

July 13, 1937.

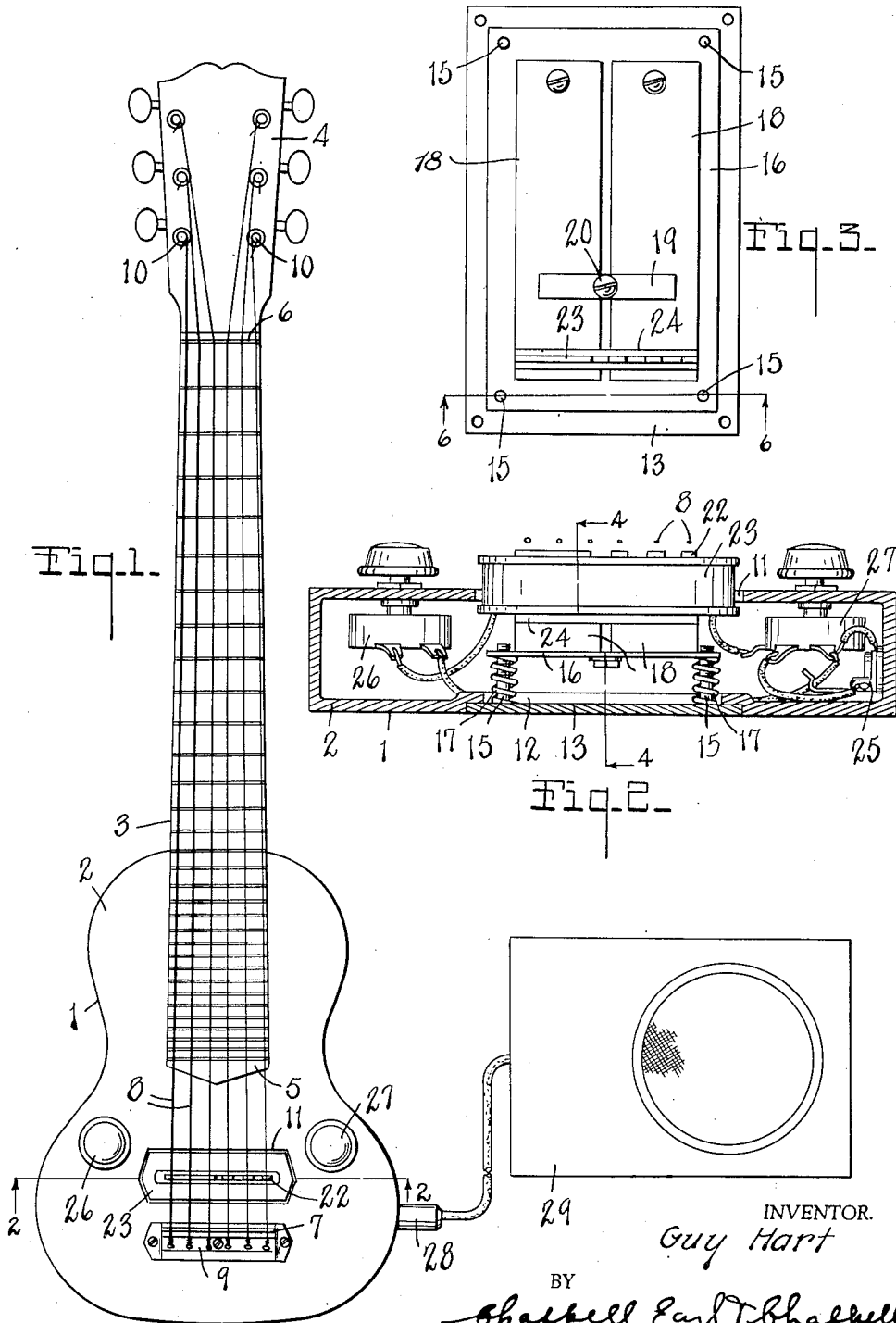
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2,087,106

