United States Patent

Morena et al.

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[45] **Aug. 1, 1972**

[54] **CYLINDRICAL DRUM SHELL**

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[22] Filed: **Nov. 27, 1970**

[21] Appl. No.: **93,314**

[52] **U.S. Cl.** .....**84/411,** 84/452 P

[51] **Int. Cl.**.....**G10d 13/02,** G10d 3/00

[58] **Field of Search**..84/411, 419, 420, 452 P, 452 R

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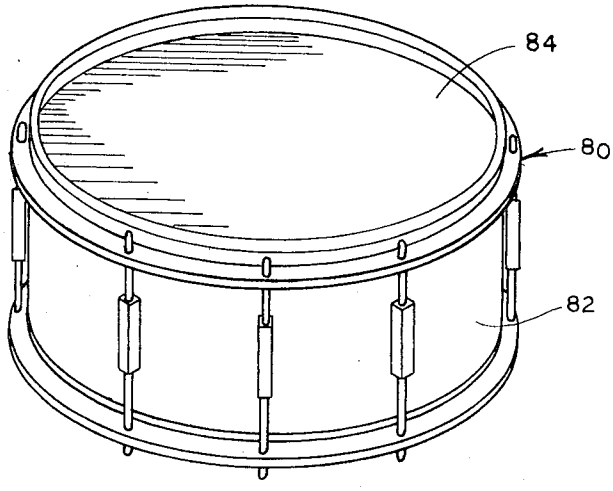
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Assistant Examiner—John F. Gonzales
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[57] **ABSTRACT**

Improved snare, bass and Tom-Tom drums are provided by forming the shell thereof from glass fibers that are bonded together with a resinous material. The glass fibers may be continuous and helically wound over a mandrel or they may be short randomly chopped fibers that form a mat which is applied either to the exterior of a male mandrel or to the interior of a female mold. The method of this invention also contemplates wrapping a band about the resin bonded fibers in order to provide a smooth outer surface. Further, it is also contemplated to provide axially spaced, annular rings at the ends of the shells for providing structural rigidity.

7 Claims, 11 Drawing Figures



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SHEET 1 OF 2

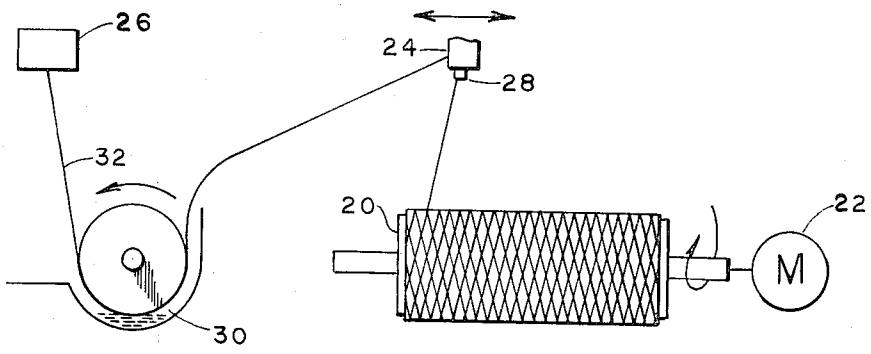


FIG. 1

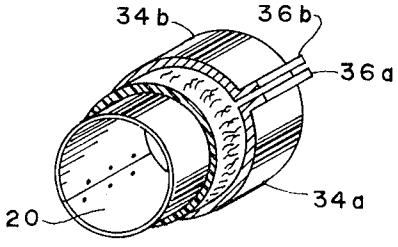


FIG. 2

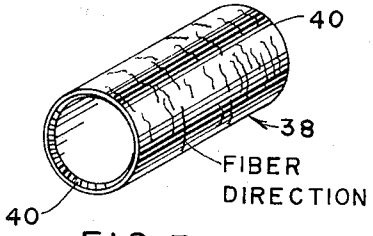


FIG. 3

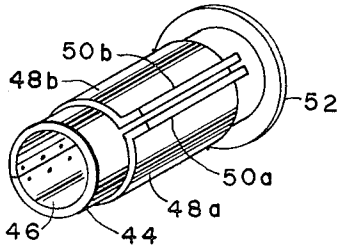


FIG. 4

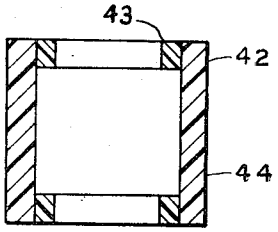


FIG. 5

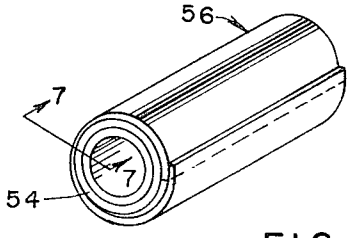


FIG. 6

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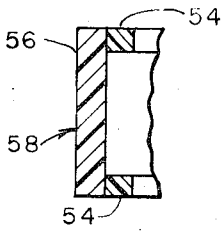


