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Patented Apr. 1, 1902.

E. KEMPSHALL.
GOLF BALL.

(Application filed Jan. 31, 1902.)

(No Model.)

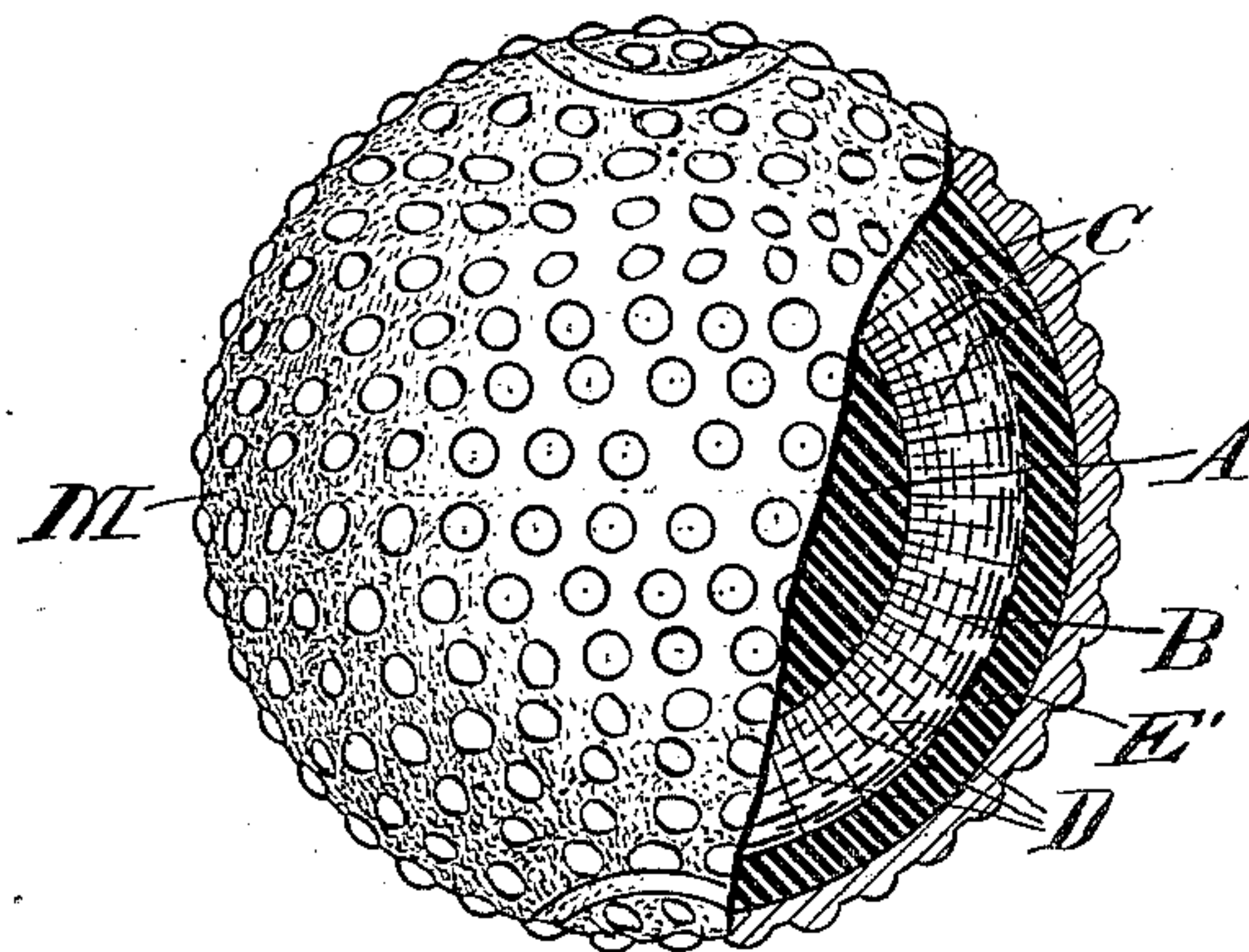


Fig. 1.

