

May 4, 1965

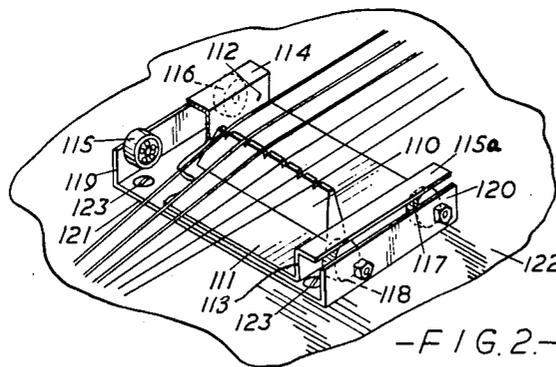
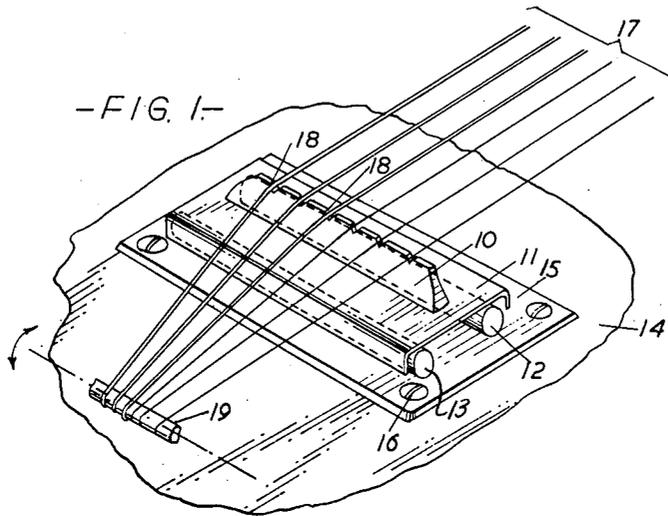
J. O. BURNS ETAL

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BRIDGES FOR STRINGED INSTRUMENTS SUCH AS FOR GUITARS

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4 Sheets-Sheet 1



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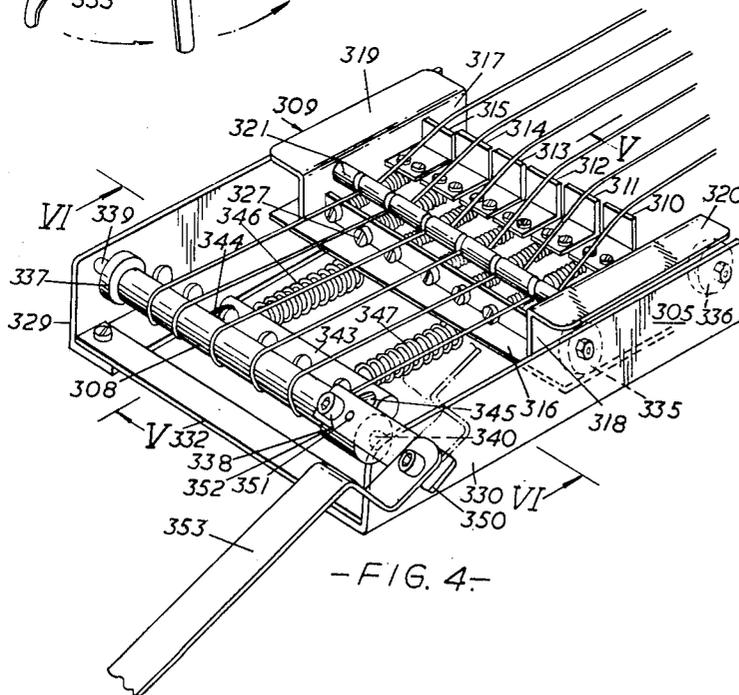
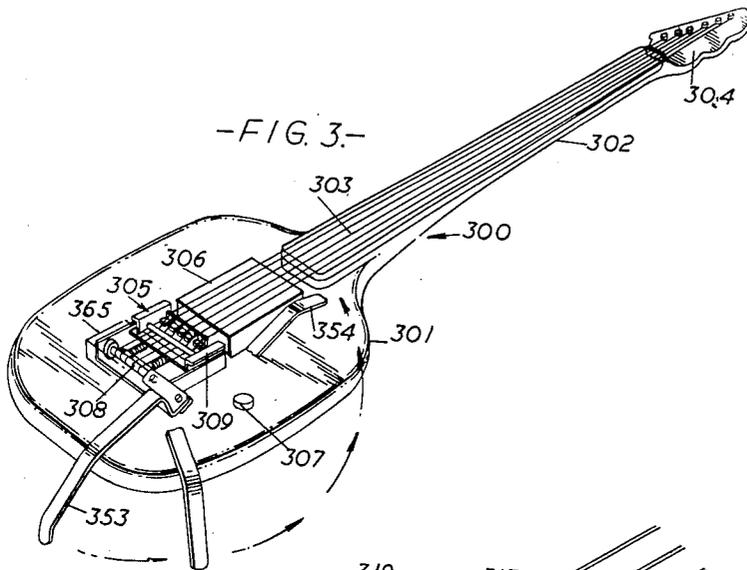
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4 Sheets-Sheet 2



