United States Patent

Labbe

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[54] TUNING FORK FOR ELECTRICALLY AMPLIFIED STRING INSTRUMENTS

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[52] **U.S. Cl.** **84/1.01,** 84/1.06, 84/1.14, 84/1.15, 84/1.16, 84/DIG. 18, 84/457

[51] **Int. Cl.** **G10h 1/00**

[58] **Field of Search** 84/1.14–1.16, 454, 84/458, 457, 267, 200–208

[56] **References Cited**

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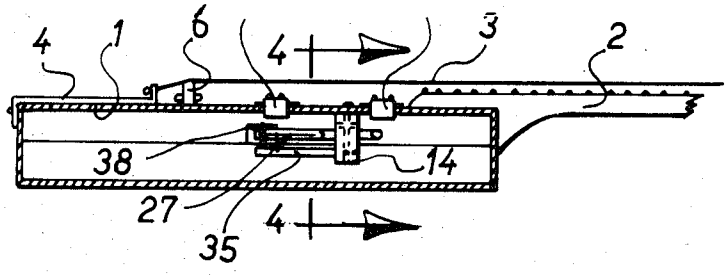
104,324	6/1870	Knox	84/457
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[57] **ABSTRACT**

A tuning fork is mounted inside the body of an electric guitar or the like electric string instrument, adjacent a microphone thereof and manual means are provided to set the tuning fork in vibration. The sound emitted thereby is amplified by the sound amplifying system of the musical instrument, so as to be clearly audible by the musician, even when exposed to noise or sounds of other instruments in an orchestra or other music ensemble. The tuning of the instrument is therefore much facilitated. The sound emitted by the tuning fork can be easily adjusted as to its volume. The tuning fork can be stopped from vibrating. The assembly can be mounted in any existing type of electric guitars, mandolins, banjos, violins and the like electronically sound amplified string instruments having a microphone underneath the strings and mounted in the sound board.

