

June 4, 1940.

L. HAMMOND
MUSICAL INSTRUMENT
Filed March 8, 1940

2,203,569

5 Sheets-Sheet 1

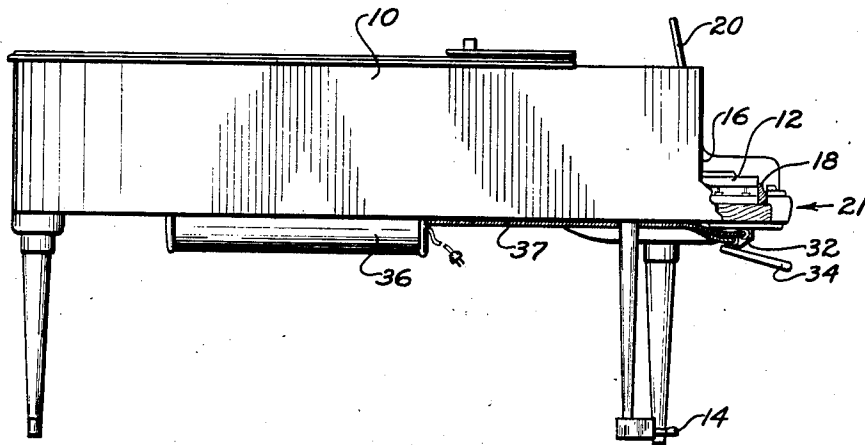


Fig. 1

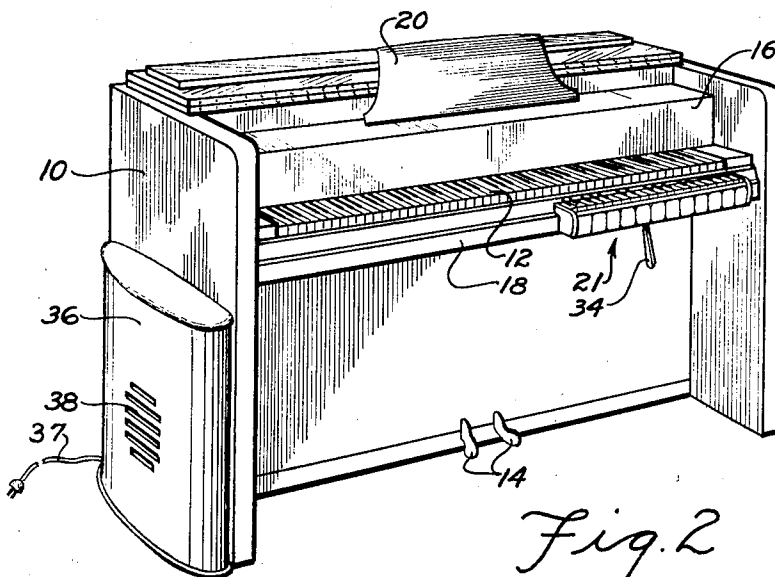


Fig. 2

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2,203,569

MUSICAL INSTRUMENT

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5 Sheets-Sheet 2

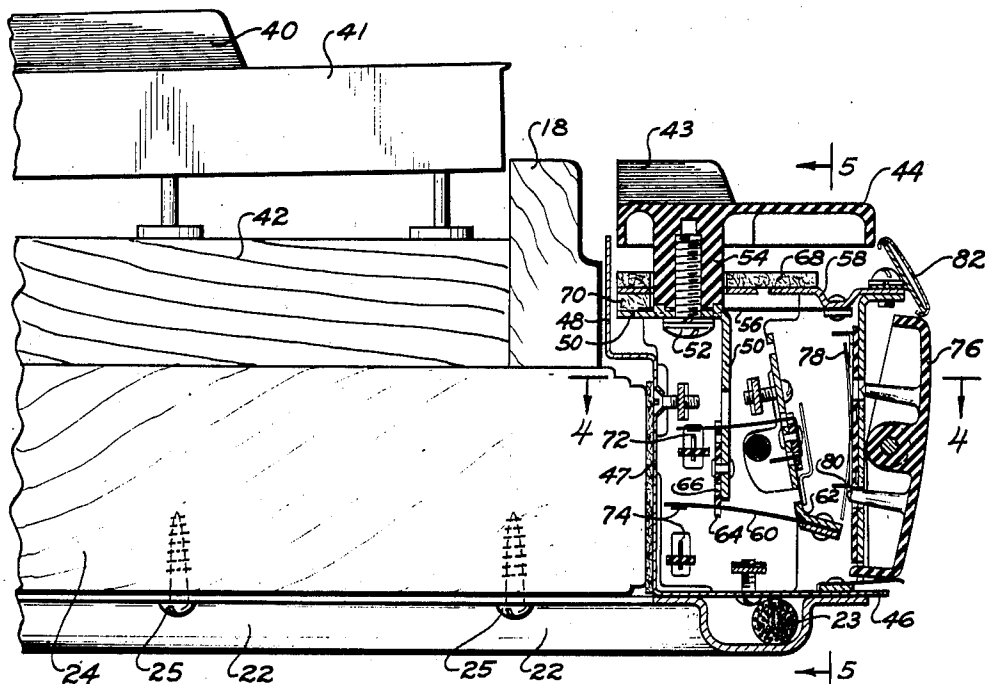


Fig. 3

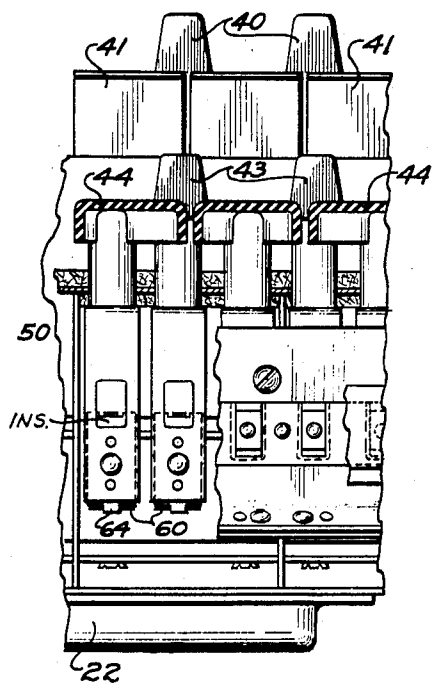


