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3,392,620

UNIFORM KEYBOARD ADAPTER

Filed June 30, 1966

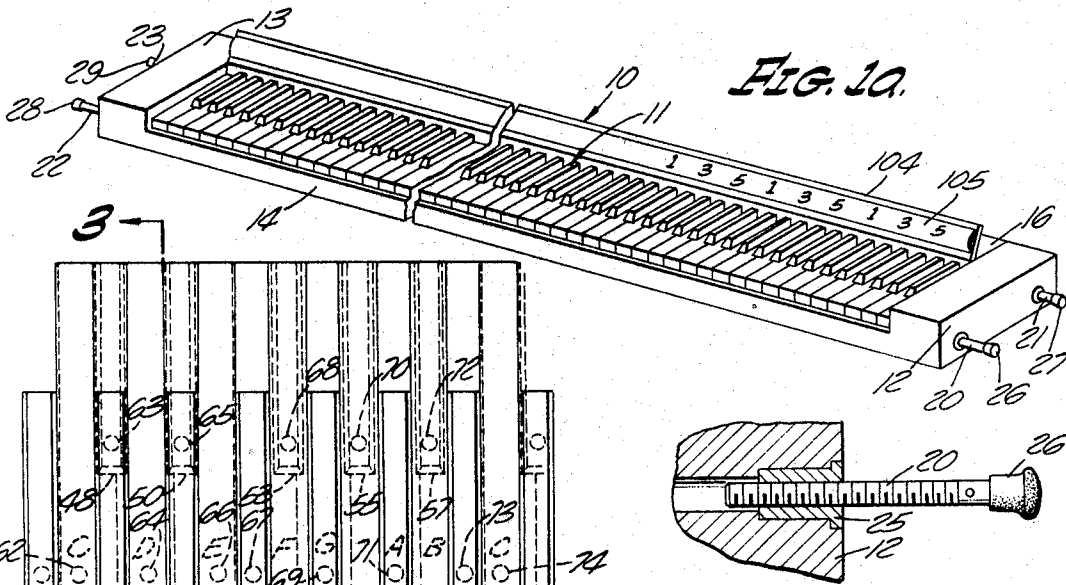


FIG. 1a.

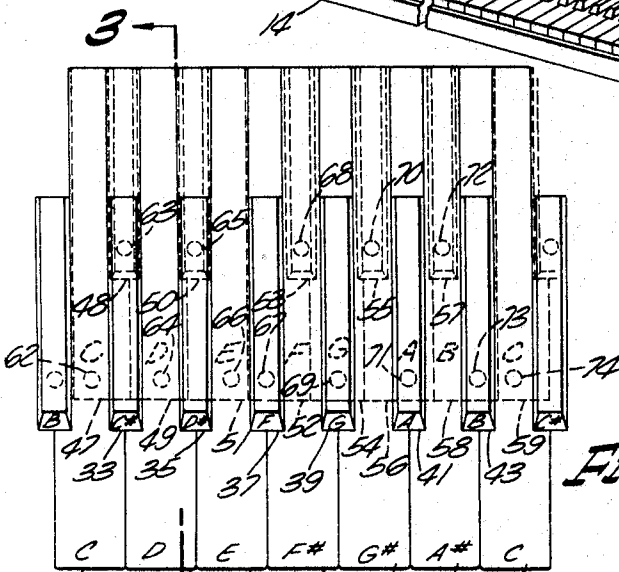


FIG. 2.

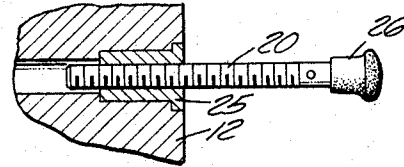


FIG. 1b.

