(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 756 181 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
11.10.2023 Bulletin 2023/41

(21) Application number: **19787672.5**

(22) Date of filing: **18.04.2019**

(51) International Patent Classification (IPC):
G10D 3/04 *(2020.01)* ***G10H 3/18*** *(2006.01)*

(52) Cooperative Patent Classification (CPC):
G10D 3/04; G10H 3/185; G10H 2220/471; G10H 2220/501

(86) International application number:
PCT/US2019/028194

(87) International publication number:
WO 2019/204657 (24.10.2019 Gazette 2019/43)

(54) SADDLE/BRIDGE ASSEMBLY FOR STRINGED MUSICAL INSTRUMENTS

STEGEINLAGE FÜR SAITENMUSIKINSTRUMENTE

ENSEMBLE PONTET/CHEVALET POUR INSTRUMENTS DE MUSIQUE À CORDES

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **20.04.2018 US 201815958874**

(43) Date of publication of application:
30.12.2020 Bulletin 2020/53

(73) Proprietor: **Oberg, Robert L.**
Syosset, NY 11791-4110 (US)

(72) Inventor: **Oberg, Robert L.**
Syosset, NY 11791-4110 (US)

(74) Representative: **Walaski, Jan Filip**
Venner Shipley LLP
200 Aldersgate
London EC1A 4HD (GB)

(56) References cited:
US-A1- 2003 172 793
US-A1- 2018 025 705
US-B1- 6 613 968
US-B1- 6 706 957

US-A1- 2003 172 793
US-A1- 2018 025 705
US-B1- 6 613 968
US-B1- 6 706 957

EP 3 756 181 B1

Description

FIELD OF THE INVENTION

[0001] The present invention relates to a saddle/bridge assembly, hereinafter simply referred to as a saddle assembly, the preferred embodiment of which, can be universally used with any stringed musical instrument, inclusive of a violin, cello, bass violin, guitar, ukulele and banjo, for supporting the strings at an elevated position above the sound board of the musical instrument, enhancing and resonating the transmission of sound from the vibration of the strings and providing sound transmission via a conventional transducer pick up incorporated within the saddle assembly.

BACKGROUND OF THE INVENTION

[0002] A stringed musical instrument employs structural support means such as a saddle and/or bridge to support the strings at a given elevation above the sound board of the musical Instrument depending upon the type of stringed musical instrument being played. For a guitar and ukulele a saddle is conventionally used to support the strings at one given elevation with respect to the soundboard whereas in a violin, cello, bass violin and banjo a bridge is conventionally used to support the strings at another preferred elevation above the soundboard. The sound board of the stringed musical instrument corresponds, in general, to the anatomical front board of the musical instrument.

[0003] However, as taught in corresponding US patent application US 2018/0025705, the anatomical front board and the anatomical rear board of a musical instrument may be simultaneously used as sound boards for the musical instrument. To use the anatomical front board and the anatomical rear board simultaneously, a bridge plate is mounted on both the front and rear sound boards of e.g., an acoustical guitar with only a single set of strings strung through the interior body of the guitar over a saddle in a bridge plate mounted on each of the two sound boards. The saddle may have a conventional transducer pick up incorporated in the body of the saddle. Sound is transferred from a soundboard in the stringed musical instrument to the atmosphere through sound openings, referred to herein as "ports", which in a violin, violin bass and cello are conventionally identified as "fholes" and in a conventional guitar and ukulele conventionally identified as a sound hole.

[0004] US 2003/172793 relates to saddles and pickup devices for stringed instruments such as electric guitars and acoustic guitars.

[0005] US 6,706,957 relates to intonation systems for fretted instruments and, more particularly, is concerned with a custom compensated nut and a custom compensated saddle or bridge for fretted instruments.

[0006] US 6,613,968 relates to guitar bridges and tailpieces and more particularly to rigidly mounted guitar bridges and tailpieces that become fixedly mounted to the body of a guitar.

[0007] A common requirement for all stringed musical instruments is the need to continually readjust string tuning during play to correct intonation and tuning. This is partially attributable to the limited contact surface area provided between a conventional bridge and soundboard in a violin, bass violin, cello and banjo and to the limited contact surface area between a conventional saddle and bridge plate mounted on the soundboard of a guitar and ukulele respectively. The saddle assembly of the present invention comprises a saddle footing which enlarges the contact surface area between the bridge or saddle and the soundboard in all stringed musical instruments and the surface area on the soundboard in contact with the bridge or saddle and bridge plate which increases sonic transmission. As a result, the saddle assembly of the present invention improves the accuracy of intonation and tuning by alleviating any tendency of the bridge or saddle to bend during play thereby holding the strings at a given tension for longer periods of time during play relative to the use of a conventional bridge and/or saddle which typically bends causing detuning and inaccurate intonation.

[0008] In addition, the preferred embodiment of the saddle footing in the saddle assembly of the present invention is universally applicable, with appropriate size modification, to all stringed musical instruments. The saddle footing in the saddle assembly of the present invention will accommodate the use of either a conventional bridge or a conventional saddle for supporting the strings in a stringed musical instrument at an elevated position relative to the soundboard and will accommodate the use of a modified bridge and/or modified saddle to provide greater control for supporting the strings and for enhancing sound transmission from the strings through the saddle assembly.

[0009] To enhance and amplify sound transmission, the saddle assembly of the present invention further comprises a conventional transducer pick up integrated into the body of the saddle footing. The body of the saddle footing may further comprise wire cables to facilitate the transmission of electrical signals generated from a transducer pick up in the saddle assembly to one or more preamplifier(s) or amplifier(s) in the stringed musical instrument.

[0010] The use of a modified bridge and/or a modified saddle is preferred to the use of a conventional bridge and/or conventional saddle in the saddle assembly of the present invention in that the modified bridge and/or modified saddle provides greater contact surface area engagement to the saddle footing increasing structural support and sonic enhancement between the strings and the soundboard of the musical instrument. Moreover, the modified bridge and modified saddle, used with the saddle footing in the saddle assembly of the present invention, may further include a conventional transducer pick up integrated into the body of the modified bridge or mod-

ified saddle to permit direct conversion of string vibrations into electrical signals which can be transmitted at a reduced signal to noise ratio from the transducer pick up to a preamplifier or amplifier. In addition, when the saddle assembly of the present invention incorporates one or more conventional transducer pick up's the saddle assembly transforms a conventional stringed musical instrument such as a violin, bass violin and cello into an electric counterpart thereof.

