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ELECTRIC MUSICAL INSTRUMENT

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Fig. 1.

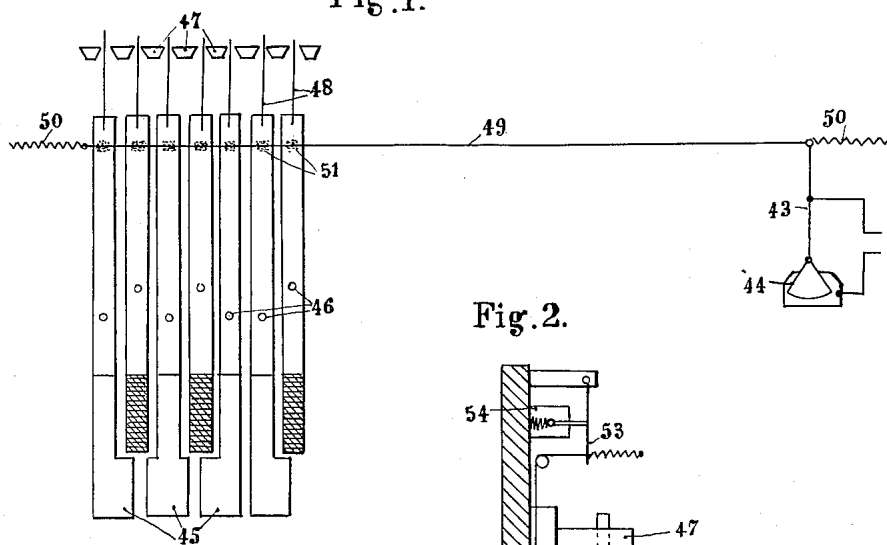
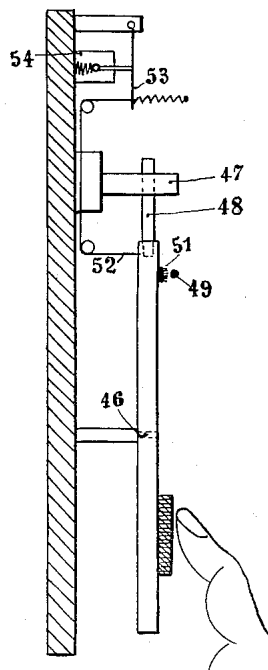


Fig. 2.



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## UNITED STATES PATENT OFFICE

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## ELECTRIC MUSICAL INSTRUMENT

Application filed August 12, 1930, Serial No. 474,775, and in France April 2, 1928.

This invention relates to electric musical instruments of the type described in the United States patent application filed on 27 March 1929 under Serial No. 350,357 of which this is a continuation in part, and discloses simple devices or means allowing to obtain the required notes of music, the variations of their intensity of sound or their vibrato in conditions rendering possible the execution of a piece of music with all the required fineness.

In accordance with the invention, use is made, for playing electric musical instruments, of a movable keyboard composed of a series of keys which are also individually movable; these keys are mechanically connected to the control members of the circuits of the instrument, whilst the keyboard is also connected to other control elements of the circuits. The required notes of music and the variations of their intensity of sound are preferably obtained by depression of the keys, whilst the displacement of the keyboard allows to obtain the vibrato of the sounds produced.

The keyboard can be divided in several sections, each of which is movable and can comprise one or more movable keys.

The invention is illustrated, by way of example, in the accompanying drawings, in which:

Fig. 1 illustrates a form of construction of a movable and divided keyboard.

Fig. 2 illustrates an example of construction in which a movable key of the keyboard can set in motion one or more elements controlling the circuits of the instruments for obtaining the notes, their variation of intensity and the vibrato.

In these figures, 45 designates the movable keys between which is left an interval allowing a slight lateral play. These keys can pivot in all directions on supports 46. Their displacement is limited by blocks 47 lined with felt, between which are inserted flexible blades 48 which are fitted on the keys.

Above this keyboard is arranged a wire or like element 49 which is held in a suitable manner, for instance by springs 50. To this wire is connected a lever 43 carrying the mov-

able armature 44 of a variable condenser, of small capacity, inserted in the oscillating circuit and which can be of any type. The wire is located at a small distance from the keys so that, by depression of one of the keys, it is possible to determine a displacement of the wire by means of any suitable actuating device, for instance by means of small brushes 51, shown in Figs. 1 and 2. This structure is completed by a device providing for variations of the intensity of the sound in proportion to the depression of the key. Fig. 2 shows, for instance, how a device of this kind can be constituted by wires 52 connected to the various keys and all secured to the movable part 53 of a common variable resistance unit or device 54.

In practice, this keyboard operates in the following manner:

By depression of a key, the closing of a contact giving a sound of definite pitch is accomplished by means of a device not shown. By this depression, the player has touched at the same time the wire 49 controlling the vibrato; by subsequently imparting to the key a horizontal oscillation about its pivot 46, he produces a vibrato of the sound. On the other hand, owing to the variation of the resistance 54, while depressing the key, the intensity of the sound produced is as much greater as the pressure exerted on the key is stronger.

