April 10, 1956 C. L. FENDER 2,741,146

TREMOLO DEVICE FOR STRINGED INSTRUMENTS

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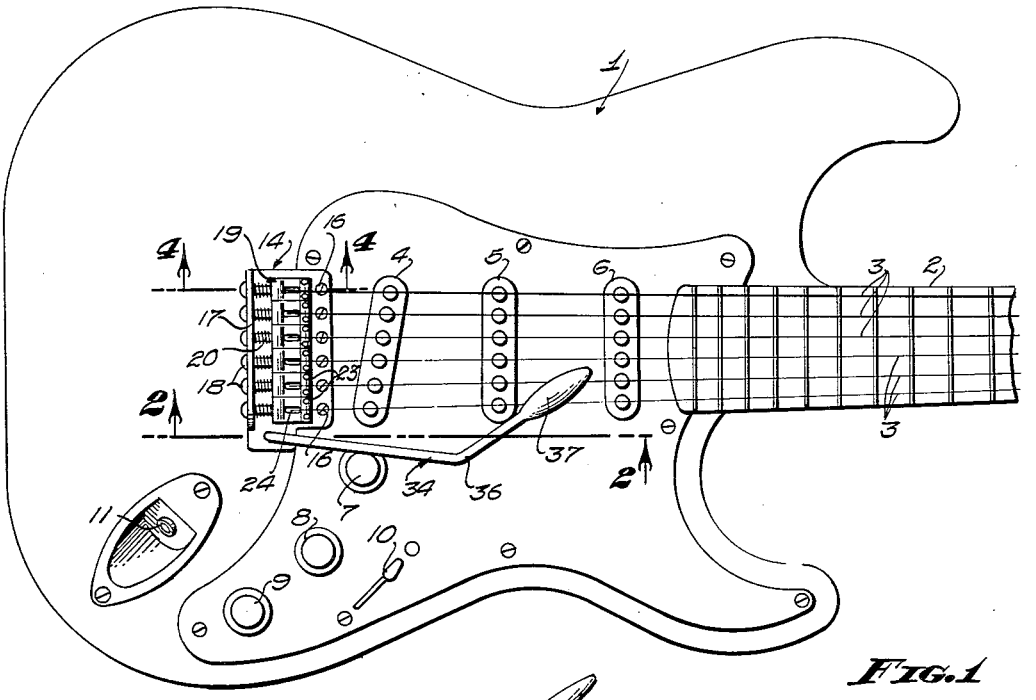

FIG. 1

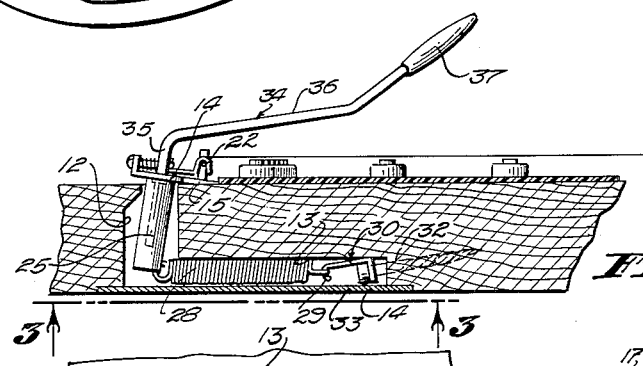

FIG. 2

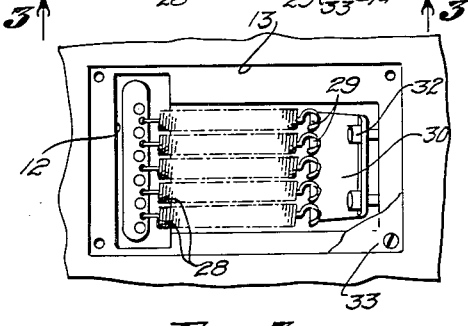

FIG. 3

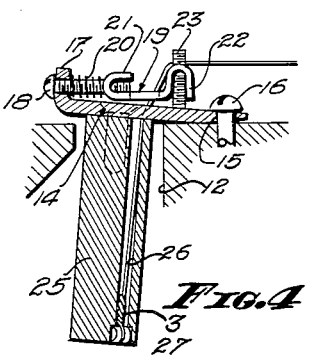

FIG. 4

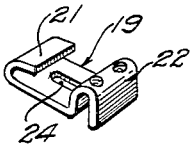

FIG. 5

INVENTOR.
CLARENCE L. FENDER
BY Lyon & Lyon
ATTORNEYS

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TREMOLO DEVICE FOR STRINGED INSTRUMENTS

Clarence L. Fender, Fullerton, Calif.