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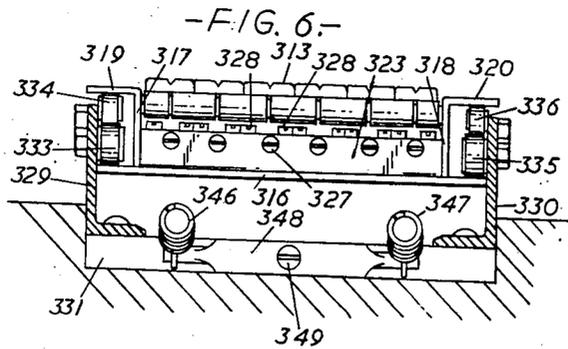
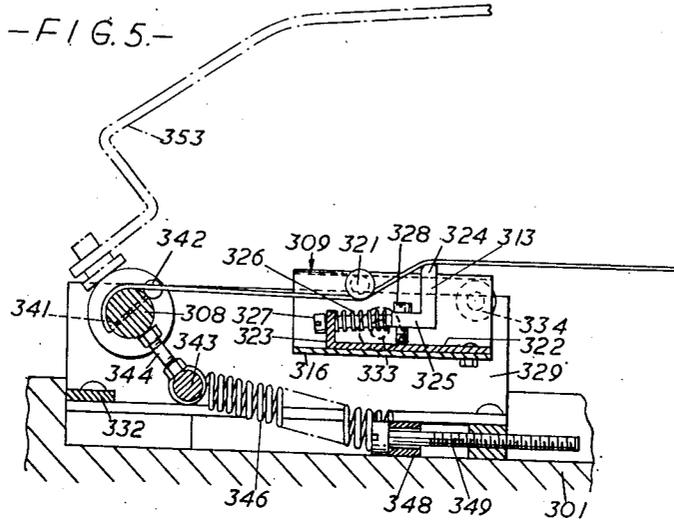
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BRIDGES FOR STRINGED INSTRUMENTS SUCH AS FOR GUITARS

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4 Sheets-Sheet 3



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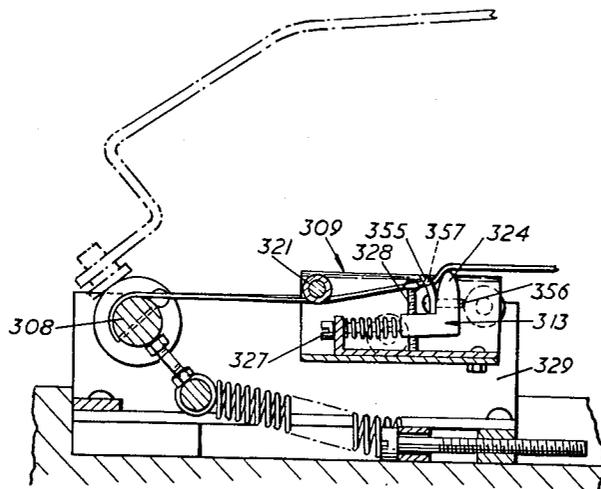
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BRIDGES FOR STRINGED INSTRUMENTS SUCH AS FOR GUITARS

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4 Sheets-Sheet 4

-FIG. 7-



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3,181,409

BRIDGES FOR STRINGED INSTRUMENTS SUCH AS FOR GUITARS

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15 Claims. (Cl. 84—313)

The present invention relates to bridges for stringed instruments such as guitars, and is especially applicable to guitars provided with a vibrato or tremolo unit for varying the pitch.

