

No. 696,895.

Patented Apr. 1, 1902.

E. KEMPSHALL.
GOLF BALL.

(Application filed Feb. 24, 1902.)

(No Model.)

Fig. 1.

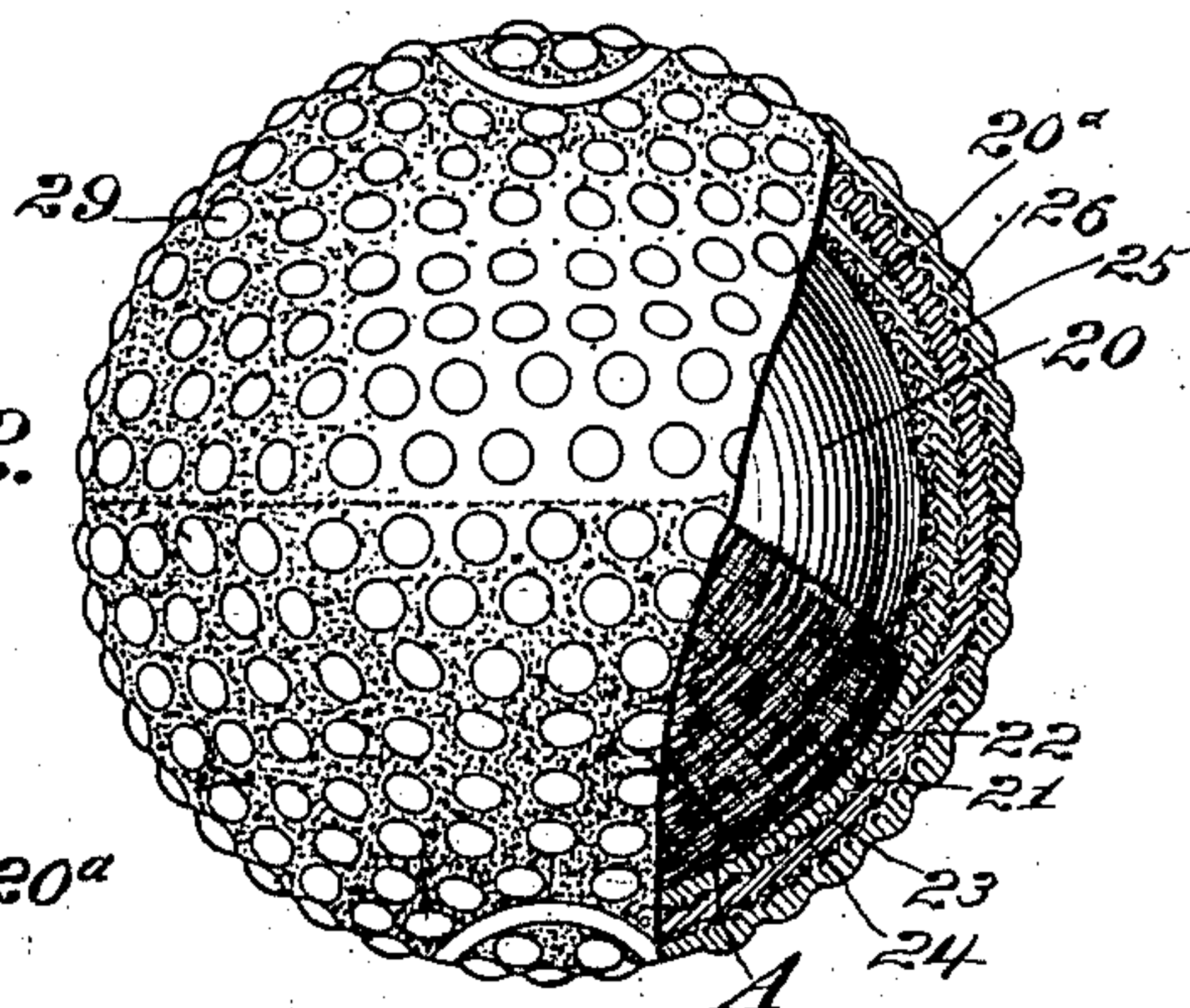


Fig. 2.

