

No. 696,890.

Patented Apr. 1, 1902.

E. KEMPSHALL.  
GOLF BALL.

(Application filed Jan. 4, 1902.)

(No Model.)

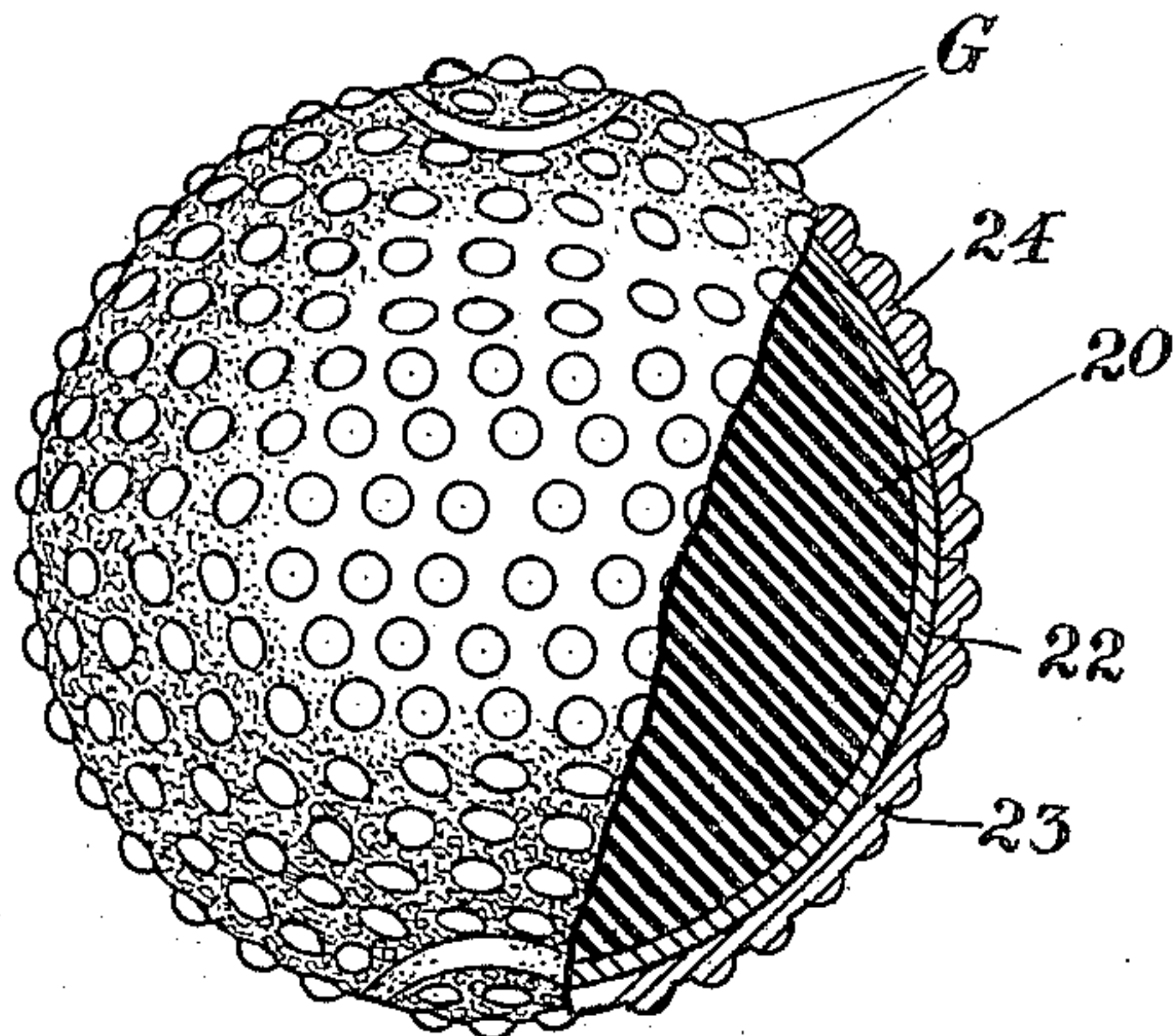


Fig. 1.

