March 23, 1965 J. L. MATTHEW ET AL 3,174,381

TREMOLO DEVICES FOR STRINGED INSTRUMENTS

Filed July 2, 1963 2 Sheets-Sheet 1

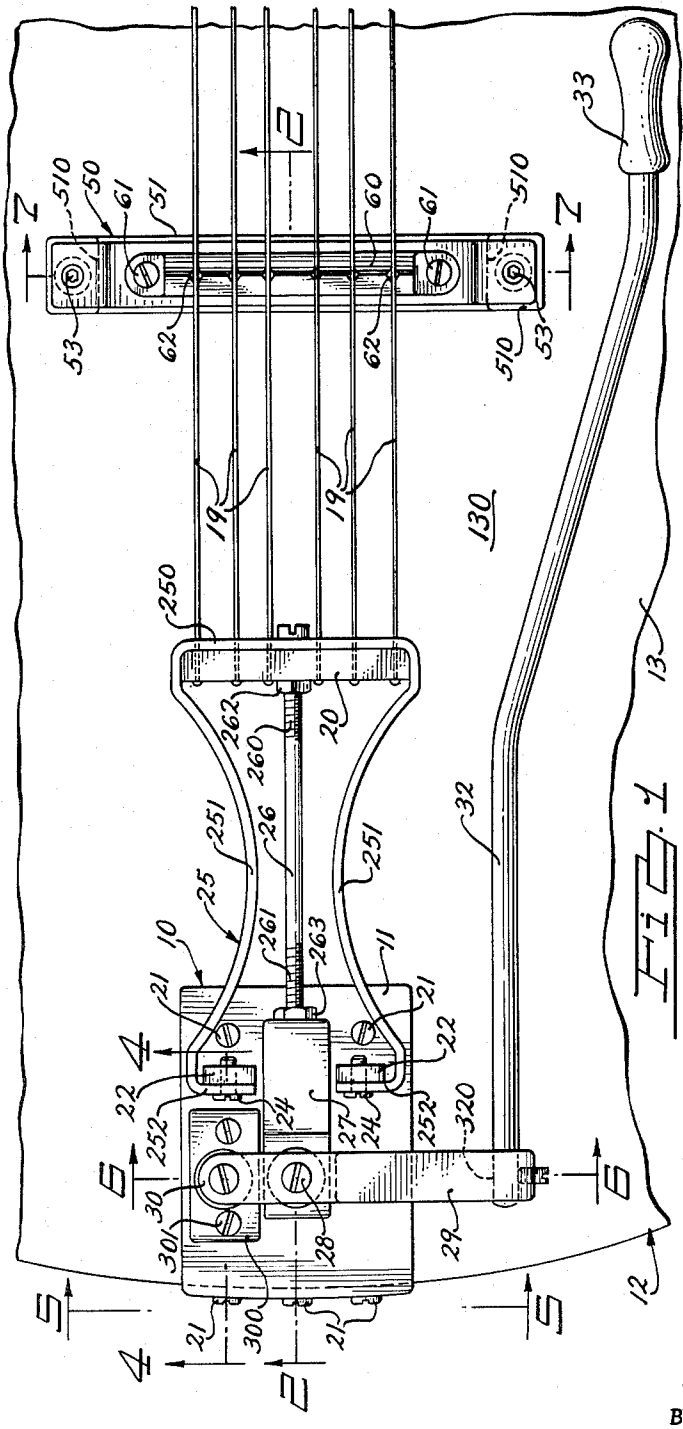


Fig. 1

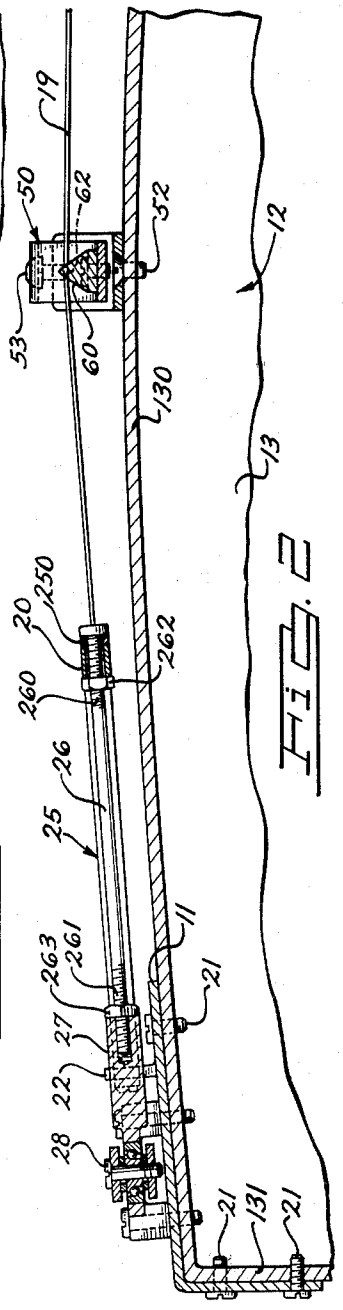


Fig. 2

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TREMOLO DEVICES FOR STRINGED INSTRUMENTS

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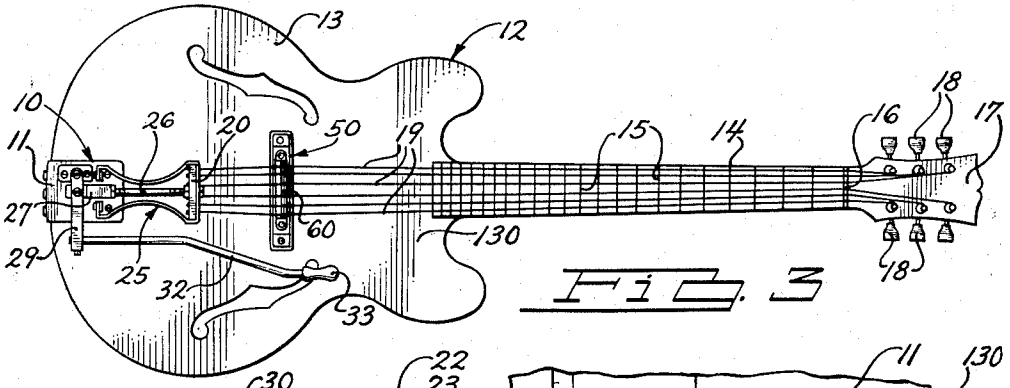



