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GAME BALL

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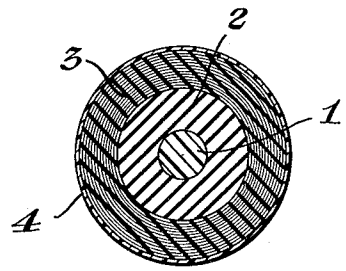

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GAME BALL

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This invention relates to game ball constructions and more particularly to a golf ball which exhibits superior flight and distance characteristics when compared to other balls made in accordance with the rules of the United States Golf Association while possessing good "click" and "feel" qualities.

The most popular golf balls in use for many years have been those having a liquid center or core. The liquid ordinarily is contained within a soft, rubber-like envelope housed in a rubber capsule around which is wrapped a plurality of strands or bands of rubber to form a compressible body. The body then is encased in a cover formed of balata or other material to produce the ball. Another type ball currently is being manufactured which makes use of the conventional cover and rubber body, but has its core formed of a metal ball which is received within a rubber capsule.

Many problems had to be overcome before an acceptable liquid center ball could be manufactured and sold. Probably the principal difficulty in the manufacture of a liquid center ball is maintaining the liquid and its enclosing capsule in spherical form. If the liquid core is not maintained spherical it will assume an oblate or elliptical form and the ball will react differently when hit along a line paralleling the major axis of the ellipse than it will react when hit along a line paralleling the minor axis of the core.

The problem of maintaining the core spherical is intensified by the winding of the rubber band body about the core. The rubber bands are wound under considerable tension and, during the initial winding operation at least, tend to deform the core from truly spherical shape. This has been counteracted to some extent by freezing the liquid forming the core, but it is not uncommon for the frozen core to have a flat spot adjacent at the point it is supported during the freezing process. Flatness of the core causes the ball to react erratically in a manner analogous to the manner a ball having an elliptical core reacts.

The difficulties in maintaining the core of a ball truly spherical have been overcome to a large extent by substituting a hard object such as a steel or other metal ball for the liquid core. The use of a metal core, however, introduces other problems such, for example, as maintaining proper weight. Metal, being considerably heavier than the liquid used in liquid center balls, requires lightening of some other part of the construction unless the size of the metal core is reduced considerably as compared to the size of the liquid core. In either event, compensation must be made for the weight of the metal with consequent effects on the flight and distance characteristics of the ball.

In both liquid and metal core balls, the substance comprising the core is relatively incompressible. Consequently, when such balls are struck by a golf club, the overwhelming majority of compression which takes place occurs between the cover and the core. In other words, the core of such a ball is not materially compressed or deformed. As a result, the distance imparted to a conventional ball is a function of the impetus caused by the ball's engagement by a moving golf club and the restoration of the deformed or compressed cover and body portions of the ball.

The restoration of the deformed portions of a conventional golf ball usually is accomplished within about

twenty feet from where the ball was hit. The United States Golf Association, therefore, has established its standards of initial velocity on the basis of the first twenty feet of travel of a ball. The maximum velocity within this distance countenanced by the association is 250 feet per second plus 2% allowance for error. Thus, the maximum velocity which can be attained by a ball within the measured distance and still be sanctioned by the association is 255 feet. As a matter of fact, no ball manufactured by conventional methods and in use heretofore has ever consistently reached a maximum initial velocity of 250 feet per second, so such balls do not enable the maximum possible distance to be obtained.

It has been discovered that the maximum, or close to the maximum, initial velocity permitted a golf ball by the United States Golf Association consistently can be achieved by replacing the liquid and metal core constructions of known golf balls with a substance which is sufficiently hard to withstand deformation during manufacture of the ball and yet is compressible under impact while having sufficient resiliency to return to its initial shape. A ball having its center formed from such material will obtain the added impetus of not only the rebound of the cover and body materials, but also the rebound of the core material. In addition, the action of the deformed or compressed core material in returning to its original condition will accelerate the restoration of the other compressed portions so as to magnify the action of decompression and increase the initial speed of the ball. An increase in the initial speed of the ball will add to the distance the ball will travel.