Fig. 2.

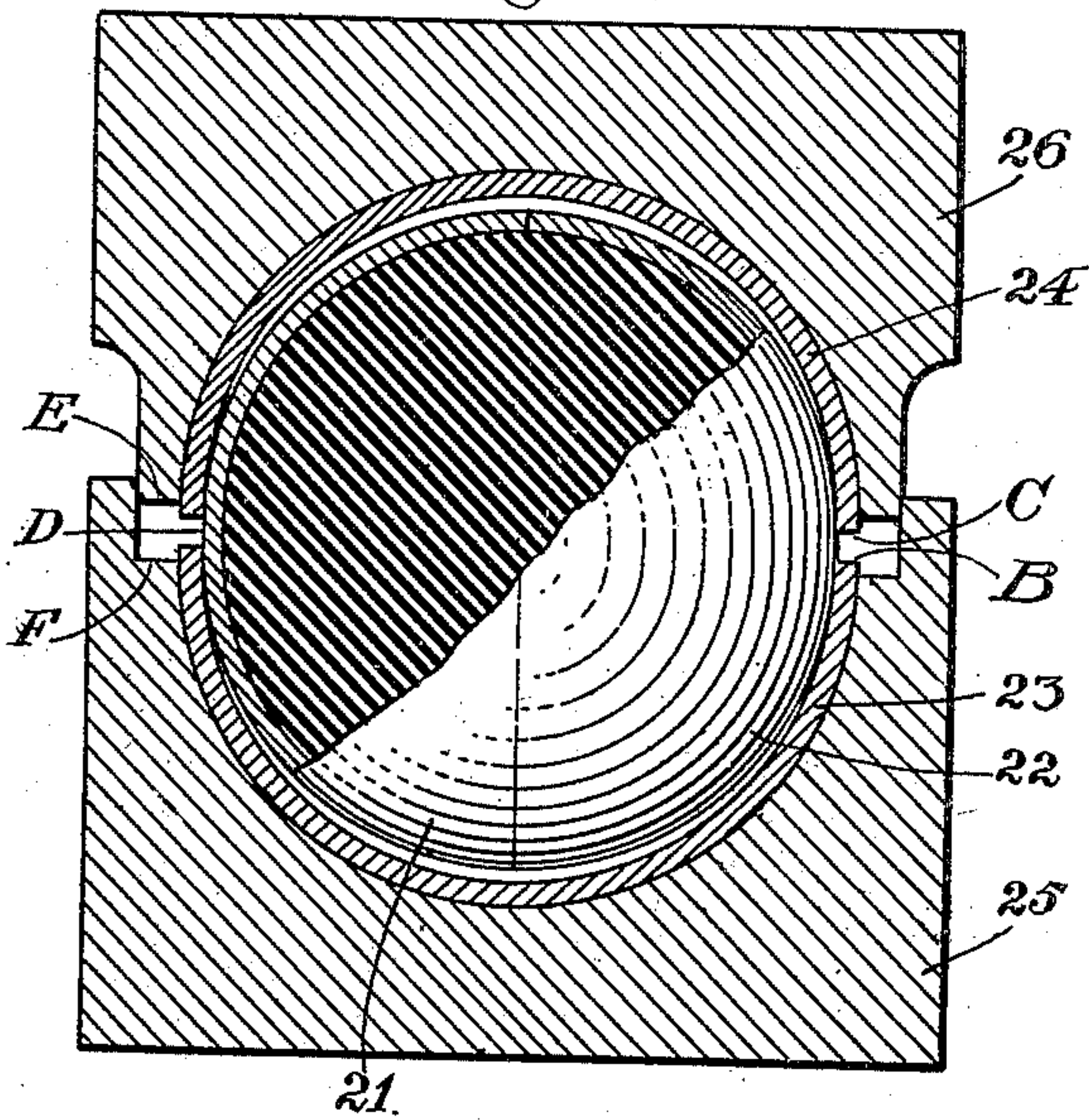
