US010467994B2

(12) **United States Patent**
Jackson

(10) **Patent No.: US 10,467,994 B2**
(45) **Date of Patent: Nov. 5, 2019**

(54) **STRING PULLING MECHANISMS FOR STRINGED MUSICAL INSTRUMENTS AND RELATED METHODS**

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(72) Inventor: **David Jackson**, Dahlonega, GA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **15/875,877**

(22) Filed: **Jan. 19, 2018**

(65) **Prior Publication Data**

US 2019/0019478 A1 Jan. 17, 2019

Related U.S. Application Data

(63) Continuation of application No. 15/646,662, filed on Jul. 11, 2017, now abandoned.

(51) **Int. Cl.**
G10D 3/14 (2006.01)

(52) **U.S. Cl.**
CPC ***G10D 3/14*** (2013.01); ***G10D 3/143*** (2013.01)

(58) **Field of Classification Search**
CPC G10D 3/14
USPC ..... 84/312 R
See application file for complete search history.

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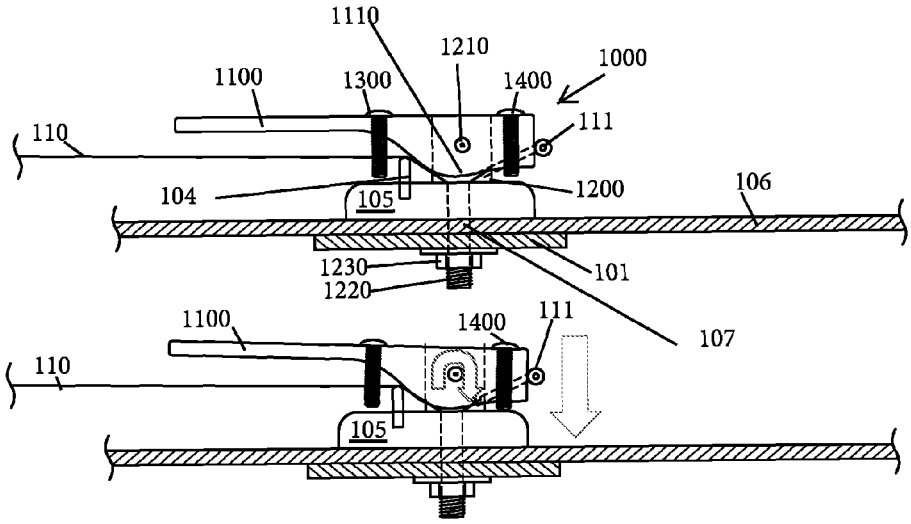
(57) **ABSTRACT**

Disclosed are apparatus and related methods for adjusting the pitch of a string on a stringed instrument. In one embodiment, the disclosed devices enable a musician to adjust the tautness and, accordingly, the pitch of individual strings of a stringed instrument by simply pushing a lever or rotating a threaded piston or on or adjacent to the bridge of the guitar. The disclosed devices can preferably be outfitted on electric or acoustic stringed instruments, including guitars. The more specific aspects of the preferred embodiments are discussed in greater detail with reference to the figures.

20 Claims, 16 Drawing Sheets



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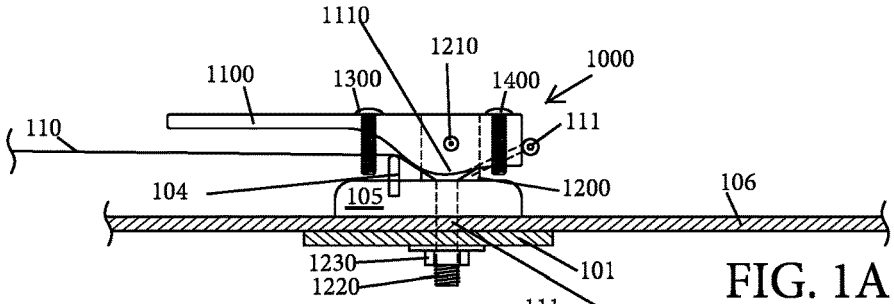


FIG. 1A

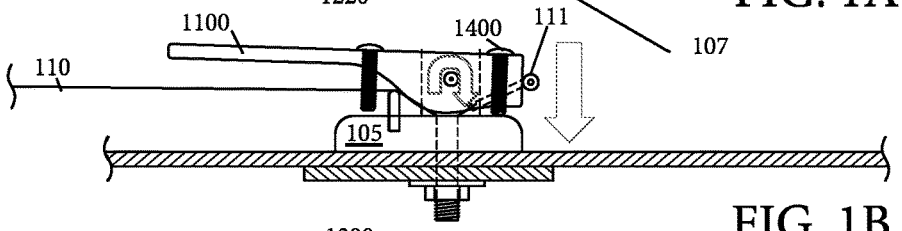


FIG. 1B

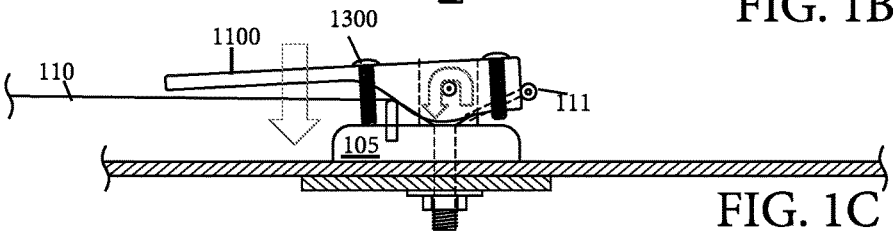


FIG. 1C

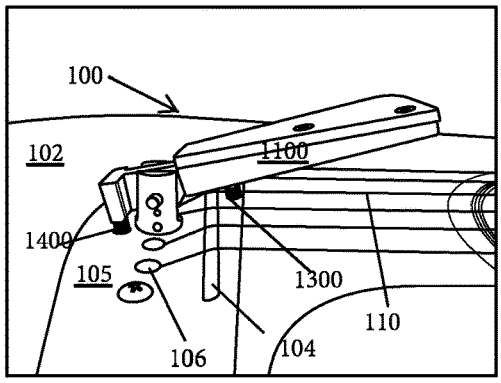


FIG. 2

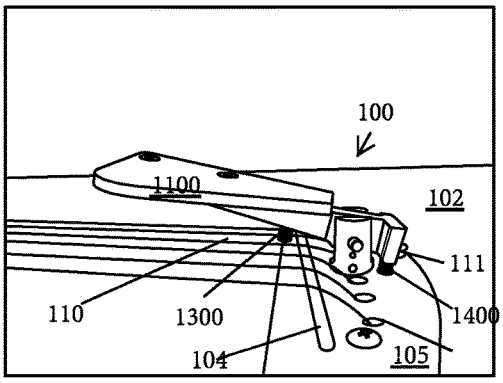


FIG. 3

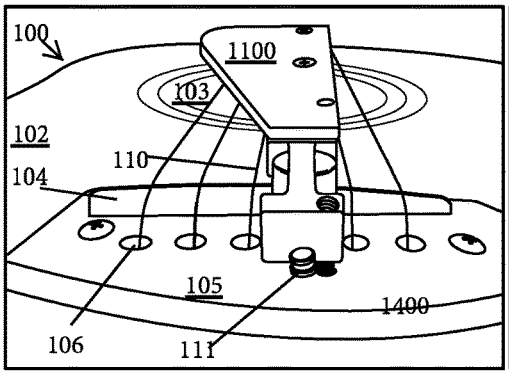


FIG. 4

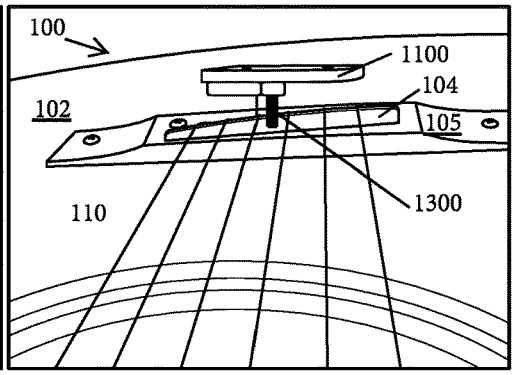


FIG. 5

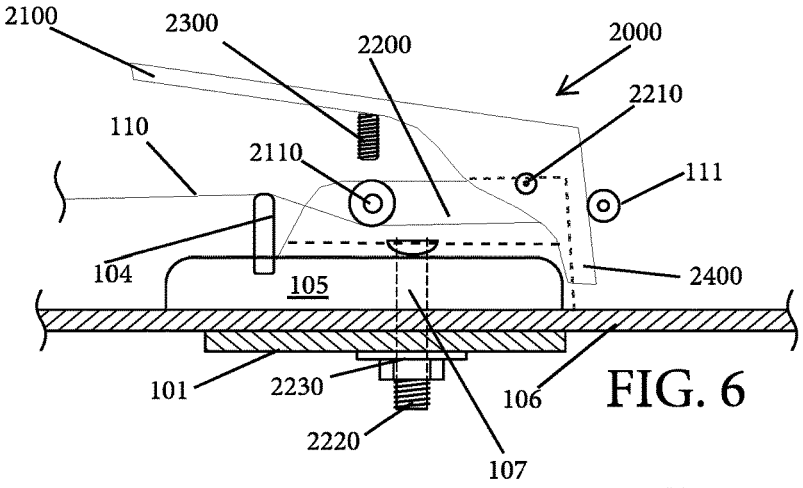


FIG. 6

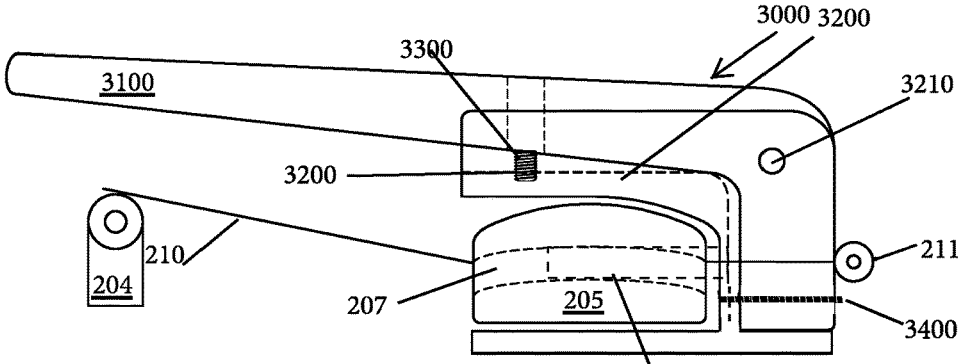
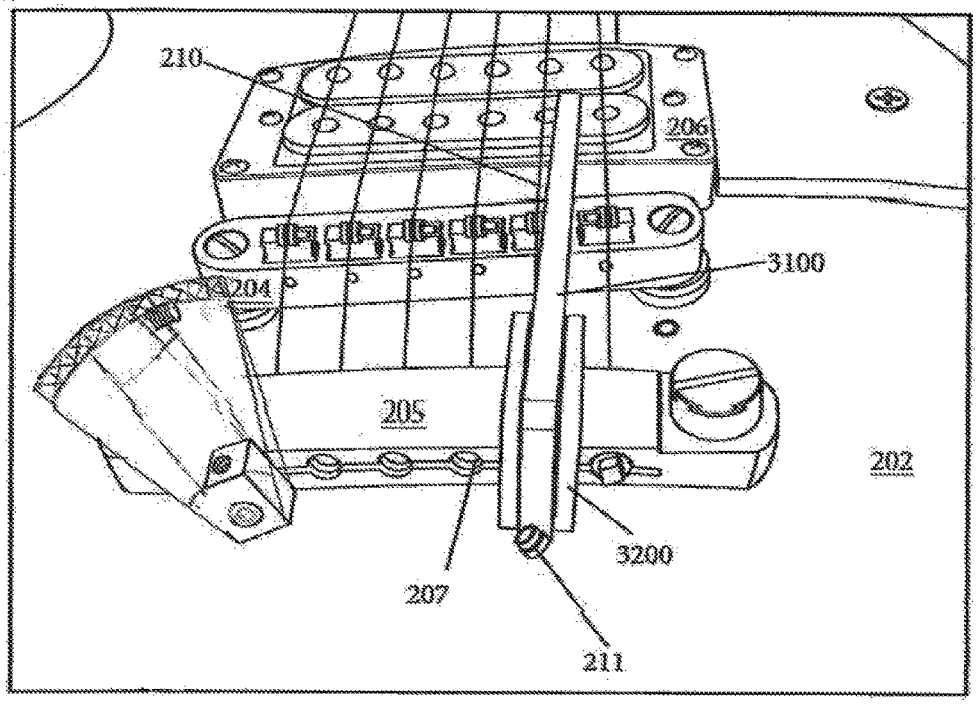


FIG. 7



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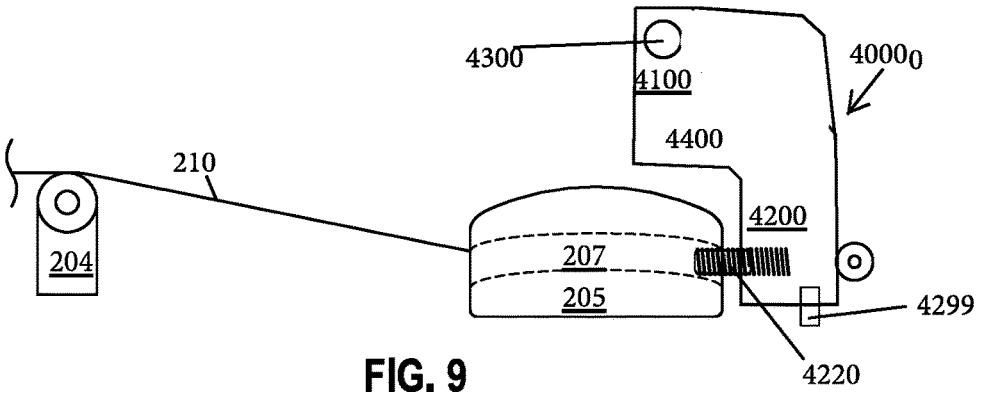