SUMMARY OF THE INVENTION

[0011] The saddle assembly of the present invention comprises a saddle footing having a body of any desired geometry and a surface curvature compatible for mounting the body of the saddle footing onto a soundboard of a violin, bass violin, cello, arch type semi-hollow guitars or a banjo or for inserting the body of the saddle footing into a bridge plate mounted on a soundboard of a guitar or ukulele. According to a first aspect of the present invention, there is provided a saddle assembly according to claim 1. Optional features are set out in the dependent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Other advantages of the subject invention will become apparent from the following detailed description of the invention when read in conjunction with the accompanying drawings of which:

Fig. 1 is an exploded perspective view of the saddle assembly of the present invention for use in a stringed musical instrument such as a guitar or ukulele comprising a saddle footing which includes an elongated slot adapted to receive either a conventional saddle or a modified saddle for insertion into a bridge plate adapted to be mounted on the soundboard of the guitar or ukulele with the modified saddle having a body into which one or more conventional transducer pick up's are integrated and with the saddle assembly further comprising at least one shim as an optional component thereof.

Figs.2a-2b are alternative perspective views of modified saddles for use with the preferred saddle footing embodiment shown in figure 1 with the modified saddle in both Figs.2a-2b possessing a body having a 'T' configuration in cross section but with the modified saddle in Figure 2a having a plurality of upper members spaced apart from one another for holding the strings of the musical instrument and with the modified saddle in Figure 2b having only one upper member having a pyramid geometry for holding the strings of the musical instrument;

Fig. 3 shows an exploded view of an alternative saddle assembly of the present invention comprising a saddle footing having a body which functions directly as a bridge plate for a soundboard of a stringed musical instrument, particularly a conventional semi-hollow guitar, with the saddle footing including adjustable thumb wheels and with the saddle assembly further comprising a modified saddle adapted to be mounted on the thumbwheels extending from the saddle footing with the modified saddle having a body including a plurality of support members for supporting the strings in the musical instrument, with the height of the support members above the soundboard of the musical instrument being adjustable for adjusting the height of elevation of the strings by manually adjusting the thumbwheels in the saddle footing;

Fig. 4 is an exploded perspective view of the saddle assembly of the present invention for use in a violin, bass violin, cello and banjo with the saddle assembly comprising a saddle footing, having an elongated slot substantially equivalent to the saddle footing shown in Fig. 1, adapted to receive either a conventional bridge or a modified bridge with the modified bridge having a surface curvature compatible with the surface curvature of the saddle footing in which it is to be mounted, and having, in the preferred embodiment thereof, a conventional transducer pick up integrated into the body of the modified bridge and showing in figure 4 an artist rendition of a violin having a soundboard upon which the saddle assembly is adapted to be mounted with the violin having a body which includes additional features for use selectively or in combination with the saddle assembly of the present invention; and

Fig. 5 is an exploded perspective view of the saddle assembly of the present invention for use in a banjo comprising a saddle footing, substantially equivalent to the preferred embodiment of the saddle footing shown herein in figures 1 and 4, and having an elongated slot adapted to receive either a conventional bridge or a modified bridge having a body equivalent to the body of the modified bridge shown in Fig. 4 and preferably including a conventional transducer pick up integrated into the body of the modified bridge.

DETAILED DESCRIPTION OF THE INVENTION

[0013] The saddle assembly 10 of the present invention for use in a stringed musical instrument is shown in Figure 1 comprising a saddle footing 12 having a body 14 of any desired geometry, preferably a rectangular geometry, which includes an elongated slot 16 extending from each opposite end of the body 14 into which a conventional saddle 18 or a modified saddle 20 is placed. The slot 16 in the saddle footing 12 has a geometry which conforms, in cross section, to the geometry of the con-

ventional saddle 18. The modified saddle 20 has a body 21 which includes a central section 22, an upper section 23 and a lower section 24 which extend from opposite ends of the central section 22. The upper and lower sections 23, 24 of the modified saddle 20 are much smaller in width relative to the width of the central section 22 such that the central section 23 and the lower section 24 form a configuration, in cross section, which conforms to the shape of the letter "T". The lower section 24 of the modified saddle 20 has a geometry and dimensions which conform to the geometry and dimensions of the slot 16 so that a tight fit occurs when the lower section 24 of the modified saddle 20 is inserted into the slot 16 of the saddle footing 12.

[0014] The upper section 23 of the modified saddle 20 is divided into a multiple number of spaced apart members 28, shaped in the form of posts, extending from the central section 22 and conforming in number to the number of strings in the guitar or ukulele into which the saddle assembly 10 is mounted for supporting the strings at a given elevated height above the soundboard of the musical instrument.

[0015] The saddle footing body 14 is adapted to be mounted directly on the soundboard of a violin, bass violin, cello or banjo or is alternatively inserted into a bridge or bridge plate 30 adapted to be mounted on or in the soundboard of a conventional guitar or ukulele. The bridge plate 30 has an internal slot 32 adapted to receive the saddle footing 12. The width of the slot 32 in the bridge plate 30 is preferably enlarged so that it conforms in dimension to the width of the body 14 of the saddle footing 12 so as to provide a relatively large surface area of engagement between the saddle footing 12 and the bridge plate 30 upon insertion of the saddle footing 12 into the slot 32 of the bridge plate 30. The geometry of the body 14 of the saddle footing 12 should conform to the geometry of the internal slot 32 to create a tight fit between the saddle footing 12 and the slot 32 in the bridge plate 30.

[0016] The saddle footing 12 includes one or two conventional transducer pick up's 33 which are integrated within the body 14 of the saddle footing 12 on the opposite sides 34 and 35 of the elongated slot 16 in the saddle footing 12. In addition, electrical cables 37 which have jacks 38 are attached to each of the transducer pick up's 33 and preferably extend through openings 36 in the internal slot 32 of the bridge plate 30. The bridge plate 30 includes openings 39 through which the strings of the musical instrument are strung.

[0017] The saddle assembly 10 may further comprise at least one shim 31 for placement into the internal slot 32 of the bridge plate 30 to increase the height of the saddle assembly 12 by increasing the height which the saddle 18 or modified saddle 20 projects from the internal slot 32 of the bridge plate 30. This provides some control to the user of the musical instrument for adjusting the elevated height of the strings relative to the level of the soundboard in the stringed musical instrument. The body 14 of the saddle footing 12 may also be sanded down to lower the height of elevation of the strings relative to the level of the soundboard in the stringed musical instrument.

[0018] Figures 2a and 2b are perspective views showing alternative embodiments of modified saddles for use with the saddle footing 12 in the saddle assembly 10 of the present invention shown in Figure 1. Figure 2a shows an alternative modified saddle 40 having a body 41 which includes a central section 42, a lower section 44 and a plurality of upper members 43 each of which are mounted on the central section 42of the saddle body 41. The upper members 43 are separated from one another to form support posts to support the strings of the musical instrument. Each upper member 43 is mounted upon and connected to a manually adjustable gear 46 threadably associated with each of a plurality of threaded openings 47 which extend along the width of the central section 42 at the top end thereof to permit the position of each upper member 43 to be laterally adjusted relative to the central section 42 . This allows for precise length adjustment of each string for tuning the intonation of each string independent of each other.