FIG. 7

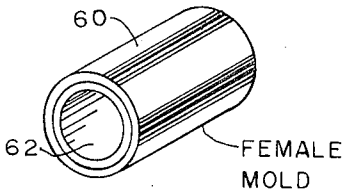


FIG. 8

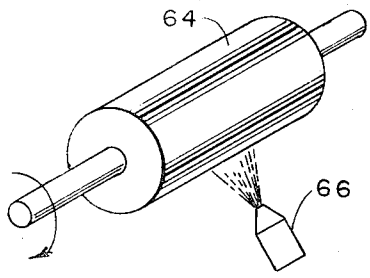


FIG. 9

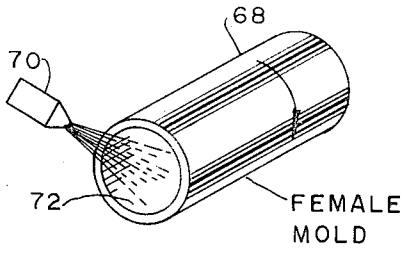


FIG. 10

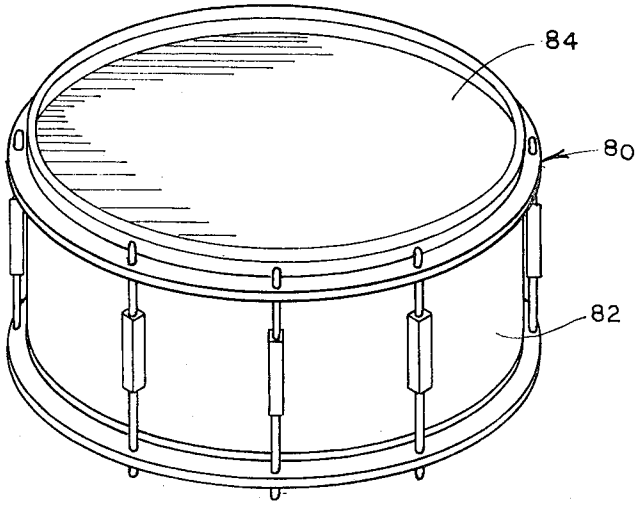


FIG. 11

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CYLINDRICAL DRUM SHELL

The aforementioned abstract is neither intended to define the invention of the application which, of course, is measured by the claims, nor is it intended to be limiting as to the scope of the invention in any way.

The present invention relates generally to musical instruments such as drums and more particularly to an improved shell for a drum such as a snare, bass or Tom-Tom.

BACKGROUND OF THE INVENTION

In the past, drum shells have been fabricated from many different materials, such as wood, metal, etc. However, while the tonal quality produced was satisfactory, the drums had other less desirable properties. Further, the prior art wooden drums were subject to deterioration as a result of exposure to a moisture laden environment. When the shell of the drum distorts, the tones produced thereby will vary and will, therefore, make the drum unsatisfactory for future use. On the other hand, the metal drums were characterized by their heavy weight.

The present invention contemplates the use of at least one drum head in combination with a glass fiber shell that is reinforced with a resinous material. The glass fibers may be wound continuously, for example, along a helical pattern that goes to and fro over a male mandrel or the drum shell may consist of a mat of randomly chopped glass fibers. While epoxy resin may be used, the fibers are preferably reinforced with polyester which produces a better tonal quality than an epoxy resin.

Accordingly, two primary objects of the present invention are to provide an improved drum and drum shell as well as an improved method for making the drum and drum shell.

A preferred method of making the drum is to form a shell by rolling a relatively thin precured resin bonded sheet into a cylinder.

A further object of the present invention is to provide an improved drum shell that is made of glass fibers which are resin bonded with polyester resin.

Another object of the present invention is to provide a musical drum having a glass-resin shell wherein the percentage of glass is in the range of approximately 30 to 70 percent.

An additional object of the present invention is to provide a drum shell consisting of a randomly chopped mat of glass fibers that are resin bonded.

