Jan. 13, 1953 M. H. FRENCH 2,625,070

PEDAL KEYBOARD

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FIG. 1

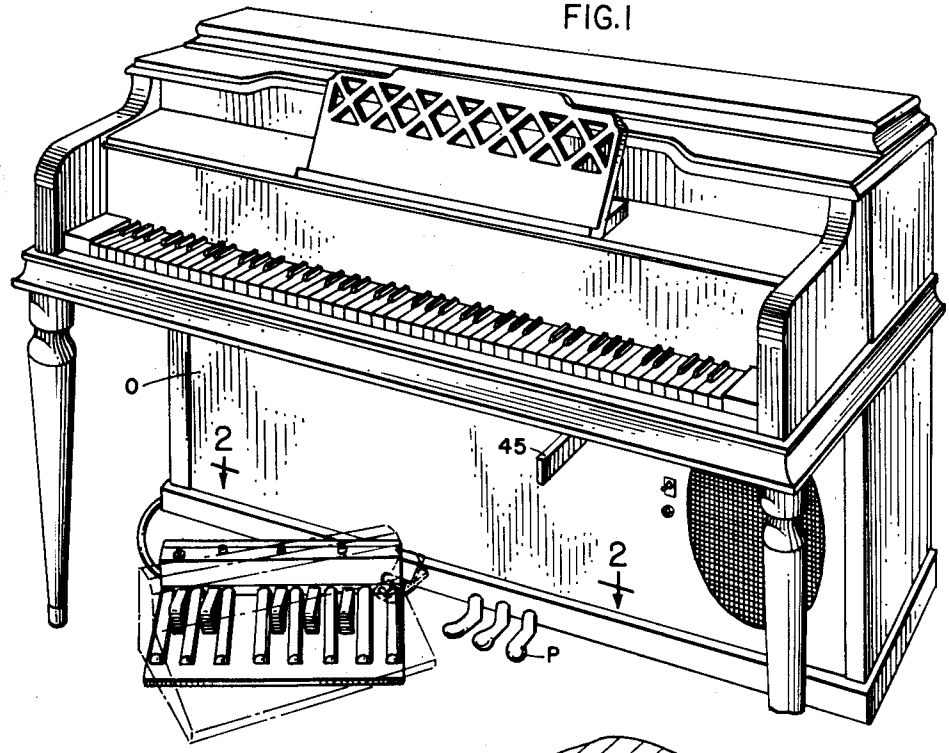



FIG. 2

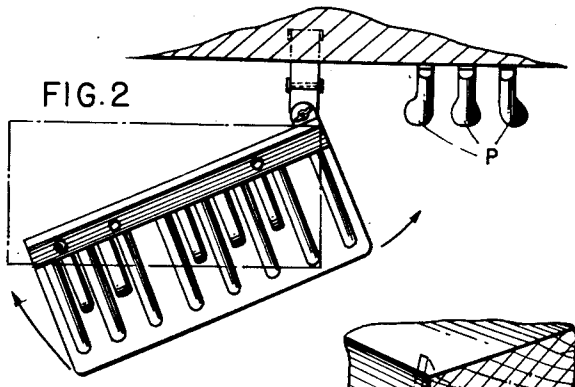
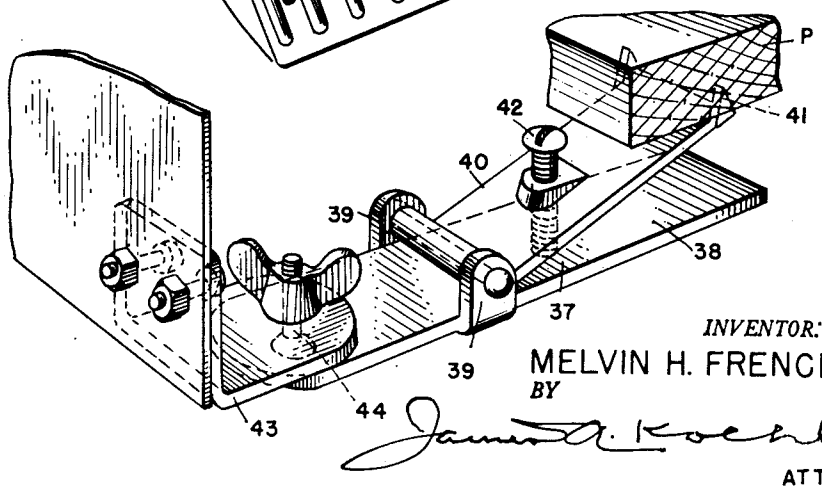



