

[54] GUITAR CONSTRUCTION

3,696,700 10/1972 Berardi ..... 84/293

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[57] ABSTRACT

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[51] Int. Cl.<sup>2</sup> ..... G10D 1/08

[58] Field of Search ..... 84/267, 291-293

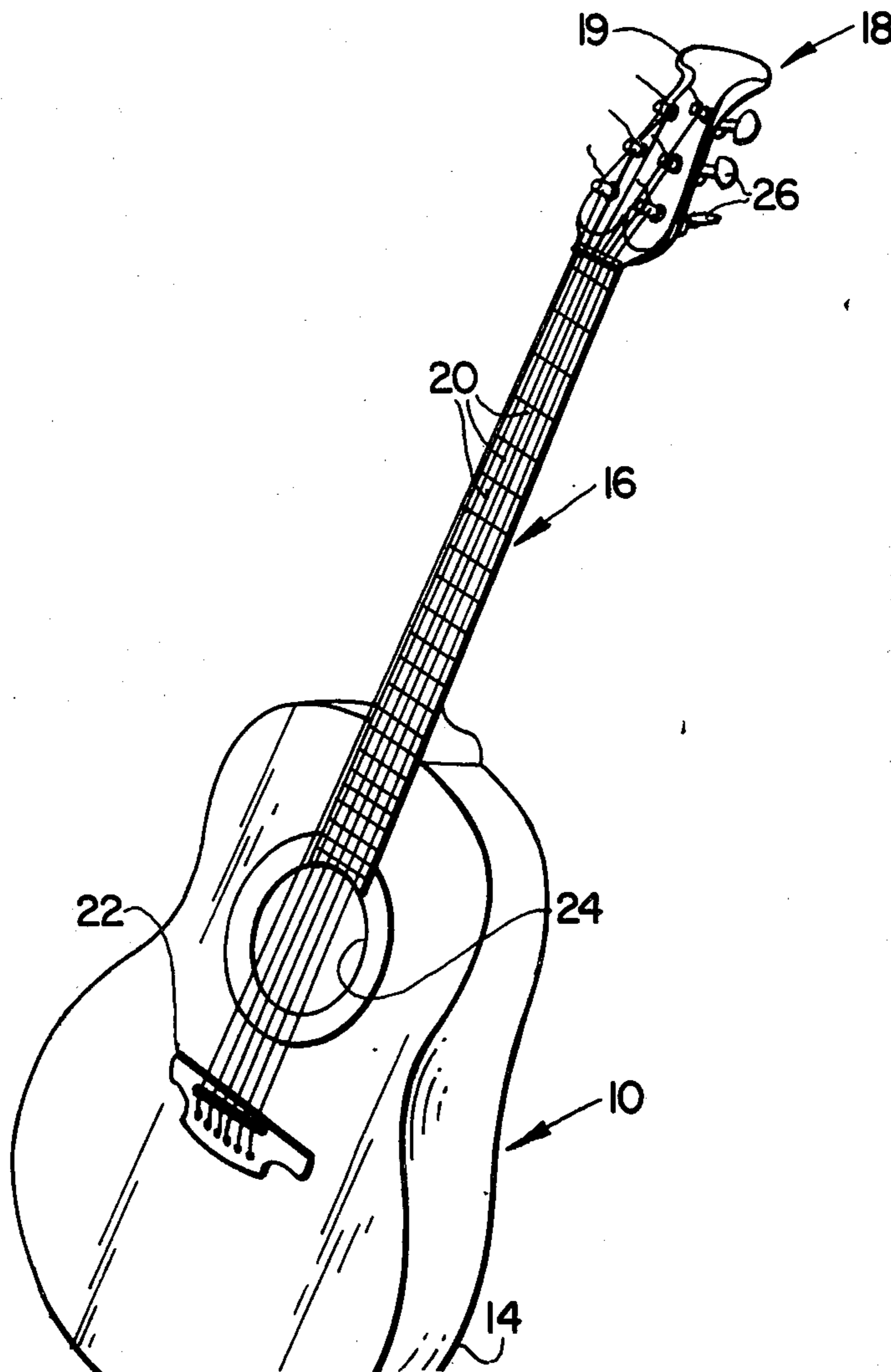
A guitar having a sound box defined by a one piece molded body of bowl shape, and a top board for enclosing the bowl. A neck is attached to the bowl and includes a die cast aluminum alloy defining the fret board and the front of the peg board. This casting is secured to an integrally molded neck block in the body and the weight of the neck is kept low by mounting a plastic back to the casting, the surface contour and texture of the plastic giving the neck a conventional wood grain appearance behind the fret board and peg board.

