

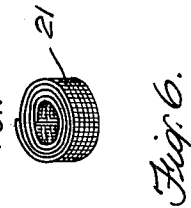
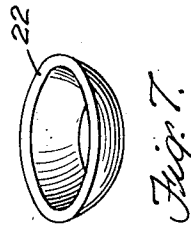
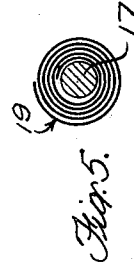
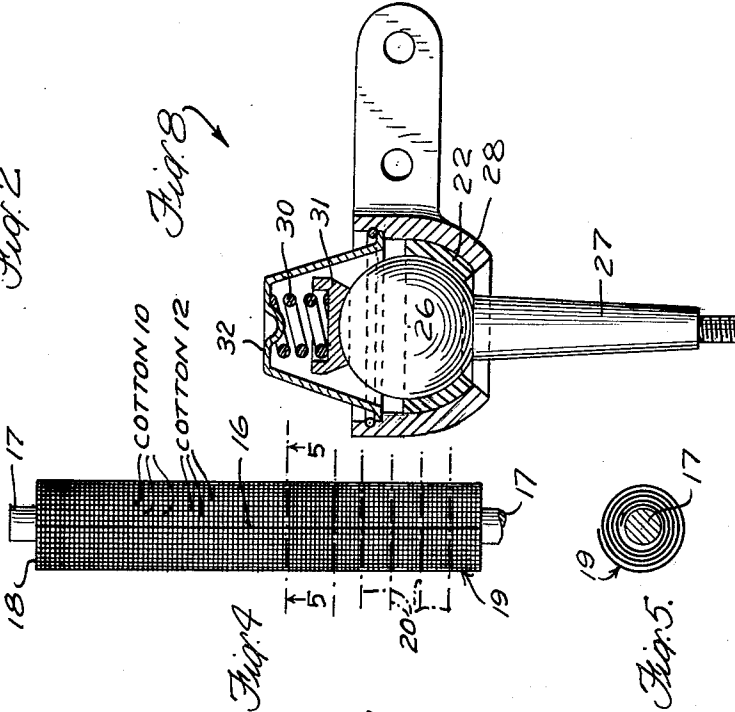
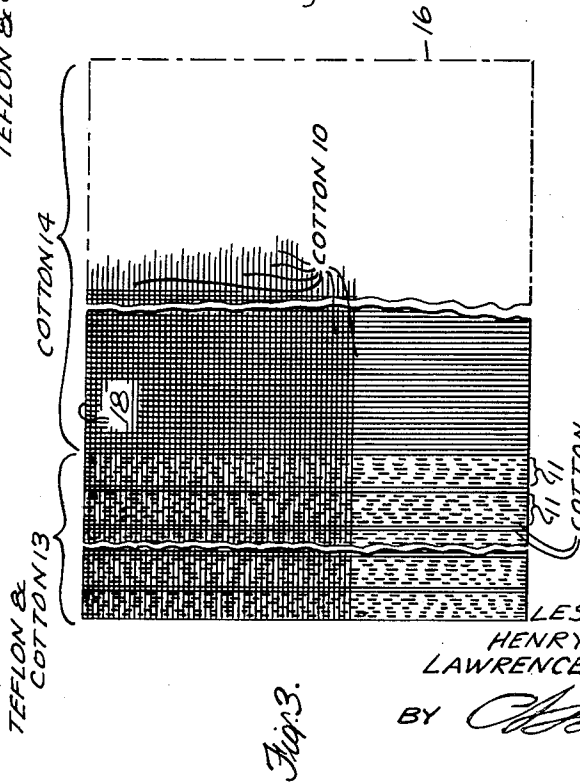
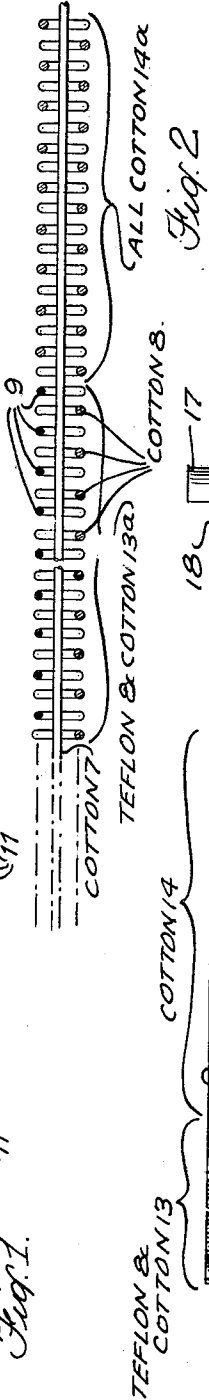
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3,053,592

ANTIFRICTION BEARING

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3,053,592

ANTI-FRICTION BEARING

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1 Claim. (Cl. 308—238)

This invention relates to anti-friction bearings and more particularly to bearings of the type wherein the bearing element is composed of a molded fabric.

An object of the invention is to provide a bearing of the above type having novel and improved characteristics.

Another object is to improve the manufacture of such a bearing.

Various other objects and advantages will be apparent as the nature of the invention is more fully disclosed. The present invention utilizes the anti-friction characteristics of Teflon (tetrafluoroethylene) yarn for the bearing surface. In order to support and bind the Teflon yarn in a fabric the yarn is woven as a filler or as warp with resin bondable yarn such as cotton as the warp or filler respectively at one end or side of a fabric sheet, the remainder of which is composed of resin bondable yarn. This sheet is impregnated with a bonding resin, dried but not cured, and rolled into the form of a tube with the Teflon yarn disposed in the inner convolution. Narrow rings are then cut from this tube to constitute preforms which are then molded under heat and pressure to form the bearing rings. In these rings the Teflon yarn is exposed on the inside to form the bearing surface which is backed by one or more convolutions of the resin-impregnated fabric.