FIG. 3




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FIG. 4

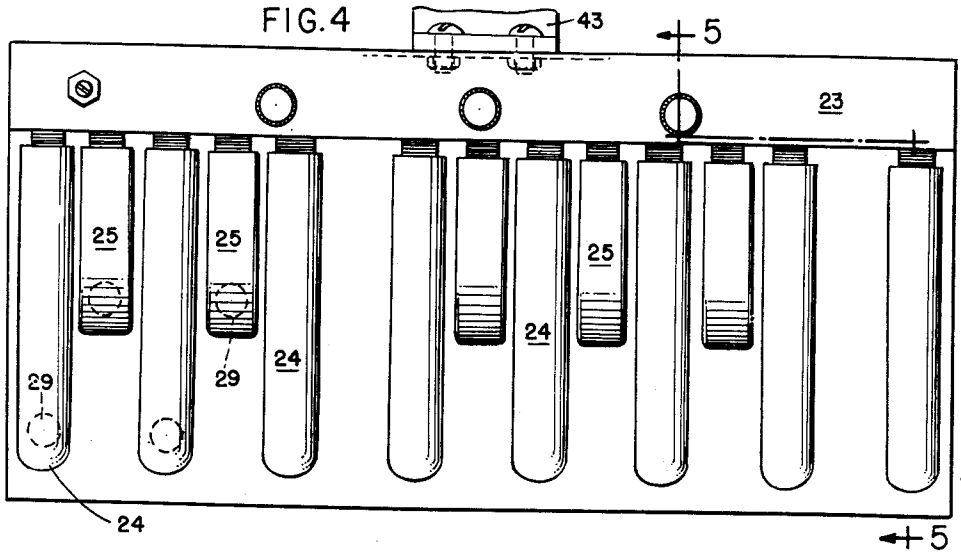



FIG. 5

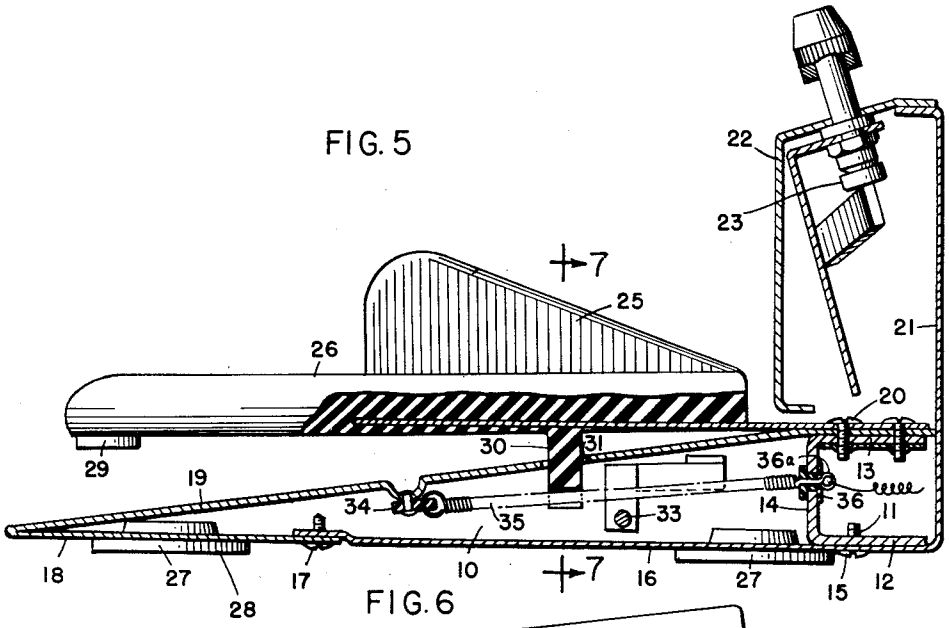



FIG. 6

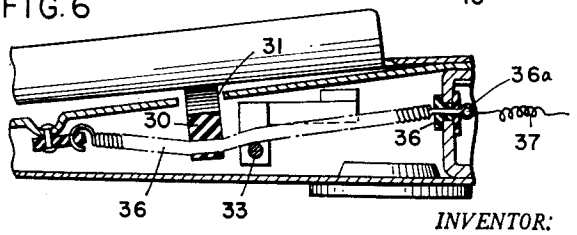
