

United States Patent

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[15] 3,668,296

[45] June 6, 1972

[54] **HEAD FOR MUSICAL INSTRUMENT**

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[22] Filed: **June 8, 1970**

[21] Appl. No.: **44,097**

3,285,117	11/1966	Cheslow84/414
3,311,690	3/1967	Fischer264/328 X
3,473,196	10/1969	Hull et al.264/328 X
3,472,715	10/1969	Weinbrenner et al.264/328 X

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[52] U.S. Cl.84/414
[51] Int. Cl.G10d 13/02
[58] Field of Search84/411, 414; 264/328

[57] **ABSTRACT**

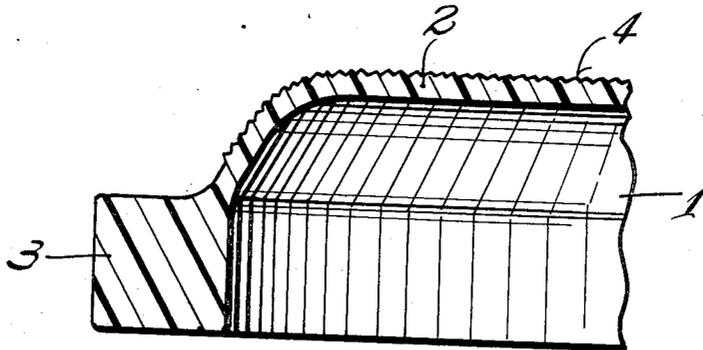
Heads for musical instruments, such as drums, having a vibratile diaphragm section and a peripheral ring section for securing the head to a musical instrument, characterized by molding the head from a moldable synthetic resinous composition as a unitary structure.

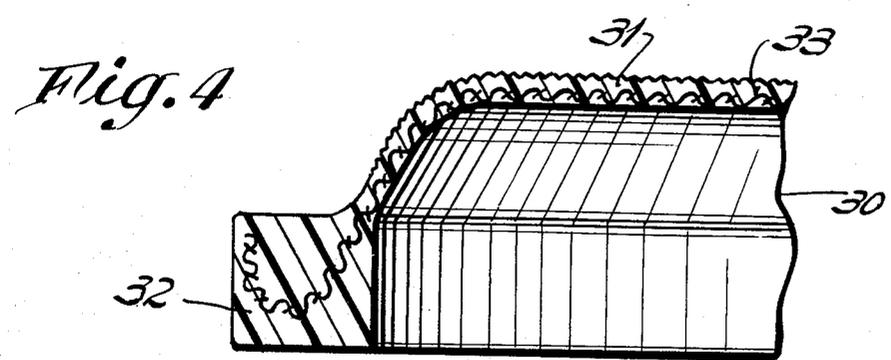
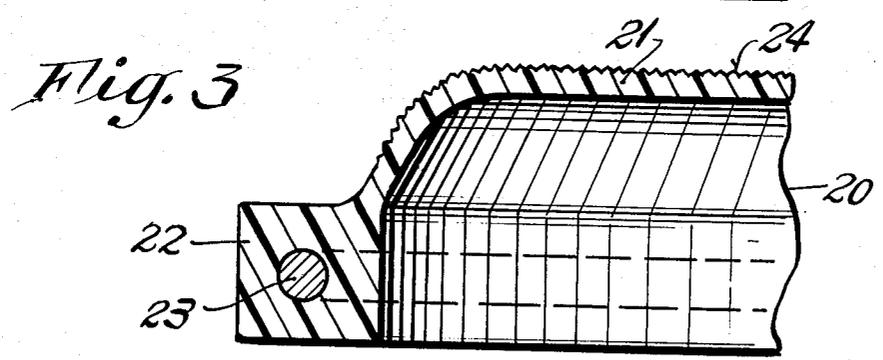
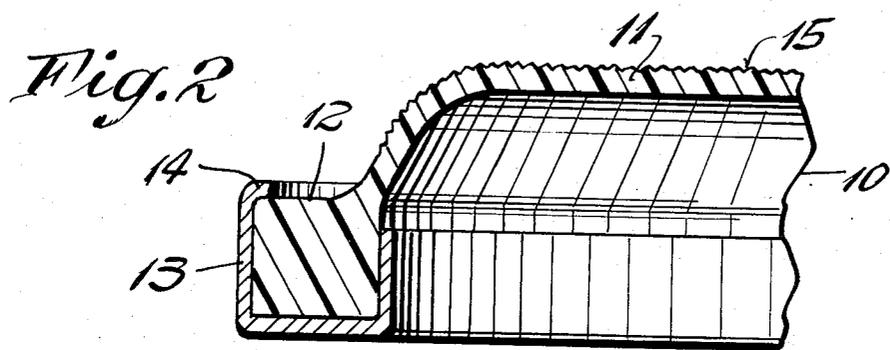
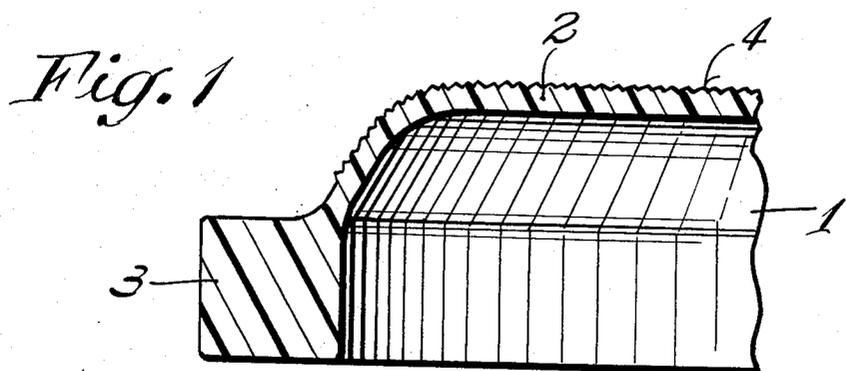
[56] **References Cited**

