Oct. 14, 1941. W. T. BROWN 2,259,060

BALL

Filed March 19, 1940

Fig. 1

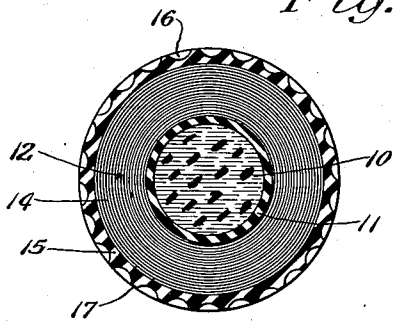


Fig. 2

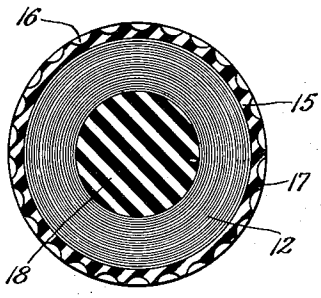


Fig. 3

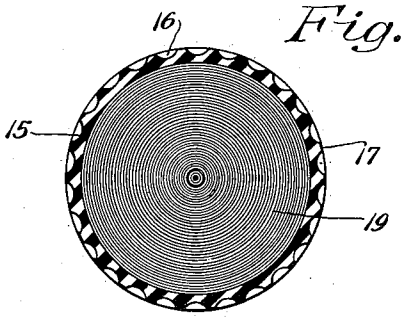


Fig. 4

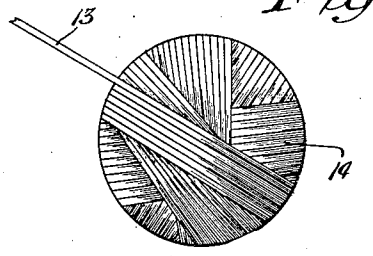


Fig. 5

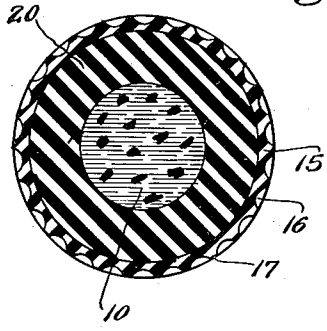
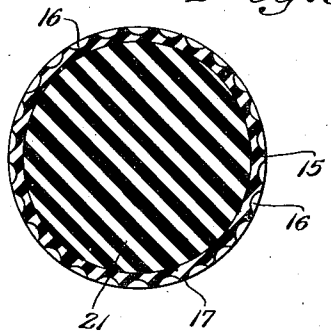


Fig. 6



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Patented Oct. 14, 1941 2,259,060

UNITED STATES PATENT OFFICE

2,259,060

BALL

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Application March 19, 1940, Serial No. 324,748

4 Claims. (Cl. 273—62)

This invention relates to resilient balls. Although the invention is especially desirable in balls used for the game of golf, the advantages thereof are equally applicable to other balls made of a plurality of superposed approximately concentric members, and especially to balls capable of being driven long distances. This invention also relates to an improved process for making balls.

It is well known that in the past considerable difficulty has been experienced in providing golf balls having the most desirable flight characteristics. One of the troublesome problems has been to obtain properly balanced balls. When a golf ball, wherein the center of weight is positioned even slightly away from the geometrical center, is struck, it has a tendency to "hook" or "slice," or to otherwise have its travel adversely affected.

Furthermore, when a ball thus fails to follow a true trajectory, flight energy thereof is wastefully expended, its flight is materially shortened, and the player's skill is not accurately tested.

Custom and official rules have set certain limits upon the weight and the size of balls used for the game of golf. For example, and at present, the conventional golf ball has a diameter of not less than 1.680 inches and usually about 1.685 inches, and a weight of not more than 1.62 ounces and usually about 1.61 ounces, giving it a specific gravity of approximately 1.125. The pure gum rubber that has customarily been used for the winding has a specific gravity less than 1. Because a heavy core has been considered desirable to achieve the best flight characteristics, and because of the necessity for meeting the standard specifications of weight and diameter, the core has usually contained a filler, which has ordinarily been weighted with derivatives of lead or other heavy metals.