Fig. 5

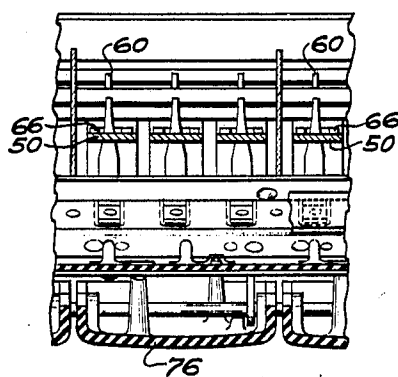


Fig. 4

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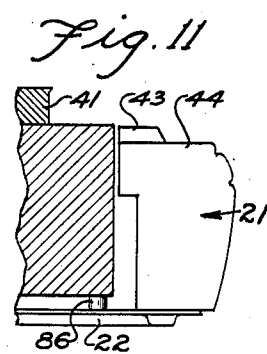
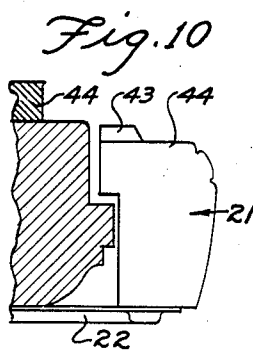
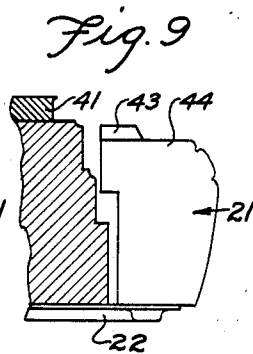
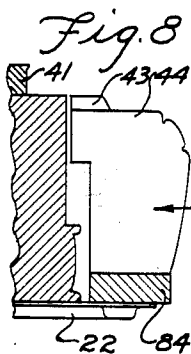
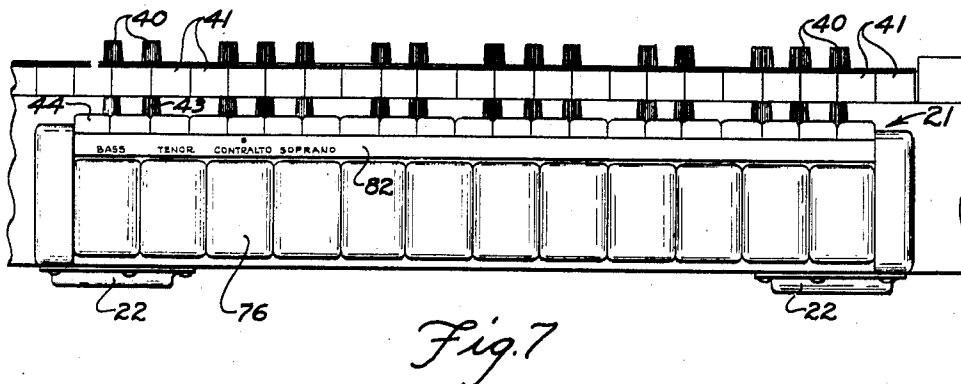
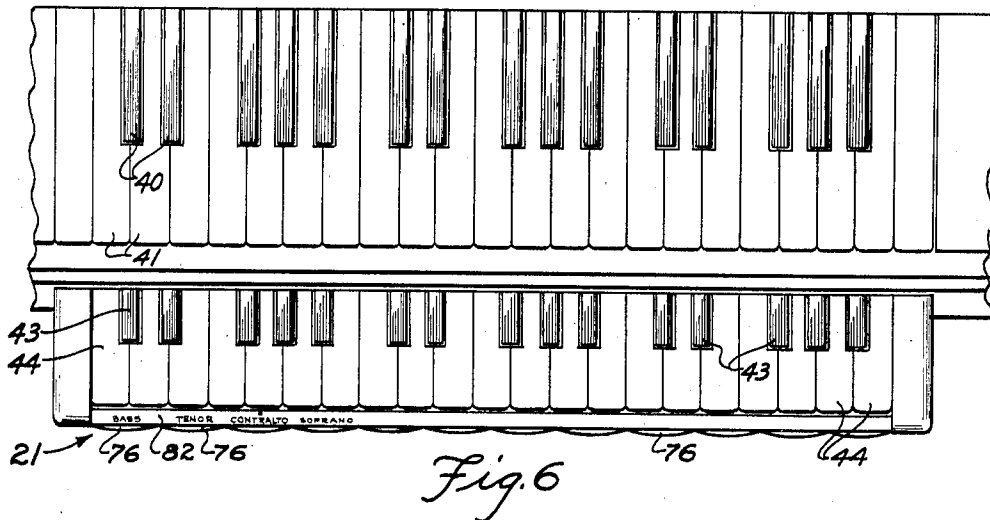
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MUSICAL INSTRUMENT