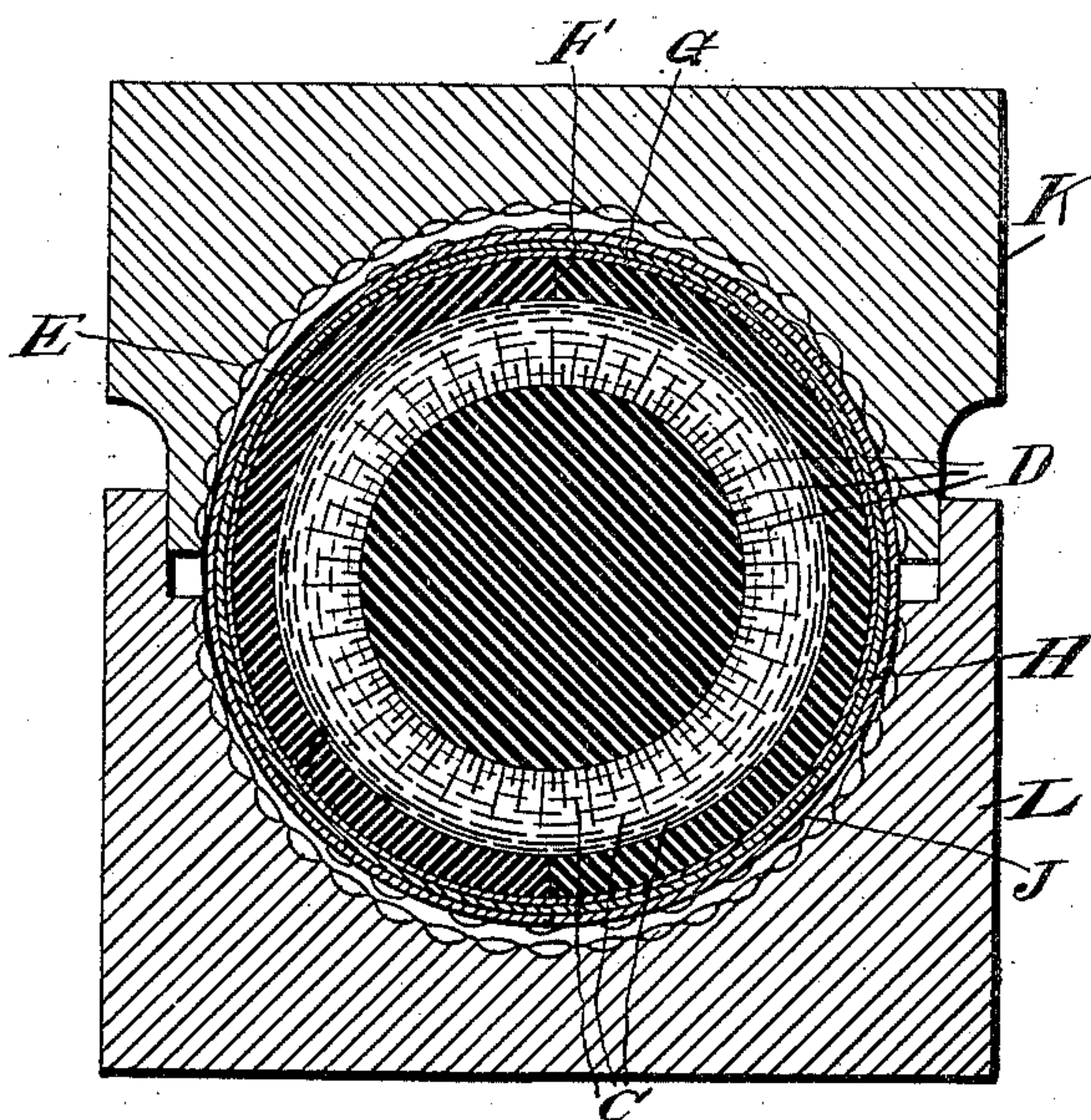


Fig. 2.

