Dec. 12, 1967 E. W. CARMICHAEL 3,357,291

HI FI AMPLIFICATION OF A SELF-CONTAINED AMPLIFIER FOR GUITAR

Filed May 25, 1966

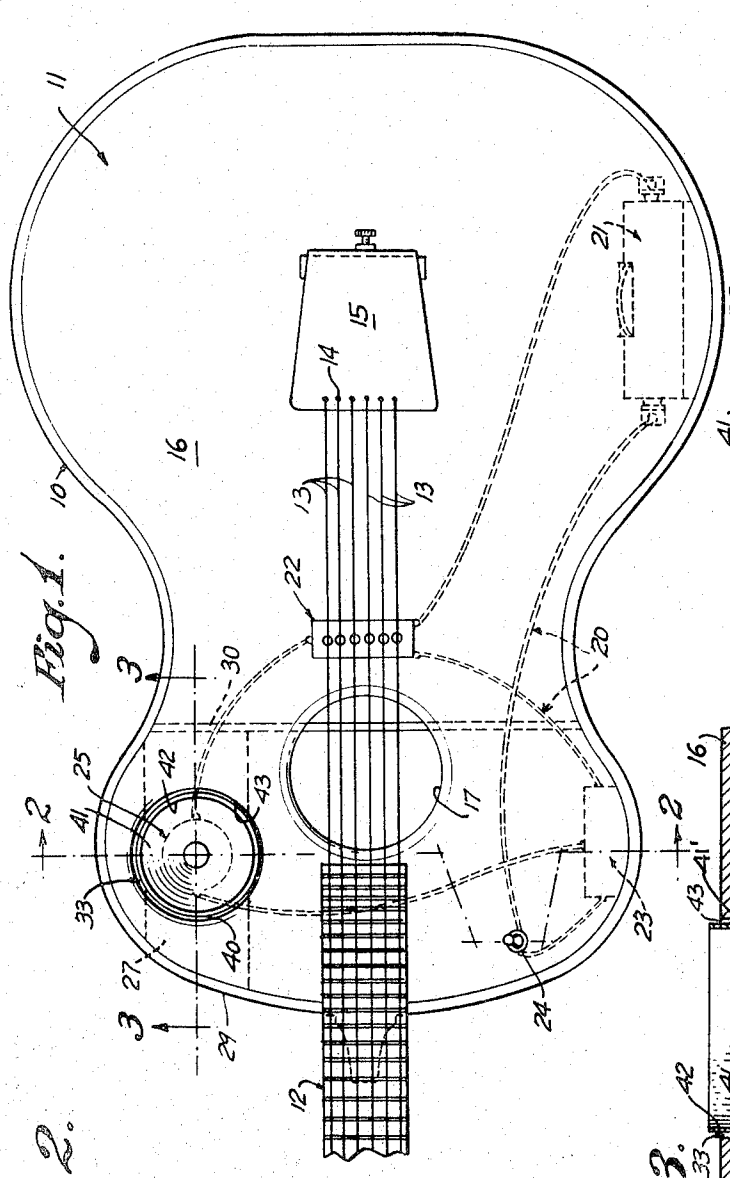


Fig. 1.

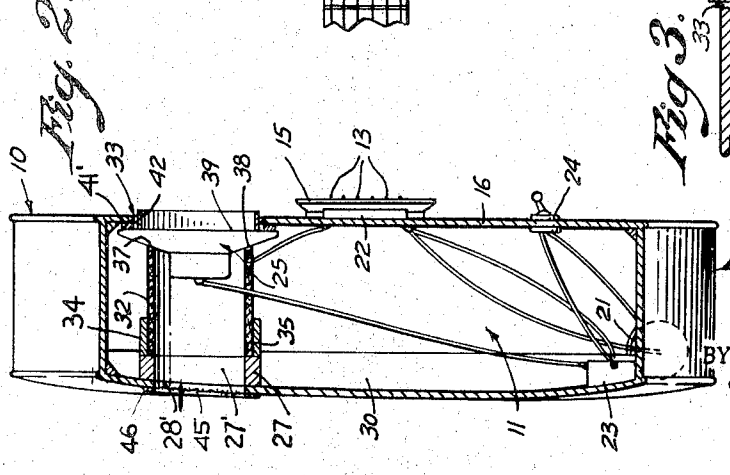


Fig. 2.

