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3,483,303

ELONGATED PICKUP FOR METAL STRINGED MUSICAL INSTRUMENTS
HAVING FERROMAGNETIC SHIELDING

Filed July 29, 1965

2 Sheets-Sheet 1

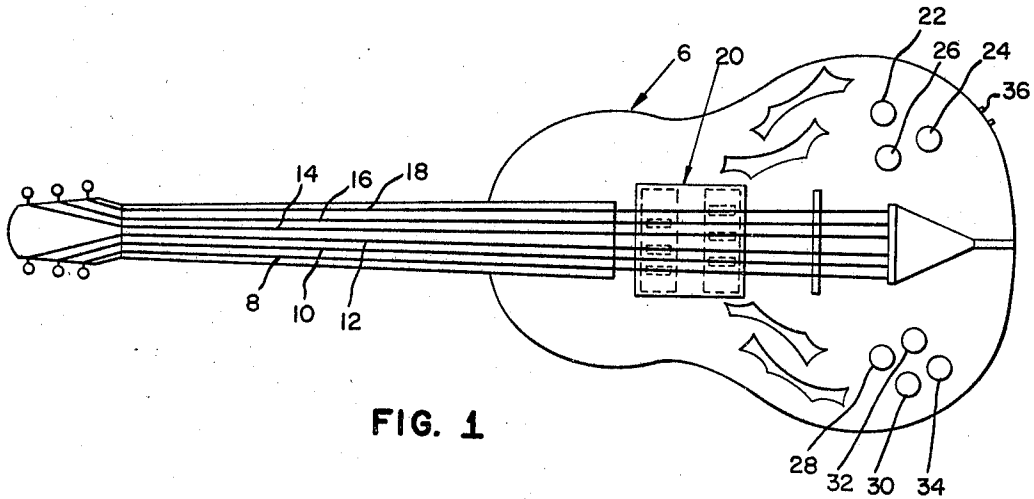


FIG. 1

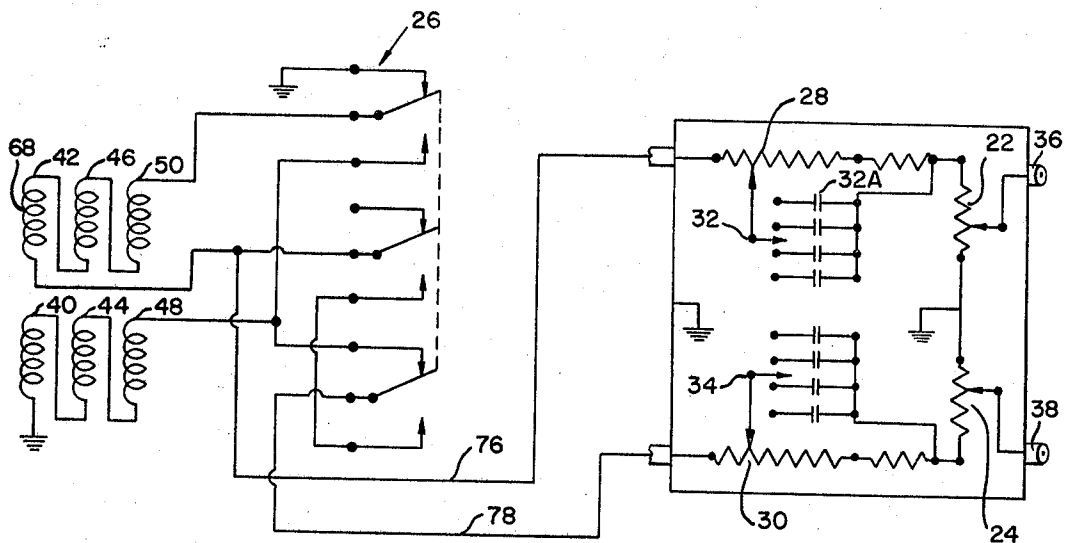


FIG. 5

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2 Sheets-Sheet 2

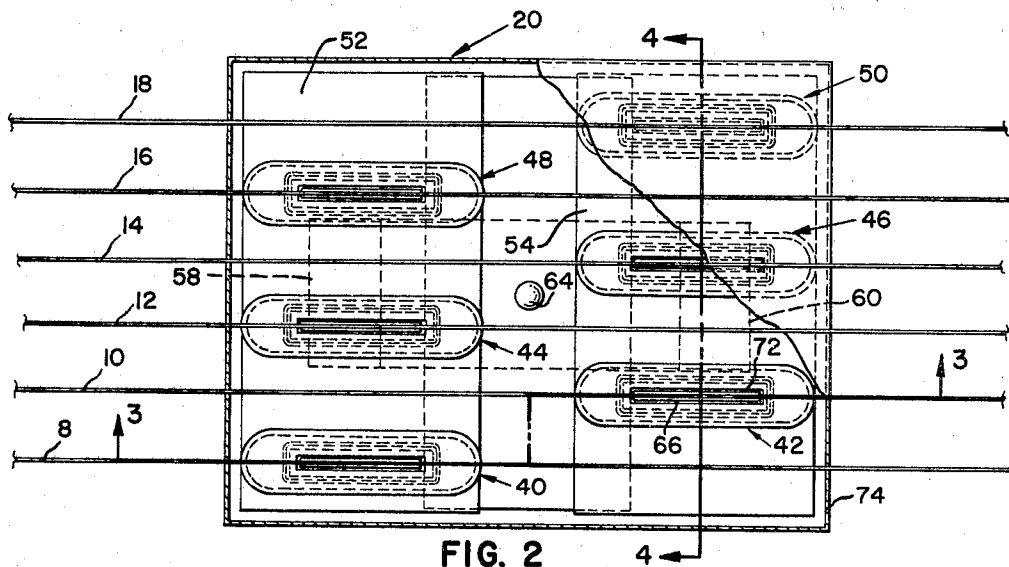


FIG. 2

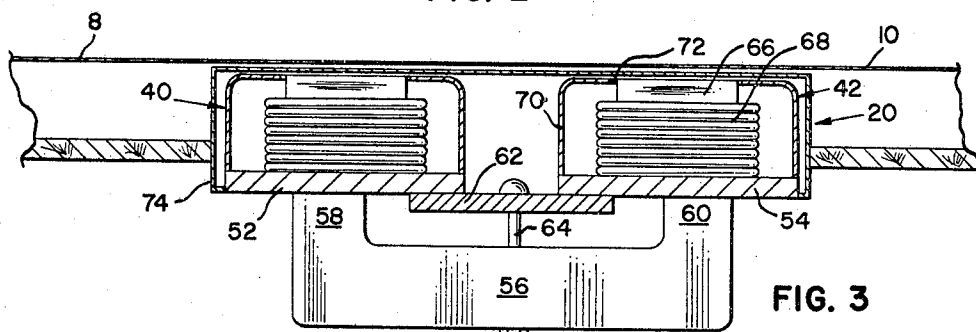


FIG. 3

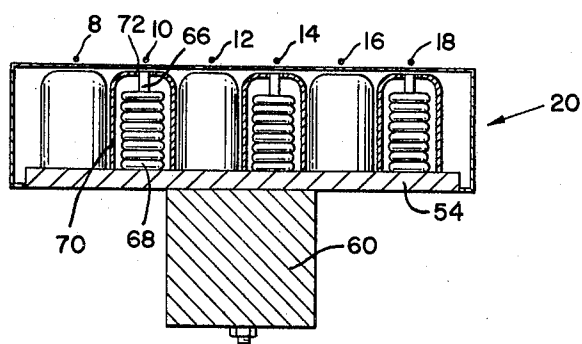


FIG. 4

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ELONGATED PICKUP FOR METAL STRINGED MUSICAL INSTRUMENTS HAVING FERRO- MAGNETIC SHIELDING

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6 Claims

ABSTRACT OF THE DISCLOSURE

A pickup is provided for a multiple metal stringed instrument wherein each individual string has an individually shielded pole piece underlying the string so that the sound of each string is picked up separately. This enables one to obtain novel stereophonic effects from the instrument.

