No. 699,094. Patented Apr. 29, 1902.

E. KEMPSHALL.

PLAYING BALL.

(Application filed Apr. 5, 1902.)

(No Model.)

Fig 1.

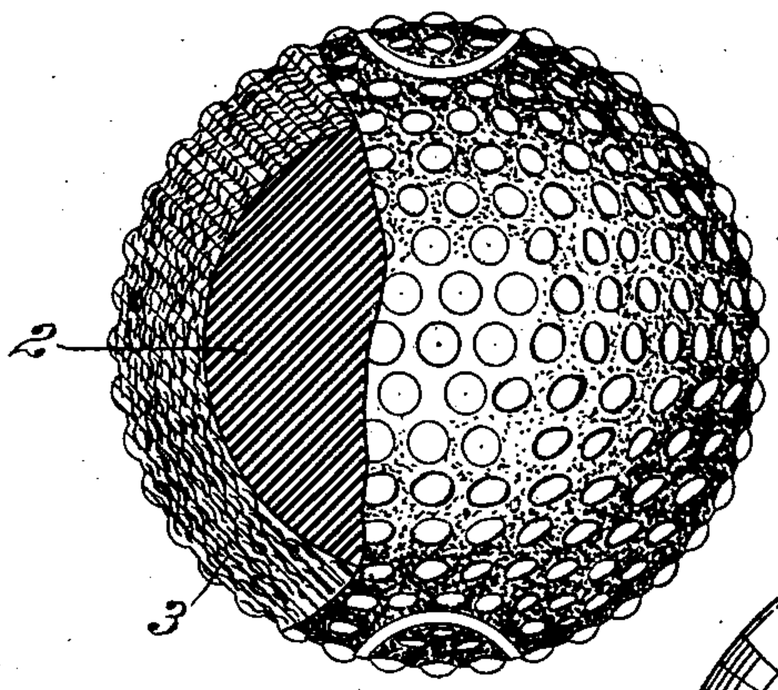


Fig. 2.

