

No. 697,925.

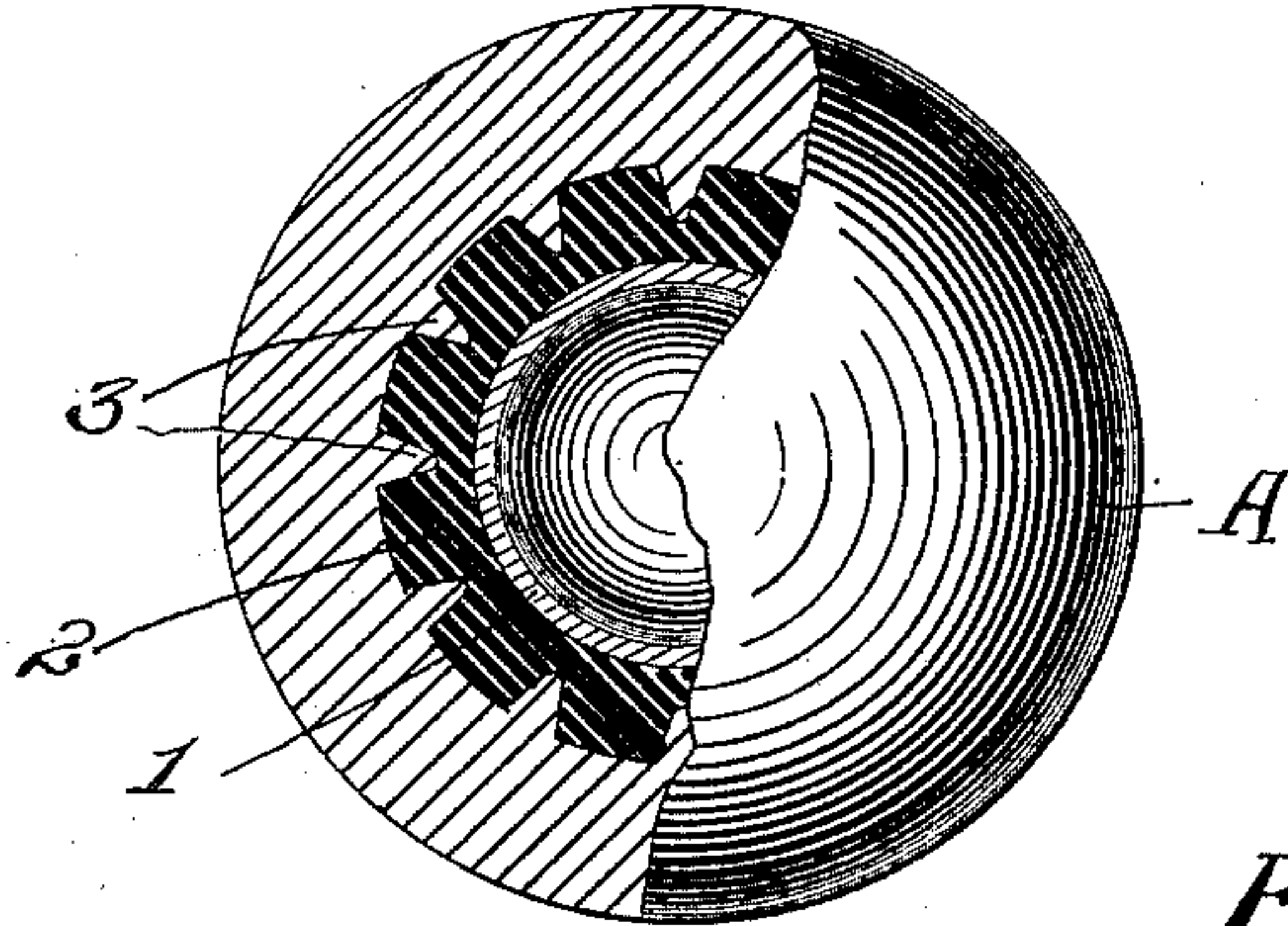
Patented Apr. 15, 1902.

