United States Patent

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[54] NECK MOUNTING FOR A STRING INSTRUMENT

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[52] **U.S. Cl.** **84/293,** 84/267

[51] **Int. Cl.** **G10d 3/00**

[58] **Field of Search** 84/267, 293, 268, 269, 274, 84/291

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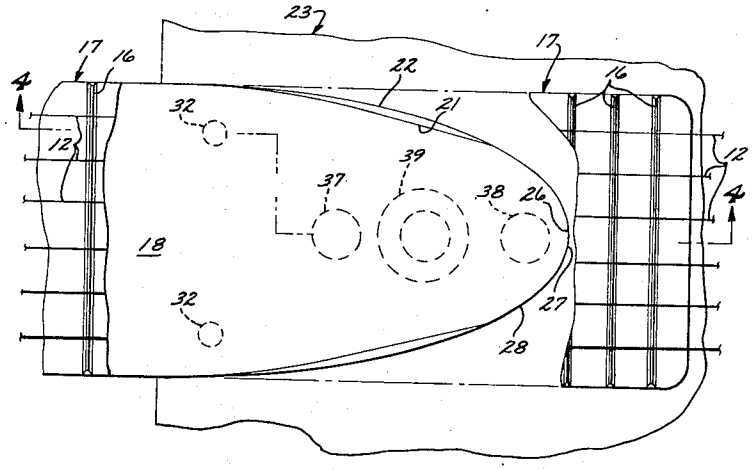
[57] **ABSTRACT**

The present invention relates to a string type musical instrument; and more particularly relates to a neck mounting for attaching the instrument neck to the instrument body. The various problems associated with this mounting are discussed and the disclosure teaches how an improved neck mounting may be achieved to overcome these problems.

10 Claims, 5 Drawing Figures



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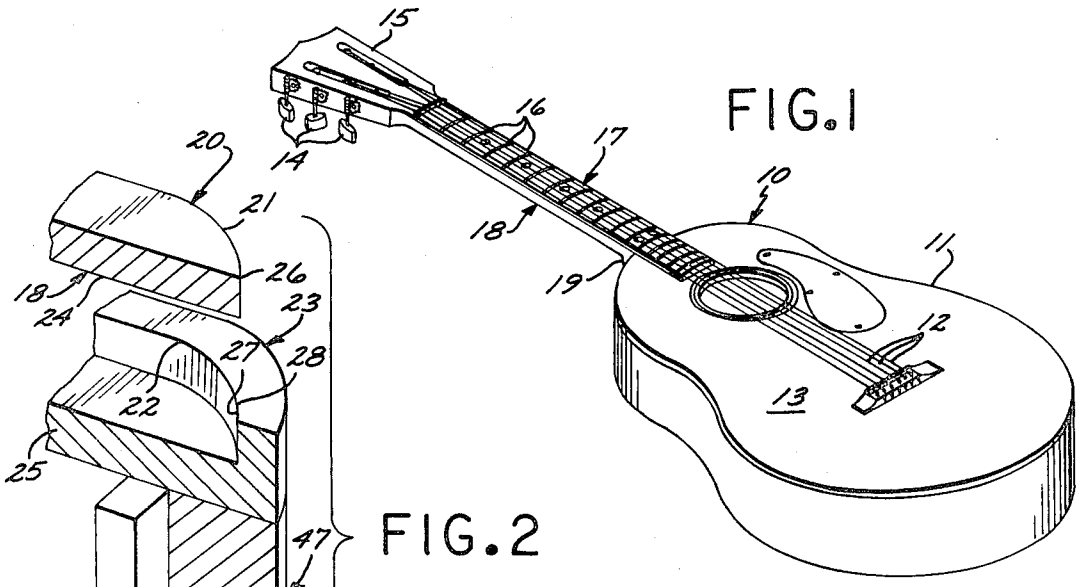