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14 Claims. (Cl. 84—313)

My invention relates to tremolo devices for stringed instruments, and included in the objects of my invention are:

First, to provide a tremolo device which is particularly adapted for use on guitars and similar stringed instruments played in such manner that one hand is in the region of the bridge, there being a tremolo control arm so arranged as to fit within the palm of the player's hand.

Second, to provide a tremolo device which is incorporated in a novel bridge structure so arranged as to have limited pivotal movement, in order that the tension applied to the strings of the instrucment may be readily varied to produce a tremolo effect.

Third, to provide in a tremolo device a novel sectional bridge so arranged that the effective operating length of each string and its height may be individually adjusted to facilitate proper tuning of each string without interfering with simultaneous tension variation of the several strings required to produce a tremolo effect.

With the above and other objects in view, as may appear hereinafter, reference is directed to the accompanying drawings, in which:

Figure 1 is a fragmentary top view of a guitar incorporating my invention;

Fig. 2 is a fragmentary sectional view through 2—2 of Fig. 1;

Fig. 3 is a fragmentary bottom view, taken from the plane 3—3 of Fig. 2 with the cover plate removed;

Fig. 4 is an enlarged fragmentary sectional view through 4—4 of Fig. 1; and

Fig. 5 is a perspective view of one of the bridge elements.

My invention is shown as incorporated in a guitar. The guitar includes a body 1 which is preferably solid and from which extends a neck 2, terminating in a head, not shown. Strings 3 extend from a bridge, to be described hereinafter, over the body 1 and neck 2.

Set within the body 1 is one or more pickup units. In the construction shown, three such pickup units 4, 5, and 6 are indicated. Each pickup unit includes permanent magnet elements located beneath the strings 3. The pickup units are controlled by control knobs 7, 8, and 9 mounted on the body 1. A switch 10 is also provided. Set into the body is a jack outlet 11 for connecting the pickup units and controls to a suitable amplifier. The construction so far described, for the purposes of the present invention, may be considered as conventional.

Formed in the body 1 is a transverse slot 12 which communicates at the under side of the body with a recess 13 directed toward the neck 2. Mounted on the body 1 adjacent the slot 12 is a base plate 14, one margin of which is beveled to form a fulcrum ridge 15. The beveled margin of the base plate 14 is secured to the body 1 by screws 16 which permit limited pivotal movement of the base plate about the fulcrum 15. The fulcrum is located forwardly of the slot 12, that is, toward the neck 2.

The base plate 14 overlies and covers the slot 12 and is provided at its rear margin with an upturned flange 17.

Tension screws 18, one for each string 3, extend forwardly through the flange 17 and are screw threaded into sectional bridge elements 19. Springs 20 are interposed between the bridge elements 19 and the flange 17.

Each bridge element 19 is formed of a strip of sheet metal bent at its rearward extremity to form a horizontally folded end 21 which receives the corresponding tension screw 18. The forward portion of each bridge element is folded upwardly and doubled upon itself to form a bridge portion of U-shaped cross-section 22 spaced outwardly of but relatively closely adjacent the fulcrum ridge 15. At each lateral margin each bridge portion is screw threaded to receive a height adjustment screw 23 which bears against the base plate 14. Each bridge element is provided with a slot 24.

Secured to the inner side of the base plate 14 is a bar 25 which extends into the slot 12. The bar is provided with a plurality of vertically extending bores 26, one for each string 3. Each string 3 passes over a corresponding bridge element 19, through slot 24, and into the corresponding bore 26 through a registering hole in the base plate 14. The extremity of each spring is provided with an anchor element 27 which seats in an enlarged portion or counterbore formed at the lower extremity of the corresponding bore 26.

Secured to the lower extremity of the bar 25 is a plurality of tension springs 28. These springs extend forwardly within the recess 13 and are relatively stiff. The forward extremities of the tension springs are retained by hooks 29 formed along a margin of a tension plate 30. The tension plate has a flange 31 at its forward margin which receives screws 32 adapted to be driven into the body 1 at the forward extremity of the recess 13. A cover plate 33 closes the recess 13.

One lateral margin of the base plate 14 and bar 25, preferably the margin which constitutes the lower side of the instrument when in playing position, is extended and receives a control arm 34. The control arm includes a vertical portion 35 which journals in the bar 25 and a laterally directed portion 36, preferably bent intermediate its ends, and terminating in a handle 37. In normal playing position, the handle 37 is disposed above and slightly below the strings 3 so as to be received in the palm of the player's right hand when in position to pluck the strings.