E. KEMPSHALL.  
BILLIARD BALL.

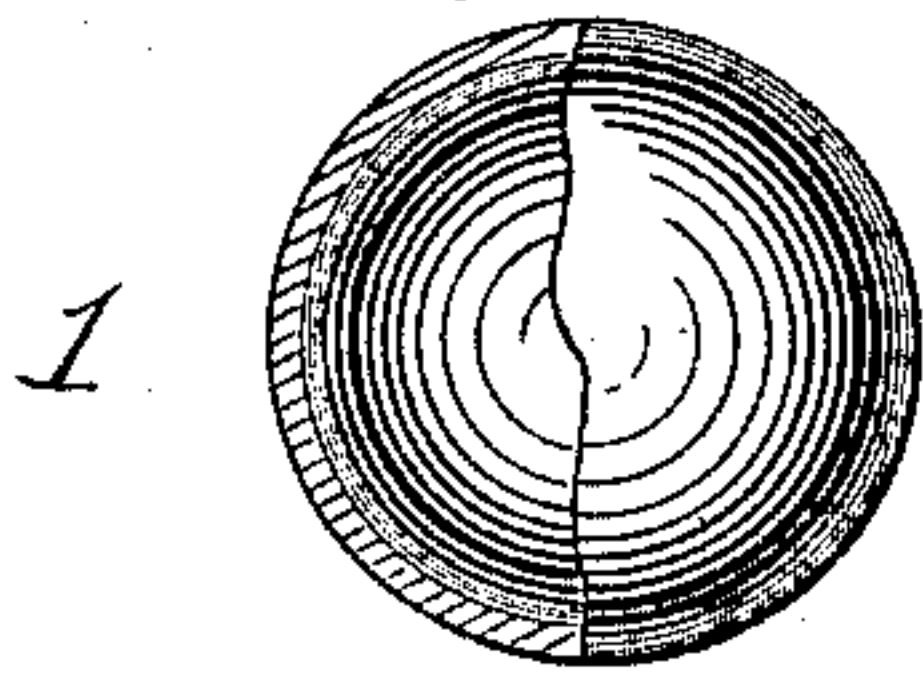
(Application filed Mar. 24, 1902.)

(No Model.)

