United States Patent [19]

Lashley

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[54] **STRING MOUNTING AND ADJUSTMENT FOR STEEL GUITARS**

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[52] **U.S. Cl.** **84/312**

[51] **Int. Cl.** **G01d 3/14**

[58] **Field of Search** 84/312, 297

[56] **References Cited**

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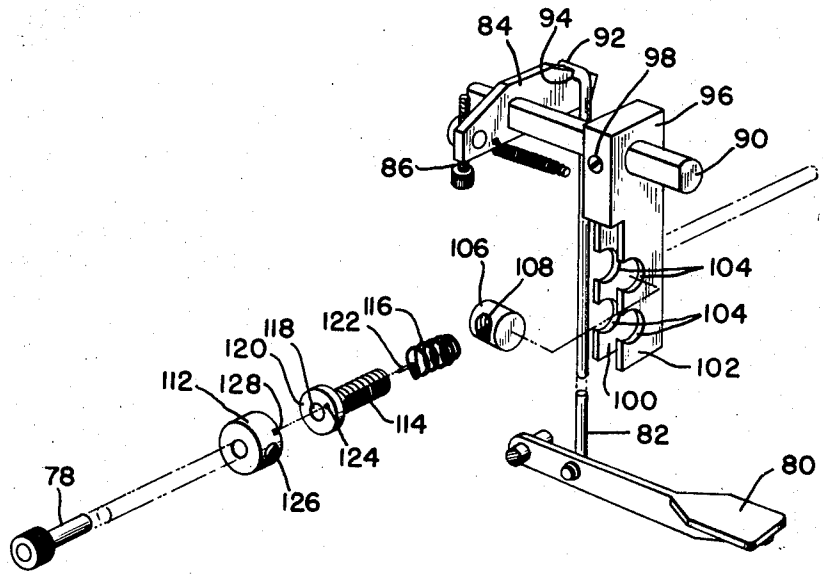
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Attorney—David Rabin

[57] **ABSTRACT**

The tension of each string of a musical instrument is adjusted by means of a member which is supported by and slidably displaceable relative to a pivotable lever over which the string passes. The movement of the pivotable lever can be varied by rotation of an elongated rod which projects from the frame of the instrument for actuation of the foot pedal.