FIG. 9

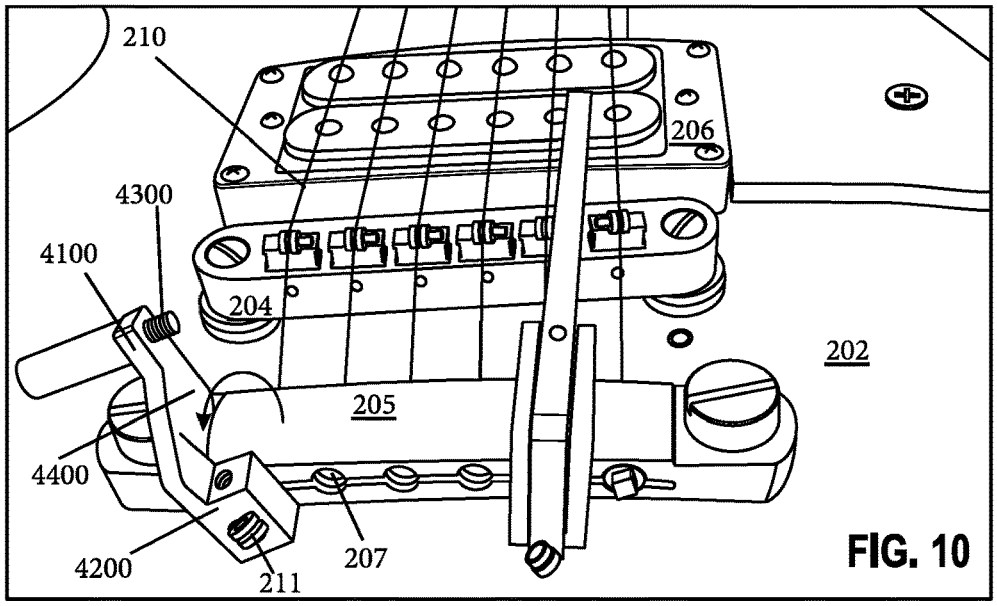


FIG. 10

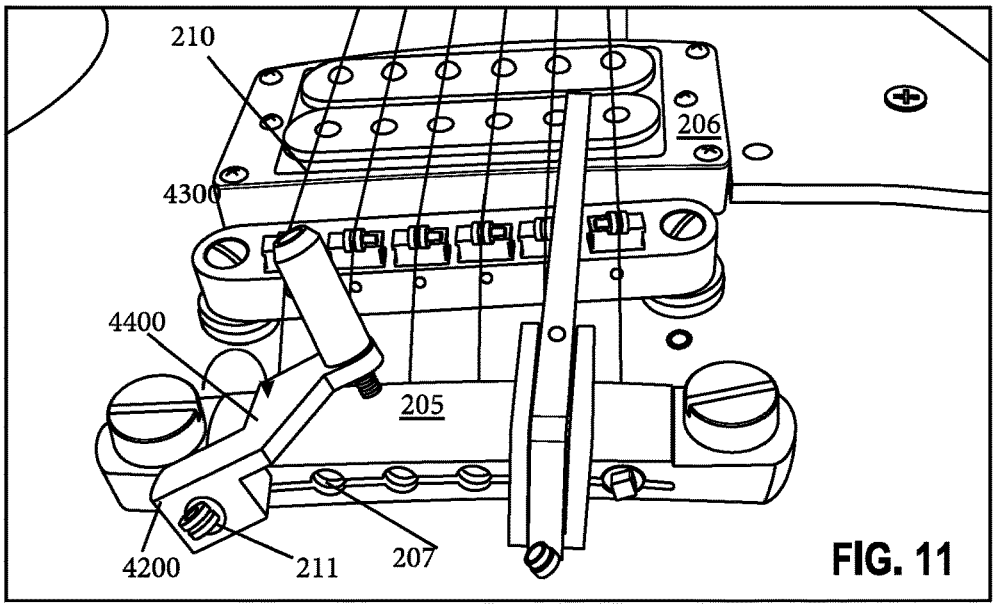


FIG. 11

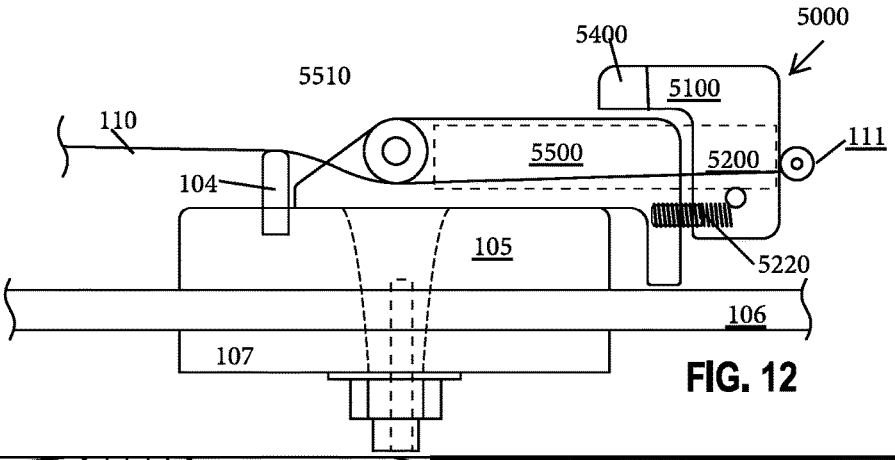


FIG. 12

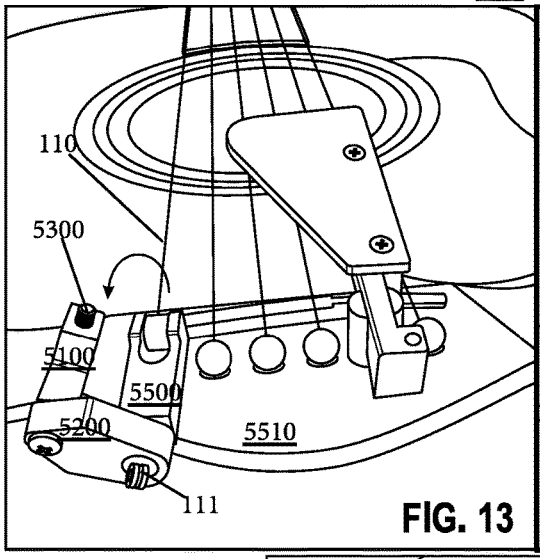


FIG. 13

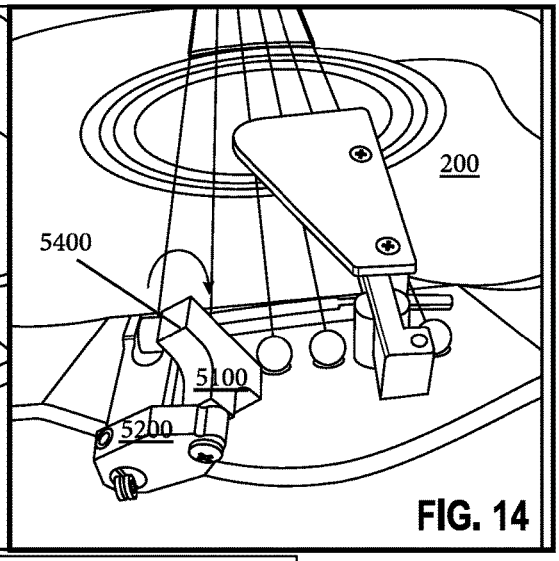


FIG. 14

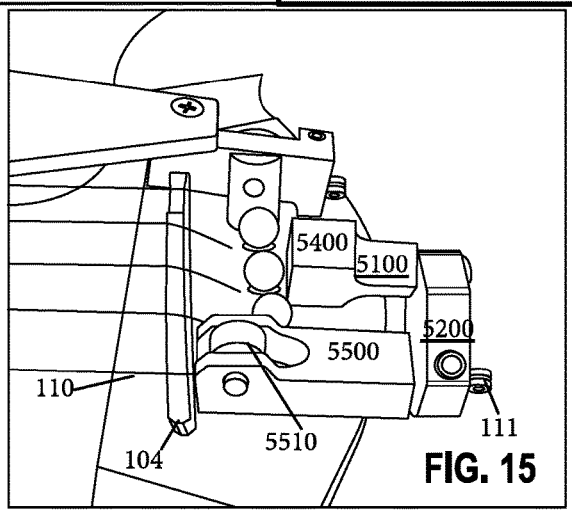


FIG. 15

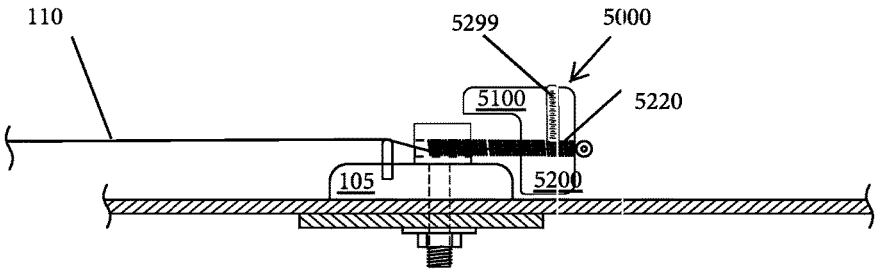


FIG. 16

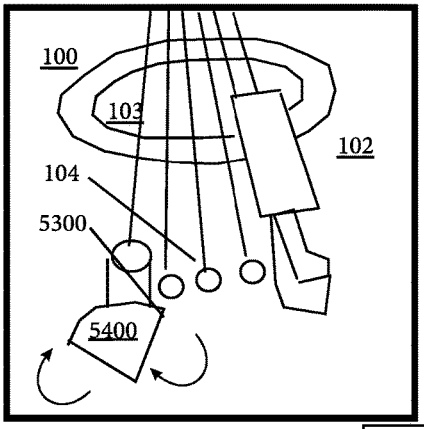


FIG. 17

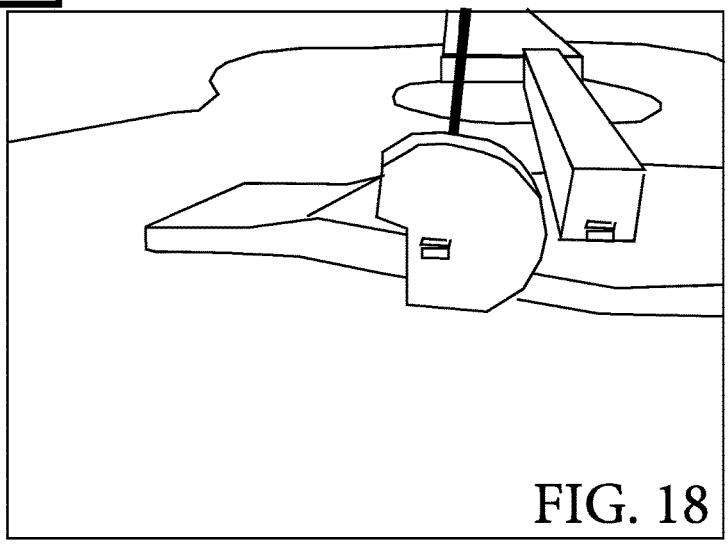
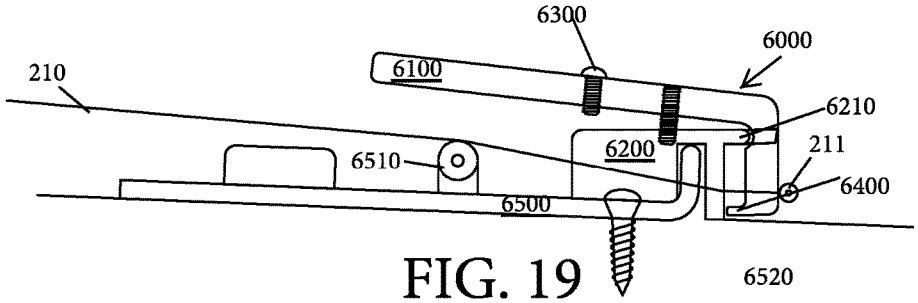


FIG. 18



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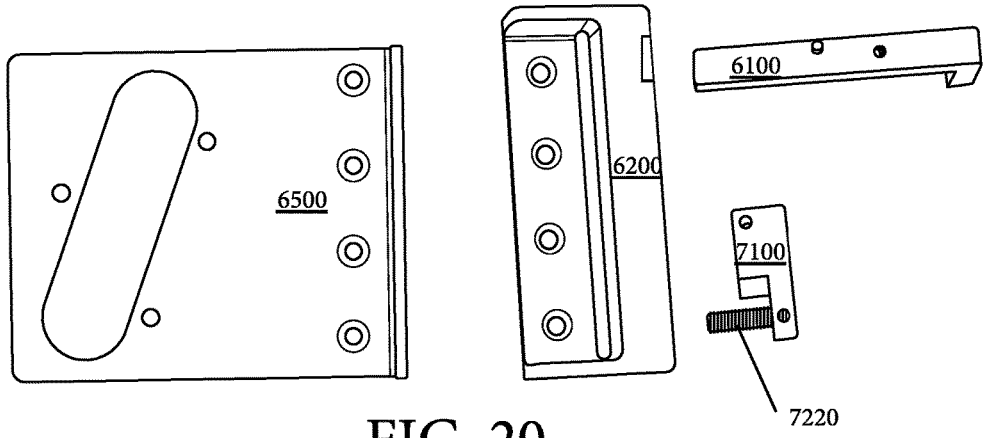