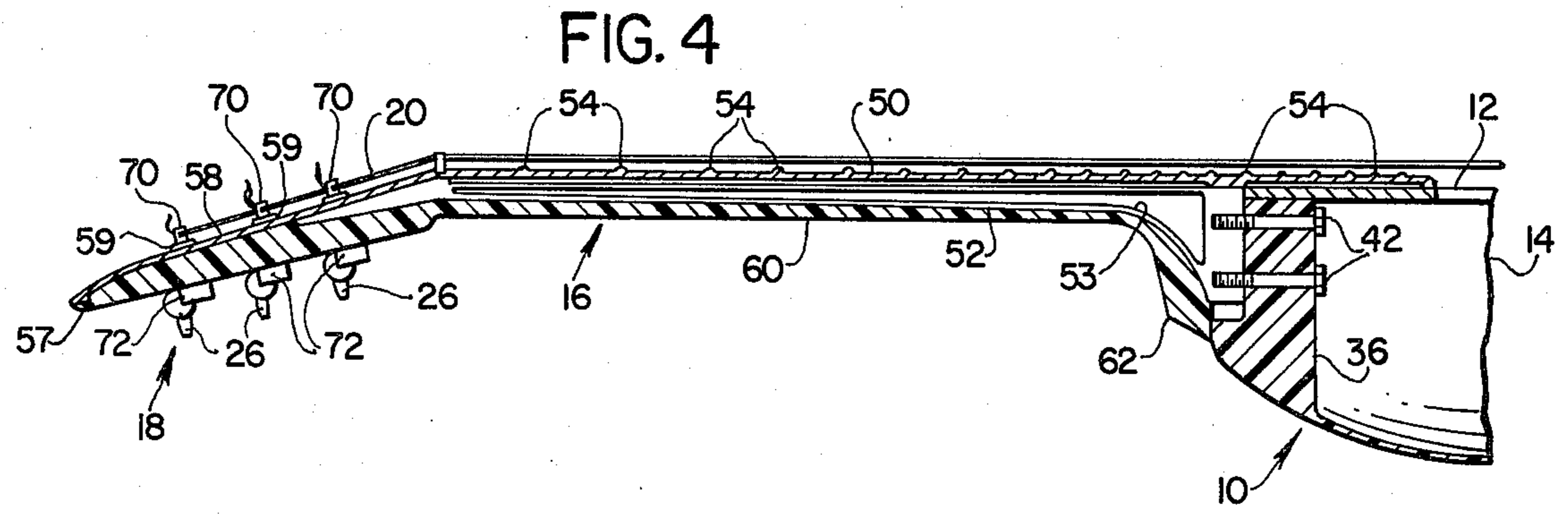
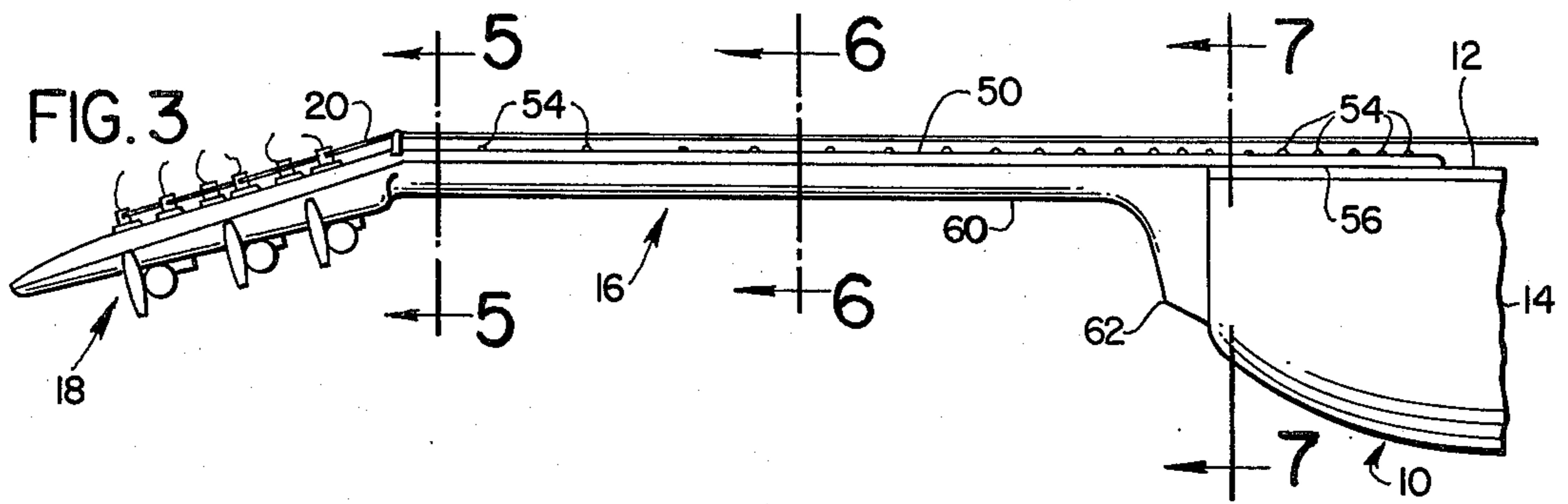
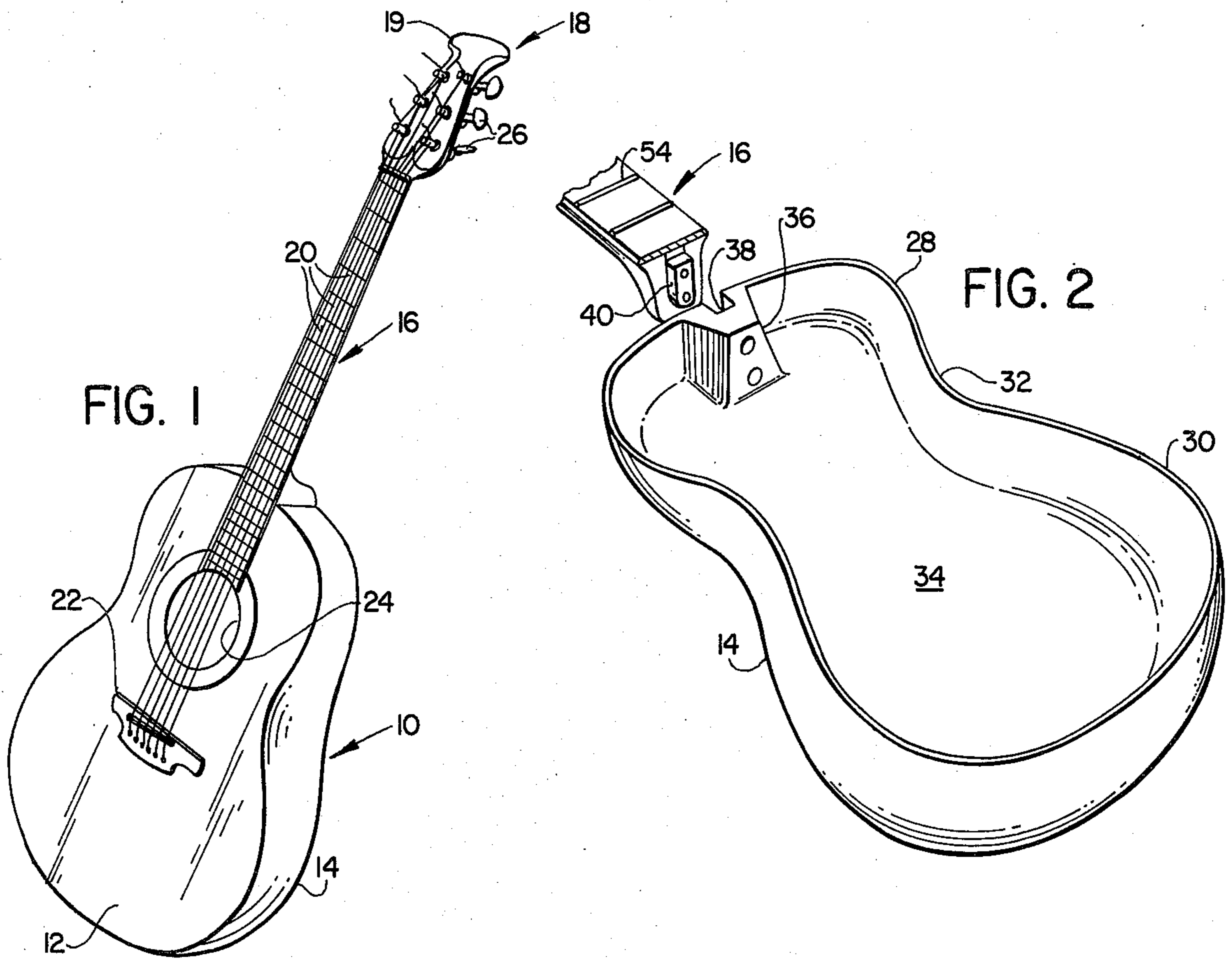