6 Claims, 5 Drawing Figures



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SHEET 1 OF 2

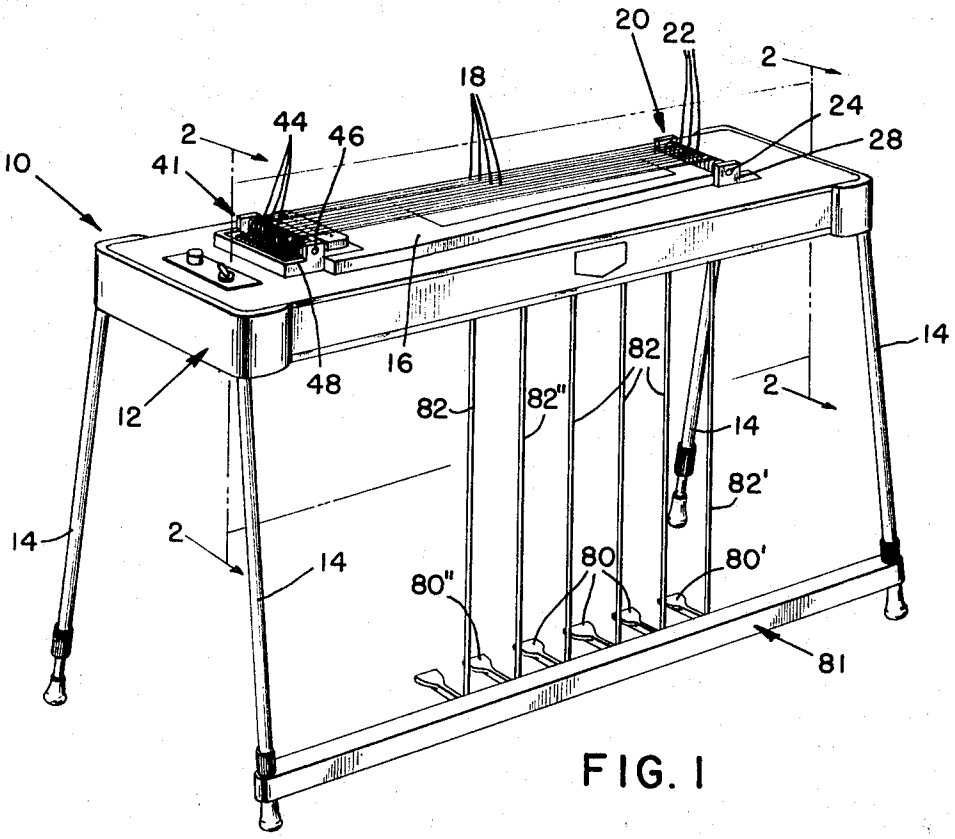


FIG. 1

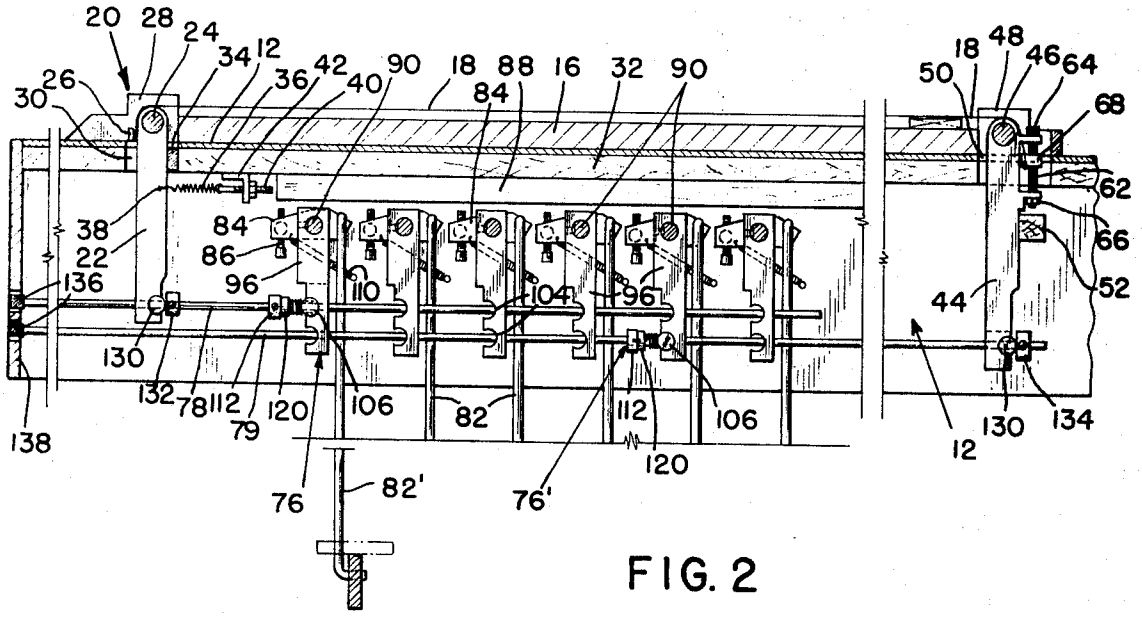


FIG. 2

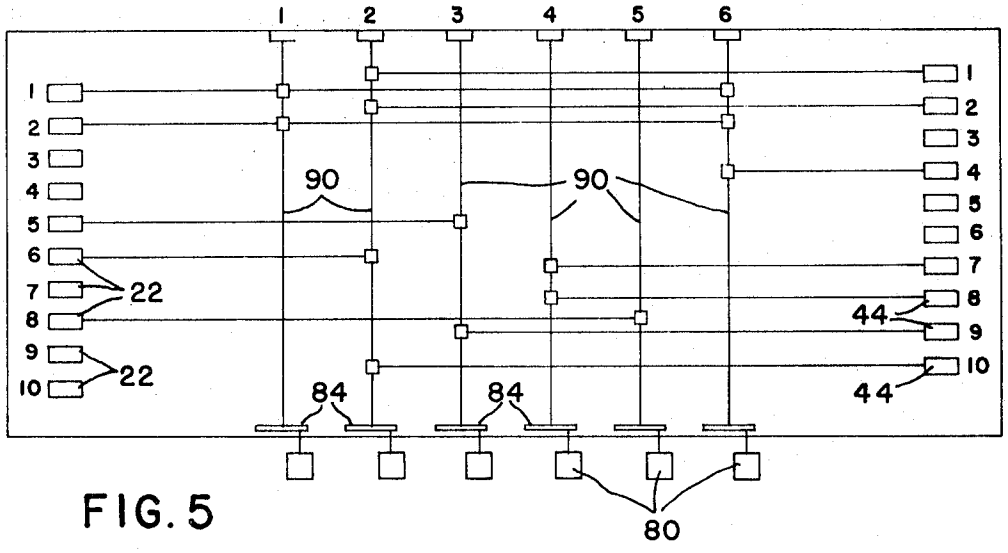


FIG. 5

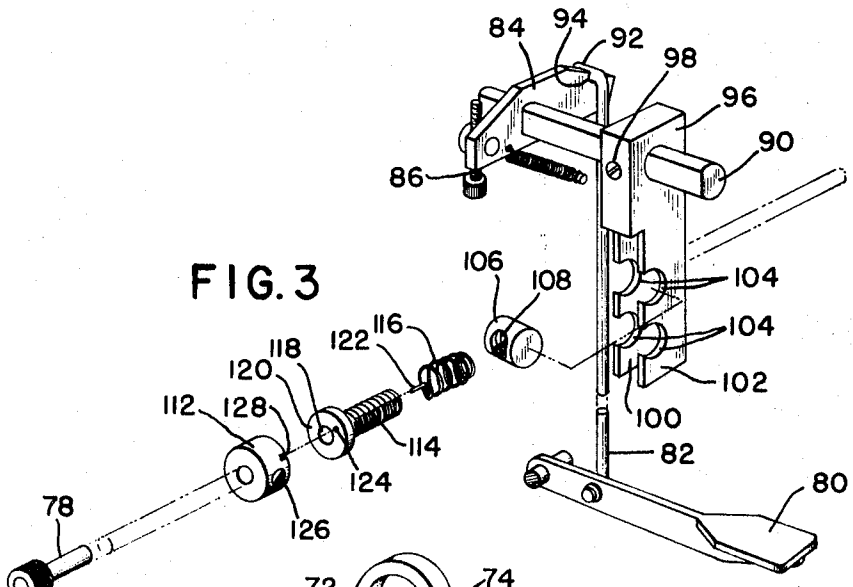


FIG. 3

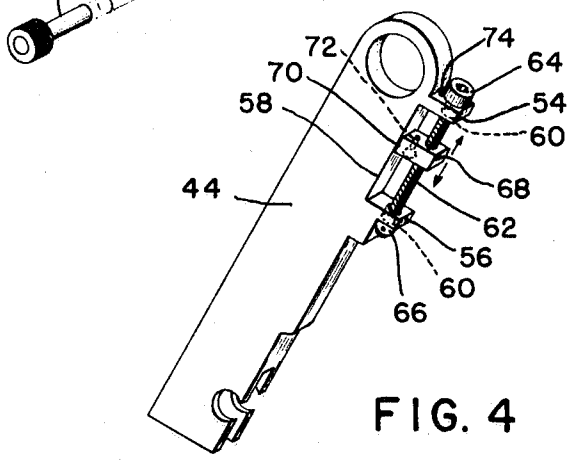


FIG. 4

STRING MOUNTING AND ADJUSTMENT FOR STEEL GUITARS

BRIEF SUMMARY AND OBJECTS OF THE INVENTION

This invention generally relates to electric guitars and more particularly to the mounting and adjustment of the strings of a pedal guitar.

In many conventional electric guitars the strings extend from the bridge, over the nut and to an open tuner. The excess string length between the nut and the open tuner is undesirable since it tends to dampen the string when it vibrates and the longer string length requires more pedal travel to tighten the string to a given frequency.

