

No. 697,418.

Patented Apr. 8, 1902.

E. KEMPSHALL.
GOLF BALL.

(Application filed Sept. 28, 1901.)

(No Model.)

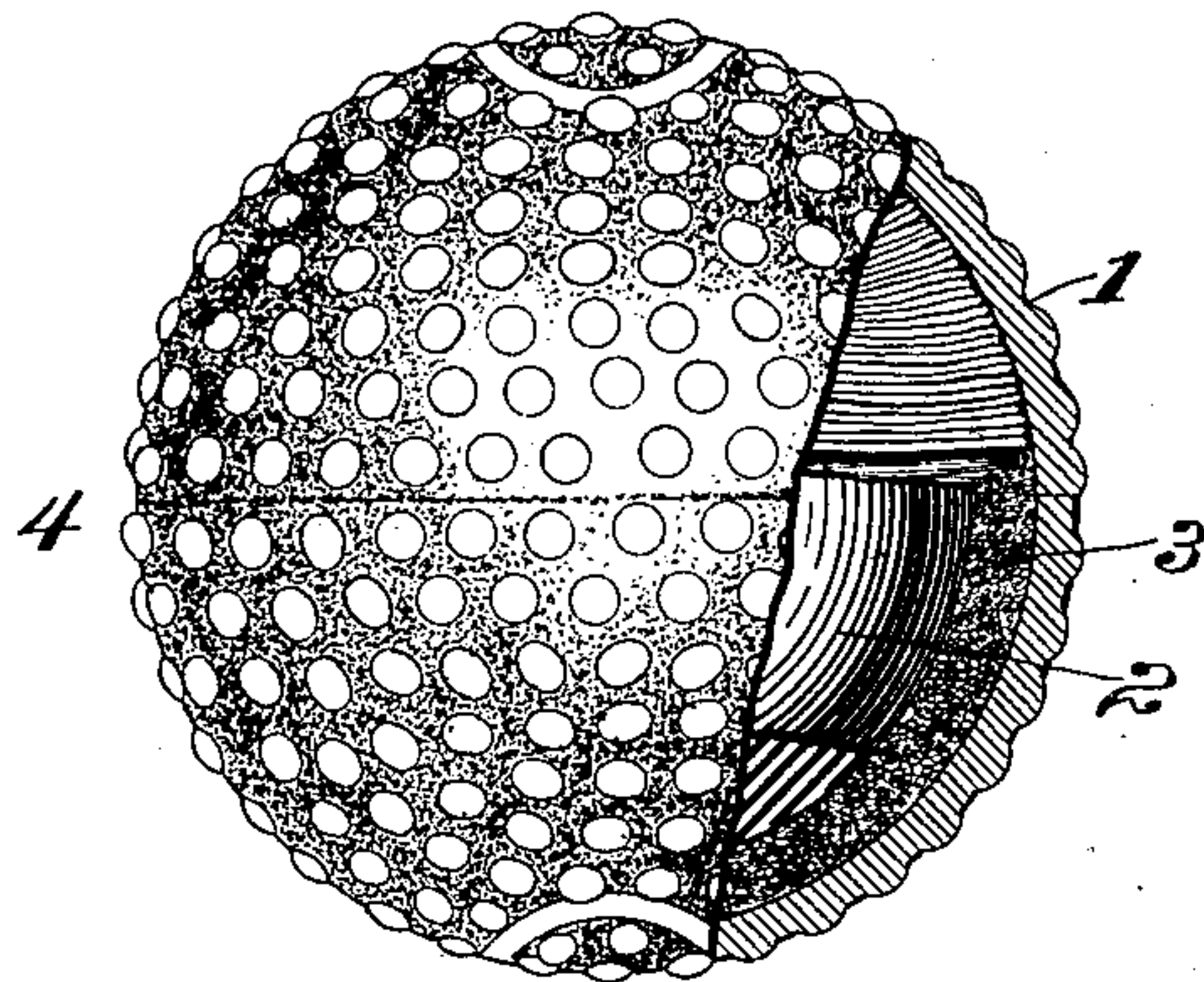


Fig. 1.