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5 Sheets-Sheet 3



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2,203,569

MUSICAL INSTRUMENT

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5 Sheets-Sheet 4

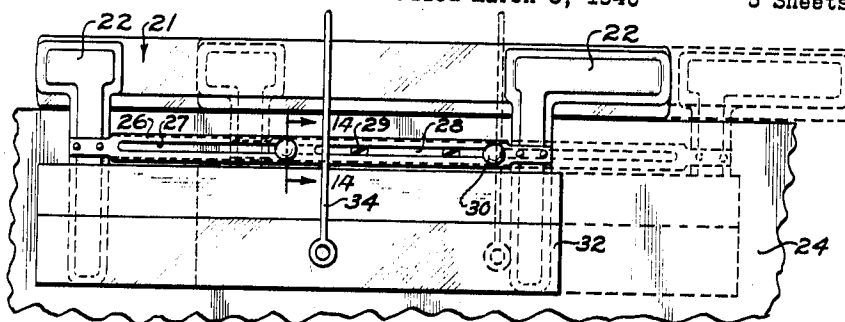


Fig. 12

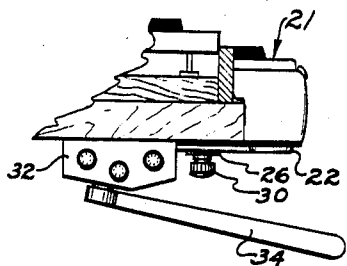


Fig. 13

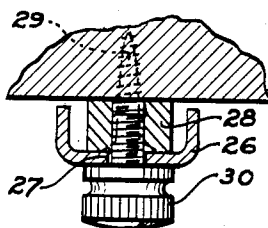


Fig. 14

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MUSICAL INSTRUMENT

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5 Sheets-Sheet 5

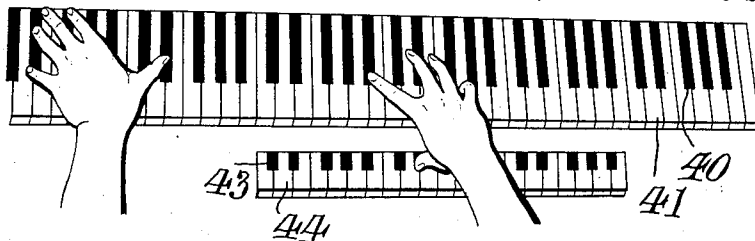


Fig. 15

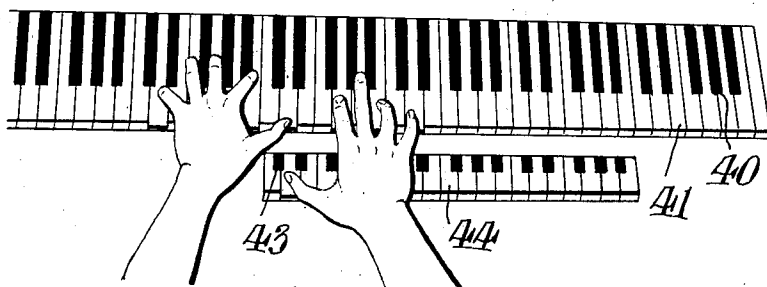


Fig 16

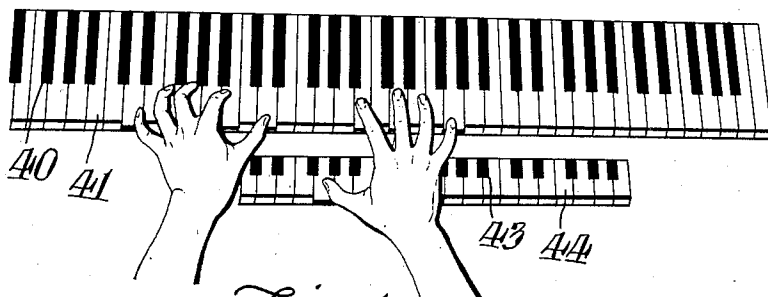


Fig 17



Fig. 18

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UNITED STATES PATENT OFFICE

2,203,569

MUSICAL INSTRUMENT

Laurens Hammond, Chicago, Ill.

Application March 8, 1940, Serial No. 322,903

12 Claims. (Cl. 84—425)

My invention relates generally to musical instruments, and more particularly to improved keyboards and controls for combination musical instruments, such as combination piano and electrical musical instruments.

It is an object of my invention to provide an improved keyboard for an electrical musical instrument which may be attached to and form a part of a piano, so as to be operated therewith as an integral part thereof.

A further object is to provide an improved keyboard for a combination piano and electrical musical instrument upon which the performer may easily play both portions of the instrument simultaneously, and render selections incapable of rendition separately on either portion of the instrument.

A further object is to provide an improved keyboard for electrical musical instruments which may be easily attached to and combined with a standard piano without defacing the latter.

A further object is to provide an improved keyboard for electrical musical instruments which includes various controls, which is very compact, and which, when attached to a piano, does not interfere in any way with the normal use of the piano, but is capable of simultaneous use therewith.