FIG. 20

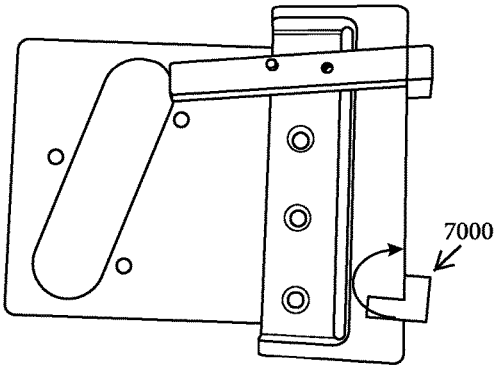

FIG. 21A

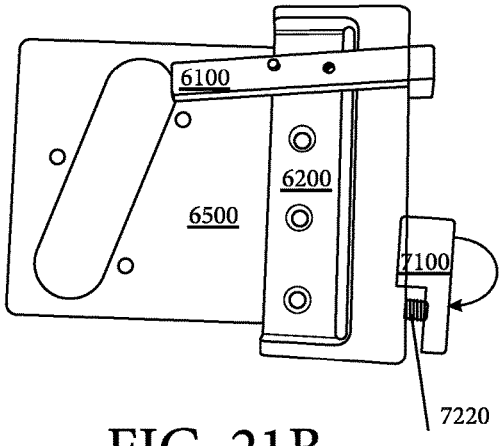

FIG. 21B

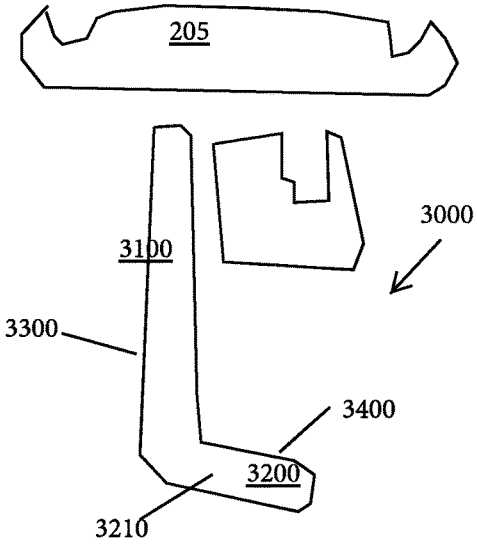

FIG. 22

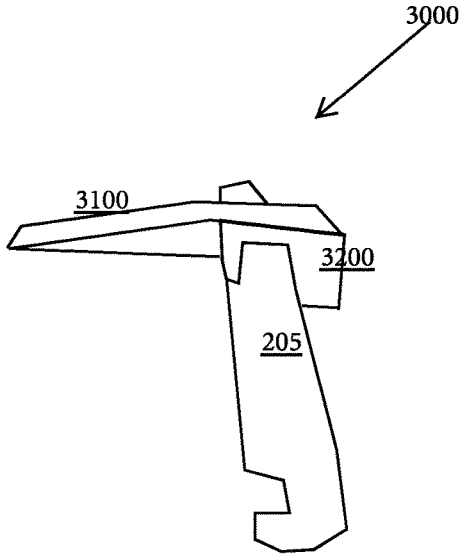

FIG. 23

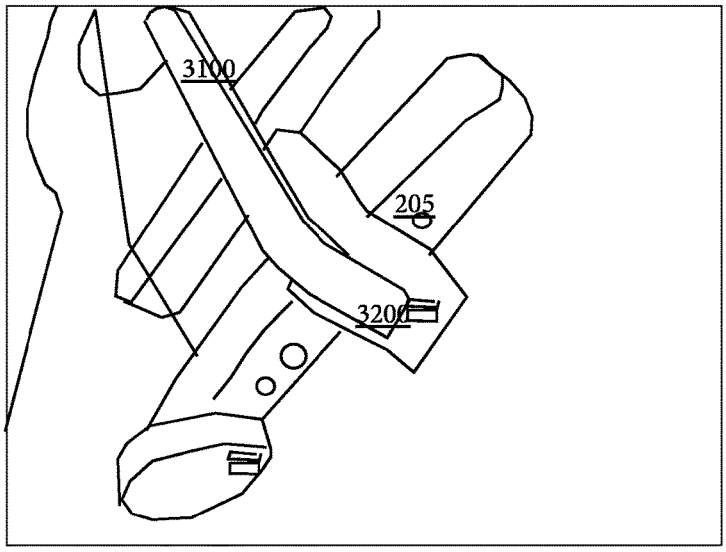

FIG. 24

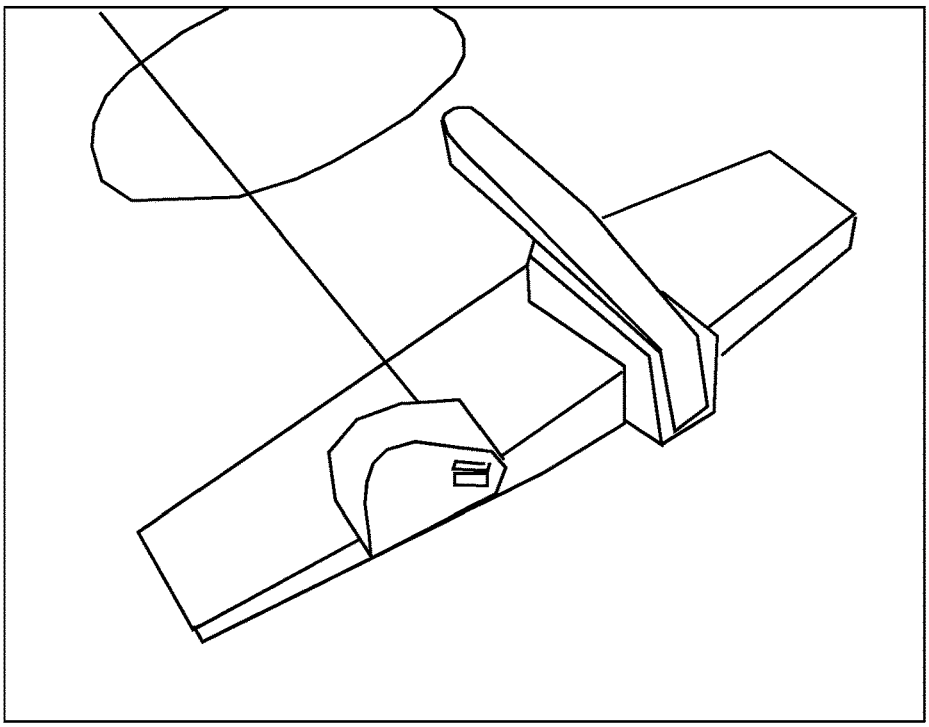

FIG. 25

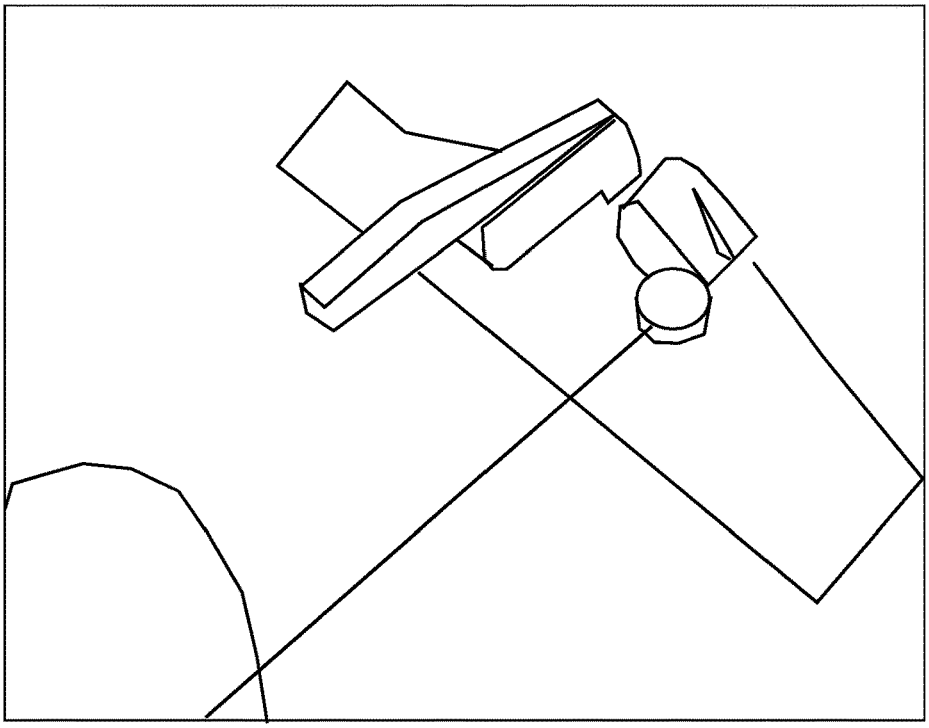

FIG. 26

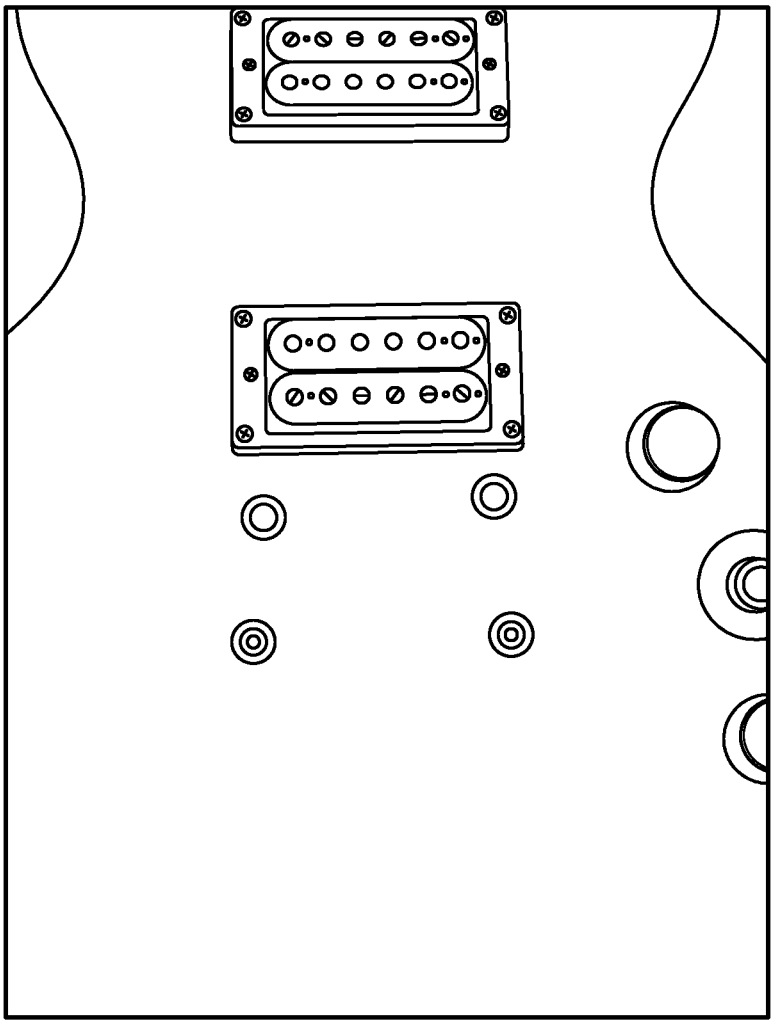

FIG. 27

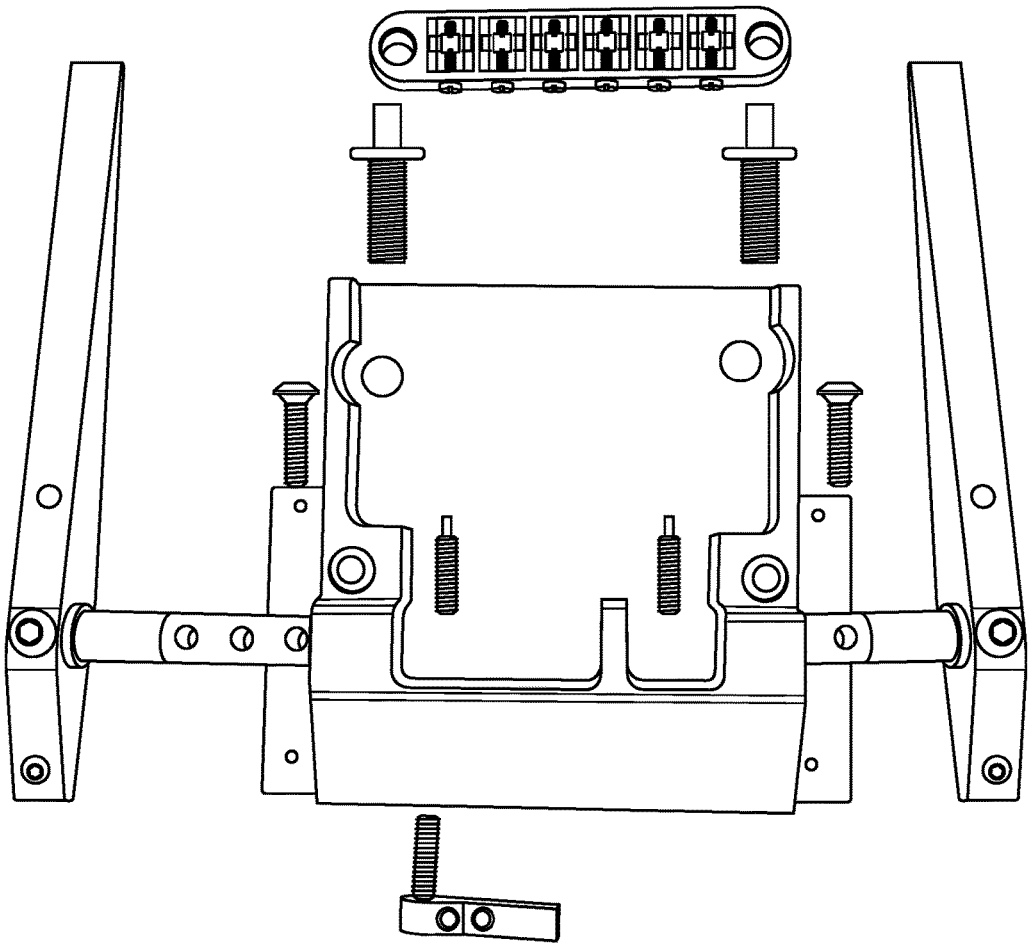

FIG. 28

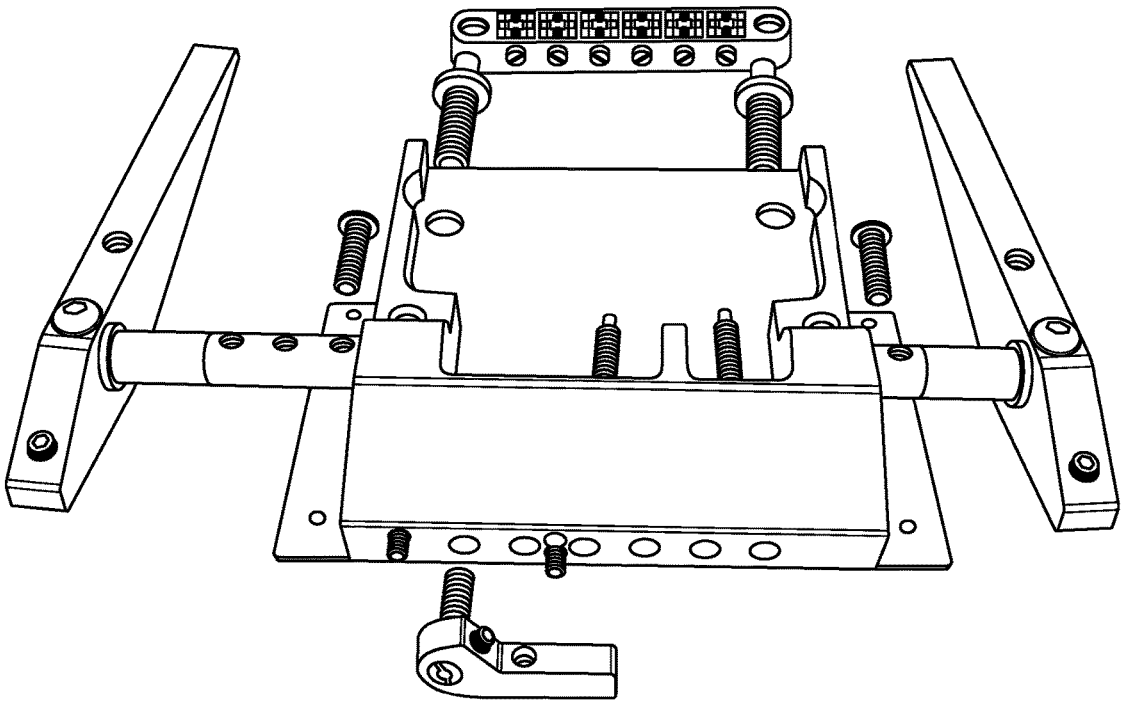

FIG. 29

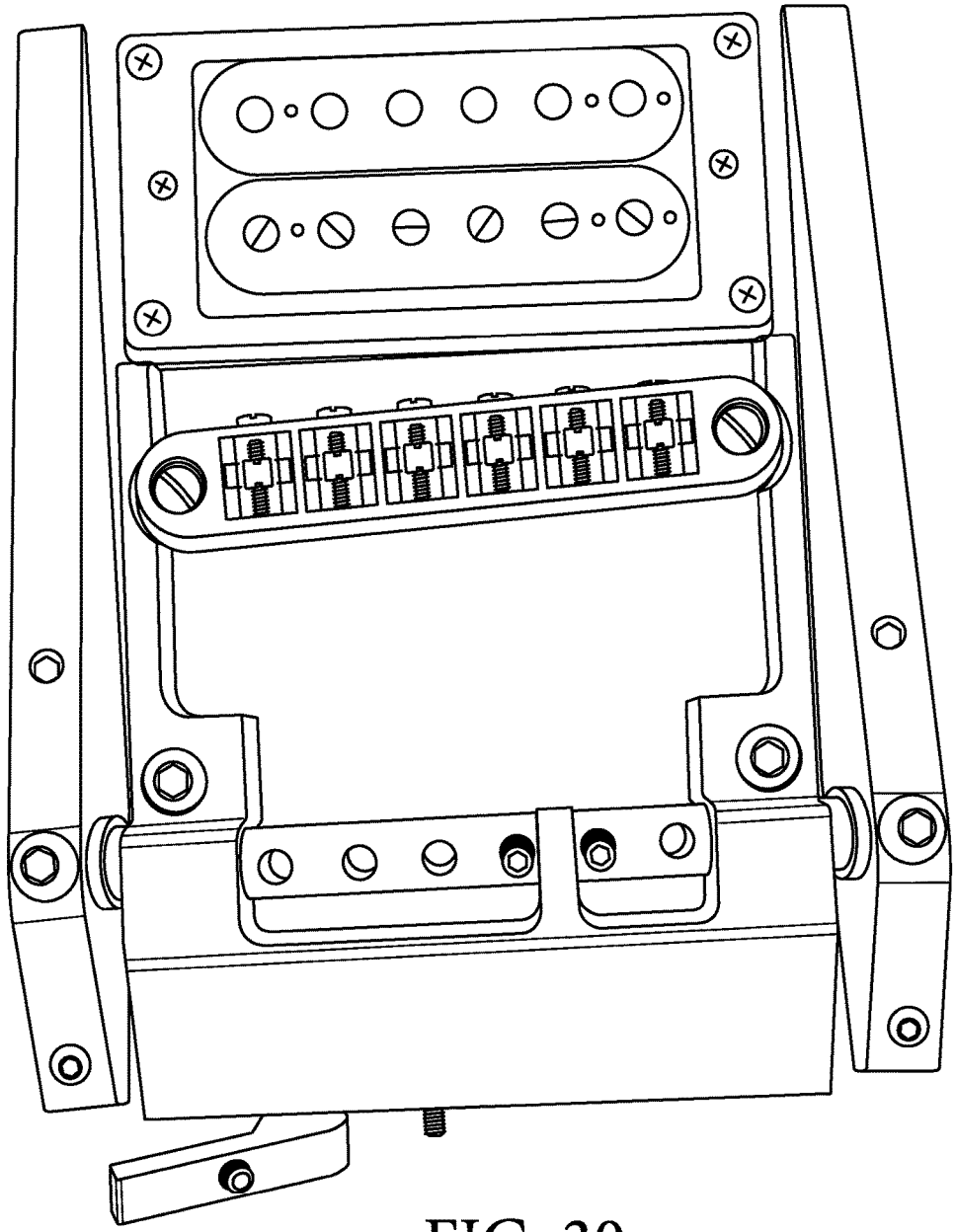

FIG. 30

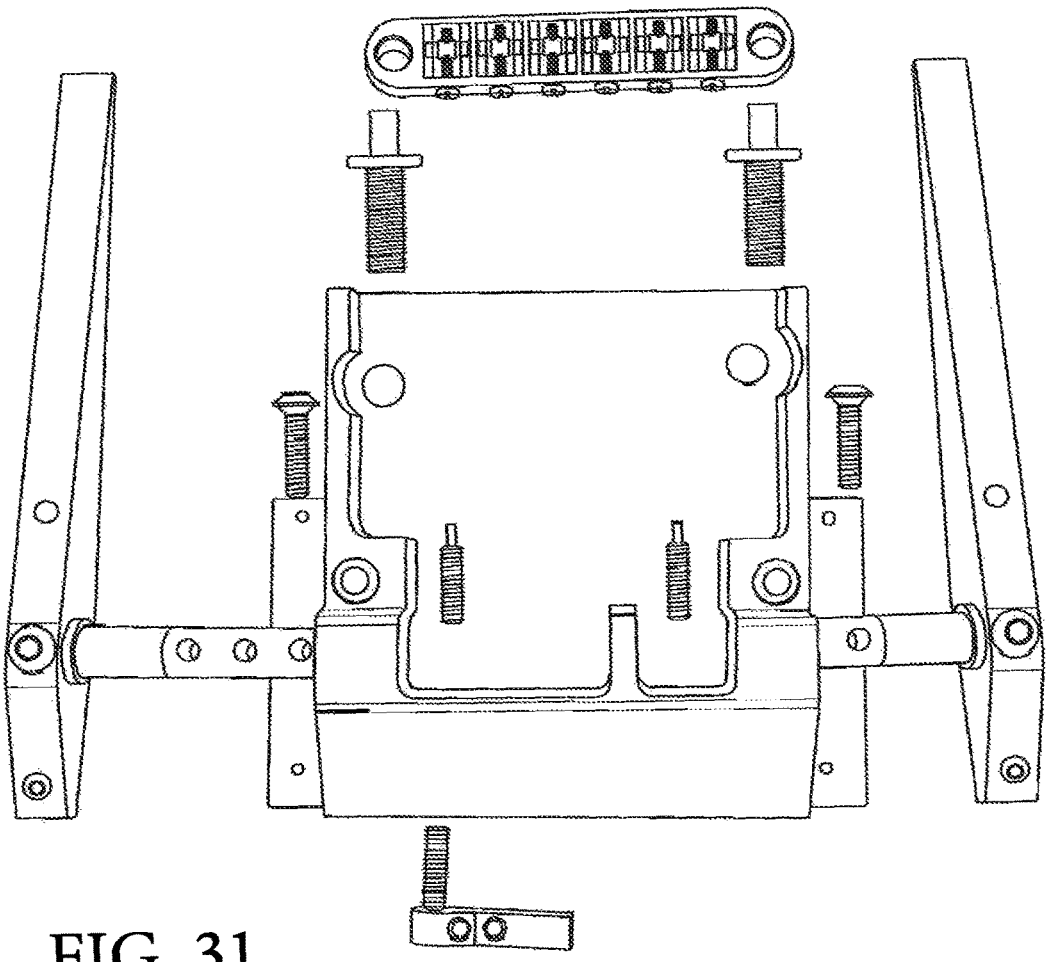

FIG. 31

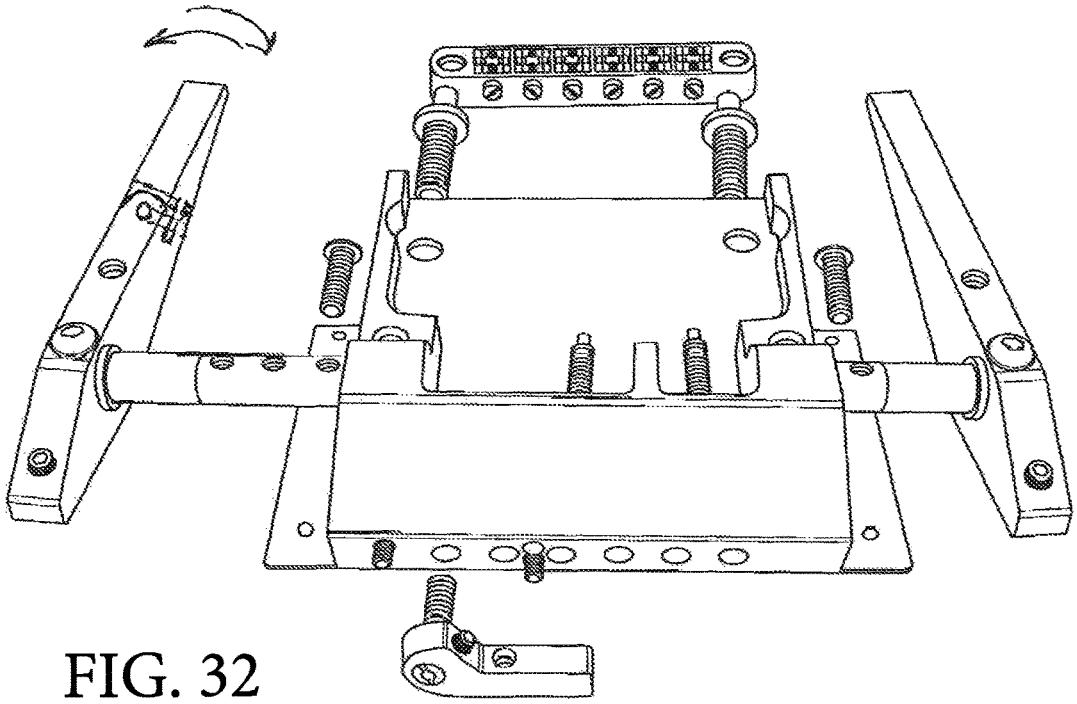

FIG. 32

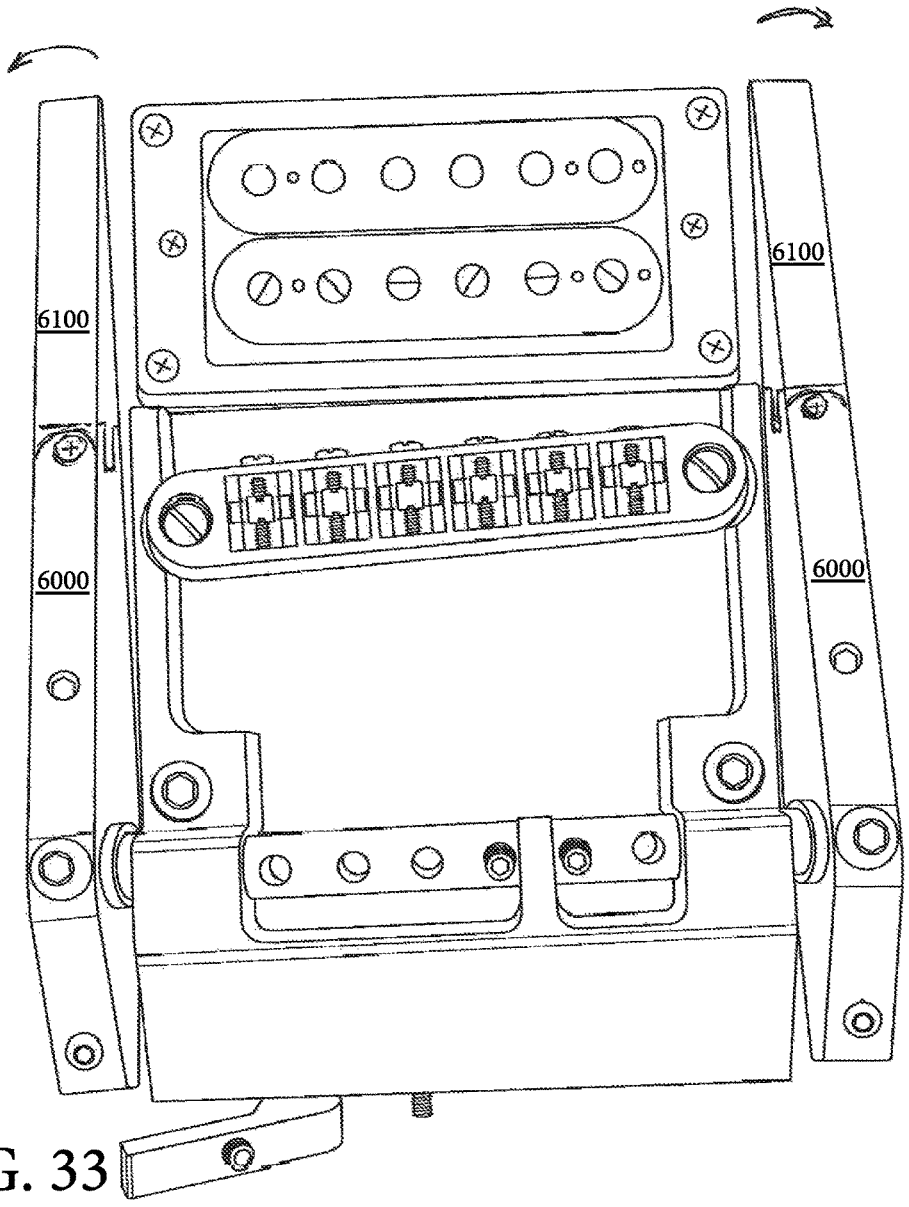

FIG. 33

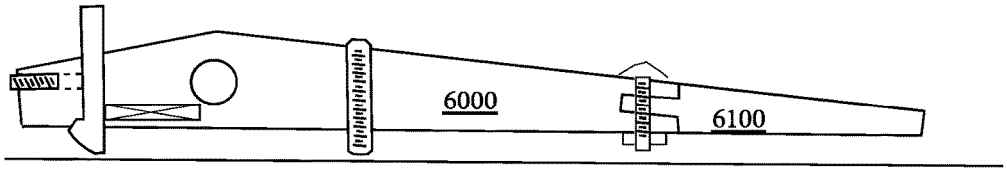

FIG. 34

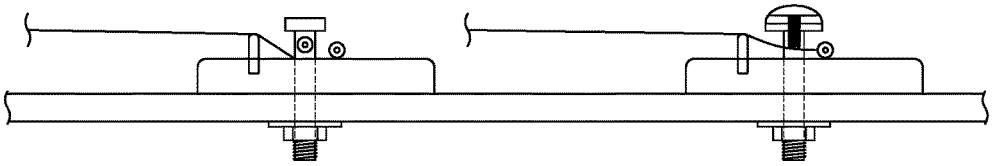

FIG. 35

STRING PULLING MECHANISMS FOR STRINGED MUSICAL INSTRUMENTS AND RELATED METHODS

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of application Ser. No. 15/646,662 (filed on Jan. 11, 2017) titled "Improvements to string pulling mechanisms for stringed musical and related methods."

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not applicable.

THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT

Not applicable.

REFERENCE TO AN APPENDIX SUBMITTED ON A COMPACT DISC AND INCORPORATED BY REFERENCE OF THE MATERIAL ON THE COMPACT DISC

Not applicable.

STATEMENT REGARDING PRIOR DISCLOSURES BY THE INVENTOR OR A JOINT INVENTOR

Reserved for a later date, if necessary.

BACKGROUND OF THE INVENTION

Field of Invention

The subject matter of this document is related to string pulling or other tension manipulating devices for strings of a stringed musical instrument.

Background of the Invention

Stringed instruments, e.g. guitars, make sounds via string vibrations. Every sound from a vibrating string has a perceptual property called pitch, which is a qualitative and quantitative measure of a listener's perception of the frequency of string vibration. A vibrating string's pitch depends on many things, including the string's thickness, tension strength, and length. Musicians can create a range of sound pitch via varying such physical characteristics of their strings.

Guitars and other stringed instruments typically have a preset pitch range that is established by pulling taut a string and setting the taut between the furthest end (key head) of a guitar's neck and the guitar's bridge. In most guitars, the tautness of the strings and the strings' corresponding pitch range is predetermined. In order to manually change the predetermined pitch range on a typical guitar, the strings must be manually tuned, one-by-one. This manual tuning is usually too awkward and time consuming to be done during a performance and as a result, the performer is typically limited to single pitch range during the duration of the musical performance with any single instrument.

Pitch-changing mechanisms for stringed instruments are known. In the case of the well-known instrument called a "pedal steel guitar," the ability to mechanically change the pitch of a string by pressing a foot pedal or knee lever provides a wider range of pitches to musicians without tedious and time-consuming tuning. Pedaled pitch changing mechanisms are also known in piano type musical instruments. But, pedaled instruments are complicated, enlarge the footprint of a musical instrument, and require a musician to sit down or stand in a one place. Hand-operated pitch changing mechanisms are therefore preferable to foot-pedal controlled pitch changing mechanisms in some cases.

In view of the foregoing, a need exists for a pitch changing mechanism that transform a fixed-pitch guitar into an instrument with hand-activated pitch changing capabilities without destructive modifications. Thus, with the disclosed improvements described herein, existing guitars can be easily converted to a pitch-changing device and vice versa without professional installation.

SUMMARY OF THE INVENTION

