

## TITLE

GUITAR THAT IS BOTH ACOUSTIC AND ELECTRIC

## INVENTOR

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## SUMMARY OF THE INVENTION

A new type of guitar is described that has a flat-top acoustic soundboard on the front, and also has standard electric pickups sensing the strings. The guitar can be used with or without a guitar amplifier. The guitar has several new construction features which enhance the quality of both acoustic and electric musical tones. The acoustic performance is not dulled by the weight of electric pickups, because the soundboard is free to vibrate with no connection to the pickups. A new internal bridge mechanism gives the guitar the playing feel and response of an electric guitar, when played acoustically or electrically. This guitar can be amplified very loud for music performances. The new inventions that create this performance are parts of the body construction; bridge mechanism; sound holes; pickup mountings; and anti-feedback damper.

## BRIEF DESCRIPTION OF THE DRAWINGS

**FIG.1** shows the front of the whole guitar.

**FIG.2** shows the back of the whole guitar.

**FIG.3** shows the front of the guitar body.

**FIG.4** shows the back of the guitar body, with the bridge cover removed.

**FIG.5** is a middle cross-section of the guitar body.

It's plane is marked on FIG.4

**FIG.6** shows the top side of the guitar body with its side sound-holes.

**FIG.7** is a middle cross-section of the guitar body.

It's plane is marked on FIG.6

## PARTS OF THE GUITAR THAT ARE MARKED ON THE DRAWINGS

- 1 Soundboard
- 2 Two f-shaped Sound-holes
- 3 Bridge
- 4 Bridge Saddle
- 5 Two Pickups
- 6 Two Pickup Surround Gaps
- 7 Six Strings
- 8 Volume Control
- 9 Tone Control
- 10 Pickup Selector Switches
- 11 Neck
- 12 Six Bridge Screws
- 13 Switches Cover
- 14 Controls Cover
- 15 Bridge Cover
- 16 Body Back
- 17 Back Spine

- 18 Bridge Cover Recess
- 19 Retainer Bar
- 20 Bridge Back Tether
- 21 Bridge Back Block
- 22 Four Pickup Height Adjustment Screws
- 23 Six String Insertion Holes
- 24 Six Bridge Cover String Holes
- 25 Anti-feedback Damper
- 26 Two Pickup Base Blocks
- 27 Two Pickup Foam Mounts
- 28 Three Side Sound-holes
- 29 Three Side Sound-hole Horns
- 30 Top Side

## DETAILED DESCRIPTION

[1] The guitar body is hollow, having a stiff solid back and sides, and a thin flat soundboard front **1**. The strings **7** are attached at the back of the bridge **3**. The soundboard has two f-shaped sound-holes **2**, and two holes **6** for pickups **5**. Pickup selector switches **10** are on the front. A volume control **8** and a tone control **9** are on the front.

[2] The back and sides of the hollow guitar body **16** are rigid, being made of hard tone-woods of thickness about 10mm at the back and about 15mm to 20mm at the sides. The back spine **17** of the body is about 30mm thick. They might be made of other rigid materials and thickness. The stiff construction helps to provide a crisp electric guitar tone, and best tuning stability. There are three maintenance access holes in the back of the guitar, sealed by plastic covers: the switches cover **13**; the controls cover **14**; and the bridge cover **15**. FIG.4 shows the back of the guitar body with the bridge cover **15** removed. It is normally screwed into the bridge cover recess **18**.

[3] The electromagnetic pickups **5** are mounted onto the back spine **17** of the instrument via a solid base block **26** and a springy deformable foam mount spacer **27**. Two screws **22** are inserted from the back and screw into threaded holes in each pickup base block **26**. The screws go loosely through the pickup foam mounts **27**, which being compressed, tend to push the pickups away from the back, and pull the screws firmly into the back. Thus the pickups are positioned firmly by the adjustment screws **22**. The screws hold each pickup at an adjustable distance from the strings. This allows the loudness and tone of each pickup to be adjusted during set-up. Having the pickups mounted on the solid back is new to prior art, and gives the amplified guitar a voice character more like a solid body or semi-acoustic electric guitar.

[4] The front soundboard **1** is made of thin acoustic tone-wood, or equivalent material, with braces. The soundboard does not touch the pickups and is free to vibrate around them. It transmits the vibrations from the strings connected to the bridge, into musical sound in the air. This gives the instrument good acoustic behaviour that is not damped and resonated by having any heavy parts attached to the soundboard. The f-shape sound-holes **2** are fairly small and well away from the bridge **3** so that the bridge vibrates a large area of the soundboard together in the same phase of vibration.

[5] Three side sound-holes **28**, on the top side of the body **30**, direct musical sound from the hollow body chamber to the guitarist's ears. The horn shape **29** makes it louder, by being an acoustic pressure transformer like the horn of a brass trumpet instrument.

[6] The bridge **3** is made of very hard tone-wood, or other material. It is capped with a saddle **4** made of bone, or other hard acoustic material. This has been found to create best musical tone. The bridge is fixed to the guitar with removable screws **12**. This allows alternative bridges of different string-playing height or intonation to be easily retro-fitted.

[7] A bridge back block **21** is inside the hollow body chamber, and fixed to the sound-board at the back of the bridge **3**. The strings **7** are inserted from the back of the instrument, through the six bridge cover string holes **24**. The strings **7** are held firm in the string insertion holes **23** and go to the front through the bridge back block **21** and bridge **3**, then along the front of the guitar neck **11**. The bridge block is glued to the front soundboard **1** and the bridge **3** is held firmly onto the soundboard by screws **12** that go into the bridge back block **21**. The inserted strings and bridge back block vibrate as one with the bridge and soundboard. The strings are not connected in any way to the back of the guitar.

[8] There is a new internal bridge mechanism. The bridge back tether **20**, being a tongue of spruce or other flexible springy material, is glued at one end to the back of bridge back block **21**. The other end of the bridge back tether **20** is glued to the rigid back of the guitar and held there by the retainer bar **19**. The bridge back tether performs several advantageous functions. It balances the forces on the bridge, and local soundboard, against the twisting force of the string tension on the top of the bridge. Thus the bridge does not rotate nor tend to distort the soundboard. It constrains the movement of the bridge to in and out, moving a large area of the soundboard. It restricts the amount of rotational vibration of the bridge.

[9] This bridge back tether **20** is a new invention, and enhances the quality of the musical instrument in several ways: Less string energy is absorbed by the bridge, so the playing sustain is longer. The bridge moves much less with the pluck of a string than it does on a common flat-top acoustic guitar. This gives it a playing feel and tone more like a solid or semi-solid electric guitar. It sounds great, both acoustically and electrically, when used with easy-to-play light gauge electric strings. The instrument is less susceptible to squealing feedback when amplified loud.

[10] There is an anti-feedback damper **25**, which is compressed between the back bridge cover **15** and the bridge back block **21** and the bridge back tether **20**. This damper **25** is made of springy foam plastic and wool felt, or any other acoustic damping material. The damper **25** absorbs any excess vibration of the bridge back block **21**, and of the bridge back tether **20**. It reduces any squealing feedback when the instrument is loudly amplified. It has very little effect on acoustic playing performance.

[END]