United States Patent

Rendell

[15] **3,641,862**

[45] **Feb. 15, 1972**

[54] **STRING INSTRUMENT CONSTRUCTION**

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[22] Filed: **June 16, 1970**

[21] Appl. No.: **46,629**

[52] **U.S. Cl.**.....**84/291**, 84/275, 84/452

[51] **Int. Cl.**.....**G10d 3/00**

[58] **Field of Search**.....84/275, 291, 292, 452, 193

[56] **References Cited**

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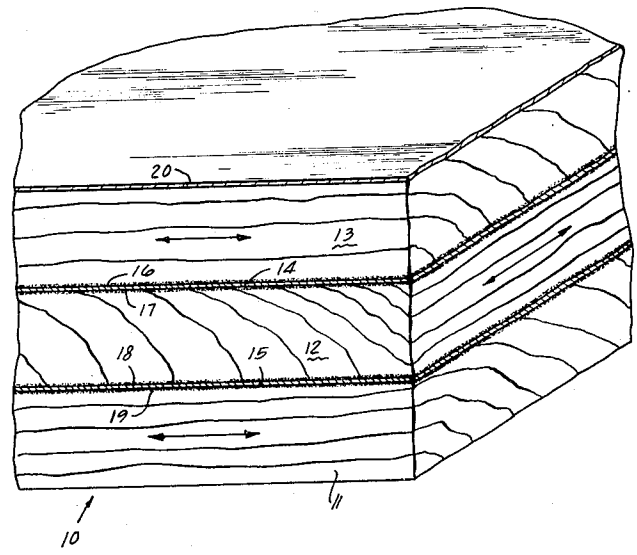
[57] **ABSTRACT**

A musical instrument has a laminated wood construction including three layers of wood bonded together, there being a fine layer of metal between the layers of wood.

11 Claims, 1 Drawing Figure



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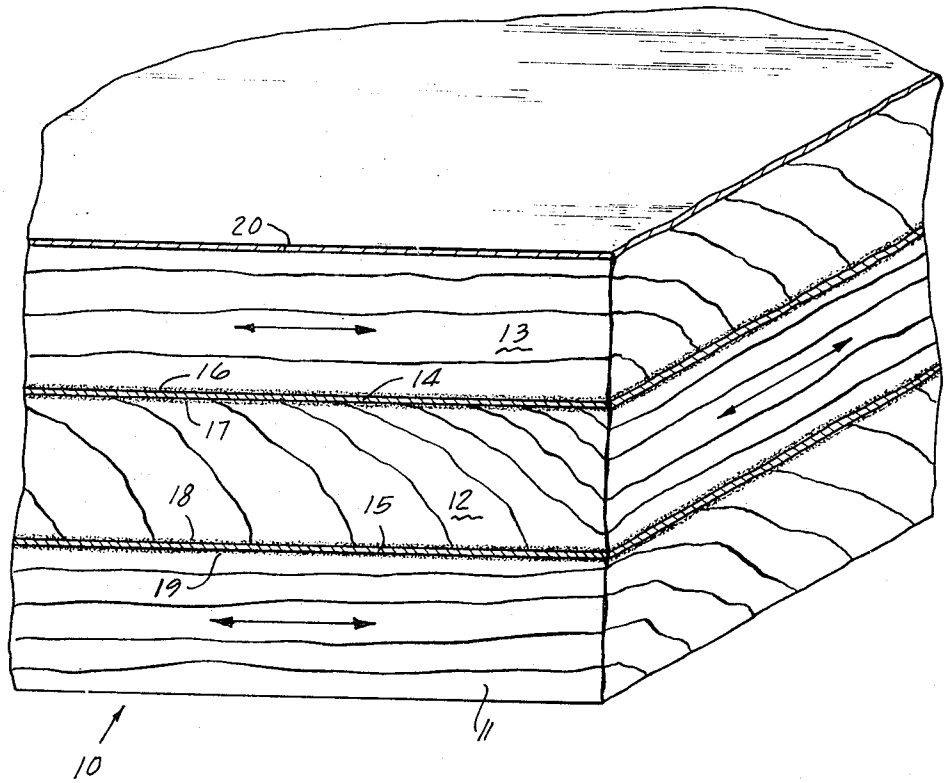

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STRING INSTRUMENT CONSTRUCTION

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to musical instruments, and more specifically to a laminated wood construction used in string instruments.

