Sept. 25, 1962 W. B. LOUGHBOROUGH 3,055,253

TYMPANIC TYPE MUSICAL INSTRUMENT

Filed Feb. 24, 1958

FIG_1

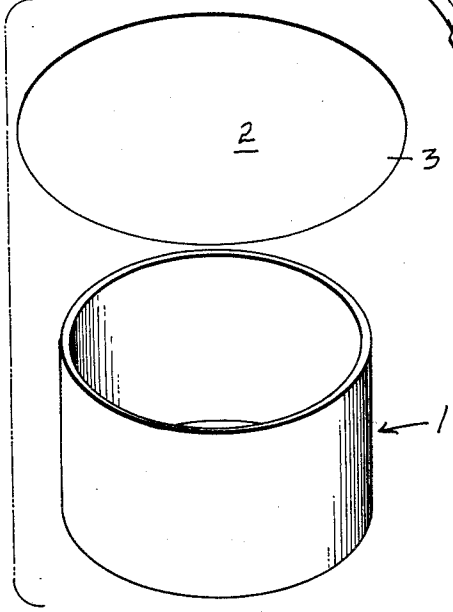


FIG_2

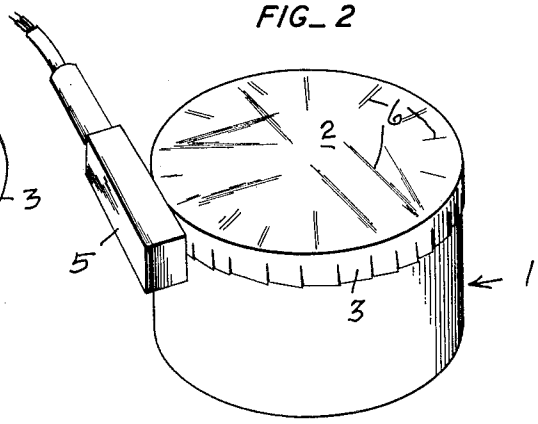


FIG_3

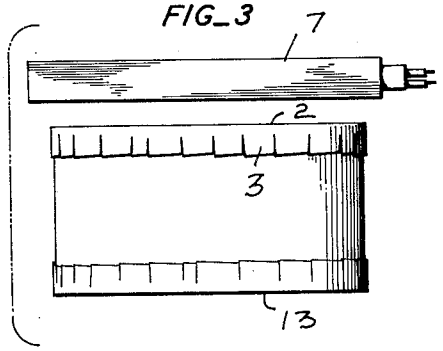


FIG_4

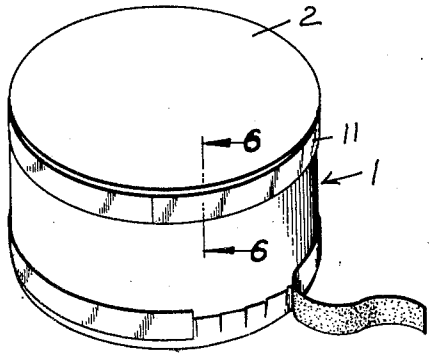


FIG_5

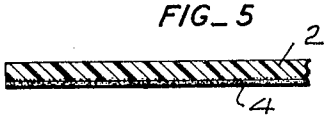


FIG_7

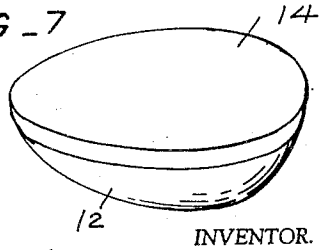
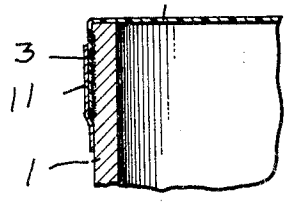


FIG_6



INVENTOR.

WILLIAM B. LOUGHBOROUGH

BY

Boyken, Mohler & Wood

ATTORNEYS

United States Patent Office

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TYMPANIC TYPE MUSICAL INSTRUMENT

William B. Loughborough, P.O. Box 303, Sausalito, Calif.

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This invention relates to musical instruments of the tympanum type, such as drums, tambourines, banjos, etc.; in which a hollow body such as a cylinder or shell has open ends or an open side with a tympanum tautly extending over one or both open ends, as the case of a cylinder, or over one open side of a shell having such open side.