Fig. 3

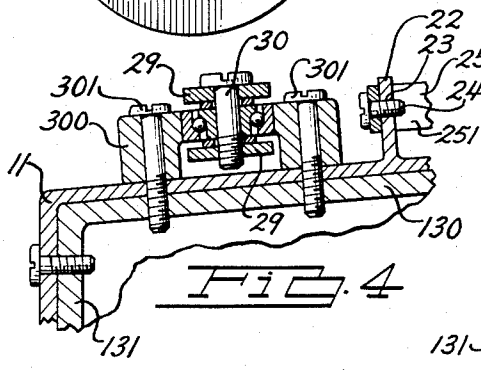



Fig. 4

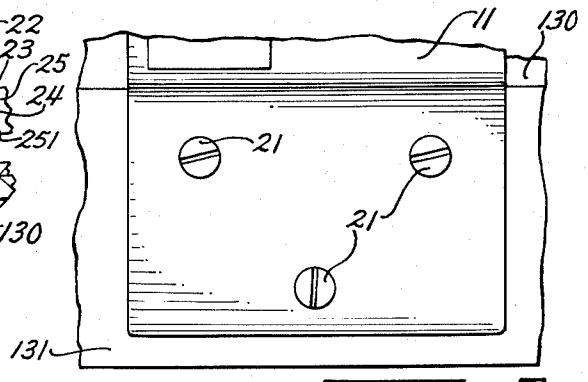



Fig. 5

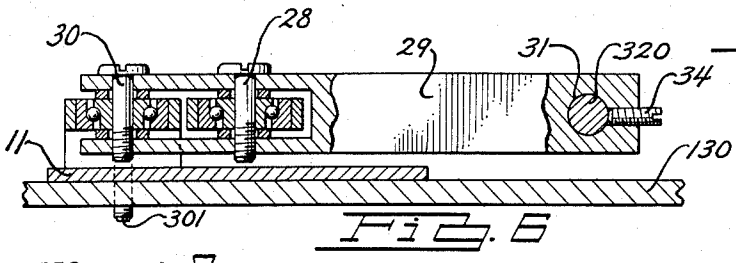



Fig. 6

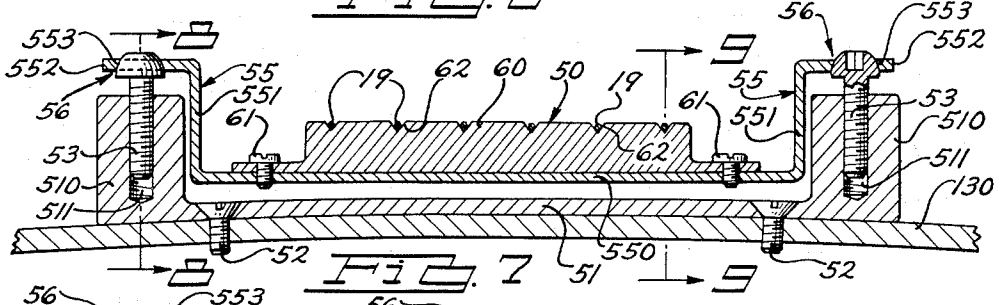



Fig. 7

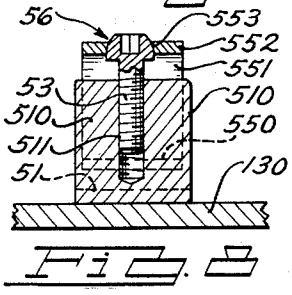



Fig. 8

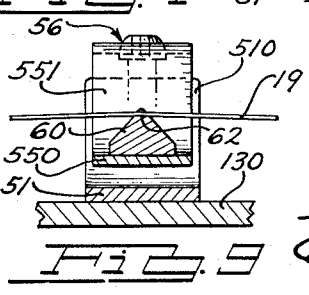



Fig. 9

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# TREMOLO DEVICES FOR STRINGED INSTRUMENTS

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4 Claims. (Cl. 84—313)

This invention relates to tremolo devices for stringed instruments such as guitars and the like.

In the prior art there have been many tremolo devices, some of which have proven more satisfactory than others in manipluability and in maintenance of tremolo tone quality.

The primary object of the instant invention is to provide an improved and simplified tremolo device for guitars and other stringed instruments which does not alter the normal tone quality of the musical instrument with which it is employed; the said tremolo device being accurately controllable and readily manipulable by the strumming hand of the musician to provide any desired degree of tremolo effect.

A further object of the invention is to provide an improved tremolo device employing a simplified, positive and quick acting self-centering hour glass type spring, and, in combination therewith, a swinging suspension bridge which assures long playing of the instrument with tremolo effect without becoming out of tune.

Other objects of the invention will become apparent by reference to the following detailed description taken in connection with the accompanying drawings, in which:

FIG. 1 is an enlarged fragmentary plan view of a guitar having thereon a tremolo device and swingable suspension bridge embodying the invention.

