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2,964,985

SOUND PICK UP DEVICE FOR STRINGED INSTRUMENTS

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2 Sheets-Sheet 1

Fig. 1.

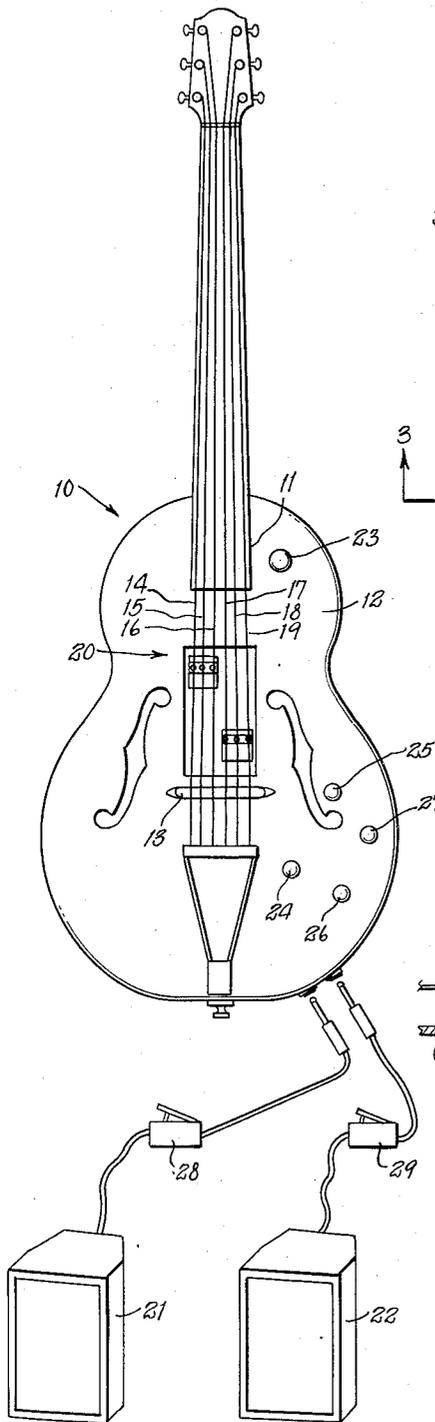


Fig. 2.

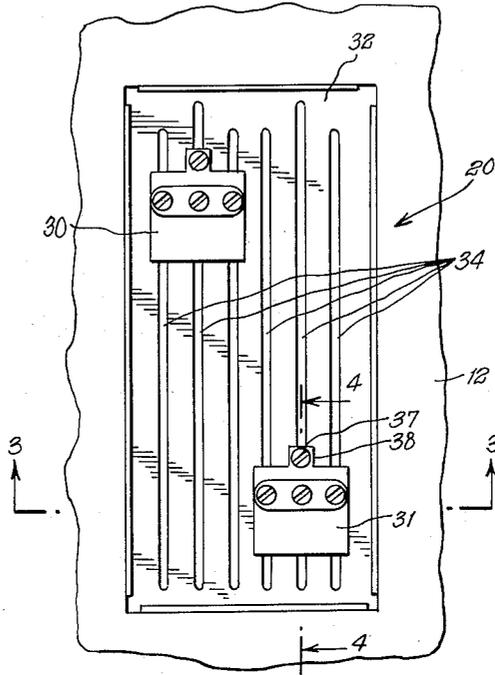


Fig. 3.

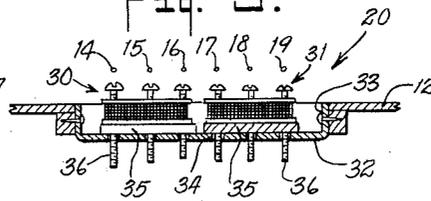
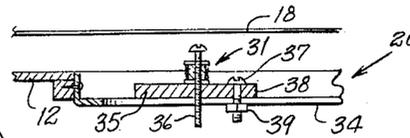


Fig. 4.