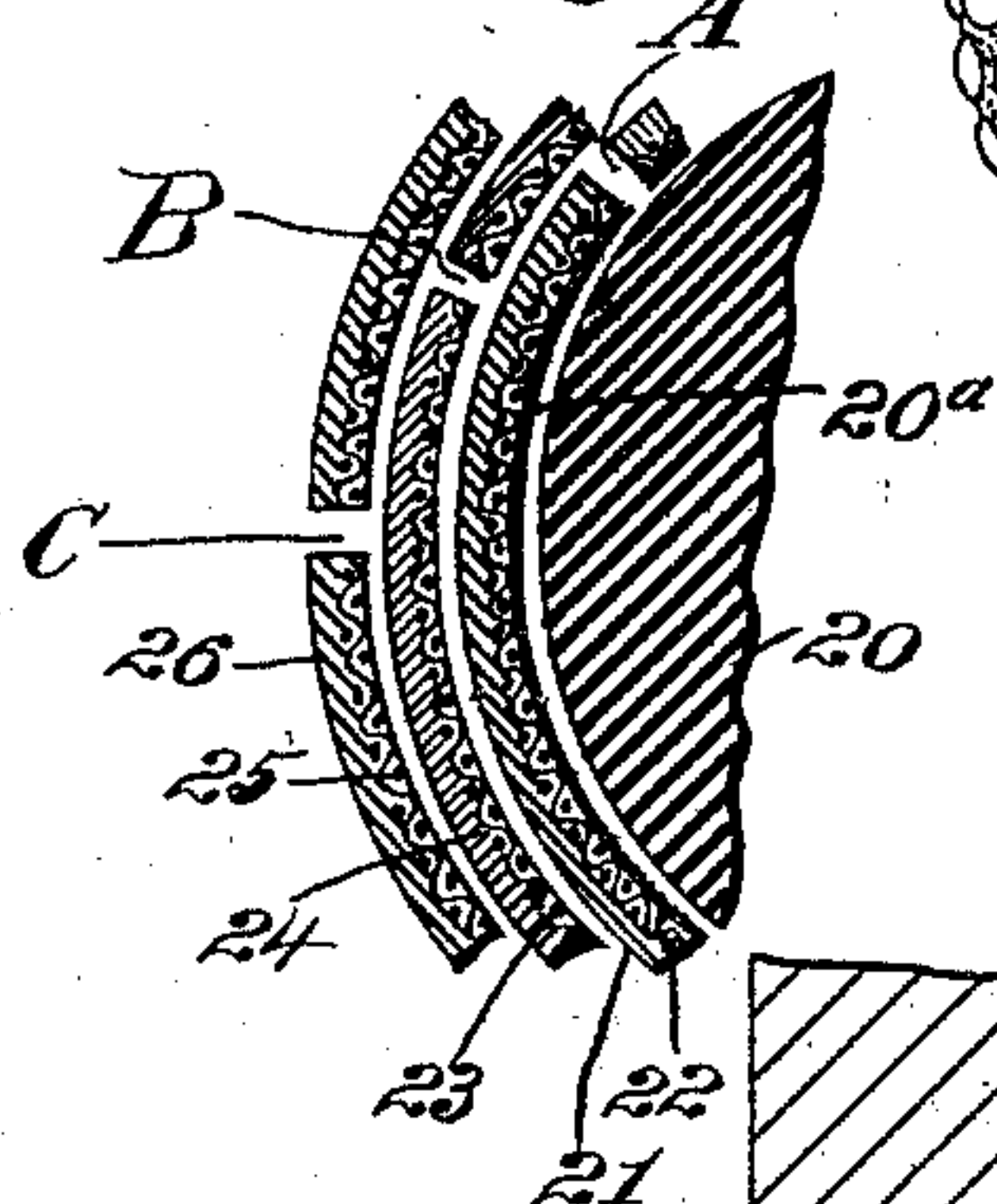


Fig. 3.