Heretofore, as is well known, skins of animals have usually been employed for this purpose, and even rubber tympanums have been used. Where skins are used, they are very susceptible to changes in tone due to changes in atmospheric humidity and heat, and consequently are usually connected with the drum body by tightening means. Also, in double headed drums, the leakage of air from inside the drum results in loss in the desired resonance and the impairment of the desired vibration of both heads, as in the case of snare drums in particular.

One of the objects of the present invention is the provision of a musical instrument or resonator of the type employing a tympanum, in which the shell body or cylinder of rigid material and the tympanum are a unit and which tympanum is not noticeably affected by variations in the atmospheric room or outdoor temperature, or in variations in atmospheric humidity.

A still further object of the invention is a method of making a musical instrument of the type having a hollow body and a tympanum in which the body and the tympanum are substantially a unit, and which tympanum is of a different material from that of the body and is substantially unaffected by variations in atmospheric temperature and humidity.

Another object of the invention is the provision of a drum and the method of making such drum, in which the hollow rigid body of the drum is open ended but in which the ends are closed by tympanums tightly extending thereacross in hermetically sealed relation to the body so that there is no escape of air from within the body and which tympanums are substantially unaffected by variations in atmospheric temperature and atmospheric humidity.

Another object of the invention is the provision of a drum or other percussive musical instrument of the tympanum type in which any unequal tensions in the tympanum or distortions thereof out of a plane, may be readily equalized or corrected by merely applying heat thereto at a temperature above atmospheric temperature and below the melting point of the tympanum.

A still further invention is the provision of a musical instrument of the type having a rigid hollow body and a tympanum extending across an open side thereof, in which the tympanum is a plastic sheet of polyethylene terephthalate or one having substantially the characteristics thereof insofar as resistance to impact and to changes under atmospheric temperature and humidity variations are concerned, and insofar as the contractable characteristic of distorted and stretched and elongated portions are concerned, when heat of a temperature above that of the atmosphere and below that of the melting point of the sheet is applied to the distorted or stretched portions and elongated portions.

Other objects and advantages will be obvious from the description and drawings.

In the drawings, FIG. 1 is an exploded view of a hollow body and tympanum therefor, that are adapted to be joined to make a musical instrument.

FIG. 2 is a perspective view showing a step in the method of making a musical instrument from the elements shown in FIG. 1.

FIG. 3 illustrates another step in the making of an instrument from the elements shown in FIG. 1 plus an additional tympanum at the opposite end of the body affixed in the same manner as shown in FIG. 2 for making a double ended drum.

FIG. 4 illustrates an optional finishing step that may be employed to cover the marginal portions of each tympanum on a hollow body.

FIG. 5 is a greatly enlarged fragmentary sectional view of a tympanum that is preferably used in the musical instruments of the tympanum type.

FIG. 6 is an enlarged sectional view taken along line 6—6 of FIG. 4.

FIG. 7 is a perspective view of an instrument that is adapted to be made by the present method.

In detail, the instrument illustrated in FIGS. 1, 2 comprises an open ended cylindrical body **1** of any suitable material such as wood, stiff fiberboard, pressed wood, metal, plastic, composition material, etc., and a tympanum **2** that is adapted to be positioned over one open end of said body, which tympanum, when secured to said body over said open end, would form a structure suitable for a tambourine, banjo head or single headed drum, according to the dimensions of the body.

The tympanum **2** is placed against the body **1** at said open end and is stretched across the latter with the marginal portion **3** placed against the radially outwardly directed surface of the cylinder at the said open end, and bonded to said cylinder (FIG. 2) on either or both the radially and axially facing surfaces.

The tympanum **2** is preferably a polymer, which is the reaction product of ethylene glycol and terephthalate acid having the chemical name of polyethylene terephthalate, and the trade name of "Mylar," and substantially integral with said sheet at one side thereof is a polyethylene film **4** (FIG. 5) that enables the sheet to be bonded with the said outer surface of the body **1** when in engagement with said surface and heat, as from an iron **5**, is applied to the marginal portion **3**. The iron may be the same as is used for heat sealing polyester products together and to other articles.

The tympanum **2**, as above described, may be quite thin, or may have a thickness that is comparable to that of conventional tympanums of skin. It is tough, durable, and remains flexible and stable over a wide range of temperature variations, such as from —60° C. to 150° C. There is no noticeable change in the product insofar as resonance, tensile strength or tautness under such variations in atmospheric temperature and humidity as may occur, where the tympanum is used in a drum, tambourine, etc.