ELECTRICAL MUSICAL INSTRUMENT

Filed Feb. 8, 1936

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

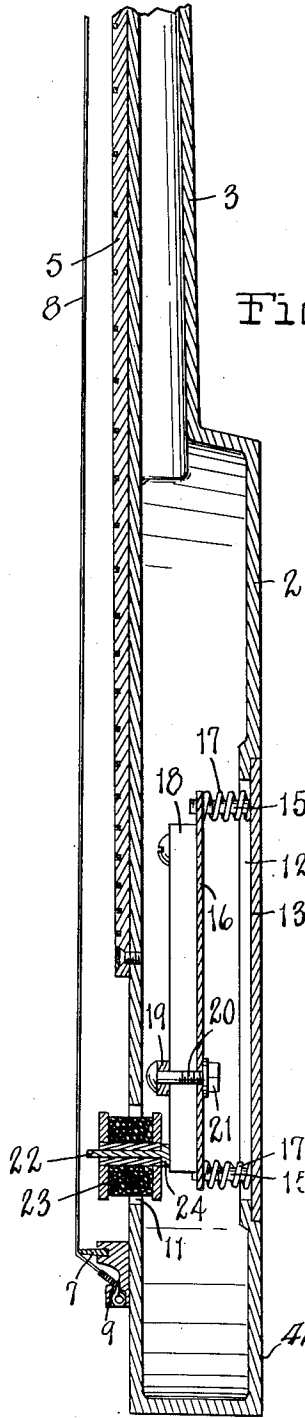


Fig. 4.

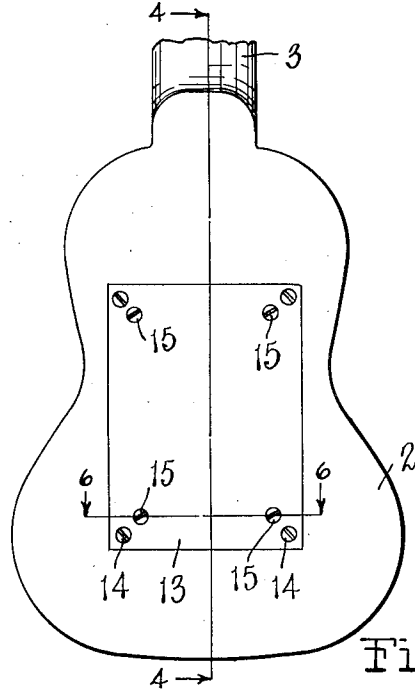


Fig. 5.

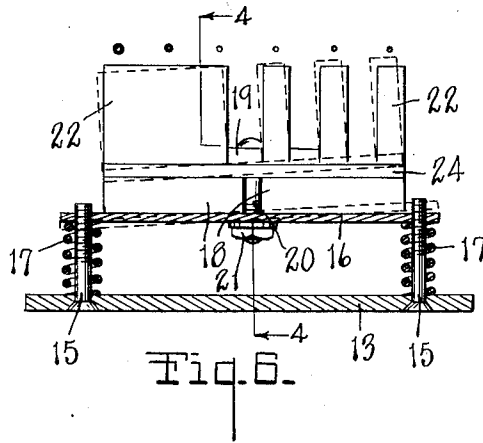


Fig. 6.

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# UNITED STATES PATENT OFFICE

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## ELECTRICAL MUSICAL INSTRUMENT

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Application February 8, 1936, Serial No. 62,950

11 Claims. (Cl. 84—1)

The main objects of this invention are:

First, to provide an electrically amplified stringed instrument embodying a body member which is substantially non-resonant and means for amplifying music produced thereon to any desired degree.

Second, to provide an instrument of the class described, which is amplified solely due to the effect of variations in an air gap produced by the vibrating strings.

Third, to provide an instrument of the type described, which is handsome in appearance and capable of producing tones of great beauty in a great number of degrees of amplification.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined in the claims.

A preferred embodiment of the invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a front view of the instrument of the invention, illustrating the manner of using the same in connection with an amplifier.

Fig. 2 is an enlarged sectional view on the line 2—2 of Fig. 1.

Fig. 3 is a view illustrating part of the operating mechanism, comprising magnets and support plate therefor.

Fig. 4 is a fragmentary sectional view taken on line 4—4 of Figs. 2, 5 and 6.

Fig. 5 is a fragmentary view showing the side of the instrument which is the reverse of that shown in Fig. 1.

Fig. 6 is a sectional view taken on the line 6—6 of Figs. 3 and 5.

Instruments of the type in which a vibrating string is employed to impart vibrations to an armature, whereby through variations in an air gap a current is induced in a coil, are well known. For the most part such instruments consist of conventional stringed instruments which are modified by the addition of suitable electrical amplifying means thereto and the amplified sounds produced by the instrument itself and amplified in the sounding box thereof. It is an object of this invention to produce a device which does not rely on the resonance of the instrument itself, the entire audible effect being due to the electrical amplifying means connected thereto.

