

No. 699,632.

Patented May 6, 1902.

F. H. RICHARDS.
MANUFACTURE OF GOLF BALLS OR OTHER ARTICLES.

(Application filed Feb. 10, 1902.)

(No Model.)

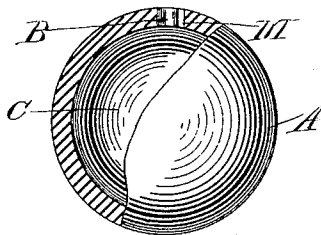


Fig. 1.

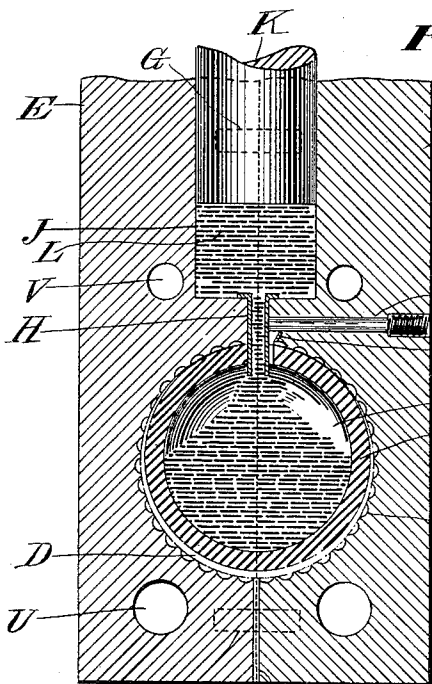


Fig. 2.

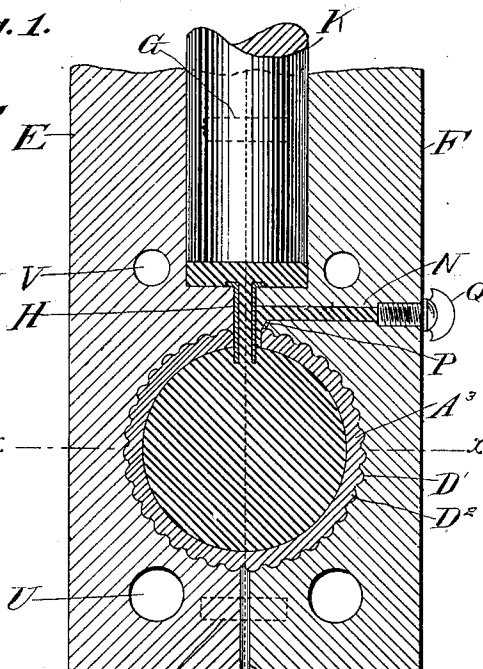


Fig. 3.

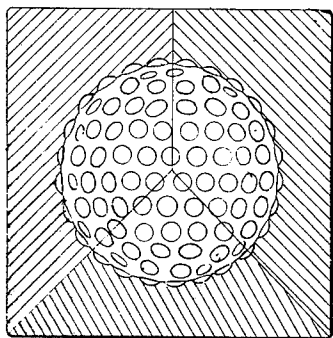


Fig. 5.

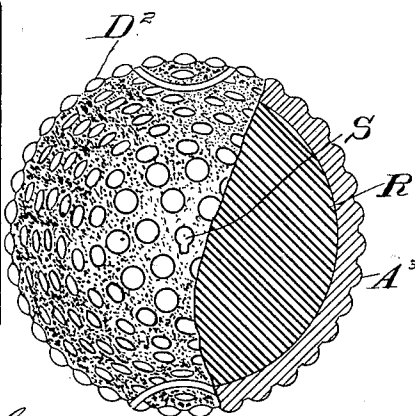


Fig. 4.

Witnesses:

Fredrick C. Zeigler
Fred. C. Maynard

Inventor:

F. H. Richards

UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE KEMPSTALL MANUFACTURING COMPANY, A CORPORATION OF NEW JERSEY.

MANUFACTURE OF GOLF-BALLS OR OTHER ARTICLES.

SPECIFICATION forming part of Letters Patent No. 699,632, dated May 6, 1902.