In view of the foregoing, an object of this specification is to disclose apparatus and related methods for adjusting the pitch of a string on a stringed instrument. In one embodiment, the disclosed devices enable a musician to adjust the tautness and, accordingly, the pitch of individual strings of a stringed instrument by simply pushing a lever or rotating a threaded piston or on or adjacent to the bridge of the guitar. In other embodiments, the pitch of an individual string of a stringed instrument may be adjusted via cam action (such as "bolt action" on a rifle). The disclosed devices can preferably be outfitted on electric or acoustic stringed instruments, including guitars.

In one embodiment, the pitch changing device is set-up as a push lever and comprises: (1) a mounting mechanism that includes a fulcrum, a lever, a down stop screw, and an open tuning top screw or stop. In operation, the lever may be mechanically coupled to a string so that whenever the lever is engaged, tension on the string is increased so that the pitch is correspondingly raised. Suitably, the open tuning stop screw restricts movement of the lever in response to the tension of the string pulling on the lever, after engagement of the lever is relaxed, and while the down stop screw restricts movement of the lever to a certain degree when engaged. The amount of movement of the lever may be set so that fully engaging the lever or fully relaxing the lever moves the pitch of a string by a whole or half tone. Suitably, the mounting mechanism for adjusting the tautness and pitch of a string of a stringed musical instrument may be easily installed on or adjacent to the bridge of a guitar.

In another embodiment, the pitch changing device is set-up as a rotary lever and comprises: a mounting mechanism that includes flat head screw that couples to a threaded bushing inside the cavity of a stringed instrument. In operation, the string may be provided through the threaded female nut mechanism and then mechanically coupled to the threaded piston engaged with the threaded nut. Suitably, when the piston is rotated relative to the nut, tension on the string is increased so that the pitch is correspondingly raised. Suitably, the interaction of the threads of the piston and nut restrict rotation of the piston in response to the tension of the string pulling on the piston, after engagement of the piston is relaxed, and while a down stop screw restricts rotation of the piston to a certain degree when engaged. The amount of movement of the piston may be set so that fully engaging the piston or fully relaxing the lever moves the pitch of a string

by a whole or half tone. Suitably, the mounting mechanism for adjusting the tautness and pitch of a string of a stringed musical instrument may be easily installed on or adjacent to the bridge of a guitar.

In yet another embodiment, the pitch changing device may be set-up as a double rotary lever (i.e., more than one rotary lever), a combination rotary and push lever (i.e., more than one of each type of lever), a double push lever (i.e., more than one push lever). In either embodiment, the double levers may be each separately installed for changing the pitch of a single string or each installed on a one side of a split shaft or two shafts so that each of the double levers control the pitch of several strings at once. Suitably, the mounting mechanism for adjusting the tautness and pitch of a string of a stringed musical instrument may be easily installed on or adjacent to the bridge of a guitar.

In some cases a roller pin or knurl screw pin maybe used in lieu of traditional guitar pins to secure strings of a guitar adjacent to the bridge. Typically, the roller pin or knurl screws can be inserted through the guitar's pin hole and secured with a flat head screw and bushing inside the guitar cavity. In practice, the roller pin or knurl screw pin may operate to (a) provide additional down pressure on a string to prevent string buzz, (b) enable seamless string replacement without removal of the roller pin or knurls screw pin, and (c) eliminate or substantially reduce the need for "bridge lifting" (i.e., the effect of the bridge being pulled off the body by the tension of the strings).

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

Other objectives of the disclosure will become apparent to those skilled in the art once the invention has been shown and described. The manner in which these objectives and other desirable characteristics can be obtained is explained in the following description and attached figures in which:

FIG. **1**A shows a first embodiment of a lever-type pitch adjustment mechanism **1000** for an acoustic guitar **100** coupled to a slack guitar string **110**;

FIG. **1**B shows a first embodiment of a lever-type pitch adjustment mechanism **1000** for an acoustic guitar **100** coupled to a taut but relaxed guitar string **110**;

FIG. **1**C shows a first embodiment of a lever-type pitch adjustment mechanism **1000** for an acoustic guitar **100** coupled to a taut and pulled guitar string **110**;

FIG. **2** is a side view of the pitch adjustment mechanism **1000** of FIG. **1** for an acoustic guitar **100**;

FIG. **3** is another side view of the pitch adjustment mechanism **1000** of FIGS. **1** and **2**;

FIG. **4** is a rear view of the pitch adjustment mechanism **1000** of FIGS. **1** through **3**;

FIG. **5** is a front view of the pitch adjustment mechanism **1000** of FIGS. **1** through **4**;

FIG. **6** shows a second embodiment of a lever-type pitch adjustment mechanism **2000** for an acoustic guitar **100** coupled to a taut but relaxed guitar string **110**;

FIG. **7** shows a first embodiment of a lever-type pitch adjustment mechanism **3000** for an electric guitar **200** coupled to a taut but relaxed guitar string **210**;

FIG. **8** is a rear view of the pitch adjustment mechanism **3000** of FIG. **8**;

FIG. **9** shows a first embodiment of a rotary-type pitch adjustment mechanism **4000** for an electric guitar **200** coupled to a taut but relaxed guitar string **210**;

FIG. **10** is a rear view of the pitch adjustment mechanism **4000** of FIG. **9**;

FIG. **11** is a rear view of the pitch adjustment mechanism **4000** of FIG. **9**;

FIG. **12** shows a first embodiment of a rotary-type pitch adjustment mechanism **5000** for an acoustic guitar **100** coupled to a taut but relaxed guitar string **110**;

FIG. **13** is a rear view of the pitch adjustment mechanism **4000** of FIG. **12**;

FIG. **14** is a rear view of the pitch adjustment mechanism **4000** of FIG. **12**;

FIG. **15** is a side view of the pitch adjustment mechanism **4000** of FIG. **14**;

FIG. **16** shows a cross-section of a different embodiment of a rotary-type pitch adjustment mechanism **5000** for an acoustic guitar;

FIG. **17** shows a rear view of the pitch adjustment mechanism **5000** installed on the bridge **105** of an acoustic guitar **100**.

FIG. **18** shows an alternate version of the arched knob **5100** disclosed above in connection with FIGS. **16** through **17**;

FIG. **19** shows a first embodiment of a lever-type pitch adjustment mechanism **6000** for a Telecaster-type electric guitar **200** coupled to a taut but relaxed guitar string **210**;

FIG. **20** is an exploded top view of the lever pitch adjustment mechanism **6000** of FIG. **16** and a rotary pitch adjustment mechanism **7000**;

FIG. **21**A is an assembled top view of the pitch adjustment mechanisms **6000**, **7000**;

FIG. **21**B is an assembled top view of the pitch adjustment mechanism **6000**, **7000**;

FIG. **22** shows an exploded view of another embodiment of a lever-type pitch adjustment mechanism **3000** for an electric guitar **200**;

FIG. **23** shows an assembled view of the pitch adjustment mechanism **3000** of FIG. **22**.

FIG. **24** shows a rear view of the pitch adjustment mechanism **3000** installed on the tail piece **205** of an electric guitar **200**;

FIG. **25** shows another embodiment of the pitch changing mechanisms;

FIG. **26** shows another embodiment of the pitch changing mechanisms;

FIG. **27** is a top view of an electric guitar with a bridge and tailpiece removed;

FIG. **28** is an exploded top view of a pitch changing mechanism;

FIG. **29** is an exploded end view of the pitch changer with a split shaft design, two levers and a rotary lever;

FIG. **30** is an assembled view of the pitch changer of FIG. **28**;

FIG. **31** is an exploded top view of a pitch changing mechanism;

FIG. **32** is an exploded end view of the pitch changer with a split shaft design, two levers and a rotary lever;

FIG. **33** is an assembled view of the pitch changer of FIG. **31**; and,

FIG. **34** is a cross section of the pitch changer of FIG. **33**

FIG. **35** is a cross section of a roller and knurl pins.