FIG. 1

FIG. 2

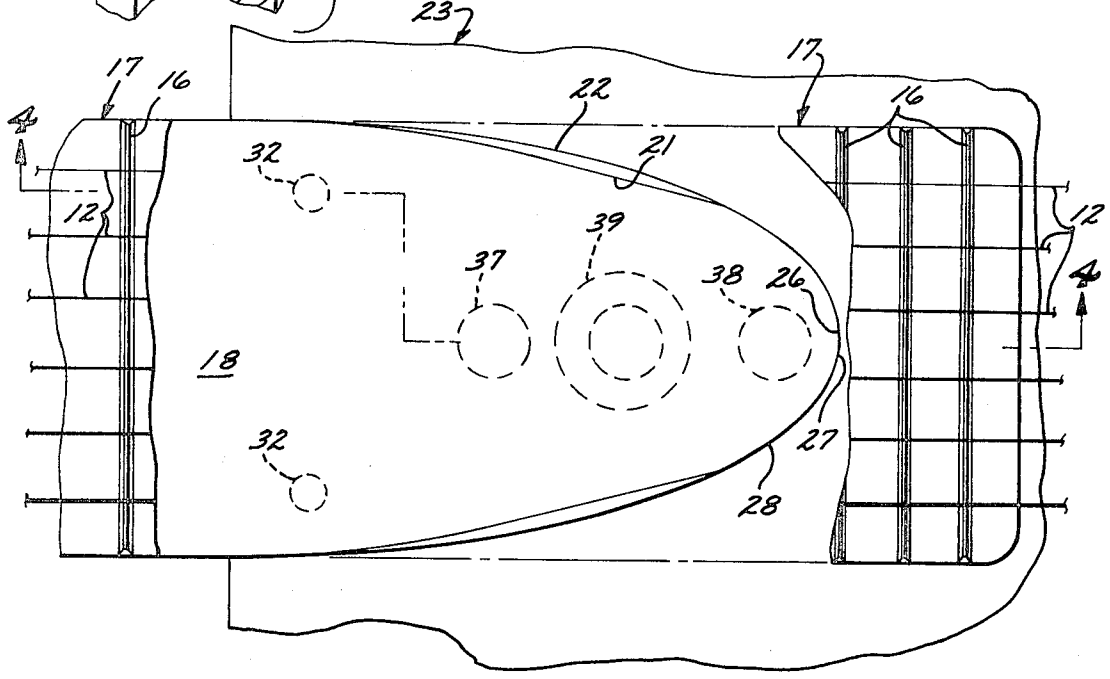

FIG. 3

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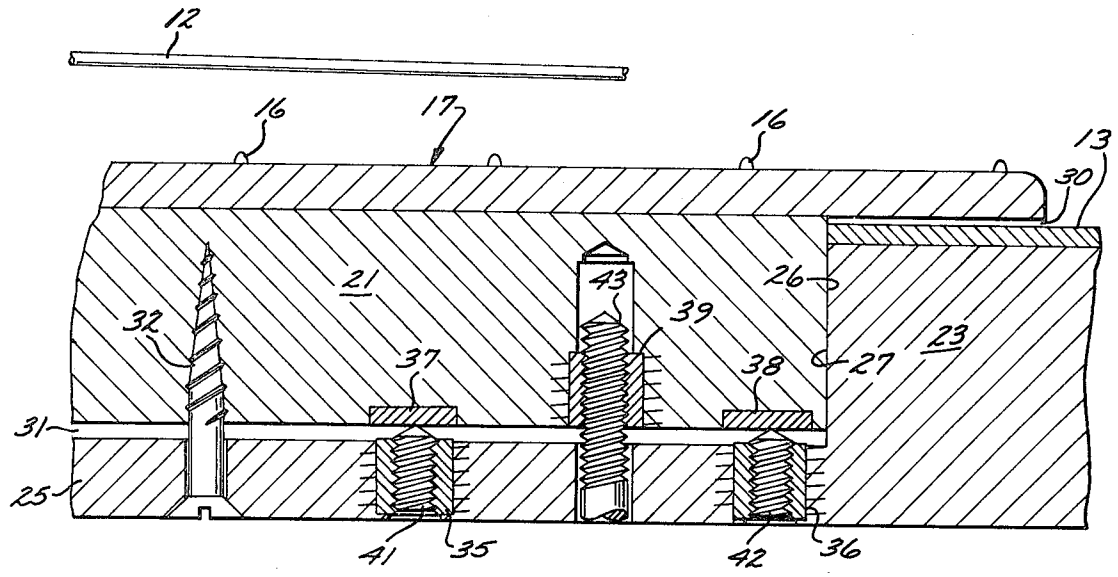