To this end, I have designed the body of the instrument with a relatively thick wall of hard wood or of metal which is substantially lacking in the quality of resonance. Aside from the sounds emanating from the amplifier designed to be employed in connection with my device,

the only audible effect produced is that of the vibrating strings themselves unamplified by a sounding box effect of the body of the instrument.

I have illustrated the invention as embodied in a type of plucked instrument. However, it will be apparent that other embodiments may be in the form of any known type of stringed instrument adapted to be played by setting the strings vibrating.

In the drawings, reference numeral 1 indicates broadly a stringed instrument of the guitar type comprising a hollow body member 2, neck 3 and tongue bar 4. The walls 41 of the body member are relatively thick, with the result that the instrument is deprived of the quality of resonance. The instrument is provided with a suitable fretted keyboard 5 extending longitudinally thereof in conventional manner. Bridges 6, 7 are mounted on the instrument, and the metal strings 8 anchored to a tailpiece 9 are adjustably tensioned over the frets by tongue pegs 10. The body member 2 is cast at the upper side thereof with an opening 11 underneath the strings and extending widthwise thereof. The opposite or bottom face of the body member is apertured at 12 to form an opening which is normally covered by the closure plate 13, screws 14 extending through the closure 13 and being threaded into the body member. Screws 15 likewise extend through the closure plate and are threaded into a spaced support plate 16 whereby the support plate may be adjusted inside the body member by turning screws 15 from the outside.

Springs 17 surround the screws 15 and resiliently space the support plate.

I secure a pair of bar magnets 18 on the support plate 16 by means of a clamping strip 19 and a bolt 20 extending through the strip and support plate and between the magnets, a nut 21 being screwed on the bolt to hold the parts in assembled relation. The bar magnets 18 carry at one end thereof magnetic extensions or fingers 22 which extend at right angles to the bar magnets upwardly through an elongated coil 23. The coil is supported by the base 24 on the magnets 22, being maintained centrally of the opening 11. The magnetic fingers 22 extend through the coil to a point adjacent but spaced from the strings 8.

The body member 2 has inserted therein a jack 25 to which the ends of the coil 23 are connected. I preferably mount suitable volume and tone controls 26, 27 on the body member 2 for ready manipulation by the player, the controls being placed in the coil circuit in a manner which will

be obvious to one skilled in the art and which need not be here described. A plug 28 carried by the amplifier 29 is adapted to be received in the jack 25.

5 In operation, when the strings are set to vibrating by the player, the variations in the air gap between the strings and the magnet fingers 22 set up corresponding variations in magnetic flux, which causes a varying electromotive force to flow  
10 in the coil windings. The electrical impulses are transformed into sound waves by the loud speaker 29 which may be manually modified as to tone or volume by the controls 26, 27. The adjusting screws 15 permit the magnets 18 and the extensions  
15 thereof to be shifted in position as indicated by the position shown in dotted lines in Fig. 6. The adjustability provided by the shifting action permits the instrument to be readily tuned.

20 It will be seen that I have produced an electrically amplified musical instrument which is adapted for the production of music in almost infinite range of tones and volumes, the notes of which are caused solely by the vibrations of the  
25 strings 8. Accordingly, the necessity for an expensive sounding box is eliminated, the notes being reproduced very faithfully by the electrical pickup of the invention.

I have illustrated and described my improvements in an embodiment which I consider very  
30 practical. I have not attempted to illustrate or describe other embodiments or adaptations as it is believed this disclosure will enable those skilled in the art to embody or adapt my improvements  
35 as may be desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a stringed musical instrument, a hollow  
40 body having walls of substantial thickness whereby said body is deprived of the property of resonance, and having an opening in one face of said body, a coil disposed in said opening, said body having an opening in another face thereof, a  
45 removable metallic closure for said last named opening, screws passing through said closure, a support plate in said body in spaced relation to the walls thereof, said screws being threaded in  
50 said plate for adjusting the position of said plate in said body, coiled springs surrounding said screws between said plate and said closure, a magnet mounted on said support plate, magnetic  
55 fingers fixed to said magnet and extending at right angles therefrom and through said coil, strings tensioned over said body and passing over  
said fingers in spaced relation thereto, an amplifier, and means electrically connecting said coil to said amplifier including volume and tone controls.