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

Figure 1 is a side elevation of the combined electrical musical instrument and grand type piano—portions of the latter being broken away more clearly to show the keyboard for the electrical portion of the instrument;

Figure 2 is a perspective view of the electrical portion of the musical instrument combined with an upright type piano;

Figure 3 is a vertical sectional view of the keyboards of the instrument;

Figure 4 is a fragmentary horizontal sectional view taken on the line 4—4 of Figure 3;

Figure 5 is a fragmentary vertical sectional view taken on the line 5—5 of Figure 3;

Figure 6 is a fragmentary plan view of the keyboards of the instrument;

Figure 7 is a fragmentary front elevational view of the keyboards of the instrument;

Figures 8, 9, 10 and 11 are fragmentary sectional views showing the keyboard for the electrical portion of the instrument attached to pianos having various front contours;

Figure 12 is a fragmentary bottom plan view

showing an adjustable mounting for the keyboard of the electrical portion of the instrument;

Figure 13 is a side elevational view of the keyboard for the electrical portion of the instrument attached to the piano portion thereof, the latter being shown in fragmentary section;

Figure 14 is a fragmentary sectional view taken on the line 14—14 of Fig. 12; and,

Figures 15, 16, 17 and 18 show the positions of the player's hands on the keyboards of the combination instrument.

Music which may be provided by a piano has substantially universal appeal, and the piano is therefore recognized as one of the most desirable and popular of musical instruments. There are, however, a number of limitations inherent in music produced by pianos. The fact that piano tones cannot be sustained indefinitely, that they always have a percussive attack, that they do not provide a clearly perceptible vibrato, and that it is difficult to execute passages properly when played pianissimo makes it desirable that piano tones be supplemented and reinforced by tones having these characteristics which are lacking from piano music. These latter characteristics may readily be obtained by a variety of electrical systems for tone generation and control, and it is therefore one of the broader objects of my invention to provide a piano with an additional keyboard controlling the operation of an electrical musical instrument in which the keyboard and controls for the electrical part of the instrument are so located and positioned that the performer may easily play upon both keyboards simultaneously. The keyboard of the electrical part of the instrument does not in any way interfere with the player's normal piano technique.

While the instrument may be made initially with both keyboards, I prefer to make the keyboard for the electrical portion of the instrument as a unit which may be attached to any standard piano and detached therefrom without marring the normally visible portions of the piano case.

The design of the cases of pianos of various manufacture differ considerably. Not only the contour of the front surface beneath the keyboard, but also the distances from the tops of the keys to the bottom surface of the bed plank, vary over a considerable range. To be fully useful for cooperation with the keys of the piano, the keys of the electrical instrument keyboard should be located closely adjacent and preferably slightly below the piano keys. By the key-

board construction disclosed herein, this space relationship of the two keyboards may be readily obtained. Due to the size, shape and arrangement of the keyboard of the electrical portion of the instrument, it may be readily attached to practically any piano commercially produced.

With the keyboard of the electrical portion of the instrument attached to the piano in the manner herein disclosed, this keyboard does not appreciably reduce the leg room available, nor do the keys in any way interfere with the normal use of the piano keyboard.

Referring to Figures 1 and 2, the instrument comprises generally a piano case 10, which may be of the upright type shown in Fig. 2, or of the grand type shown in Fig. 1, in each case having the usual keyboard 12 and pedals 14. The piano may be of any desired or conventional construction, and generally will include the usual name board 16, front rail 18, and music rack 20.

The keyboard for the electrical portion of the instrument, designated generally by the reference character 21, may be immovably secured to the piano portion of the instrument, as shown in Fig. 3, or may be adjustably secured thereto as shown in Figs. 12, 13 and 14. The keyboard is supported by a pair of channel-shaped brackets 22 which form conduits for wires 23 connecting the keyboard with the other parts of the electrical portion of the instrument.

In Fig. 3, the flange of the supporting bracket 22 is shown as being secured to the keyboard bed plank 26 by screws 25.

In the modified form of the invention shown in Figs. 12, 13 and 14, the channel-shaped brackets 22 are connected together by a channel 26 which is riveted to the brackets 22, the channel 26 having a pair of elongated slots 27. A bar 28 is secured to the keyboard bed plank with screws 29, the bar 28 being tapped to receive a pair of clamping thumb screws 30 which project through the slots 27, and are adapted to clamp the channel 26 in the position in which the latter is shown in full lines in Fig. 12, in the position in which the parts are shown in the dotted lines in said figure, or in any intermediate position. The slots are preferably sufficiently long that the keyboard may be moved a distance corresponding to one octave of keys on the piano, for reasons which will appear hereinafter.

A box 32 which may form an enclosure for certain of the parts of the electrical portion of the instrument, is rigidly secured to the brackets 22 and thus moves with the latter as the keyboard is shifted. The box 32 and its contents may counterbalance the keyboard 21, thus making the keyboard more easily shiftable upon its adjustable support. A lever 34 is preferably mounted upon the box 32, being adapted to control the over-all volume of the electrical portion of the instrument. It is pivotally mounted so that it may be engaged by the knee of the musician, and readily swung back and forth to control the expression. For this purpose, the lever is preferably spring-biased to assume the position in which it is shown in Figs. 12 and 13.