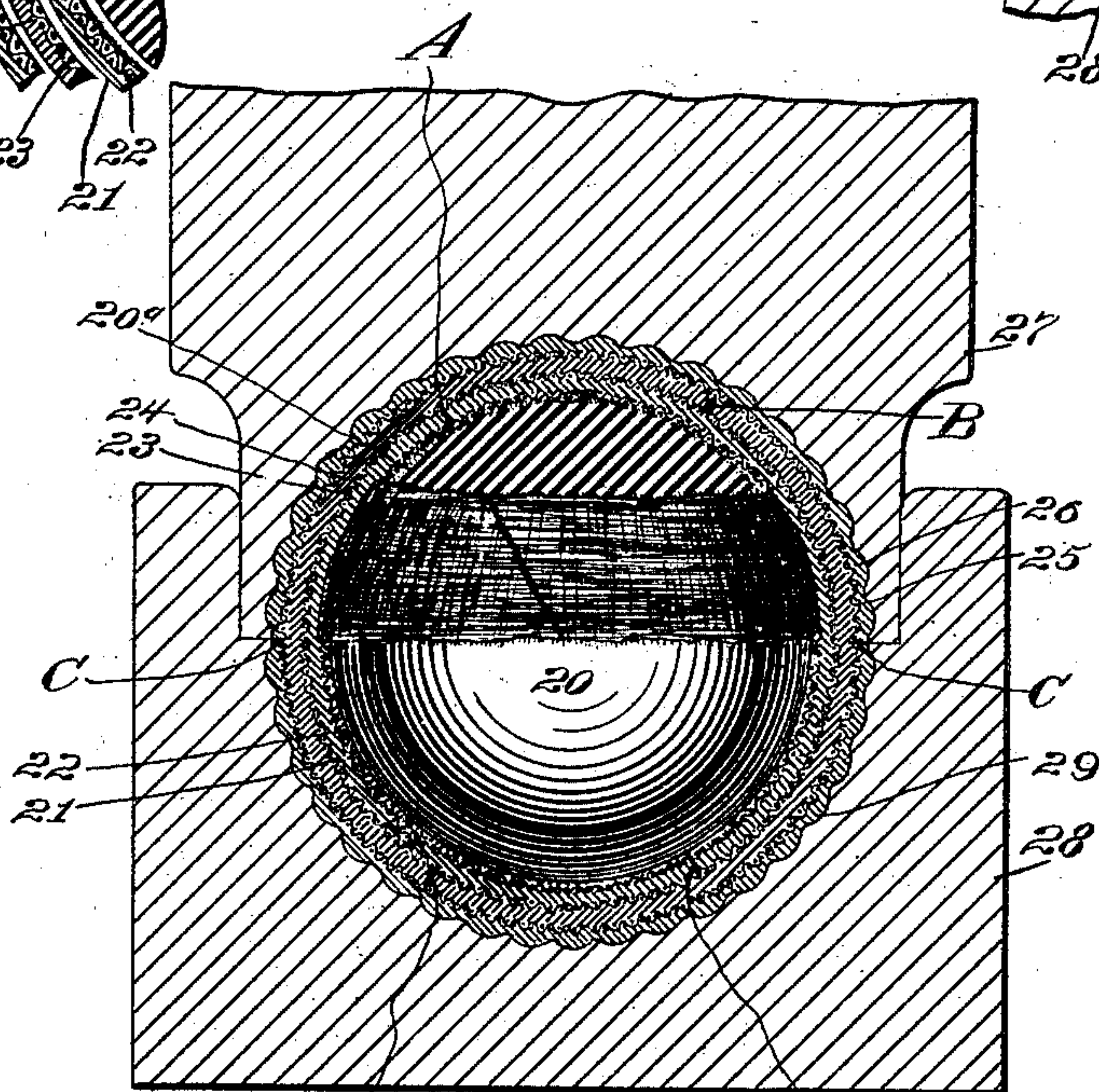
