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Cawthorn

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[54] **STONE GUITAR WITH TUNED NECK**

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[51] **Int. Cl.** **G10h 1/08,** G10h 3/00

[58] **Field of Search** ..... 84/1.16, DIG. 30, 84/267, 274, 275, 291, 268

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[57] **ABSTRACT**

Disclosed herein is a new and improved electric guitar having a stone body in which is housed conventional electronic pickup means, controls and the like, and a uniquely reinforced, "tuned" neck construction providing a new and improved musical instrument with outstanding sustain and high frequency resonanting effects. Specifically, the body is formed from a comparatively heavy stone slab, typically 1 to 1⅛ inches thick, while the neck is reinforced and its geometry stabilized by a steel truss rod and by a precisely tuned, steel reinforcing or tuning bar laminated therein. The tuning bar advantageously is a 21 inch (nominal) bar of 5/16 inch square tool steel hardened to Rockwell C 60 which is ground down to a precise length which produces a "high E" note when the bar is struck like a tuning fork and permitted to vibrate. rmitted to vibrate.

8 Claims, 5 Drawing Figures

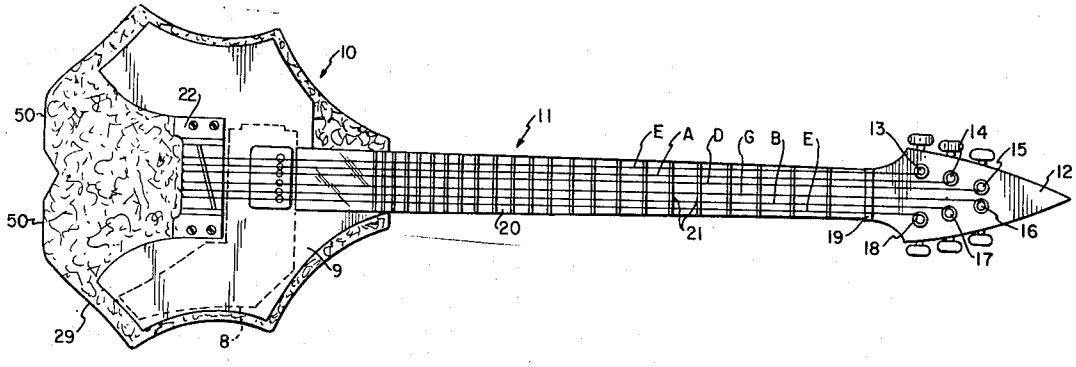


FIG. 1

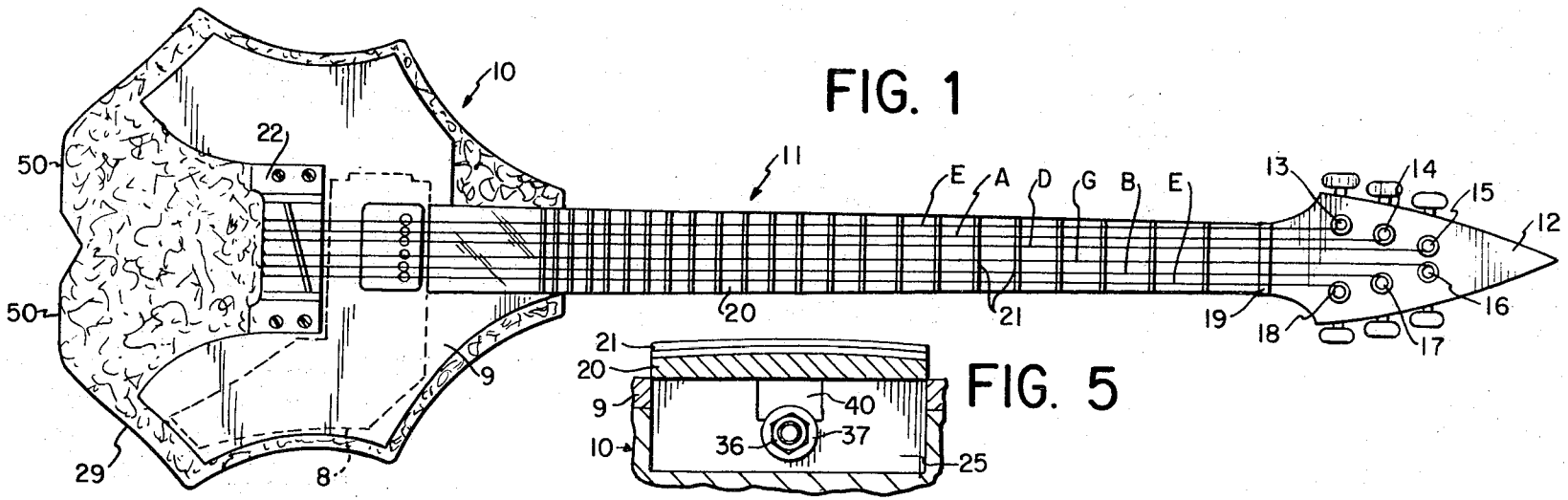


FIG. 5

FIG. 2

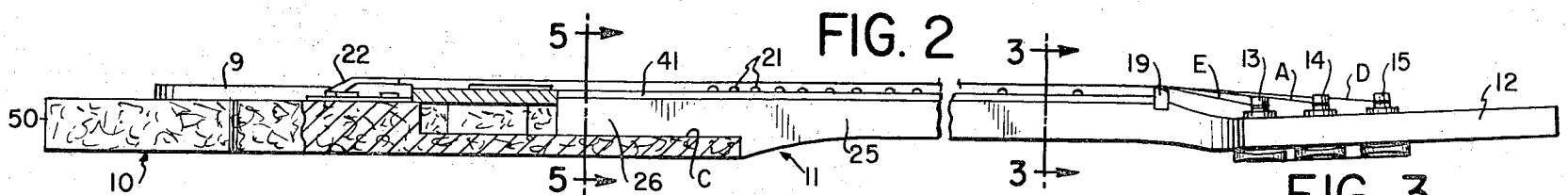


FIG. 4

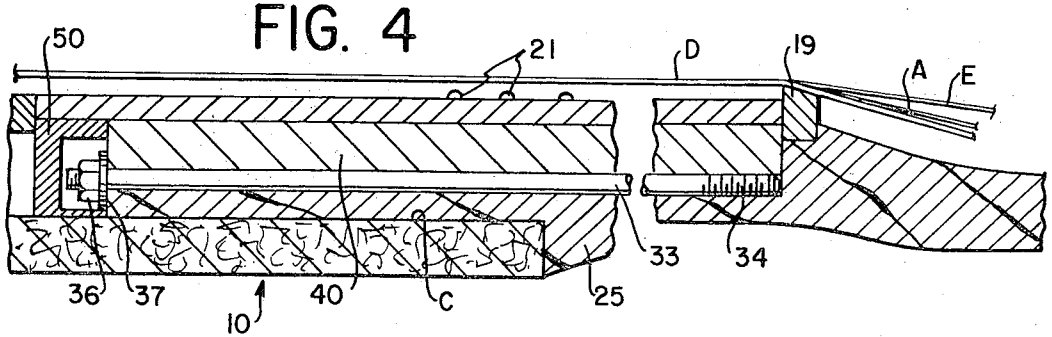
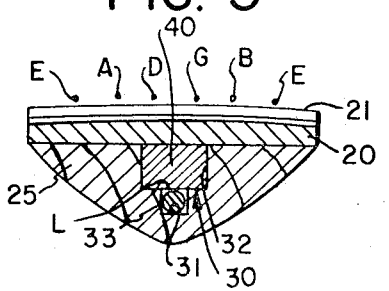


FIG. 3



STONE GUITAR WITH TUNED NECK

BACKGROUND OF THE INVENTION

Electric guitar constructions are well known to the art, and a plethora of body and reinforced neck designs therefor are shown in the patent literature. Common to all of the prior art disclosures is the goal of improving some aspect of the performance of the instrument. It is to a further and marked improvement in the strength, stability, and acoustic characteristics of stringed instruments in general and electric guitars in particular that the present invention is directed.