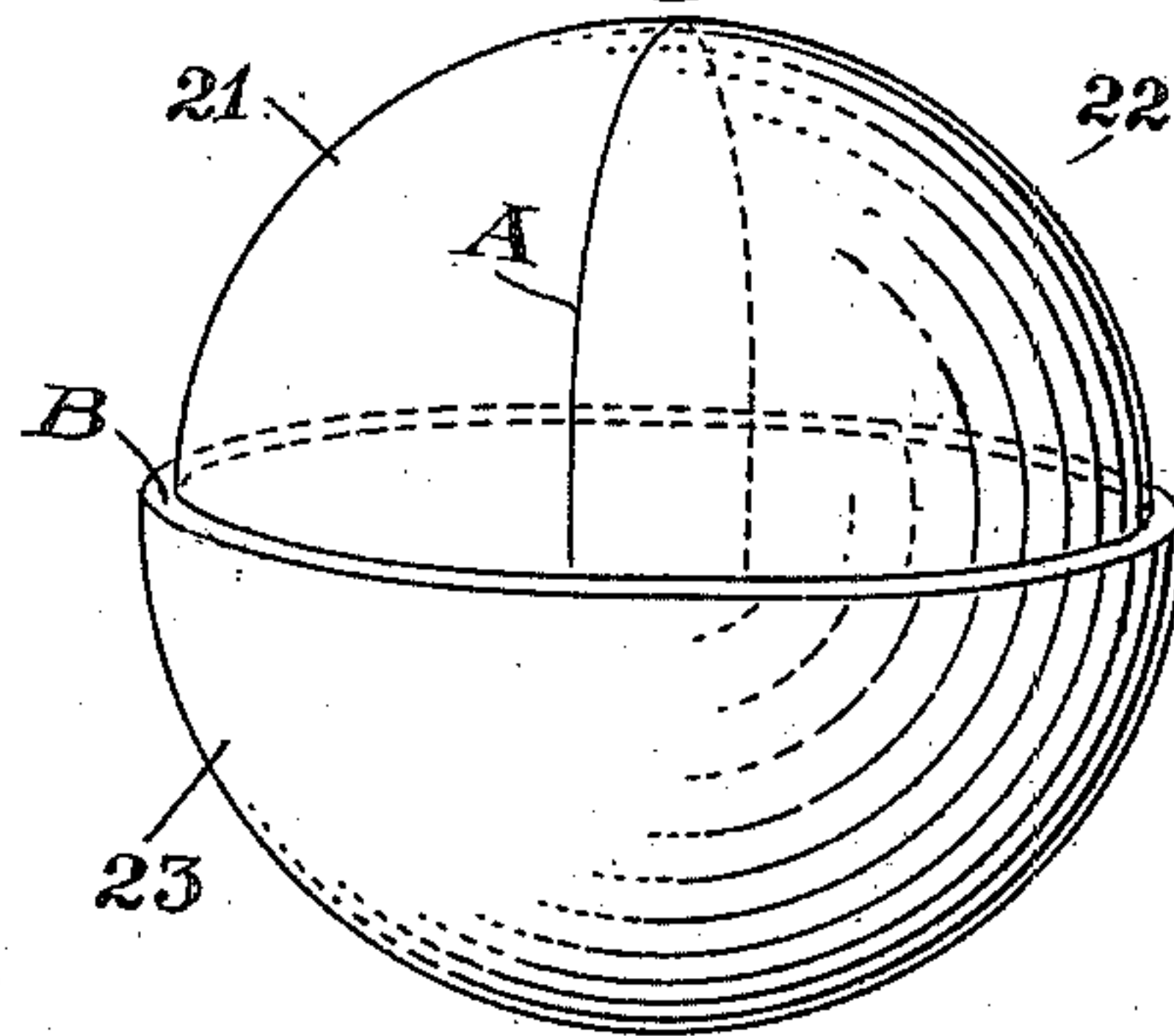


Fig. 3.