In the figures the following reference numerals identify the corresponding components:

100—acoustic guitar;
101—bridge mounting plate;
102—soundboard or topboard;
103—sound hole;
104—saddle;
105—bridge;
106—bridge pin;

107—bridge pin slot;
110—string;
111—ball-end;
200—electric guitar;
202—topboard;
204—bridge and saddle;
205—tail piece;
206—pickup
210—string;
211—ball-end;
1000—pitch adjustment mechanism;
1100—lever arm;
1110—lever belly;
1200—base;
1210—fulcrum pin or pivot pin;
1220—mounting screw;
1230—mounting nut;
1300—down stop screw;
1400—open tuning stop screw;
2000—pitch adjustment mechanism;
2100—lever arm;
2110—roller;
2200—base;
2210—fulcrum pin or pivot pin;
2220—mounting screw;
2230—mounting nut;
2300—down stop screw;
2400—open tuning stop;
3000—pitch adjustment mechanism;
3100—lever arm;
3200—base;
3210—fulcrum pin or pivot pin;
3300—down stop screw;
3400—open tuning stop screw;
4000—pitch adjustment mechanism;
4100—lever arm;
4200—base;
4220—pulling screw;
4299—set screw;
4300—down stop screw;
4400—open tuning stop;
5000—pitch adjustment mechanism;
5100—lever arm;
5200—base;
5220—pulling screw;
5300—down stop screw;
5400—open tuning stop;
5500—roller housing;
5510—roller;
6000—pitch adjustment mechanism;
6100—lever arm;
6200—base;
6210—fulcrum or pivot;
6300—down stop screw;
6400—open tuning stop;
6500—pickup plate;
6510—roller;
6520—lip.
7000—pitch adjustment mechanism;
7100—lever arm;
7200—base;
7220—pulling screw;
7300—down stop screw;
7400—open tuning stop;

It is to be noted, however, that the appended figures illustrate only typical embodiments of this invention and are therefore not to be considered limiting of its scope, for the invention may admit to other equally effective embodiments that will be appreciated by those reasonably skilled in the relevant arts. Also, figures are not necessarily made to scale but are representative.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Disclosed are apparatus and related methods for adjusting the pitch of a string on a stringed instrument. In one embodiment, the disclosed devices enable a musician to adjust the tautness and, accordingly, the pitch of individual strings of a stringed instrument by simply pushing a lever or rotating a threaded piston or on or adjacent to the bridge of the guitar. The disclosed devices can preferably be outfitted on electric or acoustic stringed instruments, including guitars. The more specific aspects of the preferred embodiments are discussed in greater detail with reference to the figures.

FIGS. **1**A, **1**B, and **1**C show a cross-section of a first embodiment of a lever-type pitch adjustment mechanism **1000**. As shown, the pitch adjustment mechanism **1000** may be defined by a lever arm **1100**, a base **1200**, a down stop screw **1300**, and an open tuning stop screw **1400**. Suitably, the lever arm **1100** is coupled to the base **1200** via a pivot or fulcrum pin **1210** through the belly **1110** of the lever arm **1100**. In a preferred embodiment, the belly **1110** defines an arc and the pivot pin **1210** is provided coaxial to said arc. On one side of the pivot pin **1210**, a down stop screw **1300** is provided through the lever arm **1100**. On another side of the pivot pin **1210**, an open tuning stop screw **1400** is provided through the lever arm **1100**. As discussed in greater detail below, the pitch adjustment mechanism **1000** may be installed on an acoustic guitar **100** (not shown).

FIGS. **2**, **3**, **4**, and **5** respectively show a right-side view, a left-side view, a rear view and a front view of the pitch adjustment mechanism **1000** installed on the bridge **105** of an acoustic guitar **100**. As can be appreciated by those of skill in the art, the guitar **100** suitably features: a sound board or top board **102**; a sound hole **103**; a saddle **104**; a bridge **105**; and strings that are secured to the bridge **105** via either a bridge pin **106** or a ball end **111**. In the depicted embodiment, the pitch changing mechanisms has replaced a bridge pin **106** and is coupled to a string with a ball end **111**.

Referring to FIGS. **1**A and **2** through **4**, the pitch adjustment mechanism **1000** may be installed on the acoustic guitar **100** via (a) positioning the base **1200** over a bridge pin slot **107** of the bridge **105**; (b) running a mounting screw **1220** of the base **1200** through the bridge pin slot **107** of the bridge **105**, through the top plate **102** of the guitar **100**, and through the bridge plate **101** on the underside of the top plate **102**; and (c) securing a mounting nut **1230** to the exposed end of the mounting screw **1200**. In the preferred embodiment, base **1200** is installed so that the pivot pin **1200** located behind the saddle **104** of the guitar, a first end of the lever arm **100** is provided over the saddle and strings **110** of the guitar, and a second end of the lever arm is provided behind the saddle **104**. Suitably, a string **110** with a ball end **111** may be strung up on the guitar **100** so that the string **110** is pulled taut to the saddle **104**, strung along the belly **1110** of the lever arm **1110** and, coupled to the back end of the lever arm **1000** via the ball end **111**.

In use, the pitch adjustment mechanism **1000** may be used to adjust the pitch of a guitar string **110**. This operation may be illustrated with reference to FIGS. **1**A through **1**C. FIG. **1**A shows a first embodiment of the lever-type pitch adjustment mechanism **1000** for an acoustic guitar **100** coupled to a slack guitar string **110**. As shown, the lever arm **1000** is

coupled to the string **110** via the ball end **111** but the lever arm **110** is not biased in any direction around the pivot or fulcrum pin **1210** because the string **110** is slack. FIG. **1**B shows pitch adjustment mechanism **1000** for an acoustic guitar **100** coupled to a taut but relaxed guitar string **110**, wherein the tension in the string **110** is applied to the back end of the lever arm **1000** so that the back end of the lever arm **1000** is pulled toward the bridge **105**. Suitably, the back end of the lever arm **1000** is run through by the open tuning stop screw **1400**, which abuts the bridge **105** to keep the string from pulling the lever arm all the way around the pivot pin **1210**. Suitably, the extent to which the open tuning stop screw is provided through the lever arm **1100** will determine the initial pitch of the string **110** since the configuration shown in FIG. **1**B will be the default position whenever the string **110** is under tension. Referring now to FIG. **1**C, the lever may be pulled by hand-action until the down stop screw **1300** abuts the bridge **105**. Suitably, such action increases the tension in the string **110** by pulling the string **110** under the belly **1110** of the lever arm **1000**. In a preferred embodiment the increased tension can modify the pitch of the string **110** up to a full tone. As can be appreciated, the amount of pitch adjustment attainable by pulling/pushing the lever **1100** can varied up to the limit set by the down stop screw's **1300** gridlocking interaction with the bridge **105**. Suitably, relaxing the lever arm **1100** will cause the lever arm **1100** and string **110** to return to the configuration of FIG. **1**B since the string tension will pull on the back end of the lever arm **1100** in the manner illustrated.

FIG. **6** shows a cross-section of a second embodiment of a lever-type pitch adjustment mechanism **2000**. As shown, the pitch adjustment mechanism **2000** may be defined by a lever arm **2100**, a roller **2110**, a base **2200**, a down stop screw **2300**, and an open tuning stop **2400**. Suitably, the lever arm **2100** is coupled to the base **2200** via a pivot or fulcrum pin **2210** through the lever arm **2100**. In a preferred embodiment, the roller **2110** defines a rotating disc and the pivot pin **2210** is provided adjacent to said disc so that the roller and the lever arm rotate independently relative to the base. On one side of the pivot pin **2210**, a down stop screw **2300** is provided through the lever arm **2100**. On another side of the pivot pin **2210**, an open tuning stop **2400** is provided on the distal end of the lever arm **2100**. As discussed in greater detail below, the pitch adjustment mechanism **1000** may be installed on an acoustic guitar **100** (not shown).

Referring still to FIG. **6**, the pitch adjustment mechanism **2000** may be installed on an acoustic guitar **100** via (a) positioning the base **2200** over a bridge pin slot **107** of the bridge **105**; (b) running a mounting screw **2220** (e.g., flat head screw for string clearance) of the base **2200** through the bridge pin slot **107** of the bridge **105**, through the top plate **102** of the guitar, and through the bridge plate **101** on the underside of the top plate **102**; and (c) securing a mounting nut **2230** or threaded bushing (not shown) to the exposed end of the mounting screw **2220** on the inside of the guitar **100**. In the preferred embodiment, the base **2200** is installed so that the pivot pin **2210** and roller **2110** are located behind the saddle **104** of the guitar, a first end of the lever arm **100** is provided over the saddle **104** and strings **110** of the guitar, and a second end of the lever arm is provided behind the saddle **104**. Suitably, a string **110** with a ball end **111** may be strung up on the guitar so that the string **110** is pulled taut to the saddle **104**, strung under the roller **2110**, and coupled to the back end of the lever arm **1000** via the ball end **111**.

In use, the pitch adjustment mechanism **2000** may be used to adjust the pitch of a guitar string **110**. This operation may be illustrated with reference to FIG. **6**. FIG. **6** shows a first embodiment of the lever-type pitch adjustment mechanism **2000** for an acoustic guitar coupled to a guitar string **110**. As shown, the lever arm **2000** is coupled to the string **110** via the ball end **111**. FIG. **6** shows the pitch adjustment mechanism **2000** coupled to a taut but relaxed guitar string **110**, wherein the tension in the string **110** is applied to the back end of the lever arm **1000** so that the back end of the lever arm **1000** is pulled toward the bridge **105**. Suitably, the back end of the lever arm **2000** is defined by the open tuning stop **2400**, which abuts the base **2200** to keep the string **110** from pulling the lever arm **2100** all the way around the pivot pin **2210**. Suitably, the open tuning stop screw **2400** will determine the initial pitch of the string **110** since the configuration shown in FIG. **1**B will be the default position whenever the string **110** is under tension. As implied from the earlier figures (FIGS. **1**A through **5**), the lever **2100** may be pulled by hand-action until the down stop screw **2300** abuts the bridge **105**. Suitably, such action increases the tension in the string **110** by pulling the string **100** over saddle **104** and under the roller **2110**. Suitably, the roller can rotate as the string is pulled taut to reduce the wear-and-tear on the string **110**. In a preferred embodiment the increased tension can modify the pitch of the string up to a full tone. As can be appreciated, the amount of pitch adjustment attainable by pulling/pushing the lever can varied up to the limit set by the down stop screw's **2300** gridlocking interaction with the bridge **105**. Suitably, relaxing the lever arm **2000** will cause the lever arm **2000** and string **110** to return to the configuration of FIG. **6** since the string tension will pull on the back end of the lever arm **2000** in the manner illustrated.

FIG. **7** shows a cross-section of a first embodiment of a lever-type pitch adjustment mechanism **3000** for an electric guitar **200**. As shown, the pitch adjustment mechanism **3000** may be defined by a lever arm **3100**, a base **3200**, a down stop screw **3300**, and an open tuning stop screw **3400**. Suitably, the lever arm **3100** is coupled to the base **3200** via a pivot or fulcrum pin **3210**. On one side of the pivot pin **3210**, a down stop screw **3300** is provided through the lever arm **3100**. On another side of the pivot pin **3210**, an open tuning stop screw **3400** is provided through the lever arm **3100**. As discussed in greater detail below, the pitch adjustment mechanism **3000** may be installed on an electric guitar **200** via securing the base **3200** to the tail piece **205** of the guitar **200** via a mounting screw **2220** provided into the string hole **207** of the tail piece **205**, wherein the mounting screw **2220** is cannulated so that the string **210** can be provided therethrough to the lever **3100** and secured thereto via the ball end **211** of the string **210**.

FIG. **8** shows a rear view of the pitch adjustment mechanism **3000** installed on the tail piece **205** of an electric guitar **200**. As can be appreciated by those of skill in the art, the guitar **200** suitably features: a sound board or top board **202**; a bridge and saddle **204**; a tail piece **205**; a pickup **206**, and strings that are secured to the tail piece **205** via a ball end **211**. In the depicted embodiment, the pitch changing mechanisms **3000** is coupled to the tail piece via a string **210** with a ball end **211**.

Referring to FIGS. **7** and **8**, the pitch adjustment mechanism **3000** may be installed on the electric guitar **200** via (a) positioning the base **3200** adjacent a string slot **207** of the tail piece **205**; (b) running a string **210** through the string slot of the tail piece **205**; and (c) coupling the ball end **211** of the string **210** to the end of the lever arm **3100**. In the preferred embodiment, base **3200** is installed so that the pivot pin **3200** located behind the tail piece **205** of the guitar **200**, a first end of the lever arm **3100** is provided over the tail piece

205 and strings 210 of the guitar 200, and a second end of the lever arm is provided behind the tail piece 205. Suitably, a string 210 with a ball end 211 may be strung up on the guitar 200 so that the string 210 is pulled taut to the saddle 204, strung through the string slot 207 of the tail piece 205 and, coupled to the back end of the lever arm 3100 via the ball end 211.

In use, the pitch adjustment mechanism 3000 may be used to adjust the pitch of a guitar string 210. This operation may be illustrated with reference to FIG. 7. FIG. 7 shows a first embodiment of the lever-type pitch adjustment mechanism 3000 for an electric guitar 200 coupled to a guitar string 210. As shown, the pitch adjustment mechanism 3000 for an acoustic guitar 200 is coupled to a taut but relaxed guitar string 210, wherein the tension in the string 210 is applied to the back end of the lever arm 3100 so that the back end of the lever arm 3100 is pulled toward the tail piece 305. Suitably, the back end of the lever arm 3100 is run through by the open tuning stop screw 3400, which abuts the base 3200 to keep the string from pulling the lever arm all the way around the pivot pin 3210. Suitably, the extent to which the open tuning stop screw 3400 is provided through the lever arm will determine the initial pitch of the string 210 since the configuration shown in FIG. 7 will be the default position whenever the string 210 is under tension. As can be extrapolated from FIG. 7 and the earlier figures, the lever 3100 may be pulled by hand-action until the down stop screw 3300 abuts the base 3200. Suitably, such action increases the tension in the string 210 by pulling the string 210 through the string slot 207. In a preferred embodiment the increased tension can modify the pitch of the string 210 up to a full tone. As can be appreciated, the amount of pitch adjustment attainable by pulling/pushing the lever can varied up to the limit set by the down stop screw's 3300 gridlocking interaction with the tail piece 205. Suitably, relaxing the lever arm 3100 will cause the lever arm 3100 and string 210 to return to the configuration of FIG. 7 since the string 210 tension will pull on the back end of the lever arm 3100 in the manner illustrated.