[0019] Each of the upper members 43 and the lower section 44 of the modified saddle 40 have a width which is much smaller in dimension relative to the width of the central section 42 so that the combination of the central section 42 and lower section 44 of the modified saddle 40 form, in cross section, a configuration equivalent in shape to the letter "T", with the lower section 44 of the modified saddle 40 having a geometry conforming in geometry and dimensions to the geometry of the slot 16 in the saddle footing 12 to create a tight fit when the modified saddle 40 is inserted into the saddle footing 12. In addition each upper member 43 of the modified saddle 40 has an upper end 48 which has a pyramid shaped geometry which includes a cut out notched section 45 upon which each of the strings of the musical instrument rest.

[0020] Figure 2b shows another alternative modified saddle 50 for the saddle footing 12 in the saddle assembly 10 of the present invention shown in Figure 1 having a body 51 which includes a central section 52, a lower section 54 which extends from the central section 52, and having an upper section 53 extending from the central section 52 with the upper section 53 having a triangular shape in cross section and forming an apex 56 upon which each of the strings of the musical instrument rest. The width of the lower section 54 and the width of the upper section 53 are much smaller in comparison to the width of the central section 52 so that the central section 52 in combination with the lower section 54 forms, in cross section, a configuration having the shape of the letter "T" with the geometry of the lower section 54 conforming in geometry and dimensions to the geometry and dimensions of the slot 16 in the saddle footing 12. It should be understood that the upper section 53 may comprise a plurality of separate pyramid shaped posts as shown in the modified saddle 20 in figure 1.

[0021] Figure 3 is an exploded view of an alternative

saddle assembly of the present invention comprising a saddle footing 60 having a body 61 adapted to be directly mounted on the soundboard of a musical instrument particularly the soundboard of a conventional semi-hollow guitar, in which case the saddle footing 60 functions as that of a conventional bridge plate when directly mounted on or in the soundboard of the musical instrument. The curvature of the body 61 should conform to the curvature of the soundboard upon which it is to be mounted. The body 61 of the saddle footing 60 may be substantially rectangular in geometry or may be configured into any other desired shape and size and may comprise two thumb wheels 63 fixedly mounted on two externally threaded posts 64 which threadably engage corresponding threaded openings in the body 61 of the saddle footing 60 with the posts 64 vertically extending from the upper surface 74 of the saddle footing 60. A conventional transducer pick up 62 is integrally incorporated within the body 61 of the saddle footing 60 with a wire cable 67 extending therefrom. The wire cable 67 may have a jack 71 for connecting the transducer pick up 62 to a preamplifier or amplifier in the musical instrument.

[0022] The saddle assembly of figure 3 further comprises a modified saddle 65 adapted to be mounted directly into the elongated slot 16 of the saddle footing 12 of the saddle assembly shown in figure 1 representing a modified version thereof or alternatively mounted upon or directly connected to the support posts 64 extending from the saddle footing 60 for forming an alternative saddle assembly of the present invention. The modified saddle 65 comprises a body 66 including a plurality of support members 68 separated from one another to form support posts for supporting the strings of the musical instrument at an elevated position above the soundboard in the stringed musical instrument. Each upper member 68 is mounted upon or connected to a manually adjustable gear 73 threadably associated with each of a plurality of threaded openings 72 which extend along the width of the body 66 to permit the position of each upper member 68 to be laterally adjusted relative to body 66 of the modified saddle 65 in the same manner as the plurality of upper members 42 are laterally adjusted in the modified saddle 40 in Figure 2a.. The height of all of the support members 68 above the soundboard of the musical instrument may be manually adjusted by manually turning the thumbwheels 63 in the saddle footing 60. Accordingly, this allows for precise length adjustment of the strings independent of one another and for height adjustment of all the strings relative to the soundboard for accurate intonation tuning of the strings.

[0023] An exploded perspective view of a violin 80 employing the saddle assembly of the present invention is shown in Figure 4 with the saddle assembly comprising a saddle footing 82 which is substantially identical to the saddle 12 shown in figure 1 for use with a guitar and ukulele. The saddle footing 82 is mounted directly on the soundboard 84 of the violin 80 at a location preferably between the two "f" holes on opposite sides of the violin 80. It should be understood that the saddle footing 82 may similarly be mounted directly on the soundboard of a conventional bass violin or cello although the dimensions of the saddle footing 82 should preferably be sized to account for the relatively substantial difference in size between a violin and a bass violin or cello respectively.

[0024] The saddle footing 82 has an elongated slot 85 adapted to receive either a conventional violin bridge 86 or a modified violin bridge 87. The modified violin bridge 87 has a solid base 88 at the bottom end of the bridge 87 to provide additional engagement and surface area between the modified bridge 87 and the saddle footing 82 upon insertion of the modified bridge 87 into the saddle footing 82. In addition the modified saddle 87 may include a conventional transducer pick up 90 integrated therein with a wire cable 92 extending therefrom having a jack 93 at the end of the wire cable 92 for connecting the transducer pick up 90 to a preamplifier or amplifier either in the violin or external thereto. Likewise, the saddle footing 82 has a conventional transducer pick up 94 integrated into the body of the saddle footing 82 similar to integration of the transducer pick up 33 in the body 14 of the saddle footing 12 of the saddle assembly 10 shown in Figure 1. A wire cable 95 would extend from the conventional transducer pick up 94 and be connected to a jack 96 in the body of the violin 80.

[0025] The violin 80 should preferably include at least one sound port 99 as shown in figure 4 which is preferably located in the anatomical front soundboard 84 of the violin 80. The sound port 99 should be constructed as taught in applicants corresponding patent application US 2018/0025705. The sound port 99 should preferably comprise a geometry which is either parabolic or cylindrical such as that a hollow tube 102 which is adapted to be inserted through an opening formed in the soundboard 84 at the end of the violin 84 adjacent the upper bout 104 with the opening essentially equal in dimension and diameter to the diameter of the tube 102 so that the tube 102 tightly engages the opening in the soundboard 84 when inserted therein. The hollow tube 102 should extend to within the interior 105 of the body of the violin 80. The sound port 99 can be separately tuned to any desired frequency range proportional to the resonant frequency of the violin. Although only one sound port 99 is shown additional sound ports may be added and located within the violin 80 either in the front soundboard 84 or the rear board or in either the upper bout 104 or any of the other sides of the violin 80. It should be understood that one or more sound ports 99 may also be included into any other stringed musical instrument including a bass violin, cello, guitar or ukulele in which the saddle assembly 10 of the present invention is included. The use of one or more sound ports 99 in the stringed musical instrument improves the quality of the sound particularly by increasing the frequency range of the generated sound through the musical instrument.

[0026] The violin 80 should also preferably include one or more panels 97 each preferably having a curved ser-

pentine like geometry substantially in the shape of the letter "S" as shown in figure 4 or may include geometrically straight i.e. flat panels, as taught in applicants corresponding application US 2018/0025705. The curved panels 97 are mounted within the interior 105 of the violin 80 and extend from the top block 98 and the bottom block 106 at each opposite end of the violin 80 toward the middle of the violin 80 with each panel 97 aligned relatively close to the opposite sides of the violin 80. The soundboard 84 of the violin 80 is mounted over the body of the violin 80 so that member 108 which extends from the fingerboard 114 fits into the top block 98 and that member 110 which protrudes from the tailpiece 112 fits into the bottom block 106 of the body of the violin respectively. The curved panels 97 permit sound to be funneled or vented toward the sound ports 99 and function as sound posts in addition to proving structural support.

