Aug. 6, 1963 L. J. HAVILAND 3,099,930

KEYBOARD CONSTRUCTION FOR ELECTRIC MUSICAL INSTRUMENT

Filed Feb. 18, 1960 2 Sheets-Sheet 1

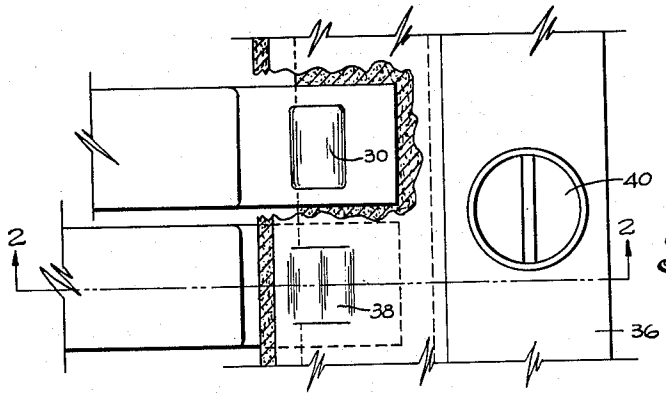


Fig. 3

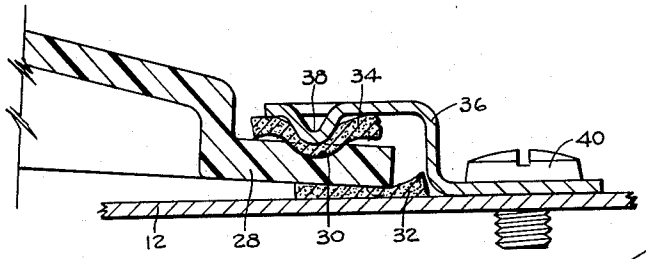


Fig. 2

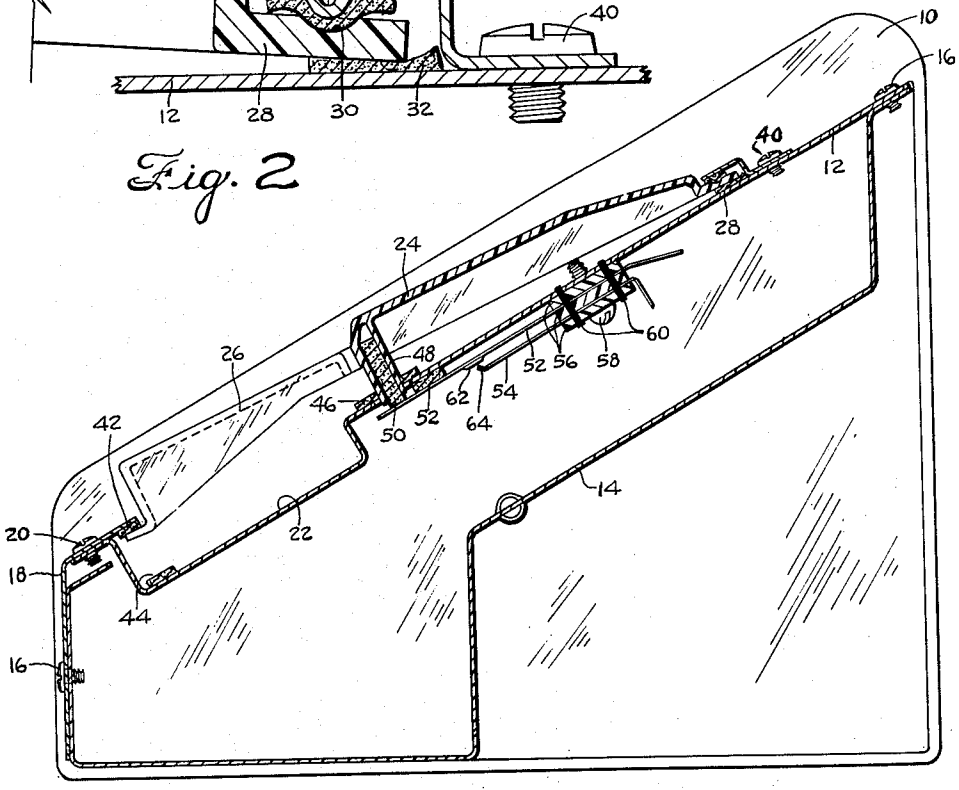


Fig. 1

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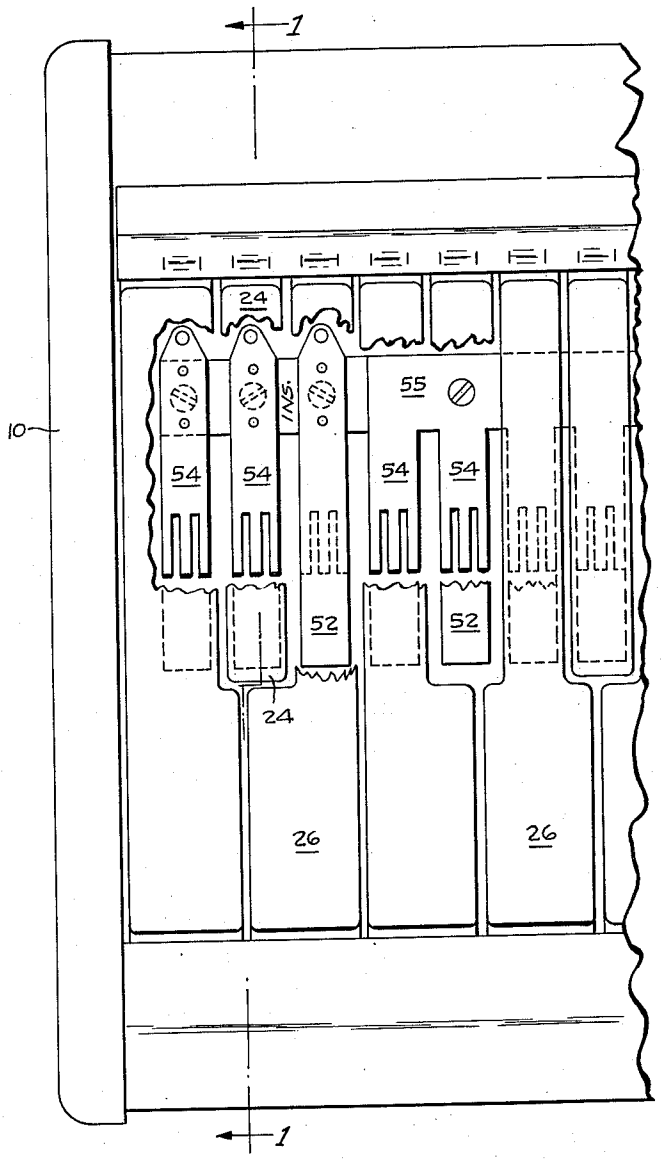


Fig. 4

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KEYBOARD CONSTRUCTION FOR ELECTRIC MUSICAL INSTRUMENT

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6 Claims. (Cl. 84—433)

The invention relates generally to manuals or keyboards for electrically controlled musical instruments and for other instruments of the accordion and miniature organ type.

The principal object of the invention is to provide an extremely simple low cost keyboard, generally of the piano type, for use in the control of a musical instrument such as the small electric organs, accordions, and the like.

A further object is to provide a keyboard of the above type in which simple means are provided to mount the keys for pivotal movement.

A further object is to provide a keyboard which is substantially noiseless in operation.

Other objects will appear from the following description, reference being had to the accompanying drawing in which:

FIG. 1 is a vertical sectional view of the keyboard substantially along line 1—1 of FIG. 4;

FIG. 2 is a greatly enlarged sectional view taken on lines 2—2 of FIG. 3;

FIG. 3 is a plan view of portions of keys and the supports shown in FIG. 2; and

FIG. 4 is generally a fragmentary plan view of the keyboard with parts thereof broken away better to illustrate other parts.

In low priced musical instruments of the accordion or toy electrical organ type, the keyboard and its mounting constitute a substantial portion of the cost of the instrument, and it is therefore highly desirable that the keyboard be of such construction that it may be manufactured at a minimum cost.