FIG. 4

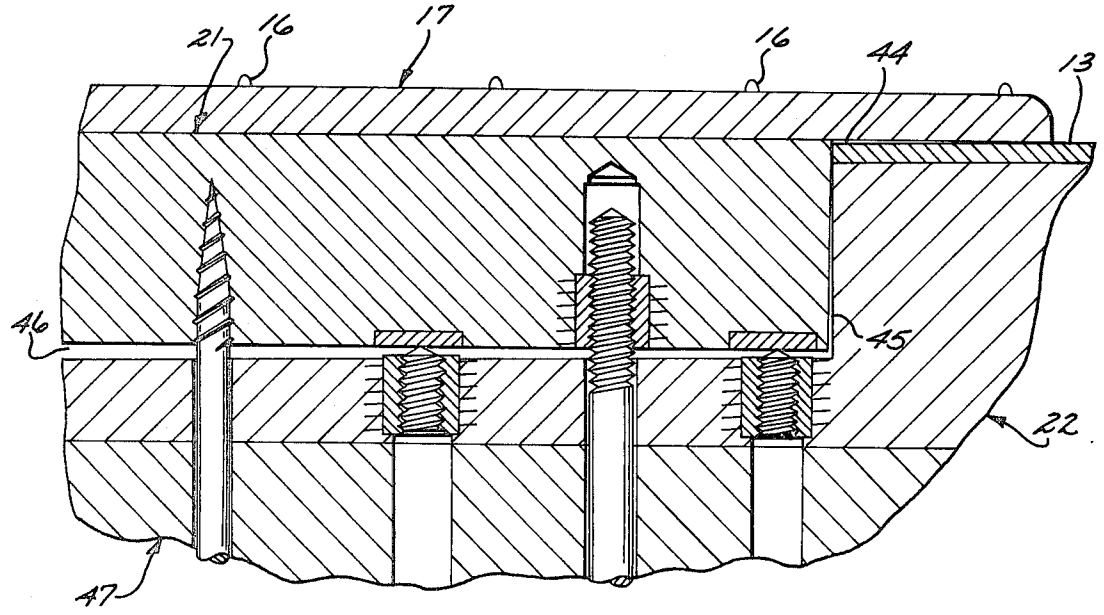

FIG. 5

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NECK MOUNTING FOR A STRING INSTRUMENT

BACKGROUND

It is well known that a guitar, and other string instruments, are a complex intermix of parts that are chosen for their own particular characteristics and for the way that these parts interact with each other. This interaction, and the final tonal characteristics of the instrument, are determined to a great extent upon the manner in which the various component parts of the instruments are assemblied relative to each other.

For example, the instrument's body must be carefully shaped in order to bring out the desired tonal characteristics but the material of which the instrument body is made has a great deal to do with the resultant tones. Moreover, the strings must be carefully selected, carefully mounted, and carefully tensioned in order for them to produce the desired musical notes; but a suitable "bridge" must transmit the string vibrations to the instrument body. Furthermore, the strings must be fingered to vary their pitch and this requires a finger board that is matched to the rest of the instrument components. In addition to all of this, the tensional forces produced by the stretched strings are such that they tend to distort the instrument; and in order to prevent this distortion, the entire instrument must be designed and made in such a way that this distortion either does not occur or is minimized.

One of the most preplexing problems of instrument design is the attachment of the finger board to the instrument body; as this should be done in such a manner that it provides an esthetic appearance, suitable structural strength, satisfactory operative length, ease of adjustment, etc.

OBJECTS AND DRAWINGS

It is therefore the principal object of the present invention to provide an improved musical instrument.

It is another object of the present invention to provide an improved musical instrument of the string type.

It is still another object of the present invention to provide an improved means for attaching the instrument's neck and finger board to the instrument's body.

It is a further object of the present invention to provide an improved adjustable means for attaching the instrument neck to the instrument body.

It is a still further object of the present invention to provide a method for easily attaching the instrument neck to the instrument body.

The attainment of these objects and others will be realized from the following detailed description, taken in conjunction with the drawings of which:

FIG. 1 shows a pictorial view of a string type musical instrument, specifically a guitar;

FIG. 2 shows a schematic, exploded, cross sectional view of the neck mounting;

FIG. 3 shows a plan view of the neck mounting;

FIG. 4 shows a longitudinal cross sectional view of the neck mounting in a preliminary state; and

FIG. 5 shows a longitudinal cross sectional view of the neck mounting in a final state.

SYNOPSIS

Broadly speaking, the present application discloses a neck mounting that causes the neck end of the instrument to mate with a neck socket; the mating being accomplished by means of quasi-parabolic curvatures that obviate binding, and additionally produce a pressure abutment that eliminates shear stress on other elements of the neck mounting.

Adjustment screws permit the control of the vertical angle between the instrument neck and the instrument body; these resultinG in a long lasting metal-to-metal contact.