Application filed February 10, 1902. Serial No. 93,312. (No specimens.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in the Manufacture of Golf-Balls or other Articles, of which the following is a specification.

This invention relates to processes employed in the manufacture of golf-balls and other articles, and especially to the kind of balls described in the patent granted to Eleazer Kempshall March 18, 1902, No. 695,866, in which a hard shell is formed upon a springy core, the shell being preferably made of celluloid which is tough, smooth, moisture-proof, springy, and durable and the core consisting, preferably, of gutta-percha, which gives the ball the property of flying a great distance when struck a hard blow by an implement. In said patent the shell is illustrated as made in sections and while hot and plastic is compressed upon the core, causing the segments to weld, the shell being hardened under pressure and holding the core under compression, so that the condition of the ball throughout is tense, thus augmenting its effectiveness. In finishing the ball according to said application the material of the shell works into the bramble marks or pits in the dies before the latter completely close, so that during the final portion of the die-closing action the brambles of the shell are shifted, particularly at the equatorial portion of the ball, there being thus a tendency to draw and tear the shell. Furthermore, it is found difficult to properly close the dies which compress the shell upon the previously-formed core, owing to the tendency of the shell material to squeeze out between the approaching edges of the dies, thus forming a flash or fin and tending to interfere with the completion of the die action, especially if the die is made in more than two parts. Owing to the last-mentioned difficulty it is found in practice desirable to use two-part dies in order to reduce the flashing; but owing to the brambles it becomes difficult to separate a two-part die after the ball is formed, the brambles of the ball fitting snugly in the pits in the dies and tending to lock the latter.

The objects of my present improvements

are to overcome these difficulties and also to avoid the necessity of always making a shell in segments, since in some kinds of balls a seamless shell is preferable, being less liable to burst than a jointed shell.

In the accompanying drawings, Figure 1 is a view, partly broken away, of one form of shell-blank. Fig. 2 illustrates a stage in the production of a ball. Fig. 3 is a view similar to Fig. 2, but illustrating a later stage. Fig. 4 is a finished ball made in accordance with my present improvements and partly broken away, so as to exhibit its construction. Fig. 5 is a diagram of a three-part mold for a ball.

In the several views similar parts are designated by similar characters of reference.

Preferably I employ a previously-formed shell or hollow sphere A, made wholly or principally of celluloid, although other material may be employed. This blank may be formed either of hemispherical or other segments suitably welded or joined or in one piece, preferably the latter. Although it is illustrated as round, still in this stage it need not be a true sphere. I preferably form said shell-blank with an opening B, communicating with the hollow C thereof. I place the sphere A in a spherical chamber D, formed in a mold consisting of opposing halves E and F, having registering dowels G and clamped together by any suitable means. Each of said members E and F may have one-half of the chamber D, which may either have the same diameter or be somewhat larger than the blank sphere A. The chamber is suitably figured, in this instance having bramble-pits D'. Into the opening B in the latter I insert the mouth of a funnel H, which is shown as penetrating into the hollow C, although this is not important in all cases. By means of said funnel the interior C of the ball is placed in communication with a vessel or receptacle J, formed or provided in the apparatus above the chamber D, said receptacle preferably being round and having a closely-fitting plunger K. The blank A may be formed without an opening B, and a pointed injector may be forced into said blank. I place in the receptacle J a quantity of material, preferably gutta-percha, which may by the action of heat be reduced to a plastic or fluid condition, as at L, Fig. 2.

This material flows down the funnel H into the hollow of the sphere A and drives out the air through a vent M, which in this instance is illustrated as a groove formed in the side wall of the main opening B and lying without the funnel H. In the portion F of the mold there may be provided a vent N, communicating at P with the ball-vent M, so the air escaping from the ball may be conducted out of the apparatus. The fluid or plastic gutta-percha may therefore settle or be forced by the plunger K through the funnel H, so as to completely fill the interior of the ball A, whereupon the vent N in the mold may be closed by a screw-plug Q, Fig. 3, the overflow of the material into or through said vent indicating to the workman that the hollow C has been filled. By means of suitable appliances the plunger K may be pressed still farther down, so as to force more of the filling material into the interior of the ball, causing the walls thereof to yield and expanding the shell until it completely fills the large spherical chamber D in the mold, as at Fig. 3. The air may escape from the chamber between the mold-section or through a vent T. Sufficient force may be applied to compress the hot and plastic celluloid shell between the gutta-percha and the walls of the chamber. The gutta-percha or other filling material is allowed to pass from a liquid into a dry or hard condition while the plunger is still pressed down, so that the expanded condition of the shell A³ is made permanent, as indicated by R, Fig. 4, the core being closely joined to the shell. The mold may then be taken apart and the ball removed, the funnel H being withdrawn and the hole left thereby in the ball being filled with a celluloid or other plug S, Fig. 4.