This invention relates to a pickup for a metal stringed instrument such as a guitar and more particularly relates to a novel form of pickup unit and circuitry used in connection therewith.

Although it has previously been suggested to obtain a stereo effect from a guitar utilizing a plurality of pickup devices, such devices as have been used in the past have not been satisfactory to give a true stereo effect.

According to the present invention, an improved form of pickup is provided for metallic strings, whether they be in the form of a wrapped, flat wound, or single filament string. The metal string itself is used to induce a current in the pickup and the pickup unit has a relatively long pole piece lying parallel to each string.

Another object of this invention is to provide a novel guitar pickup wherein there is little, if any, cross talk between the various strings. The device of the present invention also reduces mechanical noise as well as hum which might be picked up from powerlines or the like.

A further object of this invention is to provide a guitar pickup having a novel switching and tonal compensating network which gives separate control for both channels by providing predetermined crossover frequencies as well as continually variable high frequency roll-off or boost control.

A still further object of this invention is to provide an electrical pickup for a guitar wherein the output can be either full stereo or monaural and wherein even when in the monaural mode, separate tone control is possible of different channels.

Still another object of this invention is to provide a guitar pickup having a novel output circuit wherein strings are not grouped as bass strings or as treble strings, but instead are grouped 1, 3, 5 on one channel and 2, 4, 6 on the other channel.

Other objects of the invention will be apparent from the balance of the specification which follows.

In the drawings forming part of this application:

FIGURE 1 is a plan view of a guitar embodying the present invention.

FIGURE 2 is an enlarged plan view of the pickup shown in FIGURE 1.

FIGURE 3 is a view on the line 3—3 of FIGURE 2.

FIGURE 4 is a view on the line 4—4 of FIGURE 2.

FIGURE 5 is a schematic diagram showing a novel switching and tone control circuit which may be employed in conjunction with the guitar pickup of the present invention.

Referring now to the drawings by reference characters, there is shown a guitar 6 having strings 8, 10, 12, 14, 16 and 18 normally tuned to correspond with the notes E, A, D, G, B, E, respectively. The pickup device itself is generally designated 20 and it is supported on the body

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of the guitar 6, under the strings adjacent to the bridge of the instrument as is usual in the art. A plurality of controls are preferably located on the body of the guitar, namely, loudness control for channel A, 22, loudness control for channel B, 24, stereo-monoaural switch 26, high frequency control for channel B, 30, crossover control for channel A, 32, and crossover control for channel B, 34. In addition, output jacks 36 and 38 are provided for channel A output and channel B output, respectively.

The pickup device itself, 20, includes six individual pickup assemblies designated 40, 42, 44, 46, 48 and 50 which underlie the strings 10 to 18, respectively. It will be noted that each pickup lies generally parallel to a string and also that adjacent pickups are staggered with respect to its neighbor as is most clearly shown in FIGURE 2. The individual pickups are mounted on bars 52 and 54 which are made of a magnetic material such as soft iron and each of which extends the entire width of the pickup. Underlying the bars 52 and 54 is a permanent magnet 56 having poles 58 and 60. The bars 52 and 54 are supported by a strip of non-magnetic material such as brass or plastic, 62, held to magnet 56 by means of a bolt 64.

The individual pickups are identical so that only one pickup, namely that designated by the general number 42, is described in detail. The pickup consists of a thin, elongated pole piece 66, surrounded by a suitable winding 68, connected by suitable wiring to the switch 26. The wiring is not shown in FIGURES 2 through 4, but is shown in FIGURE 5. Surrounding each of the pole pieces is a magnetic shield 70 of a suitable material such as metal having an elongated slot 72 at the top thereof, which slot directly underlies string 10. It will be noted that the top of the pole piece is flush with the top of the shield. Thus from a magnetic standpoint, the pole 66 is exposed only by means of the slot 72. The whole assembly of six pickups is covered with an electrostatic shield 74 of a non-magnetic material such as brass. If desired, a plastic potting material may fill the space inside shield 74. It will be noted that each pickup is staggered with respect to its neighbor; this minimizes cross talk between the strings.

