Jan. 5, 1954 E. A. ROBINSON 2,665,132

REINFORCED BALL CASING AND METHOD OF MANUFACTURE

Filed April 7, 1948

Fig. 1

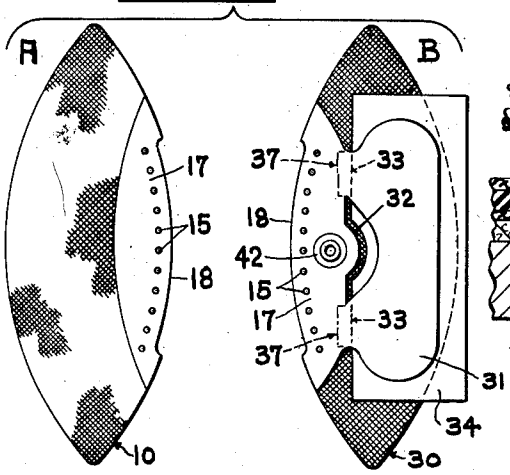


Fig. 2

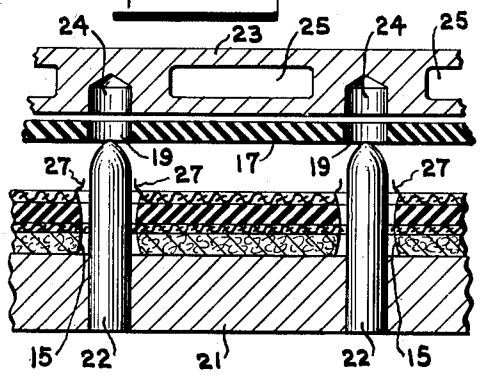


Fig. 3

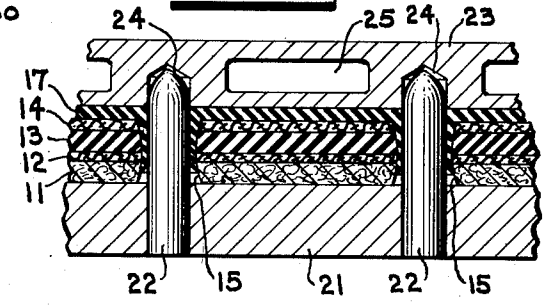


Fig. 5

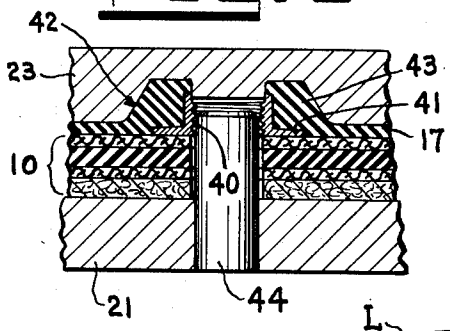
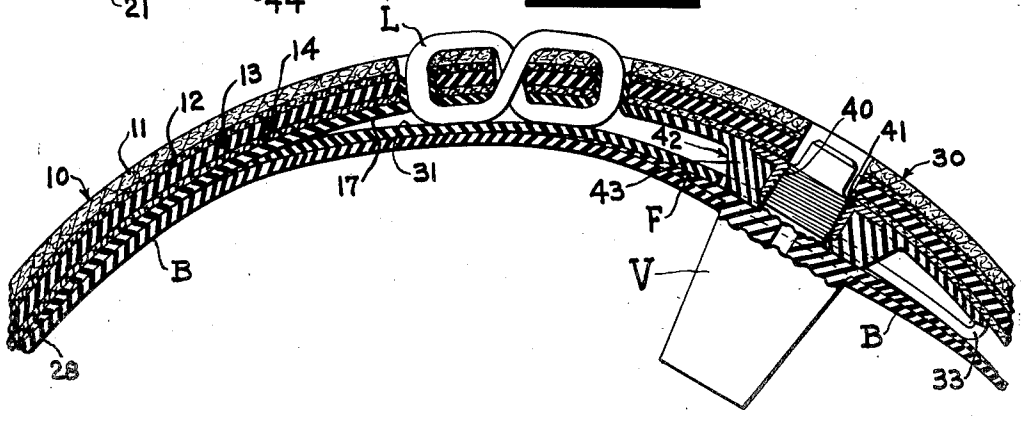