As shown in FIG. 1, the keyboard comprises an end support 10 which may be made of wood or other suitable low cost material, there being such end support at each end of the keyboard. A forwardly sloping keyboard plate 12 is secured to the end supports 10 and has a chassis sheet 14 attached thereto by screws 16, front sheet 18, and screws 20. The key support sheet 12 is formed with a channel part 22. The electrical components of the instrument may be mounted on the sheets 14 and beneath the channel portion 22.

The keyboard comprises a plurality of black keys 24 and white keys 26, arranged substantially in the manner of a conventional piano or organ keyboard. These keys are preferably made of a molded plastic material and are generally of inverted trough shape. The keys are secured to the key plate 12 in a very simple and effective manner.

Each of the keys has a short rearwardly extending shank 28 which, at its upper surface, has a rectangular channel shaped depression or indentation 30 therein. The shanks 28 are pressed against a felt strip 32 which may extend the full length of the keyboard and may be cemented to the key plate 12. A strip of felt 34 has a portion pressed into the indentations 30 in the keys by a clamping member 36 which is Z-shaped in cross section and has projections 38 slightly shorter than the indentations 30 in the keys to press portions of the felt 34 into the indentations 30 to locate and hold the shanks 28 against lateral movement. These projections are formed by shearing the metal at their ends from the clamping member 36. The clamping member or strip 36 is rigidly secured to the key plate 12 by a number of screws 40.

Movement of white keys 26 in the upward direction is limited by upstop felt strip 42 cemented beneath the inner edge of sheet 18 while their downward movement is limited by a felt strip 44 cemented to the upper surface of the channel portion 22. Downward movement of the black keys is limited by a perforated felt strip 46 cemented to the upper surface of the key plate 12. The upward movement of the black keys is limited by the compression of the felt strips 32 and 34.