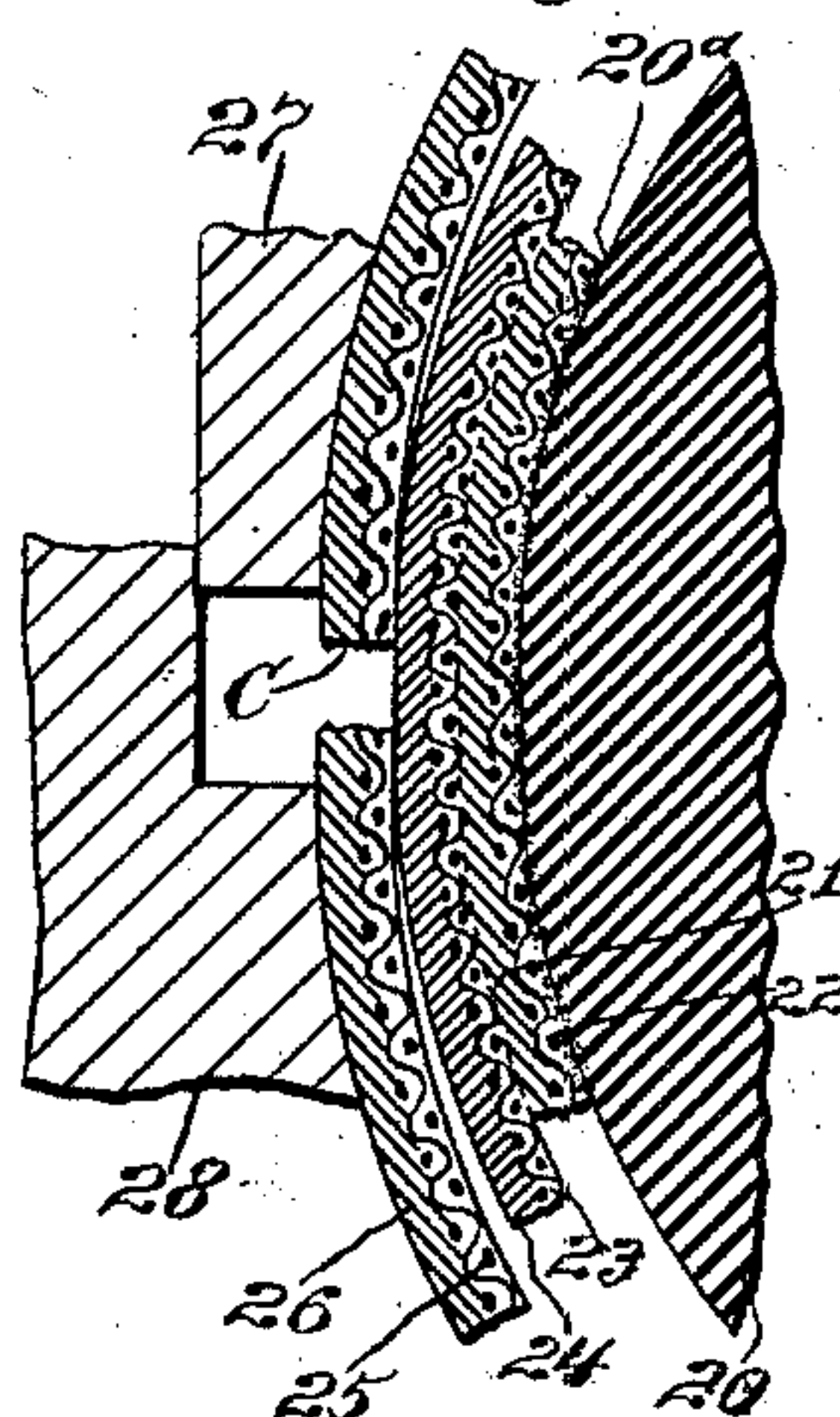