The electrical portion of the instrument is contained mainly in a relatively flat cabinet 36, which is connected to the box 32 by cables 37, as shown in Fig. 1. The cabinet 36 may be suitably secured beneath the case of a grand type of piano in the manner indicated in Fig. 1, or may be suitably positioned adjacent the piano, especially when combined with an upright piano as shown in Fig. 2. The cabinet 36 preferably

has grill openings 38 formed therein for the loud speaker located within the cabinet 36.

As shown in Fig. 3, the piano keyboard comprises the usual black sharp and flat keys 40, and the usual white keys 41. These keys are mounted in the usual manner upon the keyboard bed frame 42, which is supported by the bed plank 24.

The keyboard 21 comprises black keys 43 and white keys 44. These keys are very much shorter than the corresponding keys 40, 41, but are of the same width and spacing as the latter. The keyboard 21 is assembled upon and partially enclosed by a casing plate having a horizontal portion 46, a lower rear wall portion 47 and an upper rear wall portion 48, the portion 48 being offset rearwardly with respect to the wall portion 47. The casing plate 46, 47, 48 may extend the full length of the keyboard 21.

The keys 43, 44 are preferably molded of a suitable plastic composition, and have switch actuators 50 suitably secured thereto by screws 52 threaded in bosses 54 formed on the keys. The screw 52 passes through one end of a leaf spring 56, the other end of which is suitably secured to a rigid frame plate 58. Another leaf spring 60 is clamped to a rigid frame plate 62 at one end, and has an aperture to receive a tip 64 projecting from an insulating member 66, which is riveted to the actuator 50. The springs 56 and 60 form the sole means for supporting and guiding the key, and resiliently returning it to normal position.

The keys 43, 44 have comparatively short strokes, downward movement thereof being limited by their engagement with a felt stop 68. The return strokes of the keys are limited by the engagement of their actuators 50 with a felt strip 70. The actuator 50 is provided for the operation of switches 72, 74 or any other additional switches which may be required for the operation of the electrical portion of the instrument.

Pivoted stop tablets 76 are provided for the actuation of switches 78 and 80. These tablets form the actuating means for various controls of the electrical portion of the instrument. The tablets 76 are relatively wide and spaced closely adjacent each other so that they in effect form the front wall of the keyboard 21. A strip 82 bearing suitable identifying legends for the tablets 76 is located above the tablets 76. Some of these tablets are employed to shift the register of the keyboard, and as, for example, the tablets marked "Bass", "Tenor", "Contralto" and "Soprano". When the "Bass" tablet is operated, the three octaves of keys of the keyboard 21 will control notes in the bass register, e. g., notes C1 to B3 (using a common system of note designation, as shown in applicant's prior Patent No. 1,956,350); when the "tenor" tablet is operated keys will control notes C2 to B4; operation of the "contralto" tablet will cause the register of the keyboard to shift to the notes C3 to B5; while operation of the "soprano" tablet will shift the keyboard register to the notes C4 to B6. Thus, although the keyboard 21 includes but three octaves of keys, it may be used to play any note within a seven octave range by selective operation of the tablets 76.

Other tablets may be utilized to control such other effects as the vibrato, the rate of attack, and the over-all timbre variation by a number of resonant output circuits.

The front rails and adjacent portions of the keyboard bed planks of pianos now in use, vary

considerably in contour. The keyboard 21 is of course intended to be attached to any piano, and such attachment to pianos of different kinds is facilitated because of the shape of the casing plate 46, 47, 48.

It will be understood that it is desirable that the keys 43, 44 be located sufficiently close to the keys 40, 41 that they may readily be played with the thumb, while the remaining fingers are resting upon the keys 40, 41. The facility with which this relationship between the two keyboards is obtained, in attaching the keyboard 21 to various makes of pianos, is shown by the diagrammatic illustrations in Figs. 3 and 8 to 11 inclusive.

In Figure 8, the keyboard 21 is illustrated as being attached to a piano in which the distance from the keys to the bottom surface of the keyboard bed plank is unusually great. In attaching the keyboard 21 to a piano of this type, a spacer 84 is inserted between the brackets 22 and the keyboard 21, so as to raise the keys 43, 44 of the latter to a suitable playing position.

In Fig. 9, a piano having a front rail of stepped contour is shown, this figure illustrating how the keys 43, 44 are nevertheless positioned close to the piano keys, principally by virtue of the fact that the offset portion 48 of the casing for the keyboard 21 overhangs a portion of the front rail, and because the keys 43, 44 extend rearwardly of the casing wall 47, and thus also overlie a portion of the front rail.

Fig. 10 illustrates how the keyboard is readily supported by the brackets 22 even though the front rail of the piano has a receding contour.

Fig. 11 shows a keyboard 21 attached to a piano in which the distance between the keys and the lower surface of the keyboard bed plank is unusually short. In securing the keyboard 21 to this type of piano, the brackets 22 may be spaced from the lower surface of the keyboard bed plank by spacers 86, so that the keys 43, 44 lie at the proper lever with respect to the piano keys 41.

From a consideration of Figs. 3 and 8 to 11 inclusive, it will be apparent that the keyboard 21 may be attached to practically any piano commercially made, with the keys 43, 44 in suitable playing position with respect to the keys 41, since said figures show extreme variations in front rail construction rather than the normal variations found in a large majority of pianos now in use or on the market.

