

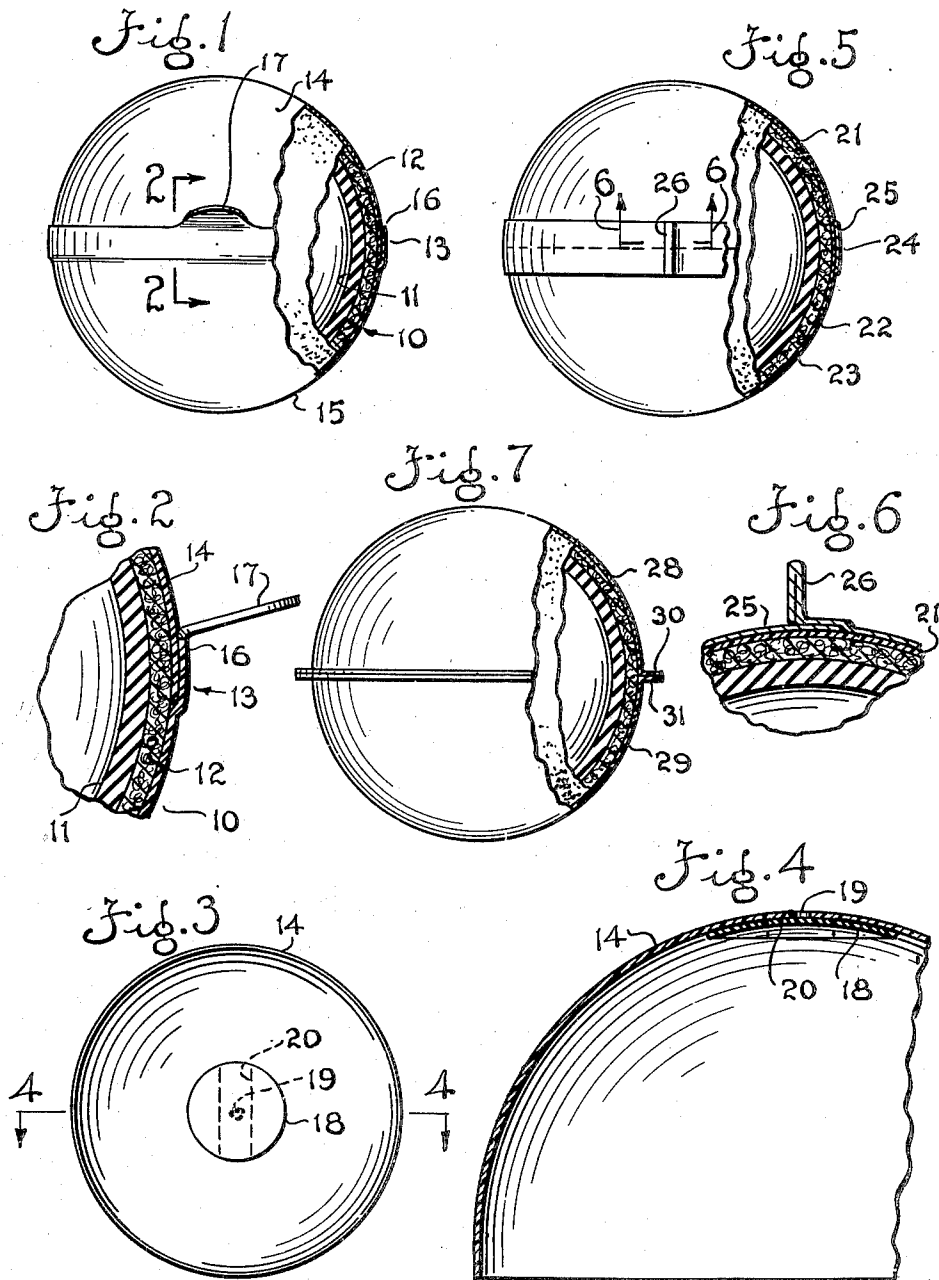
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PRESSURE PACKAGED TENNIS BALL

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PRESSURE PACKAGED TENNIS BALL

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This invention relates to packaged tennis or like inflated balls, and to methods for producing the same.

Tennis balls, in general, comprise an elastic casing of vulcanized rubber having adhered thereon an outer cover of felt material. In the manufacture of these balls, great care is taken to meet established standards with reference to size, shape, rebound, etc. It has been found, however, that due to the elasticity of the ball casing, and to the superatmospheric inflation pressure thereof, the balls have an inherent tendency to grow in size, and also that if the balls are kept out of use for a substantial period of time after manufacture thereof, the inflating fluid tends to seep or diffuse outwardly through the ball casing, due to the same being porous to a certain extent. Various efforts have been made to overcome these difficulties, but such efforts have not been completely satisfactory for various reasons. The present invention overcomes these difficulties by utilization of certain known characteristics of tennis balls in particular.