Fig. 4.

Witnesses:

Fred. Maynard
B. b. Stickney.

Inventor:

Eleazer Kempshall
By his Attorney,
J. H. Richards.

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. 696,895, dated April 1, 1902.

Application filed February 24, 1902. Serial No. 95,151. (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 golf and certain other games; and its object is to increase the efficiency and durability of the ball, my improvements affecting more particularly the shell, which I form of a hard wear-resisting springy material—such, for instance, as celluloid, which, however, I render extremely tough and otherwise superior to a simple celluloid shell of the same thickness and which I also cement to the core or filling, thereby increasing the efficiency and durability of the ball.

In the accompanying drawings, Figure 1 shows a ball made in accordance with my present improvements and partly broken away, so as to exhibit the construction. Fig. 2 is a fragmentary view illustrating the ball components. Figs. 3 and 4 illustrate stages in the process of making a ball.

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

I form a center piece 20 of suitable material, such as soft rubber, which may be either a solid sphere or built up of different materials, so long as it affords an elastic backing for the shell and has sufficient weight to enable the ball to carry well. This filling or core I cement, as at 20^a, and then cover with a shell layer composed of an outer ply of celluloid and an inner ply or facing of fabric, preferably woven, the cement (which may also be applied to the fabric) joining the fabric to the rubber core. This two-ply shell may be formed of hemispherical segments, as indicated at Figs. 2 and 4, the celluloid being indicated at 21, the fabric at 22, and the joint between the segments at A. In forming the original shell segments or blanks I preferably combine the celluloid and fabric under heat and pressure, so that the celluloid permeates the meshes of the fabric, thereby making a very firm and tough blank. This shell of celluloid-treated fabric I preferably incase

in hemispherical segments compounded of celluloid 23 and woven fabric 24, the joint between them at B crossing the joint at A, so that one shell may reinforce the joint of the other shell. I then apply an outer shell or layer made of plies of fabric 25 and celluloid 26, the fabric being inside and the facing of celluloid thereon being intended to form the periphery of the ball. The cloth and celluloid of this layer or blank may also be combined under heat and pressure, preferably so as to form hemispherical segments, which are so placed that their joint or seam C crosses the seam B of the intermediate segments, thereby breaking joints throughout and eliminating all liability of the shell bursting, since the joint of each layer is reinforced by the body of another layer. The ball thus assembled is placed between forming and heating dies 27 and 28; which are then forced together, thereby welding or joining the edges of all of the segments, which, if desired, may be cemented. I prefer to make the original shell-blanks somewhat too bulky to fit in the closed dies, so that when the latter are brought together the shell is compressed, the heat rendering the celluloid sufficiently plastic to form the welds and complete the shell, as indicated at Fig. 1. All of the celluloid used in the shell may be in such a condition that by the action of heat it may be rendered sufficiently plastic to enable it to mold under the pressure of the dies and also to enable the several layers to weld to one another, the presence of celluloid in the meshes of the fabric contributing to this effect.

The mass 20, forming the body of the ball, is highly resisting and prevents the composite shell from collapsing under the great pressure of the dies. By reason of the compression of the shell between said dies and said resisting mass the celluloid of the shell is further hardened or tempered and toughened. The bulk of the elastic filling 20 is also somewhat reduced, said filling being placed under permanent compression by the shell, which is retained in the dies until sufficiently cool to hold its shape in spite of the expansive tendency of the core. Said tendency aids in preserving the true spherical form of the

shell and also in restoring the shape of the same instantly when distorted by a blow, thus increasing the carrying power of the ball.

By building up a shell by means of thin layers of celluloid alternating with fabric and also causing the celluloid to permeate the fabric I obtain the advantage of a simple celluloid shell which possesses the advantages of thin plates as to temper, toughness, durability, &c. The layers of fabric, especially when woven, compensate for or overcome the usual brittleness of the celluloid, a composite shell of the kind herein described not being easily cracked or chipped. The presence of the fabric conduces to the springiness of the shell, since it tends to prevent the latter from being indented sharply at any point, so that when the ball is struck by an implement not only the point of contact, but also the portion of the shell surrounding said point, is flexed, thereby affecting a large area of the resisting springy mass within the shell. Hence neither the shell nor the inner mass is unduly distorted by a blow, so that little force is absorbed in changing and restoring the shape of the ball, while owing to the large proportion of the core affected great energy is brought to bear in restoring the shape of the ball, thereby causing it to spring from the implement with phenomenal speed. Cementing the shell to the core conduces to this result, it being highly desirable that the shell and core be inseparable under ordinary usage. It is not essential in all cases that three layers be employed in the shell so long as the inner layer is faced upon its concave side with fabric, which enables the layer to be cemented to the core.