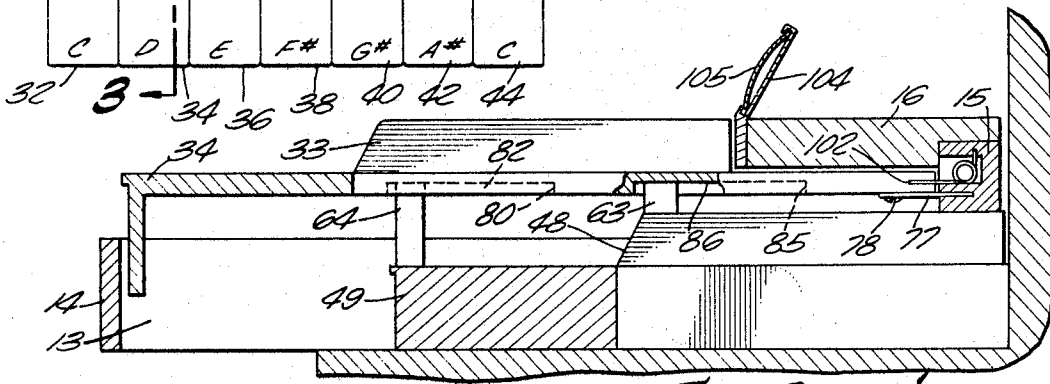


FIG. 3.

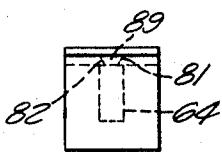


FIG. 4b.

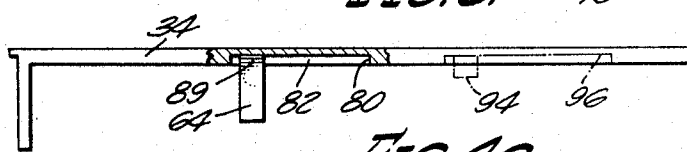


FIG. 4a.

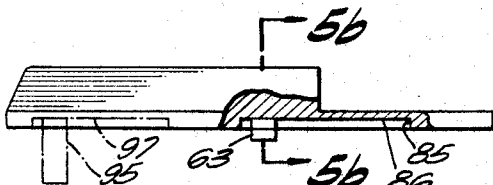


FIG. 5a.

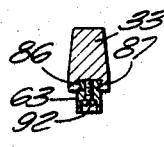


FIG. 5b.

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UNIFORM KEYBOARD ADAPTER

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6 Claims. (Cl. 84-425)

This invention relates to a keyboard adapter and more particularly to a keyboard adapter having a uniform arrangement of keys for use with a conventional keyboard instrument, such as a piano, and which may be readily positioned and attached over a standard keyboard.

The standard keyboard provided on pianos, organs, accordians, and the like, includes a nonuniform arrangement of white and black keys, with each octave including seven white keys and five black keys, the black keys being shorter than the white keys and interspersed with certain of the white keys. Thus, it is well known that an octave of such keys from the note or tone C through the note or tone B includes the following sequence of keys: white, black, white, black, white, white, black, white, black, white, black, and white for the respective notes C, C#, D, D#, E, F, F#, G, G#, A, A#, and B. This keyboard arrangement is of antique design and has been preserved through tradition of hundreds of years with very few changes. As a result of the nonuniform arrangement of the keys, twelve different sequences of depressing the keys in order to play the various musical scales are necessary thereby requiring a substantial degree of manual dexterity.

Various uniform keyboard arrangements have been proposed for simplifying the fingering of the keys in playing the various musical scales. Examples may be found in U.S. Patent No. 334,484 to Stewart and U.S. Patent No. 3,022,698 to Lucas. The former patent discloses a keyboard which may be rested upon an ordinary keyboard and includes a row of equally spaced raised keys and a range of flat keys exposed both to the front and rear of the raised keys. The keys control the original keys by means of adjustable screws. The latter patent discloses a plurality of alternating white and black "over-keys," each of which may be individually secured to the original keys of a keyboard instrument by means of pressure sensitive tape. Inasmuch as the principal requirements of a uniform keyboard adapter for conventional keyboard instruments are ease of precise alignment, attachment and removal, while still providing a suitable "touch," it will be apparent that the devices disclosed in the foregoing patents are not entirely satisfactory.