Fig. 4



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REINFORCED BALL CASING AND METHOD OF MANUFACTURE

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10 Claims. (Cl. 273—65)

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The invention relates to an improved reinforced laced casing and casing section of an inflatable article such as a football or play ball. It also relates to a casing and casing section having a protecting flap. The method of manufacturing is also a part of the invention. The lacing provided at the opening for insertion of a bladder in the ball concentrates the strain of the lacing to a narrow strip thereof defined essentially by the holes through the casing in which the lacing is passed. Heretofore the reinforcing was secured by stitching fabric to the inner face of the casing section. The holes produced by the stitching tends to weaken the casing at the holes to a certain extent and the fabric was not elsewhere secured to the casing except at the stitching so that the reinforcing secured was not as efficient as it might be. Also it is not easy for an operator to follow the lines provided upon the casing to guide the stitching so that many times the uneven stitching created a poor appearance and sometimes ineffectively sewed the reinforced fabric to the casing. Also it takes considerable time to stitch such reinforcing fabric to the casing since usually three lines of stitches was provided.

It is an object of the invention to construct a casing or casing section having a layer of reinforcing molded to the inner face of the casing whereby the reinforcing is bonded thereto throughout its surface and obtains a more effective reinforcement of the casing at the holes for the lacing.

Another object of the invention is to construct a casing or casing section having some of the molded reinforcement to flow at least partially into the lacing holes so that loose fibre ends at the hole edges are bonded therewith thereby further reinforcing the holes and securing these loose ends.

Another object is to construct a casing or casing section having a protecting flap molded to or with the molded reinforcing at the holes which flap may be bent over the holes and lacing at the casing opening and protect the bladder from chafing by the lacing.

A still further object is to provide a method of reinforcing the lacing holes in a casing by molding the reinforcing to the casing.

Another object is to provide a method of molding the reinforcing and securing a bladder valve holding insert to the casing section at the same time.

A still further object is to mold a reinforcing at the lacing holes and a protecting flap at the same time.

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Other objects of the invention will be more apparent from the following description when taken in connection with the accompanying drawings illustrating preferred embodiments of the construction and method in which:

Figure 1A is a plan view of a casing section with the molded reinforcing patch attached thereto.

Figure 1B is a plan view of the adjacent casing section showing the section with molded reinforcing at the lace holes and with a flap molded integrally thereto.

Figure 2 is a section through the molding plates with a casing section positioned therebetween and a reinforcing patch of uncured rubber in position prior to being pressed and molded to the inner surface of the casing.

Figure 3 is a section through the molding plates showing the reinforcing patch being molded to the inner surface of the casing section with some of the reinforcing material extending into the lacing holes.

Figure 4 is a section through an inflatable article such as a football in assembled and inflated relation.

Figure 5 is a section through the mold plates showing a valve holding means being molded to the casing section.

In making an inflatable article such as a football, play ball and the like, a plurality of casing sections are cut from casing material. For a football four generally oval shaped sections are cut which are stitched together at their edges to form the complete casing. Two sections 10 and 30 of a football casing are shown in Figure 1 which constitute the sections a portion of which edges are not sewn together to form the casing opening through which the bladder may be inserted and thereafter the opening closed with lacing L. The casing sections may be of any suitable material, that shown being a composition material having an outer layer 11 which may be composition material simulating leather, a fabric layer 12, a layer of rubber 13 and an inner layer 14. It is clear that any suitable casing material may be used either as a single layer although as will appear more fully hereinafter an inner fabric layer 14 is desirable.