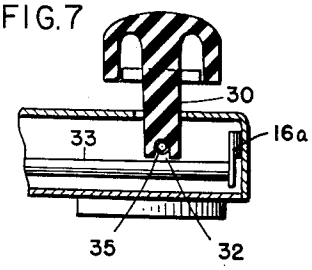



FIG. 7




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FIG. 8

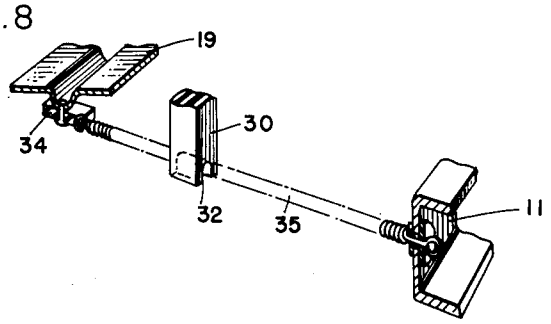
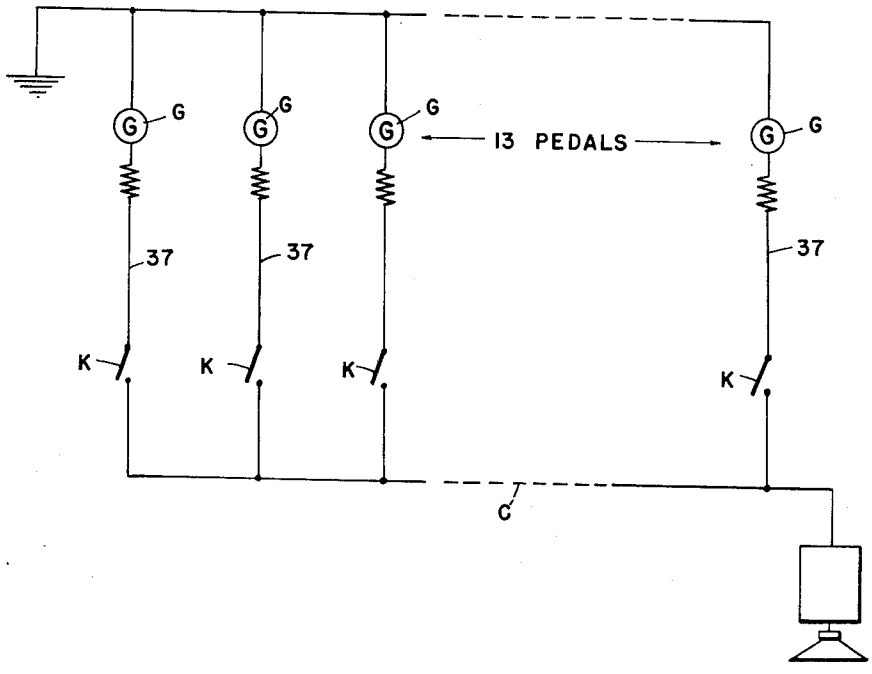