2. Prior Art

In the manufacture of string instruments, for instance guitars, laminated wood has been used heretofore which has been coated with varnish. In such manufacture, a problem has arisen in that the varnish of itself develops fine cracks, and this has become known in the industry as "checking." There are no doubt various causes to the checking problem, and there are no doubt various theories as to what those causes are or might be. Thus the likelihood of occurrence of checking can be to some extent affected by manufacturing techniques, but no known technique or structure has been found heretofore which virtually eliminates the checking problem.

In the manufacture of stringed instruments that have a varnished body, to provide a high quality appearance it is necessary that the varnished body be buffed. Buffing is ordinarily done by hand, with the instrument body held against a rotating buffing wheel. The varnish is inherently thin and the workman may be a factory worker who is low in experience, ability, or carefulness. As buffing generates heat due to friction, there results for such a manufacturer a problem that occasionally heat builds up to such an extent that the varnish is damaged, for instance by the formation of blisters, and this problem has become known in the industry as "burnthrough." When burn-through takes place, it is necessary for the manufacturer to strip the varnish from the instrument and to begin the finishing process all over again.

Musical instruments are frequently transported from place to place, especially by professional musicians, and in cold weather, the instrument is thus subjected to a substantial thermal shock, particularly when an exceptionally cold instrument is exposed to a warm room temperature. Owing to the transient differences in temperature between various elements or points in the instrument, a variety of different types of damage may result to the instrument. One of the most vulnerable parts is the body of a stringed instrument where the varnish or the wood itself may crack.

Certain musical instruments of the string type have hollow bodies with a pickup disposed therein for sensing string vibrations. Unfortunately, there are oftentimes other sources of electrical signal which radiate such signals to the extent that the pickup can sense the same, and thereby create an unwanted hum. Steps have been taken in the past to minimize such hum, but some hum has often remained.

The hollow body of a string instrument serves as a resonator or sound amplifier, and this is particularly true of the top and back of certain instruments, for instance guitars. In any hollow-bodied string instrument, the top and back inherently have a natural frequency, and in the instance of the highest quality instruments, the tops and backs are so machined or worked that their natural resonant frequency is carefully chosen and matched to be, for instance, two semitones apart. When the instrument is so constructed, it is described in industry as having a tuned top and back. Notwithstanding such care and construction, there still are certain other frequencies which may be found in the top and back, and these constitute partial overtones. When the instrument is played, the fundamental tends to die out leaving those harmonics which are not octavely related to the fundamental, therefore leaving a sustained tone which is completely unwanted. Skilled musicians thus learned to kill such tone by hand to terminate the sustained chord, thereby terminating such partial overtones or impure sound.

SUMMARY OF THE INVENTION

According to this invention, there is at least one and preferably two layers of metal built into the wood laminate, namely between the various wood layers. Preferably, the metal layer constitutes aluminum foil. This construction has eliminated checking, has made it almost impossible for workmen to buff a body so as to cause a burnthrough, it has made instruments more thermally shock resistant, it has provided shielding for pickups, and it has for all practical purposes eliminated the partial overtones.

Accordingly, it is an object of the present invention to provide a string instrument construction which is not susceptible to checking.

A further object of the present invention is to provide a string instrument construction wherein its varnish is not susceptible to burnthrough during buffing.

A further object of the present invention is to provide a string instrument construction which is thermally shock resistant to any temperature change that might reasonably be expected.

Yet another object of the present invention is to provide a string instrument construction for use on the body of a string instrument wherein the body is inherently shielded for eliminating hum.

A still further object of the present invention is to provide a construction for the body of a string instrument wherein the customary overtones of the top and the back are eliminated.

Many other advantages, features and additional objects of the present invention will become manifest to those versed in the art upon making reference to the detailed description of the accompanying drawing in which a preferred structural embodiment incorporating the principles of the present invention is shown by way of illustrative example.

ON THE DRAWING

The single FIGURE is a greatly enlarged cross-sectional view of a laminated wood portion of a string instrument provided in accordance with the present invention.

AS SHOWN ON THE DRAWING

The principles of the present invention are particularly useful when embodied in a string instrument having a laminated-wood construction, for instance for the body of a stringed instrument. The drawing is illustrative and is not made to scale. The laminated-wood construction is generally indicated by the numeral **10** and includes a first or inner layer of wood **11** having a grain that runs in a first or longitudinal direction as indicated by the arrow, a second layer **12** of wood having a grain which runs transversely, for instance at right angles, to the grain of the layer **11**, and a third layer **13** of wood which has a grain that runs substantially in the same direction as that of the first layer **11**. The laminated-wood construction **10** further includes a layer of metal **14** disposed at one side of the second layer **12** and a second layer of metal **15** disposed at the other side of the second layer **12**. Further, bonds are provided at each side of the metal layers **14, 15**, with the layers **11–13**, indicated at **16–19**. A layer of varnish **20** is normally disposed on the layer **13** where it is the facing layer and the layer **11** is the inner layer of an instrument body.