It is well known to provide a stringed instrument such as a guitar with a vibrato or tremolo unit, often in the form of a spring-loaded spindle around which the strings pass and to which they are anchored, the spindle being angularly displaceable manually by manipulation of an operating handle. By increasing the tension of the strings their pitch can be raised and by decreasing their tension the pitch can be lowered, such variations in tension being effected by winding the strings onto or unwinding the strings from the spindle as it is angularly displaced, so that in fact the length of the string under tension is varied. As the bridge is disposed close to the spindle of the vibrato or tremolo unit and the major portion of each string stretches between the bridge and the machine head of the instrument, with each angular displacement of the spindle some movement of each string relatively to the bridge usually takes place. Such movement of a string under tension over the bridge can give rise to wear and the friction between each string and the bridge impedes the movement of the string and renders it more difficult to obtain smooth and gradual changes in tension so that a tremulant or vibrato effect cannot always be as smooth as may be desired.

According to the present invention a bridge unit is rollably mounted for movement with the strings upon alteration of the tension of all the strings collectively by a tremolo or vibrato unit.

According to another feature of the present invention a bridge unit for a stringed instrument such as a guitar equipped with a tremolo or vibrato unit, comprises a base member for attachment to the body of a stringed instrument, a bridge member thereon and friction-reducing bearing means interposed therebetween.

According to yet another feature of the present invention, a bridge unit for a stringed instrument such as a guitar equipped with a tremolo or vibrato unit, comprises a bridge member for engagement by strings of the instrument and mounted on friction-reducing bearing means for displacement in a direction longitudinally of the strings.

By making it possible for the bridge, which is engaged by the strings, to move in a longitudinal direction when the tension of the strings is altered by a tremolo or vibrato unit, it is possible to obviate or at least materially reduce relative movement between the strings and the bridge when the instrument is being played. Moreover the reduction of frictional forces impeding any change in tension of the strings by a tremolo or vibrato unit reduces the magnitude of the force needed to be applied to the tremolo or vibrato unit for a given change in tension.

In one simple form of construction a bridge member is mounted on a carrier plate supported by a pair of rollers which can rest on the body of the guitar or preferably upon a base member attached thereto.

In another form of construction the bridge member is mounted on a carrier plate which has upturned flanged sides; each flange rests on a pair of ball races carried by

upstanding side members of a generally channel-shaped base member adapted to be attached to the body of the guitar.

The bridge member may take the form of a plurality of bridge elements each individual to one string and each adjustable relatively to the carrier plate in a direction towards and away therefrom and in a direction transverse thereto and generally longitudinally of a string so that the point at which each string passes over its associated bridge element can be adjusted for each string individually, whereby due allowance can be made for the diameter of each string, in relation to its length, and enable a more satisfactory accuracy of pitch to be obtained for all strings with a finger board having transversely extending frets common to all strings.

Furthermore the bridge and the tremolo or vibrato unit may be combined into a single composite unit. Thus the base member carrying the bearings for the carrier member and bridge may also act as support for a spindle of the tremolo or vibrato unit which is itself preferably mounted on ball or roller bearings. In this manner the provision of a tremolo or vibrato unit and rolling bridge unit on a guitar is considerably facilitated since only a single composite unit has to be fitted and registration between string-receiving apertures in the spindle and string-receiving notches of the bridge or of individual bridge elements, may be more readily obtained.

The invention will be further described by way of example with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view of one embodiment of the invention;

FIG. 2 is a perspective view of a second embodiment of the invention;

FIG. 3 is a diagrammatic perspective view of a guitar incorporating a third embodiment of the invention;

FIG. 4 is a perspective view of the embodiment of FIG. 3 to an enlarged scale;

FIG. 5 is a section along the line V—V of FIG. 4; FIG. 6 is a section along the line VI—VI of FIG. 4, and

FIG. 7 is a sectional view corresponding to FIG. 5 of another embodiment.

In the embodiment illustrated in FIG. 1, a bridge piece 10 is mounted on a carrier plate 11 resting on a pair of rollers, 12, 13. Whilst the rollers 12, 13 can ride on the body 14 of an instrument such as a guitar, it is preferable for them to ride on a base plate 15, secured to the body 14 in any convenient manner such as by screws 16. The strings illustrated diagrammatically at 17 of the instrument each pass over the top of the bridge 10 where they are located at a desired spacing one from another by notches 18 and terminate in a spindle 19 of a tremolo or vibrato unit, other parts of which are, for the sake of clarity, not shown. Such spindle is angularly displaceable about its axis for altering the tension of the strings collectively to raise or lower their pitch in a well-known manner. When the spindle 19 is angularly displaced some movement of the strings takes place and since the bridge 10 is rollable relatively to the body 14 of the guitar, the bridge can, to a very large extent, follow the movement of the strings longitudinally and materially reduce wear on the strings and on the bridge.