INTRODUCTION

The Overall Instrument

FIG. 1 shows a pictorial view of a guitar **10** having a body **11**; a plurality of strings **12** having one end thereof fastened in a suitable manner to the table **13** of guitar body **11**. The other ends of strings **12** are attached in a tensional manner to a like plurality of tuning pegs **14** that are rotatably positioned in a head **15**.

To play the instrument **10**, the player's fingers pinch selected strings **12** against the raised "frets" **16** of a fret board **17** that is affixed to the instrument's neck **18**. Thus, the instantaneous string length may be controlled to provide different tones.

In a manner that is not completely understood, when the strings are plucked or are otherwise set into motion, the string vibrations are transmitted to the body **11** of the instrument, and thence to the volume of air enclosed by the instrument body. Various factors (e.g., body shape, body volume, body material, body reinforcements, string tension, string mass, bridging between the strings and the body, etc.) co-act to produce the instruments overall tonal characteristics.

As may be understood from FIG. **1**, when the strings **12** are tightened, the resultant tensional forces tend to raise the instrument's head **15** and the distal end of neck **18**; and this raising tendency places a great strain on the neck/body jointure **19** where the instrument neck **18** is attached to the instrument body **11**.

BASIC CONCEPT

The improved neck/body jointure **19** is achieved, in part, as indicated in the partially cutaway, exploded, schematic representation of FIG. **2**; this indicating how the proximal end of neck **18** is shaped to form a neck end **20** having a convex tongue — like termination **21** that fits into concave arched neck socket **22** of a neck saddle **23**. It will be noted that the neck end **20** is shown to have a substantially flat bottom **24** that engages the substantially flat bottom of the neck base **25**.

Further details of the neck/saddle jointure will be seen in the top view of FIG. **3**. This view shows the strings **12** and the top of the fret board **17**, which has been partially cutaway to reveal the neck saddle **23** and the tongue **21** of the instrument neck **18**.

It will be noted that the tongue **21** is a narrow quasoparabolic shape whose sides fit somewhat loosely into a more rounded quasi-parabolic shape **22** of neck socket **23**. The extreme end **26** of tongue **21** abuts the extreme end **27** of the arch **28**. The neck end **20** is fastened to the neck saddle **23** in a manner to be more fully described later.

It should be noted at this time that the non-matching quasi-parabolic curvatures of tongue **21** and arch **28** assure that the string tensional forces cause a pressure-abutment at the tongue/arch contact area of the two quasi-parabolic curvatures; and that, moreover, there is no pinching or binding of the sides at the relieved curvature portion **21**.

Attention is now directed to FIG. **4** which shows a partial, longitudinal, cross sectional view of the neck/body mounting in a preliminary state; this view being taken where indicated by the arrows and numerals "**4**" of FIG. **3**. In FIG. **4**, a fret board **17** is indicated to be affixed to the upper surface of the instrument neck **18**; the right hand end of the fret board **17** extending a short distance over the neck saddle **23** and the table **13** of the guitar body, primarily for esthetic purposes, but also for providinG improved control of string length.

A pair of so-called "knife edged" inserts **35** and **36** are driven into the base **25** of the neck saddle **23**; the knife edges positioning the inserts, and holding them firmly in position. A pair of flat metal pressure pads **37** and **38** are placed in the bottom surface of the neck end **21** opposite the inserts **37** and **38**; and another knife edged insert **39** is positioned in the tongue **21**.

ASSEMBLY

As indicated in FIG. 4, the instrument's tongue **21** is first positioned in neck socket of neck saddle **23**, with the extreme end **26** of the tongue **21** abutting the extreme end **27** of the arch of the neck socket. At this time, one or more wood screws **32** are driven through clearance holes in the base **25** of the neck saddle **23**, and into the neck end **21**; these wood screws **32** holding the parts juxtaposed for the final aligning and tightening.

ADJUSTMENT

At this time it becomes desirable to finalize the position of the neck **18** relative to the neck saddle **23**. Obviously, the instrument neck **18** should project longitudinally along the instrument's axis; and this transverse relation is readily obtained by means of the above mentioned quasi-parabolic curvatures of neck end **21** and of neck socket **22**; and by the use of wood screws **32**. Also, obviously, the upper surface of the fret board **17** shOuld be substantially parallel with the table **13** of the instrument; and this relation is easily obtained by means of the above-mentioned flat surfaces of the neck end **21** and of the base **25**.

However, the vertical angle between the neck **18** and the body **11** is preferably adjusted for each individual instrument, or group of instruments depending upon the expected string tension, the neck length, the height of the bridge (if one is used), etc.