As will be seen, the arrangement of Figs. 1 and 2 comprises all the means allowing to give to the sounds their full expression: pitch of the sound, intensity of the sound and vibrato.

It is, of course understood that the electric device and current source which are not shown and form no specific or essential feature of this invention, nevertheless are controlled by the latter to produce the effects described up on the sound produced by said device, this control being effected by the present invention controlling the electric circuits of said device. Such devices are already known and have thus been deemed superfluous to illustrate.

The arrangements in accordance with the invention can also be combined with means

ensuring automatic execution (mechanical or like execution).

Variations of structure may be resorted to, and parts may be used without others.

Having now described my invention, I claim:—

1. In an electric musical instrument for controlling the circuits of an electric sound producing device, a keyboard in which each key is depressible to control an individual pitch of sound emitted by said sound producing device, a variable resistance unit arranged in circuit with said sound producing device and having a movable member for varying the resistance of said resistance unit, means connecting said movable member with said key whereby depression of the latter will vary the resistance of said resistance unit, and thereby vary the intensity of the sound emitted by said device, and means associated with said keyboard for producing vibrato and glissando effects in the emitted sound of said device, at will.

2. In an electric musical instrument for controlling the circuits of an electric sound producing device, a keyboard in which each key is depressible to control an individual pitch of sound emitted by said sound producing device, a variable resistance unit arranged in circuit with said sound producing device and having a movable member for varying the resistance of said resistance unit, means connecting said movable member with said key whereby depression of the latter will vary the resistance of said resistance unit, and thereby vary the intensity of the sound emitted by said device, means associated with said keyboard for producing vibrato and glissando effects in the emitted sound of said device, including a variable condenser controlling a circuit of said sound producing device, and having a movable condenser member, and movable means associated with said condenser member and arranged adjacent to said keyboard so as to provide for movement of the movable condenser member upon sidewise manual shifting of each key about its pivot while depressing said key.

3. In an electric musical instrument for controlling the circuits of an electric sound producing device, a keyboard in which each key is depressible to control an individual pitch of sound produced by said device and pivotally mounted so as to be capable of pivoting in several directions, there being a relatively wide clearance space between adjacent keys, a variable resistance unit arranged in circuit with said sound producing device and having a movable member for varying the resistance of said resistance unit, means connecting said movable member with said key whereby depression of the latter will vary the resistance of said resistance unit, and thereby vary the intensity of the sound

emitted by said device, and means associated with said keyboard for producing vibrato and glissando effects in the emitted sound of said device, including a variable condenser controlling a circuit of said sound producing device and having a movable condenser member, a tensioned member suspended adjacent to said keyboard, and corresponding contact members individually mounted upon the keys of said keyboard, so that upon depression of each key and simultaneous sidewise shifting thereof, the contact member thereon will transmit the shift to said tensioned member and thereby effect corresponding movement of the movable condenser member.

4. In an electric musical instrument for controlling the circuits of an electric sound producing device, a keyboard including a plurality of spaced keys which are individually movable in several directions and arranged to operate circuit control members upon depression thereof in order to primarily provide fixed frequencies corresponding with the notes of a normal gamut of music and simultaneously provide for variations in the amplitude and pitch of the sound produced by said device.

5. In an electric musical instrument for controlling the circuits of an electric sound producing device, a keyboard including a plurality of spaced keys which are individually movable in several directions and arranged to operate circuit control members upon depression thereof in order to provide fixed frequencies corresponding with notes of a normal gamut of music, to provide variations of the fixed frequencies corresponding with and producing vibrato and glissando effects in the music emitted by said device, and also to provide variations of the amplitude corresponding with and producing variations in the intensity of the music emitted.

6. In an electric musical instrument for controlling the circuits of an electric sound producing device, a keyboard including a plurality of keys which are individually depressible to control fixed frequencies in circuits of said device corresponding with notes of a normal gamut of music produced by the device, and also individually shiftable in sidewise directions in order to move a variable condenser controlling said fixed frequencies and said device in order to correspond with and produce variable effects in the pitch of the music produced by said device.

7. In an electric musical instrument for controlling the circuits of an electric sound producing device, a keyboard including sections in which each key is both depressible to control an individual pitch of sound emitted by said sound producing device and also shiftable in sidewise directions to control gradual variations in the pitch of the sound, at will,

for glissando and vibrato effects in the emitted sound.

8. In an electric musical instrument for controlling the circuits of an electric sound producing device, a keyboard in which each key is depressible to select and control an individual sound produced by said device, respectively, in pitch and volume, means associated with said key providing said control including an amplitude control unit electrically associated with said device, and each key also movable in several directions in order to produce vibrato and glissando effects in the music emitted, and additional frequency control means providing for said effects also associated electrically with said device and arranged to be operated by movements of said key in said several directions.

20 The foregoing specification of my "improvements in electric musical instruments" signed by me this 23 day of July 1930.

MAURICE LOUIS EUGÈNE MARTENOT.

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