FIG. 9 shows a cross-section of a first embodiment of a rotary-type pitch adjustment mechanism 4000 for an electric guitar 200. As shown, the pitch adjustment mechanism 4000 may be defined by a lever arm 4100, a knob base 4200, a down stop screw 4300, and an open tuning stop 4400. Suitably, the lever arm 4100 is coupled or otherwise provided to the base 4200 via unitary construction or other joint. As discussed below, the base 4200 features a pulling screw 4220 that may be used to draw the base 4200 toward or away from a tail piece 205 of an electric guitar. In the preferred embodiment, the knob base 4200 is secured to the pulling screw 4220 via a set screw 4299. The distal end of the lever arm 4100, a down stop screw 4300 is provided through the lever arm 4100. A proximate side of the lever arm 4100 defines an open tuning stop 4400. As discussed in greater detail below, the pitch adjustment mechanism 4000 may be installed on an electric guitar (not shown).

FIGS. 9 and 10 show a rear view of the pitch adjustment mechanism 4000 installed on the tail piece 205 of an electric guitar 200. As can be appreciated by those of skill in the art, the guitar 200 suitably features: a sound board or top board 202; a bridge and saddle 204; a tail piece 205; a pickup 206, and strings that are secured to the tail piece 205 via a ball end 211. In the depicted embodiment, the pitch changing mechanisms 4000 is coupled to the tail piece 205 via the threads of the pull screw 4220 screwed inside of the string hole 207 of the tail piece 205. Again, the knob base 4200 is attached to the pull screw 4220 or piston via the locking screw 4299.

Referring to FIGS. 9 through 11, the pitch adjustment mechanism 4000 may be installed on the electric guitar 200 via (a) positioning the base 4200 adjacent a string slot 207 of the tail piece 205; (b) running a string 210 through the string slot of the tail piece 205; (c) coupling the ball end 211 of the string 210 to the base 4200; and (d) threadedly and rotatably coupling the base 4200 to the tail piece 205 via the pulling screw 4220. In the preferred embodiment, base 4200 is installed so that the lever arm 4100 located behind the tail piece 205 of the guitar 200. Suitably, a string 210 with a ball end 211 may be strung up on the guitar 200 so that the string 210 is pulled taut to the saddle 204, strung through the string slot 207 of the tail piece 205, strung through the pulling screw 4220 and, coupled to the base 4200 via the ball end 211.

In use, the pitch adjustment mechanism 4000 may be used to adjust the pitch of a guitar string 210. This operation may be illustrated with reference to FIGS. 9 through 11. FIG. 9 shows a first embodiment of the rotary-type pitch adjustment mechanism 4000 for an electric guitar 200 coupled to a guitar string 210. As shown, the pitch adjustment mechanism 4000 for an electric guitar 200 is coupled to a taut but relaxed guitar string 210, wherein the tension in the string 210 is applied to the back end of the base 4200. Suitably, the stop 4400 of the lever arm 4100 is abutted to the tail piece 205 to keep the string from pulling the lever arm all the way around the pulling screw 4220. Suitably, the abutment of the stop 4400 to the tail piece 205 will determine the initial pitch of the string 210 since the configuration shown in FIG. 10 will be the default position whenever the string 210 is under tension. As can be interpolated from FIGS. 10 and 11, and the earlier figures, the lever 4100 may be pulled by hand-action until the down stop screw 4300 abuts the tail piece 205. Suitably, such action increases the tension in the string 210 by unthreading the pull screw 4220 which in turn pulls the string 210 through the string slot 207. In a preferred embodiment the increased tension can modify the pitch of the string 210 up to a full tone. As can be appreciated, the amount of pitch adjustment attainable by pulling/pushing the lever can varied up to the limit set by the down stop screw's 4300 gridlocking interaction with the tail piece 205. Suitably, relaxing the lever arm 4100 will cause the lever arm 4100 and string 210 to return to the configuration of FIG. 10 since the string 210 tension will pull on the back end of the lever arm 4100 in the manner illustrated.

FIG. 12 shows a cross-section of a first embodiment of a rotary-type pitch adjustment mechanism 5000 for an acoustic guitar 100. As shown, the pitch adjustment mechanism 5000 may be defined by a lever arm 5100 (defined by an arched knob, as shown), a base 5200, a down stop screw 5300, and an open tuning stop 5400. Suitably, the lever arm 5100 is coupled or otherwise provided to the base 5200 via unitary construction or other joint. As discussed below, the base 5200 features a pulling screw 5220 that may be used to draw the base 5200 toward or away from a bridge 105 of an acoustic guitar. The distal end of the lever arm 5100 may suitably be T-shaped with a down stop screw 5300 provided on one side of the T-shape and the other side of the T-shape defining an open tuning stop 5400. The pitch changer 500 further comprises a roller housing 5500 coupled to the bridge 105 of a guitar 100 and a roller 5510. As discussed in greater detail below, the pitch adjustment mechanism 5000 may be installed on the bridge 205 of an acoustic guitar (not shown).

FIGS. 13 and 14 show a rear view of the pitch adjustment mechanism 5000 installed on the bridge 105 of an acoustic guitar 100. FIG. 15 shows a side view of the pitch adjust-

ment mechanism **5000** in the configuration of FIG. **14**. As can be appreciated by those of skill in the art, the guitar **100** suitably features: a sound board or top board **102**; a sound hole **103**; a saddle **104**; a bridge **105**; and strings that are secured to the bridge **105** via either a bridge pin **106** or a ball end **111**. In the depicted embodiment, the pitch changing mechanisms has replaced a bridge pin **106** and is coupled to a string **110** with a ball end **111**.

Referring to FIGS. **12** through **15**, the pitch adjustment mechanism **5000** may be installed on the acoustic guitar **100** via (a) installing the roller housing **5500** in the bridge pin slot **107** using a flat-head screw and threaded bushing inside the instrument; (b) positioning the base **5200** adjacent the roller housing **5500**; (c) running a string **110** through the roller **5510** and roller housing **5500**; (d) coupling the ball end **111** of the string **110** to the base **5200**; and (e) threadedly and roatably coupling the base **5200** to the roller housing **5500** via the pulling screw **5220**. In the preferred embodiment, base **5200** is installed so that the lever arm **5100** is located behind the roller housing **5500**. Suitably, a string **110** with a ball end **111** may be strung up on the guitar **100** so that the string **110** is pulled taut to the saddle **104** (see FIG. **15**), strung through the roller **5510** and roller housing **5500** and, coupled to the base **5200** via the ball end **111**.

In use, the pitch adjustment mechanism **5000** may be used to adjust the pitch of a guitar string **110**. This operation may be illustrated with reference to FIGS. **13** through **14**. FIG. **13** shows a first embodiment of the rotary-type pitch adjustment mechanism **5000** for an acoustic guitar **100** coupled to a guitar string **110**. As shown, the pitch adjustment mechanism **5000** for an acoustic guitar **100** is coupled to a taut but relaxed guitar string **110**, wherein the tension in the string **110** is applied to the back end of the base **5200**. Suitably, the stop **5400** of the lever arm **5100** is abutted to the bridge **105** to keep the string **110** from pulling the lever arm **5100** all the way around the pulling screw **5220**. Suitably, the abutment of the stop **5400** to the tail piece **105** will determine the initial pitch of the string **110** since the configuration shown in FIG. **13** will be the default position whenever the string **110** is under tension. As can be interpolated from FIGS. **13** and **14**, and the earlier figures, the lever **5100** may be pulled by hand-action until the down stop screw **5300** abuts the bridge **105**. Suitably, such action increases the tension in the string **110** by unthreading the pull screw **5220** which in turn pulls the string **110** through the roller **5510**. In a preferred embodiment the increased tension can modify the pitch of the string **110** up to a full tone. As can be appreciated, the amount of pitch adjustment attainable by pulling/pushing the lever can varied up to the limit set by the down stop screw's **5300** gridlocking interaction with the tail piece **105**. Suitably, relaxing the lever arm **5100** will cause the lever arm **5100** and string **110** to return to the configuration of FIG. **13** since the string **110** tension will pull on the back end of the lever arm **5100** in the manner illustrated.

FIG. **16** shows a cross-section of a different embodiment of a rotary-type pitch adjustment mechanism **5000** for an acoustic guitar **100**. FIG. **17** shows a rear view of the pitch adjustment mechanism **5000** installed on the bridge **105** of an acoustic guitar **100**. As shown, the pitch adjustment mechanism **5000** may be defined by an arched knob **5100** (defined by an arched knob, as shown), a base **5200**, a down stop **5300** (FIG. **17**), and an open tuning stop **5400** (FIG. **17**). Suitably, the arched knob **5100** is coupled or otherwise provided to the base **5200** via unitary construction or other joint. As discussed below, the base **5200** features a pulling screw **5220** that may be used to draw the base **5200** toward or away from a bridge **105** of an acoustic guitar. The pulling screw **5200** couples to the arched knob via a set screw **5299**. The arched knob **5100** and base **5200** may suitably be pie-slice shaped with a down stop **5300** provided on one side of the pie-slice-shape and the other side of the pie-shape defining an open tuning stop **5400**. The pitch adjustment mechanism **5000** may be installed on the bridge **205** of an acoustic guitar **100**.

FIG. **17** shows a rear view of the pitch adjustment mechanism **5000** installed on the bridge **105** of an acoustic guitar **100**. As can be appreciated by those of skill in the art, the guitar **100** suitably features: a sound board or top board **102**; a sound hole **103**; a saddle **104**; a bridge **105**; and strings **110** that are secured to the bridge **105** via either a bridge pin **106** or a ball end **111**. In the depicted embodiment, the pitch changing mechanisms **5000** has been coupled to the bridge via threaded pull screw **5220** and is coupled to a string **110** with a ball end **111**.

In use, the pitch adjustment mechanism **5000** may be used to adjust the pitch of a guitar string **110**. This operation may be illustrated with reference to FIG. **17**. FIG. **17** shows the rotary-type pitch adjustment mechanism **5000** for an acoustic guitar **100** coupled to a guitar string **110**. As shown, the pitch adjustment mechanism **5000** for an acoustic guitar **100** is coupled to a taut but relaxed guitar string **110**, wherein the tension in the string **110** is applied to the back end of the base **5200**. Suitably, the stop **5400** of the lever arm **5100** is abutted to the top board **102** to keep the string **110** from pulling the lever arm **5100** all the way around the pulling screw **5220**. Suitably, the abutment of the stop **5400** to the top board **102** will determine the initial pitch of the string **110** since the configuration shown in FIG. **17** will be the default position whenever the string **110** is under tension. As can be extrapolated from FIG. **17**, and the earlier figures, the lever **5100** may be pulled by hand-action until the down stop screw **5300** abuts the op plate **102**. Suitably, such action increases the tension in the string **110** by unthreading the pull screw **5220** which in turn pulls the string **110** through the roller **5510**. In a preferred embodiment the increased tension can modify the pitch of the string **110** up to a full tone. As can be appreciated, the amount of pitch adjustment attainable by pulling/pushing the lever can varied up to the limit set by the down stop screw's **5300** gridlocking interaction with the tail piece **105**. Suitably, relaxing the lever arm **5100** will cause the lever arm **5100** and string **110** to return to the configuration of FIG. **16** since the string **110** tension will pull on the back end of the lever arm **5100** in the manner illustrated.

FIG. **18** shows an alternate version of the arched knob **5100** disclosed above in connection with FIGS. **16** through **17**. Suitably, the arched knob **5100** may be knurled around the top so that a user may use his or her wrist or arm to twist the knob **5100** while playing the strings **110** of the instrument **100**.

FIG. **19** shows a cross-section of another embodiment of a lever-type pitch adjustment mechanism **6000** for an electric guitar **200**. FIG. **17** shows an exploded view of the pitch adjustment mechanism **6000**. As shown, the pitch adjustment mechanism **6000** may be defined by a lever arm **6100**, a base **6200**, a down stop screw **6300**, and an open tuning stop **6400**. Suitably, the lever arm **6100** is coupled to the base **6200** via a pivot or fulcrum **6210**. On one side of the pivot **6210**, a down stop screw **6300** is provided through the lever arm **6100**. The other side of the pivot pin **6210** defines an open tuning stop **6400**. As discussed in greater detail below, the pitch adjustment mechanism **6000** may be installed on an electric guitar (not shown).

FIG. **20** shows an exploded view of the pitch adjustment mechanism **6000**.

Referring to FIGS. **19** and **20**, the pitch adjustment mechanism **6000** may be installed on the electric guitar **200** via (a) positioning the base **6200** over a lip of the pickup plate **6500**; (b) running a string **210** through the roller **6510** and the base **6200**; and (c) coupling the ball end **211** of the string **210** to the end of the lever arm **6100**. In the preferred embodiment, base **6200** is installed so that the pivot **6200** is located behind the pickup plate **6500**, a first end of the lever arm **6100** is provided over lip **6520** of the pickup plate **6500** and strings **210** of the guitar **200**, and a second end of the lever arm is provided behind base **6200**. Suitably, a string **210** with a ball end **211** may be strung up on the guitar **200** so that the string **210** is pulled taut to the saddle **204**, strung through the roller **6510** and, coupled to the back end of the lever arm **6100** via the ball end **211**.