This vertical angle adjustment is one of the very important advantages of the present neck mounting arrangement as it controls the height of the strings above the fret board in the area where the instrument neck joins the instrument body; and this vertical angle adjustment is achieved as follows. Set screws **41** and **42** are threadedly engaged in respective inserts **35** and **36**; and are then tightened down until they are both snug against their respective pressure pads **37** and **38**. This equal snuggness of the set screws causes the longitudinal axis of the fret board **17** to be substantially parallel with the longitudinal axis of the instrument, as indicated by the spacings **30** and **31**.

However, it is ordinarily desirable that the fret board **17** (and the neck **18** to which it is affixed) be slanted slightly upward relative to the table **13**; this causing the righthand end of the fret board to be a somewhat closer fit to the instrument body **11**, and also eliminating the need for an adjustable height bridge.

In order to obtain this desired vertical angle, retaining screw **43** is loosened; and set screws **41** and **42** are either raised or lowered to obtain the desired angle. In the present illustration, the set screw **42** is backed off about half a turn; and the retaining screw **43** is then tightened to pull the tongue **21** down upon the base **25** of the neck saddle **23**; and to prevent neck **18** from being moved any further. This operation has the effect of lowering the right side of the tongue; to produce the small tapered spaces indicated at **44**, **45** and **46** of FIG. **5**. Thus this angle adjustment, whether upward or downward, can be achieved very easily. By reason of the above-described vertical angle adjustment, the string height above the fret board can be adjusted for the player's preference. It can also be used to accommodate any change in wood structure after the string tension has been applied. Moreover, this adjustment is convenient for compensating for bridge height variations if such should occur during manufacture.

Thus, all adjustments have a metal-to-metal contact; all string tension is connected by the tongue/arch abutment; and there is no shear strain on the mounting, or on the adjusting and the retaining screws. Moreover, the neck **18** is easily removed and/or replaced when this becomes desirable.

It is apparent that adjustment holes should be provided for reaching the ends of the set screws **41** and **42**, and the end of the retaining screw **43**.

Depending upon the way that the neck saddle **23** is to be affixed to the instrument, it is at times desirable to have the saddle supporting structure affixed to the body of the instrument; and one such structure is indicated at **47** at FIG. **2**. In this case, the adjustment holes required for the set screws **41** and **42**, and for the retaining screw **43** may have to traverse the support structure **47**. Thus, all mounting stresses are parallel to the grain of the wood of the support structure; and the construction is, therefore, both lightweight and strong.

What is claimed is:

1. A neck mounting structure for a string type musical instrument, comprising:
- an instrument neck;
- said instrument neck having a neck end;
- said neck end having a convex tongue like termination;
- a neck saddle;
- said neck saddle having a neck socket for receiving said neck end;
- said neck socket having a concave arch like termination;
- the curvature of said arch of said neck socket being more rounded than the curvature of said tongue of said neck end whereby binding between the sides of said neck end and said neck socket is obviated.

2. The combination of claim **1** including a head affixed to the other end of the said instrument neck;
- means, comprising a plurality of strings tensionally attached to said head, inducing stress into said neck mounting.

3. The combination of claim **1** including means for affixing said neck saddle to said musical instrument.

4. The combination of claim **1** wherein said tongue curvature is a quasi-parabolic curve.

5. The combination of claim **1** wherein said arch curvature is a quasi-parabolic curve.

6. The combination of claim **1** including means for attaching said neck end to said neck socket.

7. The combination of claim **6** wherein said attaching means comprises metal-to-metal pressure points.

8. The combination of claim **7** wherein said pressure points comprise set screw/pressure pad combinations.

9. The combination of claim **8** wherein said set screws are threadedly engaged with inserts located in said neck saddle; and said pressure pads are affixed to the bottom of said neck ends.

10. A neck mounting structure for a guitar, comprising;
- a guitar neck;
- said guitar neck having a neck end;
- said neck end having a convex tongue like termination;
- a neck saddle;
- said neck saddle having a neck socket for receiving said neck end;
- said neck socket having a concave arch like termination;
- the curvature of said tongue of said neck end being narrower than the curvature of said arch of said neck socket whereby binding between the sides of said neck end and said neck socket is obviated;
- a head affixed to the other end of said guitar neck;
- a plurality of strings tensionally attached to said head;
- said tensional attachment inducing stress into said neck mounting;
- means for affixing said neck saddle to said guitar;
- means for attaching said neck end to said neck saddle;
- said attaching means comprising metal-to-metal pressure points having set screws threadedly engaged with inserts located in said neck saddle and having pressure pads affixed to said neck end.

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