SUMMARY OF THE PRESENT INVENTION

It has been discovered that the use of a stone body in lieu of the commonly employed hardwood body in an electric guitar markedly improves the acoustic properties, such as range, resonance, response, pitch, tone and the like generated by the guitar strings. Moreover, through the precise tuning and special reinforcing of the neck itself by a full length "tuning bar," regardless of the particular material from which the solid body is formed, vastly improved acoustic properties may be derived from a stringed instrument, especially an electric guitar.

More specifically and in accordance with the principles of the present invention, an improved electric guitar construction includes a flat stone body, i.e., a body made from a relatively hard, naturally formed mass of mineral or petrified matter such as granite, marble, onyx, rose quartz, petrified wood, agate, to provide a guitar body which will vibrate only at extremely high frequency and will contribute to the excellent sustaining qualities generated by a "tuned" neck. Moreover, the use of a stone body provides a body which tends to be acoustically "neutral" with respect to its effects on the generated, resonant frequencies of the vibrating strings, i.e., the body does not add to or subtract from the resonant frequencies of the guitar strings.

For a more complete understanding of the present invention and a greater appreciation of its attendant advantages, reference should be made to the following detailed description taken in conjunction with the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

FIG. **1** is a plan view of a guitar having a stone body and a laminated neck reinforced and tuned by a tuning bar in accordance with the principles of the present invention;

FIG. **2** is a longitudinal, cross-sectional view of FIG. **1** showing details of construction thereof; and

FIGS. **3, 4** and **5** are enlarged, transverse, longitudinal and transverse cross sections, respectively, of the new tuned neck showing details of construction thereof.

DESCRIPTION OF THE INVENTION

Referring now to FIGS. **1–5**, the new and improved guitar includes a polished, sculpted stone body **10** to which is fastened by epoxy cement C and/or bolts (not shown) a new and improved tuned neck **11**. The neck includes a generally triangular peg head **12** upon which are mounted six tuning pegs **13–18**, a nut **19**, and a fret board **20** mounting a plurality of wire frets **21** arrayed in conventional spacing. The stone body **10** supports at its upper surface a solid aluminum bridge **22** which anchors the lower ends of six metal strings which are secured at their upper ends to and made taut by the rotatable tuning pegs **13–18**. The strings are identified by their notes and are as follows: E, A, D, G, B, E, which are the sixth, fifth, fourth, third, second and first strings, respectively, of a six string guitar. Of course, the novel neck and body construction disclosed herein may be used in stringed instruments other than guitars and in instruments having more or less than six strings.

In accordance with a critical aspect of the present invention, the neck **11** is specially constructed and reinforced to provide a stable, straight guitar neck having superior strength properties, superior properties of durability, and superior acoustic properties to the reinforced guitar necks heretofore available to the art for use in electrical guitars. To that end, the neck **11** is carved from a composite structure including a hardwood base **25**, such as mahogony, ebony, maple or the like, in which is formed a longitudinal stepped groove **30**. The cross section of the lowermost portion **31** of the groove is approximately 5/32 inch square, while that of the upper portion **32** is approximately 5/16 inch square. The groove **30** extends from the nut **19** to the heel **26** of the neck, a nominal distance of 21 inches. As shown in FIG. **3**, a truss rod **33**, advantageously made of 5/32 inch diameter drill rod, is disposed in the groove **31**, and its head end is secured therein by epoxy cement **34**. Advantageously, the head end of the truss rod **33** is threaded or otherwise reshaped to enable the epoxy to bind itself securely to the truss rod as well as to the walls of the upper end of the groove **31**. In this manner, the upper end of the truss rod is firmly anchored in the uppermost portions of the hardwood neck base **25** at the nut. The foot **26***a* of the truss rod is threaded to receive a tensioning nut **36** and washer **37** which are used to tension the neck base **25** to induce a slight bow to the neck structure during the carving thereof. Before carving, the neck base **25** is a rectangular prism approximately 28 inches×2¼ inches×⅞ inch.

