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ELECTRIC KEYBOARD MUSICAL INSTRUMENT

Filed Feb. 12, 1931

Fig. 1.

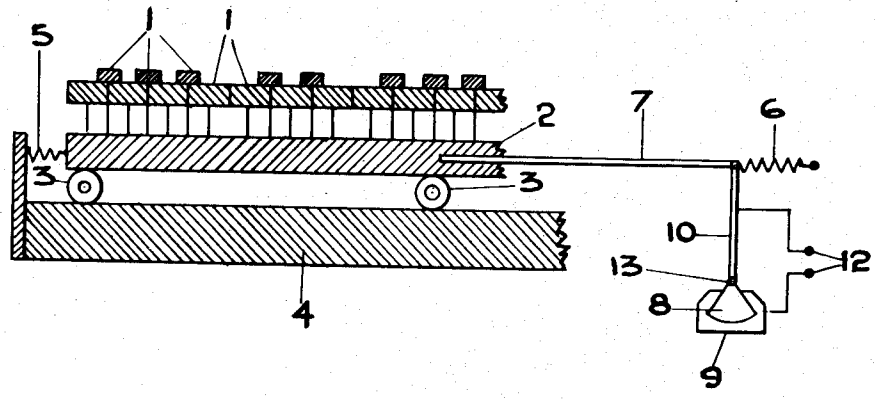
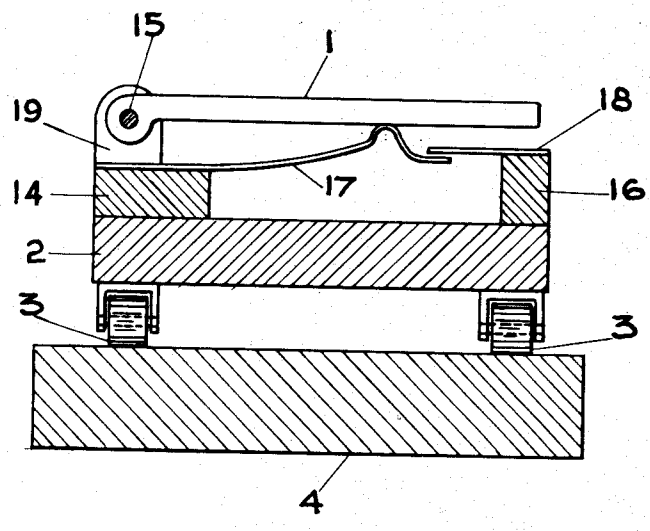


Fig. 2.



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ELECTRIC KEYBOARD MUSICAL INSTRUMENT

Application filed February 12, 1931, Serial No. 515,340, and in France April 2, 1928.

This application is a continuation in part of the former application bearing the Serial Number 350,357 and filed March 27, 1929, now Patent Number 1,824,402 dated September 22, 1931.

It is known that the qualities of expression of a musical instrument do not only reside in the possibility of obtaining determined notes together with variations of intensity, but also all the special sound effects given by the fluctuations of pitch and intensity of sound as can be obtained with a stringed instrument, as for instance the effects of "vibrato" and "glissando."

The present invention renders it possible for these fluctuations to be obtained even on keyboard electric musical instruments utilizing oscillating currents of variable frequency and intensity. According to the invention the keyboard of the instrument is movably and resiliently mounted on its fixed frame and means are provided whereby the movements of oscillation imparted to said movable keyboard by the executant permit of obtaining said special sound effects, said movements being transmitted to the electrical regulating means used for varying the frequency or the intensity of said oscillating currents.

As described in my parent application Serial Number 350,357 said electrical regulating means may be constituted by condensers, variable self-inductances having an iron core, variometers, resistances, etc. and, in a general manner, all the electrical means used for varying the frequency and the intensity of an oscillating circuit.

According to the invention, the movable keyboard, preferably made of materials as light as possible, is arranged on an assemblage of metallic and resilient springs which allow it to slightly oscillate in any direction under the impulses or oscillations of the performer's hand.

A condenser armature is secured to this movable keyboard, the other armature being fixed; the slight oscillations of the keyboard then give a special sound effect known as "vibrato."

The condenser can be replaced by a variable self-inductance having an iron core, or by a variometer, etc., and generally speaking by any means used in wireless telephony for causing the frequency of an oscillating circuit to vary.

Another kind of "vibrato" can be obtained by the variations of intensity of the sound. For obtaining such effects in accordance with the invention the oscillations of the keyboard are transmitted to a resistance acting on a suitable circuit of the instrument.

In all the cases above considered, if the necessary length and, consequently, the weight of the keyboard would tend to prevent an easy oscillation, the keyboard could be sectioned (for instance into octaves) and the devices previously described would be applied to each of these sections.