The rollers 12, 13 serve as friction-reducing bearing means for the bridge 10 and enable a desired tremolo or vibrato effect to be obtained with less displacement torque applied to the spindle 19 than if the bridge were fixed.

The carrier 11 is preferably of inverted channel section to reduce any tendency for it to be rolled off the rollers 12, 13.

In the embodiment illustrated in FIG. 2 the bridge

member 110 is mounted on a carrier 111 having upwardly extending outwardly flanged side walls 112, 113, whose flanges 114, 115a ride on ball races 115 and 116, 117 and 118, carried respectively on sides 119, 120 of a channel section base member 121 adapted to be mounted on body 122 of a guitar in any convenient manner, such as by screws 123.

Either of the embodiments illustrated in FIGS. 1 and 2 may be used on a guitar provided with a tremolo or vibrato unit and thus may be fitted as a replacement of an existing bridge in a guitar already provided with a tremolo or vibrato unit, or yet again may be used in a guitar or other stringed instrument provided with a conventional string terminating device.

The base member for the bridge may be extended to serve as base for the tremolo or vibrato unit to form a composite construction, as illustrated diagrammatically in FIG. 3, to which reference will now be made.

In FIG. 3 an electric guitar 300 is illustrated diagrammatically and comprises a solid body 301 whose shape is illustrated arbitrarily, but which may be of any desired peripheral form. A neck 302 is provided with a finger board 303, and a machine head 304. Mounted on the body 301 is a combined bridge and tremolo unit 305 and one or more pick-ups may be provided at 306, together with associated controls at 307. One end of each string is anchored to spindle 308 forming part of the tremolo unit in the combined unit 305, and each string passes over the bridge indicated generally at 309, over the pick-ups 306, above the finger board 303, its other end being secured to a tensioning member in the machine head 304.

The combined unit 305 is illustrated in greater detail and to a larger scale in FIGS. 4, 5 and 6. The bridge 309 comprises a plurality of bridge elements 310, 311, 312, 313, 314, 315, each individual to one string and carried on a carrier plate 316 having upwardly extending side pieces 317, 318, provided with outwardly extending flanges 319, 320. Extending between the side pieces 317, 318 is a rod 321 common to all strings. The side pieces 317, 318 are integral with a plate 322 secured to the carrier plate 316 and having an upturned rear flange 323. Each of the bridge elements is generally L-shaped having a first limb 324 notched at its upper edge to locate a string, and a second limb 325 extending substantially at right angles to the first limb and drilled and tapped from its free end forwards to receive a first adjusting screw 327 passing freely through an aperture formed in the flange 323, a spring 326 being disposed between the flange 323 and the end of the second limb 325. The second limb of each bridge element is also drilled and tapped to receive a pair of second adjusting screws 328. By rotation of the first adjusting screw 327 the relative position of each bridge element in a longitudinal direction can be selected as desired and by rotation of the second adjusting screw 328 the height of the bridge element can likewise be adjusted.

The base member for the combined unit comprises a pair of angle section side members 329, 330 connected together at their front ends by a front tie member 331 beneath their flanges and at their rear ends by a rear tie member 332 resting on the flanges. Each of the side members 329, 330 has secured thereto a pair of ball races 333 and 334, 335 and 336 respectively. The ball races 334, 336 at the front of the side pieces 329, 330 are at an upper level and support flanges 319, 320. The other pair of ball races 333, 335 are at a lower level and spaced therefrom and engage the upper surface of the carrier plate 316. The spindle 308 has at its ends bearing hubs 337, 338 containing needle or ball bearings engaged by bearing pins 339, 340 threadedly received in the side pieces 329, 330. The spindle 308 is drilled diametrically as at 341 at spaced locations to receive the end portions of the strings which, when connected thereto, pass there-through and encircle a toggle such as 342 in a well-known manner. A bar 343 is connected to the spindle 308 by

a pair of spacer rods 344, 345 and has attached thereto the one ends of a pair of springs 346, 347, the other ends of which are engaged around an adjustment bar 348 through which passes a tension adjustment screw 349 threadedly received in the front tie member 331. A bar 349 is connected to the bearing hub 338 of the spindle 308 by a locating pin 351 and a socket-headed screw 352 and extends sidewardly beyond the side piece 330 and has an operating handle 353 pivotally attached thereto. When the tremolo or vibrato unit is in use, the handle 353 is swung into a position relatively to the bar 350 such that it extends generally towards the machine head, as indicated diagrammatically at 354 in FIG. 3, such that manual pressure applied thereto can effect angular displacement of the spindle 308 and such that when the handle is not required for use, it can be swung out of the way.