The present invention provides a steel pedal guitar wherein the strings are suspended between two points. Each string extends between and secured to two pivotable levers. Normally, at least one of the levers is pivotably displaced by a pedal means to vary the tension of the string. Furthermore, the displacement of the lever may be varied to change the pitch or tone of the string upon actuation of the pedal by means of an elongated rod which has an end portion projecting through the frame of the instrument.

The string may be initially tensioned by a slide member which is secured to one of the pivotable levers and is adapted to be longitudinally displaced relative to the lever upon rotation of a screw assembly.

One of the primary objects of the invention is the provision of a stringed musical instrument having a novel tuning and anchoring means for the strings.

Another object of the invention is the provision of s string tensioning means which may be readily altered to vary the string tension.

A further object of the invention is to eliminate excessive string length between the nut and open tuner of conventional guitars thus giving improved tonal quality and sustain.

Still another object of the invention is the provision of a means actuated in response to depression of a pedal for varying the tone of a string.

Other objects and advantages of the invention will become apparent when considered in view of the following detailed description.

BRIEF DESCRIPTION OF THE FIGURES

FIG. 1 is a perspective view of an electric steel guitar incorporating the string mounting and tuning means;

FIG. 2 is an enlarged, fragmentary view of the guitar taken along line 2—2 of FIG. 1 and illustrating the various linkages and assemblies interconnecting the pedals and the string mounting levers;

FIG. 3 is an exploded perspective view of an assembly for varying the string tension upon actuation of a foot pedal;

FIG. 4 is an enlarged perspective view of a string mounting and tension adjusting lever; and

FIG. 5 is a schematic view illustrating a typical example of the linkage connections between the pedals and the string mounting levers.

DETAILED DESCRIPTION OF THE INVENTION

Referring to the drawing and particularly to FIG. 1, the musical instrument 10 includes an elongated rectangular metal frame 12 supported in a horizontal plane by four adjustable legs 14. The frame 12 carries a board 16 over which is stretched a series of parallel strings 18.

At one end of the board 16 is a string supporting assembly 20 which includes a plurality of levers 22 mounted in parallel relation for pivotable movement about a shaft 24, one lever 22 being provided for each string 18. One end of each string 18 is secured to a lever 22 by an adjustable pre-tensioning peg 26 mounted for rotation in one direction in the lever for tensioning the string. The shaft 24 is supported by a block or bracket 28 and the levers 22 depend thereform, as shown by FIG. 2, and extend through an opening 30 in the frame 12 and a board 32 mounted within the frame.

The levers 22 normally are urged into abutting relation with the end portion 34 of board 32, as shown by FIG. 2, by a series of springs 36, one spring being provided for each lever 22. Each spring 36 has one end secured to a lever 22, at 38, and the other end connected to a rod member 40 adjustably mounted upon a bracket 42 secured underneath the board 32.

At the other end of the board 16 is a string supporting and tuning assembly 41 including a series of string tensioning levers 44, each lever 44 having one end of a string adjustably fastened thereto. The levers 44 are mounted in spaced, parallel relation upon a shaft 46 which is supported by bracket assembly 48. The levers 44 depend from shaft 46 and extend through an opening 50 in the frame 12 and board 32. A stop member 52, which may be in the form of a wooden block or other suitable means secured to frame 12, normally limits counterclockwise pivotable movement of the levers 44, as shown by FIG. 2.

Referring to FIG. 4, each string tensioning lever 44 includes spaced flanges 54 and 56 having a slide surface 58 provided therebetween. The flanges 54, 56 have openings 60 therein for receiving an elongated screw member 62. The screw 62 is loosely received within openings 60 and is retained on the flanges by a head portion 64 and a member 66 secured to the lower end of the screw.

Threadably received on the screw 62 is a member 68 which has a portion 70 for slidably engaging the surface 58. Rotation of the screw 62 moves the slide member 68 intermediate the flanges 54, 56, as shown by FIG. 4. The slide member 68 has a recess 72 therein for receiving an end portion of a string 18. An enlarged cylindrical member on the end of the string prevents the string from sliding through the recess 72. An opening 74 permits the end portion of a string to pass through the flange 54.