Operation of my tremolo device is as follows:

If the handle 37 is not engaged or is held against movement, the instrument is played in the conventional manner and no tremolo effect is observable. If, however, the handle 37 is oscillated to and from the body 1 during vibration of any or all of the strings 3, a tremolo effect will be produced by each of the vibrated strings.

It should be observed that by reason of the pivotal connection between the control arm 34 and the bar 25 about an axis substantially perpendicular to the upper surface of the body 1, the handle 37 may ride in the palm of the player's hand and be pivoted as the player changes the position of his hand while plucking the strings. Thus, the handle remains in position for use at all times, but no tremolo effect need be produced except when the player desires to do so and oscillates the handle 37 in a direction perpendicular to the surface of the body.

Also by reason of the pivotal connection between the control arm 34 and the bar 25 the handle 37 may be located to suit the individual preference of the player and may be quickly swung out of playing position substantially below the strings as viewed in Fig. 1, or as quickly returned to playing position.

It will be observed that each of the bridge elements 19 are individually adjustable lengthwise of the strings 3 so that the effective vibrating length of each string may be accurately adjusted. Furthermore, by reason of the

height adjustment screws 23 the strings may be individually raised or lowered to the desired height.

The bar 25 is relatively massive, preferably formed of solid material, and the tension springs 28 are preferably quite stiff, so that unless the control arm 34 is manually oscillated there is no tendency for the bar 25 or springs 28 to vibrate when the strings are plucked. The mass of bar 25 and stiffness of springs 28 may, however, be maintained at a minimum because of the relatively close coupling of the bridge portions 22 and the fulcrum ridge 15. With this arrangement the entire bridge structure normally acts as a rigid member. Thus, no tremolo effect occurs except at the will and direction of the player.

Having fully described my invention, it is to be understood that I do not wish to be limited to the details herein set forth, but my invention is of the full scope of the appended claims.

I claim:

1. The combination with a musical instrument having a body and strings extending thereover, of a tremolo device, comprising: a bridge structure including a base plate secured to said body and capable of limited pivotal movement, a plurality of bridge elements carried by said base plate, each adapted to receive a string, means for independently adjusting the position of each bridge element, and a bar extending from said base plate into said body, there being an accommodation slot in said body clearing said bar, said bar adapted to receive and anchor said strings; yieldable means operable on said bridge structure to maintain tension on said strings; and an arm extending from said bridge structure and manually engageable to oscillate said bridge structure thereby to vary the tension on said strings, whereby on vibration of said strings a tremolo effect is produced.

2. The combination with a musical instrument having a body and strings extending thereover, of a tremolo device, comprising: a bridge structure including a base plate secured to said body and capable of limited pivotal movement, a plurality of bridge elements carried by said base plate, each adapted to receive a string, means for independently adjusting the position of each bridge element, and a bar extending from said base plate into said body, there being an accommodation slot in said body clearing said bar, said bar adapted to receive and anchor said strings; and an arm extending from said bridge structure and manually engageable to oscillate said bridge structure thereby to vary the tension on said strings, whereby on vibration of said strings a tremolo effect is produced.

3. In a bridge structure for stringed instruments, a bridge element, comprising: a strip of sheet material folded at one end to form a horizontal U-shaped portion and folded at its other end to form an inverted U-shaped portion, the cross portion thereof forming a bridge to receive a string of a musical instrument; screw means connected with said horizontal U-shaped portion to effect longitudinal adjustment of said bridge element; and other screw means connected with said inverted U-shaped portion to effect vertical adjustment of said bridge.

4. The combination with a musical instrument having a body and strings extending thereover, of a tremolo device, comprising: a bridge base plate secured to said body and capable of limited pivotal movement; a plurality of bridge elements mounted on said base plate, each bridge element being formed of sheet material folded at one end to form a horizontal U-shaped portion and folded at its other end to form an inverted U-shaped portion, its cross portion forming a bridge; screw means connecting the horizontal U-shaped portion of each bridge element with said base plate to effect longitudinal adjustment; other screw means connected with said inverted U-shaped portion for adjusting the height of said bridge relative to said base plate; a bar depending from said base plate and disposed within said body, there being a clearance slot therein; yieldable means operable on said bridge structure to maintain tension on said strings; and an arm extending from said bridge structure and manually engageable to oscillate said bridge structure thereby to vary the tension on said strings, whereby on vibration of said strings a tremolo effect is produced.