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2 Sheets-Sheet 2

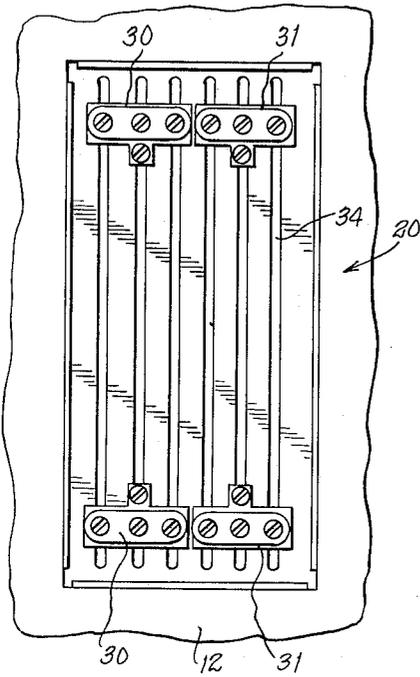


Fig. 5.

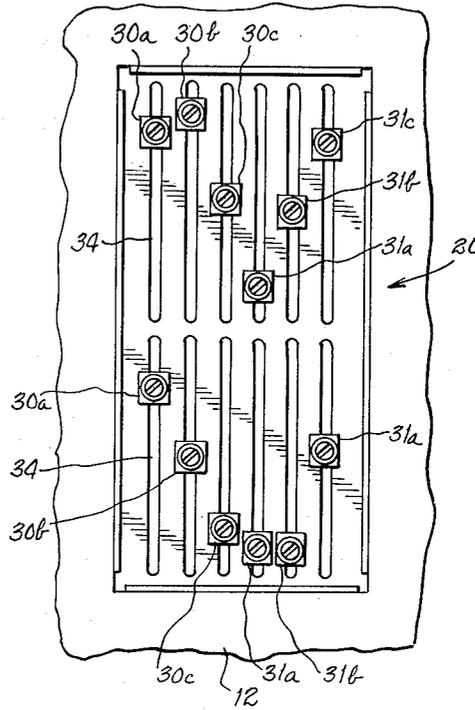


Fig. 6.

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2,964,985

## SOUND PICK UP DEVICE FOR STRINGED INSTRUMENTS

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14 Claims. (Cl. 84—1.15)

The present invention relates to sound pick up devices for stringed instruments to enable the tones produced by the instrument to be amplified and, more particularly, to an improved device of this type which produces predetermined tonal effects.

The present invention is primarily concerned with instruments in the guitar family and will be described in connection therewith, but the principles thereof can be applied to instruments in the violin family and to the banjo. Hence, the expression stringed instruments is intended to include all such instruments which have a fingerboard, a soundboard, a bridge and bass and treble strings.

Heretofore, it has been proposed to provide a sound pick up device which included an element for picking up the tones of each string and to connect the device to an electronic amplifier. It has also been proposed to provide such devices which can be moved as an entirety between the fingerboard and the bridge to adjust the volume or amplitude of the tones produced by the instrument. It has further been proposed to use two or more amplifiers placed at different locations to create desired sound effects.

The present invention aims to provide a sound pick up device adapted for connection to two electronic amplifiers which is a still further advance in the art of playing electronic guitars or the like and offers the guitarist a tonal scope and range never before made possible by the prior arrangements.

Accordingly, an object of the present invention is to provide such a device which enhances the music produced by electronic stringed instruments.

Another object is to provide such a device which is readily adapted for use in connection with all makes of guitars and other stringed instruments.

Another object is to provide such a device which affords maximum adjustment of tonal effects.

Another object is to provide such a device which can be arranged to produce the effect of two guitars by playing a single instrument.

A further object is to accomplish the foregoing in a simple, practical and economical manner.

Other and further objects will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

In accordance with the present invention, the foregoing objects in general are accomplished by providing a device which comprises transducer means adjacent the bass strings adapted for electrical connection to one amplifier, and transducer means adjacent the treble strings adapted for electrical connection to another amplifier.

For example, in a six string instrument, such as a guitar, the sound pick up is split into two sections, each section having its own volume and tone control. One section covers the first, second and third playing strings,

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and the other section covers the fourth, fifth and sixth playing strings. Each pick up section is slidably mounted on the soundboard, so that the bass and treble sections can be placed at points where tonal reproductions can be best balanced to suit the most critical player. Thus, by placing the bass section near the lower end of the fingerboard and placing the treble section near the bridge, a pure tonal scope between bass and treble is attained with separate volume and tone control to give substantially perfect balance between bass and treble. By the same token, the player can bring out the treble and subdue the bass or bring out the bass and subdue the treble. The volume shadings between bass and treble together with the tonal colorings so derived enable the instrument equipped with the device to produce exceedingly pleasing music.