UNITED STATES PATENTS

3,215,019	11/1965	Sloan84/411 X
2,934,989	5/1960	Belli et al.84/414

6 Claims, 4 Drawing Figures





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HEAD FOR MUSICAL INSTRUMENT

In the manufacture and use of musical instruments such as drums, the head presents the greatest problems with respect to assembly and failure. Prior known drum heads comprise at least two separate elements, namely the vibratile diaphragm surface element and the peripheral ring section to which the diaphragm element was fastened. Animal skins have been replaced with extruded polyethylene terephthalate polyester films as the diaphragm element, and a number of proposals have been made for fastening such films to peripheral rings formed from metal, wood or plastic or combinations thereof.

According to one proposal, the ring element is a channeled aluminum element and the circumferential edge of the diaphragm film is extended into the channel of the ring and bonded to the ring by means of epoxy resin adhesive or the like. Centering of the diaphragm in the channel is difficult. The edge of the diaphragm is sewn to the ring or perforations are provided for dowels to assist in the centering and attachment of the diaphragm to the ring. Such drum heads are unsatisfactory in that the diaphragm can break away from the ring and can crack and tear due to the weaknesses imparted to the circumferential edge by the sewing holes and/or dowel apertures therein.

According to other proposals, the diaphragm element is so formed that its circumferential edge is a channel which is then filled with a liquid resin such as an epoxy resin and the resin is cured to solidify it. Such proposals also provide unsatisfactory drum heads because the diaphragm of plastic film and the epoxy resin filler are chemically different materials and tend to separate from one another under the stress applied during fastening of the drum head to the drum and/or during use.

It is the principal object of the present invention to provide a novel drum head which is sufficiently strong and durable to resist separation of the diaphragm section from the ring section, and to resist cracking and tearing of the diaphragm during attachment and use.

It is another object of the present invention to provide a novel simplified and economical method for producing drum heads.

It is an advantage of this invention that drum heads having a roughened playing surface on the diaphragm element can be produced in simple manner without the necessity of aftertreatments, such as the application of a coating, to produce this result.

These and other objects and advantages of the present invention will be apparent to those skilled in the art in the light of the present disclosure including the drawing, in which:

FIG. 1 is a fragmentary cross-section of the structure of a drum head according to one embodiment of the present invention.

FIGS. 2, 3 and 4 are fragmentary cross-sections of the structure of drum heads produced according to other embodiments of this invention.

The objects and advantages of the present invention are accomplished by means of the discovery that a drum head having improved properties can be molded as a unitary element in simple manner thereby eliminating the prior art problems and disadvantages involved in the attachment of the diaphragm to the ring.

Referring to FIG. 1 of the drawing, the present drum head 1 comprises a vibratile diaphragm section 2 having at its outer periphery a circumferential ring section 3 of increased density or thickness molded as a unitary piece. The playing surface 4 of the diaphragm is molded as a rough surface.

The drum head of FIG. 1 is molded in conventional manner from a synthetic molding resin composition having the required properties of toughness, strength and durability. The resin composition is injected into a die mold cavity corresponding to the structure of the drum head and heat and pressure are applied to form the diaphragm and ring structures simultaneously as a unitary drum head in a single operation. This is a preferred embodiment from the standpoint of ease of manufacture and unity of material. Since a single material is involved, the drum head is stable to changes in temperature, 75

humidity or other factors which present problems with drum heads composed of different materials having different properties of thermal expansion and contraction, moisture resistance, and the like.

