame indicated generally at 10 which may be of sheet-metal and which is carried by supports 11. Toward its inner or rear end the frame 10 carries a channel shaped supporting strip 12 to the upper part of which is attached a flanged strip 13 formed with spaced horizontal slots therethrough. A plurality of keys 14 are pivoted on the framework by means of extensions 15 which project through the slots in the strip 13 and which carry leaf springs 16. The outer ends of the springs may be adjustably urged downward by screws 17 threaded into openings in a channel shaped strip 18 so that the tension on the keys can be adjusted. Upward and downward movement of the keys is limited by brackets 19 having openings therein to fit over stop pins 21 on the frame.

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The frame is adapted to carry coupler mechanism to be operated by the keys and which comprise a series of switches to be controlled by each key. As shown, the switches are formed by elongated flexible contact strips 22 which are offset intermediate their ends as indicated at 23 and which are formed adjacent one end with a relatively narrow neck portion 24. The strips are supported by insulated plates 25 and 26 which are adapted to be secured to the frame 10 as shown in Figure 1. The plate 25 is formed with a series of keyhole slots 27, the widest portion of which is slightly greater than the width of the contact strips 22 and the narrowest portion of which is narrower than the contact strips and slightly greater than the width of the neck 24. The plate 26 is formed with a series of straight slots 28 to register with the slots 27 when the plates are put together.

To assemble the contact strips in the supporting plates the plates are placed together with the slots therein in register and the strips are inserted in the slots a distance sufficient to bring the necks 24 into register with the plate 25. The plates may then be shifted on each other to force the necks into the narrow portions of the keyhole slots 27, and while in this position, may be secured to the frame. In this way the contact strips are held by the plates and project upward toward the keys so that they can pivot in a plane parallel to the length of the keys.

The group of contact strips corresponding to each key is connected at its free ends by an insulating sheet or strip 29 having openings therein through which the ends of the strips may project. The strips at each end of the series are formed with narrow projections as shown at 31 joined to the major part of the strip by shoulders

which rest against the sheet 29. When in place the projections 31 may be bent over, as shown, to hold the strips or sheets 29 from movement lengthwise of the contact strips.

To move the contact strips a bell crank lever 32 is provided for each key pivoted at its center and connected at one end to the strip 29. The opposite end of the bell crank lever extends substantially horizontally beneath the corresponding key and is adapted to be engaged by a plate 33 extending downwardly from the key. In the normal position as shown in Figure 1 the contact strips are substantially vertical. When the key is depressed, the plate 33 will engage the end of the bell crank lever to move all of the contact strips of the group corresponding to that particular key toward the left.

The contact strips are adapted to engage contact rods 34 which extend horizontally beneath the keys transversely to the key length. Each rod is of irregular cross section being shown as substantially keyhole shaped so that it has a projection extending from one side thereof which is adapted to be engaged by the contact strips. The rods are rotatably mounted between side plates 35, the keyhole projection on each rod preferably being interrupted as indicated at 36 in Figure 4 at the point where the rod passes through the plates. As seen in Figures 1 and 2 a contact rod is provided for each contact strip, the same contact rod serving the corresponding strips of any desired number of keys.

To turn the contact rods each rod is provided at some point in its length with an arm 37 extending laterally from the rod and connected to a link 38. The link 38 is in turn connected to a link 39 which is pivoted to one end of a lever 41 pivotally mounted intermediate its ends on the frame 10. An operating rod 42 may connect to the opposite end of each lever 41 and may extend to the usual stop tablet. When the stop tablet is moved the contact rod corresponding thereto will be turned through the linkage described above so that the projection thereon will lie in either a horizontal or a vertical position, as desired.

The spacing of the contact rods and the strips is such that when the projections on the rods are turned down the strips will not engage them. This is clearly illustrated, for example, by the contact rod at the extreme left in Figures 1 and 2. When the rod is turned so that its projection is horizontal, as shown in the rod third from the left in Figures 1 and 2, the contact strip will engage the projection when the key is depressed. By suitably connecting the rods and strips to desired parts of the instrument as is understood in the art, any desired coupling action may be produced.

Due to the fact that the contact strips are offset they will engage the contact projections at an angle. After engagement with the contact rod projections, a slight additional movement will cause the contact strips to flex so that they will wipe over the projections. This insures good contact at all times and will clean out any dust or dirt tending to collect on the contact points. If desired, ingress of dust or dirt to the contact points may be minimized by placing a flexible sheet between the keys and the switch mechanism to cover the switch mechanism.

While one embodiment of the invention has been shown and described in detail herein, it will be understood that this is illustrative only and is not intended as a definition of the scope of the invention, reference being had for this purpose to the appended claims.

What is claimed is:

1. A switch construction comprising a plurality of contact strips having reduced necks adjacent one end, a pair of insulating plates one of which is formed with keyhole slots and the other of which is formed with straight slots, the strips extending through the slots with the necks lying in the narrow parts of the keyhole slots, means to hold the plates against relative movement, contacts adjacent the strips to be engaged thereby and means connected to the strips to move them piovtally about their connections to the plates.

2. In a switch construction an elongated contact strip formed adjacent one end with a reduced neck, a pair of insulating plates one of which is formed with a keyhole slot and the other with a straight slot, the strip extending through the slots with the neck lying in the narrow part of the keyhole slot, and means to hold the plates against relative movement.

3. A switch construction comprising an insulating support, a plurality of contact strips carried by the support and extending outward therefrom, insulating means connecting the contacts for simultaneous movement parallel to the length of the support, a rotatable contact rod adjacent each of the strips having a projection thereon to engage the adjacent strip when the strips are moved in one direction, means selectively to rotate the rods to move the projections into or out of the paths of travel of the strips, and means for simultaneously moving the strips in said one direction.

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