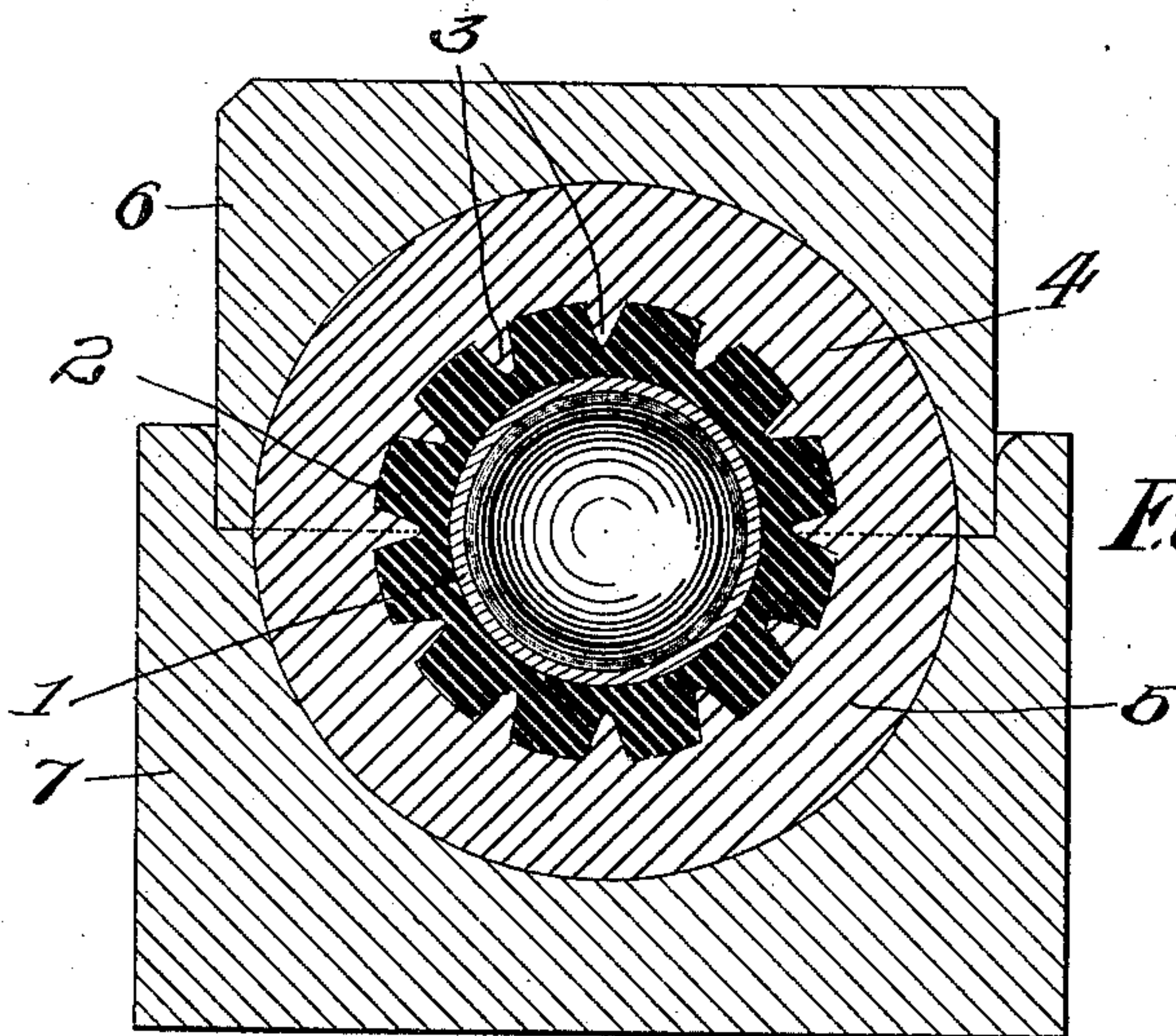
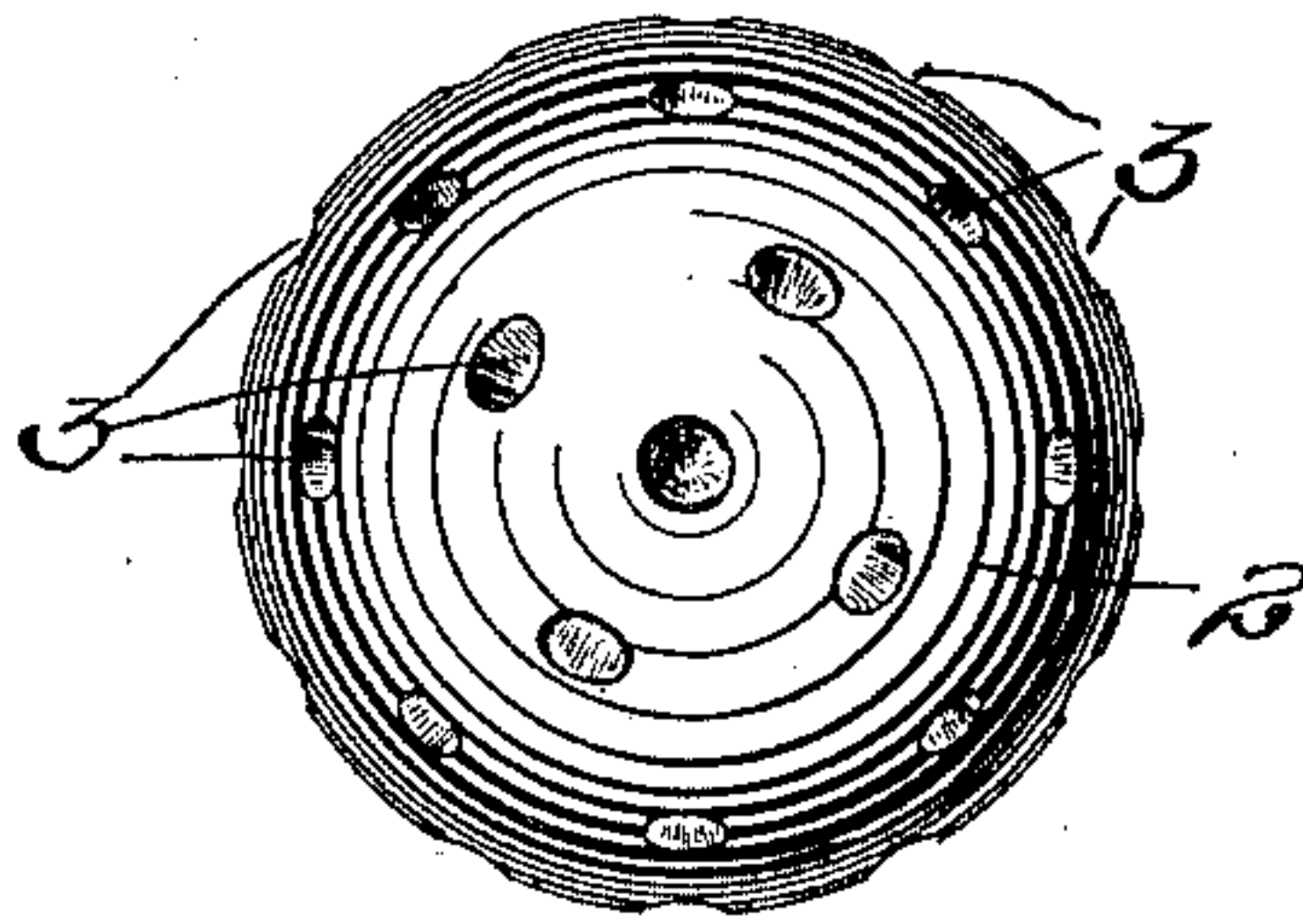
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