In accordance with the principles of the invention, a special tuning bar **40** is laminated to the neck base **25** to become an effectively integral, vibrating part of the neck **11**. The tuning bar **40**, in accordance with a critical aspect of the invention, is precisely and accurately tuned to vibrate at and to produce a pitch of a "high E" note. To that end, it has been determined that a 5/16 inch square, nominal 21 inch long bar of water hardened tool steel, when struck as a tuning fork, will vibrate at the frequency of a high E note, Hz. During manufacture, the high E tuning bar **40** may have to be slightly ground down from the nominal 21 inch length or otherwise modified to provide the requisite, precise tuning to high E. Thus and as should be understood, the resonant frequency of the bar **40** will be such that it will sympathetically vibrate with a high E note and all of its harmonics. In accordance with the invention, the tuning bar or high note sustainer **40** not only vastly enhances the desired acoustic properties of the neck of the guitar and the entire guitar itself, but being a rigid metallic element, it significantly contributes to the overall strength and stability of the guitar neck **11**.

The sustaining bar **40** is epoxy cemented in the groove **32** in the neck base **25**, prior to carving, above the truss rod **33**, which, advantageously, is precoated with a lubricant L at the truss rod-tuning rod interface to prevent the truss rod from becoming adhered to the sustaining rod **40**.

After the tuning-sustaining bar **40** and the truss rod **33** have been inserted in the block of wood or neck base **25** from which the final neck configuration **11** is to be derived, the neck base **25** is carved and shaped in conventional manner to give it the final cross section, which is generally rectangular at the heel and generally triangular at the nut. Prior to carving, a fret board **20** is laminated to the upper surfaces of the wood block. A series of wire frets **21** may thereafter be installed at the surface of the fret board, in accordance with conventional practice.

The truss rod **33** is used in combination with the sustaining bar **40** to keep the neck **11** almost straight, i.e., a slight "bow" of no greater than 1/32 inch and substantially rigid. As will be understood, absent substantially total rigidity and straightness of the neck **11** (within 1/32 inch tolerance), when the guitar is subsequently strung and the six strings placed under tension, the neck must resist all tendency to bow or curve (other than the 1/32 inch accommodatable bow) since any bowing or curving of the neck is deleterious; it will make the separation of the strings from the fret board nonuniform and will interfere with the proper performance of the guitar. Thus, it is an objective of the present invention to ensure that the strings of the guitar, when tensioned, will remain uniformly spaced from the finger board at all times regardless of the degree of tautness of the strings induced by the tuning pegs. In contrast with many prior art guitars, where a constant adjustment and retightening of the truss rod is required during the life of the guitar, the provision of both a truss rod and a sustaining rod make readjustment of the truss rod of the present guitar unnecessary throughout the life of the guitar. Indeed, after the neck **11** is carved, access to the tensioning nut **36** is eliminated by permanently epoxy cementing a metal cover **50** thereover.

In accordance with another aspect of the invention, the side edges **29** of the heavy stone body **10** are shaped to have flats **50** along and/or adjacent the bottom, so that the new guitar may be vertically free standing on its bottom edge or on its side edges. That is, of course, feasible and possible with a thin solid body, approximately 1 inch, only when stone is used as the base material, and the center of gravity of the instrument is in the body **11**; indeed, it approximates the center of gravity of the body **11.** Of course, in certain cases, it may be desirable to use the new and improved neck construction of the invention with a hardwood body, in which case, the guitar would have improved acoustic properties, however, it would not be self-supportingly, free standing, since it would have a high center of gravity.

In accordance with still another important aspect of the present invention, the guitar strings are arranged in combination with the bridge, nut, and peg head, so as to be "self-tuning." Thus, the G and D strings are positioned relative to the nut **19** to produce fifth resonant frequencies of G and D when those strings are tuned to true pitch. More specifically, the pitch produced on the D string when plucked between the tuning peg **15** and the nut **19** will be an A440 Hz. (the most commonly used tuning pitch). When this fourth string is tuned to a true D note, the tone will be the same as that produced by playing the harmonic above the seventh fret of the D string and will be the same as that produced by playing the harmonic above the fifth fret of the A string. The same type of relationship exists between the G and D strings and their harmonics. The remaining E, B, and E (first, second and sixth) strings may be tuned to the aforementioned three G, D, and A (third, fourth and fifth) strings, enabling the entire guitar to be tuned to true pitch without the necessity of resorting to a separate instrument such as a pitch pipe, tuning fork or the like.

