No. 704,462. Patented July 8, 1902.

E. KEMPSHALL.

MANUFACTURE OF GOLF BALLS.

(Application filed Mar. 15, 1902.)

(No Model.)

Fig. 1.

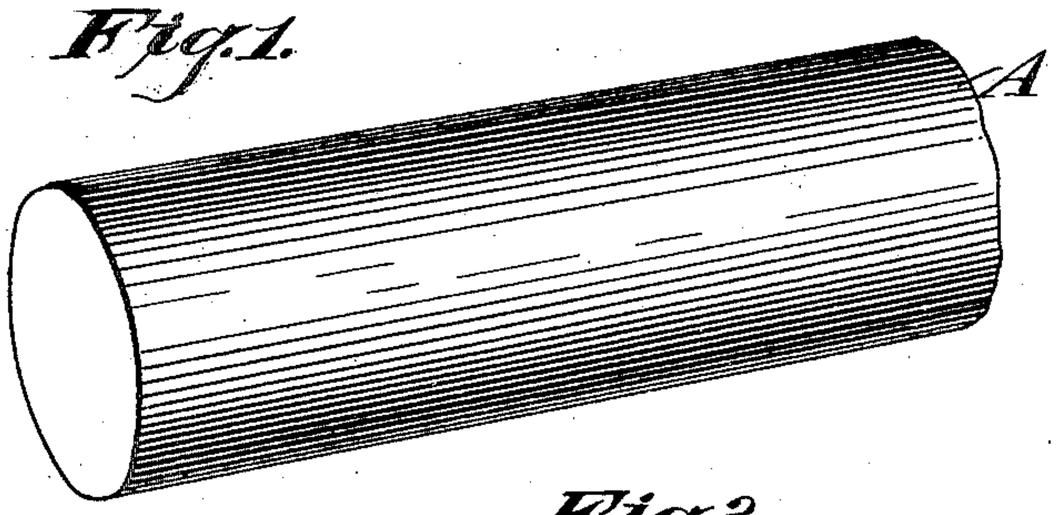


Fig. 2.

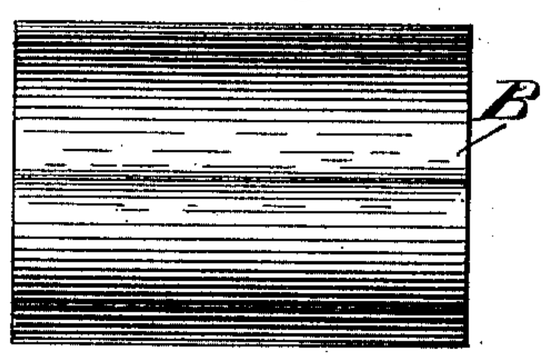
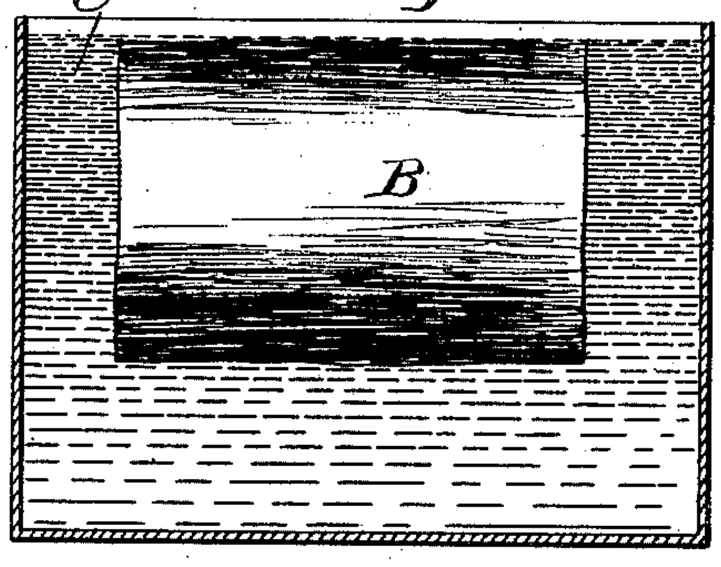


Fig. 3.



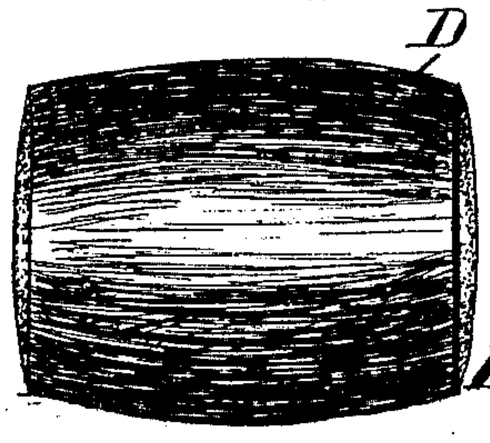


Fig. 4.

Fig. 5.