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GOLF-BALL.

SPECIFICATION forming part of Letters Patent No. 696,893, dated April 1, 1902.

Application filed January 31, 1902. Serial No. 91,975. (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, of which the following is a specification.

This invention relates to playing-balls, such as used in the game of golf and other games. Its object is to produce at low cost an efficient ball having the quality of being "dead" when given a light blow and exceedingly lively when struck a sharp blow.

In the drawings forming a part of this specification, Figure 1 is a view of a ball made according to my improvements, being partly broken away so as to exhibit its construction. Fig. 2 illustrates a stage in the process of completing the ball.

I preferably employ a spherical core A, made of gutta-percha, which is preferably introduced in a fluid condition and hardened within a suitable rubber envelop B, the gutta-percha being forced into said envelop to such an extent as to materially expand said envelop, as set forth in an application filed by Francis H. Richards December 3, 1901, Serial No. 84,529, whereby the envelop, especially the exterior portion thereof, is put into a state of high longitudinal tension, as indicated by broken curved lines C. The interior portion of the envelop is compressed by the exterior portion, as indicated by the radial lines D, and the core is held constantly under compression by said envelop. The combination of compressed core and distended envelop enhances the efficiency of the ball when struck a heavy blow. However, if desired, soft rubber may be otherwise employed for inclosing a core.

Upon the compound rubber and gutta-percha filling I place a shell E, of gutta-percha, preferably in the form of hollow hemispheres, the joint between them being indicated at F. Upon this shell I apply a coating of material G, said coating completely enveloping the core A and consisting of a thick or dense solution of celluloid or composition thereof, which is in such a plastic or fluid condition that it may be spread over the sphere E in a sub-

stantially even and somewhat thin layer. In practice I find that if this coating is one one-hundredth of an inch, more or less, in thickness it may answer the purpose. The coating is then allowed to dry to a sufficient extent, so that it can be handled safely. This drying effects a preliminary seasoning of the coating material. It will be understood that the material dried out or evaporated from this coating cannot at the subsequent heating and finishing operation work into the interior of the ball to the detriment thereof. When said coating G has become sufficiently hardened, I apply a second coating H over the ball, which in turn is allowed to dry until it attains the required firmness. I then apply a third coating J, which is likewise allowed to dry. In this manner one or more additional layers may be successively applied, according to the style of ball in hand. In practice I find that three layers, or at the most four layers, produce a shell of satisfactory qualities when the ball is intended for use in the game of golf, provided that the shell so built up is supported upon a center or core of suitable material and having the proper firmness. The ball thus built up is placed in finishing-dies K and L and subjected to both heat and compression. In practice I prefer that the ball when placed in the dies shall be somewhat oversize, so that as the die-sections are brought together they compress the ball, thereby effecting a twofold purpose, first, to compress the core, so that it may always exert an outward elastic pressure upon the finished shell, and, second, to subject the material of the shell to compression as well as heat, thereby solidifying the material of the shell itself, so that it may have the qualities of resistance, firmness, indestructibility, and springiness, which are desirable in a golf-ball. The heat and pressure may be applied for a considerable period, so that the ball may be well seasoned.

The heating of the dies by softening the coatings G, H, and J not only insures the kneading or welding of such coatings into one integral casing M, but also facilitates the flowing of the material, so that the shape of the dies is imparted to the finished ball. The

ball may be allowed to cool while under compression, so that the latter when removed are sufficiently hardened to retain their shape.

Thus it will be seen that the casing is made without any seam or joint, and hence is well adapted at all points to withstand shocks from the blow of an implement or from being driven against a stone. At the same time the ball is not subject to internal deterioration from the presence of gas or other matter escaping from the celluloid into the interior of the ball during the heating. Moreover, the necessity for first rolling the celluloid into sheets and then cutting the sheets into disks and cupping them is avoided and the trouble and expense of securing a perfect weld between the shell-joints is also avoided.

