No. 720,482. PATENTED FEB. 10, 1903.

F. H. RICHARDS.

PROCESS OF MAKING SHELLS FOR PLAYING BALLS.

APPLICATION FILED JUNE 4, 1902.

NO MODEL.

Fig. 1.

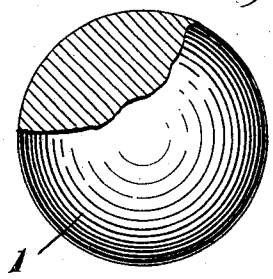


Fig. 2.

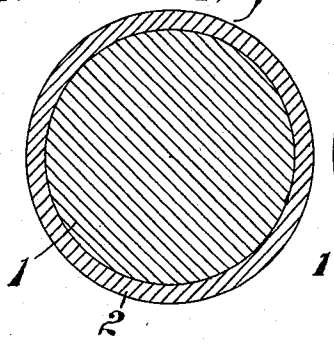


Fig. 3.

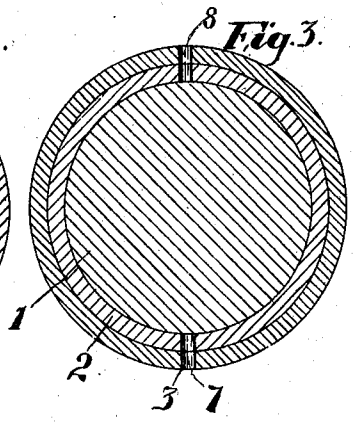


Fig. 4.

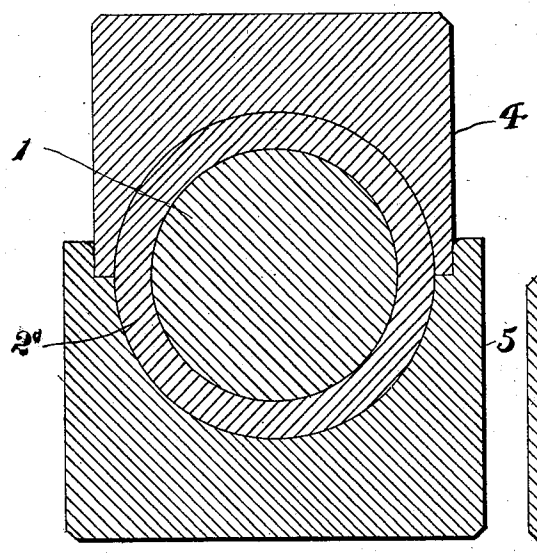


Fig. 5.

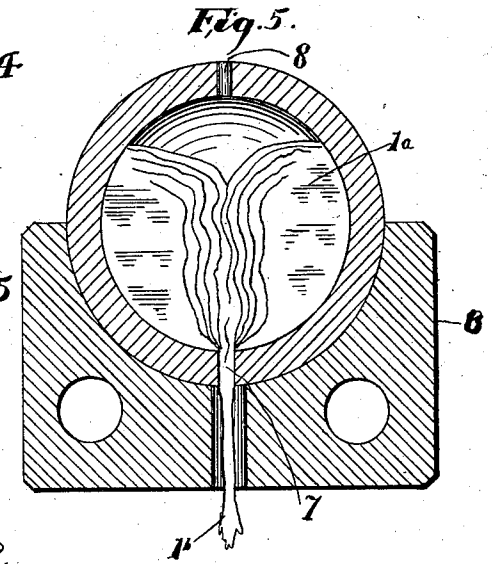
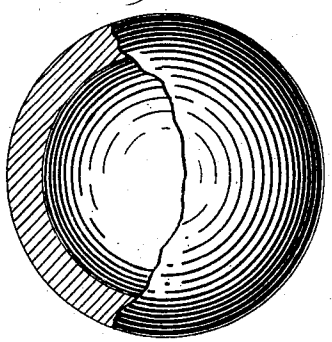


Fig. 6.



Witnesses;
Ralph Lancaster
Fred E. Maynard

Inventor:
F. H. Richards.

UNITED STATES PATENT OFFICE.

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

PROCESS OF MAKING SHELLS FOR PLAYING-BALLS.

SPECIFICATION forming part of Letters Patent No. 720,482, dated February 10, 1903.

Application filed June 4, 1902. Serial No. 110,150. (No model.)

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 Processes of Making Shells for Playing-Balls, of which the following is a specification.