The electrical portion of the instrument, as distinguished from the parts which are manually operated to control the sound output of the instrument, does not form a part of the invention claimed herein, and is therefore not illustrated or described in detail. It will be understood that the keyboard 21 may be used to control the operation of any musical instrument operable by remote control, and which will produce music which will be harmonize with that produced by the piano. Such instruments may take any one of innumerable forms, such as disclosed, for example, in the co-pending application of John M. Hanert, Serial No. 274,325, filed May 18, 1939, or in the co-pending application of Laurens Hammond and John M. Hanert, Serial No. 293,444, filed September 5, 1939. The electrical portion of the instrument is preferably of the melody type in which but a single note (with or without coupled octave notes) may be sounded at one time, and is preferably so arranged that when two or more keys are simultaneously

depressed, the note corresponding to the lowermost of the depressed keys will be sounded, while any other higher keys which may be depressed at the same time will have no effect upon the tone produced.

The generators of the electrical impulses, the power supply system, the amplifier, the loud speaker, the quality changing means, and all other parts of the electrical portion of the instrument, with the exception of the main switch, the key and tablet operated switches, and the expression or volume controlling means, are preferably mounted in the cabinet 36.

Other circuits for instruments of this general type are disclosed in the patents to Smiley Re. 20,831, to De Forest No. 1,543,990, and to Yungblut No. 2,045,172.

The constructional features of the key action and key switches are not fully disclosed herein, but are fully disclosed and claimed in the co-pending application of Laurens Hammond and George H. Stephens, Serial No. 333,824 filed May 7, 1940.

In playing the instrument described above, the electrical portion of the instrument may be used to play the melody portion of the score in one register, while the standard piano portion of the instrument is utilized to play the accompaniment. In the preferred form of the electrical portion of the instrument, the tablets 76 may be utilized to change the register of the tones produced upon depression of the keys 43 and 44, as set forth above, and to change the quality or other characteristics of the tone, so that the melody portion of the score may be rendered easily irrespective of the register in which it appears.

Upon other occasions, the keys 43, 44 may be struck simultaneously with the depression of corresponding keys 40, 41 of the piano keyboard, in which case the tones produced by the electrical portion of the instrument will combine with the tones produced by the piano strings to supplement and enrich the latter, causing new composite tones. When, as above described, the electrical portion of the instrument has tablet controls whereby the tone quality of the instrument may be readily changed, a large variety of different composite tones may be produced when the keys of the piano are depressed simultaneously with the depression of keys 43, 44.

When the speaker is located as shown in Fig. 1, the tones produced thereby will cause some vibration of the sounding board of the piano, and when the sustaining pedal of the piano is in a depressed position, will cause sympathetic vibration of the piano strings. Due to this interaction of the sound producing elements of the two portions of the instrument, the composite tones produced may be of a decidedly different character than could be obtained by either portion of the instrument if dissociated from the other. Thus, to a limited extent, the sustaining pedal of the piano may be used to control the envelope of the tone produced by the electrical portion of the instrument.

Due to the location of the expression or volume control lever 34, it may be operated by the knee of the musician without in any way interfering with his operation of the sustaining pedal of the piano portion of the instrument. In a preferred form of the invention the lever 34 is used to operate the main switch by which the electrical portion of the instrument is connected to the source of electrical energy.

The keys 43, 44 may be depressed by pressure exerted on the rearward as well as upon the forward ends thereof, and the simultaneous depression of these keys with the depression of the piano keys 40, 41 is thus facilitated. Such operation of the instrument is also made easier because of the fact that the rearward portions of the keys 43, 44 over-hang a portion of the piano, or in other words, project rearwardly beyond the main portion of the rear wall 47 of the keyboard casing.

The arrangement of the tablets 76 also facilitates the operation of the electrical portion of the instrument, since in most instances these tablets may be operated by the thumb of the player without moving his hand far from its normal playing position. The tablets also form the external front wall of the keyboard, improving the appearance thereof and making it unnecessary to provide a relatively costly finished front surface. Due to the compact arrangement of the keys 43, 44 and tablets 76 with respect to the piano keys 40, 41, the instrument may be played with a minimum of effort and without requiring the mastery of a playing technique differing greatly from that of the pianist.

When the same note is simultaneously played upon the piano keyboard and the keyboard of the electrical portion of the instrument, the composite tone will have a quality differing from the piano tone as well as from the tone of the electrical portion of the instrument. The composite tone will likewise have an intensity envelope which may be made to differ materially from that obtainable by producing the tone on either portion of the instrument separately. The piano tone is primarily percussive in character, and when such percussive tone is combined with a sustained tone, such as may readily be produced by the electrical portion of the instrument, the composite tone will produce an effect of a percussive tone merging into a sustained tone, which is very useful in the rendition of many types of music.

To facilitate "thumbing", that is, depressing the keys 43, 44 by means of the thumb while playing the piano keys with the remaining fingers of the hand, the black keys 43 may be made narrower than the black keys 40 of the piano, so that a white key 44 located between two adjacent black keys 42 may be depressed easily by the thumb without depressing either of the adjacent black keys. This is not, however, essential, because the electrical portion of the instrument may be arranged so that only the lowermost of two simultaneously depressed keys will be effective to cause sounding of a note. Ordinarily, the spacing between adjacent black keys of a piano keyboard is insufficient to permit depression of the intervening portion of the white key by a thumb of average size.

The operation of the instrument and the range of different results obtainable by its use may be more clearly described by reference to specific examples of music which may be rendered upon the instrument. For example the left hand may be utilized to play the chord C1-C2, while the fingers of the right hand play the chord A3#-D4#-G4 and the thumb of the right hand plays the note D5# on the keyboard of the electrical portion of the instrument, namely the appropriate one of the keys 43.