When the combined bridge and tremolo unit is fitted to a guitar, one end of each string is passed through the appropriate transverse bore in the spindle 308 and secured around a toggle. Each string then passes under the rod 321 which is grooved to locate each string and then over the appropriate bridge element before extending over the finger board to the machine head 304. When the strings are tuned and tensioned, all of the strings exert a torque on the spindle 308 against the action of the springs 346, 347 and by adjustment of the adjustment screw 349 the angular position of the spindle 308 can be adjusted to bring the handle 353 into a desired normal position. Each of the bridge elements can be adjusted longitudinally of its string and in a direction at right-angles thereto to give any desired location of the bridge element relatively to the end of the finger board 303 and any desired spacing of its associated string relatively to the surface of the body 301. Moreover the location of all the bridge elements collectively in the longitudinal direction can be varied if desired by movement of the carrier plate 316 relatively to the side pieces 329, 330.

When the strings are tensioned they exert a generally downwardly directed force on the bridge elements and they also exert a generally upwardly directed force on the rod 321, thus urging the flanges 319, 320 onto the front ball races 334, 336 and the carrier plate 316 on to the ball races 333 and 335. When a tremolo or vibrato effect is required by a player, the handle 353 is displaced manually toward and/or away from the body 301, thus angularly displacing the spindle 308. When the spindle 308 is displaced in a clockwise direction, as seen in FIG. 5, the strings are unwound slightly from the spindle 308 and their tension is reduced to drop their pitch. With such unwinding, the whole of the bridge can move forwardly and relative movement between each string and its associated bridge element can be obviated or at least reduced. Likewise when the handle 353 is moved in an anti-clockwise direction as seen in FIG. 5, all of the strings are wound onto the spindle 308 and the whole of the bridge 309 can move rearwardly towards the spindle 308. Ball bearings 333, 334, 335, 336 serve as friction-reducing mounting for the bridge elements and greatly facilitate the obtaining of a desired vibrato or tremolo effect and also assist in reducing the manual effort required to be applied to the handle 353.

In order to engage a string more positively over a bridge element, each bridge element 313 can be provided with an apertured plate 355 as in the embodiment illustrated in FIG. 7. The plate 355 is attached to the rear surface of the first limb 324 by a screw 356 and is provided with an aperture 357 in its upper portion for the passage of a string. Moreover the adjustment screws 328 can be longer than those in the embodiment of FIGS. 4, 5 and 6 and so permit greater range of adjustment; and the rod 321 can be nearer to the rear of the bridge 309.

A cover, of which, for the sake of clarity, only one corner portion is shown at 365 in FIG. 3, of pleasing ex-

ternal appearance can be provided to overlie parts of the tremolo unit whilst leaving the bridge exposed, or if desired, such cover can also overlie parts of the bridge. A transparent cover may be slipped over the bridge 309 from the rear whilst the tremolo or vibrato unit may be concealed by a polished ornamented metal cover.

We claim:

1. A bridge unit for a stringed musical instrument such as a guitar, comprising in combination, a bridge member adapted for engagement by strings of a said instrument, a carrier member carrying said bridge member, a base member adapted to be attached to the body of a said instrument, a tremolo spindle adapted for anchoringly receiving ends of said strings, means for angularly displaceably journalling said spindle on said base member, resilient means for urging said spindle in one angular direction, manually operable means for angularly displacing said spindle, and friction-reducing bearing means interposed between said base member and said carrier member to permit substantially linear rolling movement of said carrier member only in directions towards and away from said spindle.

2. A combined bridge and tremolo unit for a stringed musical instrument such as a guitar, comprising in combination, a base member adapted to be attached to the body of said instrument, a tremolo spindle journaled on said base member and adapted to anchoringly receive ends of strings of the instrument, torque applying means acting on said spindle in one direction of rotation, manually operable means for angularly displacing said spindle, and a bridge member rollably mounted on said base member for movement substantially only in a direction towards and away from said spindle.