My improvements may be applied in building up a shell of other material than celluloid in combination with a ply or plies of tough material, especially where one or more of the layers or blanks consist of joined segments.

I usually make the surface of golf-balls pebbled or brambled, as at 29, Fig. 1, although balls intended for other games may be otherwise finished.

In using herein the term "celluloid" I do not limit myself to any particular compound of the celluloid or pyroxylin class. It is not essential always that all or any of the plies or layers whereof the shell is built up be applied in the form of segments.

Having described my invention, I claim—

1. In a playing-ball, the combination with a springy core of a shell comprising at least two plies, the outer ply being of hard, springy, wear-resisting material, and the inner ply being of fabric cemented to said core; said shell holding said core under compression.

2. In a playing-ball, a thin shell comprising an outer ply of celluloid, a ply of fabric near the outer surface of the ball, and an inner ply of celluloid interiorly faced with fabric; in combination with a yielding core to which said facing is cemented.

3. In a playing-ball, a shell consisting of hard, springy material having separate plies of fabric incorporated therein, including an interior facing-ply, and a core to which said facing-ply is cemented.

4. A playing-ball comprising a core, a compacted shell having a plurality of thin plies or plates of celluloid, a ply or layer of tough material between said celluloid plies, and an inner facing of cloth cemented to said core.

5. In a playing-ball, a shell comprising celluloid and woven fabric embedded therein, and a springy core to which said shell is cemented.

6. In a playing-ball, a shell comprising a plurality of plies of fabric alternating with plies of celluloid, and a core consisting partly or wholly of rubber to which said shell is cemented.

7. In a playing-ball, a shell comprising an outer ply of celluloid, an inner ply of fabric, intervening plies of fabric and celluloid, and a core to which said inner ply of fabric is cemented, said core consisting partly or wholly of rubber.

8. In a playing-ball, a compacted shell comprising an outer ply of celluloid, an inner ply of fabric, and a core to which said inner ply is cemented.

9. In a playing-ball, a shell comprising a thin outer ply of celluloid backed by cloth, and an inner thin ply of celluloid interiorly faced with cloth; said plies and said cloth being closely compacted; and a core to which said interior facing is cemented.

10. In a playing-ball, the combination with a springy core of a shell cemented thereto and comprising outer and inner layers, each of said layers consisting of hard, springy material reinforced by tough material, and being formed of segments, the inner layer breaking joints with the outer layer, thereby to prevent bursting of the shell at either joint.

11. In a playing-ball, the combination with a sphere of rubber of an outer and an inner shell layer, each of said layers consisting of hemispherical segments of celluloid interiorly faced with cloth and joined at their edges, the inner layer being cemented to said rubber, and the joint of one of said layers crossing the joint of the other of said layers.

12. In a playing-ball, the combination with a core consisting partially or wholly of rubber of an outer and an inner shell layer, the inner layer being jointed or welded, and the other layer closing or covering the joint or weld of the inner layer so as to form a reinforcement therefor; and said inner layer being cemented to said rubber.

13. A playing-ball consisting of a yielding core and a shell cemented to said core and holding it under compression; said shell comprising alternate plies of celluloid and fabric closely compacted; and said plies being at least three in number.

14. A playing-ball consisting of a solid sphere of yielding material or materials, and

a shell holding said core under compression; said shell comprising closely-compacted plies of cloth alternating with one or more layers of hard, wear-resisting material, the inner surface of said shell being of cloth, which is cemented to said core.