*Fig. 4.*

**Witnesses:**  
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# UNITED STATES PATENT OFFICE.

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

## BILLIARD-BALL.

SPECIFICATION forming part of Letters Patent No. 697,925, dated April 15, 1902.

Application filed March 24, 1902. Serial No. 99,715. (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 Billiard-Balls, of which the following is a specification.

This invention relates to playing-balls, and in particular to balls for use in the game of billiards; and its object is to simplify and improve the construction and to increase the durability and efficiency thereof.

In the accompanying drawings, Figure 1 shows my improved ball, partly in section. Fig. 2 shows a hollow metal sphere which I preferably use for the core of the ball. Fig. 3 shows a rubber envelop with which I cover the core shown in Fig. 2. Fig. 4 illustrates a process of finishing the ball.

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

For the core I preferably employ a hollow metal sphere 1, which is preferably of about one-half the diameter of the completed ball, although it may be made larger or smaller, if desirable, and may be made of other substances than metal and does not need to be hollow in every way in practicing my invention so long as it performs the necessary functions. Upon this core I mold a solid soft-rubber envelop 2, preferably highly vulcanized, and this I provide, either at the molding thereof or subsequently, with a series of pits 3, preferably throughout the surface of the envelop and extending about half-way through the interior of the envelop, as illustrated at Fig. 4. These pits may have any suitable form; but a conical form, as illustrated, is preferred. The diameter of the rubber envelop is preferably one and a half times that of the core 1, although it may be varied within the scope of my improvements. Upon the ball thus formed I place thick hemispherical segments 4 and 5 of celluloid and place the whole within heating and compressing dies 6 and 7. The heat of the dies renders the celluloid plastic, and the dies being powerfully brought together force the plastic material into the pits 3, as at 8, and also preferably place the rubber under a high degree of compression. I maintain the pres-

sure upon the ball until the shell cools and hardens, so that when the ball is removed from the press the shell powerfully grips the rubber envelop and permanently holds the same under compression. This compression is increased with the passage of time, owing to the gradual curing and consequent shrinkage of the celluloid, so that the rubber sphere becomes more powerfully gripped and the ball is improved. Thus I produce a ball which has a hard substantial shell upon a cushion backing, the shell being keyed upon the rubber sphere in such manner that it is impossible for a blow to disrupt the shell from the ball. My improved ball has a high degree of stability, especially when subjected to light blows. Moreover, the principal part of the weight as made by my improvements is located near the exterior of the ball, this being due to the use of the hollow sphere 1, for which I prefer to use a rigid steel shell which is inexpensive to manufacture. The material of the completed shell A, Fig. 1, should be of high-quality celluloid or other pyroxylin compound and fine and dense in character, so as to present a true and even surface and resistance throughout the ball, that it may give the same response to the same blow wherever struck.

It will be seen that the shell A, which penetrates the pits 3, carries the envelop within when struck, by reason of the prongs or barbs 8, in a manner much more effectual and with better results than if the shell A were merely placed upon the rubber sphere. The ball is hence extremely effective and well adapted to all the requirements of the game.

Certain features of my present improvements may be used in forming balls for other games—such, for instance, as the game of golf, particularly the feature of interlocking the hard shell with a soft spherical backing. Other compounds of pyroxylin may be substituted for celluloid. The shell and the rubber are interfelted—that is, so intimately forced together by pressure and heat as to interlock.

