ELECTRIC GUITAR BRIDGE

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6

INVENTOR

ROBERT C. SCHERER

William H. Breuer, Agent

ATTORNEY
It is an object of the invention to provide a novel and economical pivotable transducer bridge for an electric guitar.

As a further feature of the invention, the transducer system of the invention is provided with string bearing elements which are adjustable in the direction of string length, individually for each string, to compensate the individual guitar for the differences from true pitch which ensue when the strings are stopped to short lengths, as a function of mechanical parameters of the string, such as density, thickness, etc.

The above and still further objects, features and advantages of the present invention will become apparent upon consideration of the following detailed description of one specific embodiment thereof, especially when taken in conjunction with the accompanying drawings, wherein:

FIGURE 1 is a view in perspective of a guitar embodying the present invention;

FIGURE 2 is a view in perspective of a bridge transducer and mounting according to one embodiment of the invention;

FIGURE 3 is a view in transverse section taken on the line 3—3 of FIGURE 2;

FIGURE 4 is a further view in transverse section taken on the line 4—4 of FIGURE 2;

FIGURE 5 is a view in plan of a modified form of the transducer of FIGURE 2; and

FIGURE 6 is a view in transverse section taken on the line 6—6 of FIGURE 5.

Referring now to the accompanying drawings, 10 is an elongated extrusion, which may be made of aluminum, brass, or the like, and which has a U shape when taken in cross section. Arm 11 of the U is a base arm, and contains holes 11a adjacent to its ends, which are located symmetrically of the width of the base 11, and serve for pivotably supporting the base on nuts 12 threadedly engaging two threaded pins 13. The further or upper arm 14 of the extrusion is provided with two slots 15, which extend into the end wall 16, of the U, and form plural cantilever arms 14a. An inverted V-shaped riser 17 is provided near the forward edge of each arm 14a, which has a transverse notch 18 cut at its center. The notches 18 serve to locate guitar strings S.

The cantilever arms form individual supports for the strings, which are acoustically largely isolated from one another by the slots 15.

Located under each cantilever arm 14a is a piezo-electric crystal 20, having one wall in contact with the under side of the arm 14a. Under the crystals is a strip of thin shim stock 21 slotted at 31a, under each of slots 15. Under each strip of shim stock 21, is a strip 22, of insulation, which is resilient mechanically and which damps acoustic vibrations. Underlying the strip 22, is a further strip of shim stock 23. Strip 23 thus forms one electrode for all of crystals 20, and strip 23, grounded to the extrusion, forms the other electrode. Leads 25 are connected to strips 21 and 23.

A base plate 27 underlies the base 11. From the base plate 27 extend the threaded pins 13, which are located to mate with holes 11a and to extend freely therethrough. On the pins 13, are threadedly engaged knurled thumb nuts 12, having central tapered risers 28 which serve as balls to engage the holes 11a, and to permit pivotal movement of the base plate 11 with respect to base plate 27. Adjustment of thumb nuts 12 vertically permits leveling of the bridge transducer as a whole, and adjustment of its vertical position with respect to the body of the guitar.

In the system of FIGURES 5 and 6, an elongated extrusion 30 is employed, which is in the system of FIGURE 1, and integrally includes a base arm 31, a string support arm 32 and a joining element 32a for the arms. The lengthwise edges 33 of the extrusion are cut at an angle of about 84° to the end edges 34. The support arm 32 is provided with grooves
35 in pairs, defining a cantilever arm 35a each containing a central land 36. The grooves 35 extend parallel to the end edges 34, and for the entire width of the support arm 32 and well into joining element 32a. On the cantilever arms 35a, guided by lands 36, slide string supports 37, each consisting of a transverse raised member 38 and a pair of arms 39, 40 extending from the transverse raised member 38 at right angles thereto. The arms 39, 40 snugly fit the sides of the land 36 and are slidable therein, while the transverse raised member 38 straddles and slides on land 36. As illustrated in FIGURE 6, a string 40 of a guitar is located in a notch 41 cut centrally of the transverse raised member 38. Each pair of arms, as 39, 40, is held in position, once it has been properly located by a bolt 42, which threadedly engages a threaded opening in the land 36. The bolts, having wide heads 43 which extend over the arms 39, 40, lock these in place when the bolt is tightened.

Crystals and electrodes therefor are located and function as in the system of FIGURE 1. The 84° angle which the lengthwise edges 33 make with the directions of the guitar strings, and the adjustability of the string supports of the lever arms, enable the adjustment of the bridge string termination such that the string plays in tune over its entire playable range, regardless of its physical parameters pertaining to oscillatory frequency.

It is a feature of the present invention that the guitar may utilize metallic or non-metallic strings, i.e., nylon or steel, throughout or in part, without effect on tonal output, insofar as this effect may be due to the transducer. The use of acoustic damping material 22 is particularly important because it serves to damp out undesirable highs, as clicks, pops, finger noise and the like, and also serves to acoustically isolate the crystals 20 from one another.

While I have described and illustrated one specific embodiment of my invention, it will be clear that variation of the details of construction which are specifically illustrated and described may be resorted to without departing from the true spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. In a transducer bridge for a stringed instrument, a member having a flat base, a plurality of cantilever arms extending parallel to said base, each of said cantilever arms including a string locating element, a piezo-electric crystal located intermediate each of said cantilever arms and said flat base, and in contact with said cantilever arms, a layer of electrically conductive material underlying and in contact with said piezo-electric crystals, an electrical and acoustic insulating layer underlying said layer of electrically conductive material, and a layer of electrically conductive material underlying said electrical and acoustic insulating layer and in contact with said base.

2. The combination according to claim 1 wherein is provided an adjustable spacer supporting said base, said spacer including two threaded pins, said base including two holes, said pins extending freely through said holes, and nuts threadedly engaging said threaded pins, each of said nuts including a tapered riser pivotably engaging an edge of one of each hole.

3. The combination according to claim 1 wherein said string locating elements are elements slidably adjustable with respect to said base in the direction of the strings of said guitar.

4. The combination according to claim 2 wherein said string locating elements are slidably adjustable with respect to the base in the direction of the strings of said guitar.

5. In a transducer bridge for a stringed instrument, a base, means supporting said base on said stringed instrument, a plurality of discrete cantilever arms secured to said base in string supporting relation, each of said cantilever arms including a string locating element, a separate piezo-electrical element located in vibration receiving relation to each of said cantilever arms, and means for deriving voltages from said piezo-electric elements which are developed in response to vibrations of said strings and are communicated to said piezo-electrical elements via said cantilever arms.

6. The combination according to claim 5 wherein said piezo-electric elements each has two faces, one of said faces being subjected to vibrations provided by said cantilever arms, and means for substantially isolating the other of said faces from vibrations of said base, said other of said faces being supported against said base.

7. The combination according to claim 6 wherein said last means includes a layer of electric and acoustic insulating layer underlying said other of said faces.

8. The combination according to claim 5 wherein is provided an adjustable spacer supporting said base, said spacer including two threaded pins, said base including two holes, said pins extending freely through said holes, and nuts threadedly engaging said threaded pins, each of said nuts including a tapered riser pivotably engaging an edge of one of each hole.

9. The combination according to claim 5 wherein said string locating elements are elements slidably adjustable with respect to said base in the direction of the strings of said guitar.

10. The combination according to claim 8 wherein said string locating elements are slidably adjustable with respect to the base in the direction of the strings of said guitar.

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J. D. MILLER, Primary Examiner.