In use, the pitch adjustment mechanism **6000** may be used to adjust the pitch of a guitar string **210**. This operation may be illustrated with reference to FIG. **19**. FIG. **19** shows a first embodiment of the lever-type pitch adjustment mechanism **6000** for an electric guitar **200** coupled to a guitar string **210**. As shown, the pitch adjustment mechanism **6000** for an acoustic guitar **200** is coupled to a taut but relaxed guitar string **210**, wherein the tension in the string **210** is applied to the back end of the lever arm **6100** so that the back end of the lever arm **6100** is pulled toward the base **6200**. Suitably, the back end of the lever arm **6100** is defined by the open tuning stop **6400**, which abuts the base **6200** to keep the string from pulling the lever arm **6100** all the way around the pivot **6210**. Suitably, the extent to which the open tuning stop **66400** is provided to the lever arm will determine the initial pitch of the string **210** since the configuration shown in FIG. **19** will be the default position whenever the string **210** is under tension. As can be extrapolated from FIG. **19** and the earlier figures, the lever **6100** may be pulled by hand-action until the down stop screw **6300** abuts the base **6200**. Suitably, such action increases the tension in the string **210** by pulling the string **210** through the roller **6510**. In a preferred embodiment the increased tension can modify the pitch of the string **210** up to a full tone. As can be appreciated, the amount of pitch adjustment attainable by pulling/pushing the lever can varied up to the limit set by the down stop screw's **6300** gridlocking interaction with the base **6200**. Suitably, relaxing the lever arm **6100** will cause the lever arm **6100** and string **210** to return to the configuration of FIG. **19** since the string **210** tension will pull on the back end of the lever arm **6100** in the manner illustrated.

FIGS. **20**A and **20**B show an assembled rotary-type pitch adjustment mechanism **7000** for an electric guitar. As shown, the pitch adjustment mechanism **7000** may be defined by a lever arm **7100**, a base **6200**, and other components described above in connection with the other rotary type pitch changers. Suitably, the lever arm **4100** is coupled or otherwise provided to the base **4200** via a pulling screw **7220** that may be used to draw the lever arm **7100** toward or away from the base **6200**.

FIGS. **20**A and **20**B show a top view of the pitch adjustment mechanism **7000** installed on the pickup plate **6500** of an electric guitar **200**. As can be appreciated by those of skill in the art, the guitar **200** suitably features: a sound board or top board **202**; a bridge and saddle **204**; a tail piece **205**; a pickup **206**, and strings that are secured to the tail piece **205** via a ball end **211**. In the depicted embodiment, the pitch changing mechanisms **4000** are coupled to the tail piece **205**. Referring still to FIGS. **20**A and **20**B, the pitch adjustment mechanism **7000** may be installed and operated on the electric guitar **100** in the manner described above in connection with rotary type pitch adjusters.

FIG. **22** shows an exploded view of another embodiment of a lever-type pitch adjustment mechanism **3000** for an electric guitar **200**. FIG. **23** shows an assembled view of the pitch adjustment mechanism **3000** of FIG. **22**. As shown, the pitch adjustment mechanism **3000** may be defined by a lever arm **3100**, a base **3200**, a down stop screw **3300**, and an open tuning stop screw **3400**. Suitably, the lever arm **3100** is coupled to the base **3200** via a pivot or fulcrum pin **3210**. On one side of the pivot pin **3210**, a down stop screw **3300** is provided through the lever arm **3100**. On another side of the pivot pin **3210**, an open tuning stop screw **3400** is provided through the lever arm **3100**. As discussed in greater detail below, the pitch adjustment mechanism **3000** may be installed on an electric guitar (not shown).

FIG. **24** shows a rear view of the pitch adjustment mechanism **3000** installed on the tail piece **205** of an electric guitar **200**. As can be appreciated by those of skill in the art, the guitar **200** suitably features: a sound board or top board **202**; a bridge and saddle **204**; a tail piece **205**; a pickup **206**, and strings that are secured to the tail piece **205** via a ball end **211**. In the depicted embodiment, the pitch changing mechanisms **3000** is coupled to the tail piece via a string **210** with a ball end **211**.

Referring to FIGS. **22** through **24**, the pitch adjustment mechanism **3000** may be installed on the electric guitar **100** via (a) positioning the base **3200** adjacent a string slot **207** of the tail piece **205**; (b) running a string **210** through the string slot **207** of the tail piece **205**; (c) running the string through a cannulated screw provided to the string hole **207**; and (d) coupling the ball end **211** of the string **210** to the end of the lever arm **3100**. In the preferred embodiment, base **3200** is installed so that the pivot pin **3200** located behind the tail piece **205** of the guitar **200**, a first end of the lever arm **3100** is provided over the tail piece **205** and strings **210** of the guitar **200**, and a second end of the lever arm is provided behind the tail piece **205**. Suitably, a string **210** with a ball end **211** may be strung up on the guitar **200** so that the string **210** is pulled taut to the saddle **204**, strung through the string slot **207** of the tail piece **205** and, coupled to the back end of the lever arm **3100** via the ball end **211**.

FIGS. **25** and **26** show various other embodiments of the pitch changing mechanisms disclosed above.

FIG. **27** is a top view of an electric guitar with a bridge and tailpiece removed. FIG. **28** is an exploded top view of a pitch changing mechanism with both lever type and rotary type pitch changing capabilities. FIG. **29** is an exploded end view of the pitch changer with a split shaft design, two levers and a rotary lever. Two shafts, side-by-side could also be employed. FIG. **30** is an assembled view of the pitch changer of FIG. **29**. The depicted device accommodates two individual lever type string pitch changers (on either side), that operate on separate parts of a split shaft design. The device also incorporates the rotary lever. The lever type pitch changers and rotary type pitch changers operate according to the principles recited above in connection with the other figures. For installation, the pitch changing device may be mounted using the holes used in the original bride and tail piece.

FIG. **31** is an exploded top view of a pitch changing mechanism with both lever type and rotary type pitch changing capabilities. FIG. **32** is an exploded end view of the pitch changer with a split shaft design, two levers and a rotary lever. Two shafts, side-by-side could also be employed. FIG. **33** is an assembled view of the pitch changer of FIG. **32**. FIG. **34** is a cross section of pitch change

assembly in FIGS. **31** through **33**. The depicted device accommodates two individual lever type string pitch changers (on either side), that operate on separate parts of a split shaft design. The device also incorporates the rotary lever. The lever type pitch changers and rotary type pitch changers operate according to the principles recited above in connection with the other figures.

Referring to FIGS. **34** and **33**, the device depicted suitably features a lever arm **6000** with a swivel digit **6100**. Suitably, the swivel digit **6100** adds a swivel handle or lever for players' comfort and ease of play. Suitably, the swivel handle **6100** places the end of the lever at a location that is reachable via the player while still playing the instrument. This feature enables the player to change the pitch of strings without moving hands. Suitably, the lever enables plucking of the strings while changing the pitch of the string without moving hand placement.

Some embodiments include a roller pin and a knurl screw pin. The roller pin and knurl screw pin are intended to replace existing pins in acoustic guitars. Typical string pins can be challenging to remove when re-stringing. The roller and knurl pins, on the other hand, are simply inserted through the pin hole and secured with a washer and nut inside the guitar cavity. The roller and knurl pins suitably provide additional down pressure on a string to prevent string buzz. The roller and knurl pins suitably also make stringing of the musical instrument easier because strings can be changed simply by loosening the associated screw and pulling the string through to attachment. String replacement may suitably be accomplished in a similar manner. Once a string is in place the roller or knurl pin may be tightened to secure the string. Additionally, the operation of pins through the instruments face instead of through the bridge of the instrument reduces 'bridge lifting" (i.e., the separation of bridge from the instrument's face under string tension).

Although the method and apparatus is described above in terms of various exemplary embodiments and implementations, it should be understood that the various features, aspects and functionality described in one or more of the individual embodiments are not limited in their applicability to the particular embodiment with which they are described, but instead might be applied, alone or in various combinations, to one or more of the other embodiments of the disclosed method and apparatus, whether or not such embodiments are described and whether or not such features are presented as being a part of a described embodiment. Thus the breadth and scope of the claimed invention should not be limited by any of the above-described embodiments.

Terms and phrases used in this document, and variations thereof, unless otherwise expressly stated, should be construed as open-ended as opposed to limiting. As examples of the foregoing: the term "including" should be read as meaning "including, without limitation" or the like, the term "example" is used to provide exemplary instances of the item in discussion, not an exhaustive or limiting list thereof, the terms "a" or "an" should be read as meaning "at least one," "one or more," or the like, and adjectives such as "conventional," "traditional," "normal," "standard," "known" and terms of similar meaning should not be construed as limiting the item described to a given time period or to an item available as of a given time, but instead should be read to encompass conventional, traditional, normal, or standard technologies that might be available or known now or at any time in the future. Likewise, where this document refers to technologies that would be apparent or known to one of ordinary skill in the art, such technologies encompass those apparent or known to the skilled artisan now or at any time in the future.

The presence of broadening words and phrases such as "one or more," "at least," "but not limited to" or other like phrases in some instances shall not be read to mean that the narrower case is intended or required in instances where such broadening phrases might be absent. The use of the term "assembly" does not imply that the components or functionality described or claimed as part of the module are all configured in a common package. Indeed, any or all of the various components of a module, whether control logic or other components, might be combined in a single package or separately maintained and might further be distributed across multiple locations.

Additionally, the various embodiments set forth herein are described in terms of exemplary block diagrams, flow charts and other illustrations. As will become apparent to one of ordinary skill in the art after reading this document, the illustrated embodiments and their various alternatives might be implemented without confinement to the illustrated examples. For example, block diagrams and their accompanying description should not be construed as mandating a particular architecture or configuration.

All original claims submitted with this specification are incorporated by reference in their entirety as if fully set forth herein.

I claim:

1. A rotary-type pitch changer device comprising:
a knurly arched knob coupled to a mounting mechanism;
a cannulated mounting screw;
a down stop screw; and
an open tuning stop screw, wherein
the arched knob is coupled to the mounting screw and a string of a stringed musical instrument, and wherein
the string of the musical instrument is provided through the cannulated screw so that rotating the knurly arched knob manipulates the pitch of the string by adjusting string tension, and wherein
the down stop screw limits movement of the arched knob towards the string to set a maximum tension on the string, and wherein
the open tuning stop screw limits movement of the arched knob away from the string to set a minimum tension on the string.

2. The device of claim **1**, further comprising a roller, wherein the roller is coupled to the mounting mechanism and supports the string and accommodates movement of the strings by changes to string tension during rotation of the arched knob.

3. The device of claim **1**, wherein the mounting mechanism is configured to correspond to existing mounting holes of a stringed musical instrument without modification.

4. The device of claim **1**, wherein the mounting mechanism is pivotably attached to the stringed musical instrument to permit the pitch changer to move out of the way from a user's hands.

5. The device of claim **1**, further comprising a base positioned adjacent to the mounting mechanism and configured to adjust a height of the string relative to the stringed musical instrument.

6. The device of claim **1**, wherein the arched knob includes an outer surface with a texture that allows a user's arm and wrist to turn the arched knob.

7. A lever-type pitch changer device for a stringed musical instrument with an internal cavity, said pitch changer comprising:

a lever pivotally coupled to a mounting mechanism so that manipulating the lever changes at least the pitch of a string of the stringed musical instrument;

a down stop screw; and

an open tuning stop screw, wherein

the mounting mechanism includes a flat head screw coupled to a mounting nut so that the string is positioned over the flat head screw and attached to the lever, and wherein

the down stop screw limits movement of the lever towards the string to set a maximum tension on the string, and wherein the open tuning stop screw limits movement of the lever away from the string to set a minimum tension on the string.

8. The device of claim **7**, further comprising a roller, wherein the roller is coupled to the mounting mechanism and accommodates movement of the string by changes to string tension during engagement of the lever.

9. The device of claim **7**, wherein the mounting mechanism is configured to correspond to existing mounting holes of a stringed musical instrument without modification.

10. The device of claim **7**, wherein the mounting mechanism is pivotably attached to the stringed musical instrument to permit the pitch changer to move out of the way from a user's hands.

11. The device of claim **7**, further comprising a base positioned adjacent to the mounting mechanism and configured to adjust a height of the string relative to the stringed musical instrument.

12. The device of claim **7**, wherein the lever includes an outer surface with a texture that allows a user's arm and wrist to push the lever.

13. A pitch changer device installed on a tailpiece of a musical instrument, said pitch changer device comprising:

a knurly arched knob coupled to a mounting mechanism;

a lever pivotally coupled to the mounting mechanism;

a cannulated mounting screw;

a down stop screw; and

an open tuning stop screw, wherein

the arched knob is coupled to the mounting screw and a string of a stringed musical instrument, and wherein

the lever changes at least the pitch of the string of the stringed musical instrument, and wherein

the string of the musical instrument is provided through the cannulated screw so that rotating the knurly arched knob and the lever manipulates the pitch of the string by adjusting string tension, and wherein

the down stop screw limits movement of the arched knob and the lever towards the string to set a maximum tension on the string, and wherein

the open tuning stop screw limits movement of the arched knob and the lever away from the string to set a minimum tension on the string.

14. The device of claim **13**, further comprising a roller, wherein the roller is coupled to the mounting mechanism and accommodates movement of the string by changes to string tension during rotation of the arched knob and engagement of the lever.

15. The device of claim **13**, wherein the mounting mechanism is configured to correspond to existing mounting holes of a stringed musical instrument without modification.

16. The device of claim **13**, wherein the mounting mechanism is pivotably attached to the stringed musical instrument to permit the pitch changer to move out of the way from a user's hands.

17. The device of claim **13**, further comprising a base positioned adjacent to the mounting mechanism and configured to adjust a height of the string relative to the stringed musical instrument.

18. The device of claim **13**, wherein the arched knob and the lever includes an outer surface with a texture that allows a user's arm and wrist to turn the arched knob.

19. The device of claim **13**, wherein the arched knob works independently of the lever in manipulating the pitch of the string.

20. The device of claim **13**, further comprising a plurality of arched knobs and levers to provide a customizable pitch changer for a user.

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