Preferably the heat is sufficient to also soften the gutta-percha shell E and enable it to weld at the joint F. I thus form a double shell upon the rubber and gutta-percha filling which possesses great strength and durability. The gutta-percha is thus caused to form one complete sphere, as at E', and the celluloid another complete covering, as at M.

The pressure of the dies compacts and solidifies both the celluloid and gutta-percha components of the shell, the confined mass of rubber and gutta-percha being sufficiently resisting to support the comparatively weak material of the shell under any desired degree of pressure of the forming-dies.

By providing a backing of gutta-percha in the shell I am enabled to employ a relatively thin compound plate of celluloid for the outer covering, thereby not only reducing the expense, but also making it possible to use celluloid in its most effective form, since a thin plate of this material possesses valuable characteristics not found or at least imperfectly developed in a thick plate. For one thing a thin cover of celluloid may be better seasoned than a thick or massive cover, and it is more springy and pliant, while possessing the same wear-resisting, smooth, waterproof, and other qualities which render the ball desirable in the game of golf. At the same time I am enabled to use in the shell a large mass of gutta-percha, which possesses to a superlative degree the quality of storing up force from a blow, which is necessary in a golf-ball. It will be understood that it is important in view of the small size of the balls used in this game and the necessity of its carrying or flying a great distance to use in its construction such a combination of materials as will utilize to advantage every portion of the mass of the ball, or, in other words, it is important to eliminate all dead weight therefrom. Hence it is desirable not only to provide a core or filling having the desired qualities, but also to provide therefor a shell which not only protects said filling, but also itself contributes in a large degree to the flying power or efficiency of the ball, while preventing a light blow from affecting the highly-elastic interior. This desideratum is obtained in this

instance by reducing the thickness of the celluloid cover, so as to retain only enough thereof to provide a wear-resisting, waterproof, and otherwise satisfactory exterior for the balls, and lining such cover with a relatively thick mass of gutta-percha, which not only has great carrying power, but is tough. The celluloid overcomes the objections to the use of a plain gutta-percha exterior, while all of the advantages of the gutta-percha are retained.

One important advantage of my celluloid shell resides in its quality of retaining its original color throughout all the severe usage which it receives in a game. The compressed core gives the entire shell a good backing at all points and tends to prevent such indentations of the shell by an implement as would cause the shell to crack. The celluloid casing is not only practically indestructible, but is at the same time so smooth that it offers little resistance to the air in its flight. It drives farther than any ball heretofore produced, while on account of its slipperiness it easily travels through grass, and is hence excellently adapted to the game. It overcomes the defects of prior golf-balls of being easily cut by a blow from an implement.

It will be understood that the resistance of the central mass at the compressing operation furnishes a substantial support for sustaining the relatively thin shell against the pressure of the forming-dies and coöperates with the latter in producing the desired density or firm, tough, and springy texture of the shell.

In using the term "compression" herein as applied to the rubber sphere or to its core I refer to the gripping or compressive tendency of the shell or casing, which is due to maintaining great pressure of the dies while said shell or casing cools and hardens. This compressive tendency may or may not be accompanied by a condensation of the bulk of the rubber or its core, the presence or absence of such condensation depending upon the character of the material used and upon the degree of pressure employed in forming the ball. It is to be understood that in case condensation of the bulk of the core or its soft envelop takes place it is due to the presence of air-spaces or impurities in the material. It is not, however, essential that the core or rubber be always condensed in bulk. When using the term "seamless" herein I mean to distinguish between my celluloid shell and one made from hemispherical or other segments, which have seams extending in a radial direction, or, in other words, I mean that my said shell is radially seamless. If desired, only one celluloid layer may be used within the scope of my present improvements; but I prefer to use several, for the reasons stated.

In using the term "celluloid" I refer to celluloid compounds generally and do not limit myself to any particular variety of such compound nor to any particular grade or mixture of celluloid composition.