Being of different specific gravities, the core and winding could not form a properly balanced unit unless the winding was very even and concentric, and unless the core was concentric and in the exact geometric center of the assembly. Although considerable technical skill has been applied to solving the problem of centering the core in the winding, and although relatively complicated machines have been designed to accomplish this purpose, the results have very often been unsatisfactory.

Even when the core has been properly centered, however, core fluid weighted with lead or other heavy metal derivatives has been known to escape from the core and penetrate into an isolated portion of the windings to cause an out-of-balance condition.

The part of the ball remaining when the cover is removed is known as the ball center. The ball center ordinarily includes both a core (very often with fluid) and a winding, but the finally desired assembled structure determines its detailed construction.

A golf ball center having a winding cannot have a smooth surface because the filament of the winding causes small ridges. This inherent impossibility of the ball center being a smooth sphere is one of the causes for the cover, which is molded on, having a variable thickness. The cover of the golf ball has ordinarily been constructed of a material such as gutta percha, balata and similar materials having a specific gravity different from the winding. A golf ball may be out of balance because its cover is of variable thickness.

Furthermore, the cover has ordinarily been molded from two hemispherical cover blanks. Although matched blanks are customarily used, the cover thickness of the two hemispheres has frequently varied enough to throw the ball out of balance. Even when the blanks have been of the same thickness, the molding press, having an upper and a lower die, has sometimes operated imperfectly. Whenever one of the two dies has been hotter than the other, there has been a quicker flow of material away from the hotter die, preventing the ball center from being molded concentrically with the cover; or, the softer half cover has allowed the harder half cover to shift and sink the ball center therein causing or making an off-center and out-of-balance ball. The inherent impossibility of having a smooth spherical winding surface, the variable thickness of the hemispherical blanks, and the variable temperature of the molding dies are illustrative of the difficulties of molding a cover without introducing a condition of out-of-balance.

Some manufacturers test balls for balance. If a ball is found to be nearly perfectly balanced it is sold as a first-grade ball. If it is rejected by the rigid test, it may still fall within the wider tolerances for inferior balls, in which case it can be sold as a "second" (or sold in a less "high-grade" and less expensive line with resultant loss of profit).

One practice in the past to balance the ball included puncturing the cover at the light side of the ball and injecting a weighted fluid. However, such a practice had disadvantages such as: requiring additional costly steps after the ball was ordinarily completed; adversely puncturing the ball in several places for weighting; making the ball overweight; spoiling the external appearance of the ball; or necessitating an extra coating operation.

If an unbalanced ball happens to be teed up the same way on several successive shots, several successive hooked balls may result. If the golfer thinks the hooked balls are produced by his faulty form in hitting, he may change his manner of

striking the ball to correct his supposed imperfectness. If the ball is then teed up so that the heavy side of the ball tends to produce a sliced ball, the golfer's stroke produces an extremely sliced condition compounded of the effect of the unbalanced ball and of the efforts of the golfer. Under such circumstances, the erratic and out-of-balance ball renders a mastery of the game difficult if not impossible.

It is an object of this invention to provide a golf ball capable of maintaining a true path in flight by reason of being properly balanced.

Another object is to provide a golf ball capable of being manufactured simply and inexpensively.

Further objects of this invention are to: improve the useful life of a golf ball by eliminating some of the factors which have in the past caused a ball to develop unsatisfactory flight characteristics after a relatively short period of use; provide a ball suitable for use by a beginner at the game of golf; eliminate many of the difficulties heretofore incident to molding an outer cover onto a golf-ball center; and eliminate the losses incident to the production of substandard balls.

Features of the present invention resulting in the attainment of the abovementioned objects include the use of a weighted rubber of increased specific gravity for the elastic filament of the winding. Other features include: the use of a much lighter core filler than has heretofore been customary; the use of a core filler having the same specific gravity as the assembled winding; the use of an outer cover of higher specific gravity than has sometimes been used; the use of an outer cover having the same specific gravity as the ball center; the use of a uniform specific gravity for each and all of the parts of the ball regardless of its design.

Other objects and features will hereinafter appear.

In the drawing :

Figure 1 is a cross-sectional view of one embodiment of the invention.

Fig. 2 is a cross-sectional view of another golf ball embodying the invention.

Fig. 3 is a cross-sectional view of another form of ball utilizing this invention.

Fig. 4 is an external view of the winding shown in cross-section in Figs. 1, 2 and 3.