Thus, the new stone guitar, or any guitar having its strings arranged in the above-described manner, may be initially tuned and returned at any time using the method of the invention. Moreover, proper tuning of the individual strings and their relationship to each other may be simply and quickly checked from time to time to make certain that the guitar is properly tuned, as will be understood. This unique system of tuning a guitar is effected by the proper spacing of the nut and the tuning pegs of the strings, namely, the third and fourth (G and D) strings.

A guitar constructed in accordance with the aforementioned priciples will have a unique and beautiful sound that heretofore has never been produced by an electric guitar or comparable instrument. Moreover, the sound is vastly superior, in terms of measurable parameters, to any of the sounds that have been produced by known guitars, whether electric or otherwise. The enjoyment of the ultimate quality of the sound generated by strings vibrating between a stone body and tuning pegs mounted on the new and improved neck will, of course, be affected by the choice of pickup electronics employed. Of course, the ulitmate tonal quality of an electric guitar is fundamentally limited by the ability of the vibrating strings to generate acceptable tones, and, regardless of the electronics employed, it is the combination of guitar body neck, and strings which are determinative thereof.

The guitar of the present invention may be conventionally "electrified" by disposing appropriate electronic pickups beneath the vibrating guitar strings in a suitable cavity **8** formed in the stone body and covered by a conventional pick guard plate **9,** as shown.

It should be appreciated that the new electric guitar construction of the invention provides a stringed instrument having a uniquely tuned and reinforced neck which provides excellent sustaining and high frequency resonating characteristics to generate notes. Moreover and especially with regard to the harmonics of E, the basic note of the guitar, this "sustain" and "resonation" broadens and tunes the response of the entire instrument as it is played.

It should be understood, of course, that the stone guitar herein illustrated and described is intended to be representative only, as certain changes may be made therein without departing from the clear teachings of the disclosure. Accordingly, reference should be made to the following appended claims in determining the full scope of the invention.

I claim:

1. A stringed musical instrument comprising

a. a stone body of single piece construction having at its face a hollowed out cavity therein;

b. an elongated, reinforced neck secured to said body;

c. a bridge mounted on said stone body;

d. tuning pegs and a nut carried by said reinforced neck;

e. a plurality of strings extending between said tuning pegs and said bridge; and

f. a pick guard closing said cavity.

2. The instrument of claim **1,** in which

a. said single piece stone body is selected from the group comprising granite, marble, onyx, rose quartz, petrified wood and agate.

3. The instrument of claim **1,** in which

a. said neck is tuned and reinforced by the inclusion therein of a metallic tuning bar tuned to a high E note.

4. The instrument of claim **1,** in which

a. the side edges of said stone body include at least one straight edge portion upon which the instrument may be substantially, vertically free standing.

5. The instrument of claim **4,** in which

a. said straight edge is perpendicular to the longitudinal axis of said neck.

6. The instrument of claim **1,** in which

a. said neck is of hardwood construction having a full length stepped groove formed therein;

b. a truss rod is disposed in the bottom of said groove for reinforcing and for adjustably tensioning said neck prior to the attachment thereof to said stone body;

c. said tuning bar is disposed in said groove above said truss rod;

d. said tuning bar comprises a 21 inch (nominal) bar of 5/16 inch square tool steel hardened to Rockwell C 60;

e. said groove is covered by a hardwood fret board extending substantially for the full length of said neck;

f. said finger board and the head of said truss rod are permanently secured to the hardwood portions of said neck by epoxy cement;

g. a lubricant is disposed at the interface of said truss rod and said tuning bar.

7. The guitar neck construction of claim **6,** in which

a. said tuning bar comprises a 21 inch (nominal) bar of 5/16 inch square tool steel hardened to Rockwell C 60.

8. The guitar neck construction of claim **6,** in which

a. said tuning bar is an elongated metallic element which, when struck as a tuning fork, produces a high E note.

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