It is to be noted that the upper end portions of both levers 22 and string tensioning levers 44 are rounded, as shown by FIGS. 2 and 4. Since each string extends from a peg 26 on one lever 22 over the top of the lever 22 and over the top of lever 44 before being attached to slide 68, it can be seen that each string is suspended between points on the levers 22 and 44. To tune a string 18, the corresponding screw 62 is rotated to loosen or tighten the string by moving the slide member 68 upwardly or downwardly relative to the lever 44. Adjustment of the screw 62 sets the tuning of the string by increasing or relaxing the tension on the string. It is to be understood that all strings are properly tuned individually in this manner. The particular number of strings on the guitar may vary.

The strings 18 may be initially pretensioned by rotating the pegs 26 having end portions of the strings wrapped thereabout.

The levers 22 and 44 are adapted to be pivoted slightly by a tone changing mechanism 76 to change the pitch of the strings when plucked. The tone changing mechanism 76 includes a series of actuating rods 78, 79, which displaces the levers 22 and/or 44 in response to actuation of pedals 80 and pedal connecting rods 82. The pedals are pivotally mounted on a beam assembly 81 which extends between two of the legs 14.

Referring to FIGS. 2 and 3, one tone changing mechanism 76 will be described in detail. Upon actuation of foot pedal 80', the pedal connecting rod 82' is displaced downwardly thereby pivoting a rocker arm 84 until the adjustable stop screw 86 abuts a stop member 88 fixed beneath the board 32. The rocker arm 84 is secured to a support shaft 90 which is pivotably mounted on the frame 12. The upper end 92 of the pedal connecting rod 82 is bent, as shown by FIG. 3, to fit into a recess 94 formed within the rocker arm 84. A linkage 96, which is secured by a set screw 98 for rotation of the support shaft 90, includes spaced, parallel depending leg portions 100, 102. The leg portions 100, 102 are spaced sufficiently to receive actuating rod 78 therebetween. The leg portions are provided with pairs of recesses 104 for receiving and retaining cylindrical members 106 therein. The cylindrical member 106 permits pivotable displacement of the link 96 relative to the actuating rod 78.

The cylindrical member 106 has a bore 108 for threadably receiving an adjusting screw 114. The screw 114 has an enlarged bore 118 for loosely receiving a rod 78. Positioned between the screw head 120 and the cylindrical member 106 is a coil spring 116, one end 122 of the spring passing through a small opening 124 in the screw head 120.

The rod 78 also passes through a collar 112 which is fastened thereto by a set screw 126. The collar 112 has a notch or recess 128 therein for receiving the end 122 of coil spring 116 when the collar 112 and screw head 120 are urged into contact with each other. The coil spring 116 and end 112 and collar recess 128 serve as a clutch to impart rotation of the rod 78 to the screw 114. Rotation of screw 114 changes the angular relationship of the linkage 96.

The lower end portions of the levers 22 and 44 are slotted, and provided with recesses for receiving cylindrical members 130, similar to the member 106 previously described. The rod 78 passes through the slotted lever and is loosely received within a bore provided in the cylindrical member 130. A collar 132 is fixed to rods 78 in abutting relation with the cylindrical member 120 of lever 22, as shown by FIG. 2, and collar 134 is fixed to the rod 79 in abutting relation with the cylindrical member 130 of the finger 44.

The link 96 and rocker arm 84 normally are biased in a counterclockwise direction by a spring 110 which extends between the rocker arm 84 and the side wall of frame 12. The connecting rod 82 and the foot pedal 80 limit counterclockwise movement of the rocker arm and link 96 beyond the position shown by FIG. 2.

It is to be noted that the rods 78 and 79 have knurled end portions 136 which are flush with the end wall 138 of frame 12. However, upon actuation of a preselected pedal 80 one or more predesignated rods 78 or 79 are urged to the left, FIG. 2, such that the knurled portion 136 extends outwardly of the frame wall 138 thereby permitting adjustment of the tone of the string 18 upon rotation of the rod 78 or 79.