FIG. 9




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2,625,070

# UNITED STATES PATENT OFFICE

2,625,070

## PEDAL KEYBOARD

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Application June 19, 1951, Serial No. 232,310

6 Claims. (Cl. 84—426)

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This invention relates to pedal keyboards for electronic organs of the class employing electrical generators respectively producing waveforms of audio signals at the tone frequencies of different notes of the chromatic scale, which generators are connected in an electrical network that includes means for translating selected tone signals into audible sounds for musical expression. Instruments of this general class include systems such as the one disclosed in United States Letters Patent to M. J. Larsen, No. 2,403,090, or the United States Letters Patent to J. A. Koehl, No. 2,250,065. In each of the instruments disclosed in said patents, keying circuits connect said generators to the translating means so that when depressing playing-keys, tone signals are transmitted to the translating means from selected tone signal generators. The herein disclosed invention is more particularly designed, adapted and intended for use with the combination instrument disclosed in the patent to Koehl, No. 2,250,065, and an object of the invention is the provision of a simple and inexpensive form of keyboard which, when connected in the electric circuit of said patent enables production of sustained bass notes during rendition of music from the customary keyboard of the instrument.

Among certain of the more essential objects of the invention, the following are illustrative:

The provision of a pedal keyboard, the design and compact construction of which enables it to occupy only a minimum space while insuring a relationship thereof to the expression pedals of a piano enabling the foot operated keys of said keyboard to be operated by the left foot of the player while the right foot is left free for operating the customary expression pedals of the piano.

The provision of a pedal keyboard which may be readily attached to the case of a piano at the left of the expression pedals of the piano, which keyboard is adjustable in a horizontal plane about a vertical axis so that the keys thereof will be disposed to suit the choice of the player and insure convenient actuation thereof by the left foot of the player.

The provision of a dependable and exceedingly simple electric switch mechanism which is actuable in response to motion of a respective foot operated key of the device.

The provision of a structurally novel means for resiliently supporting the foot operated keys of the device.

The provision of a structurally novel and exceedingly simple form of mounting for the foot actuated keys of the device.

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The provision of means for maintaining a coacting relationship between elements of an electric switch and a respective foot actuated key of the device, which key functions in a dependable manner to insure actuation of the switch by said key.

The provision of a pedal keyboard, the foot operated keys of which are substantially noiseless in action.

Other objects and advantages of the invention will be manifest upon reference to the following description and accompanying drawings, in which:

Figure 1 is a perspective view of a combined piano and electric organ showing my invention applied to the case thereof;

Figure 2 is a top plan view partly in horizontal section of the pedal keyboard illustrating in full lines, one position of adjustment thereof, and in dot-and-dash lines another possible position of adjustment thereof;

Figure 3 is a perspective view of the attaching means for said pedal keyboard;

Figure 4 is a plan view on an enlarged scale of the pedal keyboard;

Figure 5 is a section taken on the irregular line 5—5 of Figure 4 with parts in full lines;

Figure 6 is a transverse section of the pedal keyboard showing the electric switch of a respective foot actuated key;

Figure 7 is a section taken on line 7—7 of Figure 5;

Figure 8 is a sectional perspective view of a portion of the pedal keyboard showing one of the resilient electrical contactors; and

Figure 9 is a schematic view of a portion of the electric circuit in which the switches of the foot actuated keys of said pedal board are connected.