A patch 17 of sheet reinforcing material of uncured rubber-like material, that is any material which is vulcanizable upon application of heat or heat and pressure, is formed such as by cutting to any desired shape with the edge 18 preferably conforming to the edge of the casing section. The rubber-like or vulcanizable ma-

terial may be natural or synthetic rubber alone but it has greater strength if fibrous material is dispersed or mixed therein such as shredded tire cord or cotton flax. The casing section is then placed between the plates of a molding or curing press in which the lower plate 21 is cold or unheated and may be cooled if necessary in order to assure that the heat applied in the curing process does not scorch the outer surface of the casing. The lower plate may carry pins 22 which receives the lacing holes 15 to locate the casing in proper position and holes 19 may be provided in the reinforcing patch to also locate it in proper position with respect to the casing.

The upper plate 23 has holes 24 therein to receive the ends of the pins 22. The upper plate is heated in any suitable manner such as by passing steam through the chambers and pressed down upon the uncured reinforcing patch. The heat cures the reinforcing material and molds it to the inner surface of the casing section so that it is integrally bonded with the inner surface thereof. With an inner layer of fabric 14 on the casing section the reinforcing material flows into the interstices in the fabric to more firmly bond the cured reinforcing patch thereto. The molded material also holds the threads or yarn of the fabric in position and thereby materially strengthens the casing and at least this reinforced part of the layer of fabric material.

Usually, in cutting the lacing holes through the casing section, the threads of the fabric do not cut cleanly and usually loose fibres 27 remain at the edges. If the holes are a little larger in diameter than the pins 22 some of the reinforcing material flows into the hole and anchors these loose ends thereby further reinforcing the holes through the casing. Heretofore such loose thread ends may be pulled with the lacing when the lacing is threaded through the hole and because of its narrow dimension may begin a cut in the casing material at the hole. With these threads bonded in the hole with the reinforcing material this cannot happen. In curing and molding or bonding the uncured sheet of rubber-like material to the inner surface of the casing section, the pressure and heat applied thereto causes the edges of the reinforcing patch to flow outwardly forming a tapered edge 28 similar to a skived edge such as provided with leather reinforcing. This tapered edge will not show as a shoulder or edge through the casing when the bladder is inflated therein.

The two adjacent casing sections may be alike, however, preferably one of the casing sections may carry a protecting flap as shown in the section Figure 1B. With this section the reinforcing sheet or patch of crude or uncured rubber-like material may be cut as shown in Figure 1B, with the reinforcing patch and the flap 31 attached thereto as one piece. A hole or opening 32 may be provided therebetween if desired thereby forming two hinge portions 33. This hole is provided so that when the flap is folded over the lacing holes the valve opening and valve retaining means 40 to be described hereinafter, is not blocked by the flap.

For this section of a ball casing the casing section is placed upon the cold plate 21 of the curing press as for the section of Figure 1A and the uncured and formed or cut sheet of rubber-like material is placed thereover. Since it is not desired to have the flap molded or adhering to the inner surface of the casing section, means may be placed between the flap and the inner surface of the casing such as a sheet of paper, holland cloth, a thin plate of metal or other material, tack eliminating powder or soap solution. The insertion of a thin metal plate 34 provides the simplest manner of preventing adhesion. The upper heated plate is then brought down into contact with the reinforcing patch and protecting flap upon the casing, pressure being applied between the plates and heat being applied to the upper plate 23 so that the reinforcing patch 17 is cured and molded to the inner surface of the casing section but the flap 31 is not molded thereto because of the protecting means or plate 34. The flap 31, therefore, is free to be folded over the lacing holes in the completed ball, as shown in Figure 4, the flap hinging upon the hinge portions 33.

It is not necessary that the flap 31 and the reinforcing patch 17 be formed or cut in one piece. As a matter of fact a sheet of uncured rubber-like material such as the patch 17 may be used with the casing section Figure 1B and a separate flap cut of the general shape as shown in dot-dash lines. When so constructed the two reinforcing patches may be identical for each casing section. In molding, however, the tongues 37 provided upon one of the formed portions of uncured material and shown as being carried by the protecting flap 31 is laid over the reinforcing patch 17 and when molded the uncured tongues 37 flow and merge integrally with the patch 17 to form an integral reinforcing patch bonded to the casing section and a free flap hinged to the reinforcing patch.