Referring now specifically to FIGURE 5, the hookup of the various switches is shown. The switch 26 is a three-pole, double-throw switch and serves as a stereo-monoaural switch. When in the position shown, coils 42, 46, and 50 are in a series with the output taken through wire 76, while coils 40, 44 and 48 are similarly in series with the output taken through wire 78. When in this position, the potentiometer 28 serves as a high frequency control for channel A, while switch 32 is adapted to connect one or more of the capacitors 32-A into the circuit serving as a rolloff control for channel A. Similarly, controls 30 and 34 control high frequency response and rolloff for channel B. The loudness of the two channels is controlled by potentiometers 22 and 24 and output is taken from jacks 36 and 38 for channels A and B, respectively. When using the pickup with switch 26 in this position, a complete stereo effect is achieved as if two separate instruments were being used. The strings are not separated in the conventional bass and treble configurations, but rather, are separated in a 1, 3, 5 and 2, 4, 6 configuration.

When the switch 26 is moved to the opposite position from that illustrated in FIGURE 5, all six of the coils are in series and output appears both at 76 and 78. However, the tone controls are still operative for the separate outputs on the jacks 36 and 38 so that even when employing a monaural signal, a dual channel output circuit can still be used with separate tone controls for each channel.

It is made apparent from the foregoing that I have provided an improved pickup for electric guitars which gives a full stereo effect which can be switched to a monaural effect at will.

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Although the output is shown as being taken from strings 1, 3, 5 on one channel and the remaining strings on the other channel, it is obvious that other configurations might be used since each pickup provides a separate output for one of the strings.

In one practical embodiment of the invention the pole pieces were 1.25 inches long and 0.11 inch wide. The length should be at least 10 times the width for optimum results.

The pickup of the present invention gives a true acoustical tone in contrast with the mechanical tone normally associated with electric guitars.

Although the pickup for the present invention has been described in conjunction with a six-stringed instrument, it is quite obvious that the principles of this invention apply to any metal stringed instrument regardless of the number of strings.

I claim:

1. A pickup for a metal stringed instrument having a plurality of strings comprising an individual pole piece underlying each string each pole piece having a length of several times its width and having its long axis lying parallel with the string, each pole piece having a ferromagnetic shield surrounding the bottom and sides of the pole piece leaving only the top face of the pole piece exposed to the string.

2. A pickup in accordance with claim 1 for an electric guitar or the like, said pickup comprising separate pole pieces for each string, each of said pole pieces having a long, narrow configuration having its long axis parallel with a string, wherein the pole pieces for adjacent strings are staggered with respect to each other.

3. An electronic pickup in accordance with claim 1 for a six-stringed instrument comprising six elongated pole pieces, one of which is placed under one of the strings

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of the instrument, and wherein the poles for strings 1, 3, and 5 are in alignment forming a first set, and wherein the pole pieces for strings 2, 4 and 6 are likewise in alignment forming a second set, the first set of pole pieces being staggered with respect to the second set of pole pieces.

4. The structure of claim 3 wherein each of said pole pieces has windings thereon with the windings for strings 1, 3 and 5 connected together to form a first output channel, and wherein the windings for strings 2, 4 and 6 are connected together to provide a second output channel.

5. The structure of claim 4 wherein each of said channels has separate high frequency control and a separate rolloff control.

6. The structure of claim 4 wherein a switch is provided whereby when said switch is in a first position, strings 1, 3 and 5 form a first output channel and strings 2, 4 and 6 form a second output channel, and when said switch is in a second position, all of said windings are combined into a single output channel.

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