Dec. 12, 1944. W. H. DIDDEL 2,364,955

GOLF BALL

Filed April 1, 1943

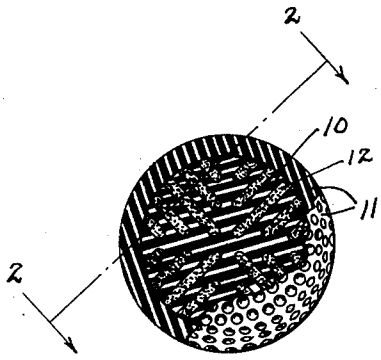


Fig. 1.

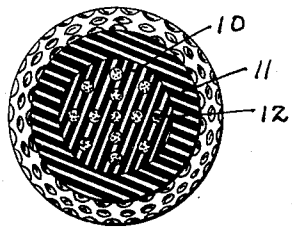


Fig. 2.

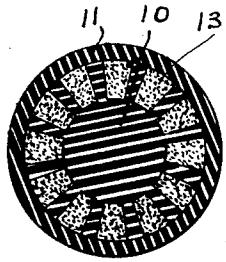


Fig. 3.

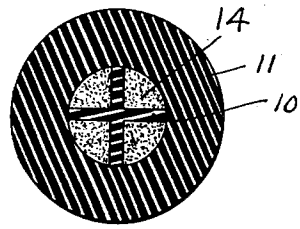


Fig. 4.

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GOLF BALL

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2 Claims. (Cl. 273—62)

This invention relates to a golf ball of a construction whereby a golf game may be played in exactly the same manner as heretofore but upon a greatly reduced course area. The invention embodies a structure which will give the ball the same "feel" as the heretofore commonly used ball but which will have considerably less rebound or resilience. At the same time the structure will permit the ball to be played by the same force applied by the clubs. The structure will give the same sound upon impact of the club with the ball. The ball will be of the same approximate size or slightly increased in diameter thereover, this slight increase aiding in increasing wind resistance.

By use of a ball embodying the structure of the invention, the ordinary golf course of some 135 acres may be reduced to a fifteen acre size which will permit the course to be introduced into congested areas, such as in cities, or in areas where the space is otherwise necessarily limited, such as in military service camps, schools, and the like. A primary object of the invention is to reduce the over-all cost of playing golf without sacrificing to any material degree the sport of the game. Furthermore, by use of the invention, permitting the reduced size of course, golf may be played on a lighted course after dark in order to make the game available to a far greater number of persons, particularly those who may be engaged at the present in defense work plants during the daytime.

Reference is made to the accompanying drawing, in which

Fig. 1 is a view of a golf ball in partial section and embodying the invention;

Fig. 2, a view in section on the line 2—2 in Fig. 1;

Fig. 3, a view in diametrical section of a golf ball embodying a slightly modified form of structure; and

Fig. 4, a view in diametrical section of a golf ball embodying a still further modified form of the invention.

Like characters of reference indicate like parts in the several views in the drawing.

While it is desired that the resilience or rebound of the present type of golf ball be materially reduced, it is also desirable that the ball has a low enough specific gravity which will permit it to float in case it drops into water hazards. Furthermore with the reduction in resilience, it is highly desirable to have a reduction in weight in order that the ball have the same "feel" as the present ball, otherwise this "feel" would give a heavy reaction to the player on account of the reduced resilience. Therefore the invention, among other things, involves the idea of reducing the weight as much as possible along with the reduction of rebound.

A natural rubber compounded to have high hysteresis loss under impact, or a polymeric material, such as any one of the synthetic materials known as "butyl" rubber, "buna rubber 77", "buna rubber S", vinyl acetate, vinyl chloride, and in fact any natural or synthetic resin with well known plasticizers, may be employed to form the body of the ball providing such material, while elastic, has a very high mechanical hysteresis loss. Such material further must have a good, impact-cutting resistance, capable of a high degree of distortion with a relatively low rate of retraction or restoration to original shape. This high mechanical hysteresis loss is characteristic of the materials above named, particularly in some of their polymeric forms when so designed.

As a generic term, the word "rubber" will be employed hereinafter to indicate any one of the materials selected from the above named group. A core 10 is formed of less diameter than that of the finished ball and in this core is carried a plurality of cavities into which materials may be inserted and confined by the outer layer or cover 11 of the ball.