In operation of the instrument, the strings are initially pre-tensioned by securing one end of each string to a slide member 68 while the other end is wound around an adjusting peg 26. The strings are then tuned by turning the screw 62 to move the slide member 68 along the levers 44.

The tone of the strings cn be varied when plucked by actuating preselected pedals. For example, depressing pedal 80' pulls pedal connecting rod 82' downwardly thereby pivoting the linkage 96 in rocker arm 84 clockwise until the stop screw 86 abuts the stop member 88. Pivotable movement of linkage 96 to the left, FIG. 2, through the screw head 120 moves collar 112 and actuating rod 78 to the left. Since the collar 132, which also is fixed to rod 78, abuts cylindrical member 130, the lever 22 is pivoted counterclockwise about shaft 24 a preselected amount thus loosening a string 18 to change the tone thereof.

When it is desired to adjust the movement imparted to the lever 22 by the rod 78, the pedal 80' is depressed which displaces the rod 78 to the left, projecting the knurled end 136 outwardly of the frame end wall 138. Upon actuation of the rod 78 the end 122 of spring 116 projects beyond the opening 124 in screw head 120 and engages the recess 128 in collar 112. Thus, rotation of rod 78 imparts rotation to screw 114 which is adjusted relative to the linkage 96 in the collar 112. Therefore, the variation of screw 114 varies the distance the rod 78 and collars 112, 132 move to impart movement to the lever 22.

The degree of movement of levers 44 can be varied in a similar manner. For example, upon actuation of pedal 80'' and connecting rod 82'', the rod 79 is moved to the left, FIG. 2, and the collar 134 urges the lever 44 in a clockwise direction about shaft 46 to vary the tone of the string.

The particular number of strings, and levers as well as the number of pedals may vary. As shown by the example of FIG. 5, one pedal may actuate a plurality of levers.

I claim:

1. In combination with a musical instrument having a string, means for mounting and controlling the tension of said string comprising a string supporting assembly provided at one end of the instrument and a string supporting and tensioning assembly provided at the other end of the instrument, each of said assemblies including an elongated displaceable lever having an arcuate portion over which the string passes, means for adjustably securing the ends of said string to the displaceable levers, means for adjustably displacing at least one of said levers to selectively vary the tension of said string, said displacing means including at least one elongated, axially displaceable and rotatable rod, a manually actuated pivotable linkage, and means for selectively coupling said rod and said pivotable linkage for displacing said linkage upon axial displacement and rotation of said rod for selectively controlling displacement of said at least one lever and consequently the tone of the string.

2. In combination with a musical instrument as recited in claim 1, said displacing means further including pedal means for displacing said pivotable linkage and said elongated rod.

3. In combination with a musical instrument as recited in claim 1, said displacing means further including pedal means connected to said pivotable linkage, said coupling means defining a clutch arrangement including a stop collar secured to said rod, a screw member threadably secured to said linkage and means adapted to transmit rotation of said rod and stop collar to said screw member for displacing said linkage.

4. In combination with a musical instrument as recited in claim 1, said means for adjustably securing the ends of said string to the displaceable lever including means on one of said levers for retaining and pretensioning the string, the other of said displaceable levers having a slidable member in engagement therewith and displaceable therealong, said slidable member having an end of the string attached thereto, and means supported by said other end and threadably engaging said slidable member for displacing said slidable member along said other lever to change the tension of said string.

5. In combination with a musical instrument as recited in claim 3, said clutch arrangement further including a recess formed within said stop collar and said means adapted to transmit rotation of said rod to said screw comprising a coil spring member surrounding said screw and having an end portion passing through said screw and adapted to be received within said collar recess.

6. In combination with a musical instrument as recited in claim 2, and further including a frame for supporting said string supporting assembly and said string supporting and tensioning assembly, said frame including at least one end wall defining at least one opening therein, one end of said elongated rod normally being positioned flush with said end wall, and protruding exteriorally of said frame.

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