In carrying the invention into practice, use is made of a mounting in the form of a narrow casing 10 which comprises a horizontal, rearwardly disposed U-shaped channel bar 11 providing a lower horizontal flange 12, an upper horizontal flange 13 and a vertical, forwardly facing connecting wall 14. Detachably connecting at 15 to said flange 12 is a flat metal cover plate 16. The forward portion of the plate is detachably connected at 17 to the base flange 18 of a metal stamping which includes an upwardly and rearwardly inclined portion 19, the extreme rear end of which is secured at 20 to the top flange 13 of said U-bar. The construction just described is such that a space is formed between the rearwardly inclined portion 19 of said plate

13 and the aforementioned plate 16 for accommodating certain working parts of the device.

Said plate 16 is also extended upwardly and vertically a suitable distance as at 21 to form a part of a supplemental casing 22 which houses a volume control mechanism 23 of any well known construction.

The pedal keyboard shown herein consists of 8 long white keys 24 and 5 short black keys 25, all of which are parallel to each other. Each of these keys is disposed in a horizontal position as shown to proper advantage at Figure 5. Each individual key may consist of a plastic material which has molded therein a substantial length of a flat spring metal 26. The rear end of each spring is secured by the fastenings 20 to the horizontal flange 13 of the aforementioned U-shaped channel bar 11. Due to the horizontal position of each of the keys and the angularity of the portion 19 of plate 18 it follows that each individual key is mounted for vertical motion when pressure of the foot is applied thereto to the front end thereof. The base plate 18 and the plate 16 are each thereof provided with a rubber button 27 which provides a flat bottom surface 28 of substantial area. These buttons function as anti-slipping devices to retard any tendency of the pedal keyboard to shift about a vertical axis. Each individual key 25 and 26 is provided with a similar rubber button 29 which is disposed so as to yieldingly come against the portion 19 of said plate 18 and thereby provide for a quiet action of the pedals and to avoid any metal to metal contact of the parts herein employed.

Each individual key 25 or 26 is provided with an integral depending lug 30 which is freely movable in a slot 31 formed in said portion 19 of the base plate 18. This lug projects into the space between the plate 16 and said portion 19 of plate 18, and as illustrated in Figures 5, 6 and 7, said lug 30 is bifurcated at 32. Mounted in the space between said plate 16 and the portion 19 of plate 18 and electrically insulated therefrom at 16a is a bus-bar 33. The said portion 19 is provided underneath a respective foot actuated key with a strip of insulating material 34 to which one end of a coil spring 35 is secured. The opposite ends of the spring is connected to the vertical wall 14 of the U-channel bar and insulated therefrom as at 36. Thus for each individual pedal there is a spring 35 which forms an electrical conductor and movable contactor of an electric switch. The spring 35 passes through the bifurcation 32 of the lug 30 of a respective foot actuated pedal key and it should be noted that under the normal tension of the spring it is perfectly straight and disposed above and in space relation to the aforementioned bus-bar 33. This is shown to advantage at Figure 5 of the drawings and the intended operation of this element of my invention will be clearly comprehended upon further reference to Figures 6, 7 and 8.

At 37 is an attaching means enabling the pedal keyboard to be attached to the underside of combined piano and organ O shown at Figure 1. This means comprises a heavy metal plate 38 of suitable gauge, width and length, oppositely disposed upstanding lugs 39 upstruck therefrom. Mounted for vertical pivotal motion in the lugs is a clamp plate 40, the back end of which has spurs 41. Carried by the plate is a jack-screw 42, the lower end of the shank of which bears against the upper surface of plate 38. When the plate 38 is disposed forwardly of the piano and to the left of the expression pedals P, the back end thereof may be inserted under the base or bottom P of the case of the piano so that the clamp plate 40 may be tilted upwardly by adjusting the screw 42, thereby causing the upwardly extending spurs 41 to enter and to become firmly imbedded in the case of said piano as will be clearly understood upon reference to Figure 3 of the drawings. To the back end of the pedal keyboard, at the right-hand end thereof is permanently secured an angle bracket 43. This bracket is connected by a clamp 44 to the front end of said bar 38. The clamp is of a construction which permits the pedal keyboard to be shifted about a vertical axis from the full line position shown in Figures 1 and 2 to the dot and dash positions shown in said figures. Adjustment of the pedal board is not limited to these two positions and it is not amiss to mention that the player may obtain any desired position of rotational adjustment of the pedal board that will establish an angular relation of the pedal keys 24 and 25 to suit the convenience of the player.