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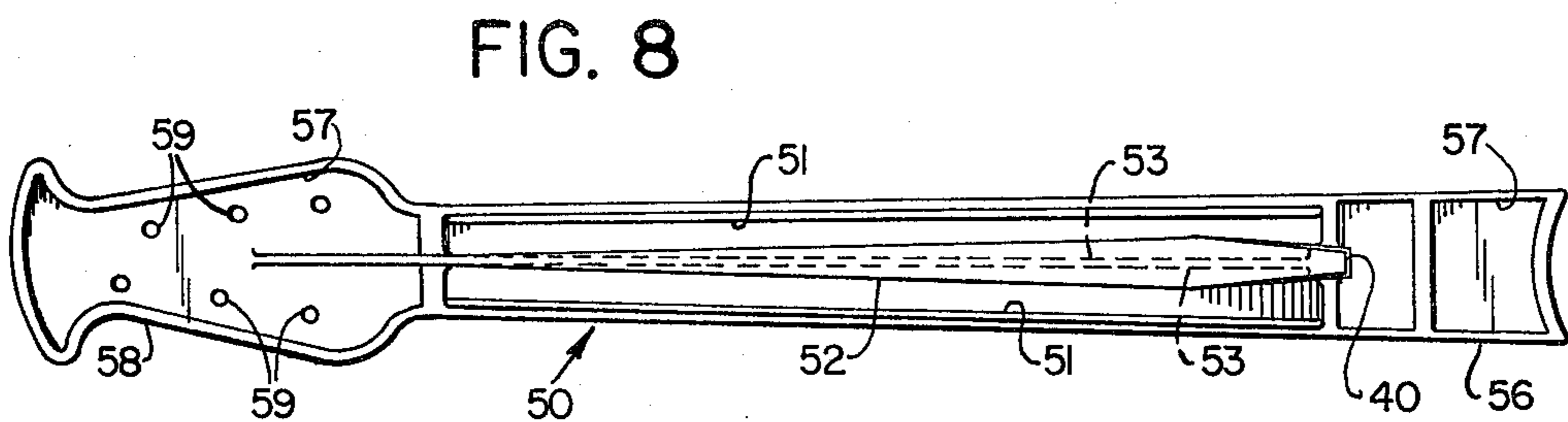