[0027] Figure 5 shows a saddle footing 120 for the saddle assembly of the present invention similar to Figure 4 but mounted on the soundboard of a banjo. Likewise the saddle footing 120 may incorporate a conventional transducer pick up 122 with a cable wire 124 for transmitting the electrical signals generated by the conventional transducer pick up 122 to a preamplifer or amplifier in the banjo or external thereto.

Claims

1. A saddle assembly (10) for a stringed musical instrument comprising a saddle footing (12) having a body (14) of any desired geometry and a surface curvature compatible with and conforming to the surface curvature of the soundboard of the stringed musical instrument upon which the body of the saddle footing is mounted, with the saddle footing comprising an elongated slot (16) adapted to accommodate either a bridge or saddle, **characterized in that** at least one transducer pick up (62) is incorporated in the body of the saddle footing.

2. A saddle assembly (10) as defined in claim 1 wherein a wire cable (67) extends from each transducer pick up (62) which is adapted to transfer electrical signals, generated from the transducer pick up, corresponding to the vibrations from plucking the strings in the stringed musical instrument, to a pre-amplifier or amplifier.

3. A saddle assembly as defined in claim 1 wherein the saddle footing is mounted with the use of a bridge plate.

4. A saddle assembly (10) as defined in any one of the preceding claims further comprising the bridge or the saddle (20), wherein said bridge or said saddle elevates the strings in the stringed musical instrument relative to the soundboard.

5. A saddle assembly (10) as defined in claim 4, wherein said bridge or said saddle (20) has a geometry which conforms in geometry and curvature to a geometry and curvature of the elongated slot in the saddle footing.

6. A saddle assembly (10) as defined in claims 4 or 5 in which the saddle (20) comprises a body (21) having a central section (22) and a lower section (24) with the width of the central section being substantially larger than the width of the lower section such that the central section and lower section form in cross section a configuration substantially conforming in shape to the shape of the letter "T", with the lower section having a geometry which conforms to the geometry of the elongated slot in the saddle footing so that a tight fit occurs when the lower section of the saddle is inserted into the elongated slot (16) of the saddle footing (12).

7. A saddle assembly (10) as defined in claim 6 wherein the body of the saddle further comprises an upper section (23) including a multiple number of spaced apart members (28), shaped in the form of posts, mounted upon the central section (22) and conforming in number to the number of strings in the stringed musical instrument in which the saddle assembly is mounted for supporting the strings at an elevated height above the soundboard of the musical instrument.

8. A saddle assembly (10) as defined in claim 7 wherein said central section (22) of the saddle comprises a top surface, a plurality of threaded openings spaced apart from one another and aligned parallel to the width of the central section with each threaded opening extending to the top surface thereof, a gear threadably mounted within each threaded opening of the central section with each of the members of the upper section connected to a gear to permit the position of each upper member to be laterally adjusted relative to the central section by manually adjusting each gear in the saddle.

9. A saddle assembly (10) as defined in claim 6 wherein the body of the saddle further comprises an upper section (23) having a triangular shape in cross section for supporting the strings in the stringed musical instrument at an elevated height above the soundboard of the musical instrument.

10. A saddle assembly (10) as defined in claim 4 wherein the bridge (87) or saddle comprises a body having a solid base (88) at the lower end thereof adapted for insertion into the elongated slot (85) in the saddle footing (82) with the solid base being of uniform dimension extending from each opposite end of the bridge or saddle and with the geometry of the solid

base of the bridge or saddle conforming to the geometry of the elongated slot in the saddle footing such that the surface area of the bridge or saddle conforms to the surface area of the elongated slot upon engagement therewith.

11. A saddle assembly (10) as defined in claim 10 wherein the stringed musical instrument comprises at least one sound port (99) having a hollow member with a cylindrical geometry extending through the sound board into the interior of the musical instrument for tuning the sound port to a desired frequency range proportional to the resonant frequency of the stringed musical instrument.

12. A saddle assembly (10) as defined in claim 10 wherein the stringed musical instrument comprises at least one sound port having a hollow member with a parabolic geometry extending through the sound board into the interior of the musical instrument for tuning the sound port to a desired frequency range proportional to the resonant frequency of the stringed musical instrument.

13. A saddle assembly (10) as defined in claims 11 or 12 wherein the stringed musical instrument further comprises at least several curved panels having a curvature substantially in the shape of the letter "S" for funneling or venting sound through the sound port (99).

14. A saddle assembly (10) as defined in any one of the preceding claims wherein the saddle footing (12) includes two transducer pick ups (33), each said pick up is incorporated within the body (14) of the saddle footing on opposite sides of the elongated slot (16) in the saddle footing.

Patentansprüche

1. Stegeinlagenanordnung (10) für ein Saitenmusikinstrument, umfassend einen Stegeinlagenfuß (12), der einen Körper (14) mit einer beliebigen gewünschten Geometrie und einer Oberflächenkrümmung aufweist, die mit der Oberflächenkrümmung des Resonanzbodens des Saitenmusikinstruments, an dem der Körper des Stegeinlagenfußes montiert ist, kompatibel ist und damit übereinstimmt, wobei der Stegeinlagenfuß einen Langschlitz (16) umfasst, der dazu ausgelegt ist, entweder einen Steg oder eine Stegeinlage unterzubringen, **dadurch gekennzeichnet, dass** mindestens ein Tonabnehmer (62) in den Körper des Stegeinlagenfußes einbezogen ist.

2. Stegeinlagenanordnung (10) nach Anspruch 1, wobei sich ein Drahtkabel (67) von jedem Tonabnehmer (62) erstreckt, das dazu ausgelegt ist, elektrische Signale, die von dem Tonabnehmer erzeugt werden und den Schwingungen vom Zupfen der Saiten in dem Saitenmusikinstrument entsprechen, an einen Vorverstärker oder Verstärker zu übertragen.

3. Stegeinlagenanordnung nach Anspruch 1, wobei der Stegeinlagenfuß mit der Verwendung einer Stegplatte montiert ist.

4. Stegeinlagenanordnung (10) nach einem der vorhergehenden Ansprüche, ferner umfassend den Steg oder die Stegeinlage (20), wobei der Steg oder die Stegeinlage die Saiten in dem Saitenmusikinstrument relativ zu dem Resonanzboden anhebt.

5. Stegeinlagenanordnung (10) nach Anspruch 4, wobei der Steg oder die Stegeinlage (20) eine Geometrie aufweist, deren Geometrie und Krümmung mit einer Geometrie und einer Krümmung des Langschlitzes in dem Stegeinlagenfuß übereinstimmt.