Accordingly, it is a principal object of the present invention to provide a novel uniform keyboard adapter which may be readily attached to and removed from the keyboard of an existing keyboard instrument, and which enables a suitable "touch" to be obtained.

It is an additional object of the present invention to provide a relatively simple keyboard adapter having a uniform arrangement of keys for facilitating the fingering of various musical scales, and which may be readily attached to a conventional keyboard instrument and simply adjusted with respect to the original keys thereof, and in which the "touch" of individual keys may be adjusted.

These and other objects and features of this invention will become more apparent through a detailed consideration of the following description taken in conjunction with the accompanying drawing in which:

FIGURE 1a is a perspective view of a uniform keyboard adapter constructed in accordance with the teachings of the present invention;

FIGURE 1b is a sectional view of a portion of the adapter in FIGURE 1a;

FIGURE 2 is a partial plan view of the adapter illus-

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trating the manner in which uniform keys overlie conventional keys to ensure proper contact;

FIGURE 3 is a cross-sectional view taken along a line 3-3 of FIGURE 2 illustrating the manner in which the over-keys of the present invention are hinged and the "touch" thereof is adjustable;

FIGURES 4A and 4B illustrate a typical, long or white, over-key; and

FIGURES 5A and 5B illustrate a typical short, or black, over-key.

In accordance with an exemplary embodiment of the teachings of the present invention, a uniform keyboard adapter is provided having a plurality of first type keys, such as white keys, interspersed with a plurality of second type keys, such as black keys. The two type keys alternate thereby providing a uniform keyboard. Each of the keys is hinged, or otherwise suitably pivotally mounted at the rear thereof to a frame member to provide a permanent relationship of the keys and spacing therebetween. The adapter is rectangular with the frame member forming the rear portion thereof. The opposite ends of the frame include cushioned and adjustable members for locking the adapter in place and for enabling proper adjustment thereof with respect to the conventional keyboard. Each of the over-keys includes a centrally mounted and longitudinally adjustable contact member for engaging the proper underlying conventional key. Longitudinal adjustment of a contact member aids in providing a suitable "touch" for a key. A track for receiving a slider card may be provided rearwardly of the over-keys to provide a simple means of identifying the tonic of the key being played in. This card should be shorter than the entire adapter keyboard by the length of one octave and should contain several marks one octave apart in order to locate all of the tonics of the key being played in. Additional small cards may be inserted over the locator card to facilitate the teaching of chords in the uniform keyboard system. For example, for a major chord the position of the root, third and fifth could be indicated.

A melody can be played in any of twelve keys of the adapter by learning one fingering which accommodates six keys and a second fingering which is identical to the first fingering except that it is a "mirror image," i.e., black keys and white keys rather than white keys and black keys are played in the same sequence. This enables transposing readily from one key to another.

Referring now to the drawings, a keyboard adapter according to the present invention includes a frame 10 and a plurality of hinged keys generally designated by reference numeral 11. The frame 10 includes end members 12 and 13, a front shield or apron 14, and a rear member or bar 15 (note FIGURE 3). These components of the frame 10 may be made of wood or metal and are suitably secured together by means of screws, or the like, to provide a rigid supporting frame for the keys 11. A cover 16 may extend between the two end members 12 and 13 and cover the rear ends of the keys 11. Adjusting and locking screws 20, 21 and 22, 23 are threaded into the respective end members 12 and 13. These adjusting screws provide a means for adjusting the keys 11 with respect to the keys on a conventional keyboard and for locking the adapter firmly in place on the conventional instrument. Typically, each of the screws 20 through 23 may be threaded into a respective collar firmly secured within the members 12 and 13, such as a collar 25 secured within the end 12 as shown in FIGURE 1b. Rubber caps 26 through 29 are mounted on the ends of the respective screws 20 through 23 to prevent scratching of the instrument to which the adapter is attached. A hole may be provided through each of the screws, or

flat surfaces may be provided toward the ends thereof, for facilitating adjustment thereof.

