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2,858,249

METHOD OF MAKING A TETHERING RING FOR A PLAYBALL

Filed Dec. 3, 1954

2 Sheets-Sheet 1

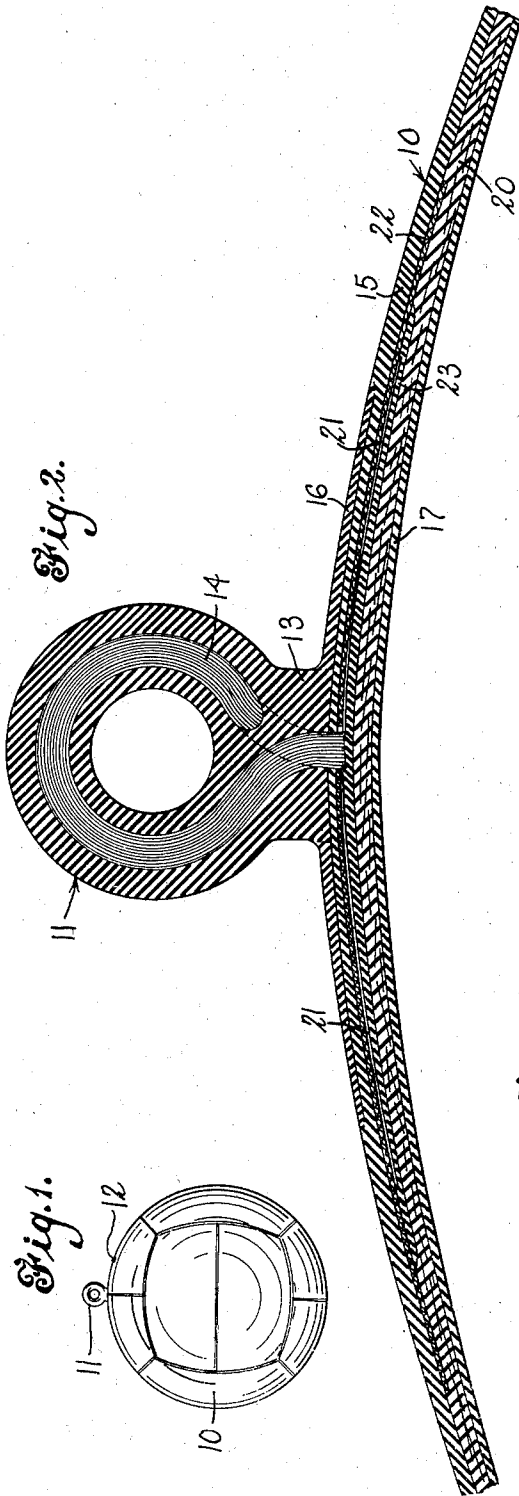
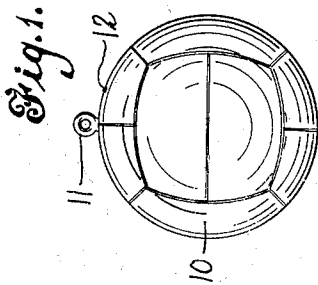


Fig. 3.