FIG. 2 is a longitudinal sectional view taken on the line 2—2 of FIG. 1.

FIG. 3 is a plan view of a guitar showing the tremolo device and swingable suspension bridge of the invention indicating a preferred relationship of the operating arm of the tremolo device in its overall relationship to the guitar.

FIG. 4 is an enlarged sectional view taken on the line 4—4 of FIG. 1.

FIG. 5 is an enlarged elevational view taken on the line 5—5 of FIG. 1.

FIG. 6 is an enlarged sectional view taken on the line 6—6 of FIG. 1.

FIG. 7 is an enlarged sectional view of the swingable suspension bridge taken substantially on the line 7—7 of FIG. 1.

FIG. 8 is a sectional view taken on the line 8—8 of FIG. 7.

FIG. 9 is a sectional view taken on the line 9—9 of FIG. 7.

Referring now to the drawings wherein like reference characters refer to like and corresponding parts throughout the several views, the improved tremolo device 10 and its companion swingable suspension bridge 50 of the invention are disclosed in the drawings for illustrative purposes mounted on a guitar 12. The guitar 12 or other conventional stringed instrument with which the instant invention may be employed generally consists of a body 13, neck 14 including frets 15, a neck bridge 16, a head 17, and the usual adjustable key operated string anchor pegs 18. Strings 19 anchored at one end to the tail piece 20 of the tremolo device 10, and, as hereinafter described in detail, the said strings 19 are supported on the special suspension bridge 50, also hereinafter described in detail. The said suspension bridge 50 has its base 51 fixed to the top member 130 of the body 13 of the guitar 12 by suitable countersunk head studs 52. The other end of the said strings 19 are suitably anchored to string anchor pegs 18 extending into the head 17 on the neck 14.