FIGURE 2 illustrates the manner in which an octave of over-keys 32 through 44 ranging from C through C are positioned over respective original keys 47 through 59. Each of the over-keys may be seven-sixteenths inch wide at the rear, or hinge end, with the long or white over-keys being one inch wide at the front end. Each over-key is symmetrical about the longitudinal axis thereof, and there should be a spacing of approximately three thirty-seconds inch between the keys at the hinge end. The narrow ends of the over-keys are centered directly over the narrow ends of the respective original keys. The over-key of C extends one-fourth inch into the octave below it, but this presents no problem inasmuch as the next lower over-key is a black or short key. The over-keys have attached to the undersides thereof contact members, such as contact members 62 through 74 shown in dashed lines in FIGURE 2. The contact members are one-fourth inch in diameter and are located on the longitudinal axes of the respective over-keys to prevent interference with the original keys.

FIGURE 3 is a cross-sectional view of the adapter taken along a line 3—3 of FIGURE 2 and shows the relationship of two keys of the adapter to the white key 49 and the black key 48 of a conventional piano 76. The adapter does not extend rearwardly of the original black keys and, hence, no modification of the conventional instrument is necessary. Each of the over-keys, such as the key 34 as shown in FIGURE 3 is hinged to the rear member 15 by a resilient metal leaf 77. The member 15 may be made of wood, or made of metal if greater rigidity is desired. The leaf forms a force fit within a slot in the member 15, or is secured thereto by means of a screw (not shown). The forward end of the leaf 77 preferably is secured to the underside of the key 34 by a screw 78. This arrangement allows original precise positioning of all of the keys with respect to each other while maintaining the desired spacing therebetween. If desired, the spacing between each of the keys may be maintained by a tiny wheel (not shown), the axis of which is parallel to the longitudinal axis of a key and mounted on one side of each key. Alternatively, a spacer of a relatively slick material, such as a fluorocarbon resin, may be used. Alignment of the long or white keys, such as the key 34, may be accomplished further by providing a pin (not shown) extending inwardly from the shield 14 and engaging a slot in the forward end of this key.

Each of the over-keys has an elongated slot or notch on the underside thereof with the notch having tapered sides to dovetail with the upper end of a contact member. For example, the flat or white key 34 as seen in FIGURES 3, 4a and 4b includes a notch 80 having tapered sides 81 and 82. The short or black key 33 as shown in FIGURES 5a and 5b includes a notch 85 therein having tapered sides 86 and 87. The contact member 64 has an upper end 89 which mates with and may be positioned within the notch 80. Similarly, the contact member 63 has a similar upper end which fits within the notch 85 of the black key 33.

Each of the contact members is locked in position by means of a set screw. For example, a set screw 92 is shown extending centrally through the contact member 63 attached to the black key 33 in FIGURE 5b. The set screw may be tightened to lock the control member within the notch. This arrangement enables the contact members of the various keys to be longitudinally adjusted for varying the "touch" of each key.

FIGURES 4a and 5a also illustrate the phantom lines contact members 94 and 95 mounted in respective notches 96 and 97. The white key 34 with the contact member 64 is used for the notes C, D, and E, and with a contact member 94 for the notes F#, G# and A#. A black key 33 with a contact member 63 is used for notes C# and D# and with a contact member 95 for notes F, G, A and

B. It will be appreciated that the notches in each key may be one continuous notch rather than two separate notches if desired.