This invention relates to the shells of playing-balls; and its object is to improve the structure thereof, and particularly to make the same continuous or unjointed.

In the drawings forming part of this specification, Figure 1 is a view of a temporary core used in forming a shell. Fig. 2 shows a shell of plastic material applied upon said core. Fig. 3 shows a second shell applied over the Fig. 2 device. Fig. 4 illustrates a process of compacting the shell upon the temporary core. Fig. 5 illustrates a method of removing the core, and Fig. 6 illustrates a completed shell or hollow ball.

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

I employ a temporary spherical core 1, consisting, preferably, of metal fusible at low temperature—such, for instance, as Rose's metal—and upon this I form a shell 2, preferably of plastic material, such as gutta-percha or celluloid. This material may be applied in a soft, plastic, or solvent condition either by dipping or otherwise. If a thick shell is desired, the material 2 may be allowed to harden or partially season, and then a second coating or shell 3 may be applied and allowed to harden. If desired, one of the shells 2 and 3, preferably the former, may be gutta-percha, and the other may be celluloid. At Fig. 4 is illustrated a thick shell 2^A, made entirely of either gutta-percha or celluloid by one or more dippings or applications of material upon the core 1, and at this figure are also illustrated heating and compressing dies 4 and 5, whereby the shell may be given a true spherical form, the heat of the dies rendering the plastic material soft and the pressure having the effect of compacting and further curing the same. The core 1 supports the shell against the pressure of the dies.

The core may be removed by placing the ball in a cup 6, which may be heated to an extent to melt the metal, as at 1^a, which may flow out through a fine aperture 7, formed in the shell, the outflowing material being indicated at 1^b. The ball is also preferably provided at its top with an aperture 8 for ingress of air. The metal fuses at a temperature which is insufficient to render the shell plastic or at least so soft as to collapse. If desired, the apertures 7 and 8 may be plugged up. At Fig. 6 is illustrated a complete shell made according to the above-described method. It will be thus seen that the shell is hollow and without a transverse or radial seam or joint, and hence is not liable to crack or burst.

My improved shell may be filled in any suitable manner or may be left hollow, as desired. Variations may be made within the scope of my improvements. The process illustrated at Fig. 4 may be omitted, if desired. Either the simple or the compound shell may be made according to the method disclosed in pending applications, Serial Nos. 99,716 and 101,463.

Having described my invention, I claim—

1. A process in forming a shell for a playing-ball consisting in forming a shell upon a sphere of metal fusible at low temperature, liquefying said metal by heat, and drawing it from said shell.

2. A process in forming a shell for a playing-ball consisting in forming a shell of plastic material upon a sphere of metal fusible at low temperature, liquefying said metal by heat, and drawing it from said shell.

3. A process in forming a shell for a playing-ball consisting in forming a shell of celluloid upon a sphere of metal fusible at low temperature, liquefying said metal by heat, and drawing it from said shell.

4. A process in forming a shell for a playing-ball, consisting in applying a layer of plastic material upon a spherical body so as to form a shell thereon, and then evacuating said shell.

5. A process in forming a shell for a playing-ball, consisting in forming a shell of nitro-

cellulose compound or pyroxylin material upon a spherical body of solid material, and then withdrawing the solid material.

6. A process in forming a shell for a playing-ball consisting in forming a shell of layers of plastic material upon a sphere of metal fusible at low temperature, liquefying said metal by heat, and drawing it from said shell.

7. A process in forming a shell for a playing-ball consisting in forming a shell of plastic material upon a sphere of metal fusible at low temperature, providing the shell with apertures, liquefying said metal by heat, drawing it through said apertures, then plugging the apertures.

8. A process in forming a shell for a playing-ball, consisting in applying a pyroxylin material in a plastic condition upon a spherical body to form a shell, allowing said shell to harden, and then softening said spherical body and withdrawing the same.

9. A process in forming a shell for a playing-ball, consisting in coating a collapsible spherical body with pyroxylin material to form a shell, and then causing said collapsible body to withdraw from the shell.

10. A process in forming a shell for a playing-ball, consisting in forming a plastic shell upon a fluxible body, and then withdrawing said body.

11. A process in forming a shell for a playing-ball, consisting in forming a shell of plastic material upon a former consisting principally or wholly of matter which may be caused to flow without destruction to the shell, and then causing said matter to flow out of said shell.

FRANCIS H. RICHARDS.

Witnesses:
B. C. STICKNEY,
F. W. BARNACLO.