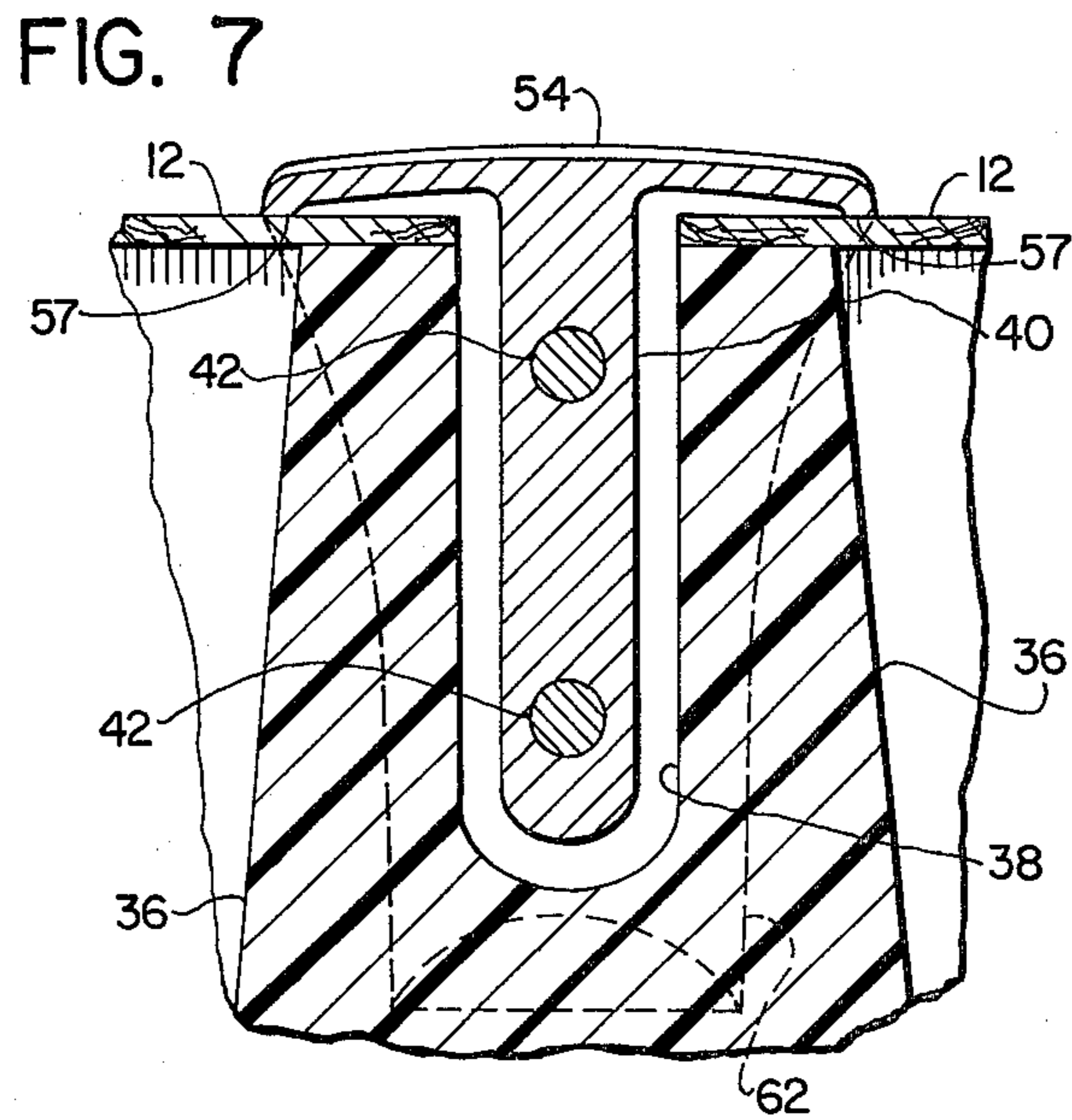
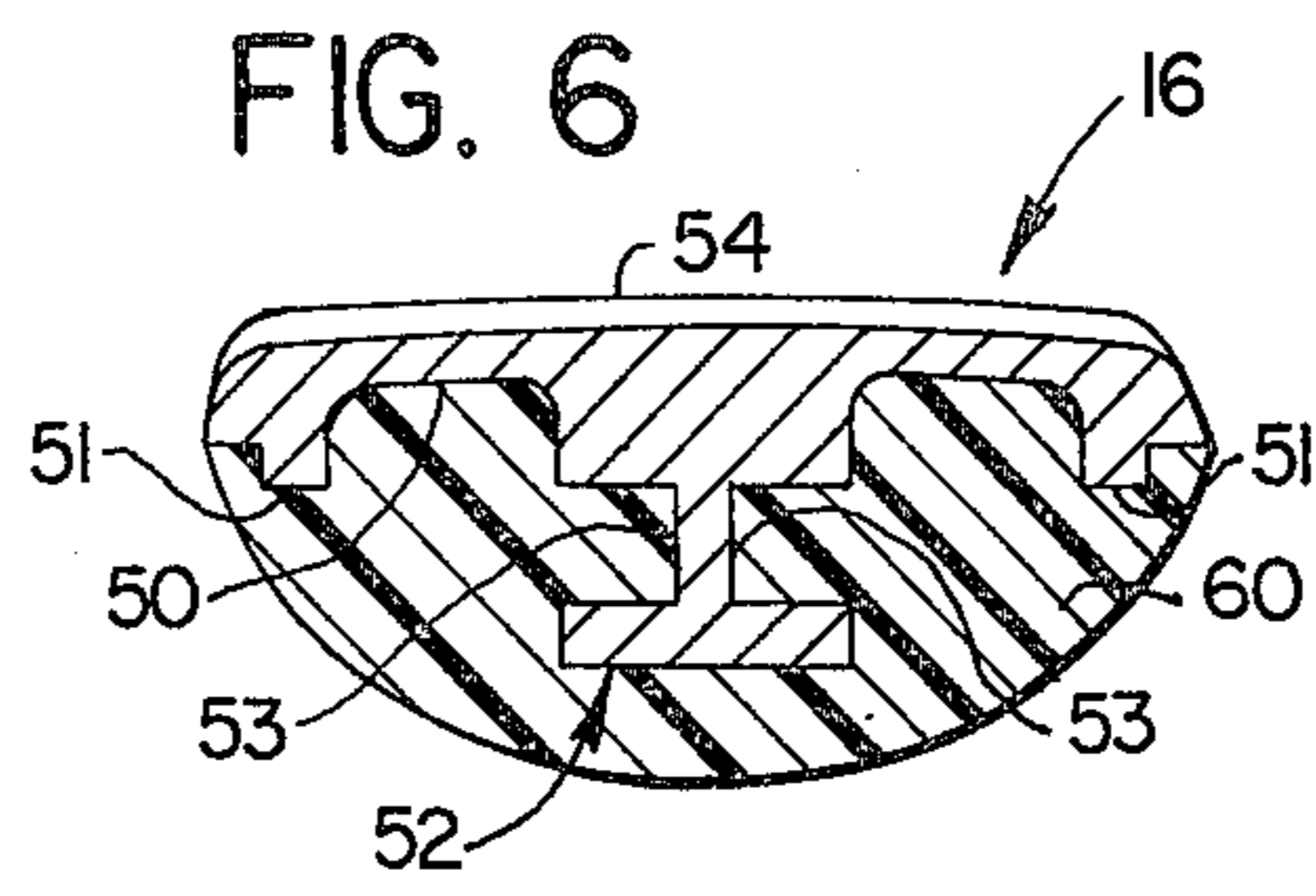
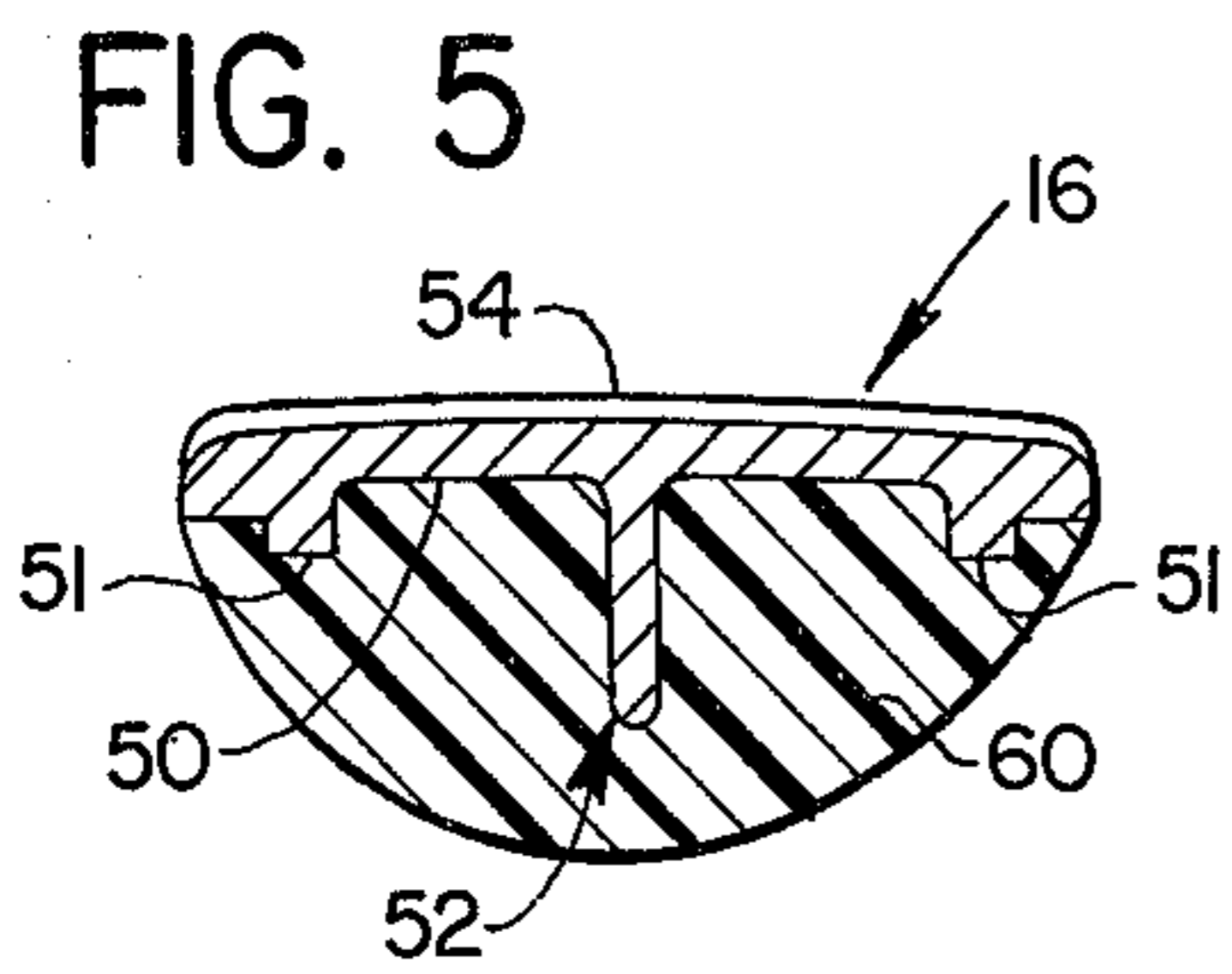
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10 Claims, 8 Drawing Figures