6. Stegeinlagenanordnung (10) nach Anspruch 4 oder 5, bei der die Stegeinlage (20) einen Körper (21) umfasst, der einen mittleren Abschnitt (22) und einen unteren Abschnitt (24) aufweist, wobei die Breite des mittleren Abschnitts im Wesentlichen derart größer ist als die Breite des unteren Abschnitts, dass der mittlere Abschnitt und der untere Abschnitt im Querschnitt eine Konfiguration bilden, deren Form im Wesentlichen mit der Form des Buchstabens "T" übereinstimmt, wobei der untere Abschnitt eine Geometrie aufweist, die mit der Geometrie des Langschlitzes in dem Stegeinlagenfuß übereinstimmt, sodass ein Presssitz entsteht, wenn der untere Abschnitt der Stegeinlage in den Langschlitz (16) des Stegeinlagenfußes (12) eingeführt wird.

7. Stegeinlagenanordnung (10) nach Anspruch 6, wobei der Körper der Stegeinlage ferner einen oberen Abschnitt (23) umfasst, der eine Mehrzahl von voneinander beabstandeten Elementen (28) einschließt, die in der Form von Pfosten geformt sind, an dem mittleren Abschnitt (22) montiert sind und deren Anzahl mit der Anzahl von Saiten in dem Saitenmusikinstrument übereinstimmt, bei dem die Stegeinlagenanordnung montiert ist, um die Saiten in einer angehobenen Höhe über dem Resonanzboden des Musikinstruments zu stützen.

8. Stegeinlagenanordnung (10) nach Anspruch 7, wobei der mittlere Abschnitt (22) der Stegeinlage eine obere Oberfläche umfasst, wobei eine Vielzahl von Gewindeöffnungen voneinander beabstandet und parallel zu der Breite des mittleren Abschnitts ausgerichtet ist, wobei sich jede Gewindeöffnung bis zu der oberen Oberfläche davon erstreckt, wobei ein Zahnrad schraubbar innerhalb jeder Gewindeöff-

nung des mittleren Abschnitts montiert ist, wobei jedes der Elemente des oberen Abschnitts mit einem Zahnrad verbunden ist, um zu gestatten, dass die Position jedes oberen Elements relativ zu dem mittleren Abschnitt seitlich eingestellt wird, indem jedes Zahnrad in der Stegeinlage manuell eingestellt wird.

9. Stegeinlagenanordnung (10) nach Anspruch 6, wobei der Körper der Stegeinlage ferner einen oberen Abschnitt (23) umfasst, der im Querschnitt eine dreieckige Form aufweist, um die Saiten des Saitenmusikinstruments in einer angehobenen Höhe über dem Resonanzboden des Musikinstruments zu stützen.

10. Stegeinlagenanordnung (10) nach Anspruch 4, wobei der Steg (87) oder die Stegeinlage einen Körper umfasst, der an dem unteren Ende davon eine feste Basis (88) aufweist, die zum Einführen in den Langschlitz (85) in dem Stegeinlagenfuß (82) ausgelegt ist, wobei die feste Basis eine einheitliche Abmessung aufweist und sich von jedem gegenüberliegenden Ende des Stegs oder der Stegeinlage erstreckt und wobei die Geometrie der festen Basis des Stegs oder der Stegeinlage mit der Geometrie des Langschlitzes in dem Stegeinlagenfuß derart übereinstimmt, dass der Flächeninhalt des Stegs oder der Stegeinlage bei Eingriff damit mit dem Flächeninhalt des Langschlitzes übereinstimmt.

11. Stegeinlagenanordnung (10) nach Anspruch 10, wobei das Saitenmusikinstrument mindestens eine Schallöffnung (99) umfasst, die ein hohles Element mit einer zylindrischen Geometrie aufweist, das sich durch den Resonanzboden in das Innere des Musikinstruments erstreckt, um die Schallöffnung auf einen gewünschten Frequenzbereich proportional zu der Resonanzfrequenz des Saitenmusikinstruments zu stimmen.

12. Stegeinlagenanordnung (10) nach Anspruch 10, wobei das Saitenmusikinstrument mindestens eine Schallöffnung umfasst, die ein hohles Element mit einer parabolischen Geometrie aufweist, das sich durch den Resonanzboden in das Innere des Musikinstruments erstreckt, um die Schallöffnung auf einen gewünschten Frequenzbereich proportional zu der Resonanzfrequenz des Saitenmusikinstruments zu stimmen.

13. Stegeinlagenanordnung (10) nach Anspruch 11 oder 12, wobei das Saitenmusikinstrument ferner mindestens mehrere gekrümmte Platten umfasst, die eine Krümmung im Wesentlichen in der Form des Buchstabens "S" aufweisen, um Schall durch die Schallöffnung (99) zu leiten oder abzulassen.

14. Stegeinlagenanordnung (10) nach einem der vorhergehenden Ansprüche, wobei der Stegeinlagenfuß (12) zwei Tonabnehmer (33) einschließt, wobei jeder der Abnehmer innerhalb des Körpers (14) des Stegeinlagenfußes auf gegenüberliegenden Seiten des Langschlitzes (16) in den Stegeinlagenfuß einbezogen ist.

Revendications

1. Ensemble chevalet (10) pour un instrument de musique à cordes comprenant un pied de chevalet (12) comportant un corps (14) de n'importe quelle géométrie souhaitée et une courbure de surface compatible avec et épousant la courbure de surface de la table d'harmonie de l'instrument de musique à cordes sur lequel le corps du pied de chevalet est monté, avec le pied de chevalet comprenant une fente allongée (16) adaptée pour recevoir soit un sillet, soit un chevalet, **caractérisé en ce qu'**au moins un micro à transducteur (62) est intégré dans le corps du pied de chevalet.

2. Ensemble chevalet (10) selon la revendication 1, dans lequel un câble métallique (67) s'étend depuis chaque micro à transducteur (62) qui est adapté pour transférer des signaux électriques, générés par le micro à transducteur, correspondant aux vibrations provenant du pincement des cordes sur l'instrument de musique à cordes, à un préamplificateur ou un amplificateur.

3. Ensemble chevalet selon la revendication 1, dans lequel le pied de chevalet est monté à l'aide d'une plaque de sillet.

4. Ensemble chevalet (10) selon l'une quelconque des revendications précédentes comprenant en outre le sillet ou le chevalet (20), dans lequel ledit sillet ou ledit chevalet élève les cordes de l'instrument de musique à cordes par rapport à la table d'harmonie.

5. Ensemble chevalet (10) selon la revendication 4, dans lequel ledit sillet ou ledit chevalet (20) comporte une géométrie qui épouse en géométrie et en courbure une géométrie et une courbure de la fente allongée dans le pied de chevalet.

6. Ensemble chevalet (10) selon la revendication 4 ou 5, dans lequel le chevalet (20) comprend un corps (21) comportant une section centrale (22) et une section inférieure (24), la largeur de la section centrale étant sensiblement plus grande que la largeur de la section inférieure de telle sorte que la section centrale et la section inférieure forment en section transversale une configuration dont la forme épouse sensiblement la forme de la lettre « T », la section inférieure comportant une géométrie qui épouse la géo-

métrie de la fente allongée dans le pied de chevalet de sorte qu'un ajustement serré se produise lorsque la section inférieure du chevalet est insérée dans la fente allongée (16) du pied de chevalet (12).