The relative touch between the short and long over-keys, as well as the touch of the whole set of over-keys, can be simply adjusted by positioning the contact members attached thereto. The "touch" or amount of force needed to press a key is particularly important, and fine variations in touch can be detected easily by even fair instrumentalists. The fact that the over-keys cannot extend into the interior of the keyboard instrument as do the original key "lever arms" presents certain difficulties from the standpoint of enabling a reasonable amount of variation in the leverage provided. The over-keys are levers of the second class, and have a varying mechanical advantage provided by the adjustable contact members as described above. The mechanical advantage of all the over-keys may be reduced by individual wire springs, such as a spring 102 shown attached to the rear end of the key 34 in FIGURE 3. The spring 102 extends into the rear end of the key 34 and is affixed thereto, and also is affixed to the frame member 15. The springs are in continuous tension and thereby exert an upward clockwise force on the over-keys as illustrated in FIGURE 3 and thereby counteract a part of the mechanical advantage provided by the leverage of the over-keys.

A track 104, which may be formed of metal, is mounted behind the over-keys as shown in FIGURES 1a and 3. A slider card 105 may be fitted into the track 104 and include any markings which may be helpful. The slider card should provide a means of identifying all the tonics of the key in which the instrumentalist is playing. Any other marking system may be used, and cards may be inserted to aid in learning chord conformations. If music is to be played in the key of C, a numeral "1" is opposite the key of C with all other "1's" on the slider also being opposite over-keys of C. In order to play in a different key, such as D, the instrumentalist slides the cardboard slider with the "1" adjacent the key name, such as D, in which the selection is to be played.

It now will be apparent that the present invention provides a novel uniform keyboard adapter which readily may be attached to and removed from the keyboard of an existing instrument. Inasmuch as the adapter may be constructed of lightweight materials and may be separated or folded into two halves, it is easily portable in a suitable case. The rubber footed adjustment screws at each end of the adapter allow fine horizontal adjustment throughout a suitable range, for example two to four inches, to ensure proper alignment of the over-keys with the original keys. The overall touch, as well as the relative touch between the keys, can be simply adjusted by varying the positions of the contact members. If more adjustment is needed the individual tension springs at the hinged ends of the keys may be removed and replaced with springs of a different spring constant. The touch can thus be made substantially identical to any existing piano.

What is claimed is:

1. A keyboard adapter having a uniform set of alternate long and short keys for attachment over the conventional keys of a keyboard instrument comprising

frame means for hingeably supporting said uniform set of keys over the keys of a keyboard instrument, said frame means comprising end members having adjustable means coupled therewith for enabling the frame means to be firmly attached to said instrument and for enabling proper alignment of said uniform set of keys with the keys of said instrument, and said frame means comprising a supporting member for hingeably supporting each of said long and short keys,

a set of uniform keys including alternate long and short keys, each of said keys being hingeably coupled with said supporting member, and each of said short and

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long keys having an elongated notch in the underside thereof substantially centered along the longitudinal axis of the respective long and short keys,
 a contact member coupled within the notch of each of said long and short keys, said contact members being longitudinally adjustable in the notches of said long and short keys for varying the "touch" thereof.
 2. An adapter as in claim 1 including tension spring means for biasing each of said long and short keys in a direction tending to return said long and short keys to an initial position after they have been depressed.
 3. An adapter as in claim 2 including track means coupled with said frame means substantially extending from end to end thereof behind said long and short keys, said track means serving to exhibit indicia of the proper long or short keys to be depressed for playing a chord.
 4. An adapter as in claim 1 wherein each of the notches in said long and short keys have tapered sides for forming a dovetail fit with a respective contact member.
 5. An adapter as in claim 1 including tension spring means for biasing each of said long and

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short keys in a direction tending to return said long and short keys to an initial position after they have been depressed, and
 each of the notches in said long and short keys having tapered sides for mating with ends of the respective contact member and forming a dovetail fit therewith, and screw means coupled with each of said contact members for enabling the contact members to be secured to respective long and short keys.
 6. An adapter as in claim 5 including track means coupled with said frame means substantially extending from end to end thereof behind said long and short keys, said track means serving to exhibit indicia of the proper long or short keys to be depressed for playing a chord.

References Cited

UNITED STATES PATENTS

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RICHARD B. WILKINSON, *Primary Examiner*.GARY M. POLUMBUS, *Assistant Examiner*.