11 Claims, 9 Drawing Figures



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2 Sheets-Sheet 1

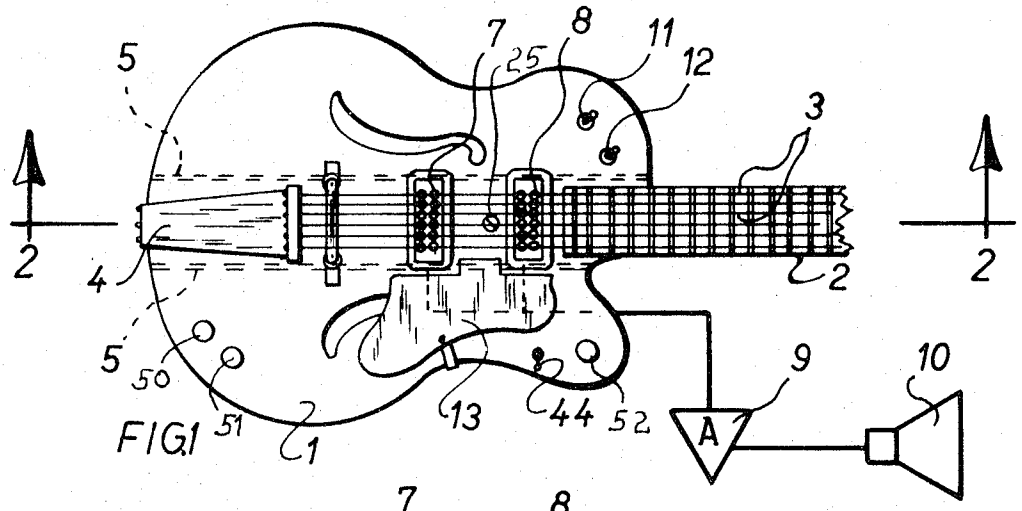


FIG.1

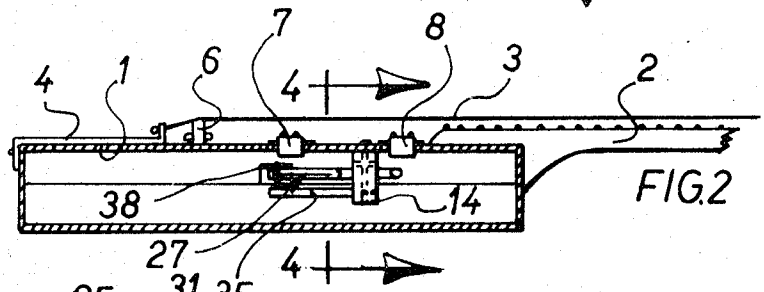


FIG.2

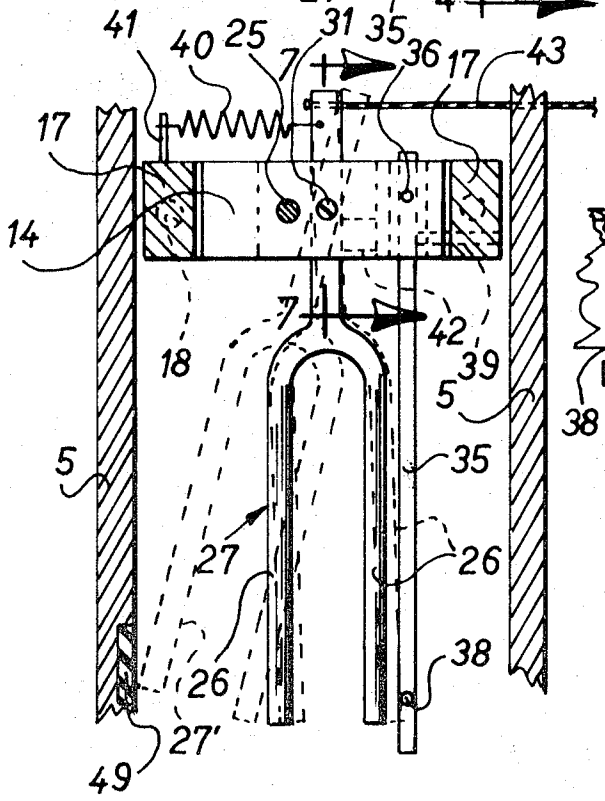


FIG.3

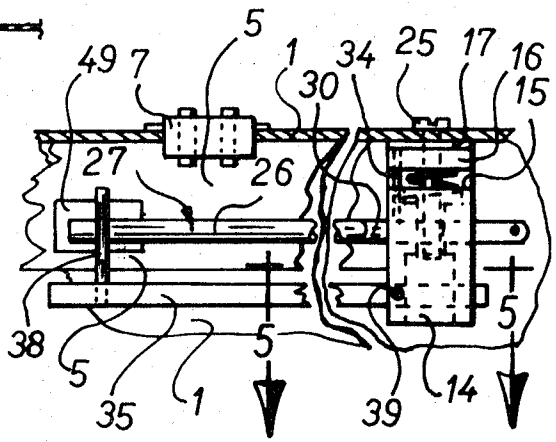


FIG.2a

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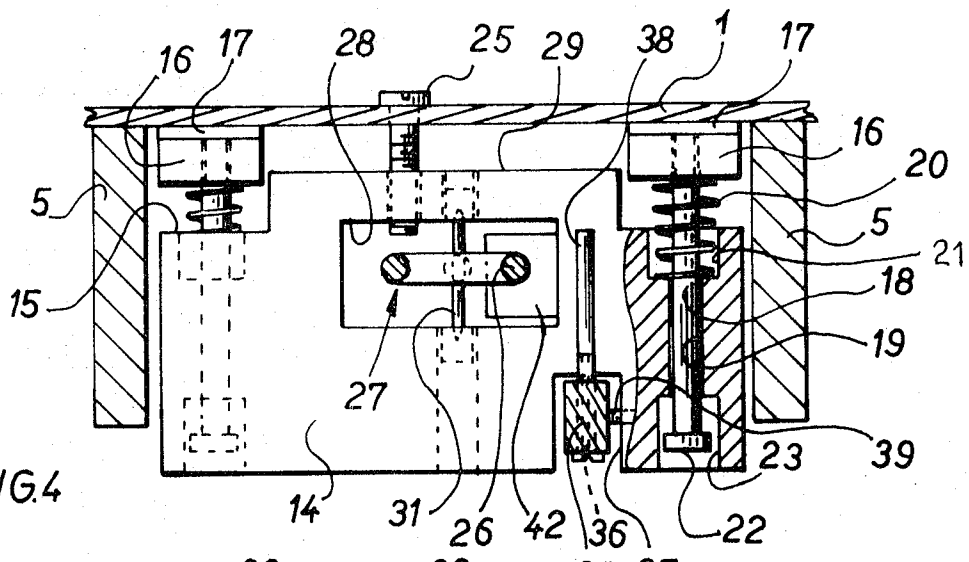