In molding the reinforcing patch to the section, it is desirable also to secure or attach a valve retaining means 40 to the casing at the same time and in one operation. Any suitable valve retaining means may be used, that shown being a threaded bushing which receives a threaded stem carried by the valve V for the bladder B. The valve may be secured to the bladder in any suitable fashion such as by cementing the flange F of the valve to the bladder or it may be integral therewith. So far as securing the valve retaining means to the casing section is concerned, it needs a flange 41 which is placed upon the inner face of the casing section and located in proper position by a pin 44 after which the uncured sheet of the reinforcing patch is placed thereover. The mold plate will carry a molding cavity 42 conforming with the shape of the anchoring cover or button 43 under which the retaining means is secured to the casing section.

This invention is presented to fill a need for improvements in a reinforced casing and method of manufacture. It is understood that various modifications in structure, as well as changes in mode of operation, assembly, and manner of use, may and often do occur to those skilled in the art, especially after benefiting from the teachings of an invention. Hence, it will be understood that this disclosure is illustrative of preferred means of embodying the invention in useful form by explaining the construction, operation and advantages thereof.

What is claimed is:

1. A ball casing part and the like comprising a section having lace holes therethrough adjacent an edge thereof, and a reinforcing patch of vulcanizable material molded to the inner surface thereof at least between the lace holes and the adjacent edge of the section, and the molded reinforcing material projecting at least partially into the lace holes.

2. A casing part or the like comprising a section of flat substantially inflexible material having at least one hole therethrough, a metallic insert at the hole having a flange contacting the section and a central opening, and a reinforcing patch of vulcanizable material vulcanized to the section around the hole and at least over the flange of the metallic insert with the central opening uncovered to secure the latter to the section solely by the patch.

3. A ball casing and the like comprising a plurality of casing sections of a substantially inflexible material having their entire edges but one secured together forming an enclosing casing with an aperture, at least one section having lace holes therethrough at the aperture and adjacent the edge of the casing section, and a reinforcing patch of vulcanizable material molded to the inner surface of each section having lace holes and at least in an area between the lace holes and the edge of the section, the reinforcing patch material extending at least part way into the lace holes.

4. A ball casing as in claim 3 including a layer of fabric secured to the inner surface of each casing section having lace holes, and the reinforcing patch material being molded at least partly into the lace holes.

5. A method of reinforcing lacing holes in a casing section adapted to receive an inflatable bladder comprising forming a reinforcing patch of uncured vulcanizable material in sheet form, applying the patch to the inner surface of the casing section to be reinforced, applying heat and pressure to the uncured patch to mold and cure the same to the casing section partially filling the lacing holes with pins of lesser diameter than the holes while the patch is being molded and cured whereby some of the vulcanizable material flows at least partially into the holes.

6. A method of reinforcing lacing holes for a casing section adapted to receive an inflatable bladder and for securing a bladder valve holding insert thereto comprising forming a reinforcing patch of uncured vulcanizable material in sheet form, applying a bladder valve holding insert to the casing section, applying the patch to the inner surface of the casing to be reinforced and over the insert, applying heat and pressure to the uncured patch to mold and cure the same to the casing section and over the insert.

7. A method of reinforcing lacing holes in a casing section adapted to receive an inflatable bladder and of forming a protecting flap integral therewith comprising forming at least one patch of uncured vulcanizable material in sheet form conforming approximately to the shape of the reinforcing patch and protecting flap, applying the same to the inner surface of the casing section, placing non-adhering means between the protecting flap and the inner surface of the casing, and applying heat and pressure to the reinforcing patch and protecting flap to mold and cure the same with the reinforcing patch bonded to the casing section.

8. A method as in claim 7 including placing a bladder valve retaining means between the reinforcing patch and the casing section whereby the latter is secured in place when the patch is molded and cured.

9. A method as in claim 7 in which the reinforcing patch and the protecting flap are separately formed and laying a portion of one over a portion of the other before applying heat and pressure whereby the two are integrally molded together when heat and pressure is applied.

10. A method as in claim 7 in which the reinforcing patch and the protecting flap are formed as one piece.

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