## GUITAR CONSTRUCTION

## SUMMARY OF INVENTION

This invention relates generally to the construction of guitars of the type having a hollow sound box and an upstanding neck attached thereto. More particularly, this invention relates to a composite neck for such a guitar, said neck including a rigid frame member one end of which is secured to a neck block integrally molded in the one piece bowl, or body portion of the sound box. A light weight plastic back member is carried by and faired into the side edges of the neck frame. The frame has a front face which defines the guitar frets, and the neck frame also supports the pegs which are adapted to adjustably receive the upper ends of the guitar strings. Thus, the invention permits the frame to be made from a structural material such as cast aluminum, while the weight and appearance of the neck is nevertheless kept comparable to the conventional wood neck by black anodizing the front face of the aluminum casting to simulate ebony for example, and by forming the plastic back with a contour and external texture to simulate other decorative wood, such as mahogany or the like.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a guitar constructed in accordance with the present invention.

FIG. 2 is a partially exploded perspective view illustrating the joint provided between the neck of the guitar illustrated in FIG. 1, a portion of the fret board defining portion of which is broken away, and also illustrating the one piece molded bowl which cooperates with the top or sound board (not shown) to define the sound box of the guitar illustrated in FIG. 1.

FIG. 3 is a side elevational view showing the relevant portions of the guitar oriented in a horizontal position.

FIG. 4 is a sectional view generally similar to FIG. 3 but with portions thereof illustrated in full lines and other portions in section.

FIG. 5 is a sectional view taken generally on the line 5—5 of FIG. 3.

FIG. 6 is a sectional view taken generally on the line 6—6 of FIG. 3.

FIG. 7 is a sectional view taken generally on the line 7—7 of FIG. 3.

FIG. 8 is a bottom view of the rigid neck frame member comprising one of the components of the neck illustrated in assembled relationship in previous views.

## DETAILED DESCRIPTION

Turning now to the drawings in greater detail, FIG. 1 shows a guitar incorporating the present invention, such a guitar comprising a sound box indicated generally at 10 and including a one piece molded generally bowl-shaped body 14 to which is attached a generally flat top plate or sound board 12. A neck 16 is carried at the upper end of the bowl 14 and the upper end of the neck 16 defines a peg head or peg board 18 to which the upper ends of the various strings 20, 20 are conventionally attached by means of adjustable posts. The lower ends of the strings are supported by a bridge 22 directly mounted to the sound board 12 and a sound opening 24 is provided in the top 12 in accordance with conventional practice. The tension in each of the strings 20, 20 is adapted to be adjusted by use of thumbscrews, indicated generally at 26, 26 one of

which is associated with each of the strings and each thumbscrew is geared to one of each of the pegs mounted in the peg board structure 18 so as to permit the user to adjust the tension in the strings of the instrument and thereby tune the instrument as required. The body 14 of the guitar preferably comprises a one piece molded plastic material which is cast from a polyester fiberglass sheet molding compound. The body is cast in a two part mold which defines the exterior and interior surfaces of this body portion 14. Thus, the sound box is defined and derives its bowl shape from an integrally molded member, which defines the various side walls and gives to the guitar its characteristic upper bout 28 and lower bout 30 with the characteristic waist 32 provided therebetween. In addition, the rear wall 34 of the bowl body 14 preferably has a rounded bowl-shaped configuration such that the rear wall blends smoothly with the side walls of the one piece body 14.

One of the two parts of the mold is so shaped that the interior surface of the bowl-shaped body 14 forms an integral neck block 36 adjacent the top of the upper bout 28, and the exterior surface of the bowl body 14 is provided with an upwardly opening mortise or groove 38 by properly shaping the other mold half. This neck block 36 is preferably tapered from front to rear so as to be slightly wider in the area where it is joined to the rear wall 34 of the bowl 14, and this is illustrated in FIG. 7. FIG. 7 also illustrates the configuration of the mortise groove 38, and it should also be noted that the neck 16 includes a tenon defining portion 40 which is loosely received in the mortise 38 so as to provide a void between the tenon 40 and the mortise groove 38. However, the upwardly facing inner wall of the mortise groove 38 is precisely formed so as to receive a precisely formed cooperating surface on the tenon 40 so that the neck 16 can be secured to the neck block 36 solely by means of screws 42, 42 as best shown in FIG. 4. As illustrated in FIG. 4 the neck block 36 has a rightwardly facing surface which is also tapered so as to provide added strength to the relatively massive neck block 36 and to also permit ready removal of the bowl 14 from its mold. It should perhaps be noted that in the description to follow and in the appended claims, the guitar will be described as it appears in FIG. 1, namely as being disposed in an upright position, for convenience in discussing the orientation of its various parts.