7. Ensemble chevalet (10) selon la revendication 6, dans lequel le corps du chevalet comprend en outre une section supérieure (23) comprenant un nombre multiple d'éléments espacés (28), profilés sous la forme de montants, montés sur la section centrale (22) et correspondant en nombre au nombre de cordes de l'instrument de musique à cordes dans lequel l'ensemble chevalet est monté pour supporter les cordes à une hauteur élevée au-dessus de la table d'harmonie de l'instrument de musique.

8. Ensemble chevalet (10) selon la revendication 7, dans lequel ladite section centrale (22) du chevalet comprend une surface supérieure, une pluralité d'ouvertures filetées espacées les unes des autres et alignées parallèlement à la largeur de la section centrale, chaque ouverture filetée s'étendant jusqu'à la surface supérieure de celle-ci, un engrenage monté en filetage dans chaque ouverture filetée de la section centrale, chacun des éléments de la section supérieure étant connecté à un engrenage pour permettre à la position de chaque élément supérieur d'être ajustée latéralement par rapport à la section centrale par réglage manuel de chaque engrenage dans le chevalet.

9. Ensemble chevalet (10) selon la revendication 6, dans lequel le corps du chevalet comprend en outre une section supérieure (23) comportant une forme triangulaire en section transversale pour supporter les cordes de l'instrument de musique à cordes à une hauteur élevée au-dessus de la table d'harmonie de l'instrument de musique.

10. Ensemble chevalet (10) selon la revendication 4, dans lequel le sillet (87) ou le chevalet comprend un corps comportant une base pleine (88) à son extrémité inférieure adaptée pour être insérée dans la fente allongée (85) du pied de chevalet (82), la base pleine étant de dimension uniforme s'étendant à partir de chaque extrémité opposée du sillet ou chevalet et la géométrie de la base pleine du sillet ou chevalet épousant la géométrie de la fente allongée dans le pied de chevalet de telle sorte que la surface du sillet ou chevalet épouse la surface de la fente allongée lors de son engagement avec celle-ci.

11. Ensemble chevalet (10) selon la revendication 10, dans lequel l'instrument de musique à cordes comprend au moins un orifice sonore (99) comportant un élément creux avec une géométrie cylindrique s'étendant à travers la table d'harmonie jusqu'à l'intérieur de l'instrument de musique pour accorder l'orifice sonore à une plage de fréquences souhaitée proportionnelle à la fréquence de résonance de l'instrument de musique à cordes.

12. Ensemble chevalet (10) selon la revendication 10, dans lequel l'instrument de musique à cordes comprend au moins un orifice sonore comportant un élément creux avec une géométrie parabolique s'étendant à travers la table d'harmonie jusqu'à l'intérieur de l'instrument de musique pour accorder l'orifice sonore sur une plage de fréquences souhaitée proportionnelle à la fréquence de résonance de l'instrument de musique à cordes.

13. Ensemble chevalet (10) selon la revendication 11 ou 12, dans lequel l'instrument de musique à cordes comprend en outre au moins plusieurs panneaux incurvés comportant une courbure sensiblement en forme de lettre « S » pour canaliser ou évacuer le son à travers l'orifice sonore (99).

14. Ensemble chevalet (10) selon l'une quelconque des revendications précédentes, dans lequel le pied de chevalet (12) comprend deux micros à transducteur (33), chaque dit micro est intégré dans le corps (14) du pied de chevalet sur les côtés opposés de la fente allongée (16) dans le pied de chevalet.