I usually pebble or score the exterior surface of golf-balls, the interior surface of the dies being provided with depressions at G for this purpose. In billiard-balls, to which some features of my invention are applicable, the outer surface should usually be a smooth and true sphere.

Variations in construction, material, method, and other particulars may be resorted to within the scope of my present improvements. A gutta-percha and celluloid shell may be otherwise formed within the scope of my improvements and may be used with other fillings than those herein specifically mentioned.

The herein-described process is made the subject-matter of my pending application, Serial No. 87,888, filed March 12, 1902.

Certain features of construction herein disclosed are made the subject-matter of my other pending application, Serial No. 90,442, filed January 20, 1902, the claims herein reciting constructions not disclosed in the last-mentioned application.

Having described my invention, I claim—

1. A playing-ball comprising a spherical rubber envelop distended by a filling of gutta-percha, and a shell built up of gutta-percha and celluloid and compressed upon said envelop, the celluloid portion of the shell being seamless.

2. A playing-ball comprising a spherical core of gutta-percha, a solid soft-rubber spherical envelop thereon, a gutta-percha shell upon said envelop, and a plurality of seamless layers of celluloid incasing said shell.

3. A playing-ball comprising a spherical gutta-percha core, a soft-rubber envelop thereon, a relatively thick gutta-percha shell upon said envelop, and a celluloid covering upon said shell; said celluloid covering being materially thinner than said gutta-percha shell, and comprising a plurality of seamless layers fused or welded together.

4. A playing-ball comprising a spherical gutta-percha core, a solid soft-rubber spherical envelop thereon, a gutta-percha shell upon said envelop, and a seamless celluloid covering upon said shell; said celluloid and gutta-percha shell being compressed upon said envelop.

5. A playing-ball comprising a gutta-percha spherical core, a soft-rubber envelop thereon, a gutta-percha shell upon said envelop, and a multiple-ply thin celluloid covering compressed upon said shell; said gutta-percha shell being formed in segments welded and compressed upon said filling.

6. A playing-ball comprising a gutta-percha core, a soft-rubber envelop, a gutta-percha shell upon said envelop, and a celluloid covering upon said shell; said gutta-percha shell being made in sections or portions which are welded and compressed upon said filling, and said celluloid comprising a plurality of welded coatings compressed upon said shell.

7. A playing-ball comprising a gutta-percha core, a soft-rubber envelop thereon, a gutta-percha shell upon said envelop, and a thin celluloid covering upon said shell; said gutta-percha shell being made in sections which are welded and compressed upon said filling, and the celluloid covering comprising a plurality of seamless layers welded together and compressed upon said shell.

8. A playing-ball comprising a core which is inclusive of a spherical body of india-rubber, a shell of gutta-percha compressed upon said core and a seamless celluloid casing compressed upon said shell.

9. A playing-ball comprising a relatively large sphere of gutta-percha, a shell of gutta-percha; an intervening layer of soft, springy material; said shell being compressed upon said intervening layer and core; and a thin seamless casing of celluloid compressed upon said shell.

10. A playing-ball comprising a yielding filling, a thick gutta-percha shell compressed thereon; and a thin seamless celluloid casing compressed upon said shell.

11. A playing-ball having an internal mass of rubber and gutta-percha and a seamless casing or shell of hard, wear-resisting material.

12. A playing-ball having an internal mass of soft rubber and gutta-percha and a seamless celluloid casing or shell.

13. A playing-ball having an internal mass of soft rubber and gutta-percha and a seamless celluloid casing compressed thereon.

14. A playing-ball having an internal mass of gutta-percha and soft rubber and a relatively thin seamless celluloid shell compressed to size upon said mass so as to hold the latter under compression.

15. A playing-ball having an internal mass of gutta-percha and rubber and a relatively thin shell consisting of several layers of celluloid compressed upon said mass so as to hold the latter under compression.

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