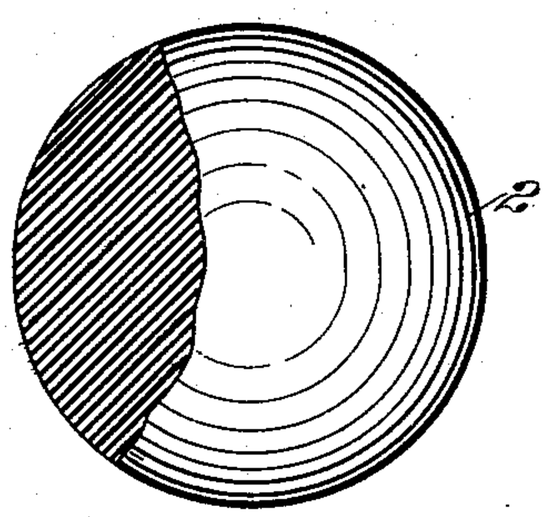


Fig. 3

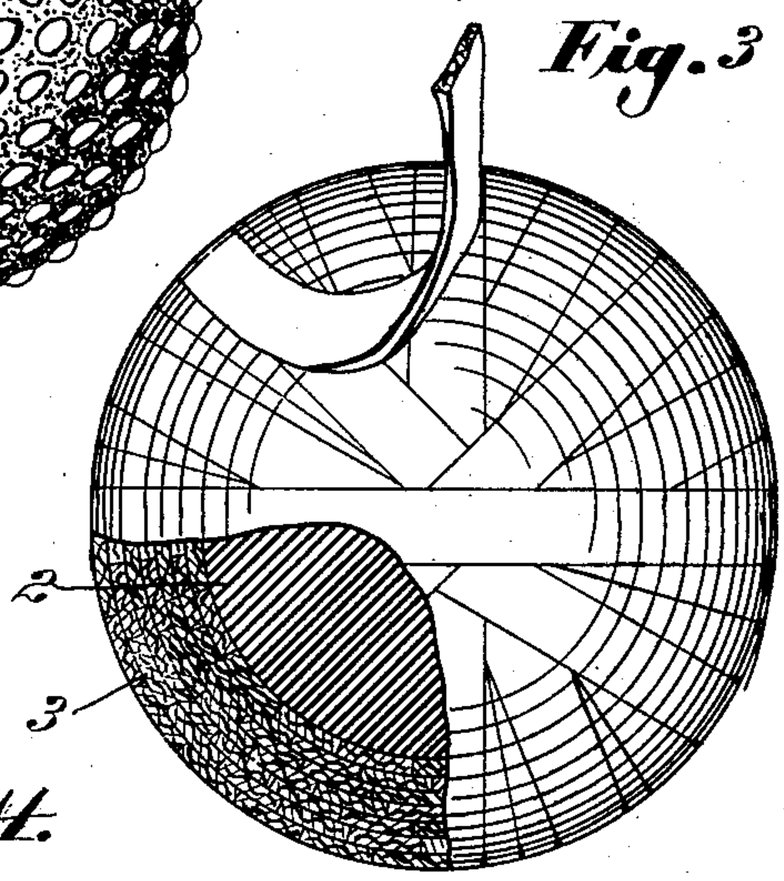
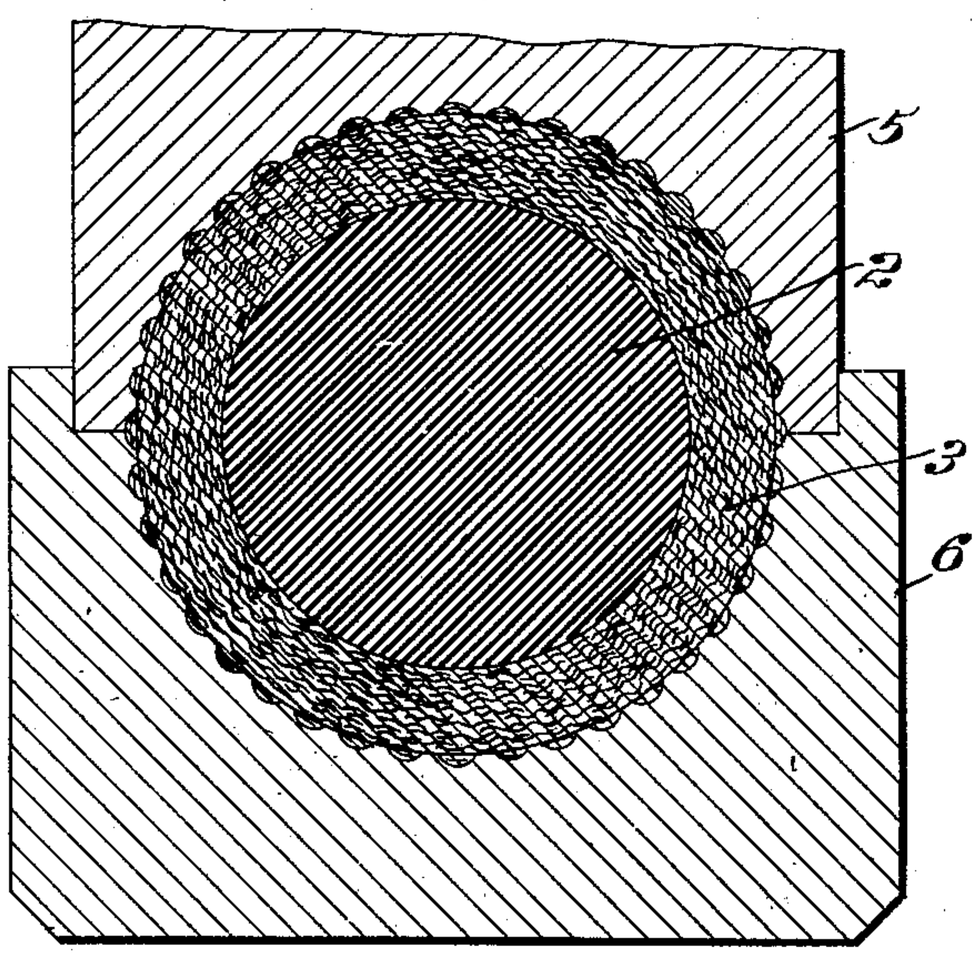


Fig. 4.



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UNITED STATES PATENT OFFICE.

ELEAZER KEMPSHALL, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE KEMPSHALL MANUFACTURING COMPANY, A CORPORATION OF NEW JERSEY.

PLAYING-BALL.

SPECIFICATION forming part of Letters Patent No. 699,094, dated April 29, 1902.

Application filed April 5, 1902. Serial No. 101,463. (No model.)