Referring to that form of the invention as illustrated in Figs. 1 and 2, the core 10, while preferably molded as an integral unit, may be considered as embodying six symmetrical, equal size sections. Fig. 2 illustrates in sectional view one of these sections and shows as cavities a plurality of cylindrical bores 12. The center bore, Fig. 1, is located to be radial of the core but all of the other bores are parallel thereto and of decreasing lengths in reference to their positions ranging upwardly. Each section of the core 10 is similarly provided with these bores 12.

Into each of the bores 12 is inserted a frangible material in rod-like form. A preferred material is magnesium oxide on account of its lightness and the fact that in the finished ball, these rod-like pencils carried in the various bores 12 will break up into finely divided powder following some use of the ball. Among other materials suitable for filling these cavities 12 are pumice stone, mica, balsa wood in stick form, charcoal, and a granulated cork held in stick form with a frangible binder.

Following the filling of these cavities 12 with the selected material above indicated, the outer layer or cover 11 of the ball is applied and vul-

canized to the core 10 so that the ball then becomes to all intents and purposes an integral unit in respect to the core and cover.

Assuming that the "butyl" rubber is employed for a substantially 1.1 specific gravity, and the diameter of the ball is made to be 1.75 inches, and that the magnesium oxide is employed as the filler, the amount of magnesium oxide required for a particularly good functioning ball would be 33% by volume to the balance of 67% of the synthetic resin. By weight the proportion of filler would be 11.7%. These proportions may vary, of course, depending upon the filler and body material selected. However, the proportions will fall in any event between well defined limits of 65% to 80% by volume of the body material and with the corresponding 35% to 20% of the filler material. In terms of weight, this range would be from 87% to 93% of the body material with the corresponding 13% to 7% of the filler material.

The filler material serves to back up the relatively soft synthetic rubber to prevent undue distortion thereof under impact so as to keep that distortion within the range whereby the original form of the ball will be restored eventually although slowly, as above indicated. Since the filler, even the balsa wood, will break up into finely divided particles after the ball has been used in play for a short period of time, the filler will not remain in a rigid pencil form but will yield to some extent, but also absorb the impact energy to transfer it to innermost portions of the ball. It is to be noted that there is no air or gas cavity as such within the ball.

Further by adding the filler material, the overall weight of the ball, which would otherwise be quite high, is materially reduced and, in fact, when the above indicated proportion of materials is employed, the resultant ball will have a weight below the specific gravity of water, providing, of course, too much loading has not been employed in the synthetic resin.

The internal loading by the filler very materially reduces the rebound, but the "feel" of the ball upon impact of the club will be substantially the same to the player as that experienced with the heretofore type of ball. The resultant ball will have a rating of less than 45 on the Goodyear resilience test.

Referring to that form of the invention shown in Fig. 3, heavier masses of the filler are employed by inserting wedge-like segments 13 of the filler in radially disposed positions around the core. In this form, however, the location of the filler in such concentrated masses brings that material closer in effect to the periphery of the ball to reduce the concentrated weight near the outside.

In the form shown in Fig. 4, this distribution of weight is better in that the filler is brought closer to the center but is in relatively large masses since the filler is divided into eight equal sections 14. In this form there is a relatively thick layer of the synthetic resin which is not reinforced in effect with the filler material nor is the filler material distributed therethrough although the weight is largely concentrated in the outer portion of the ball.

While I have herein shown and described my invention in the best form known to me, it is obvious that structural variations may be employed without departing from the spirit of the invention and I therefore do not desire to be limited to that precise form beyond the limitations as may be imposed by the following claims.

I claim:

1. A golf ball comprising a spherical body made of a rubber characterized by high mechanical hysteresis loss under impact; and filler material imbedded in the body distributed in regular manner therearound, said filler material being of a frangible nature to break up into a comminuted state upon body impact; said filler material consisting of magnesium oxide.

2. A golf ball comprising a spherical body made of a material characterized by high mechanical hysteresis loss under impact, said material being one of the materials of the group consisting of compounded latex rubber, "butyl" rubber, "buna" rubber "77," "buna" rubber "S," vinyl acetate, and vinyl chloride; a filler material imbedded in the body distributed in regular manner therearound, said filler material being of a frangible nature to break up into a comminuted state upon body impact; said filler material being one of the materials of the group consisting of magnesium oxide, mica, pumice stone, balsa wood, charcoal, and granulated cork.

WILLIAM H. DIDDEL.