Turning next to a more detailed description of the unique construction for the neck 16 of the guitar illustrated in the drawings, FIG. 4 best illustrates the basic two member construction for this component of the guitar, said neck being there illustrated as including an elongated neck frame member 50 which is fabricated from a relative rigid structural material such as die cast aluminum to lend the necessary structural strength to the neck 16 of the instrument. A plastic back member 60 is mounted to the rear side of the frame member 50 and gives to the neck the characteristic wood appearance, and convex contour familiar to guitar players generally. This combination of a relatively heavy structural member and a light weight plastic member gives the instrument the proper feel or weight distribution. From FIGS. 5 and 6 it will be apparent that the relatively low density plastic material incorporated into the back member 60 occupies a substantial portion of the cross sectional area of the neck 16, with the result that the strength of the neck is provided through the medium of the die cast aluminum frame member 50, but

the "feel" and appearance of the back of the neck is derived from the relatively light weight plastic portion 60.

In accordance with the present invention, the tenon 40 is defined adjacent the lower end of the neck frame 50 and more particularly at the lower end of a longitudinally extending rib 52 integrally cast in such neck frame member 50. This rearwardly projecting rib 52 extending upwardly from said tenon defining portion 40 thereof to the area of the peg board 18 is best shown in FIG. 4. Thus, the neck frame member 50 has a generally T-shaped cross sectional configuration, the stem of the T defining this rearwardly projecting rib 52.

Still with reference to the configuration of the die cast aluminum neck frame 50 it is a further feature of the present invention that the front face of such frame member 50 defines the raised frets 54, 54 and more particularly defines the fret board itself. These frets are defined in the form of laterally extending ribs at the front face of the frame member 50 and this fret board defining portion includes a projecting or cantilevered depending leg portion 56 designed to extend over and to abut the front face of the instruments sound board 12 as best shown in FIGS. 3 and 4. This depending portion 56 of the cast frame member 50 also serves to cover the mortise and tenon joint connection between the neck 16 and the guitar body portion 14. Thus, the sound board or top plate 12 of the guitar's sound box extends between the upper edges of the bowl 14 and the rearwardly facing surface of this depending portion of the fret board. Preferably, the area of the front face of the aluminum neck frame 50 which lies between the various frets 54, 54 is anodized to impart a black color to this portion of the neck which simulates the ebony or other wood commonly used in this area of the more expensive guitars. Actually, in the process of fabricating the neck the entire front surface of the aluminum neck frame 50 is anodized, and the area of the ribs 54, 54 is ground slightly so as to provide a polished aluminum appearance for the frets themselves.

Still with reference to the aluminum neck frame 50, the upper end portion thereof forms the peg head or peg board area of the neck 16 which receives an adjustably supports the upper ends of the strings 20, 20 as mentioned previously. As best shown in FIG. 4 this upper end portion 58 of the cast aluminum neck frame 50 is quite thin throughout its lateral and longitudinal extent, but does define raised bosses 59, 59 which bosses serve to provide a suitable support for the posts or pegs 70, 70 utilized to actually support the ends of the guitar strings 20, 20. These posts or pegs 70, 70 are rotatable in the peg board by means of the thumb-screws 26, 26 through a conventional worm gear arrangement indicated generally at 72, 72. These guitar string supporting and adjusting components need not be described in detail herein, but it is noted that each is efficiently supported from a structural point of view in the aluminum front face of the neck defined by the cast aluminum neck frame member 50. This portion 58 of the aluminum casting 50 is also given an anodized finish, preferably black, and may have a decorative end portion given it during the casting of the member 50 illustrated generally at 19 in FIG. 1.

Turning next to a more detailed description of the plastic back member 60, said member preferably comprises a low density expanded polyurethane foam material of the type sometimes used in the fabrication of fur-

niture or the like, and it is a further feature of the present invention that the convex external contour of this back member 60 is given the appearance of natural wood by the presently known technique of providing a silicon bladder in the mold utilized to cast the aluminum structural member 50, which bladder can be itself formed directly on a wood model so as to take the grain from the model and to impart such grain to the molded polyurethane surface of the back member 60. Some coloring is required to be added to the surface of the polyurethane foam material in order to produce the desired tint in the plastic back member 60, the color depending upon whether mahogany is to be simulated or some other decorative wood material. It is further noted that in addition to providing a major portion of the cross sectional area of the neck 16 in the form of such relatively low density plastic, as described above with reference to FIGS. 5 and 6, it is also a feature of the present invention that the neck 16 is provided with a heel portion indicated generally at 62, which heel 62 is also formed primarily of such plastic material and is given the desired shaped as a result of the configuration provided for in the mold from which it is formed. Further, the peg board 18 and more particularly the rear portion thereof, also has a predominant portion of its cross section defined by said foam filler material, and here again the result achieved is to provide a neck which appears to be fabricated from a wood material rather than the less expensive plastic actually utilized.

Still with reference to the unique neck construction provided by the cast aluminum frame member 50 and its associated plastic back member 60, it will be apparent from FIGS. 5 and 6 that the T-shaped configuration for the frame member 50 offers a relatively large surface area to which the plastic foam material of the neck 60 can adhere. In this connection, it should also be noted that longitudinally extending lands 51, 51 are also provided adjacent the longitudinally extending lateral edges of the fret board defining portion of the frame 50 and in order to further improve the bond provided between the aluminum and the polyurethane foam material of the frame 50 and back member 60 respectively. As illustrated in FIG. 6, the rearwardly projecting stem 52 of the T-shaped frame member 50 is preferably undercut as indicated generally at 53, 53 to provide the added strength of a mechanical connection between these members 50 and 60. Present practice calls for casting the aluminum stem without these recesses 53, 53 and for later machining these recesses to give the rib a generally I-shaped configuration as illustrated best in FIG. 4. Thus, the recesses not only serve to mechanically hold the polyurethane foam 60 back to the frame 50, but also serves to significantly lighten the overall neck 16 and thereby contribute to the stated advantages for this invention.