When used in an electrical musical instrument in which the keys must control electric circuits each of the keys, both black and white, is provided with a tubular downwardly projecting part 48 into which a cylindrical felt plug 50 is inserted, leaving a short length thereof projecting from the tubular portion for engagement with resilient contact finger 52 to flex the fingers downwardly against a slightly flexible contact arm 54. The contact finger 52 operates to return the key to its upper normal position. The contact finger 52 and contact arm 54 are clamped between insulating strips 56 which have suitable perforations formed therein for a screw 58 which is threaded in the keyboard plate 12. The contact finger 52 and contact arm 54 have sufficiently large holes therein to clear the screw 58 and are further held in position by a pair of small dowel pins 60 which extend through holes formed in the insulating strips 56 and in the contact finger 52 and contact arm 54. These dowels may be cemented in one of the insulating strips 56. The contact finger 52 preferably has short projections 62 pressed therein for making good electrical contact with the three switch contact elements 64 which are bent upwardly slightly to provide good sliding contact. There are preferably three such projections 62 in cooperation respectively with the fingers of the trifurcated contact arm 54 so as to make the sliding contact. There being three contacts in parallel when the switch is closed the chances of failure to close the circuit between the two switch arms, due to the presence of foreign matter or film or oxidation, is greatly reduced.

For many instruments the trifurcated switch arms 54 may be stamped from a single sheet as indicated in FIG. 4 wherein the switch arms 54 are stamped from a common sheet 55, thus further reducing the cost of manufacture. In other instances, the contact arms 54 will be individual to each key.

From the foregoing it will appear that the keyboard and the switches therefor are of extremely simple construction so that the manufacture of the parts and assembly thereof may be done at a very low cost. The fact that a single means, the felt strip 32 in conjunction with the felt strip 34, is used to mount all the keys avoids the necessity of providing individual mounting means for the keys. Since the projections 38 on the clamping member 36 are shorter than the width of the keys, they prevent lateral movement of the pivoted ends of the keys, although such movement is also prevented by the perforated felt strip 46 surrounding the tubular portions 48.

While various parts of the keyboard have been stated as being made of felt this term is used in its broader sense to include any similar material which has reasonably high elasticity which may be readily deformed, which will not be noisy, and which is of relatively low cost. Such other materials may include a resilient nylon felt, certain forms of rubber and rubber substitutes either in homogeneous form or in the form of foam rubber and the like.

In view of the use of felt, or the like, at all the points at which the harder parts of the keys and keyboard would otherwise contact, the keyboard is, in normal use, substantially noiseless.

While I have shown and described particular embodiments of my invention, it will be apparent to those skilled in the art that numerous modifications and variations may

be made in the form and construction thereof, without departing from the more fundamental principles of the invention. I therefore desire, by the following claims, to include within the scope of my invention all such similar and modified forms of the apparatus disclosed, by which substantially the results of the invention may be obtained by substantially the same or equivalent means.

I claim:

1. A keyboard of the piano type comprising, a supporting member, a plurality of playing keys each having a shank at its pivotal end, felt-like means above and below the shanks, clamping means carried on said supporting member and having a portion spaced apart from said supporting member, an irregularity on said portion and on said key shanks with the irregularity on said portion in alignment with the irregularity on one of said key shanks, and a resilient means held under pressure by and between said aligned irregularities whereby said keys are held against movement along the longitudinal axis of said keys while permitting limited pivotal movement of said keys about an axis transverse to said longitudinal axis and passing through said resilient means.

2. The combination set forth in claim 1 in which the clamping means comprises a member common to a plurality of keys.

3. The combination set forth in claim 1 in which the supporting means has openings therein, and in which the keys have tubular projections terminating in a piece of felt-like material for the actuation of a part.

4. A keyboard of the piano type comprising, a supporting member, a plurality of playing keys each having a shank at its pivotal end and positioned above the supporting member, upper and lower felt-like elements positioned above and below each of the shanks, the lower felt-like elements carried by the supporting member, a clamping member secured to the supporting member and overlying and engaging the upper felt-like elements, each of the keys and the juxtaposed portions of the clamping member having mating arcuate irregularities to hold the keys against lateral and longitudinal movement while permitting limited pivotal movement thereof.

5. A combination for use in a keyboard, the improvement comprising a plurality of elongate keys each having an end portion with an arcuate formation therein, a supporting member underlying the end portion of each of said keys, an arm carried by said supporting member and spaced above one of said keys, an arcuate projection on said arm having an axis of rotation transverse to the longitudinal axis of said keys and adapted to be aligned with said arcuate formation in said one key, and a resilient element located between said supporting member and said one key and between said projection and said arcuate formation under pressure whereby said key is clamped against movement along its longitudinal axis while permitting pivotal movement about said central axis.

6. The combination claimed in claim 5 in which said arm is adapted to be flexed for permitting the longitudinal movement of said one key.

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