2. In a stringed musical instrument, a hollow  
60 body having walls of substantial thickness whereby said body is deprived of the property of resonance, and having an opening in one face of said body, a coil disposed in said opening, said body  
65 having an opening in another face thereof, a removable metallic closure for said last named opening, a support plate in said body in spaced relation to the walls thereof, means for adjusting the position of said plate in said body, a  
70 magnet mounted on said support plate, magnetic fingers fixed to said magnet and extending at right angles therefrom and through said coil, strings tensioned over said body and passing over  
said fingers in spaced relation thereto, an amplifier, and means electrically connecting said coil to

said amplifier including volume and tone controls.

3. In a stringed musical instrument, a hollow  
body having walls of substantial thickness whereby said body is deprived of the property of  
5 resonance, and having an opening in one face of said body, a coil disposed in said opening, said body having a support plate in spaced relation to the walls thereof, means for adjusting the position of said plate in said body, a magnet mounted  
10 on said support plate, magnetic fingers fixed to said magnet and extending at right angles therefrom and through said coil, strings tensioned over said body and passing over said fingers in spaced relation thereto, an amplifier, and means  
15 electrically connecting said coil to said amplifier including volume and tone controls.

4. In a stringed musical instrument, a hollow  
body having walls of substantial thickness whereby said body is deprived of the property of resonance, and having an opening in one face of said  
20 body, a coil disposed in said opening, said body having a support plate in spaced relation to the walls thereof, means for adjusting the position of said plate in said body, magnetic fingers extending at right angles from said plate and through  
25 said coil, strings tensioned over said body and passing over said fingers in spaced relation thereof, an amplifier, and means electrically connecting said coil to said amplifier including volume and tone controls.

5. In a stringed musical instrument, a hollow  
body having walls of substantial thickness whereby said body is deprived of the property of resonance, and having an opening in one face of  
35 said body, a coil disposed in said opening, said body having a support plate in spaced relation to the walls thereof, means for adjusting the position of said plate in said body, magnetic fingers extending at right angles from said plate and through  
40 said coil, strings tensioned over said body and passing over said fingers in spaced relation thereto, an amplifier, and means electrically connecting said coil to said amplifier.

6. In a stringed musical instrument, a hollow  
45 body having walls of substantial thickness whereby said body is deprived of the property of resonance, a coil, a magnet mounted in said body and extending through said coil, strings tensioned over said body and passing over said magnet in  
50 spaced relation thereto and forming therewith a variable air gap, means adjustably and resiliently mounting said magnet in said body, an amplifier, and means electrically connecting said coil to said amplifier.

7. In an electrically amplified stringed instrument, a body member substantially lacking resonance, magnets of varying size adjacent the  
55 strings of the instrument, said magnets and strings providing a series of variable air gaps therebetween, a coil surrounding and supported by said magnets, said magnets being resiliently and adjustably supported in said body member, external means for adjusting the position of said  
60 magnets, an amplifier, and means carried by said body member for electrically connecting said coil to said amplifier and comprising volume and tone controls.

8. In an electrically amplified stringed instrument, a body member substantially lacking resonance, magnets adjacent the strings of the  
70 instrument, said magnets and strings providing a series of variable air gaps therebetween, a coil surrounding said magnets, said magnets being resiliently supported in said body member, external means for adjusting the position of said mag-  
75

nets, an amplifier, and means carried by said body member for electrically connecting said coil to said amplifier and comprising volume and tone controls.

5 9. In an electrically amplified stringed instrument, a body member substantially lacking resonance, a magnet adjacent the strings of the instrument, said magnet and strings providing a series of variable air gaps therebetween, a coil surrounding said magnet, said magnet being resiliently supported in said body member, means for adjusting the position of said magnet and amplifier, and means carried by said body member for electrically connecting said coil to said amplifier and comprising volume and tone controls.

10 10. In an electrically amplified stringed instrument, a body member, a magnet adjacent the strings of the instrument, said magnet and strings

providing a series of variable air gaps therebetween, a coil surrounding said magnet, said magnet being resiliently supported in said body member, means for adjusting the position of said magnet, an amplifier, and means carried by said body member for electrically connecting said coil to said amplifier and comprising volume and tone controls.

11. In an electrically amplified stringed instrument, a body member, a magnet adjacent the strings of the instrument, said magnet and strings providing a series of variable air gaps therebetween, a coil surrounding and supported by said magnet, said magnet being resiliently supported in said body member, an amplifier, and means carried by said body member for electrically connecting said coil to said amplifier and comprising volume and tone controls.

GUY HART.