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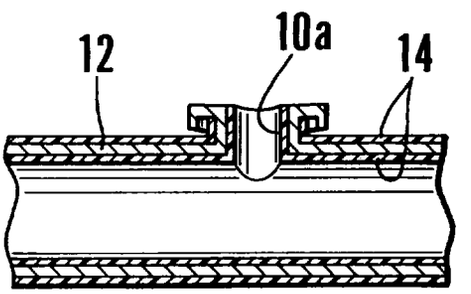
(54) A method for improving the resonance of a musical instrument, and a musical instrument made by the method

(57) There is provided a method of improving a resonance of a sounding board (12) of a musical instrument (10) by coating a surface of the sound board with a lubricant (14) wherein after application, said lubricant (14) is dried on said surface (12) to form a temporary or permanent resonance layer (14) on said sounding board surface (12). Also provided is a musical instrument comprising a temporary or permanent resonance layer (14) formed from a lubricant on an inner and/or outer surface of the sounding board (12) of said instrument (10).

FIG. 2



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Description

This invention relates to a method of improving the resonance of a musical instrument, and the musical instrument made by the method.

The tone quality and the volume of a musical instrument depend on the material from which it is made and processing.

A player usually tries to improve his performance on a musical instrument by improving his technical skill as much as possible.

It has been understood in the history of a musical instrument that it must be made of a single material only such as metal, wood, bamboo or plastic, and tone quality produced by each material dictates the character of the musical instrument.

A wind instrument having a layer made of carbon fiber reinforced resin which is adhered to an inner periphery of its pipe has been proposed, see for example, the Japanese Utility Model Publication No. 65692 1987 (not examined).

It is described in the specification of Japenese Utility Model Publication No. 65692, page 2, lines 6-9 that carbon fiber having a better vibration attenuation ratio and adhered to an inner periphery of the pipe turns loudness up, improves sharpness and balance, and the tone quality can be improved remarkably in comparison to the wind instrument made of a bamboo or plastic only.

It is also described that the volume may be increased due to the characteristics of carbon fiber.

It is the understanding of this inventor, however, that an increase in volume can not be expected from carbon fiber having a high attenuation ratio.

Although carbon fiber reinforced resin is comparatively light and rigid, it is far more expensive than glass fiber so that the cost of making a musical instrument having a thick layer by laminating a plurality of carbon fiber reinforced resins is very high, and when the musical instrument is molded to have a thick layer, the cost of making the instrument increases inevitably as well.

Musical instruments made of materials other than plastic are produced by laminating a plurality of layers which are made independently, thus increasing the troublesome steps and the cost involved.

Thus viewed from a first aspect, the present invention provides a method of improving the resonance of a sounding board of a musical instrument by coating a surface of the sounding board with a lubricant wherein after application, said lubricant is dried on said surface to form a temporary or permanent resonance layer on said sounding board surface.

Viewed from a second aspect, the present invention provides a musical instrument comprising a temporary or permanent resonance layer formed from a lubricant on an inner and/or outer surface of the sounding board of said instrument.

According to a further aspect, this invention provides a method of improving the resonance of a musical instrument whereby a temporary and/or permanent even resonance layer is formed easily on the sounding board of the musical instrument in order to change the propagation characteristics of the sounding board and also to diminish friction between the even sounding board and the air.

Preferably, there is provided a method of improving resonance of a musical instrument whereby lubricant is sprayed onto the top and/or underside of a sounding board of the musical instrument and dried to form a temporary or permanent even resonance layer on top of and/or under the sounding board.

Alternatively, there is preferably provided a method of improving the resonance of a musical instrument whereby the musical instrument is dipped into lubricant and dried to form a temporary or permanent even resonance layer on and/or under the sounding board of the musical instrument.

Alternatively still, there is provided a method of improving the resonance of a musical instrument whereby lubricant is formed by brushing onto the top and/or underside of a sounding board of the musical instrument to form a temporary or permanent resonance layer on top of and/or under a sounding board of the musical instrument.