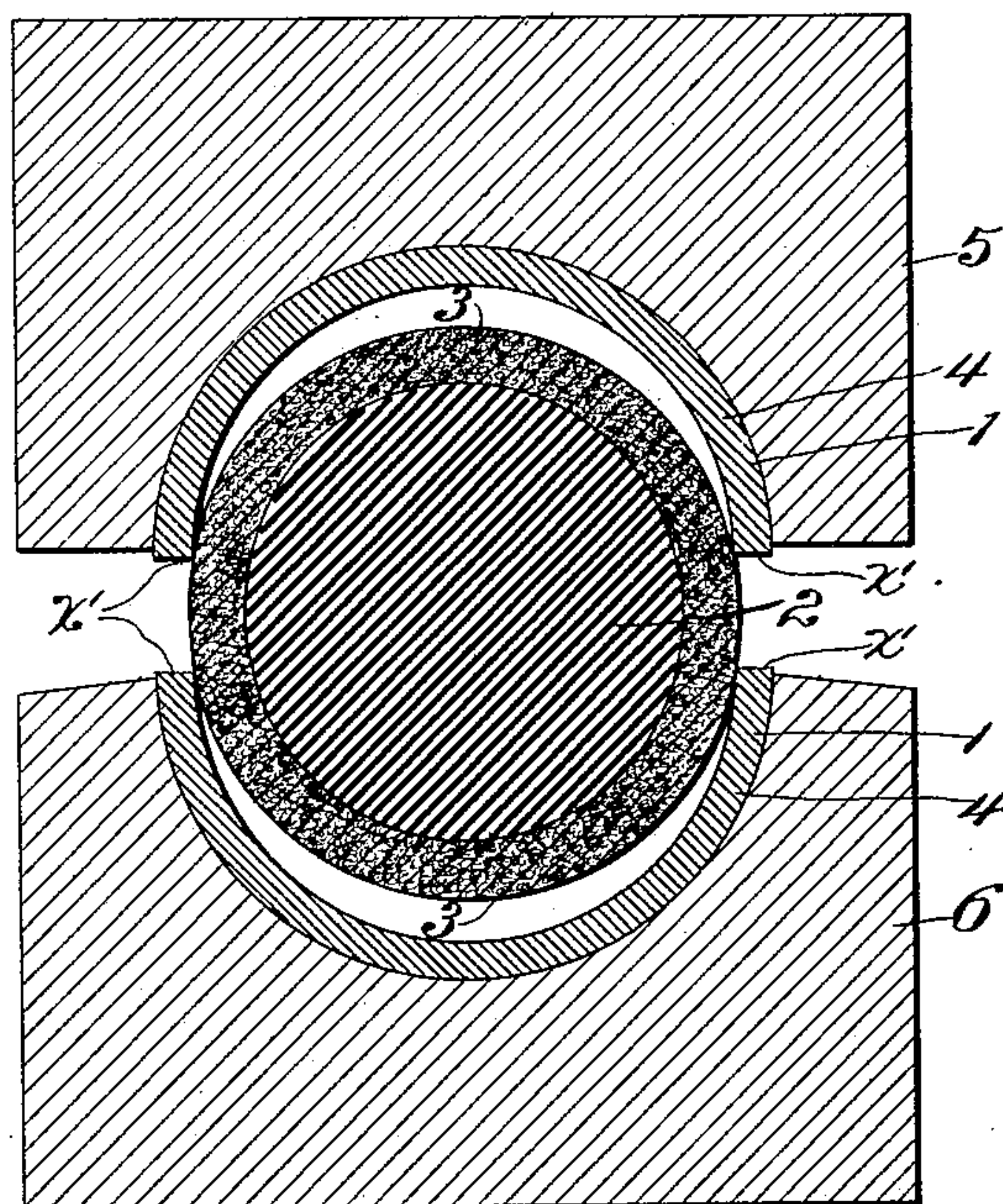


Fig. 2.

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UNITED STATES PATENT OFFICE.

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

GOLF-BALL.

SPECIFICATION forming part of Letters Patent No. 697,418, dated April 8, 1902.

Application filed September 28, 1901. Serial No. 76,951. (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 Golf-Balls and Manufacture of Same, of which the following is a specification.

This invention relates to balls such as used in golf and certain other games; and its objects are to improve the quality, efficiency, and stanchness of the balls and also to improve the method of producing them.

In my pending application, filed September 25, 1901, Serial No. 76,814, is illustrated a ball constructed with a relatively hard or stiff but springy shell, which is filled with an elastic substance that is held under compression by the shell, whereby the latter is supported against distortion produced by a blow, the constant elastic outward pressure of the core tending to maintain the shell in spherical shape and coöperating with the natural springiness of the shell to enhance the efficiency of the ball. The material of the core is preferably gutta-percha and that of the shell preferably celluloid, and in manufacturing such balls I preferably make the core oversize, compress the shell-segments thereover, and cause the latter to adhere to each other, all as set forth in said application.

According to my present improvements I provide the relatively soft material of the core with a jacket, preferably by winding twine layer over layer around the same, the ball thus preliminarily formed being preferably oversize, and then I place the shell-segments over such ball and subject the whole to compression, simultaneously heating the shell, so as to enable it to more readily contract to its finished size under the action of the dies. The jacket prevents the soft material of the core from flowing out through the crevice between the edges of the shell as they approach each other. The presence of the jacket in the finished ball confers advantages, which will be hereinafter explained.