One object of the present invention is to provide an improved packaged ball of the character described, which will not only retain its given size and shape until such time as it is to be used, but which will also retain given superatmospheric inflation pressure thereof to preserve its rebound qualities.

Another object of the invention is to provide improved individually packaged tennis or like ball, including an attractive protective covering, which materially enhances the sales appeal of the ball.

Another object of the invention is, to provide an improved protective jacket for tennis or like balls, including means for readily removing the jacket when it is desired to use the ball.

Another object of the invention is to provide improved methods for producing packaged tennis or like balls having the features described in the foregoing objects.

These and other objects of the invention will be manifest from the following brief description and the accompanying drawings.

Of the accompanying drawings:

Figure 1 is an elevational view of a tennis ball, partly broken away and in section, the same having thereon a protective jacket in accordance with one form of the invention.

Figure 2 is an enlarged fragmentary cross-section, taken substantially on the line 2—2 of Figure 1.

Figure 3 is an interior view of one of the hemi-

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spherical jacket segments of Figure 1, illustrating the manner of providing a flapper valve therein.

Figure 4 is a cross-section, partly broken away, taken on the line 4—4 of Figure 6.

Figure 5 is a view similar to Figure 1, also partly broken away and in cross-section, illustrating another form of the invention.

Figure 6 is an enlarged fragmentary cross-section, taken substantially on the line 6—6 of Figure 5.

Figure 7 is a view similar to Figures 1 and 5, illustrating another modified form of the invention.

Referring particularly to Figures 1 and 2, there is illustrated a packaged tennis ball casing embodying the features of the invention, said ball being of the usual type, including an inner spherical body 11 of vulcanized rubber and an outer cover 12 of felt adhered thereto, said felt cover providing interstitial spaces in the outer surface portions of the ball which will be utilized in conformity with the present invention in a manner to be described later. A segmental jacket 13, of suitable inextensible, gas-impervious material, is provided to preserve the ball against growth or expansion due to superatmospheric pressure of the inflation fluid of the ball, which fluid may be air or other gas at approximately 18 lbs. per square inch. The jacket may be composed of transparent or translucent plastic material, such as acetate, rubber hydrochloride film, cellulose, viscose, etc. Although the jacket material may also be of metal such as aluminum, transparent plastic material is partially advantageous, because it enhances the sales appeal of the ball, while frangible material is desirable to facilitate ready removal of the jacket therefrom.

Jacket 13 may be preformed, as by the use of cavity molds or other means, to provide hemispherical halves or segments 14 and 15, which halves are proportioned to embrace the ball while at its normally inflated size, and to have marginal edge portions in slightly overlapping relation, as indicated at 16. To further facilitate ready removal of the jacket segments from the ball, for use of the same, one segment 15 may have one or more, preferably two, integral tabs 17 formed at its free marginal edges, whereby such tabs may be twisted or pulled to tear the segment 15 sufficiently to permit complete removal of the jacket.

The present invention contemplates an improved mode of preventing seepage of the inflation pressure from within the ball, outwardly

through minute pores normally in the rubber casing thereof, which seepage will occur if the ball is not used until after considerable time has elapsed from the manufacture thereof. The improvement for this purpose includes application of superatmospheric pressure fluid, substantially equal to or perhaps even greater than the inflation pressure of the ball, within the interstitial spaces or space provided between the ball casing and jacket thereof. This may be accomplished in different ways. One method contemplated herein includes the steps of applying the jacket segments 14 and 15 to the ball while it is maintained in a pressure chamber at superatmospheric pressure, of compressed air, helium, oxygen or other gas, and while retaining the segments embraced about the ball, applying a liquid solvent or a suitable adhesive between the connecting surfaces of the overlapping edge portions of the segments. If these operations are carried out completely within a room at such superatmospheric pressure, however, the gas used must be capable of being breathed by the operator. Thus, the segments may be adhesively joined at the lapped edges thereof to seal the restraining jacket against possible escape of pressure fluid from between the ball casing and its jacket after removal from the pressure chamber. Until the jacket is so removed, as previously described, the superatmospheric pressure in the interstices or space between the ball casing and the jacket prevents seepage of said inflation pressure outwardly through minute pores in the rubber body 11, which seepage would cause the ball to become underinflated or lifeless, the inextensible or inextensible jacket 13 at the same time preventing growth of the ball due to the superatmospheric inflation pressure, to a size which might exceed that called for by standard requirements.