Preferred embodiments of the invention will now be described, by way of example only, and with reference to the accompanying drawings, in which:

FIG. 1 is a front elevation of a flute having a sounding board made by the method of this invention;

FIG. 2 is an enlarged sectional view of an embodiment of the breath hole portion of the flute shown in FIG. 1;

FIG. 3 is an enlarged sectional view of a further embodiment of the breath hole portion of the flute shown in FIG. 1;

FIG. 4 is an enlarged sectional view of a still further embodiment of the breath hole portion of the flute shown in FIG. 1;

FIG. 5 is a perspective view of a violin having an improved resonance layer formed integrally on an outer periphery of the sounding board; and

FIG. 6 is an enlarged sectional view of an improved resonance layer of a portion of the violin shown in FIG. 5.

In the accompanying drawings, like numerals designate the like parts throughout the several views thereof.

Figure 1 shows a flute 10 having a breath hole 10a.

As shown in Figure 2, lubricant of silicon solution (not shown) is sprayed at room temperature onto the top and bottom surfaces of a sounding board 12 of a flute 10, and the sprayed lubricant is subjected to drying to form integrally a pair of temporary or permanent resonance layers 14, 14 on top of and underneath the sounding board 12.

In FIG. 3, an alternative embodiment of a flute produced by the method of the invention is shown, wherein silicon lubricant is sprayed at room temperature onto the top surface of a sounding board 12 of a flute 10, and the sprayed lubricant is subjected to drying to form integrally a temporary or permanent even resonance layer 14 on the sounding board 12.

In FIG. 4, a still further embodiment of a flute produced by the method of the invention is shown, wherein silicon lubricant is sprayed at room temperature onto the bottom surface of a sounding board 12 of a flute 10, and the sprayed lubricant is subjected to drying to form integrally a temporary or permanent even resonance layer 14 under the sounding board 12.

Referring to FIGS. 5 and 6 showing an embodiment of a violin 20 produced according to the method of the invention, lubricant of silicon solution is sprayed at room temperature onto the upper surface of a sounding board 22 of a violin 20, and the sprayed lubricant is subjected to drying to form integrally a temporary or permanent even resonance layer 24 on the sounding board 22 of the violin 20.

According to a preferred method of coating the sounding board of a musical instrument, a musical instrument such as a flute 10 is immersed into a solution of silicon lubricant (not shown) to form a temporary or permanent even resonance layer 14 on top of and/or under the sounding board 12 of the flute 10.

According to an alternative method of coating the sounding board of a musical instrument, silicon lubricant is brushed onto the sounding board 12 of the flute 10 to form a temporary or permanent even resonance layer 14 on top of and/or under the sounding board 12 of the flute 10.

In an embodiment of the method, molyodenum disulfide is either sprayed or brushed onto the top and/or underside of a sounding board 12 of a flute 10 at a temperature between 100 degree centigrade and 200 degree centigrade for a time between 30 minutes and 1 hour.

In another embodiment, fluorine is either sprayed or brushed onto the top and/or underside of a sounding board 12 of a flute 10 at a temperature between 100 degree centigrade and 400 degree centigrade for a time between 30 minutes and 1 hour.

In still another embodiment, graphite is either sprayed or brushed onto the top and/or underneath surface of a sounding board 12 of a flute 10 at a temperature between 100 degree Centigrade and 200 degree centigrade for a time between 30 minutes and 2 hours.

In still another embodiment, carnauba wax is either sprayed or brushed onto the top and/or underneath surface of a sounding board 12 of a flute 10 at a temperature between 100 degree centigrade and 200 degree centigrade for a time between 30 minutes and 2 hours.

Sound dispersion will be explained with reference to a wind instrument such as a flute 10.

Sound waves produced by the flute 10 are in the form of compressional waves which are reflected off the sides of the flute and returned back to cause interference, thus generating a stationary wave.

Depending upon the material and construction of the flute 10, the stationary wave produces a sound having a particular tonal quality.

The propagation characteristics of a sound wave (and hence the tone) produced by a flute 10 having an improved resonance layer 14 of carbon fiber reinforced resin on top of and/or underneath the sounding board 12 can be freely changed in comparison to a conventional flute having no improved resonance layer on top of and/or underneath the sounding board.

More particularly, according to this invention, energy loss from the produced soundwave caused by friction between the sounding board 14 and the air can be remarkably decreased in order to avoid vibration attenuation and to achieve continuous and better vibration.

In addition, a speed of air beam influencing appreciably on the produced sound can be increased.