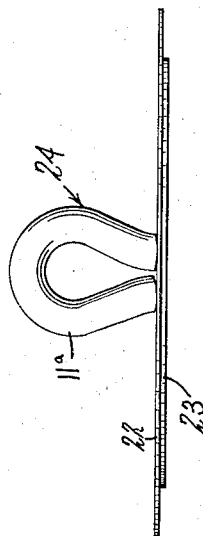
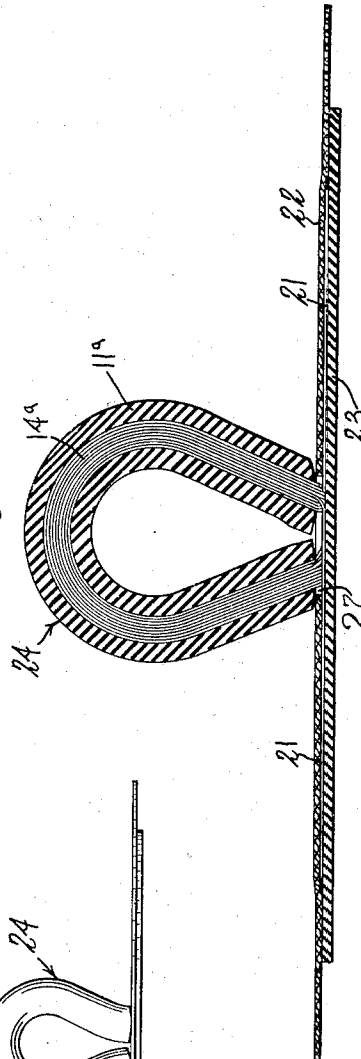


Fig. 4.



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2 Sheets-Sheet 2

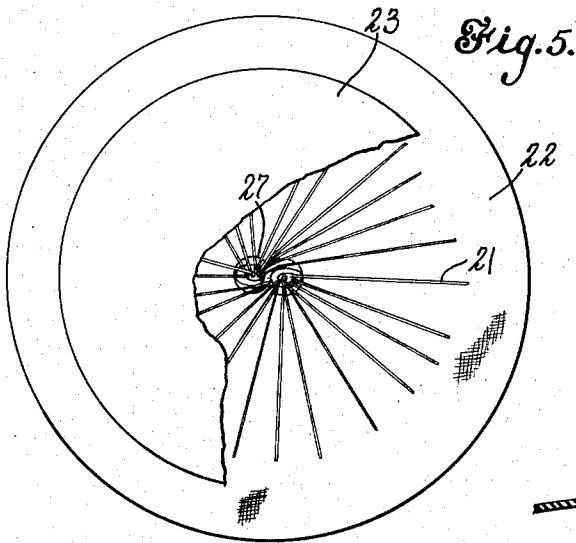


Fig. 7.

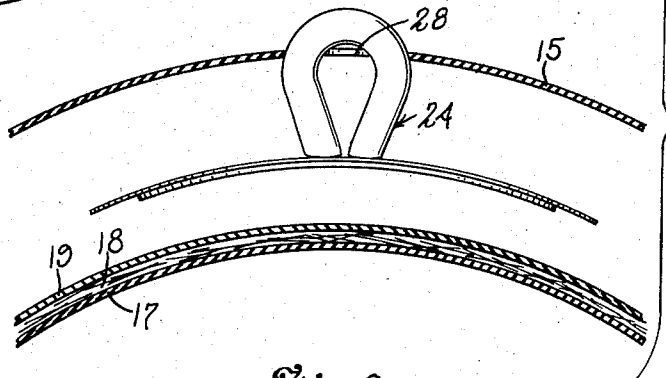
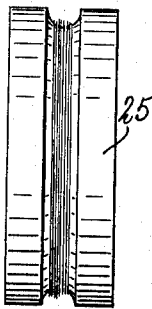
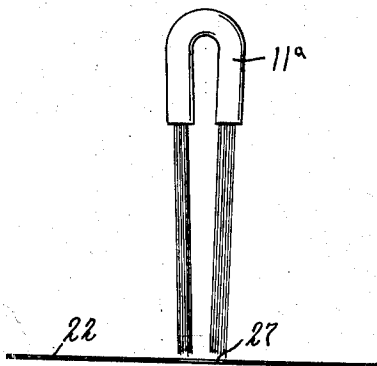


Fig. 8.

Fig. 9.



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METHOD OF MAKING A TETHERING RING FOR A PLAYBALL

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2 Claims. (Cl. 154—90)

This invention relates to improvements in tether balls, that is to say, balls used in playing the game of tether ball or for other purposes where the ball is limited in its movement by an attached tethering member.