In the accompanying drawings, Figure 1 is a view, partly broken away, of the ball made according to my present improvements; and

Fig. 2 illustrates the preferred method of joining the shell to the core.

Similar characters of reference designate like parts in both figures.

The shell (designated as 1) consists of a relatively hard but springy material, such as celluloid or hard rubber, while the filling comprises a relatively soft substance 2, which is elastic in all directions. For this filling I employ any suitable material, such as rubber, of suitable consistency, but preferably gutta-percha or one of its substitutes. I first inclose the filling in a more or less tough jacket or coat, which preferably consists of one or more layers of fibrous material. In this instance I make said jacket by winding twine 3 repeatedly around the same, so as to form a ball, the windings passing over and over and forming a closely-compacted coat. I prefer to employ linen twine of relatively hard twist; but in some cases other kinds of twine, cord, or the like may be used. In its original shape the nucleus is substantially round, although it may depart from the spherical form within the scope of the invention; but I prefer that its bulk shall be a little too large for the final capacity of the shell.

The shell I preferably form in two semi-spherical segments 4, between which the nucleus ball is placed. The parts thus assembled are placed between forming-dies—as, for instance, 5 and 6—whereupon the latter are pressed together by means of suitable mechanism, thus forcing the shells together so as to bring their edges into intimate contact. To said edges cement is previously applied, so that when they are forced together they adhere, although the invention is not limited to this particular method of effecting adhesion. When required, the dies may be heated by steam or otherwise for bringing the material of the shell-segments into suitable condition and consistency, both for uniting them and also for facilitating the compressing and shaping action of the dies. When celluloid is employed, the heating of the dies effects a softening of the shell, so that it may be more readily pressed from its original to its finished or final size, and the dies may be then allowed to cool before the balls are taken

out, so as to give the shells an opportunity to reharden, whereby they are enabled to retain their shape when removed. The abutting edges of the original segments at 1^x may be made somewhat full, thereby to furnish material for properly forming the joint between them as they are subjected to the final compression.

It will be understood that the material of the shell is compressed between the dies and the resisting mass of the ball contained therein, and since said inner ball is first prepared somewhat oversize the resistance thereof while under such compression furnishes a substantial support for sustaining the relatively thin shell against the pressure of the forming-dies. By properly proportioning the size of the inner ball the shells when being finished may be sustained against any necessary degree of pressure of the dies.

In case other material, such as hard rubber, is employed for the shells the method of manufacture may be varied within the limits of the invention.

My present improvements in construction and method are applicable not only to golf-balls, but also to balls for use in playing billiards and analogous games, and it will be understood that the thickness of the shell and also the firmness and relative size of the center pieces may be varied in accordance with the requirements of any particular game or use for which the balls may be employed.

I usually make the exterior surface of golf-balls pebbled or corrugated to any design or configuration which may be preferred by the player. In this instance the ball is represented as finished with relatively slight elevations of a spherical conformation; but in billiard-balls of course the outer surface should usually be a smooth and true spherical surface.

For a golf-ball the shell is preferably made of celluloid, which is stiff and springy, and hence well adapted for use in this game, while the interior is preferably made of gutta-percha. The object of such a combination is to produce a two-fold springiness in the ball or, in other words, to enable the elasticity of the filling to cooperate with the springiness of the shell, so as to instantly restore the latter to its normal shape after distortion by a blow, and thus to enhance the resiliency of the ball as a whole. The elasticity of the filling, and hence its promptness in recovering from the blow, is greatly enhanced by having it constantly under compression, since the outward pressure thereof in all directions tends constantly to assume and maintain a spherical shape, or, in other words, an outward pressure, such as caused by compression, is of material assistance in enabling the ball to spring instantly back to its original shape, and hence to rebound when thrown against an object, as well as to fly with greater speed and to cover a greater distance when

struck by an implement. It will be seen that one of the important features of the ball resides in causing the springiness of the shell and elasticity of the filling to cooperate in producing a ball of greatly-increased efficiency.

It will be understood that the jacket covering the soft nucleus is of importance in manufacture in cases where the shell is compressed over the nucleus, whether or not the parts are heated at the pressing operation, since even if the parts are cold the tendency of the nucleus when subject to pressure is to flow out between the approaching edges of the shell, which tendency is entirely overcome by the confining action of the relatively tough jacket, and in cases where heat is employed, and hence where the nucleus is rendered still softer and more liable to flow, the jacket becomes of still greater importance. Yet so far as this portion of my invention is concerned it is not essential that the jacket be produced by winding cord or other fabric around the nucleus, nor is it always essential that the jacket be formed of fibrous material, the essence of this feature consisting in providing means whereby the nucleus is retained while the shells are being forced together thereover.