Sound dispersion and response are improved to increase sound volume, to achieve smooth sound linkage, to decrease a wind cutting sound and to obtain the changed propagation characteristic, thus producing better tonal quality.

Accordingly, musical satisfaction can be given to both the player and the listeners.

In accordance with the method of this invention, the improved resonance layer 14 can be easily formed integrally on top of and/or underneath the sounding board 12 of the musical instrument 10 from an inexpensive lubricant.

Thus it may be seen that, at least in its preferred embodiments, this invention provides:

a musical instrument having an improved resonance layer on and/or under a sounding board of the musical instrument whereby vibration attenuation caused by friction between the sounding board and the air is reduced; or

a musical instrument having an improved resonance layer on and/or under a sounding board of the musical instrument whereby the propagation characteristics of the sound waves produced can be easily changed;

a musical instrument having an improved resonance layer on and/or under a sounding board of the musical instrument whereby sound volume can be easily increased, and response can be improved to achieve smooth sound linkage; or

a flute having an improved resonance layer outside and/or inside the pipe whereby a wind cutting sound at an edge can be decreased, and a better influence is given to tone quality by the changed propagation characteristics; or

a musical instrument having an improved resonance layer on and/or under a sounding board of

the musical instrument whereby mood change can be brought to a performance feeling so as to give satisfaction to both a player and the listeners; or

a musical instrument having an improved resonance layer on and/or under a sounding board of the musical instrument whereby volume control can be easily carried out; or

a musical instrument having an improved resonance layer on and/or under a sounding board of the musical instrument whereby vibration attenuation caused by friction between the sounding board and the air can be avoided to continue better vibration of the sound; or

a musical instrument having an improved resonance layer on and/or under a sounding board of the musical instrument whereby a speed of an air beam giving great influence on the produced sound can be increased.

While the forms of the invention herein described constitute presently preferred embodiments, many others are possible. It is not intended herein to mention all of the possible equivalent forms or ramifications of the invention.

It is to be understood that the terms used herein are merely descriptive rather than limiting, and that various changes may be made without departing from the scope of the invention.

Claims

1. A method of improving the resonance of the sounding board of a musical instrument (10,20) by coating a surface of the sounding board (12,22) with a lubricant wherein after application, said lubricant is dried on said surface to form a temporary or permanent resonance layer (14,24) on said sounding board surface.

2. A method as claimed in claim 1, wherein said lubricant is applied to said surface by spraying.

3. A method as claimed in claim 1, wherein said lubricant is applied to said surface by dipping the sounding board (12,22) and/or the musical instrument (10,20) into a solution of said lubricant.

4. A method as claimed in claim 1, wherein said lubricant is applied to said surface by means of brushing a solution of said lubricant onto said surface.

5. A method as claimed in any preceding claim, wherein said lubricant is applied to the outer surface of said sounding board (12,22).

6. A method as claimed in any preceding claim, wherein said lubricant is applied to the inner surface of said sounding board (12,22).

7. A musical instrument (10,20) comprising a temporary or permanent resonance layer (14,24) formed from a lubricant on an inner and/or outer surface of the sounding board (12,22) of said instrument.

8. A method or musical instrument as claimed in any preceding claim wherein said lubricant contains molybdenum disulfide.

9. A method or musical instrument as claimed in any of claims 1 to 7 wherein said lubricant contains a solution of silicon.