It will be understood that during the operation of forcing the gutta-percha into the ball the shell A, which is rendered plastic either by the heat of the gutta-percha or by the heat of the dies, or both, is expended in all directions and caused to conform to the surface of the chamber D and to fill the bramble-pits D' or other marks therein. The brambles or other figures D² are gradually formed upon the periphery of the ball, and since there is no movement of the dies there is no tendency to tear any of the brambles from the shell, nor is the material of the shell itself likely to be torn or unduly thinned at any point. On the contrary, the pressure of the fluent mass is uniform in all directions throughout the interior of the shell, and since great pressure may be produced by said plunger said shell may be thoroughly compacted, thereby conducing to its toughness, durability, and springy properties, which are of great value in golf-balls. By reason of the fluent mass of gutta-percha being maintained at high pressure while the portion thereof within the shell, as well as the shell itself, cools or hardens the quality of the ball is improved.

Preferably the gutta-percha in the recepta-

cle J is kept hot, as well as under great pressure, during the hardening of all or the principal portion of the celluloid shell and also during the hardening of the major portion of the core, the latter cooling first at its exterior and then gradually hardening toward the center. By this means the core is not only solidified, but also put in a condition of permanent compression, in which condition it is held by the hardened celluloid shell. The process of hardening the ball from the exterior during the feeding of hot gutta-percha to the still fluent heart of the ball may be facilitated by cooling the dies in any suitable way, as by causing cold water to flow through channels U, formed in the portions of the dies opposite the gutta-percha receptacle J, and the inflowing gutta-percha may at the same time be kept hot by the passage of steam through upper channels V. Not only is a ball thus produced extremely compact or solid, but it will also be understood that the material of the ball from center to periphery is in an abnormal condition, the core being held under compression by the shell, thereby increasing the efficiency of the ball, largely because the compressed core effectually maintains the shell in a true spherical form and immediately and powerfully resists distortion thereof by a blow and by reaction aids in speeding the ball when struck by an implement. Thus an extremely active and powerful ball is produced. Moreover, the ball is not unduly sensitive to a light touch from an implement, which renders it even more desirable for the game of golf.

The shell-blank above mentioned may be either jointed or seamless. If desired, in forming a seamless shell a coating of green celluloid may be applied to a spherical core of gutta-percha and the whole placed in heating and finishing dies, as illustrated, so that the heat may reduce the gutta-percha to a fluent condition, and then additional gutta-percha may be forced into the shell in the same manner as hereinbefore described, thereby completing the molding of the core and forming a seamless hollow shell upon a compressed core. It is to be understood that my invention is not limited in all cases, however, to the use of a core consisting either wholly or partly of gutta-percha nor to a core having a springy nature, since other cores may be employed within the scope of my invention to meet different requirements. One of the leading features in my present improvement consists in molding a solid or hard core within a hard wear-resisting shell, which is rendered plastic at the molding operation and caused to conform to the surfaces of the die, and causing both shell and core to harden, so that each retains its form, and especially where the core material is excessive, so that the shell is expanded, and particularly where both shell and core are permitted to harden gradually while the feeding in of core material is continued.

The material of the shell may be of any desired compound of celluloid or kindred material or of any suitable plastic material, and it is not necessary in all ways of practicing my invention that the shell consist wholly of plastic material.

Other modifications and variations may be resorted to within the scope of my invention, which may be used in producing a variety of molded shells or articles having other than spherical form.

The herein-described playing-ball is made the subject-matter of my pending application, Serial No. 93,001, filed February 7, 1902.