Another important characteristic is that unequal tension as may exist due to stretching it on a hollow body resulting in wrinkles **6** (FIG. 2) or distortions may be equalized by applying heat, as from a heated iron **7** (FIG. 3) to the surface that extends across the open side of the body **1**. This also results in the portion so extending across said open side becoming absolutely flat, and the relief of said portion from unequal tension provides for maximum uniform resonance in sound. Should the head or tympanum become dented from blows thereon, the dents will quickly disappear upon the application of heat to the tympanum.

These irons **5**, **7** are at a temperature at which the film **4** will bond or fuse with the material in direct engagement therewith, such as the cylinder **1**, and which temperature may be between 300° F. and 425° F. or preferably approximately 405° F.

The marginal portion **3** is bonded with the outer surface of the cylinder along a continuous line and is flat against the cylinder. Due to the irregularity of the edges

of the tympanum, a tape **11** is secured to and covers the marginal portion.

In FIGS. 3, 4 a drum is shown in which a second head **13** is present, which head is at the opposite end of the cylinder from head **2**, but it is applied in the same manner as head **2**.

The finished drum having imperforate heads or tympanums at opposite ends of an imperforate cylinder, provides a hermetically closed drum in which there is no leakage of air from within the drum. This is desirable from the standpoint of resonance, and also in the case of kettledrums, where maximum vibration of both tympanums under striking one of them is desired.

The present method also lends itself to application of the tympanum to irregular outlines, such as the irregular outline of the shell **12** of FIG. 8, in which the tympanum **14** follows the irregular contour of the open side, yet upon the tympanum being heated, as described with respect to FIG. 3, the tension on the tympanum will be substantially equalized along the edges where it would otherwise be unequal.

I claim:

1. A drum comprising a cylinder of relatively rigid material and opposite end axially outwardly facing walls of flexible, resilient sheet material tautly extending across the ends of said cylinder, said cylinder and said end walls being imperforate, means bonding said end walls air tight to the ends of said cylinder continuously around said ends whereby the interior of said cylinder will be hermetically sealed against leakage of air into the same, said means being substantially integrally united to said walls and to said cylinder whereby said end walls and said cylinder constitute a unitary structure.

2. A resonator comprising: a rigid endless wall bounding a space enclosed thereby and having an endless planar edge extending around said wall, said wall forming the main body of the resonator, a resilient, flexible, skin-like tympanum substantially inseparably united with said wall along said edge and extending over the latter, said wall being tautly stretched and bounding one side of the said space enclosed by said wall, and said wall extending a substantial distance away from said tympanum including the portion united to said wall.

3. A resonator comprising: a rigid endless wall bounding a space enclosed thereby and having an endless planar edge extending around said wall, said wall forming the main body of the resonator, a resilient, flexible, skin-like tympanum substantially inseparably united with said wall along said edge and extending over the latter, said tympanum being tautly stretched and bounding one side of the said space enclosed by said wall, said tympanum being under substantially uniform tension over the portion thereof extending across said space, and said wall extending a substantial distance away from said tympanum including the portion united to said wall.

4. A resonator comprising: a rigid endless wall bounding a space enclosed thereby and having an endless planar edge extending around said wall, said wall forming the main body of the resonator, a resilient, flexible, skin-like tympanum substantially inseparably united wth said wall along said edge and extending over the latter, said tympanum being tautly stretched and bounding one side of the said space enclosed by said wall, said endless wall being cylindrical, and said tympanum being at one end thereof and extending over the outer sides of said wall at said one end thereof, the portion so extending over said outer sides being the portion that is substantially inseparably secured to said wall, and said wall extending a substantial distance away from said tympanum including the portion united to said wall.

5. A resonator comprising: a rigid endless wall bounding a space enclosed thereby and having an endless planar edge extending around said wall, said wall forming the main body of the resonator, a resilient, flexible, skin-like tympanum substantially inseparably united with said wall along said edge and extending over the latter, said tympanum being tautly stretched and bounding one side of the said space enclosed by said wall, said tympanum being a sheet of synthetic plastic material having substantially the characteristics of a reaction product of ethylene glycol and terephthalic acid and being substantially stable against physical changes under variations in atmospheric temperature and under variations in the humidity of the atmosphere, and said sheet being under uniform tension over the portion thereof extending across said space, and said wall extending a substantial distance away from said tympanum including the portion united to said wall.

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