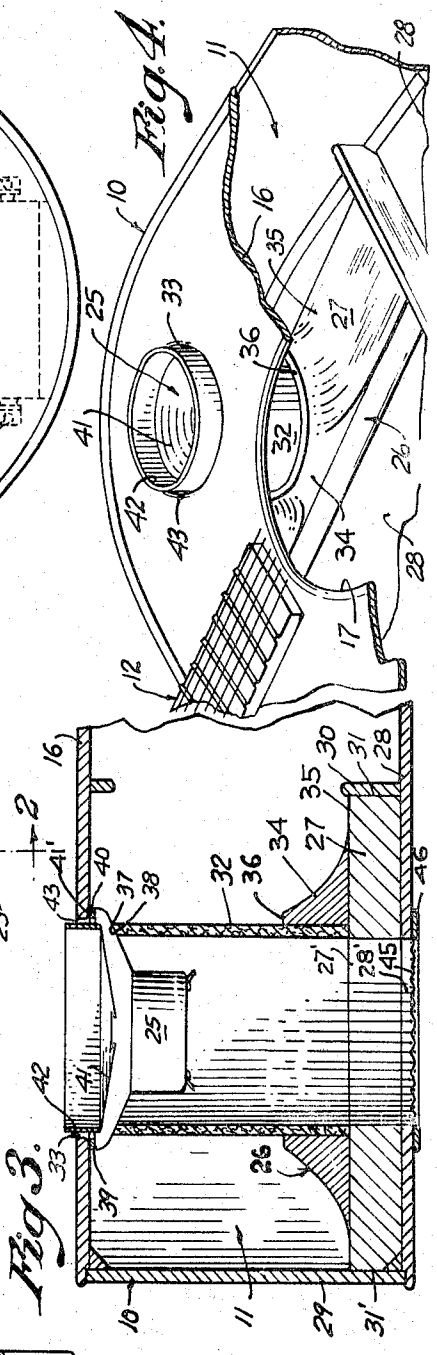


Fig. 4.



Fig. 3.

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# HI FI AMPLIFICATION OF A SELF-CONTAINED AMPLIFIER FOR GUITAR

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8 Claims. (Cl. 84—267)

This invention relates to a speaker mount and more particularly to such a means for mounting a speaker within a conventional guitar. The present application is a continuation in part of my former application Ser. No. 490,488 filed in the United States Patent Office on Sept. 27, 1965.

In general the present invention contemplates the conversion of a conventional guitar into one in which a magnetic pickup and sound amplification system may be built into the instrument itself. Magnetic pickups in which vibrations of the strings of a guitar are imparted to an armature for the purposes of setting up small voltage disturbances therein are not broadly new. Such a pickup is shown and described in United States Letters patent No. 2,557,754 which issued June 19, 1951 to Gurnie E. Morrison. As illustrated in the Morrison patent such pickup equipped guitars do not rely on the sound box but rather on the hi fidelity circuitry for transmitting and amplifying the sound vibrations created by the strings. In other words, electrical guitars are constructed on a solid block body simulating the shape of a guitar and require plugs and cords connectable to a speaker unit which is remote from the instrument itself.

It is an object of the present invention to provide, in a conventional guitar, a mounting for a speaker concealed within the sound box of the instrument and means for dampening the resonance of the speaker relative to the sound box yet affording full resonance of the sound within the sound box from a normal plucking of the strings in the usual manner.

It is another object of the invention to provide a conventional guitar with sound amplification concealed within the sound box of the instrument and a speaker mount therein so constructed as to be independent of the normal operation of the sound created by the strings supplemental to the normal sound thereof.

These and other objects of the present invention will become apparent from a reading of the following description in the light of the drawing in which:

FIG. 1 is a plan view of the sound box of a conventional guitar having a magnetic pickup system embodied therein together with a built in speaker and mount therefor in accordance with the present invention.

FIG. 2 is a section through FIG. 1 taken along line 2—2 thereof.

FIG. 3 is an enlarged fragmentary section through FIG. 1 as seen along line 3—3 thereof.

FIG. 4 is a fragmentary perspective view of a portion of the sound box broken away to illustrate the speaker mount of the present invention.