It is important to note that the combined tremolo device 10 and bridge 50 of the instant invention is a marked improvement over the earlier invention in Tremolo Devices for Stringed Instruments of Jack L. Matthew and Albert Punturi disclosed and claimed in U.S. Patent No. 2,897,711 issued August 4, 1959, particularly in the effectiveness of the improved tremolo mechanism including its positive self-centering hour glass type spring and simplified operating lever construction and the novel swinging suspension bridge employed which has been found to be an aid to the self-centering of the tremolo device in that the normal string pressure on the bridge constantly urges the bridge to swing back to center after release of manipulation of the operating lever of the tremolo device, which urging is in aid of and not opposed to the functioning of the hour glass type spring of the tremolo device. This does not occur when using conventional fixed, pivoted or roller bridge heretofore employed with tremolo devices.

The tremolo device 10 consists of a base plate 11 fixed to the top member 130 and end member 131 of the guitar body 13 by suitable studs or the like 21. A pair of laterally spaced upstanding posts 22 preferably formed integral with the said base 11 are suitably bored and threaded at 23 to receive studs 24 which telescope through the transverse ends 252 of the hour glass shaped tremolo spring 25 and secure it to the said base 11 in spaced relationship thereabove and above the top member 130 of the said guitar body 13. The said tremolo spring 25 is preferably substantially rectangular in cross section and has a head end 250, and symmetrical inwardly curved sides 251, and transverse ends 252. The tail piece 20 which receives and anchors the ends of the strings 19 at the head end 250 of the tremolo spring 25 is suitably fixed thereto. Obviously, the tail piece 20 may be omitted, and the strings 19 may be suitably fixed to the head end 250 of the tremolo spring 25.

The said tail piece 20 and the head end 250 of the tremolo spring 25 are centrally bored to telescopingly receive a long adjusting stud 26 having its head end and lower end threaded at 260 and 261 respectively. The said lower end 261 of the adjusting stud 26 is threaded into an anchor arm 27 which is pivotally connected at 28 to a tremolo lever 29 pivoted at 30 to the base 10 as best shown in FIG. 1. The free end of the tremolo lever 29 is suitably bored at 31 to receive the lower end 320 of the tremolo arm 32 having an operating handle 33 at the upper end thereof. Suitable lock nuts 262 and 263 on each threaded end 260 and 261 of the adjusting stud 26 fix the tremolo spring and lever mechanism in their proper adjusted position. A suitable set screw 34 may be employed to fix the tremolo arm 32 in a desired adjusted position.

The pivot 28 connecting the anchor arm 27 to the tremolo lever 29, and the pivot 30 connecting the tremolo lever 29 to the base 11, are both preferably ball bearing pivots to assure completely free operation of the tremolo device 10. By shortening or lengthening the distance between the head end 250 of the tremolo spring 25 and the anchor arm 27 by means of the adjusting stud 26, the normal operating characteristics of the tremolo device 10 and its tremolo spring 25 are established, and by turning up the lock nuts 262 and 263 on the threaded head and lower ends 260 and 261 respectively of the adjusting stud 26, such adjustment is maintained.

The particular novel swinging suspension bridge construction 50 preferably employed in combination with the tremolo device 10 of the invention consists of a base 51 which is secured by means of countersunk head studs 52 at the proper location to the top member 130 of the body 13 of a guitar or the like 12. Upwardly extending from opposite ends of the base 51 are suitable stanchions 510

bored and threaded at 511 to receive threaded semi-spherically headed Allen type studs or posts 53 which may be turned to level or support the bridge suspension bar 55 at the desired height above the base 51.

The bridge suspension bar 55 is generally U-shaped having a low platform 550, end uprights 551 and outwardly disposed flanges 552. Each outwardly disposed flange 552 is apertured at 553 and formed at the said apertures 553 to conform to the curvature of the round head studs or posts 53 providing a universal joint 56 between the flanges 552 of the bridge suspension bar 55 and its supporting posts 53.

A generally triangular string supporting bridge element 60 is mounted by such means as studs 61 centrally on the top of the low platform 550 of the bridge suspension bar 55. The said bridge element 60 is suitably notched at 62 to accommodate the strings 19 of the guitar or other stringed instrument 12.