Witnesses:

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Inventor:

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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. 696,890, dated April 1, 1902.

Application filed January 4, 1902. Serial No. 88,410. (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; and its chief object is to strengthen and improve the covers of balls which are subjected to severe usage, as in the game of golf.

In the accompanying drawings, Figure 1 is a view of my improved ball, partly broken away, so as to exhibit its construction. Fig. 2 illustrates a stage in the process of covering the ball, and Fig. 3 illustrates the relative arrangement of jointed layers used in forming the cover.

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

Upon a core 20 of suitable material, such as gutta-percha or soft rubber, I place hemispherical segments 21 and 22 of hard, wear-resisting material—such, for instance, as celluloid—and this inner shell I inclose with an outer shell consisting of hemispherical segments 23 and 24, placing the latter so that the seam A, between the inner segments, extends transversely and preferably at right angles to the edges B and C of the outer segments. The ball thus formed or assembled I place between heating and forming dies 25 and 26, the edges B and C preferably being parallel with the lips E and F of the dies. The latter I bring together forcibly, thereby closing the outer shell upon the inner shell and joining the edges B and C of the former. The filling or core 20 is nearly the full size of the ball and is originally prepared somewhat oversized—that is, of a bulk too great for the capacity of the finished shell; and one of the objects of compressing the shell upon the filling is to place the latter in a state of normal compression, so as to increase the efficiency of the ball, as set forth in my pending application, Serial No. 76,814, filed September 27, 1901. An advantage of my present improvements is that the material of the filling is prevented by the inner shell D from squeezing

out between the lips E and F of the dies. The heating of the dies renders the material of the shell layers plastic and enables the edges at A, as well as those at B and C, to weld, and owing to the crossing of the welds the danger of the ball bursting at a weld when subject to rough usage in play is avoided, since the body portion of one of the layers reinforces the weld portion of the other thereof, thereby making a practicably indestructible casing for the core. Moreover, the weld itself is improved in character in each layer by reason of the contiguity of the material of the other layer, the heating and pressure having a tendency to compact the material of both layers into one concrete thick shell. The pressure to which the shell is subjected tends also to compact, toughen, and temper the celluloid or other material, rendering it less liable to chip off and also more springy, tenacious, and durable. It will also be understood that celluloid in the form of thin layers, which I preferably use, has desirable qualities that are not so well marked when the celluloid is made up in thick layers, so that my laminated shell has the temper of thin celluloid, while also having enough body to furnish the necessary resistance to a blow. Either or both of the layers may, however, be incompletely cured or somewhat green, it being desirable that there shall be at least enough solvent present in the material to render the same plastic and weldable when heat is applied. Thus it will be seen that the ball at Fig. 1 comprises a solid core of gutta-percha, soft rubber, or suitable materials in combination, compressed by a shell built up of layers of celluloid, each layer consisting of segments welded at their edges, the welds crossing, and said layers being further welded together or adhering facewise, thereby producing a shell practically as strong as a seamless shell in the normal expansive tendency of the filling serving or aiding to maintain the true spherical form of the shell and also aiding materially in restoring the ball to its true shape after a blow, thereby conducing to the flying power thereof. Moreover, by having the core in a state of initial compression less distor-



tion of the ball under a blow occurs before the limit of compression is reached, whereby less force is wasted in changing and restoring the shape to the ball, so that nearly all of the force of the implement is utilized in speeding the ball.

It will be seen that one layer of the shell serves to reinforce the joint of the other layer, and it will be understood that such reinforcement not only enables the shell to withstand the normal expansive energy of the filling, but also prevents undue flexure and practically eliminates the danger of bursting at the joint.