The nature of the invention will be better understood from the following description, taken in connection with the accompanying drawings in which a specific embodiment has been shown for purposes of illustration.

In the drawing:

FIG. 1 is a warpwise section of a fabric embodying the invention illustrating one form of weave wherein the Teflon yarns run fillerwise;

FIG. 2 is a fillerwise section of a fabric illustrating a modified form of weave wherein the Teflon yarns run warpwise;

FIG. 3 is a broken plan view of the fabric of FIG. 1 on a greatly reduced scale;

FIG. 4 is a plan view of a fabric roll from which the preforms are cut;

FIG. 5 is a section taken on the line 5—5 of FIG. 4;

FIG. 6 is a perspective view of a single preform;

FIG. 7 is a perspective view of a molded bearing ring; and

FIG. 8 is a sectional view of a ball joint containing the bearing ring of FIG. 7.

The fabric of FIG. 1 is composed of chain warps 10 of a resin-bondable yarn, such as cotton woven as double chains with filler yarns 11 of Teflon and other filler yarns 12 of resin-bondable yarn, such as cotton. The Teflon yarns 11 are indicated as multiple ply yarns having three plies and about equal in diameter to the cotton yarns 12 so as to provide a fabric of uniform thickness. The Teflon fillers 11 are alternated with the cotton fillers 12 to form a Teflon stripe 13 followed by an all cotton area 14, the pattern being repeated along the fabric.

In the embodiment of FIG. 1 two Teflon yarns 11 are alternated with two cotton yarns 12 in the stripe area 13. It is to be understood that the number of yarns in the sequence may be varied. For example a single

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Teflon filler may be alternated with a single cotton filler or if desired all of the filler yarns in the area 13 may be composed of Teflon. Usually it is sufficient to alternate the Teflon and cotton yarns in the interest of economy as it has been found that in use the Teflon tends to flake off and coat or plate the cotton yarns so as to form a substantially continuous Teflon surface as set forth in copending application Serial No. 843,196 filed September 29, 1959, now abandoned.

It is also to be understood that the Teflon yarns may constitute warp yarns instead of fillers as shown in FIG. 2 wherein the area 13a is formed by Teflon warps 9 alternated with cotton warps 8 to form stripes extending longitudinally of the fabric which alternate with all cotton stripes 14a composed of cotton warps 8 and cotton fillers 7.

The above fabric is now impregnated with a phenolic resin and is dried but not cured as described in Pat. No. 2,908,535. The fabric is then cut into strips as along line 16 in FIG. 3 or into similar warpwise strips if the Teflon runs warpwise, to form sheets having stripes 13 at one end, the remainder of the sheet being composed entirely of the bondable areas 14.

These sheets are now rolled on a mandrel 17 with the stripe 13 of Teflon forming the inner convolution and the area 14 forming the outer convolutions. The width of the areas 13 and 14 is so selected that the Teflon is exposed on the inner surface only and the Teflon area is backed by a plurality of all cotton convolutions. The inner and outer edges of the sheet register so that the rolled sheet is of uniform thickness. The outer edge 18 may then be heat sealed as by the application of a hot tool which softens the resin temporarily to form a resin-bonded, self-supporting tube 19. The tube 19 is then removed from the mandrel and is cut transversely, as along lines 20 to form narrow rings 21 as shown in FIG. 6. These rings 21 are placed in a mold and molded under heat and pressure to form bearing rings 22 as shown in FIG. 7. The width of the preform rings 21 is made such that the mold contains the proper quantity of material for the molding step.

The molded rings 22 may be cylindrical for a cylindrical bearing or may constitute a segment of a sphere for a ball and socket joint. In any case the Teflon is exposed on the inner or bearing surface and the bondable backing is exposed on the outside to be bonded to the metal of the bearing shell or housing. The bondable yarns in the inner convolution serve to bond the layer together to form a unitary structure.

One use for this bearing is shown in FIG. 8 wherein a ball 26 having a spindle 27 is seated on a bearing ring 22 of the type above described which is bonded in a housing 28. This bonding can be accomplished by heating the metal surface of the housing with the ring 22 in place to cause the resin to bond to the metal. This is facilitated if the ring 22 is not completely cured in the mold, leaving the final heat setting to take place after the ring has been inserted in the housing 28. The ball 26 is shown as spring pressed against the ring 22 by a spring 30, seated against a plate 31 resting on the ball 26 and a cap 32 which is held in the housing 28. This bearing construction is illustrative only as it will be obvious that the bearing ring is of general application.

What is claimed is:

A molded fabric bearing comprising a woven fabric strip composed in part of warpwise and fillerwise yarns of resin-bondable material and in part of Teflon yarns woven with said resin-bondable yarns, said Teflon yarns all running in the same direction and being disposed in

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a stripe extending across said fabric strip at one end, said fabric being impregnated with a thermosetting resin which is bondable to said resin-bondable yarns and being in the form of a roll wherein said Teflon yarns extend axially with said stripe forming the inner convolution of the roll, said resin being in the heat-set state characteristic of a thermosetting resin cured under heat and pressure and bonding the convolutions together to form a unitary bearing ring wherein the Teflon is ex-

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posed on the inner surface and is backed by the convolutions of resin-bondable yarns.

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