To all whom it may concern:

Be it known that I, ELEAZER KEMPSHALL, a citizen of the United States, residing in Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Playing-Balls, of which the following is a specification.

This invention relates to playing-balls; and it consists, substantially, in the improvements hereinafter particularly described; and the principal object of the invention is to provide a ball of this character possessing great stability and integrity of structure, whereby the same is adapted to all the essential requirements of golf and similar games.

My present improvements relate more especially to the shell or external structure of the ball, which is of special form or construction, which gives to it the quality or capacity of withstanding severe usage to which it may be subjected in the game.

The invention also has certain other objects in view, as will hereinafter fully appear when taken in connection with the accompanying drawings, in which—

Figure 1 is a part-sectional view of a completed ball, the elements of which are constructed and organized substantially in accordance with my present invention. Fig. 2 is a sectional view representing a body or center for the ball. Fig. 3 is also a part-sectional view of my improved playing-ball, showing the form or construction of the shell or external structure of the ball previous to compression thereof in suitable dies for the purpose. Fig. 4 represents a sectional view of one means which may be employed in the final step of the process of manufacture of my improved playing-ball.

Before proceeding with a more detailed description it may be stated that I employ any suitable body or center for the ball, to which I apply an external structure or shell, formed of a thin strip or strips of suitable interlined stock, which are wound about the said body or center in various directions and to any depth or extent of thickness desired, whereupon the structure is subjected to compression under heat, substantially as will hereinafter appear.

Specific reference being had to the accompanying drawings by the designating characters marked thereon, A, Fig. 1, represents a completed playing-ball constructed substantially in accordance with my present improvements, the same comprising a suitable spherical body or center 2 of any suitable material, preferably gutta-percha; and to said body or center I apply the external structure or shell of the ball, which in the present instance is of special form and from which a great many important advantages are derived. The said external structure or shell consists, preferably, of thin strips 3 of suitable interlined stock, preferably of celluloid and woven fabric, which are wound about the body or center in various directions and as tightly as possible, with the celluloid element preferably outermost, substantially as indicated at Fig. 3, wherein the structure is shown as it appears previous to being subjected to compression in the dies therefor. These strips 3 of interlined stock are comparatively thin and of moderate width, and in order to effectually apply them to the body or center of the ball I may heat the same until the celluloid element thereof becomes plastic, or nearly so, and then wind the strips tightly over the said body or center, with the result that the different windings of the strips adhere to the material of the said body or center, as well as to each other. I continue to wind the strips upon the said body or center, and in virtue of the clinging tendency of the overwound portions of the strips to each other a solid external structure or shell of substantially spherical form is produced, as indicated at Fig. 3, it being evident that the woven fabric in the stock of which the strips are formed lends substantial toughness and integrity thereto, this being a desideratum in structures of this class or type. It will also be seen that by having the strips very thin and winding them tightly and causing them to adhere to one another little or no air remains in the completed shell, which is a desideratum. It is not essential that the fabric be closely woven in all instances. In fact, it is preferably open-weave, so that it may become thoroughly embedded or locked in the celluloid, or, in other words, it is desirable that there shall be a large preponderance of celluloid or other plastic material in the shell. It is not essential that the fibrous material

whereby the strips are toughened be always in the shape of woven fabric, and it will be seen that the principal advantage of the fibrous material is derived from the strands or threads that run lengthwise of the strips, which act as ligaments or tendons, which strengthen the shell in all directions and render it practically rupture-proof, or, in other words, prevent the core from bursting the shell when the ball is given a hard knock. After completing the final winding of the said interlined strips 3 of celluloid and woven fabric, substantially as indicated at Fig. 3, I may first place the structure in suitable smooth dies, by which to give to the ball its general form, as well as to subject the materials of the strips to a preliminary compression, and which is preferably performed while the celluloid is still in such a heated state as to be comparatively soft or semiplastic. For all practical purposes, however, I have found that the structure shown in Fig. 3 may be placed between dies 5 and 6, such as are indicated at Fig. 4, and finished or completed at one operation—that is to say, by subjecting the structure to compression of the dies under heat and maintaining such compression until the external structure or shell of the ball hardens by cooling.