FIG.4

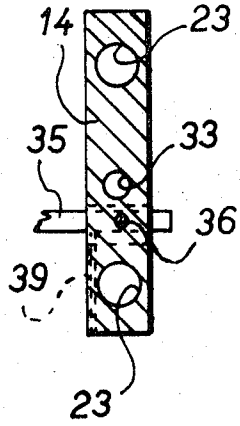


FIG.5

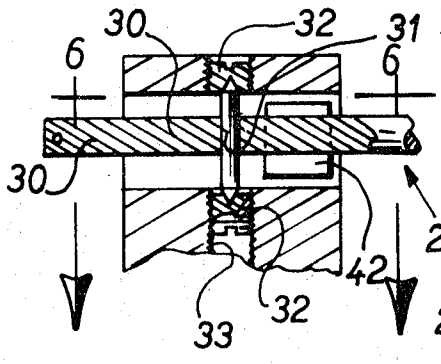


FIG.7

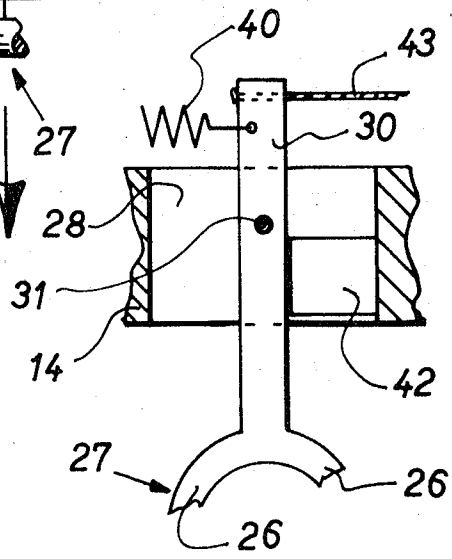


FIG.6

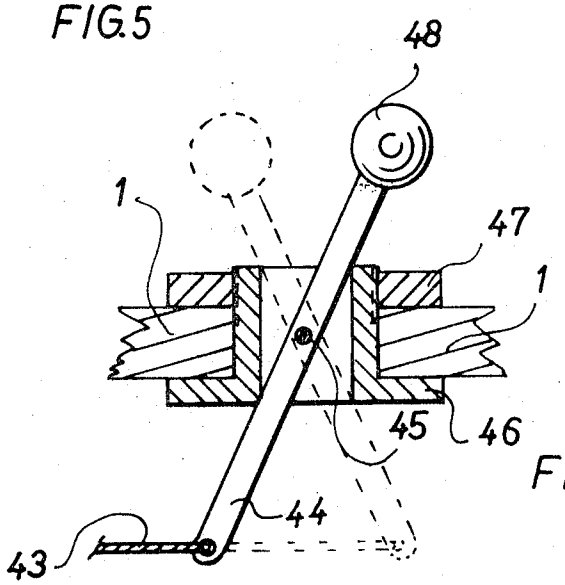


FIG.8

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TUNING FORK FOR ELECTRICALLY AMPLIFIED STRING INSTRUMENTS

The present invention relates to a tuning fork system and, more particularly, to such a system in combination with an electronically amplified string instrument, such as an electric guitar, mandolin, banjo, bass guitar, violin and the like.

It is known to mount a tuning fork on a string instrument (see for instance U.S. Pat. No. 416,756 of Dec. 10, 1899 to Schuster), so that the musician has a conveniently accessible tuning fork which may quickly set up into vibration to be able to tune the strings of his instrument. However, the sound emitted by the tuning fork is not any louder than the sound emitted by a hand-held tuning fork. When the musician plays in an orchestra or other musical ensemble and every musician tries to tune his instrument at the same time, or when the musician tries to tune his instrument in an area with loud background noise, he hardly can hear the tuning fork and it is very difficult for him to properly tune his instrument.

A variety of electrically amplified string instruments are now in use, such as the electric guitar, electric banjo, etc., each having its own sound amplifying system.

In accordance with the invention, advantage is taken of this sound amplifying system to amplify the sound of the tuning fork as well as the sound of the strings for emitting a loud enough tuning sound for the musician to easily and properly tune his instrument, even when there is loud background noise.