From the foregoing it will be seen that the finished ball comprises a relatively soft elastic nucleus, a relatively hard springy shell, and an intermediate layer of material which has the property of being tough, but is not necessarily hard nor resilient. This layer forms a reinforcement for the shell itself and is of great value, since when the ball is given a knock the force thereof is diffused, and hence the ball is generally altered from its true spherical shape, whereby the elasticity of the nucleus acts over a large area with greatly-increased effectiveness, so that the ball much more readily assumes its normal shape, and is thus more lively and efficient. It will be understood that when the ball is given a sharp knock with a corner or small end of an implement the normal tendency of the shell, especially when the latter is made of celluloid and has thin walls, as illustrated in the drawings, is to dent in sharply, thus affecting only the part of the nucleus which is right behind the area of impact and compacting only a small portion of the nucleus, without tending generally to alter the entire conformation thereof, so that only this small portion of the nucleus would be materially effective in returning the shell to its original shape, whereas by placing a jacket of a suitable toughness over the nucleus and behind the shell the sharp indentation of the latter is prevented, since if the jacket is pushed inwardly anywhere a large area thereof is necessarily affected and dragged inwardly to a slight extent, so that instead of a deep indentation being produced in the nucleus over a small area the latter is slightly flattened over a large area, and thereby the entire shape of the nucleus, as well as the shell, is a little dis-

torted, and in consequence the whole energy of the imprisoned mass is called upon and the ball is restored instantly to its normal position. Moreover, by employing said intermediate coating or backing for the shell the liability of cracking of the latter is practically eliminated, particularly since the presence of such packing prevents undue indentation of the shell, as just explained. The shell may be otherwise reinforced, and both the shell and the reinforcement may be made of varying thickness and of other materials within the scope of the invention, and various effects produced by different combinations of shell, reinforcement, and nucleus may be produced within the scope of the invention. Preferably the twine is made of linen of relatively hard twist and passed over and over the nucleus to form a closely-compact coat of material thickness, so as to more readily transmit and spread the force of the blow and distribute said force over a large area of the compressible elastic center piece. It will be understood that the presence of said jacket does not defeat the tendency of the compressed nucleus to preserve the spherical shape of the shell, since said jacket is not as rigid as the shell itself, and although it is wound compactly over the nucleus still it becomes relaxed to a slight extent, so far as the longitudinal tension of the twine or the like is concerned, when the shells are compressed thereover. Many other variations in construction, arrangement, and method may be resorted to within the scope of my present invention.

The improved method or process herein described is made the subject-matter of my divisional application, filed November 16, 1901, Serial No. 82,500.

Having described my invention, I claim—

1. A playing-ball having a stiff, springy shell formed of plastic material, an elastic nucleus, and an intervening independent layer of fibrous material; said shell holding said nucleus under compression.

2. A playing-ball comprising a shell formed from plastic material, and a springy nucleus held under compression by said shell; said nucleus being wound around with fibrous strips so as to form an independent layer.

3. A playing-ball consisting of a solid nucleus of springy material which is overwound with twine, and a shell of plastic material holding said nucleus under compression.

4. A playing-ball comprising a core of yielding material, an independent flexible tough

fibrous jacket thereon, and a shell of plastic material compressed upon said jacket.

5. A playing-ball comprising a core of gutta-percha overwound with linen twine, and a shell of plastic material holding said core under compression.

6. A playing-ball comprising a yielding core, an independent tough flexible fibrous layer thereon, and a celluloid shell compressed upon said layer and core.

7. The combination of a core consisting largely of gutta-percha, an independent layer of fibrous material covering said core, and a casing of celluloid compressed upon the fibrous material and core.

8. A playing-ball having a yielding core and a celluloid shell which is reinforced with an independent layer of fibrous material, said shell holding said core under compression.

9. A playing-ball having a core which consists largely of gutta-percha, fibrous material wound upon said core and forming an independent layer, and a celluloid shell compressed upon said fibrous material and core.

10. A playing-ball having a yielding core overwound with strips of fibrous material, and a shell of plastic material consisting of segments welded at their edges and holding said core under compression.

11. A playing-ball having a core which consists largely of gutta-percha, and a celluloid shell reinforced by an independent layer of fibrous material and consisting of spherical segments which are welded together at their edges and hold said core under compression.

12. A playing-ball comprising a shell consisting of hemispherical sections welded together at their edges, and a filling of springy material having an independent tough, flexible jacket of fibrous material and held under compression by said shell.

13. A playing-ball comprising a shell which consists of hemispherical segments of celluloid welded together at their edges, and a spherical filling of gutta-percha covered with twine and held under compression by said shell.

14. A ball consisting of a solid sphere of gutta-percha wound compactly with several layers of hard-twisted linen twine, and held under compression by a relatively thin celluloid shell.

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