Fig. 5 is a cross-sectional view of another embodiment of this invention.

Fig. 6 is a cross-sectional view of another ball embodying this invention.

Before describing the present improvements and mode of operation thereof in detail it should be understood that the invention is not limited to the details of construction and arrangement of parts shown in the accompanying drawing, which is merely illustrative of the present preferred embodiments, since the invention is capable of other embodiments, and the phraseology employed is for the purpose of description and not of limitation.

Figure 1 discloses one form of the present invention and includes a core filler 10 contained in a hollow spherical core 11. A winding 12, formed by stretching and wrapping an elastic filament or filaments 13 under tension, is superposed approximately concentrically about the core 11. A ball center 14 composed of the core filler 10, the core 11 and the winding 12 is encased within an outer cover 15 preferably provided with depressions 16 such as dimples or mesh, to make it more attractive and to improve and insure its long flight. The cover ordinarily has a coating 17 of enamel or other suitable material. In the past balls have been designed with the component parts of different specific gravities and slight inaccuracies in manufacture have resulted in unbalanced balls, as pointed out in detail hereinbefore.

Now, of particular importance, it should be noted that, according to the present invention, preferably each and all of the superposed members of the ball, including the core filler 10, the core 11, the winding 12, outer cover 15 and coating 17 of enamel or other suitable material, have substantially the same specific gravity, so that if the parts are not perfectly concentric, or are not perfectly centralized one relative to the other, still the center of gravity of the ball as a whole will be at its geometrical center.

To this end, the core filler, core, winding and cover may be made from fluids, rubber and rubberlike materials ordinarily used in golf and other balls. However, and of particular importance, in accordance with this invention, the composition of the material used for each part of the golf ball must be very carefully controlled with special attention being given to the specific gravity of the material, and of the material after it is assembled in the ball. To obtain a ball suitable for the game of golf, having a specific gravity of 1.125, the filament 13 and the cover 15 are, in the present embodiment, made heavier than those used in the past. The core filler 10, core 11 and enamel 17 are lighter than those which have ordinarily been used.

The core 11 can be prepared of rubber, weighted with sufficient barytes, to give it a specific gravity of 1.125. The filament 13 can be prepared of rubber, weighted with a higher proportion of barytes than used in making the core 11 to make an allowance for the interstices of the winding 12 which must have a specific gravity the same as the core 11. Instead of barytes, blanc fixe may be used as a weighting agent or filler for the rubber. Both barytes and blanc fixe are impure forms of barium sulfate. Zinc oxide, whiting, or other fillters may be used as weighting agents. Blends of rubber and neoprene may be used, in which case a smaller percentage of weighting materials is effective in producing a predetermined specific gravity.

Furthermore, the shape of the filament 13, the stretch of the filament, and the nature and number of windings or circles of filament for a given diameter of winding is carefully controlled, as is possible with ball-winding machines now in general use, so that the winding on the ball is of the desired specific gravity, and substantially like that of other parts or members of the center and/or ball when assembled. Additionally, the filaments for the winding are weighted to give the desired specific gravity with relation to the carefully controlled stretch, nature and number of circles of the winding.

A mixture of glue glycerine and water can be used as a core filler of specific gravity 1.125. For example, a mixture consisting of:

	Grams
Glue	10
C. P. glycerine	100
Water	97

has been found to be satisfactory.

A mixture of gutta percha, rubber and zinc oxide can be used in preparing the cover stock.

For example, the following composition gives the desired specific gravity:

Gutta percha	100
Rubber	10
Zinc oxide	26

The golf ball enamel which has been used in the past has a specific gravity of approximately 1.680. By using a smaller concentration of titanium dioxide, or by using another pigment of lower specific gravity, it is possible to prepare a suitable coating such as enamel or the like of specific gravity 1.125. Also, by using varnishes or coating materials of different specific gravities with suitable pigments it is possible to have a coating with a specific gravity of 1.125. For example it has been found that a mixture consisting of:

	Grams
Spar varnish	196
Titanium dioxide	5.64

when ground for about fifteen hours produces a good coating having the desired specific gravity. Preferably the varnish has 51% solids and a specific gravity of 1.099 as a dried varnish film.