Having described my invention, I claim—

1. A playing-ball, comprising an inner and an outer sphere, whereof one has integral hobs which penetrate the other.



2. A playing-ball, comprising an inner and an outer sphere, one of said spheres being harder than the other, and one of said spheres having integral hobs which penetrate the other. 5
3. A playing-ball, comprising an inner and outer sphere whereof one is harder than the other, said harder sphere having hobs which penetrate the softer sphere.
- 10 4. A playing - ball, comprising inner and outer spheres, said outer sphere having inwardly-protruding integral hobs which penetrate the inner sphere.
- 15 5. A playing - ball, comprising inner and outer spheres, whereof one has integral hobs and the other has corresponding pits, said hobs extending into said pits and locking the spheres together.
- 20 6. A playing-ball, comprising an inner soft sphere provided with pits, and an outer hard sphere provided with hobs which engage said pits.
- 25 7. A playing - ball, comprising an inner sphere of rubber and an outer sphere of celluloid, one of said spheres having hobs and the other of said spheres having pits engaged by said hobs.
- 30 8. A playing-ball, comprising an inner rubber sphere having pits and an outer celluloid sphere having hobs which project into said pits.
- 35 9. A playing-ball, having a hard core, a sphere upon said core, and a shell upon said sphere, one of said sphere and shell elements having integral hobs which penetrate the other of said elements.
- 40 10. A playing-ball, comprising a hard core, a soft sphere thereon provided with pits and a hard shell upon said sphere, said shell having integral hobs which enter said pits.
- 45 11. A playing - ball, comprising a hollow metal sphere, a rubber envelop thereon, provided with pits and a celluloid shell upon said envelop, said shell having hobs which enter said pits.
- 50 12. A playing-ball, comprising a hard core, a soft envelop thereon and a hard shell interlocking with said envelop.
- 55 13. A playing-ball comprising a hard core, a soft-rubber envelop thereon and a celluloid shell interlocking with said envelop.
- 60 14. A playing-ball, comprising an inner soft sphere provided with pits, and an outer hard sphere compressed thereon and provided with hobs which engage said pits.
15. A playing-ball, comprising an inner sphere of rubber and an outer sphere of celluloid compressed thereon, one of said spheres having hobs and the other of said spheres having pits engaged by said hobs.
16. A playing-ball, comprising an inner rubber sphere having pits and an outer celluloid sphere compressed thereon and having hobs which project into said pits.
17. A playing-ball, having a hard core, a soft sphere upon said core, and a hard shell compressed upon said sphere, one of said sphere and shell elements having hobs which penetrate the other of said elements.
18. A playing-ball, comprising a hard core, a soft sphere thereon provided with pits and a hard shell compressed upon said sphere, said shell having hobs which enter said pits.
19. A playing - ball, comprising a hollow metal sphere, a rubber envelop thereon, provided with pits and a celluloid shell upon said envelop and holding the same under compression, said shell having hobs which enter said pits.
20. A playing-ball, comprising a hard core, a soft envelop thereon and a hard shell interlocking with said envelop and holding it under compression.
21. A playing-ball, comprising a hard core, a soft-rubber envelop thereon and a celluloid shell interlocking with said envelop and holding the same under compression.
22. In a playing-ball, an indented springy sphere and a hard shell interfelted with and maintaining said sphere under compression.
23. In a playing-ball, a rubber sphere uniformly rugged throughout its surface and a hard envelop interfelted with and maintaining said sphere under compression.
24. In a playing-ball, a resilient sphere uniformly rugged throughout its surface and a pyroxylin - composition envelop interfelted with and maintaining said sphere under compression.
25. In a playing-ball, a resilient sphere uniformly rugged throughout its surface and a celluloid envelop interfelted with and maintaining said sphere under compression.
26. In a playing-ball, a springy sphere and a hard shell thereon said sphere and shell being interlocked.
27. In a playing-ball, a hard core, a hard shell and a cushion held under compression between said core and shell and interlocked with the latter.
28. In a playing-ball, a hard hollow core, a hard shell, and a cushion held under compression between said core and shell and interlocked with the latter.
29. In a playing-ball, the combination of a metallic core, a celluloid shell, and a resilient cushion held under compression between said core and shell and interlocking with the latter.

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Witnesses:

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