An object of this invention is to provide a game ball having flight and distance characteristics superior to balls known heretofore while retaining good qualities of "click" and "feel."

Another object of the invention is to provide a game ball composed entirely of compressible materials, each of the materials constituting the ball being capable of being compressed to some extent when the ball is hit.

Another object of the invention is to provide a game ball composed completely of compressible materials and which are so related to one another as to facilitate the fabrication of the ball.

A further object of the invention is to provide an improved ball of the kind referred to which can be manufactured and sold at a cost no greater than that of balls currently being sold.

Other objects and advantages of the invention will be pointed out specifically or will become apparent from the following specification when it is considered in conjunction with the appended claims and the accompanying drawing, in which:

The FIGURE is a sectional view of a ball formed in accordance with one embodiment of the invention.

A ball formed in accordance with the disclosed embodiment of the invention comprises a core or nucleus **1** received within a spherical capsule **2** around which is wrapped a plurality of highly tensioned, elastic rubber threads or bands **3**, the parts **2** and **3** forming a body. The body is enclosed within a cover **4** formed of balata or polyethylene materials of known kind. For purposes of illustration, the ball disclosed in the drawing is a golf ball, but it should be understood that the invention is equally applicable to the construction of other kinds of game balls.

The cover **4**, the windings **3** and the capsule **2** are all conventional readily compressible materials and may be assembled on the core or nucleus **1** in a conventional manner. The core **1**, however, comprises a solid sphere of synthetic material capable of being molded. Examples of such materials are nylon, styrene, and linear polyethylene.

A golf ball constructed in accordance with the disclosed embodiment should have an overall diameter of 1.68 inches to comply with the United States Golf Association rules. It also should have a weight of 1.62 ounces. In a preferred construction, the nucleus should have a diameter of about 7/16 inch, the rubber capsule should have a diameter of about 1¼ inches and the elastic winding a wall thickness of about ¼ inch, or an overall diameter of about 1.655 inches. The cover thickness then will be about .025 inch or sufficient to give the ball the proper diameter.

The material from which the nucleus 1 is made may be a high impact, moldable plastic of the kind referred to, and should be one which is relatively hard while still having inherent properties of elasticity and resilience. Nylon is one such material and is preferable to all those referred to above. Because of the hardness of the nucleus 1, the winding 4 can be wrapped around the center of the ball under greater tension than can be employed with liquid center balls, with the result that the layer of winding may have a resilience greater than is possible to provide in a liquid center ball.

Inasmuch as the nucleus of the ball is a molded solid, it can be made truly spherical, thereby permitting each of the parts of the ball surrounding the nucleus to be symmetrical about the center of the ball. As a result, the ball will react uniformly no matter where it is hit by a club, so there will be little, if any, tendency of the ball to veer in flight if it is properly hit and the distance characteristics of the ball will be uniform regardless of where the ball is struck.

When a ball made according to the disclosure is forcibly struck by a club, the cover, the rubber winding, the rubber capsule and then the nucleus are all compressed or deformed. Each of the materials from which the ball is made has a tendency to return to its original position but

at different rates, and it is important to note that each of the materials of the ball is capable of being compressed under the impact of a club. This being the case, a ball having a core formed of nylon or analogous synthetic material is a livelier ball and one which will have a greater initial velocity upon being struck than a ball composed of parts which are not all compressible. A ball having a greater initial velocity upon being struck quite naturally will be capable of traveling a greater distance than a ball having a lower initial velocity. Consequently, a ball formed according to the disclosure can be expected to, and does, travel farther than conventional balls struck with the same force and under the same conditions.

The disclosed embodiment is representative of a presently preferred form of the invention but is intended to be illustrative rather than definitive thereof. The invention is defined in the claim.

I claim:

A game ball comprising a solid, spherical nucleus formed of rigid, molded high impact nylon; a capsule formed of rubber material concentrically enclosing said nucleus; a layer of wound rubber strands concentrically wrapped about said capsule under tension; and a cover concentrically enclosing said layer of wound strands, each of the materials forming said nucleus, said capsule, said layer of strands, and said cover being readily compressible but at different rates.

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