The golf ball illustrated in Fig. 2 has a winding 12, a cover 15, depressions 16 and a coating 17 of enamel or other suitable material, such as found in Fig. 1. It differs from that form of the present invention shown in Fig. 1 primarily in the provision of a solid core 18, made of resilient rubber, which is of the same uniform specific gravity as the assembled winding 12, and is of the same specific gravity as the cover 15.

In Fig. 3, a cover 15 surrounds a winding 19 which differs from the winding 12 in Figs. 1 and 2 inasmuch as the winding 19 resembles a solid sphere instead of a hollow sphere, and does not contain a core. The winding 19 and cover 15 are of the same specific gravity throughout in the assembled ball, and the center of gravity thereof is at the geometric center even though the winding is irregular, or "off center," within the cover.

In Fig. 4, the external view of the ball center 14 shows the winding 12. An elastic filament 13 is wrapped under tension in successive convolutions in the usual manner to form an external surface resembling a sphere. The filament 13 may be any natural or synthetic elastic material having the desired elasticity and specific gravity, one example being given hereinbefore.

In Fig. 5, a core filler 10 is contained in the cavity of a hollow spherical core 20. The hollow spherical core 20 differs from the core 11 inasmuch as its walls are very much thicker, and inasmuch as its elastic properties are such that it replaces both the core 11 and the winding 12. A cover 15 preferably of tough material fits directly onto the core 20. The cover 15, core 20 and core filler 10 are each and all of substantially the same specific gravity to provide a very evenly balanced ball.

Fig. 6 shows a solid spherical core 21, having elastic properties suitable for a resilient ball capable of being driven long distances, which is enclosed within a tough cover 15 having the same specific gravity as the core 21.

The filler, core, winding, and cover members, although of different sizes and different combination in Figs. 2 through 5, may be of the same materials as described in detail in connection with Fig. 1, the important factor being that each part or member of the complete ball, or of the ball center is of substantially the same specific gravity.

Preferably a coating 17 is used having a specific gravity the same as the other members of the ball. Even when a coating of different specific gravity is used there is relatively little danger of unbalancing the ball, because sometimes only a thin film is used. Thus, normally even if the cover or coating is of different specific gravity, 90% or more of the ball is still substantially of the same specific gravity. It is the aim of the present invention to create a properly balanced ball by means of maintaining a substantially uniform specific gravity throughout substantially all of the ball.

According to the present invention, the process of making a ball having a plurality of superposed approximately concentric members, and having a uniform specific gravity throughout, consists of preparing the innermost member of a predetermined specific gravity, and forming the outer members about it, said outer members being of the same specific gravity as the innermost member.

Further, the process consists in the steps of: making a ball core of a predetermined specific gravity; weighting, stretching and circling an elastic filament about the core in such a manner that the specific gravity is substantially like that of the core. A further step may include weighting and forming a cover on said core and winding so that the specific gravity thereof is also substantially like that of the core and the winding. A further step in the process, when hollow cores or inner members are used, includes providing a weighted fluid within the hollow core so that the solid and normally hollow sections thereof are of substantially the same specific gravity.

Variations and modifications may be made within the scope of this invention, and portions of the improvements may be used without others.

Having thus described the invention what is claimed as new is:

1. A resilient playing ball, at least ninety-five percent of the weight of the same being of exactly the same specific gravity, said ball including a plurality of members, one of said members being a cover and one of said members being a winding of a filament containing neoprene, rubber and blanc fixe, said filament being shaped, tensioned, and wound in such a manner that the winding, consisting of said stretched filament and interstices, possesses exactly the same specific gravity as the cover.

2. A golf ball comprising a core; and a winding of stretched elastic filament said filament containing neoprene, rubber, and blanc fixe, said winding including interstices, said winding, when upon said core, being of exactly the same specific gravity as the core, and positioned approximately concentrically about it.

3. In a ball the combination of a filler; a hollow core adapted to contain said filler; a winding of neoprene containing elastic filament wound under tension; and an outer cover, at least ninety per cent of the weight of said combination being of exactly the same specific gravity.

4. In a ball, the combination of a filler; a hollow core containing said filler; a winding of elastic filament stretched and placed upon the core said filament consisting of blanc fixe, pigments, rubber, and neoprene; and an outer cover, said filler, core, cover and winding as placed having specific gravities such that the ball is of exactly uniform specific gravity throughout.

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