10. A method or musical instrument as claimed in any of claims 1 to 8 wherein said lubricant contains fluorine.

11. A method or musical instrument as claimed in any of claims 1 to 8 wherein said lubricant contains graphite.

12. A method or musical instrument as claimed in any of claims 1 to 8 wherein said lubricant contains carnauba wax.

13. A musical instrument (10,20) having a sounding board (12,22) treated according to the method of any preceding claim.

FIG. 1

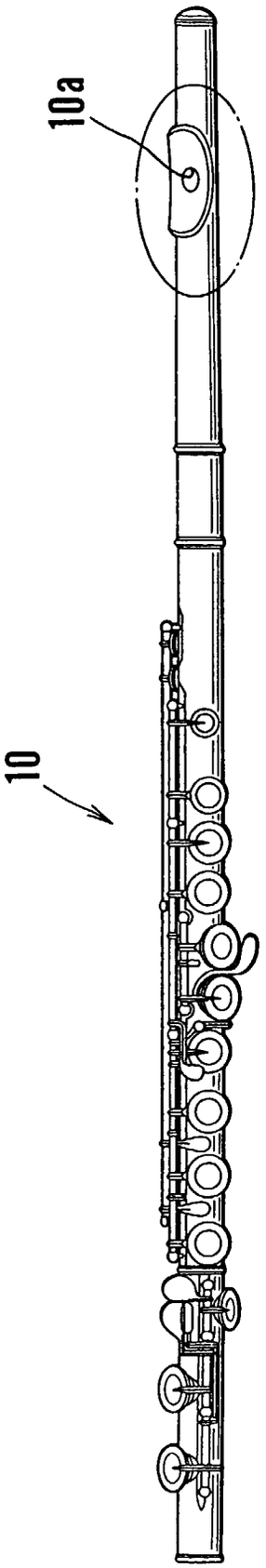

FIG. 2

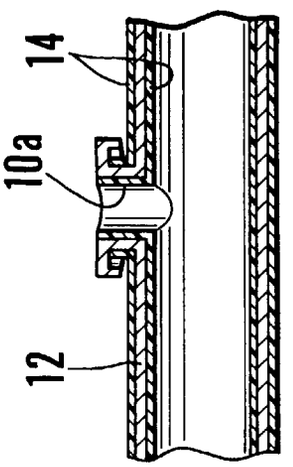

FIG. 3

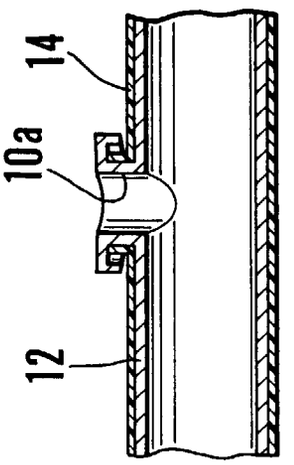

FIG. 4

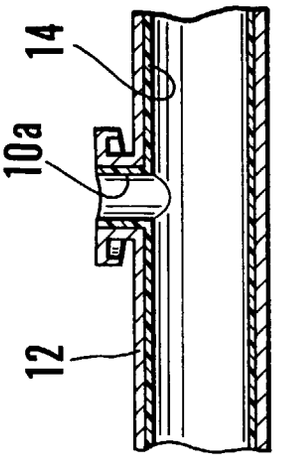

FIG. 5

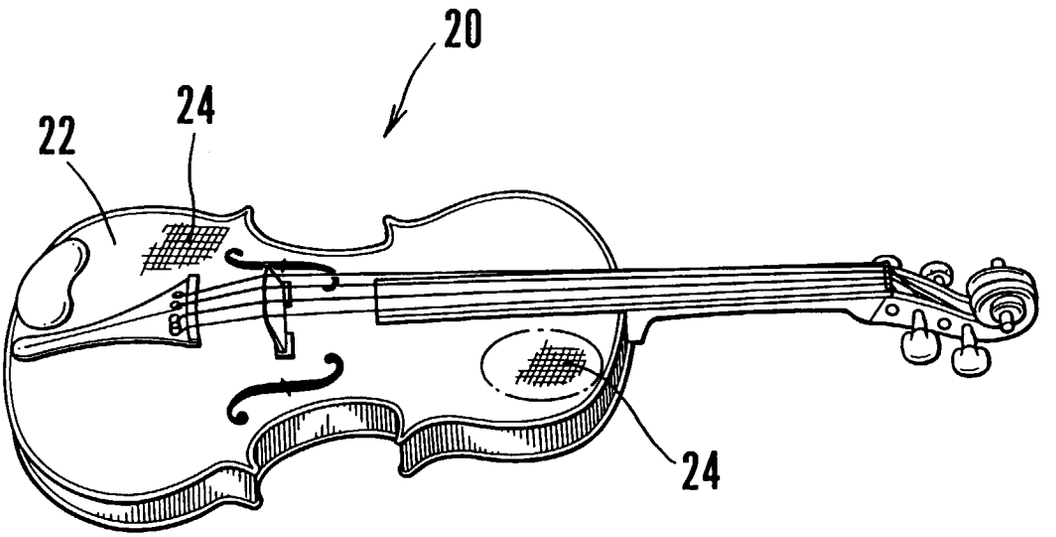

FIG. 6