Oct. 10, 1944. K. E. WILHELM 2,360,090

GOLF BALL

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FIG. 1

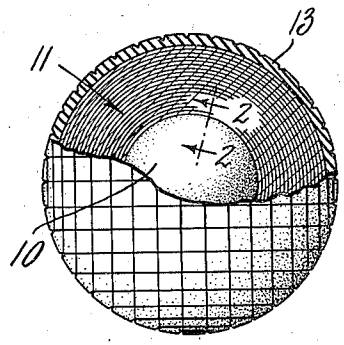
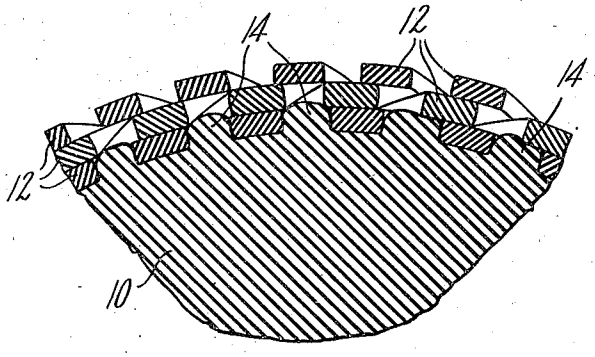


FIG. 2



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GOLF BALL

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2 Claims. (Cl. 273—62)

This invention relates to golf balls and more particularly to an improved center or core for golf balls.

For many years golf balls have been made by winding rubber thread or tape upon a semi-hard rubber center to build up a ball body of the desired size, whereupon an outer cover of balata has been molded about the ball body.

In recent years the tension with which the rubber thread has been wound about the semi-hard rubber center has been increased to provide a harder ball having greater flight.

This increase in the thread tension has caused a tendency of the ball to "go out of round" when in use, and which apparently is caused by the rupture of the thread windings adjacent the rubber center in a localized area of the ball.

It is known that this tendency of a ball to go out of round is avoided by using a very hard rubber or celluloid center, but this causes the ball to have a woody feel when struck with the club, it also increases the tendency of the windings lying next to the center to slip on the hard smooth surface, and the cover is more likely to cut when the ball center is very hard. The tendency of a ball to go out of round is also avoided by using a liquid or mobile center, but the liquid has to be confined in some form of envelope which adds to the cost of manufacture.

It is believed that the tendency of a ball to go out of round when it is provided with a semi-hard rubber center is due, at least in part, to the fact that the elastic properties of such center exert an injurious action upon the thread windings adjacent the center when the ball is struck hard.

The primary purpose of the present invention is to provide a golf ball with a semi-hard plastic or plastic-like center which will increase the life of the golf ball over that of a ball having a semi-hard rubber center, without reducing the flight of the ball or its other desired properties.

Since, as above stated, I believe that the elastic properties of a semi-hard rubber center act injuriously upon the thread windings adjacent the center, I propose to overcome this difficulty by employing a semi-hard center having low elastic properties and substantial cold flow so that when the center is suddenly deformed it will recover slowly.

It is extremely important in carrying out the present invention that the center employed shall have pronounced cold flow properties at ordinary temperatures so that the plastic or plastic-like material forming the center will gradually penetrate into the interstices between the thread windings, and that the windings engaging the center shall sink into its surface sufficiently to equalize the forces acting upon the threads so as to avoid unduly stressing any of these threads.

The golf ball center or core contemplated by the present invention can be formed of any one of a large number of highly plasticized plastics and also of plastic-like material, provided they are moderately hard and have good cold flow properties. The ball body and cover may be constructed as usual heretofore.

The various features of the present invention will be more fully understood from the following description when read in connection with the accompanying drawing wherein:

Fig. 1 is a front elevation with parts in section of a golf ball having the construction of the present invention; and

Fig. 2 is an enlarged sectional view taken on the line 2—2 of Fig. 1.

The golf ball shown in the drawing may be of usual construction except for the material forming the center and as illustrated comprises a center 10 and body 11, the latter being formed by winding a thread or tape 12 of rubber or other strand forming material tightly about the center. The ball body 11 is enclosed in a cover 13 which may be formed of balata in accordance with the usual practice. The size of the center 10 may be the same as the semi-hard solid rubber center extensively used heretofore and may have about the same degree of hardness.

It is desired to point out, however, that the hardness of the present center 10 may vary throughout a wide range so long as it has a relatively high cold flow so that the material forming the center will flow between the thread windings as indicated by 14. It is also important that the elastic properties of the center 10 shall be considerably below that of the elastic properties of the semi-hard rubber center commonly used heretofore in golf balls.

The present golf ball center 10, as above stated, may be made of any one of a large number of highly plasticized plastics having the low elastic properties and pronounced cold flow herein contemplated, and the center may also be formed of plastic-like material possessing these properties.

The preferred class of materials which may be employed in making up the present center includes highly plasticized plastics such as polyvinyl butyral, ethyl cellulose, cellulose acetate, nitrocellulose, and the various types of vinylites.

The center 10 may also be formed of plastic-like materials such as a mixture of ground rubber scrap and a relatively soft viscous bonding material such as stearine pitch provided the resulting material has the desired degrees of hardness and the cold flow properties above mentioned. These center forming materials may have their properties modified by the addition of plasticizers, fillers and the like.

In order to secure the desired degree of cold flow under the pressure of the thread windings, it is believed that the material forming the center should have a hardness range between 25 and 60 on a Shore A durometer scale when the reading is taken at room temperature ten seconds after the application of the pressure.

The following examples will serve to make clear two widely different materials that may be used to form the core 10 contemplated by the present invention.

Example I

	Parts by weight
Polyvinyl butyral	100
Plasticizer	33.3
Filler	20.6
Stearic acid	1.7
	155.6

Example II

	Parts by weight
Ground rubber (sole and heel scrap)	100
Soft stearine pitch	50
	150

In each of these examples the parts when thoroughly mixed form a plastic-like mass having very little elasticity but high cold flow properties, and a hardness within the range above mentioned. A golf ball center, formed of the material of either of the above examples, when dropped from a distance onto a hard surface had very little ability to rebound.

Golf balls provided with centers made up of the material of Example I and of the material of Example II when tested for durability were found to stand up better than similar golf balls, having a semi-hard rubber center.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. A golf ball having a center formed primarily of a plasticized thermoplastic resin and possessing very little ability to rebound but having high cold flow properties, and a body formed of threads wound tightly around the center in direct contact with the center forming material, the material of the center having a hardness range between 25 and 60 on a Shore A durometer scale when the reading is taken ten seconds after the application of the pressure, the said cold flow properties of the center being sufficiently high at room temperature to cause the material of the center to penetrate gradually but deeply into the interstices between the threads and flow about the threads into accurate molding relation therewith.

2. A golf ball having a center formed primarily of plasticized polyvinyl butyral and possessing very little elasticity and very little ability to rebound but having high cold flow properties, and a body formed of threads wound tightly around the center in direct contact with the center forming material, the material of the center having a hardness range between 25 and 60 on a Shore A durometer scale when the reading is taken ten seconds after the application of the pressure, the said cold flow properties of the center being sufficiently high at room temperature to cause the material of the center to penetrate gradually but deeply into the interstices between the threads and flow about the threads into accurate molding relation therewith.

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