It is therefore the general object of the present invention to provide an electric string instrument having a pick-up microphone on the sound board, with a tuning fork system disposed inside the instrument adjacent the microphone, the tuning fork being provided with manually operated means to set up the same in vibration, its vibrations being picked up by the microphone and amplified by the instrument own sound amplifying system.

Another object of the invention resides in the provision of a tuning fork system of the character described, which is adjustable so that the relative volume of the sound emitted by the tuning fork and the sound emitted by the strings, can be made more or less equal in accordance with the musician's desire.

Another object of the invention resides in the provision of a tuning fork system of the character described, in which the sound emitted by the tuning fork can be stopped any time the musician wishes to do so.

Another object of the invention resides in the provision of a tuning fork system of the character described, adapted to be fitted in electric string instruments of known constructions and of various types.

The foregoing and other objects of the invention will become more apparent during the following disclosure and by referring to the drawings, in which:

FIG. 1 is a partial top plan view of an electric guitar provided with the tuning fork system of the invention;

FIG. 2 is a longitudinal section of the guitar along line 2—2 of FIG. 1;

FIG. 2*a* is a partial longitudinal section, on an enlarged scale, similar to that of FIG. 2, showing the tuning fork assembly;

FIG. 3 is a top plan view, partially in section, of the tuning fork assembly;

FIG. 4 is a cross-section of the tuning fork assembly and of the guitar sound board and taken along line 4—4 of FIG. 2;

FIG. 5 is a plan section along line 5—5 of FIG. 2*a*;

FIG. 6 is a plan section of the support block in the region of the pivotal mounting of the tuning fork, taken on line 6—6 of FIG. 7;

FIG. 7 is a partial longitudinal section showing the pivot assembly of the tuning fork; and

FIG. 8 is a partial cross-section of the instrument sound board showing the lever system for swinging the tuning fork.

In the drawings, like reference characters indicate like elements throughout.

FIG. 1 shows an electric guitar of the hollow body type and comprising a sound board 1, a finger board 2, strings 3 attached at one end to a tail piece 4 secured to the end of the body, while the other ends of the strings 3 are attached to string keys, not shown, mounted at the outer end of the finger board 2 in conventional manner.

The sound board 1 is reinforced by longitudinally extending reinforcing bars 5, which are spaced and parallel and mounted inside the body and adhered, or otherwise firmly secured, to the inside surface of sound board 1.

The guitar is provided with a sound amplifying system including two conventional pick-ups or microphones 7 and 8 mounted in the sound board 1 extending above and below the same and disposed just underneath the strings 3 to normally pick up the sound emitted by said strings and send it to the input of an amplifier 9, the output of which is connected to one or more loudspeakers 10. Microphones 7 and 8 are sound sensitive at both main faces thereof. Each microphone 7,8 has its own volume control 50,51 which is normally at maximum position. A common volume control 52 is normally the only one manipulated by the musician.

Switches 11 and 12, mounted on the sound board, control the microphones 7 and 8 respectively.

The foregoing is a conventional construction of an electric guitar.

In accordance with the invention, a tuning fork assembly is mounted inside the body of the guitar with the tuning fork adjacent one of the microphones 7 and 8 and, preferably, microphone 7, which is closer to bridge 6.

The guitar is also provided with the usual pick guard 13 mounted on the sound board adjacent the strings 3 on one side thereof.

A rectangular support block 14 is notched at two corners along a common longer side thereof to form two notches 15 for each receiving a pressure block 16 lined at its upper face with a pad or layer 17 of felt or other sound-proofing friction material. Each abutment block has a pin 18 secured thereto, which extends through a through bore 19 made in block 14.

A compression coil spring 20 surrounds each pin 18, abuts at one end against pressure block 16, while its other end rests on the bottom of a cavity 21 made in block 14 and opening in notch 15. Pin 18 has a head 22 at its other end freely movable in a cavity 23 made in block 14. Springs 20 urge abutment blocks 16 upwardly to a limit position in which pin head 24 abuts the bottom of cavities 23.

An adjustment screw 25 is screwed within block 14 and freely extends through the sound board 1. The screw 25 serves to secure the block 14 inside the body of the instrument and its head is accessible between strings 3, so that rotation of the screw will adjust the spacing between the block 14 and the inside surface of sound board 1. The pressure blocks 16 bear against the inside surface of sound board 1 and maintain support block 14 in proper position transversely of the guitar and between the two reinforcing bars 5. Support block 14 is located between the two microphones 7 and 8 in a position such as to locate the tines 26 of a tuning fork 27 opposite microphone 7.