By the term "compression" used herein I refer to compressive tendency, which in practicing my invention is usually accompanied by condensation of the compressed material. It is to be understood that in case condensation of the core occurs at the compressing operation it is due to the presence of air-spaces or impurities in the material. It is not essential in practicing my invention that the core be always condensed in bulk, so long as when the ball is finished the core is gripped by the shell. This grip is made even more powerful by the shrinking of the celluloid, which continues for a long time after the ball is made.

I usually form the shell of golf-balls with a pebbled or brambled surface, as at G; but for other games the balls may be made with a smooth periphery.

As my improvements relate chiefly to an improvement in the shell, whereby it is adapted particularly for the purposes specified, I have illustrated the core 20 in the form of a solid sphere; but it may be otherwise formed and still be wholly or partly held under compression by the improved shell. I prefer to employ gutta-percha for at least a large portion of said core, although any other yielding backing may be employed for the shell, reducing the tendency of the latter to chip and also cooperating therewith to increase the efficiency of the ball. The shell I make relatively thin, so that it may possess a degree of flexibility, springiness, or temper not present in a solid or nearly solid ball of the same material, thus preserving the wear-resisting quality of the ball, while making it lively and efficient. So long as the shell is made up of wear-resisting material which is harder than the backing or filling it is not essential that said shell in all cases be made of celluloid. More than two plies or layers may be used for the shell within the scope of my invention. While I prefer celluloid for reinforcing the joint or weld between segments, other material may be employed within the scope of my invention, and while I prefer to reinforce one welded or jointed segmental shell by means of a like shell, still a reinforcement may be made by means of a shell otherwise formed and consisting of other substance.

In using the term "celluloid" I mean to

include all components of the celluloid or pyroxylin class.

The herein-described process is made the subject-matter of my pending application, Serial No. 97,881, filed March 12, 1902.

Having described my invention, I claim—

1. In a playing-ball, a shell of plastic material made up of layers, one of said layers being formed of jointed spherical segments, and another of said layers reinforcing the joint, and a yielding filling held under compression by said shell.

2. In a playing-ball, a shell formed largely or wholly of plastic material and comprising a plurality of layers, one of said layers being in the form of jointed or welded hemispherical segments, and another of said layers reinforcing the weld, and a yielding filling held under compression by said shell.

3. In a playing-ball, a shell formed largely or wholly of plastic material and comprising two layers, each consisting of jointed spherical segments, the joint or seam in one layer running crosswise with the joint or seam in the other layer, and a yielding filling held under compression by said shell.

4. In a playing-ball, a shell comprising an inner and outer layer, each consisting of a plurality of welded segments, and each of said layers reinforcing the weld of the other thereof.

5. In a playing-ball, the combination with a core of a plastic shell comprising at least one layer made up of jointed segments and reinforced at the joint by another layer; said shell holding said core under compression.

6. In a playing-ball, the combination of a yielding core and a celluloid shell holding said core under compression; said shell comprising inner and outer layers, each of said layers consisting of segments welded together, and the weld in one of said layers running crosswise of the weld in the other thereof.

7. In a playing-ball, the combination with a yielding core, of a shell consisting wholly or partly of celluloid and holding said core under compression; said shell consisting of layers, at least one whereof is in the form of segments welded together, and another of said layers reinforcing the weld; said layers being also compacted and welded together facewise.

8. A playing-ball comprising a core consisting wholly or largely of gutta-percha, and a shell consisting wholly or largely of celluloid and made up of outer and inner layers, each layer consisting of hemispherical segments welded together, the welds running crosswise of each other; and said layers being solidified and welded together facewise so as to form a concrete shell, which holds said core in a state of compression.

9. In a playing-ball, a shell made up of layers, at least one of said layers consisting of celluloid one of said layers being formed of jointed spherical segments, and another of



said layers reinforcing the joint; and a yielding core held under compression by said shell.

10. In a playing-ball, a shell comprising two layers, at least one of said layers consisting of celluloid each consisting of jointed spherical segments, the joint or seam in one layer running crosswise with the joint or seam in

the other layer; and a yielding core held under compression by said shell.

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Witnesses:

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