As thus constructed the external structure or shell of my improved playing-ball has no joints which are liable to spread open upon subjection of the ball to severe usage, since the interlined stock of which the said external structure or shell is made up or constituted will not crack or split even under severe blows from a stick or other implement, and thus my improved ball is rendered far more substantial and durable than many similar balls hitherto devised having like objects in view. As a result of the process of manufacture of my improved ball the celluloid material of the interlined stock of the external structure or shell is well seasoned besides being rendered more compact under compression and not liable to lose its shape from extraneous causes. It will be understood that the overwound portions of the strips 3 of interlined stock blend together and form a homogeneous external structure or shell minus welds or seams, it being added that my improved ball has phenomenal flying power under a hard blow, while being comparatively "dead" to a light blow, so that it is well adapted for the "driving" and "putting" features of the golf-game.

The external structure or shell may be formed in the above-described manner of interlined stock composed of other plastic material, such as gutta-percha or any material of the pyroxylin class combined with any suitable woven fabric, substantially as indicated herein.

It is not essential always that the celluloid or plastic material be placed upon both sides of the fabric material when making the strips, and by the term "interlined stock" I mean stock compounded of plastic material (preferably a pyroxylin compound or derivative) and fabric, in any suitable arrangement for the purposes herein set forth. It will be seen that in the completed shell the ligaments, tendons, bands, or fabric strips are promiscuously mingled with and embedded or keyed in the shell material, which relative arrangement of ligaments and shell material may be effected in other ways than by winding compound fabric and celluloid strips. The celluloid of the strips adheres strip to strip, and owing to the natural adhesion, as well as to the subsequent compression, reheating, and recompression the celluloid strips become welded together and form a substantially continuous shell.

Variations may be resorted to within the scope of my present improvements, and it may be stated at this point that the compression-dies shown in Fig. 4 are preferably pitted on their operative surfaces in order to impart to the exterior surface of the ball a "brambled" structure.

Having described my invention, I claim—

1. A playing-ball comprising a body or center, and an applied shell or casing constructed of overwound strips of interlined stock.

2. A playing-ball comprising a body or center, and an applied shell or casing constructed of overwound interlined strips of celluloid compressed upon said body or center.

3. A playing-ball comprising a body or center of gutta-percha, and an applied shell or casing constructed of overwound strips of interlined stock.

4. A playing-ball comprising a body or center of gutta-percha, and an applied shell or casing constructed of overwound interlined strips of celluloid compressed upon said body or center.

5. A playing-ball comprising a springy body or center, and an applied shell or casing constructed of overwound strips consisting of celluloid and fabric and welded together and holding said center under compression.

6. A playing-ball comprising a springy spherical body or center, and an applied shell or casing constructed of overwound interlined strips of celluloid compressed upon said body or center.

7. A playing-ball comprising a body or center, and an applied shell or casing constructed of overwound strips of celluloid lined with woven fabric.

8. A playing-ball comprising a springy body or center, and an applied shell or casing constructed of overwound strips of celluloid lined with woven fabric, said strips being welded together, and the whole being compressed upon said center.

9. A playing-ball comprising a hard spherical body or center of gutta-percha, and an applied shell or casing constructed of overwound thin strips of celluloid lined with textile fabric.

10. A playing-ball comprising a body or cen-

ter, and a shell thereon consisting of strips, said strips consisting of celluloid and fibrous material, and being wound continuously in different directions and welded together where they cross.

11. A playing-ball comprising a shell which consists of strips of celluloid wound continuously in different directions and welded together where crossing; fibrous material being embedded throughout said shell.

12. A playing-ball comprising a core and a shell thereon; said shell consisting of strips of plastic material and fabric; all of said strips being wound continuously in different directions, the plastic material being welded strip to strip, and the fabric strips being embedded in said plastic material.

13. A playing-ball comprising a core and a shell holding said core under compression; said shell consisting of strips of celluloid and strips of fabric; all of said strips being wound continuously in different directions, said celluloid being welded strip to strip, and the fabric strips being embedded in said celluloid.

14. A playing-ball comprising a shell made of plastic material and ligaments; said plastic material forming a continuous or unbroken shell, and said ligaments extending promiscuously throughout said shell; and a core within said shell.

15. A playing-ball comprising a core of springy material and a shell holding said core under compression; said shell consisting of celluloid, and ligaments of fibrous material being interspersed throughout the shell and binding tightly upon said core.

16. A playing-ball comprising a springy body or center, and a highly-compacted shell thereon, said shell consisting of strips wound continuously in different directions upon said body and welded where crossing; and said strips being compounded of plastic material and fibrous material.

17. A playing-ball including a sphere consisting of a strip or strips of celluloid wound continuously in different directions.

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