Referring to the drawing a conventional guitar **10** is shown as having a sound box **11** constructed in the usual manner. The fret arm **12** shown fragmentarily has the usual adjusting screws (not shown) at its head for tuning the strings **13** which are anchored as at **14** to a plate **15** mounted on the top panel **16** of the sound box **11**. The sound box **11** has the usual circular opening **17** just beyond the inner end of the fret arm **12** and the instrument is played by plucking the strings to resonate the tone therefrom within the sound box in the usual manner.

The electrical and audio circuit **20** therefor includes the usual components such as a self contained source of electrical energy in the form of a dry cell battery **21**; a magnetic pickup **22**; a micro-electric amplifier unit **23** of the transistor type, a switch **24** and a speaker **25**. The components are mounted on and some are concealed within the sound box **11** so that an entire hi-fidelity amplification system is self contained on and in the guitar **10**.



The battery **21** and micro-electric unit **23** are each mounted securely in a replaceable manner within the sound box **11**. The magnetic pick-up **22** may be mounted in any convenient place to pickup vibrations from the strings. In the present disclosure I have shown it mounted on the top panel **16** of the sound box with an independent magnet associated with each of the strings of the guitar in the usual manner. The switch **24** may be mounted on any wall of the guitar, as for example, thet top panel **16** in a zone thereof out of the way of normal playing area thereof.

The speaker **25** is preferably placed in a free area or zone of the instrument and mounted in such a manner as to be shielded from and to shield the sound box from any reflective reaction of the sound vibrations of each against the other. It is to this purpose that the speaker mount of the present invention is directed.

The speaker mount of the present invention, generally designated **26**, comprises a base board platform **27** fit solidly to the bottom or back panel **28** of the sound box **11**. The platform **27** is preferably a hard balsa wood strip or slab shaped to fit the contour of the back panel **28** of the sound box **11** and a cross rib **30** within the box **11**. The cross rib **30** may or may not be present in the conventional instrument. If none is present such a rib **30** must be placed in the manner shown for an abutment for the end **31** of the platform **27**. The rib **30** is glued to the inner surface of the back panel **28** as is the platform **27** and the ends **31** and **31'** of the latter are firmly glued to the rib **30** and one end wall **29** of the guitar.

The base board platform **27** has a hole **27'** bored therethrough to receive and support a tube **32**. The back panel **28** likewise has a hole **28'** bored therethrough in alignment with the hole **27'** in the platform **27** and the inner wall of the tube **32**.

The diameter of the tube **32** is dictated by the size of the speaker **25**. The platform **27** is of a width to support the tube or cylinder **32** which has an outside diameter such as to support the speaker **25**. The tube **32** may be any suitable material such as paper, wood or plastic as desired. The platform **27** preferably extends parallel to the long axis of the instrument, i.e., lengthwise between the cross rib **30** and the wall **29** of the sound box.

The diameter of the speaker **25** is dictated by the area or zone available for its exposure through the top panel **16** of the sound box **11**. The exposure is made through an aperture **33** formed in the top panel **16** directly above the platform **27** and co-axially of holes **27'–28'** and the tube **32**.

The tube or cylinder **32** is mounted within a round collar **34** of wood which fits tightly around the tube and the collar **34** is glued to the top surface **35** of the platform **27**. The collar **34** is slightly higher than the thickness of the platform **27** and has its upper surface **36** spaced from the top end **37** of the tube **32**. The collar **34** is coved away from its upper end **36** to a spread bottom adjacent the platform **27**.

The top end **37** of the tube **32** is countersunk to conform to the cone shaped back wall **38** of the speaker **25** and is secured to the latter by suitable cement or glue to provide an infinite, absolute, sound sealed backing for the speaker. Neither the speaker nor any part of the speaker mount is in direct contact with the top panel **16** of the sound box **11**. This is one of the most critical aspects of the present invention to assure against the resonant qualities of the top panel being effected by sound vibrations from the speaker and vice versa.