Tuning fork 27 is pivotally carried by support block 14. For this purpose, block 14 has an aperture 28, of generally rectangular shape, and opening at the two main faces of the block and disposed near the top edge 29 of the block. The stem 30 of tuning fork 27 is fitted with a double pointed pivot needle 31, which extends transversely of the stem and is pivotally mounted in the conical cavities of two bearing screws 32 threaded in block 14, one of which is accessible at the top edge 29 of said block, while the other one is accessible through a blind bore 33 opening at the lower end face of the block. Thus, the fork is free to pivot with respect to block 14 in a plane substantially parallel to the plane of the sound board 1.

A guide pin 34 is secured to each pressure block 16, adjacent pin 18 and freely fits a bore of block 14 to prevent rotation of pressure block 16 with respect to support block 14.

A bar 35 is bolted at one end at 36 within a notch 37 made in the lower portion of block 14. This striker bar 35 extends along the tuning fork and at a lower level than the latter and carries at its outer end an upstanding striker pin 38 in the path of the tuning fork when the latter is swung about its pivot axis formed by pivot needle 31 and bearing screws 32. The striker bar 35 extends substantially at right angles to the long axis of block 14, but this angle can be slightly varied. For this purpose, an adjustment abutment screw 39, screwed within the block 14 and accessible from one side thereof, is adapted to engage the striker bar 35 in a position offset from retaining bolt 36.

To adjust the striker bar, bolt 36 is loosened; screw 39 is rotated in the desired direction; and the striker bar is pushed against the screw, and when the desired angular relationship between the striker bar and block 14 is obtained, bolt 36 is again tightened to firmly retain the striker bar in the desired position. Screw 39 is also an abutment for striker bar 35.

The stem 30 of the tuning fork 27 protrudes from the opposite main face of block 14 and is attached to one end of a tension spring 40, the other end of which is attached to a pin 41 secured to block 14. Spring 40 extends away from striker bar 35.

A rubber, or otherwise resilient compressible block 42, is disposed within aperture 28 on the side of the tuning fork stem opposite tension spring 40 and serves to resiliently maintain tuning fork 27 in a rest position substantially parallel to striker bar 35, the spring 40 applying the stem 30 of the tuning fork against block 42. This position of the tuning fork is shown in full line in FIG. 3.

A string 43 is attached to the outer end of the tuning fork stem 30, freely extends underneath a reinforcing bar 5 and is attached to a lever 44 (See FIG. 8 and also FIG. 1), which is pivoted intermediate its ends at 45 to a flanged bushing 46 extending through a hole in the sound board 1 and retained therein by a nut 47 screwed on the threaded bushing 46.

The lever 44 extends through bushing 46 and is provided at its upper end with a knob 48 disposed exteriorly of the musical instrument body to be manually operated so as to pull on string 43. The reinforcing bar 5 of the guitar directly facing tuning fork 27 is provided with a compressible cushion strip 49, preferably embedded in a groove made in said bar, and disposed in the path of the outer end of the tuning fork, when the same is pivoted about its pivot axis upon pulling of string 43. Strip 49 deadens the noise which would be produced by fork 27 hitting bar 5.

The device of the invention is used and operates as follows.

Whenever the musician wants to tune his string instrument, such as a guitar, the sound amplifying system 9,10 and at least microphone 7 operating, he pulls on string 43 by actuating lever 44 by means of its knob 48. This pivots the tuning fork up to a limit position, as shown in dotted line at 27' in FIG. 3, wherein the tuning fork abuts strip 49 carried by a reinforcing bar 5. This also causes tensioning of tension spring 40. Upon release of the lever 44, the tuning fork swings back under the action of spring 40 until it abuts striker pin 38, which causes the tuning fork to vibrate. During pivotal movement of the tuning fork towards the striker pin 38, the compressible block 42 is compressed, and upon the tuning fork hitting the striker pin, the block 42 immediately returns the tuning fork to its rest position shown in full line in FIG. 3. The tuning fork continues to vibrate directly adjacent the microphone 7 and the tuning sound is amplified by amplifier 9 and emitted through loudspeaker 10. If the musician wants to stop the sound emitted by the tuning fork, he simply pulls again on lever 44 until the tuning fork comes to rest against strip 49, thereby stopping the tuning fork from vibrating. He then slowly releases the lever to bring the tuning fork gently to its rest position without hitting striker pin 38. Adjustment of the angular relation of striker bar 35 with block 14 is achieved, as previously described, by manipulating pivot bolt 36 and adjusting screw 39, so as to adjust the force with which the tuning fork will hit striker pin 38 under action of tension spring 40.