An essential feature of the invention is the combination with a piano or other keyboard instrument employing expression pedals P of a sustaining pedal keyboard instrument situated at the left of said expression pedals P so that said pedals can be conveniently operated by the right foot of the player, leaving the left foot free to operate the pedal keys 24 and 25 of said pedal keyboard.

No claim is made herein to an electrical network in which the individual switches of the respective foot actuated keys are connected. In order that there shall be no misunderstanding regarding the functionality of the switches, I have illustrated in Figure 9 a portion of an electric circuit including waveform generators G individual to the respective switches of the pedal keys, the latter indicated at K. The individual switches connect to a common conductor C which may be connected in any conventional manner to an amplifier in the output circuit of which is a loudspeaker. While I have shown a pedal keyboard comprising a specified number of pedal keys, namely 13, I do not intend to be limited in this respect. I show this specified number of keys in the particular embodiment of my invention because it is intended to use same with a type of keyboard instrument employing either expression pedals as shown at P or some sort of volume control device common to instruments of this class.

I stress also the relationship of a knee actuated volume control 45 which when used in the combination which includes the expression pedal keys P and my improved keyboard, also enables the volume of sound to be controlled by the knee of the leg, the foot of which is used to operate said pedals P.

A unique feature of the invention consists in providing a hollow metal base structure which is wedge shape in transverse section, the bottom of which casing is flat and the top inclined upwardly and rearwardly, said base structure serving to house the respective electric switches and to protect them from dust and foreign matter. As the fastenings 15 and 17 are removable, the switches are readily accessible upon detaching plate 16 from said channel bar 11 and said plate 13. When a pedal 24 or 25 is depressed as shown at Figure 6, the lug 30 functions to exert downward pressure on spring contactor 36, causing

flexure of the spring and effective electrical engagement thereof with said bus-bar **33**. The rubbing action of the spring against the bus-bar incident to flexure thereof serves to keep the effective contact surfaces of said bar and said spring in a clean condition. The ends of the springs for the respective keys **24** or **25** terminate in loops **36***a* at the vertical wall of said U-bar **11**. Leads **36***b* from the generators G are soldered to said loops as shown at Figures 5 and 6. All leads which connect the generators to the springs **36** of the respective keys **24** or **25** may be housed in the channel of said U-bar and formed into a cable for connection in the signal transmission network.

What I claim as my invention is:

1. The combination with a keyboard musical instrument of the class employing a case having one or more expression pedals situated at the front and close to the bottom and intermediate the ends of said case; a pedal keyboard disposed at the front of the case and to the left of said expression pedals; and means for detachably securing said pedal keyboard to the bottom of the case so that it is free to rest on the floor.

2. The combination according to claim 1, wherein said securing means is connected to said pedal keyboard for adjustment thereof about a vertical axis.

3. The combination according to claim 1, wherein said securing means is connected to said pedal keyboard for adjustment thereof about a vertical axis and wherein the securing means includes a device for holding said pedal board against movement about said axis.



4. The combination according to claim **1**, wherein means are employed for detachably securing said pedal board to the bottom of said case, which said means comprises a rigid bar having a vertically adjustable clamp which is insertable beneath the bottom of the case and has spurs for penetrating the material of said bottom.

5. A pedal keyboard, means for attaching same to the case of a musical instrument for actuation thereof by the foot of the player; and means connecting the keyboard to said first named means for adjustment thereof about a vertical axis.

6. A pedal keyboard according to claim 5, wherein means are employed for securing the keyboard against movement about said axis.

MELVIN H. FRENCH.


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