To further clarify this principle of tonal control, when the bass section is at the fingerboard and the treble section is at the bridge, a well rounded bass side and a crisp sharp treble side will be heard. When the instrument is played in full chord form, it gives the effect of two guitars. When single string solos are played, the cross over between bass and treble creates a fresh sound and affords the player greater variation in solo work, once again giving the effect of two guitar parts.

In the drawings:

Fig. 1 is a plan view of a guitar equipped with a sound pick up device in accordance with the present invention.

Fig. 2 is an enlarged, fragmentary plan view illustrating in detail the device shown in Fig. 1.

Fig. 3 is a sectional view taken along the line 3—3 on Fig. 2.

Fig. 4 is a sectional view taken along the line 4—4 on Fig. 2.

Fig. 5 is a view similar to Fig. 2 illustrating another arrangement of the device.

Fig. 6 is a view similar to Fig. 2 illustrating still another arrangement of the device.

Referring to Fig. 1 of the drawings in detail, a guitar 10 is shown which comprises a fingerboard 11, a soundboard 12, a bridge 13, three bass strings 14, 15 and 16, three treble strings 17, 18 and 19, and a device 20, about to be described in detail, mounted on the soundboard between the lower end of the fingerboard and the bridge. The guitar further includes means adapted for connection to bass and treble electronic amplifiers 21 and 22, a master volume control 23, bass and treble volume controls 24 and 25, respectively, bass and treble tone controls 26 and 27, respectively, and switches 28 and 29 for the amplifiers 21 and 22, respectively. These means are of conventional construction and any novelty of the use herein resides in their arrangement in relation to the device 20, as will be described hereinafter.

As shown in Figs. 2 to 4, the device 20 generally comprises a sound pick up head or microphone 30 adjacent the bass strings and a similar head 31 adjacent the treble strings. These pick up heads may be of the electromagnetic type, as shown herein, and more specifically described in United States Patent No. 2,612,541, but could also be of the piezoelectric type, if desired. Since the function of these heads is to convert the mechanical wave energy or sonic energy into electrical wave energy capable of amplification and electronic modulation, these heads are transducer means in a generic sense.

Each of these heads is electrically connected independently of the other, with the head 30 connected to the amplifier 21 through the volume and tone controls 24 and 26 and the switch 28 and with the head 31 connected to the amplifier 22 through the volume and tone controls 25 and 27 and the switch 29. The master volume control 23 is utilized to simultaneously vary the voltage supplied to both of the amplifier circuits and

thereby controls the overall volume of the instrument, regardless of relative volume adjustment between the bass and treble.

The device 20, in a simple and practical form, as shown herein, comprises a rectangular panel 32 having side walls 33 set into a rectangular opening in the soundboard 12 and secured thereto in any suitable manner, and suitable means for individually mounting the heads 30 and 31 on the panel.

In carrying out the present invention in its broadest aspects to provide independent bass and treble pick up and amplification thereof, the heads may be secured to the panel in predetermined positions between the lower end of the fingerboard and the bridge to give a desired bass-treble effect. However, since the present invention contemplates adjustment of the relative positions of the heads by the player to create such effects to his or her satisfaction, the heads are slidably mounted independently of each other for lengthwise adjustment along the strings between the fingerboard and the bridge.

Such adjustment is accomplished by providing the panel with six slots 34, each below one of the six strings, and mounting each of the heads 30 and 31 on a plate 35 which is slidably supported on the panel 32 and adapted to be secured thereto in the manner about to be described. Each of the heads 30 and 31 has three elements 36 projecting upwardly therefrom and each directly beneath one of the six strings for enabling each string to modify the electromagnetic head by its sonic energy. These elements are in the form of screws which are threaded through the core of the head and the plate and extend into one of the slots 34 and the upper ends thereof are thereby adjustable with respect to the strings to produce a desired tonal end amplitude balance between the strings. The lower ends of the screws ride in the slots or guideways 34 to maintain the plates 35 in crosswise alignment, and the plates are adapted to be secured in a desired position by a screw 37 which extends through a tab 38 at one end of the plates and into a slot 34 and nut 39 fastened to the screw 37 at the underside of the panel 32 (Fig. 4). Preferably, the elements just described are assembled on the panel as shown before the panel is attached to the instrument, and the final operation in such assembly is to deface the threads at the lower end of the screws 37 to prevent the nut 39 from backing off and falling into the instrument.