The increased thickness of the ring section 3 is necessary to impart strength to the drum head and to provide a hoop which is capable of tight engagement with the counter hoop and clamping means present on the cylindrical body of the drum to which the drum head is to be attached. The inner circumference of the ring section is greater than the outer circumference of the drum cylinder, and the outer circumference of the ring section is slightly smaller than the inner circumference of the drum counter hoop, whereby the drum head is capable of engagement between these elements on the drum in known manner.

The rough surface 4 of the diaphragm section 2 is an optional feature but represents an important advantage of this invention. Such a surface enables the drum to be played with a brush to produce a shuffling or scratching noise in known manner. Prior extruded diaphragms had to be coated to provide such a surface, and such coatings are expensive and tend to wear off during use. The present rough surface 4 is an integral part of the diaphragm section and is produced by means of a die face having a pitted or etched surface.

The embodiments of FIGS. 2 and 3 are used in cases where additional strength is required in the ring section. These embodiments are particularly pertinent to drum heads of larger diameter and drums of increased size.

As shown in FIG. 2, the drum head may be molded together with a channeled metallic ring which gives the drum head increased resistance to flexing and warping. The metallic ring 13, preferably of aluminum, is present in the die cavity of the molding machine and the molding resin composition is injected into the cavity to fill the channel of the metallic ring 13 and to form the molding resin ring section 12 therewithin while at the same time forming the diaphragm section 11. The metallic ring 13 is provided with a lip 14 which extends over the resin ring section 12 and restrains it against slippage from the channel.

Thus the drum head 10 of FIG. 2 comprises a diaphragm section 11 integral with a resin ring section 12, embedded in the channel of a metallic ring 13 having a restraining lip 14, the diaphragm having a rough surface 15.

The embodiment of FIG. 3 is similar to that of FIG. 1 except that a metallic ring 23 is embedded in the resin ring section 22 to impart additional strength to the drum head. This is accomplished by providing means such as pins within the die cavity for centering the metallic ring 23 within the ring section of the die cavity, and then injecting molding resin into the die cavity and around the metallic ring. The final drum head 20 has a diaphragm section 21 integral with a resin ring section 22 having a metallic ring 23 embedded therein, the diaphragm having a rough surface 24.

According to another preferred embodiment, where additional strength and increased resistance to stretching is required in the diaphragm section, a continuous thin woven fabric material is incorporated into the present drum heads. Preferred materials are woven synthetic thermoplastics such as nylon, Dacron, Orlon, fiberglass, and the like. This is accomplished by placing the woven fabric into the mold prior to the injection of the molding resin. The resin is injected onto the top side of the fabric and some amount of the resin penetrates the fabric so that the fabric is embedded in the molding resin in the final product, as illustrated by FIG. 4 of the drawing. Thus woven fabric 33 is embedded in the diaphragm section 31 and the ring section 32 to provide a drum head 30 having exceptional strength and resistance to stretch. Such a drum head requires little or no adjustment once it has been fastened to the cylindrical body of the drum. Also the embedded fabric is insulated against the effects of moisture.

The molding resin compositions useful according to the present invention are conventional compositions providing

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the required strength and durability. Preferred resins are the polyurethanes which are reaction products of polyfunctional isocyanates and polyesters or polyethers. However other conventional durable molding resins such as nylon, polyvinyl chloride, polycarbonates, polyoxymethylene, and the like, are also suitable. The molding composition can be pigmented to any desired color.

Variations and modifications may be made within the scope of the claims and portions of the improvements may be used without others.

I claim:

1. A head for a musical instrument comprising a vibratile diaphragm section and a circumferential ring section of greater thickness than said diaphragm section, said sections being molded in a single operation from the same synthetic resinous molding composition as a unitary element whereby the head is stable against separation of said sections with changes in temperature and humidity.

2. A head according to claim 1 in which said ring section is contained within a circumferential channeled metallic ring.

3. A head according to claim 1 in which a metallic ring is contained within said circumferential ring section.

4. A head according to claim 1 in which said synthetic resinous molding composition comprises a resin selected from the group consisting of nylon, polyvinyl chloride, polycarbonate, polyoxymethylene and polyurethane.

5. A head according to claim 1 in which the molding composition comprises a polyurethane resin.

6. A head for a musical instrument comprising a vibratile diaphragm section and a circumferential ring section of greater thickness than said diaphragm section, said sections being molded in association with a continuous thin woven fabric in a single operation from the same synthetic resinous molding composition as a unitary element whereby the head is stable against separation of said sections with changes in temperature and humidity, said fabric being penetrated by said molding composition and being embedded therein in both said diaphragm and ring sections to render said head exceptionally strong and resistant to stretch.

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