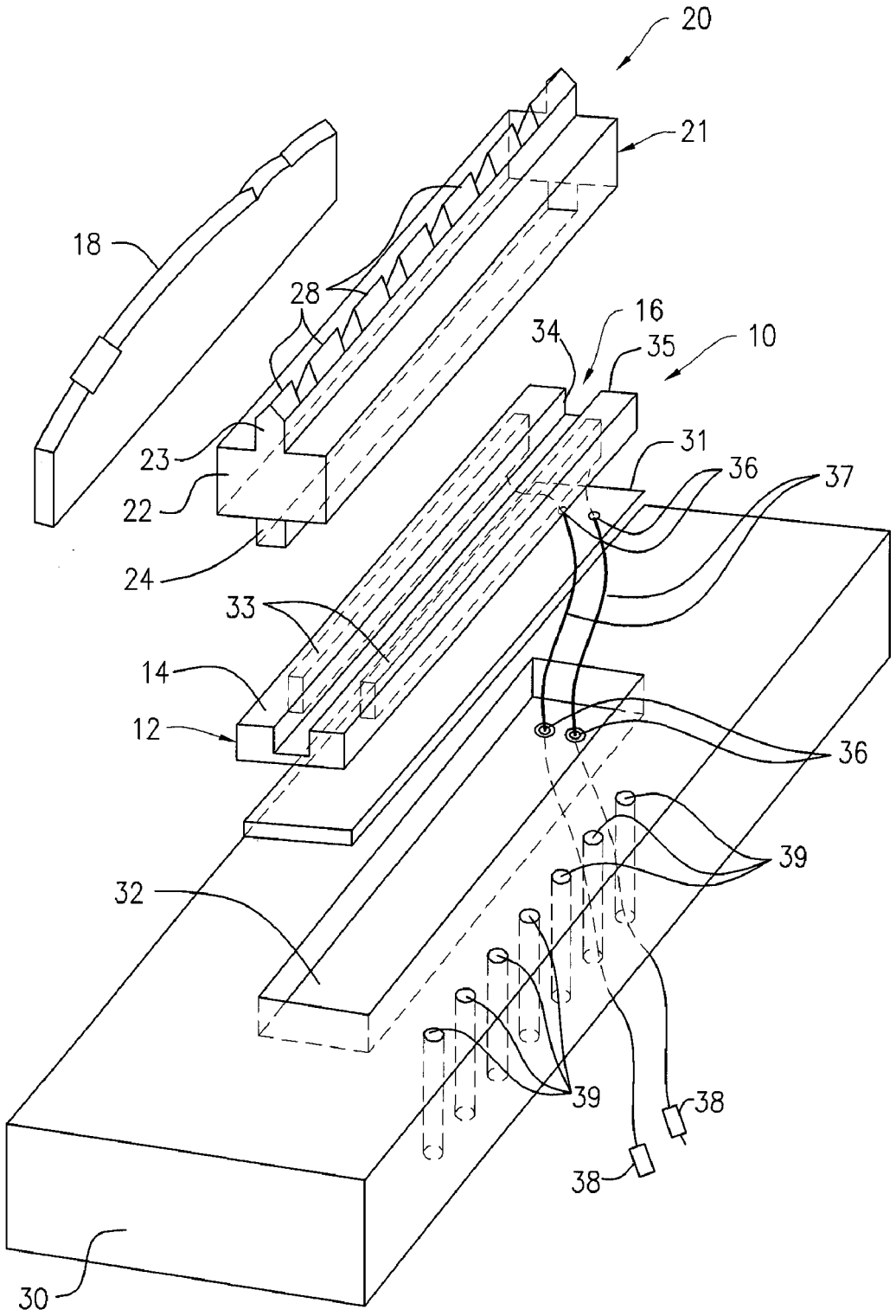

FIG. 1

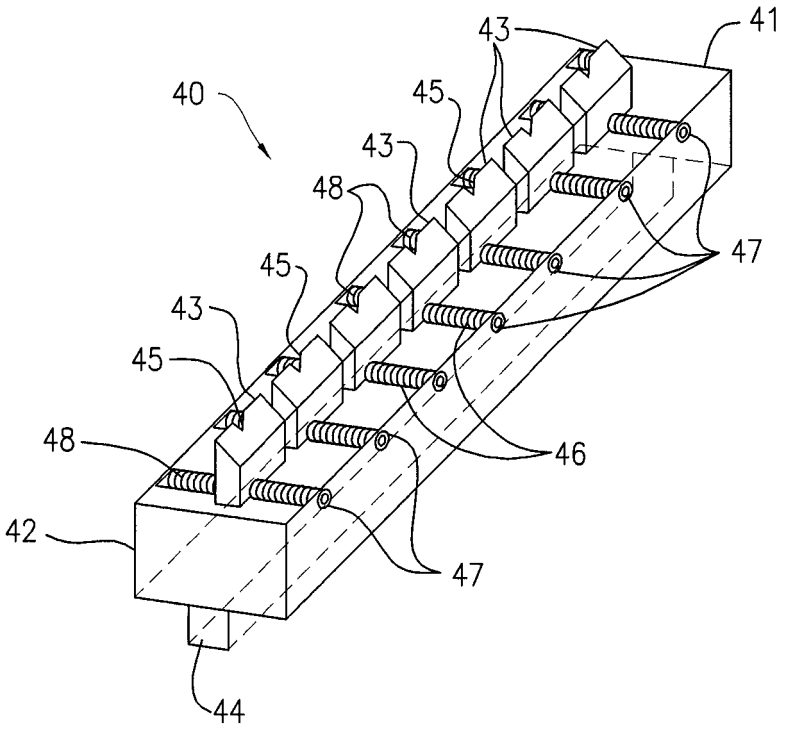

FIG. 2a

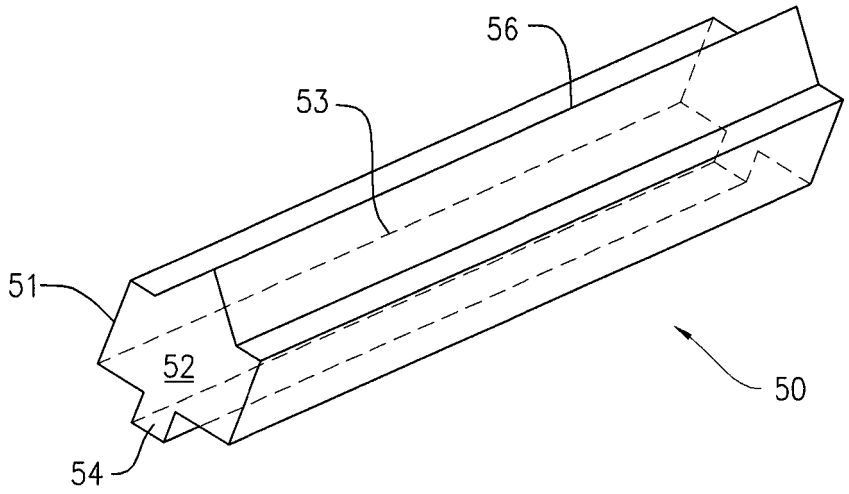

FIG. 2b

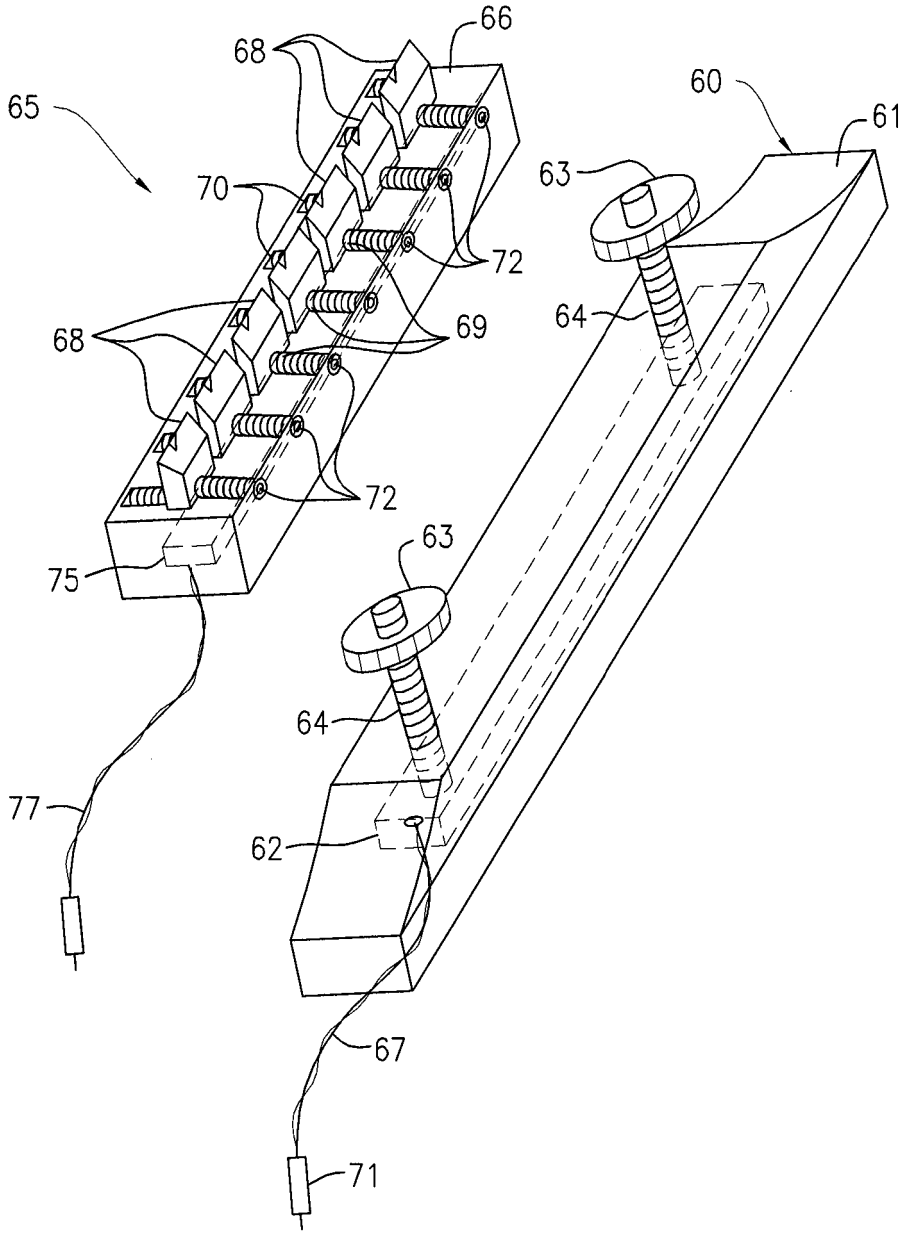

FIG. 3

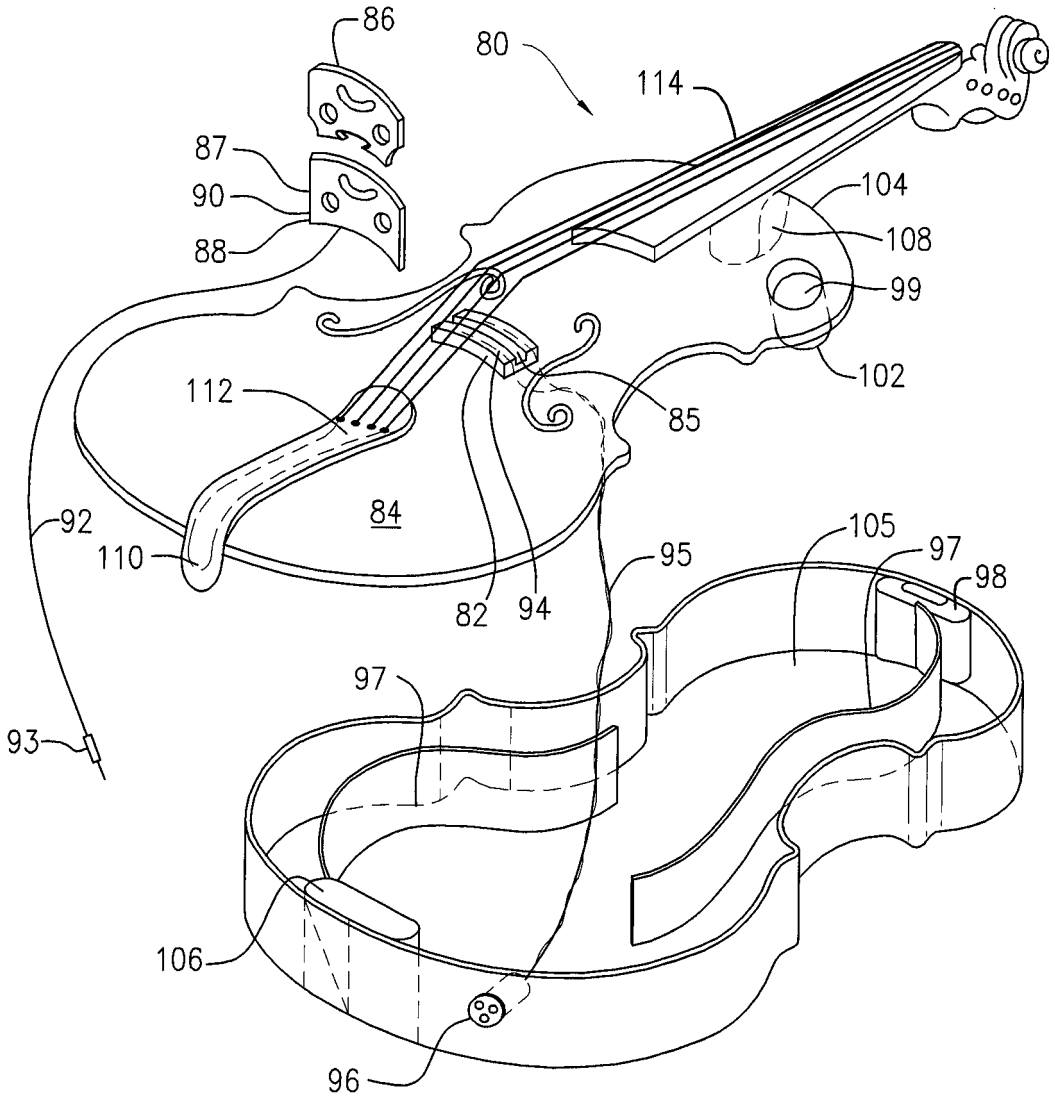
86
80
114
87
90
88
104
108
99
102