In the form hereinafter described, the body of the ball to be tethered is an inflatable body or carcass such as used in volley balls, but the invention is applicable to balls of other kinds.

In some previous tether ball structures, metallic inserts in the wall of the ball have been employed for the purpose of fastening the attaching cord. Such inserts are objectionable for the reason that they may cause injury to those playing the game of tether ball or to persons using such a ball for other purposes. In the present case, attachment of the cord to the ball is facilitated by providing on the ball an outwardly projecting attaching ring or eye, but such ring or eye is flexible so that contact therewith is not a hazard to be avoided. While lacking metallic reinforcement, nevertheless the attaching means for the cord provides a very strong and durable connection between the cord and the ball.

One of the objects of the invention is to provide an improved process for making a tethering means of the ring or eye type for attachment to a playball or other ball.

Another object is to avoid complication in the process of making a structure of this nature in which a fibrous synthetic reinforcement of great tensile strength is employed.

In the accompanying drawings:

Fig. 1 is an elevation of a tether ball embodying the invention;

Fig. 2 is a section on a scale large than actual size showing that part of the ball upon which the attaching ring is provided;

Fig. 3 is a side elevation of an assembly of parts including a ring blank used in making the ball;

Fig. 4 is an enlarged vertical sectional view of the assembly shown in Fig. 3;

Fig. 5 is a bottom plan view of this assembly with a portion of the lower rubber patch broken away;

Fig. 6 is an exploded view showing somewhat diagrammatically the relationship of certain parts of the final assembly;

Fig. 7 is an elevation of a spool on which cord is wound;

Fig. 8 shows a rubber cover or sleeve applied to lengths of cord; and

Fig. 9 shows the assembly or article of Fig. 8 at a later stage.

In the drawings, the ball selected for illustration is an inflatable ball having a body similar to that of a volley ball and having applied to the body a tethering ring suitable for the connection of a tethering cord or other tethering element. The ring is a ring of rubber or like cured material projecting from the ball body or carcass, there being a connecting neck at the base of the ring,

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which neck is of the same material. The ring is strongly reinforced internally by being provided with an interior core of nylon cords. These cords which are in parallel arrangement are not only extended through the body of the ring but through the ring neck and into the reinforced carcass wall at the base of the neck, there being lateral extensions from the cord ends coming down through the neck into the reinforcing structure of the ball wall. These lateral extensions at the end portions of the cords, which protrude from the ring neck at the base of the latter, are in a diverging or splayed arrangement so that they fan out and reinforce a considerable area around the neck of the ring, as hereinafter described. The ball wall in this example includes an inner rubber bladder, an external layer of thread or cord applied thereto, a cushioning layer of rubber over the thread or cord and an external cover layer of rubber. In that part of the wall to which the tethering ring is applied, there are additional layers, as hereinafter described. The external or finishing layer of rubber used in the major part of the ball wall is welded to or coalesced with a rubber disk, as hereinafter described, which disk in the completed ball is joined with the finishing layer or cover layer and with the ring neck so as to be in one piece therewith and to present in this region of the ball a smooth continuous external surface.

In the drawings, the completed ball is shown in Fig. 1, the same having a spherical body 10 with a rubber surface that may be grooved as customary in balls of this type. The tethering ring or eye is indicated at 11, and at 12 is the inflating valve which can be of any preferred kind. The neck portion of the ring is indicated in Fig. 2 at 13, the fibrous reinforcing core at 14, the external or finishing layer of rubber used in the major part of the ball wall at 15, the rubber portion or disk joining the finishing layer with the ring neck at 16, and the bladder portion of the ball wall at 17. For purposes of explanation, the hatching of Fig. 2 shows certain rubber parts such as the disk 16 as separate parts rather than as merged parts.