3. In a stringed musical instrument, such as a guitar, having a body and a plurality of strings, a combined bridge and tremolo unit comprising, in combination, a bridge member for engaging said strings, a manually operable tremolo spindle for anchoring ends of said strings, a base member common to said bridge member and said tremolo spindle and attached to said body, and means for rollably mounting said bridge member on said base member for substantially linear movement towards and away from said tremolo spindle.

4. In a stringed musical instrument, such as a guitar, having at least a body and a plurality of strings, a combined bridge and tremolo unit comprising a bridge member, a tremolo spindle anchoring one end of each of said strings, a base member common to said bridge member and to said tremolo spindle and attached to said body, means for journalling said tremolo spindle on said base member, torque applying means acting between said base member and said tremolo spindle in one direction, manually operable means for angularly displacing said tremolo spindle for varying the tension of said strings collectively, and friction-reducing bearing means between said bridge member and said base member to permit substantially linear rolling movement of said bridge member in directions towards and away from said tremolo spindle with collective variations of string tension whilst restraining movement of the bridge member in directions parallel to said tremolo spindle.

5. A combined bridge and tremolo unit for a stringed musical instrument, such as a guitar, having a body and a plurality of strings, comprising a bridge unit, a tremolo unit, a base common to said bridge unit and said tremolo unit and adapted to be attached to the body of a said instrument, said tremolo unit including a spindle adapted for anchoringly securing one end of each of the strings, bearing means for journalling said spindle to said base, torque applying means acting between said base and said spindle for urging said spindle in one direction of angular displacement, and manually operable means for angularly displacing said spindle, said bridge unit including a carrier member, a plurality of bridge elements on said carrier member, said carrier member having upturned flanged

sides, two pairs of ball races carried by said base, one pair at each side thereof for engaging said flanged sides of said carrier member to permit rolling movement of the bridge unit relatively to said base solely in directions substantially towards and away from said spindle.

6. A combined bridge and tremolo unit for a stringed musical instrument, such as a guitar, having a body and a plurality of strings, comprising a bridge unit, a tremolo unit, a base common to said bridge unit and said tremolo unit and adapted to be attached to the body of a said instrument, said base having upstanding side members, said tremolo unit including a spindle adapted for anchoringly securing one end of each of the strings, bearing means for journalling said spindle to said side members, torque applying means acting between said base and said spindle for urging said spindle in one direction of angular displacement and manually operable means for angularly displacing said spindle, said bridge unit including a carrier member a least one bridge element on said carrier member, said carrier member having upturned flanged sides, and a pair of ball races on each side member of said base for engaging said flanged sides of said carrier member, to permit substantially linear rolling movement of said carrier member relatively to said base in directions towards and away from said spindle whilst restraining movement of said carrier in directions parallel to said spindle.

7. A combined bridge and tremolo unit for stringed musical instrument, such as a guitar, having a body and a plurality of strings, comprising a bridge unit, a tremolo unit, a base common to said bridge unit and said tremolo unit and adapted to be attached to the body of a said instrument, said tremolo unit including a spindle adapted for anchoringly securing one end of each of the strings, bearing means for journalling said spindle to said base, torque applying means acting between said base and said spindle for urging said spindle in one direction of angular displacement, and manually operable means for angularly displacing said spindle, said bridge unit including a carrier member, said carrier member having upturned flanged sides, two pairs of ball races carried by said base, one at each side thereof for engaging said flanged sides of said carrier member to permit substantially linear rolling movement of said carrier member relatively to said base in directions toward and away from said spindle whilst restraining movement of said carrier member relatively to said base in directions parallel to said spindle, a plurality of bridge elements on said carrier member for each engaging an individual string, and adjustment means associated with each bridge element for positioning each element relatively to said carrier member towards and away therefrom and in directions substantially parallel to said directions of rolling movement of the carrier member relatively to said base.

8. A combined bridge and tremolo unit for a stringed musical instrument, such as a guitar, having a body and a plurality of strings, comprising a bridge unit, a tremolo unit, a base common to said bridge unit and said tremolo unit and adapted to be attached to the body of a said instrument, said base having upstanding side members, said tremolo unit including a spindle adapted for anchoringly securing one end of each of the strings, bearing means for journalling said spindle to said side members of said base, torque applying means acting between said base and said spindle for urging said spindle in one direction of angular displacement, and manually operable means for angularly displacing said spindle for collectively varying tension in strings secured thereto, said bridge unit including a carrier member, said carrier member having upturned flanged sides, a pair of ball races carried by each side member of said base engaging said flanged sides of said carrier member to permit substantially linear rolling movement of said carrier member relatively to said base in directions towards and away from said spindle upon said collective tension variation of said strings,

whilst restraining relative movement in directions parallel to said spindle, a plurality of bridge elements on said carrier member for each engaging an individual string, and adjustment means associated with each bridge element for positioning each element relatively to said carrier member towards and away from said carrier member and in directions substantially parallel to said directions of said rolling movement.