Having thus described my invention, I claim—

1. A process in producing playing-balls, consisting in molding a core within a shell of plastic material and causing said shell to harden.

2. A process in producing playing-balls, consisting in molding a springy core within a shell of celluloid.

3. A process in producing playing-balls, consisting in molding a gutta-percha core within a shell of celluloid.

4. A process in molding playing-balls, consisting in placing a shell of plastic material within the mold, forcing heated material into the shell so as to cause the latter to conform to the mold, and causing the shell and core to harden.

5. A process in molding playing-balls, consisting in placing a celluloid shell while plastic within a figured mold, forcing a fluent mass into the shell so as to cause the shell to expand and become embossed by the mold, and causing the shell and core to harden while confined in the mold.

6. A process in molding playing-balls, consisting in placing an undersized celluloid shell within a mold and closing the mold, forcing heated gutta-percha into the shell so as to expand the same and cause it to fit the mold, and hardening the shell while in the mold.

7. A process in molding playing-balls, consisting in placing within a figured mold a shell consisting partially or wholly of celluloid, closing the mold tightly, heating gutta-percha, forcing the gutta-percha into said shell so as to cause the same to fit the mold, and causing the celluloid to harden while the mold remains closed.

8. A process in molding an article of celluloid, consisting in forming a blank undersized but approximately conforming to the shape of the mold, inserting the blank within the mold, heating the blank, and expanding the blank by internal pressure so as to fit the mold.

9. A process in molding an article of celluloid, consisting in forming the article undersized but approximately conforming to the shape of the mold, inserting the blank within the mold, heating the mold, expanding the blank by internal pressure so as to fit the

mold, and causing said article to harden while confined in the mold.

10. A process in molding an article of celluloid, consisting in forming the article undersized but approximately to conform to the shape of the mold, inserting the blank within the mold, heating the mold, expanding the blank by internal pressure so as to fit the mold, causing said article to harden while confined in the mold, and maintaining such internal pressure until the article hardens.

11. A process in producing playing-balls, consisting in reducing hard material to fluent condition, forcing it into a hollow sphere of plastic material so as to cause the latter to conform to a mold, causing the sphere and the filling to harden, and plugging up the hole through which the fluent mass is introduced.

12. A process in producing playing-balls, consisting in forcing into a shell consisting partially or wholly of celluloid a heated mass of gutta-percha too great for the capacity of said shell, so as to expand the latter, and causing the gutta-percha to harden and form a permanent core.

13. A process in producing playing-balls, consisting in forming a hollow celluloid sphere with a vent, inserting a funnel into said sphere, heating said sphere, heating gutta-percha, causing said gutta-percha to flow through said funnel and force out the air through said vent, subjecting the gutta-percha to pressure so as to distend said sphere, preventing escape of gutta-percha through said vent during the application of pressure, allowing the gutta-percha and the shell to harden under pressure, withdrawing the funnel, and plugging the shell.

14. A process in producing playing-balls, consisting in introducing a fluent mass into a hollow sphere of plastic material, permitting the air to escape from said hollow sphere, closing the air-vent, forcing more fluent mass into the sphere so as to expand the latter, and causing said sphere and filling to harden.

15. A process in producing playing-balls, consisting in introducing heated gutta-percha into a heated hollow sphere consisting partially or wholly of celluloid, permitting the air to escape from said hollow sphere at a point near the point of introduction of said gutta-percha, closing the air-vent, forcing more gutta-percha into the sphere so as to distend the latter, and causing said sphere and said gutta-percha to harden.

16. A process in producing playing-balls, consisting in forming a seamless shell of plastic material, molding a core within said shell, and causing the shell to harden.

17. A process in producing playing-balls, consisting in reducing hard, springy material to a fluent condition, introducing it within a seamless shell of celluloid, and causing the core to harden.

18. A process in producing playing-balls, consisting in heating gutta-percha, introducing it into a seamless shell of celluloid, and

causing the gutta-percha to harden under pressure.

19. A process in molding playing-balls, consisting in placing a seamless moldable shell
5 within the mold, forcing heated material through a hole formed in the shell so as to cause the latter to conform to the mold, and causing the shell and core to harden.