It has been indicated above that in this form the ball wall includes in addition to the rubber bladder 17 and the finishing layer of rubber 15, a layer of thread or cord applied to the bladder and a cushioning layer of rubber applied over the thread or cord which reinforces the ball wall. In Fig. 6 is shown a reinforcing thread layer 18 applied over the bladder 17 and a cushioning layer of rubber 19 applied over the thread layer in forming the ball wall, but in the completed structure, the intermediate rubber layer 19 and the thread layer 18 are pressed together to embed the thread in the so-called intermediate rubber, and this composite layer of thread and rubber is indicated in Fig. 2 at 20.

The fibrous core 14, as above mentioned, reinforces the body of the tether ring as well as the neck 13 of the ring and for this purpose the core is disposed in ring formation within the rubber body of the tether ring, with portions of the core arranged laterally of each other within the neck 13. The laterally extended end portions of the elements of core 14 are indicated at 21 in Fig. 5, which view shows the laterally located core portions from which these extensions 21 are extended. These extensions 21 in divergent arrangement are located against the lower face of a disk 22 of textile material forming a friction patch, and these extensions 21 are held in place against the friction patch 22 by an adhesively applied disk or patch 23 of uncured rubber which is cured at a later stage.

The parts just referred to, as shown in Fig. 5, form a part of an assembly also shown in Figs. 3, 4 and 6 which is employed in making the ball, this assembly being in-

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licated generally at 24 and including together with the disks 22 and 23 and the interposed filamentary extensions 21, a partially formed ring or ring blank of rubber indicated at 11^a with its reinforcing core member indicated at 14^a. This assembly 24 is at a certain stage placed in the ball wall structure in the relationship shown in Fig. 6, as hereinafter described.

In making the assembly 24, the first step may be to provide the fibrous core, and in making such a core, it is preferred to employ a number of parallel filamentary elements of nylon cord. Each element may consist of two or more filaments stranded together. It is preferred to wind the cord a number of times around a spool or mandrel such as shown at 25 in Fig. 7, say, about 30 turns, and to then cut the hank or coil to provide a core which may have a length of, say, eight inches. This core, in the form of a pencil, is then covered at its intermediate part by a sleeve 26 of uncured rubber, the adjacent edges of a folded rubber piece being seamed together to provide the sleeve. The next step is to fold the sleeve and the enclosed core so as to produce a generally U-shaped article, as shown in Fig. 9, the same being a U-shaped rubber member with a multiplicity of filaments projecting to a substantial extent from the ends of the U. The filament ends are then projected through a suitable aperture 27 in the disk 22 and the ends of the sleeve brought down into contact with the disk after which the filaments are splayed out, as shown in Fig. 5, and firmly held in place between disk 22 and rubber patch 23. The filaments are usually coated with a tacky substance and the rubber patch adhesively applied to them and to the friction patch. While, in the drawings, the friction patch is shown as consisting of a single layer, it may have two adhesively interconnected layers of friction material which layers have their threads in biased relationship so as to give increased strength.

The individual filamentary extensions or continuations from the core body radiate from locations placed side by side and corresponding to the side by side locations of the free ends of the rubber blank 11^a. The diameter of the rubber patch 23 substantially corresponds to the diameter of the region or area in which the elements 21 are located, and the friction disk 22 is preferably of a somewhat greater diameter than the disk 23.

In making the ball, the procedure in assembling the rubber bladder 17, the thread winding 18, and the layer of intermediate rubber 19 may be in accordance with the usual practice, the bladder being inflated to a certain degree, the thread being wound on the bladder, and the layer 19 of uncured rubber stock being placed over the winding. The assembly 24 of rubber ring blank, internal core, and underlying attached flexible and composite base portion, may then be incorporated in the wall being formed. The flexible base part of the ring assembly is applied to the rubber layer 19 in the proper location so that the rubber patch 23 and the peripheral portion of the friction patch 22 will be in contact or substantially in contact therewith. The next step is to place in position the layer 15 of uncured rubber. This is usually in quadrants or like pieces of sheet stock and one of the pieces is provided with a hole 28 which enables it to be placed over the ring blank and to have its inner surface in contact with the friction patch 22. The next step is to place over the protruding ring blank a disk 16^a of uncured rubber which may have a diameter of about two inches, which disk or patch has a hole 29. The elasticity of the disk or patch 16^a will enable it to be fitted over the ring blank by stretching so as to be disposed around the lower part of said blank.