9. A combined bridge and tremolo unit for a stringed musical instrument, such as a guitar, having a body and a plurality of strings, comprising a bridge unit, a tremolo unit, a base common to said bridge unit and said tremolo unit and adapted to be attached to the body of a said instrument, said base having upstanding side members, said tremolo unit including a spindle adapted for anchoringly securing one end of each of the strings, bearing means for journalling said spindle to said side members of said base, torque applying means acting between said base and said spindle for urging said spindle in one direction of angular displacement, and manually operable means for angularly displacing said spindle for collectively varying tension in strings secured to said spindle, said bridge unit including a carrier member, said carrier member having a base plate and upturned flanged sides, said base plate and flanged sides forming an upper flange and a lower flange at each side thereof, a front ball race and a rear ball race carried by each side member of said base, said front ball races being at a different level from said rear ball races, a plurality of L-shaped bridge elements on said carrier member each having an upstanding limb for engaging an individual string, and a rod member carried by said flanged sides to the rear of said bridge elements, tension in strings engaging said bridge elements and said rod member causing said upper flanges to be engaged by said front ball races and said lower flanges by said rear ball races, said ball races permitting substantially linear rolling movement of said carrier member relatively to said base member in directions towards and away from said spindle upon collective variation in string tension whilst restraining relative movement in directions parallel to said spindle.

10. A unit according to claim 9 including a plurality of plates secured one to the rear face of the upstanding limb of each bridge element, each plate extending in part substantially parallel to said limb and in part diverging rearwardly outwardly away therefrom and being provided with a string-receiving aperture in the diverging portion thereof.

11. A combined bridge and tremolo unit for a stringed musical instrument, such as a guitar, having a body and a plurality of strings, comprising a bridge unit, a tremolo unit, a base common to said bridge unit and said tremolo unit and adapted to be attached to the body of a said instrument, said base having upstanding side members, said tremolo unit including a spindle adapted for anchoringly securing one end of each of the strings, bearing means for journalling said spindle to said side members of said base, torque applying means acting between said base and said spindle for urging said spindle in one direction of angular displacement, and manually operable means for angularly displacing said spindle for collectively varying tension in strings secured to said spindle, said bridge unit including a carrier member, said carrier member having a base plate and upturned flanged sides, said base plate and flanged sides forming an upper flange and a lower flange at each side thereof, a front ball race and a rear ball race carried by each side member of said base, said front ball races being at a different level from said rear ball races, a plurality of L-shaped bridge elements on said carrier member each having an upstanding limb for engaging an individual string, a rod member carried by said flanged sides to the rear of said bridge elements, tension in strings engaging said bridge elements and said rod member, causing said upper flanges to be engaged by said front ball races and said lower flanges by said rear ball races, said rear ball races permitting substantially

linear rolling movement of said carrier member relatively to said base in directions towards and away from said spindle upon collective tension variation of said strings upon operation of said manually operable means whilst restraining relative movement in directions parallel to said spindle, and adjustment means associated with each bridge element for selectively positioning each element relatively to said carrier member towards and away from said base plate and in directions substantially parallel to directions of rolling movement of said carrier member relatively to said base.