For use with alternative methods for applying superatmospheric pressure fluid between the ball casing and the restraining jacket, the segment 14, for example, may be provided with a flapper valve 18 comprising a relatively small patch of thin, flexible, gas-impervious material 18, such as natural rubber, the same being applied to the interior surface of the jacket segment, over a relatively small aperture 19 therein. Valve patch 18 may be adhesively attached to the casing over substantial areas thereof at opposite sides of aperture 19, to define a passage 20 for communication with the exterior of the jacket with the interior thereof, the arrangement being such that superatmospheric fluid pressure applied to the inner surface of the flapper valve 18 will seal aperture 19. With this construction, the method of applying the jacket 13 to the ball may be substantially varied. For instance, the jacket segments 14 and 15 may be applied to the ball by use of any suitable means, and adhered at the overlapping or otherwise joined portions thereof, indicated by the numeral 16, as by use of solvents or adhesives according to the material of the jacket, and these operations being carried out under normal atmospheric conditions. Balls thus provided with pressure restraining jackets may then be placed in a suitable chamber at required superatmospheric pressure (such as air or other suitable gas at approximately 18 lbs. per square inch), the result being that the superatmospheric pressure fluid will enter the space between the ball and the restraining jacket, through the valve aperture 19 and passage 20 of flapper valve 18. The balls may then be removed from the influence of said superatmospheric pressure, to nor-

mal atmospheric pressure conditions, whereby the superatmospheric pressure between the ball and the restraining jacket will apply requisite pressure to flapper valve 18 to maintain a tight pressure-retaining seal over the aperture 19.

In the form of the invention illustrated in Figures 5 and 6, hemispherical segments 21 and 22 are applied to a tennis ball 23 as by one of the methods previously described, the restraining jacket being of suitable inextensible pressure-fluid impervious material as before. The segments, however, are proportioned so that the complementary edges thereof may be adhesively joined in abutting relation as indicated at 24. With or without adhesion of the abutting edges, according to circumstances, a reinforcing strip or band 25 of substantial width may be applied around the abutting edge portions to provide a tight seal and to hold the segments together against internal pressure. For this purpose, the band 25 may be of material of the type having a tacky adhesive substance on the inner face thereof, to permit ready removal of the band when it is desired to remove the jacket for use of the ball. Such removal of the band 25 may be further facilitated by providing a tab 26, formed by overlapping the ends of such tacky strip material and folding an extension of one end upon itself (see Figure 6). The band 25 may also be of material which is adhered by use of compatible solvents, or it may be of material such as rubber hydrochloride sheeting shrunk onto the ball jacket by use of heat, or otherwise heat-sealed onto the jacket, according to the material thereof used. The method of applying the protective jacket so as to provide equalizing superatmospheric pressure between the ball cover 23 and the jacket may otherwise be as previously described.

Referring particularly to Figure 7, there is illustrated another type of packaged tennis ball involving the use of jacket segments 28 and 29, formed with integral outwardly extending annular flanges 30 and 31, respectively, and adhered in complementary registry, as shown, when the segments are applied to embrace the ball in sealing relation. The materials utilized for the segments, the adhesives for the same, and the method of applying the segments to retain superatmospheric pressure between the ball and the jacket thereof may be substantially as previously described.

With reference to the various forms of the invention, when molded thermo-plastic synthetic resin materials are used for the jacket segments, adhesion of the connecting portions thereof may be accomplished by application of compatible solvents or acids of known types. Examples of such synthetic resins are celluloid, cellulose nitrate, cellulose acetate, cellulose acetate butyrate, ethyl cellulose, vinyl, and acrylic plastics. For adhesion purposes, the cellulose compounds are softened or made slightly soluble in the presence of alcohols such as acetone, and although the vinyls resist alcohol, they are soluble in ketones and esters. Such solvents are readily applied at overlapping or abutment edge portions of the jacket segments, as by touching around the edge portions thereof with a brush which has been dipped in the solvent.

Thus has been provided improved individually packaged tennis balls and methods for producing same, by which the resulting product may be preserved in requisite condition for use without deterioration, distortion or loss of rebound pro-

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pensities, for substantially long periods of time. Although the invention has been described in various forms with particular reference to packaging a single tennis ball, it has been found in actual practice that tennis balls may be similarly packaged in multiples, such as two's or three's, with highly satisfactory results.

Other modifications of the invention may be resorted to without departing from the spirit thereof or the scope of the appended claim.

What is claimed is:

A packaged product of the character described, comprising a tennis ball including an inner elastic casing inflated by superatmospheric pressure to normal playing size and an outer cover of felt, and a pressure-restraining jacket substantially firmly embracing said ball, interstitial spaces of said cover between said casing and said jacket containing pressure-fluid at superatmospheric pressure approximating said inflation pressure of the casing, said jacket having a pressure-fluid receiving aperture therein and a check valve in association with the aperture to seal the same against escape of pressure-fluid, said valve including a piece of thin flexible material having

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portions thereof at opposite sides of said aperture adhered to the inner surface of said jacket, the area between said adhered portions of said valve piece providing a passage for pressure-fluid from the exterior to the interior of the jacket through said aperture.

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