As a second example the left hand may be used to play the chord D2-G2-B2-D3, the fingers of the right hand playing the chord G3-B3-D3 while

the right thumb plays the note D1 on the appropriate key 44.

From these two examples, it will be apparent that the thumb of the right hand may be used to control the sounding of notes which could not possibly be played on the keyboard of a standard piano while holding the particular chords designated.

In Fig. 15 the position of the player's hands are shown in executing the rendition of the chord D1#-D2# with the left hand, the chord A3#-D4#-G4 with the fingers of the right hand and the note D5# with the thumb of the right hand—a series of notes which could not be simultaneously played on a standard piano keyboard by a solo player.

In Fig. 16, in addition to the chords D2-G2-B2-D3 and B3-D4-G4 played by the left hand and fingers of the right hand respectively, the thumb of the right hand is shown as depressing one of the keys 44 to cause the sounding of the note D1, assuming that the "bass" tablet 76 has been operated. If the "tenor" tablet had been operated the note D2 would be sounded by the electrical portion of the instrument, while if the "contralto" tablet had been operated the note D3 would be heard. Similarly if the "soprano" tablet alone had been operated the note D4 would be sounded. If all or several of the register controlling tablets labeled "bass", "tenor", "contralto", and "soprano" are operated at one time the notes indicated above (namely D1, D2, D3 and D4) or various combinations of these notes, depending on the combination of tablets which are operated, will be sounded simultaneously.

In Fig. 17 the chord D2-G2-B2-D3 is being played by the left hand while the chord B3-D4-G4 is played with the fingers of the right hand. The thumb of the right hand depresses a G key 44 which may result in sounding the note G1, G2, G3 or G4, or any combination of these notes, depending upon which of the register selecting tablets 76 has or have been operated.

In Fig. 18, the keyboard 21 is shown as shifted to the right the distance of one octave of keys from its normal position. In this figure the left hand is utilized to play the chord B2-D3-G3-B3 and the fingers of the right hand are shown as depressing the piano keys to play the chord G4-B4-D5, while the thumb of the right hand plays the note D2, or D1, D3, or D4, or any combination of these four notes, depending upon the setting of the register controlling tablets 76, again illustrating, in different manner, how the keyboard 21, due to its close proximity to the piano keyboard, and due to the fact that its mounting is such that it may be shifted longitudinally of the piano keyboard, makes it possible to play simultaneously a series of notes spread over such a wide range that they could not possibly be played by a solo player on a piano.

From a consideration of these examples of musical scores which may be satisfactorily rendered on the improved instrument, it will be apparent that very many novel and interesting musical effects may be obtained by a single player, due particularly to the unique relationship between the keyboard 21 and the piano keyboard. While the keyboard 21 does not in any way interfere with the use of the piano keyboard in a normal manner, it is so positioned that it may be conjointly used with the piano keyboard to produce these novel and interesting musical effects.

Since the electrical portion of the instrument is so arranged that only the lowermost of two

or more simultaneously depressed keys of the keyboard 21 will be effective in causing sounding of a note, the musician need not exercise any particular care in the depression of keys of the keyboard 21 by his thumb, it being necessary only that he does not depress any keys lower than the one which he intends to have control the production of the tone. By virtue of this fact, a chromatic scale arpeggio may be rendered with great facility because, to produce this result, the musician need merely slide his thumb rapidly along the keyboard.

The fact that the keyboard 21 has an off-set rear wall and that the keys 43, 44 thus over-lie a portion of the front rail or other forwardly projecting part of the piano case, is an important factor in making it possible to have the keys 43, 44 so close to the piano keys that the musician can depress the keys of the piano keyboard, while simultaneously depressing a key of the keyboard 21 with his thumb.

Because the keys 43, 44 are mounted for substantially translatable movement, the player can depress these keys by pressing downwardly upon the rear ends thereof. The mounting of the keys 43, 44 in a manner such that they have substantially translatable vertical motion, and that their strokes are relatively short, are factors which contribute materially to the attainment of the primary objective of the invention, namely, making it possible easily to depress these keys with the thumb, while the remaining fingers of the hand may be used to depress keys of the piano keyboard. The two keyboards are so closely positioned that they are within the span of a single hand, not only to the extent that both keyboards may be reached simultaneously by a single hand, but that both keyboards may be played upon simultaneously with such convenience as greatly to facilitate such playing.

By defining the keys 43, 44 as having substantially "translatable motion," I wish to distinguish from the usual pivoted keys in which the motion is rotatory. The key may be said to be capable of substantially translatable motion when the pressure of the finger applied to at least one part of its finger engaging surface will cause the key to move, in a manner such that at a given instant, all points of the key will be moving in substantially the same direction at substantially the same velocity, whether or not the key is so mounted as to be capable of other additional forms of movement.

While I have shown and described a particular embodiment of my invention, it will be understood that the invention as illustrated and described is merely exemplary, and that I desire to include within the scope of my invention, all such similar and modified forms of the invention by which substantially the results of my invention may be obtained through the use of substantially the same or equivalent means.

I claim:

1. The combination of an electrical musical instrument with a piano having a keyboard, a keyboard case attached to said piano in close proximity to and in front of the keyboard thereof, a plurality of keys of substantially the same width and spacing as the piano keys but appreciably shorter than the latter mounted on said case, said short keys having playing surfaces extending rearwardly to substantially the rear edge of said case, and means attaching said case to said piano, the playing surfaces of the

two keyboards being within the convenient playing span of a single hand.