112
85
84
92
110
82
94
95
105
97
98
97
93
106
96

FIG. 4

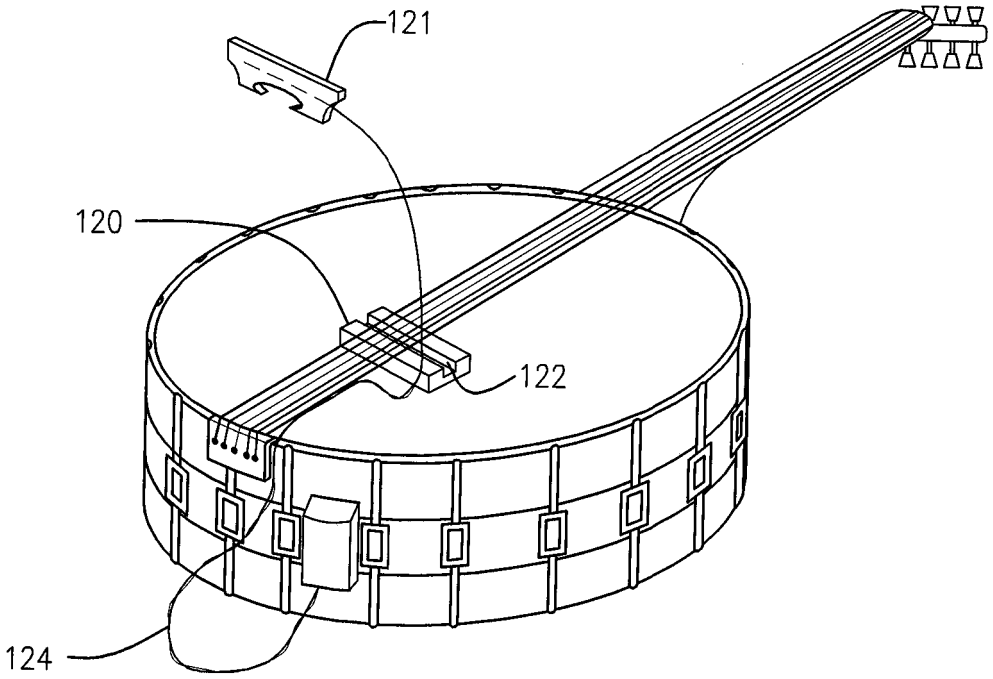

FIG. 5

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 20180025705 A **[0003] [0025] [0026]**
- US 2003172793 A **[0004]**
- US 6706957 B **[0005]**
- US 6613968 B **[0006]**