20. A process in molding and embossing
10 playing-balls, consisting in placing a seamless moldable celluloid shell within a figured mold, forcing a fluent mass into the shell so as to cause the shell to conform to the mold, and causing the shell and core to harden while confined in the mold.
15

21. A process in molding playing-balls, consisting in placing an undersized seamless celluloid shell within a mold and closing the mold, forcing heated gutta-percha into the
20 shell so as to expand the same to fit the mold, and hardening the shell while in the mold.

22. A process in producing playing-balls, consisting in introducing core material under pressure within a shell of plastic material, and
25 causing said shell and core to harden gradually from the exterior while the pressure is continued.

23. A process in producing playing-balls, consisting in compressing a springy core within
30 an entire shell consisting partially or wholly of celluloid.

24. A process in producing playing-balls, consisting in compressing gutta-percha within a shell of celluloid by forcing into said shell
35 extra gutta-percha while in a fluent condition, and causing it to harden while under pressure.

25. A process in molding playing-balls, consisting in placing a moldable shell within the
40 mold, forcing heated material into the shell so as to cause the shell to conform to the mold, forcing extra material into said shell so as to compact the shell and compress the core, and causing the shell and core to harden while the
45 pressure is continued.

26. A process in molding figured playing-balls, consisting in placing an entire moldable celluloid shell within a figured mold, forcing
50 a fluent mass into the shell so as to cause the same to conform to the mold, and causing the shell and core to harden while confined in the mold.

27. A process in molding playing-balls, consisting in placing an undersized celluloid shell
55 within a mold and closing the mold, forcing heated gutta-percha into the shell so as to expand the same to fit the mold, and forcing extra gutta-percha into the shell as the shell and core gradually harden.

28. A process in molding playing-balls, consisting in placing within a mold a shell consisting partially or wholly of celluloid, closing
60 the mold tightly, heating gutta-percha,

forcing the gutta-percha into said shell so as to cause the same to fit the mold, causing the
65 shell and core to harden gradually while the mold remains closed, and forcing an extra quantity of gutta-percha into the shell during said hardening.

29. A process in producing playing-balls,
70 consisting in reducing hard material to fluent condition, forcing it into a seamless hollow sphere of moldable material so as to cause the latter to conform to a mold, forcing extra
75 fluent material into the sphere, causing the sphere and the filling to harden, and plugging up the hole through which the fluent mass was introduced.

30. A process in producing playing-balls, consisting in forcing into a seamless shell consisting partially or wholly of moldable celluloid a heated mass of gutta-percha too great
80 for the capacity of said shell, so as to expand the latter, and causing the shell and gutta-percha to harden while confined in the mold.
85

31. A process in producing playing-balls, consisting in forming a seamless hollow celluloid sphere with a vent, inserting a funnel into said sphere, heating said sphere, heating
90 gutta-percha, causing said gutta-percha to flow through said funnel and force out the air through said vent, subjecting the gutta-percha to pressure so as to distend said sphere, preventing escape of gutta-percha through
95 said vent during the application of pressure, allowing the gutta-percha and the shell to harden under pressure, forcing extra fluent
gutta-percha into the shell during such hardening, withdrawing the funnel, and plugging the shell.
100

32. A process in producing playing-balls, consisting in introducing a fluent mass into a hollow sphere of plastic material, permitting the air to escape from said hollow sphere, closing the air-vent, forcing more fluent mass
105 into the sphere so as to expand the latter, and causing said sphere and filling to harden gradually from the exterior while extra material is forced into the shell.

33. A process in producing playing-balls,
110 consisting in introducing heated gutta-percha into a heated seamless hollow sphere consisting partially or wholly of celluloid, permitting the air to escape from said hollow sphere at a point near the point of introduction of
115 said gutta-percha, closing the air-vent, forcing more gutta-percha into the sphere so as to distend the latter, and causing said sphere and said gutta-percha to harden, while extra gutta-percha in a heated condition is forced
120 thereinto.

FRANCIS H. RICHARDS.

Witnesses:

B. C. STICKNEY,
JOHN O. SEIFERT.