15. A playing-ball consisting of a solid yielding core held under compression by a shell consisting of layers each composed of a ply of fabric faced with hard, wear-resisting material; such composite layers being formed of segments welded or joined together at their edges, and being cemented to the core.

16. A playing-ball consisting of a yielding core held under compression by a closely-compacted shell consisting of a plurality of layers, at least the inner one of said layers consisting of spherical segments of celluloid faced upon its inner side with fabric, and cemented to said core.

17. A playing-ball consisting of a yielding core upon which is cemented a closely-compacted thin shell consisting of a plurality of layers, each layer consisting of a plurality of joined celluloid segments, each faced upon its inner side with fabric, and the joint or seam in one layer crossing the joint or seam in another layer.

18. A playing-ball consisting of a yielding core held under compression by a relatively thin closely-compacted shell consisting of a plurality of layers, each layer consisting of joined hemispherical fabric and celluloid segments, the fabric being upon the inner side of each layer, the joint or seam in one layer extending crosswise of the joint or seam in the other layer, and the shell being cemented to the core.

19. In a playing-ball, the combination with a core of a shell or covering comprising segments welded or joined at their edges and cemented to said core; each segment comprising a ply of fabric and a layer of hard, wear-resisting, springy material closely compacted with said fabric.

20. In a playing-ball, the combination of a core of springy material; hemispherical cover-segments joined at their edges and cemented upon said core; each segment comprising an inner layer of woven fabric, as 22, and a layer of celluloid, as 21; and a reinforcing-cover, as 23, 24, for the joint or seam.

21. In a playing-ball, the combination of a core; spherical segments, each comprising an inner layer of woven fabric, as 22, and a layer of celluloid, as 21; said segments being welded at their edges and cemented upon the core; and a fabric reinforcement, as 23, for the weld.

22. In a playing-ball, the combination of a relatively massive solid core, and a relatively thin shell consisting of an inner layer, an outer layer, and an intervening layer; said inner and outer layers consisting of cloth having celluloid embedded therein, and each being formed of segments welded at their

edges, the welds crossing; said intervening layer being also of celluloid and firmly uniting said outer and inner layers; and said shell being compacted upon and cemented to said core and holding the latter under compression.

23. In a playing-ball, the combination with a yielding core of a shell cemented thereto and consisting of fabric and hard, wear-resisting material in alternate layers; said layers being welded into the form of a concrete substance and holding said core under compression.

24. In a playing-ball, the combination of a springy core; celluloid segments or plates joined at their edges, to form a cover, and cemented upon said core; and a fabric reinforcement covering the joints.

25. In a playing-ball, a shell consisting at least partially of celluloid and cemented to and compressed upon a springy core, and holding the latter under compression.

26. In a playing-ball, the combination of a core and a shell cemented thereto; said shell consisting of an outer ply of celluloid, then a ply of fabric, then a second ply of celluloid, then a second ply of fabric, then a third ply of celluloid, and then a third ply of fabric.

27. In a playing-ball, the combination with a filling of a shell or casing cemented thereto and consisting of celluloid lined with fabric.

28. In a playing-ball, the combination with a filling of a shell cemented to said filling and holding the latter under compression, said shell consisting of celluloid lined with woven fabric.

29. A ball incased in and cemented to united hemispherical cups formed from celluloid in which fabric is embedded.

30. A ball incased in and cemented to united spherical segments formed from celluloid which is united with woven fabric.

31. A playing-ball having a filling and a shell cemented to said filling and holding the latter under compression; said shell including an outer layer of celluloid lined with fabric, said layer being formed in hemispherical segments which are welded together at their edges.

32. A playing-ball comprising a filling and a shell cemented thereto; said shell being compounded of fabric and celluloid.

33. A playing-ball comprising a yielding filling and a shell cemented to and holding said filling under compression, said shell being formed from hemispherical segments welded together at their edges, and the shell including a plurality of layers of celluloid and at least one layer of woven fabric.

ELEAZER KEMPSHALL.

Witnesses:

B. C. STICKNEY,
JOHN O. SEIFERT.