12. A combined bridge and tremolo unit for a stringed musical instrument, such as a guitar, having a body and a plurality of strings, comprising a bridge unit, a tremolo unit, a base common to said bridge unit and said tremolo unit and adapted to be attached to the body of a said instrument, said base having upstanding side members, said tremolo unit including a spindle adapted for anchoringly securing one end of each of the strings, bearing means for journalling said spindle to said side members of said base, torque applying means acting between said base and said spindle for urging said spindle in one direction of angular displacement, and manually operable means for angularly displacing said spindle for collectively varying tension in strings secured to said spindle, said bridge unit including a carrier member, said carrier member having a base plate and upturned flanged sides, said base plate and flanged sides forming an upper flange and a lower flange at each side thereof, a front ball race and a rear ball race carried by each side member of said base, said front ball races being at a different level from said rear ball races, a plurality of L-shaped bridge elements on said carrier member each having an upstanding limb for engaging an individual string, a rod member carried by said flanged sides to the rear of said bridge elements, tension in strings engaging said bridge elements and said rod member, causing said upper flanges to be engaged by said front ball races and said lower flanges by said rear ball races, said rear ball races permitting substantially linear rolling movement of said carrier member relatively to said base in directions towards and away from said spindle upon collective string-tension variation upon operation of said manually operable member, whilst restraining relative movement in directions parallel to said spindle, each bridge element having a second limb extending substantially at right angles to said first-mentioned limb, each said second limb being drilled and tapped to threadedly receive a pair of adjustment screws extending in a direction substantially parallel to said first-mentioned limb to engage said carrier member for selectively positioning each bridge element in directions towards and away from said carrier member, each said second limb being drilled and tapped to receive a further adjustment screw extending substantially parallel to the second limb, a transverse flange upstanding from said carrier member and provided with a plurality of spaced apertures, each said further adjustment screw passing through one of said apertures, spring means around each said further adjustment screw acting between said transverse flange and a second limb of a bridge element.

13. A combined bridge and tremolo unit for a stringed musical instrument, such as a guitar, having a body and a plurality of strings, comprising a bridge unit, a tremolo unit, a base common to said bridge unit and said tremolo unit and adapted to be attached to the body of a said instrument, said base having upstanding side members, said tremolo unit including a spindle adapted for anchoringly securing one end of each of the strings, bearing means for journalling said spindle to said side members of said base, a pair of spacer members extending substantially radially from said spindle, a bar carried by said spacer members, an adjustment bar adjustably connected to said base, and spring means acting between said bar and said adjustment bar for urging said spindle in one direction of

angular displacement, and manually operable means for angularly displacing said spindle for collectively varying tension in strings secured to said spindle, said bridge unit including a carrier member, said carrier member having a base plate and upturned flanged sides, said base plate and flanged sides forming an upper flange and a lower flange at each side thereof, a front ball race and a rear ball race carried by each side member of said base, said front ball races being at a different level from said rear ball races, a plurality of L-shaped elements on said carrier member each having an upstanding limb for engaging an individual string, a rod member carried by said flanged sides to the rear of said bridge elements, tension in strings engaging said bridge elements and said rod member, causing said upper flanges to be engaged by said front ball races and said lower flanges by said rear ball races, said ball races permitting substantially linear rolling movement of said carrier member relatively to said base in directions towards and away from said spindle upon collective string tension variation upon operation of said manually operable member whilst restraining relative movement in directions parallel to said spindle, each bridge element having a second limb extending substantially at right angles to said first-mentioned limb, each said second limb being drilled and tapped to threadedly receive a pair of adjustment screws extending in a direction substantially parallel to said first-mentioned limb to engage said carrier member for selectively positioning each bridge element in directions towards and away from said carrier member, each said second limb being drilled and tapped to receive a further adjustment screw extending substantially parallel to the second limb, a transverse flange upstanding from said carrier member and provided with a plurality of spaced apertures, each said further adjustment screw passing through one of said apertures, spring means around each said further adjustment screw acting between said transverse flange and a second limb of a bridge element.

14. A unit according to claim 13 in which said spring means acting between said bars comprises a pair of ten-

sion springs and in which said adjustment bar is disposed below said carrier member.

15. A combined bridge and tremolo unit for a stringed musical instrument, such as a guitar, having a body and a plurality of springs, comprising a bridge unit, a tremolo unit, a base common to said bridge unit and said tremolo unit and adapted to be attached to the body of a said instrument, said tremolo unit including a spindle adapted for anchoringly securing one end of each of the strings, bearing means for journalling said spindle to said base, torque applying means acting between said base and said spindle for urging said spindle in one direction of angular displacement, and manually operable means for angularly displacing said spindle, said bridge unit including a carrier member, said carrier member having upturned flanged sides, two pairs of ball races carried by said base, one at each side thereof for engaging said flanged sides of said carrier member, said ball races and said flanged sides permitting substantially linear rolling movement of said carrier member relatively to said base in directions towards and away from said spindle whilst restraining relative movement in directions parallel to said spindle, and a plurality of bridge elements on said carrier member each for engagement by an individual string, each bridge element having an upstanding string engaging limb and an outwardly diverging plate secured thereto, each plate being provided with a string receiving aperture in the diverging portion thereof.

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