To attain this purpose, the top surface **39** of the speaker **25** is set just beneath, but not touching the under surface of the top panel **16**. It has been found that a clearance space of from .030 to .060 of an inch between the top surface **39** of the speaker and the under surface of the top panel **16** achieves best results. The top surface **39** of the speaker **25** is a solid metallic ring **40** circumscribing the flexure cone **41** of the speaker. To assure insulation, non-touching, between the ring **40** and the top panel **16** of the sound box a suitable sound and vibration absorbing washer **41'** may be inserted therebetween as shown. For purposes of the present invention a fiber sound ring **42** is set into the ring **40** and cemented thereto. This sound ring **42** is a hard paper or fiber cylinder which extends up through the aperture **33** in the top panel **15** for a distance of approximately 1/16 of an inch above the top surface of the top panel **16**.

As best seen in FIGS. 2 and 3, a clearance space between the circular margin **43** of the aperture **33** and the outer surface of the sound ring **42** must be provided. A clearance of .020 to .040 of an inch between the ring **42** and margin **43** of the aperture is considered best.

By the foregoing arrangement the speaker mount **26** provides a shield between the flexure cone **41** of the speaker **25** and the resonant effect of the top panel **16**. Moreover, the entire speaker unit is supported from the back panel **28** of the sound box in a zone thereof remote from the resonant sound board effect of the sound box. The platform **27**, tube **32** and collar **34** of the mount **26** all being firmly and securely attached to the back panel **28** assures against vibrations of the latter effecting that of the flexure cone **41** of the speaker and vice versa.

The open bottom of the tube **32** as provided by the bore **27'** in the platform and the bore **28'** in the bottom panel of the guitar relieves any back pressure behind the speaker **25** and thus assures clear tone from the flexure cone **41** of the speaker without creating reverberation in the speaker body. A suitable screen **45** of fiber glass material or the like may be secured to the back panel **28** to cover the opening **28'** therein and a neat trim collar **46** secured to the back panel around the bore **28'** serves to hold edges of the screen **45** in place.

While I have described the speaker amount for a conventional guitar in specific detail it will be appreciated that the same may be susceptible to variations, modifications and/or alterations without departing from the spirit or scope of my invention. I therefore desire to avail myself of all variations, modifications and/or alterations as may fairly come within the purview of the appended claims.

What I claim as new and desire to protect by Letters Patent is:

**1.** The combination with a loud-speaker of an amplifier system built into the sound box of a conventional guitar having a top and a bottom panel spaced by an outer wall, a speaker mount comprising;



an aperture formed in such top panel in a zone thereof remote from the strings of the guitar and having a marginal edge slightly larger than the inner diameter of the outer rim of such speaker at the perimeter of the flexure cone of the speaker,

a platform conforming to the contour of the inner surface of such bottom panel and secured thereto opposite the aperture formed in such top panel,

a cylinder having one end mounted on said platform and its opposite end secured to the back of the speaker for supporting the speaker concentric to and in spaced relation but close proximity to the aperture formed in such top panel, and

a sound ring secured to the outer rim of such speaker and in spaced concentric relation to the marginal edge of the aperture in such top panel.

**2.** The speaker mount in accordance with claim **1** in which said sound ring extends above the top surface of such top panel to shield the flexure cone of said speaker from the vibrations of the strings of the guitar.

**3.** The speaker mount in accordance with claim **1** in which said platform and the bottom panel of the guitar each have a hole formed therethrough conforming substantially to and aligned with the inner wall of said cylinder.

**4.** The speaker mount in accordance with claim **1** including a sound and vibration absorbing collar between the outer rim of the speaker and the top panel of the guitar.

**5.** The speaker mount in accordance with claim **1** including a cross rib on the inner surface of the bottom panel of said guitar in spaced relation to one end of the outer wall thereof and in which said platform extends parallel to the long axis of the guitar and has its ends secured to said cross rib and to said end wall of the guitar.

**6.** The speaker mount in accordance with claim **3** including a sound and vibration absorbing collar disposed in the space between the outer rim of the speaker and the top panel of the guitar.

**7.** The speaker mount in accordance with claim **6** including a sound ring within the outer rim of the speaker and extending upwardly through the top panel and in spaced relation to the aperture in such top panel.

**8.** The speaker mount in accordance with claim **7** including a cross rib secured to the inner surface of the bottom panel of the guitar and in spaced relation to one end of the outer wall of the latter, and in which said platform is secured to said cross rib and to said one end wall of the guitar.

No references cited.

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