5. The combination with a musical instrument having a body and strings extending thereover, of a tremolo device, comprising: a bridge base plate secured to said body and capable of limited pivotal movement; a plurality of bridge elements mounted on said base plate, each bridge element being formed of sheet material folded at one end to form a horizontal U-shaped portion and folded at its other end to form an inverted U-shaped portion, its cross portion forming a bridge; screw means connecting the horizontal U-shaped portion of each bridge element with said base plate to effect longitudinal adjustment; other screw means connected with said inverted U-shaped portion for adjusting the height of said bridge relative to said base plate; a bar depending from said base plate and disposed within said body, there being a clearance slot therein; springs extending between said bridge structure and said body acting to maintain tension on said strings, said bridge structure and springs having a relatively large mass whereby said bridge structure tends to be uninfluenced by vibration of said strings; and an arm extending from said bridge structure and manually engageable to oscillate said bridge structure thereby to vary the tension on said strings, whereby on vibration of said strings a tremolo effect is produced.

6. A tremolo device for stringed instruments, comprising: a bridge structure adapted to receive and anchor the strings of a musical instrument; means permitting limited pivotal movement of said bridge structure to vary the tension on said strings; means for dampening said pivotal movement whereby such movement is minimized when said strings are vibrated; a handle having a hand engageable tip portion extending from said bridge structure over a plane defined by said strings; and a connection between said handle and bridge structure permitting pivotal movement of said handle about an axis substantially perpendicular to said plane to bring said tip portion adjacent to or remote from said strings as desired without causing oscillation of said bridge structure but with movement of said handle toward and from said plane effecting oscillation of said bridge structure.

7. The combination with a musical instrument having a body and strings extending thereover with a slot being provided in said body transversely of said strings, of a tremolo device, comprising: a bridge structure including a base plate fulcrumed on said body for limited pivotal movement to vary the tension on said strings and a dampening bar loosely received by said slot, said bar having sufficient inertia normally to prevent substantial vibration of the bridge structure, said bridge structure anchoring the ends of said strings; yieldable means connected to said bar normally operable to maintain tension on said strings; and an arm secured to and extending from said bridge structure and manually engageable to oscillate said bridge structure.

8. The combination with a musical instrument having a body having a face with strings extending thereover, of a tremolo device, comprising: a bridge structure secured to said body for limited pivotal movement on a fixed axis substantially parallel with said face and extending transversely of said strings to vary the tension on said strings; means carried by said bridge structure receiving and anchoring the ends of said strings; yieldable means connected between said body and said bridge structure normally operable to maintain tension on said strings; and an arm secured to and extending from said bridge structure and manually engageable to oscillate said bridge structure.

9. The device defined by claim 8 in which said arm is secured to said bridge structure for pivotal movement toward and away from said strings about an axis substantially perpendicular to said face without oscillating

said bridge structure but with movement of said arm toward and away from said face oscillating said bridge structure.

10. The combination with a musical instrument having a body and strings extending thereover, of a tremolo device, comprising: a bridge structure secured to said body for limited pivotal movement to vary the tension on said strings; means carried by said bridge structure receiving and anchoring the ends of said strings; springs extending between said bridge structure and said body acting to maintain tension on said strings, said bridge structure and springs having a relatively large mass whereby said bridge structure tends to be uninfluenced by vibration of said strings; and an arm secured to and extending from said bridge structure and manually engageable to oscillate said bridge structure.

11. The combination with a musical instrument having a body provided with a face with strings extending thereover, of a tremolo device, comprising: a plate mounted closely adjacent the plane of the face of said instrument for pivotal movement on a fixed axis substantially parallel with said face and extending transversely of said strings, said pivotal movement varying the tension on said strings; means secured to said plate anchoring the ends of said strings; a bridge member secured to said plate and having raised portions engaging said strings and spacing said strings outwardly from said face, said raised portions being located closely adjacent but outwardly of said axis; yieldable means connected between said plate and said body normally maintaining said strings under tension; and handle means connected with said plate for manual engagement to oscillate said plate.

12. The device defined by claim 10 in which said bridge member comprises a plurality of individual bridge elements, each of said elements being independently adjustable longitudinally and vertically with respect to said body.

13. The device defined by claim 10 in which the connection between said handle and said plate permits pivotal movement of said handle about an axis substantially perpendicular to said plane to bring said handle adjacent or remote from said strings as desired without causing oscillation of said bridge structure but with movement of said handle toward and from said plane effecting oscillation of said bridge structure.

14. The device defined by claim 12 in which said bridge member comprises a plurality of individual bridge elements, each of said elements being independently adjustable longitudinally and vertically with respect to said body.

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