In Fig. 5, another arrangement is illustrated which differs from that just described only in that two heads 30 and two heads 31 are mounted for independently slidable adjustment adjacent the bass and treble strings respectively. The heads 30 are connected to the amplifier 21 and the heads 31 are connected to the amplifier 22. The four heads provide for tonal blends, coloring and shading having a broader range and scope to produce even more pleasing two guitar effects.

In Fig. 6, still another arrangement is illustrated which demonstrates that each string can be provided with its individual and independently adjustable picking head. For example, three heads 30a, 30b and 30c may be provided for the bass strings and three heads 31a, 31b and 31c may be provided for the treble strings. This concept can be further extended to provide a pair of independently adjustable heads for each string either slidably mounted for movement in a single slot or in separate pairs of slots, respectively as shown. This arrangement accomplishes the ultimate in tonal and amplitude effects for a two guitar simulation. In this arrangement, the heads 30a, 30b and 30c are connected to the amplifier 21 and the heads 31a, 31b and 31c are connected to the amplifier 22.

From the foregoing description, it will be seen that the present invention provides an improved pick up device for electronic string instruments which opens up an entirely new field in playing techniques heretofore undreamed of with unlimited combinations and variations

which may be devised by the artist. All this is accomplished in a simple, practical and economical manner and in conjunction with standard electronic equipment already employed. This is very advantageous because the present invention can thereby be embodied in existing as well as newly constructed instruments.

As various changes may be made in the form, construction, and arrangement of the parts herein, without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matters are to be interpreted as illustrative and not in any limiting sense.

What is claimed is:

1. A musical instrument of the string type having at least one group of bass strings and at least one group of treble strings, individual electrical pick up means operatively associated with each group of strings, electro-acoustic translating means connected to said pick up means, and individual control means operatively associated with each of said pick up means, whereby tones produced from each of said groups of strings may be selectively controlled.

2. A musical instrument according to claim 1, including means for slidably mounting said pick up means independently of each other for lengthwise adjustment along the strings.

3. A musical instrument according to claim 1, wherein each of said pick up means includes a pair of independent heads.

4. A musical instrument according to claim 3, including means for slidably mounting each pair of heads for lengthwise adjustment along the strings.

5. A musical instrument according to claim 1, wherein each of said pick up means includes an independent head for each string.

6. A musical instrument according to claim 5, including means for slidably mounting said heads for lengthwise adjustment along the strings.

7. A musical instrument according to claim 1, wherein each of said pick up means includes a pair of independent heads for each string.

8. A musical instrument according to claim 7, including means for slidably mounting said pairs of heads for lengthwise adjustment along the strings.

9. A musical instrument according to claim 1, including a plurality of guideways extending lengthwise beneath the strings, means for slidably mounting each of said pick up means including an element for each of said strings extending into each of said guideways, and means on said slidably mounting means cooperating with said guideways to secure each of said pick up means in a desired position of adjustment.

10. A musical instrument according to claim 9, wherein each of said elements is positioned directly beneath a string and is mounted on said pick up means for vertical adjustment thereof to vary the characteristics of said pick up means.

11. A musical instrument according to claim 9, wherein the number of guideways and elements corresponds to the number of strings, and two mounting means in which each has one of said pick up means thereon.

12. A musical instrument according to claim 9, wherein the number of guideways correspond to the number of strings, two pairs of mounting means in which each one has a pick up means thereon and each pair of the pick up means is operatively associated with one of said groups of the strings, and elements on each pick up means correspond in number to the strings of each of said groups.

13. A musical instrument according to claim 9, wherein the number of guideways corresponds to the number of strings, and a pick up means having an element thereon is provided for each guideway.

14. A musical instrument according to claim 9, wherein pairs of guideways are provided corresponding in number

to the number of strings, and a pick up means having an element thereon is provided for each guideway.

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