The layer **11** is preferably maple or birch. The layer **12** is preferably basswood or mahogany. The layer **13** is preferably maple, birch or mahogany. Where mahogany is used for the facing layer **13**, the intermediate or core layer **12** is preferably basswood.

Bonds **16–19** are preferably formed by the use of a sheet type of glue that has no moisture content, for example that sold under the trademark TEGO by Borden Company.

The sheet type of glue is converted into the bonds **16–19** by the application of heat, which is normally accomplished by use of heated dies. The dies have a configuration that conforms to the profile that is desired, for instance the curvature of the back or top. The dies have an operating temperature of 300° F., and are applied to the assembled layers for a period of 4 minutes.

The metal layer **14** and the metal layer **15** preferably comprise a thickness that could be characterized as being a foil, for instance a thickness between 0.001 inch and 0.002 inch, and aluminum is preferred because of its good thermal conductivity.

The layers **11–13** are typically 0.050 inch thick. At manufacture, the various layers **11–15** as well as the four sheets of sheet glue are disposed in position, and these elements are inserted in a forming die and heated until the sheet glue has cured to form the bonds **16–19** and to form the wood to the desired contour. The laminated wood is then further processed to become part of the instrument and the varnish **20** is applied. Maple is the most difficult of woods to work with, and the metal layer still serves to eliminate checking of the varnish **20** when applied to maple. The metal layer or layers also serve to distribute heat to enable machine buffing without special care and with no risk of burnthrough, and the metal layers further render the body of the instrument to be thermally shock resistant. The layers **14, 15** are normally not visible in a finished instrument and they therefore provide shielding against hum without in any way affecting the appearance of the instrument. Particularly significant is the degree of purity of tone that is obtained from an instrument constructed in the manner set forth because of the elimination of the partial overtones and the elimination of the need for killing such tones by hand when the instrument is played.

In some applications, a single layer of metal will suffice for all the purposes mentioned. If there is any tendency for the workpiece to warp, the second layer of metal eliminates the warpage problem. Another aspect of "burnthrough" is that operators have removed so much varnish that the stain beneath the varnish has also been destroyed. Even that type of excessive buffing does not take place with my construction since part of the cause of such excessive buffing was a softening and hence a loss of the varnish and the stain immediately beneath it.

One of the manufacturing advantages of this construction is that there is a cost reduction by the substantial elimination of reworking or repair of instruments in process. Further, tuning of the top and back can now be eliminated in some instances and yet the instrument will have a purer tone than was previously possible.

Although various minor modifications may be suggested by those versed in the art, it should be understood that I wish to embody within the scope of the patent warranted hereon, all such embodiments as reasonably and properly come within the scope of my contribution to the art.

I claim as my invention:

1. A stringed musical instrument having a hollow body, the body having a laminated wood construction, said construction comprising:

a. a first layer of wood having a grain running in a first direction;

b. a second layer of wood having a grain running transversely to said first direction;

c. a third layer of wood having a grain running substantially in said first direction;

d. a layer of sheet metal at one side of said second layer, and with said second layer disposed intermediate said first and third layers; and

e. means bonding all of said layers together.

2. A musical instrument according to claim **1** which includes a second layer of metal bonded into said construction at the other side of said second layer.

3. A musical instrument according to claim **2** in which said layers of metal comprise aluminum foil of a thickness between one and two thousandths of an inch, and including a layer of varnish separated from one of said layers of foil by said third layer of wood.

4. A musical instrument according to claim **1** in which said metal is aluminum.

5. A musical instrument according to claim **1** in which said metal has a thickness on the order of one to two-thousandths of an inch.

6. A musical instrument according to claim **1** in which said first and third layers are maple and said second layer is mahogany.

7. A musical instrument according to claim **1** in which said first and third layers are birch and said second layer is basswood.

8. A musical instrument according to claim **1** including a layer of varnish separated from said layer of metal by said third layer of wood.

9. A musical instrument according to claim **1** in which said bonding means comprises heat-cured cement.

10. A musical instrument according to claim **1** in which said layers have a curved contour.

11. A musical instrument according to claim **1** in which said first layer is an inner layer of maple, said second layer is a core layer of basswood, and said third layer is a facing layer of one of the group of maple, birch and mahogany.

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