Adjustment of the retaining screw 25 will adjustably vary the distance between the tuning fork and the microphone 7, so as to vary the loudness of the sound emitted by the tuning fork through the loudspeaker in relation to the loudness of the sound emitted by the strings 3 through the same loudspeaker. Obviously, the overall sound of the string and of the tuning fork can also be adjusted by the normal volume control 52 on the amplifier 9.

It is preferred to so adjust the spacing of the tuning fork from fork from microphone 7, so that the tuning fork emits a sound of about the same loudness as the sound emitted by the strings.

The tuning device is very easily and simply installed within the body of an electric guitar or the like electric string instrument, such as a mandoline, banjo, bass guitar, violin and the like. The device is small enough to easily fit between the usual reinforcing bars 5, so that the tuning fork may be arranged very close to the microphone. When the instrument is provided with only one microphone, usually the microphone 8 is used. In such an instrument, the position of the device is simply reversed relative to the position shown in the drawings, so that the tuning fork will be directed towards the finger board with the outer end of the tuning fork disposed adjacent the microphone 8.

What I claim is:

1. In combination with a string instrument having a body with a sound board, strings extending over said sound board and an electronic sound amplifying system including a microphone mounted in said sound board and extending through the same, a tuning device for said musical instrument comprising a support located under said sound board, means to secure said support to said sound board, a tuning fork supported by said support in a position adjacent said microphone, and manually operated means accessible at the exterior of said instrument to cause vibration of said tuning fork producing a tuning sound picked up by the microphone and amplified by the sound amplifying system.

2. The combination of claim 1, wherein said tuning fork is pivotally carried by said support for swinging movement across said microphone in a plane substantially parallel to said sound board, said means to produce vibration of said tuning fork including a bar secured to said support and extending along said tuning fork and having a portion in the path of the swinging movement of said tuning fork and string means attached to said tuning fork to swing said tuning fork about its pivot axis, whereby the latter will strike said striker bar portions to vibrate.

3. The combination as claimed in claim 2, wherein said string means exert, when pulled, swinging movement of said tuning fork in a direction away from said striker bar abutting portion and further including spring means attached to said tuning fork and to said support and swinging said tuning fork towards said striker bar portion upon release of said string means.

4. The combination as claimed in claim 3, further including resilient compressible means carried by said support in the path of the tuning fork and compressed by said tuning fork when the same swings towards said striker bar portion under action of said spring means, to thereby return said tuning fork to a position spaced from said striker bar portion, against the action of said spring means.

5. The combination of claim 4, further including adjustment means to vary the position of said support towards and away from said sound board, so as to vary the spacing between said tuning fork and said microphone.

6. The combination of claim 5, wherein said adjustment means include a screw extending through said sound board and threaded within said support, whereby rotation of said screw moves said support towards or away from said sound board, said screw further constituting said means to secure said support to said sound board.

7. The combination of claim 6, further including spring-loaded pressure blocks carried by said support and frictionally engaging said sound board and disposed on each side of said

screw to exert a resilient force on said support tending to move the same away from said sound board.

8. The combination of claim 7, further including means to adjust the angular relationship of said striker bar with said support.

9. The combination of claim 4, further including cushion means carried by said instrument and located in the path of the swinging movement of the tuning fork in a direction away from said striker bar portion to limit said tuning fork swinging movement and also to stop vibration of said tuning fork when the latter is caused to rest on said cushion means.

10. The combination as claimed in claim 9, wherein said instrument has spaced parallel longitudinally extending reinforcing bars applied to the inside face of said sound board, said support, tuning fork and striker bar disposed between said reinforcing bars, one of said reinforcing bars carrying said cushion means.

11. The combination of claim 7, wherein said string means include a string attached at one end to said tuning fork, a lever pivotally mounted on said instrument having a portion accessible externally of said instrument and the other end extending within said instrument, the other end of said string being attached to said lever other end.

* * * * *