2. In an electrical musical instrument, a keyboard case for attachment to a standard piano in close proximity to and in front of the keyboard thereof, a plurality of keys of standard piano width and spacing but appreciably shorter than standard keys, said keys occupying the top of said case and having playing surfaces extending rearwardly to substantially the rear edge of said case, and means on the case for attaching the same to said piano, whereby the two keyboards will lie within the convenient playing span of a single hand.

3. In an electrical musical instrument, a keyboard frame for attachment to a standard piano in close proximity to and in front of the keyboard thereof, a plurality of keys of substantially standard piano width and spacing but appreciably shorter than standard piano keys, means in said frame supporting said keys for individual vertical substantially translatable motion, said keys having playing surfaces extending rearwardly to substantially the rear edge of said frame, and means for attaching said frame to said piano, whereby the two keyboards will lie within the convenient playing span of a single hand.

4. In an electrical musical instrument, a keyboard supporting frame for attachment to a standard piano, a plurality of keys carried by said frame and of substantially standard piano width and spacing but appreciably shorter than standard keys, said keys having playing surfaces extending rearwardly to a straight line, and means for attaching said supporting frame to said piano whereby said line falls in front of and close to the front ends of the keys of the piano keyboard, and so that the two keyboards will lie within the convenient playing span of a single hand.

5. The combination of an electrical musical instrument with a piano having a keyboard, a keyboard case attached to said piano in close proximity to and in front of the keyboard thereof, a plurality of keys of substantially the same width and spacing as the piano keys but appreciably shorter than the latter, said short keys having playing surfaces extending rearwardly to substantially the rear edge of said case, means attaching said case to said piano, with the two keyboards within the convenient playing span of a single hand, said means including a bracket having its forward end attached to said case and extending rearwardly beneath and attached to the keyboard bed plank of the piano.

6. In an electrical musical instrument, a keyboard case for attachment to a standard piano in close proximity to and in front of the keyboard thereof, said case having a rear wall, a plurality of keys of standard piano width and spacing but appreciably shorter than the standard keys, said keys having playing surfaces extending rearwardly beyond a portion of the rear wall of said case, and means for attaching said case to the piano, whereby the keyboard will be held in such position with respect to the piano keyboard that both keyboards will lie within the convenient playing span of a single hand.

7. In an electrical musical instrument, a keyboard case for attachment to a standard piano in close proximity to and in front of the keyboard thereof, a plurality of keys of substantially standard piano width and spacing but appreciably shorter than the latter, said keys having

playing surfaces extending rearwardly to substantially the rear edge of said case, means for attaching said case to a standard piano, whereby the two keyboards will lie within the convenient playing span of a single hand, and a plurality of register controlling tablets mounted on said case, whereby the range of notes playable on one of said keyboards simultaneously with the playing of a given note on the other of said keyboards by the one hand is greatly extended.

8. In an electrical musical instrument, a keyboard frame for attachment to a standard piano in close proximity to and in front of the keyboard thereof, a plurality of keys of substantially standard piano width and spacing but appreciably shorter than the latter and mounted on said frame for vertical substantially translatory motion, said keys having playing surfaces extending rearwardly to substantially the rear edge of said frame, means for attaching said frame to said piano, whereby it is positioned so that the two keyboards lie within the convenient playing span of a single hand, and a plurality of tablets pivoted on the front of said case, said tablets being located closely adjacent each other so as to form substantially the whole of the front wall of said case.

9. In an electrical musical instrument, a keyboard frame for attachment to a standard piano in close proximity to and in front of the keyboard thereof, said frame having a rear wall with a rearwardly offset upper portion, a plurality of keys of substantially standard piano width and spacing but appreciably shorter than standard keys, said keys having playing surfaces extending rearwardly beyond the main portion of said rear wall of said frame, and means for attaching said frame to said piano, whereby the two keyboards are positioned to lie within the convenient playing span of a single hand.

10. In an electrical musical instrument, a keyboard case for attachment to a standard piano in close proximity to and in front of the keyboard thereof, a plurality of keys of standard piano width and spacing but appreciably shorter than standard keys, said keys occupying the top of said case and having playing surfaces extending rearwardly to substantially the rear edge of said case, means on the case for attaching the same to said piano, whereby the two keyboards will lie within the convenient playing span of a single hand, and a plurality of control tablets forming the front wall of said case.

11. In an electrical musical instrument, a keyboard case for attachment to a standard piano in close proximity to and in front of the keyboard thereof, a plurality of keys of substantially standard piano spacing but appreciably shorter than standard keys, said keys occupying the top of said case and having playing surfaces extending rearwardly to substantially the rear edge of said case, and means on the case for attaching the same to the piano, whereby the two keyboards are held in close proximity and within the convenient playing span of a single hand.

12. In an electrical musical instrument, a keyboard case for attachment to a standard piano in close proximity to and in front of the keyboard thereof, a plurality of keys of substantially standard piano spacing but appreciably shorter than standard keys, said keys occupying the top of said case and having playing surfaces extending rearwardly to substantially the rear edge of said case, and adjustable means for attaching said keyboard to the piano, said means including a sliding connection between a part thereof carried by said case and a part thereof carried by the piano, whereby said case may be shifted longitudinally of the piano keyboard.

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