Still another object of the present invention is to provide a drum shell consisting of a sheet of randomly chopped resin bonded glass fibers that is laid up by hand on a male mandrel or in a female mold.

An additional object of the present invention is to provide reinforcing rings of resin bonded glass fibers at both ends of the molded drum shell.

A feature of the present invention is that the resin is cured at room temperature.

An additional object of the present invention is to provide a method for forming a smooth finish on the outer surface of the shell by wrapping a band thereabout.

A particular object of this invention is to provide a musical drum employing precured resin bonded glass fiber sheet.

These and other objects, features and advantages of the invention will, in part, be pointed out with particularity and will, in part, become obvious from the following more detailed description of the invention, taken in conjunction with the accompanying drawings, which forms an integral part thereof.

DESCRIPTION OF THE DRAWING

In the drawing:

FIG. **1** is a schematic view illustrating structure for forming a snare drum shell in accordance with the method of the present invention;

FIG. **2** is a perspective, schematic view illustrating another step in the formation of a snare drum shell;

FIG. **3** is a perspective view of a snare drum shell formed in accordance with the present invention as illustrated by the structural embodiment shown in FIGS. **1** and **2**;

FIG. **4** is a schematic, perspective view illustrating the structure used in forming a bass or Tom-Tom drum in accordance with the method of the present invention;

FIG. **5** is the longitudinal, sectional view illustrating the bass and Tom-Tom drums formed in accordance with the method of the present invention utilizing the structure shown in FIG. **4**;

FIG. **6** is a schematic, perspective view illustrating a drum shell that comprises an alternative embodiment of the present invention;

FIG. **7** is a fragmentary sectional view taken along line **7**—**7** of FIG. **6**;

FIG. **8** is a schematic, perspective view illustrating an alternative embodiment of the present invention;

FIG. **9** is a schematic perspective view illustrating an additional embodiment of the present invention;

FIG. **10** is a schematic perspective view illustrating still another alternative embodiment of the present invention; and

FIG. **11** is a schematic, perspective view illustrating a typical drum that can be made by the method of this invention.

Referring now to the drawing, the first embodiment of the present invention will now be described in connection with FIGS. **1**, **2** and **3**. There is provided a male mandrel **20** that is rotated about its longitudinal axis by a motor **22** in a conventional manner. A carriage **24**, having a filament supply source **26** and a filament feed-eye **28** is shuttled back and forth between the opposed ends of the mandrel **20** while the mandrel is being rotated about its longitudinal axis by the motor **22**. During the travel of the carriage **24** and the feed-eye **28**, a bath **30** applies a continuous coating of a resinous binder to the filament band **32**. Polyester resins are preferred for this purpose because they provide a better tonal quality than say, epoxy resins, for example.

The mandrel **20** may be solid as shown in FIG. **1**. Subsequently, after the glass fibers have been wound on the mandrel **20** to a specific thickness, a band, which may be in two parts, **34***a* and **34***b*, is clamped around the glass fibers to provide a smooth outside finish. Flanges **36***a* and **36***b* formed on the bands **34***a* and **34***b* may be used for clamping purposes.

The resin used for impregnation is an isopthalic polyester resin that is cured at room temperature with methyl ethyl ketone peroxide. Preferably the resin does

not incorporate fillers and is modified only by the addition of styrene. Pigmentation is natural and the percentage of glass in the glass-resin composition is preferably in the approximate range of 30 percent to 70 percent by weight. After the resin has cured, the bands **34***a* and **34***b* are removed and the wound structure is removed from the mandrel **20**. It will be particularly noted in FIG. **3** that the finished snare drum shell **38** has circumferentially running glass fibers and beveled ends **40**.

Turning now to FIGS. **4** and **5**, there is shown another alternative embodiment of the present invention. A bass drum or Tom-Tom **42** is formed by wrapping a random chopped mat **44** over a male mandrel **46**, the mat **44** being laid up by hand to the desired thickness. The mat is then impregnated with an orphopthalic polyester resin which is cured at room temperature using methyl ethyl ketone peroxide. Subsequently a pair of half bands **48***a* and **48***b* are positioned over the shell **44** so as to provide a smooth finish to the outside thereof. Flanges **50***a* and **50***b* formed integrally with the bands **48***a* and **48***b*, respectively may be used for clamping purposes. A support plate **52** may also be used. After curing the bands are removed from the drum **42**. Preformed resin bonded fiber glass hoops **43** are then adhesively secured at the opposite ends of the drum.