As best shown in FIG. 8 the cast aluminum neck frame member 50 is slightly tapered in its longitudinal direction so that the upper end is somewhat narrower than the lower end. It is also noted that the rearwardly projecting rib 52 is similarly tapered, but that the lower end of this rib has a slight reverse taper in the area which ultimately defines the tenon 40. The depth of this rearwardly projecting rib 52 is best shown in FIG. 4, but by virtue of a comparison of FIG. 4 with FIG. 8 it is noted that the rib 52 has a depth which is approximately one-third the width of the fret board throughout a major portion of the length of such fret board, and

that only in the area of the reverse taper does this rib 52 become somewhat deeper, and actually reaches a depth in the area of such tenon defining portion 40 on the order of the width of such fret board at that point.

Other features of the neck frame member 50 can be seen from the various views, especially the rear side view of FIG. 8. The thickness of the peg head defining portion, and that of the fret board defining portion, are minimized as a result of the rib 52 and the lands 51, 51. Further, the marginal edge of these portions of the casting 50 define a bead 57 which extends peripherally around both these portions. As a result of these features, the thickness of these portions need only be on the order of three thirty-seconds inch, a dimension which provides a light weight for this aluminum casting, and hence further contributes to the stated advantages of this invention.

I claim:

1. In a guitar, the combination comprising a hollow sound box including an integrally molded one piece bowl-shaped body which has a relatively thin wall of substantially uniform thickness and which also defines a thickened portion projecting inwardly of its inside surface to define an integrally molded neck block adjacent the upper boundary of said body, a neck for attachment to said neck block, said neck including an elongated neck frame member having a portion adjacent its lower end which cooperates with said neck block to define a mortise and tenon joint therebetween, said neck frame member having a portion adjacent its upper end which forms a peg board for receiving the posts to which the guitar strings are mounted, said neck frame member having an intermediate portion which is of generally T-shaped cross sectional configuration, and a low weight plastic back member carried by a rearwardly projecting rib defined by the stem of the T-shaped frame, said plastic back member being molded to have a generally convex external contour and the opposed longitudinally extending lateral edges of said back member being faired into the laterally opposed longitudinally extending side edges of the T-shaped neck frame member.

2. In a guitar the combination as set forth in claim 1 wherein said neck frame member has a generally flat front face defining the fret board of the guitar, said front face having raised laterally extending ribs at spaced longitudinal locations defining the frets for the guitar, and said fret board defining portion including a lower end extending in front of the mortise and tenon joint, and said sound box including a top which covers the bowl-shaped body and which top has a portion extending between the bowl and the underside of said lower fret board defining end of said neck frame member.

3. In a guitar the combination as set forth in claim 1 wherein said bowl-shaped body is integrally molded

from a rigid plastic material, and wherein said neck frame member is integrally molded from a die cast metal material.

4. In a guitar the combination as set forth in claim 2 wherein said bowl-shaped body is integrally molded from a rigid plastic material, and wherein said neck frame member is integrally molded from a die cast metal material, and said plastic back member comprises a low density expanded polyurethane foam material with said convex external contour having the appearance of the natural wood, and T-shaped neck frame being fabricated from an aluminum alloy and said front face thereof being anodized, said fret defining ribs being finished to provide a color contrast between the anodized face of the fret board and said frets.

5. In a guitar the combination as set forth in claim 4 wherein said plastic filler material is molded directly to the back side of said T-shaped frame member, said rearwardly projecting rib of said T-shaped frame member having opposed laterally outwardly projecting flanges to provide a generally I-shaped cross section for said rib.

6. In a guitar the combination as set forth in claim 5 wherein said rear side of said T-shaped frame member further includes longitudinally extending rearwardly projecting flanges spaced just inwardly of said laterally opposed side edges of said neck frame member.

7. In a guitar the combination as set forth in claim 4 wherein said polyurethane foam filled portion of said neck includes a portion behind said aluminum alloy peg board to provide a massive wood appearance to the upper end of the neck without significantly adding to the overall weight of the guitar neck.

8. In a guitar the combination as set forth in claim 7 wherein said rearwardly projecting rib of said T-shaped frame member extends downwardly to define said tenon at its lower end, said rib having a depth which is approximately one-third the lateral width of the fret board defining portion of said neck frame member except for that portion of said rib defining said tenon, which tenon defining portion of said rib has a depth which is approximately equal to the width of the fret board defining portion.

9. In a guitar the combination as set forth in claim 8 wherein said polyurethane foam filled portion of said neck includes a heel portion above and behind said tenon defining portion of said rib, which heel portion hides said rib and covers said mortise and tenon joint.

10. In a guitar the combination as set forth in claim 9 wherein said tenon defining rib portion has a lower face which mates with an inner face on the mortise defining portion of said neck block, and at least one screw extending upwardly through an opening in said neck block and threadably received in said tenon defining rib.

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