The assembly of the members just referred to is shown schematically in Fig. 6, and it will be understood that after this assembly has been completed and the parts in the tethering portion of the ball wall have been pressed into adhesive relationship to each other, the article is ready for molding. In a suitable mold, the wall of the

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ball has its parts bonded together, condensed and properly shaped, and the final shape is given to the tether ring 11. The mold portion which forms the tether ring is of such formation as to convert the ring blank from the shape shown in Fig. 4 to that shown in Fig. 2. The rubber compounds used in the assembly may contain the usual or preferred vulcanizing agents, and usually vulcanization of the composite article is effected by the heating of the mold.

In the molding operation, the rubber disk or patch 16^a is flowed to fill in and strengthen the wall of the ball adjacent the neck portion of the tether ring and in this operation the disk or patch 16^a is joined in one piece with the neck and with the covering layer 15, this being the piece which forms the above-described part 16 of the completed structure. The completed rubber ring is quite flexible and resilient.

By the herein described improvements, the tethering ring or eye of the ball is made flexible so that contact thereof with the player's hand, head, or other part of the body, is unlikely to cause injury. There is no inner metallic reinforcement such as commonly used in previous balls of this type, which reinforcement is likely to cause injury. Without a metallic reinforcement, the present structure has unusual strength by reason of the provision of the flexible fibrous core within and around the ring, extended through the ring neck, into the ball wall, and firmly anchored in the ball wall. The provisions for anchoring the flexible nylon core in the ball wall are especially advantageous as they do not detract from the flexibility of the tethering ring, while, at the same time, maintaining a strong strain-resistant bond between the ring and the wall. This is produced by extending individual elements of the core laterally into the ball wall over a relatively large area surrounding the ring neck, the laterally disposed core elements being of substantial length in comparison to the part of the core which is enclosed in the ring, and these lateral elements being very effectively anchored between inner and outer layers of the ball wall. In the particular case shown, the layers between which the ring base is anchored are the rubber layers 15 and 19 to which the base part of the ring has a strong bond over a large area. The base of the ring blank being quite flexible, the same can readily take the curvature of the carcass, and in the ball wall it occupies a minimum of space depthwise while serving as a very effective anchor for the ring.

The illustrated ball structure is by way of example only and various changes can be made in the details of the structure and in the procedure in making the ball without departing from the principles of the invention and the scope of the claims.

What I claim is:

1. The method of making a ring blank structure for a tether ball which comprises forming an elongated substantially straight core of a plurality of filaments, placing about the middle of said core an embracing sleeve of rubber which is of substantially less length than the core, then folding the article thus produced symmetrically so that it assumes substantially U shape with filaments extending in approximately parallel groups from the ends of the sleeve, passing the ends of the groups through an aperture in a disk-like reinforcing member, moving the ends of the sleeve toward the reinforcing member until the sleeve ends are in substantial contact with said member, splaying out the filaments against the lower surface of the anchoring member in a radiating formation, and applying an adhesive disk to the anchoring member so as to anchor said elements between the disk and the anchoring member.

2. The method of making a ring blank for a tether ball, which ring blank has a rubber ring body and an underlying disk-like anchoring base, which method comprises forming a pencil-like body of parallel fibrous fila-

ments, applying to the intermediate portion of this body an encircling rubber sleeve of substantially less length than the body, folding the article thus produced so that the sleeve is made U shaped with the filaments projecting from the respective ends in the same direction, and then fastening the sleeve to an anchoring body by passing the filaments through a hole in an anchoring disk and fastening the filaments to the opposite face of the disk with said filaments disposed substantially radially of the disk.

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