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GOLF BALLS

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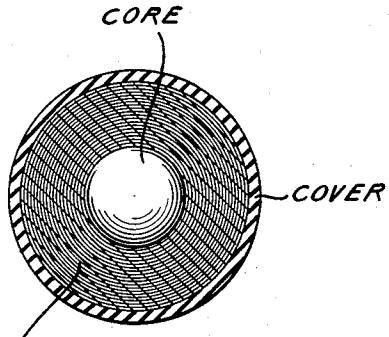

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GOLF BALLS

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This invention relates to improved golf balls.

In normal practice, golf balls are manufactured by winding a 100% natural rubber thread around a center until the desired diameter is reached. These tightly wound cores are then surrounded by a tough cover, said cover having the characteristic golf ball cover designs impressed on it to produce the completed ball. Under specific conditions of center size and type, winding tension, thread size, and cover thickness and design, a ball is produced that has certain specific playing characteristics. Important among these playing characteristics are flight and rebound. Skilled golfers also desire what is known in the art as good "click and feel." These rather intangible characteristics of a golf ball are best evaluated by having a highly skilled golfer hit the ball and observe the sound and feel. A good ball gives a loud sharp clear sound when hit a solid blow with a golf club, for example, a driver. Furthermore, when the ball is hit, the golfer feels the blow through his hands as they tightly grip the club. Some balls feel heavy and dead as though they take a long time to leave the club after initial contact between the club and ball. Better balls feel lively as though they get away from the club quickly.

The rebound of a golf ball is evaluated simply by dropping the ball onto a hard surface from a height of 100 inches and observing the height of rebound on the first bounce. Depending on the components of the ball, the rebound may vary from 60", or less, to as much as about 72".

Flight is evaluated by hitting the ball a standard blow with a machine which drives the ball any desired distance usually adjusted by varying the blow to give a distance and trajectory about like that obtained when a skilled golfer drives a good grade of ball.

Those skilled in the art have for many years tried to improve simultaneously the flight, rebound, click and feel of golf balls. Heretofore, best results were obtained by using the best quality natural rubber thread. The other components of the ball, for example, the center type and size as well as the cover composition and thickness can affect the playing qualities of the ball, but a prime factor is the thread.

Since natural rubber is at best of variable quality, makers of golf balls have for many years tried to find synthetic materials to use in the golf ball, and thus obtain a more uniform and improved product. All these attempts, insofar as the center of rubbery strands is concerned, have been singularly unsuccessful. Synthetic rubber of many kinds, as for example, polychloroprene rubber (neoprene), styrene-butadiene rubber (SBR types) and polyurethane rubbers have been tried, and the results were always an unsatisfactory ball. At one time when natural rubber was unavailable, some balls were made with neoprene (polychloroprene) and marketed. However, as soon as natural rubber again became available, the balls containing neoprene were unacceptable to the golfers.

This same unsatisfactory result was obtained whether the synthetic rubber was used alone or as a blend with natural rubber in making the thread for the golf ball. In view of all this previous experience, it was indeed surprising and completely unexpected to find that exceptionally good golf balls were obtained when made with thread containing synthetic cis-1, 4 polyisoprene rubber.

The failure of previous synthetic rubber has been variously attributed to soaps and dispersing agents used in emulsion polymerization, lack of the natural proteins found in natural rubber, or the different colloidal structure of the synthetic rubber. While these and other lines of reasoning have been offered, they are not conclusive in explaining why natural rubber makes a good golf ball and synthetic materials do not. For example, the soaps are not present in the polyurethane rubbers and removal of protein does not make natural rubber produce poor golf balls. Therefore it is clear that those otherwise skilled in the art of making golf balls cannot predict in advance what kind of thread will or will not make a good golf ball. In view of the present state of the art, we cannot explain just why we should obtain a ball having exceptional qualities by using even relatively moderate amounts of synthetic cis-1, —4 polyisoprene rubber in the thread.

It is the object of my invention to provide a golf ball having improved playing characteristics in comparison with conventional golf balls. My invention provides a golf ball having improved rebound, flight, click and feel. My invention will provide the golfer with a more responsive ball, one that will enable him to improve his score and increase his satisfaction from the sport. This object, which will be apparent to those familiar with golfing, may be accomplished by making a golf ball from rubbery threads or strands composed of synthetic cis-1, 4-polyisoprene.

Compositions as shown below were compounded, mixed, and cured using standard rubber equipment and standard rubber processing techniques. Quantities are in parts by weight.

	1	2	3
#1 Ribbed Smoked Sheets	100.00	65.00	65.00
Synthetic cis-polyisoprene		35.00	35.00
Sulphur	5.33	5.33	4.50
Di-beta-naphthyl-p-phenylenediamine	0.25	0.25	0.25
Diphenylguanidine	0.20	0.20	0.20
Heptaldehyde-aniline reaction product	0.20	0.20	
N-cyclohexyl-2-benzothiazole sulphenamide			2.50

Sufficient thread, in the correct size, was prepared from the above formulae to make enough golf balls for testing. Among other things, flight and rebound tests were conducted using our standard test methods.

Flight and rebound test results were:

Example 1		Compound #1	Compound #2
Average rebound	inches	71.77	74.23
Difference	do	2.46	
Average flight	yards	221.04	224.02
Difference	do	2.93	

Example 2		Compound #1	Compound #3
Average rebound	inches	70.7	72.6
Difference	do	1.9	
Average flight	yards	214.6	218.3
Difference	do	3.7	

Example 3		Compound #1	Compound #3
Average rebound	inches	70.9	72.2
Difference	do	1.3	
Average flight	yards	217.2	220.5
Difference	do	3.3	

These tests indicate that a ball having a thread winding comprised of about 20–50 parts by weight of synthetic cis-1, 4-polyisoprene blended with correspondingly 80–50 parts of natural rubber is suitable.

Average differences in the order of 1 yd. in flight and 1" in rebound are considered to be statistically significant differences in experiments of this type. Samples of the balls containing cis-polyisoprene have been extensively evaluated by a nationally known golf professional who is unqualified in his opinion that these balls provide the golfer with substantially improved "click" and "feel" as well as increased driving distance.

Synthetic cis-1, 4-polyisoprene imparts substantially longer flight and higher rebound, as well as improved "click" and "feel" to those golf balls made with rubber thread containing it. The synthetic cis-1, 4-polyisoprene which is used as a principal ingredient in the golf balls described in this invention is produced by known techniques. The material used was "Shell Isoprene Rubber," which is, at the present time, the only commercial source of this material. It is believed that this material is made by solvent polymerization and should have from about 85% to about 97% content of isoprene radicals joined in the cis-configuration and preferably 90–95%.

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

1. A golf ball construction including a center, a layer of thread winding, and a cover, the novel feature of said construction being wherein said thread winding comprises at least 20% by weight of synthetic cis-1, 4-polyisoprene.

2. A golf ball comprised of a resilient core, a layer of thread winding, and a cover wherein the thread winding is comprised of a blend of from 50 to 80 parts by weight of natural rubber and correspondingly from 50 to 20 parts by weight of synthetic cis-1, 4-polyisoprene.

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