With the foregoing novel construction, the tremolo device of the invention is positively self-returning to neutral after manipulation of the tremolo operating arm 32 and release of the tremolo operating handle 33, the movement of the operating arm 32 of the tremolo device minutely alternately shortening and lengthening the strings 19 of the musical instrument to obtain the tremolo effect. The downward pressure of the strings 19 on the swinging suspension bridge 50 constantly urges the bridge 50 to swing back to its central or neutral position from which it swings during the manipulation of the tremolo. Obviously, the new and improved tremolo device of the invention may be used either alone or in combination with the novel swinging suspension bridge on stringed instruments to provide a highly effective easily accomplished tremolo effect, and, when the said novel suspension bridge is used in combination with the improved and simplified tremolo device of the invention, the usual frequent retuning of conventional tremolo equipped instruments during long periods of play is not required.

Although but a single embodiment of the invention has been disclosed and described in detail, it is obvious that many changes may be made in the size, shape, arrangement and detail of the various elements of the invention, all without departing from the spirit and scope thereof as defined by the appended claims.

We claim:

1. A tremolo device for stringed musical instruments comprising

a base plate fixed to the body of said instrument including a pair of laterally spaced upstanding tremolo spring anchor posts,

an hour glass shaped tremolo spring having a closed head end, symmetrically curved sides and transverse open ends secured at said open ends to said tremolo spring anchor posts and disposed in spaced relationship above said base plate and the body of said instrument,

means anchoring the strings of said stringed instrument to the closed head end of said spring,

a tremolo lever disposed transversely across and above said base plate and pivoted at one end thereto,

a tremolo operating arm connected to the other end of said tremolo lever and extending along said stringed instrument adjacent the area of strumming the strings thereof,

an anchor arm pivoted at one end to said tremolo lever and having its free end extending toward the closed head end of said tremolo spring,

and means connecting the head end of said tremolo spring to the free end of said anchor arm.

2. A tremolo device for stringed musical instruments comprising

a base plate fixed to the body of said instrument including a pair of laterally spaced upstanding tremolo spring anchor posts,

an hour glass shaped tremolo spring having a closed head end, symmetrically curved sides and transverse open ends secured at said open ends to said tremolo spring anchor posts and disposed in spaced relationship above said base plate and the body of said instrument,

means anchoring the strings of said stringed instrument to the closed head end of said spring,

a tremolo lever disposed transversely across and above said base plate and pivoted at one end thereto,

a tremolo operating arm connected to the other end of said tremolo lever and extending along said stringed instrument adjacent the area of strumming the strings thereof,

an anchor arm pivoted at one end to said tremolo lever and having its free end located between said tremolo spring anchor posts and extending toward the closed head end of said tremolo spring,

an adjustable connecting rod between the head end of said tremolo spring and the free end of said anchor arm,

and means securing said connecting rod in its adjusted position.

3. In a tremolo device for stringed musical instruments as claimed in claim 1,

a swingable suspension bridge including a base fixed thereon transversely of and below the strings of said stringed instrument, said base having stanchions at opposite ends thereof,

a bridge suspension bar including a low platform, end uprights and outwardly disposed end flanges supported on said stanchions and formed to provide universal movement therebetween,

and a triangular string supporting element disposed longitudinally on said low bridge platform and fixed thereto, the said suspension bridge platform and said string supporting element swinging longitudinally with the movement of the strings supported thereon responsive to manual movement of the tremolo operating arm and the release thereof.

4. In a tremolo device for stringed musical instruments as claimed in claim 2,

a swingable suspension bridge including a base fixed thereon transversely of and below the strings of said stringed instrument, said base having stanchions at opposite ends thereof,

semi-spherically headed studs threaded into said stanchions and extending thereabove,

a bridge suspension bar including a low platform, end uprights and outwardly disposed end flanges formed to be supported on said studs and provide a universal movement between said bridge suspension bar and said studs, the turning of said studs providing means for leveling and adjusting the height of said bridge suspension bar in respect to the said base and stanchions,

and a string supporting element on the low bridge platform of said bridge suspension bar supporting the strings of said instrument below the points of universal support of said bridge suspension bar, the said suspension bridge platform and said string supporting element swinging longitudinally with the movement of the strings supported thereon responsive to manual movement of the tremolo operating arm and the release thereof.


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