The systems of movable keyboards above described render it possible to obtain a vibrato exactly responsive to the movements of the performer, as far as the rapidity of these movements and their amplitude are concerned. On the other hand, if it is desired to obtain a mechanical vibrato, that is to say of constantly equal frequency and amplitude, the armature of the condenser will be secured to the movable keyboard through the medium of an oscillating spring the strength and frequency of oscillations of which will be chosen according to the weight of this armature. By slightly shaking the movable keyboard from time to time, the movable armature of the condenser will continue to oscillate under the action of said oscillating spring for a short while after said shaking of the keyboard has ceased.

The invention also consists in the fur-

ther features as hereinafter described and claimed.

In the accompanying drawing forming part hereof, Fig. 1 shows in longitudinal broken section an embodiment of the movable keyboard made according to the invention.

Fig. 2 is a transverse section of the same keyboard showing a conventional form of key and appurtenances adapted to carry out the invention.

In this drawing 1 represents the keys, similar to the keys of a piano, which are pivoted as for example, on a rod 15 in a post 19 upon block 14 of the carriage 2, and depressible in the vertical direction, while a contact 18 on block 16 and a resilient contact 17 on block 14 are preferably connected to an oscillating circuit such as already referred to, and the contacts controlled by said key 1 in such a manner that there is obtained, with each key, a sound of given pitch by sounding means not shown. These means, which may include such circuits as just referred to and more definitely described in the parent application mentioned at the beginning of this specification, form no actual part of the invention per se, but are merely alluded to in order to demonstrate where the present invention is applied. If the keyboard as a whole is considered, said keys are mounted upon a rolling support or carriage 2 which is movable in all directions. Said support 2 may be slightly displaced on rollers 3—3, running on the horizontal surface of a fixed frame 4 in all directions. The movable support 2 is constantly brought back into its normal position of rest by the action of two opposed springs 5, 6, the second spring being connected to the movable support 2 by a rod 7.

This rod is itself connected to a lever 10 which carries the movable armature or rotor 8 of a variable condenser indicated at 9, of small capacity, inserted in the oscillating circuit which is partly indicated at 12. Said variable condenser may moreover be of any kind. The lever 10, which centers upon stationary pivot 13, may also be adapted to control the movable member of any other electrical device for modulating the frequency of an oscillating current, such devices being illustrated in the parent application, now Patent No. 1,824,402, bearing the date of September 22, 1931.

It is thus seen that the carriage 2 pivotally supports the keys, and the latter as a group are shiftable therewith, upon rolling of the carriage upon its rollers 3, 3, and such shifting of the carriage is designed to cause variations in tones sounded by any and all keys that happen to be depressed while said shifting of the carriage occurs. The devices according to the invention may be also combined with means ensuring the entirely automatic operation of the instrument (mechanical, electrical or otherwise).

What I claim is:

1. A keyboard for electrical musical instruments adapted to produce variations such as vibrato and glissando of sounds by means of a controlled electric circuit, including the combination, with a stationary frame, of a movable support shiftably supported upon said frame, depressible keys upon said movable support, and means for controlling said circuit comprising an electrical control device in said circuit provided with a movable control member which responds in movement to said movable support.

2. A keyboard for electrical musical instruments adapted to produce variations such as vibrato and glissando of sounds by means of a controlled electric circuit, including the combination, with a stationary frame, of a movable support shiftably supported upon said frame, resilient devices interposed between said stationary frame and said movable support, depressible keys upon said movable support, and means for controlling said circuit comprising an electrical control device in said circuit provided with a movable control member which responds in movement to said movable support.

3. A keyboard for electrical musical instruments adapted to produce variations such as vibrato and glissando of sounds by means of a controlled electric circuit, including the combination, with a stationary frame, of a movable support shiftably supported upon said frame, depressible keys upon said movable support, and means for controlling said circuit comprising an electrical control device in said circuit provided with a movable control member and a mechanical connection between said movable control member and the movable support, whereby the latter may move the former.

4. A keyboard for electrical musical instruments adapted to produce variations such as vibrato and glissando of sounds by means of a controlled electric circuit, including the combination, with a stationary frame, of a movable support shiftably supported upon said frame, roller disposed beneath said movable support and resting upon said stationary frame, depressible keys upon said movable support, and means for controlling said circuit comprising an electrical control device in said circuit provided with a movable control member which responds in movement to said movable support.

5. A keyboard for electrical musical instruments adapted to produce variations such as vibrato and glissando of sounds by

means of a controlled electric circuit, including the combination, with a stationary frame, of a movable support divided into sections, each of which includes a series of depressible keys, and means for controlling said circuit comprising an electrical control device in said circuit provided with a movable control member which responds in movement to said movable support.

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