In FIGS. **6** and **7** there is shown still another method for forming a drum shell. A pair of axially spaced rings **54** are fabricated from a suitable material such as filament wound resin bonded glass fibers. The rings **54** are then positioned on a mandrel to provide a desired cross-sectional configuration. After the rings **54** have cured, the outer portion of the rings is ground to the desired diameter. The rings **54** are then suitably positioned in a jig and a precut length of resin impregnated glass fiber reinforced sheeting **56** is then fitted about the rings **54** and bonded thereto to form a completed drum shell **58**. As shown, for example, in FIG. **6**, the rolled sheet **56** is overlapped and then bonded.

FIG. **8** illustrates another alternative embodiment of the present invention. A female mold **60** is provided and a glass fiber mat **62** that is suitably impregnated with a polyester resin is laid up by hand on the internal diameter of the mold **60**.

FIGS. **9** and **10** illustrate still other alternative embodiments of the method comprising the present invention. In FIG. **9** a male mandrel **64** is rotated about its longitudinal axis by any suitable means (not shown). A gun **66** is used to spray a chopped up lay-up of random glass fibers **66**. As described hereinabove, the glass fibers are impregnated with a polyester resin. In FIG. **10**, a female mold **68** is employed. A spray gun **70** discharges chopped glass fibers **72** on the internal surface of the female mold **68**. A polyester resin is used to bind the glass fibers.

FIG. **11** is used herein to schematically illustrate any of the drums mentioned hereinbefore which have been made by any of the processes described. In its broadest sense the drum **80** consists of a shell **82** and a drum head **84**. Suitable means, many of which are well known in the art, may be used for securing the head **84** to the shell **82**. It is to be understood that the scope of the invention also includes a shell as described above and two drum heads.

From the foregoing, it will be appreciated that an improved drum shell has been provided for snares, bass and Tom-Tom drums. In contrast to the prior art drum shells which are heavy or subject to damage in damp atmospheres, the present invention provides several methods for forming a low cost drum and drum shell that are relatively light and which are not adversely affected by environmental conditions. The methods described hereinabove are inexpensive and require a minimum of labor for forming large drum shells particularly where pre-cured sheets are cut to size since these sheets can be readily handled and require no finishing operation. If desired, the outside surface of the shells described hereinabove may be coated electrostatically with flocking of short fibers or the shells may be covered by a thin sheet of a decorative metal or plastic material. The decorative sheet is cut to the exact circumference and bonded in place by a suitable adhesive system, such as a contact cement.

The present invention described hereinbefore provides a drum that is of superior tonal quality as a result of the use of polyester resins.

The improved drum shell described hereinabove may be fabricated by any one of the following methods:

1. winding continuous glass fiber filaments over a male mandrel;
2. laying-up by hand a chopped fiber mat over a male mandrel;
3. laying-up by hand a chopped glass fiber mat into a female mold;
4. gun spraying a chopped glass fiber lay-up over a male mandrel;
5. gun spraying a chopped glass fiber lay-up into a female mold; and
6. rolling a pre-cured sheet of a predetermined size onto axially spaced rings.

It has been found that best tonal quality is achieved when the thickness of the drum shell is in the range 0.07 inch to 0.13 inch with non-woven glass fibers bonded by polyester resin. The percentage of glass should be between 30 and 70 percent by weight.

There has been disclosed heretofore the best embodiment of the invention presently contemplated. However, it is to be understood that various changes and modifications may be made by those skilled in the art without departing from the spirit of the invention.

What we claim as new and desire to secure by Letters Patent is:

1. A musical drum comprising a cylindrical shell composed of glass fibers bonded by a synthetic resin, at least one drum head secured to said shell and a pair of axially spaced, resin bonded glass fiber rings secured to the inner face of said cylindrical shell proximate the opposite ends thereof.

2. The drum in accordance with claim 1 wherein said fibers are continuous and are arranged in a predetermined pattern.

3. The drum in accordance with claim 1 wherein said resin is selected from a group consisting of epoxy resin and polyester resin.

4. The drum in accordance with claim 1 wherein said glass fibers are in the form of short segments and are randomly dispersed to define a mat.

5. The drum in accordance with claim 1 wherein said shell is formed of an initially flat precured sheet having a thickness in the range 0.07 inch to 0.13 inch.

6. The drum in accordance with claim 5 wherein said sheet is overlapped at the ends and bonded along the common overlapping portion.

7. The drum in accordance with claim 1 wherein the percentage of glass by weight in the glass-resin composition is between 30 and 70 percent.

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