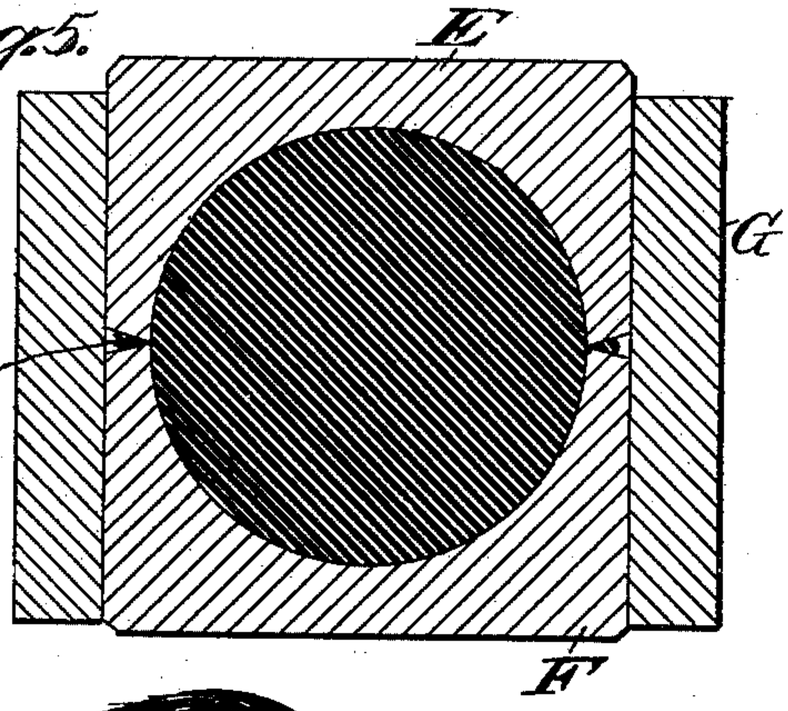
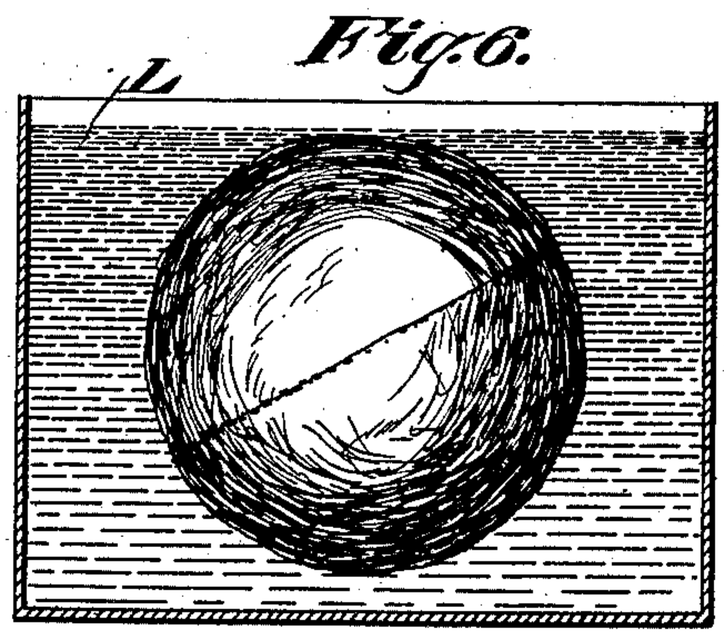


Fig. 6.



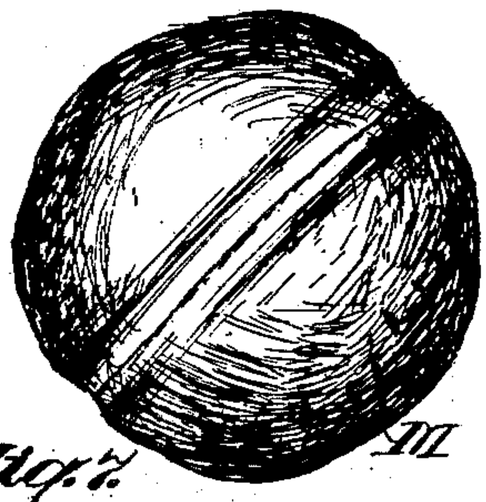
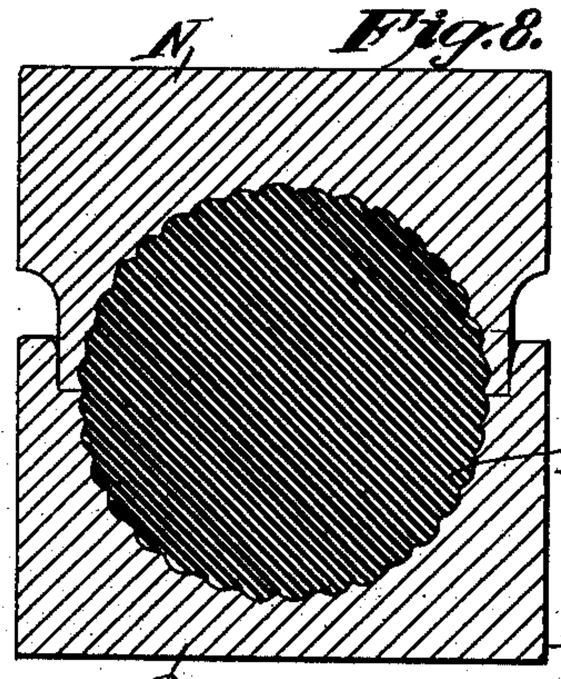


Fig. 7.

Fig. 8.



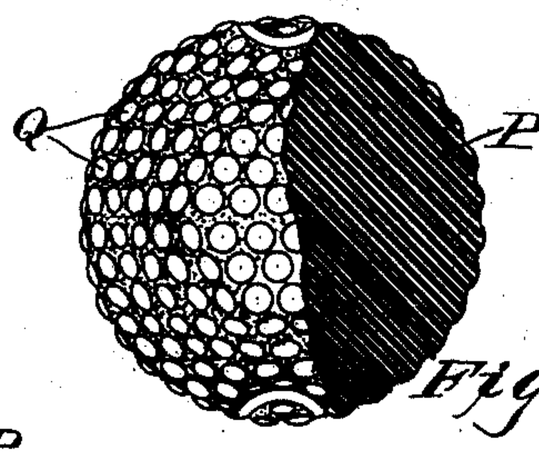


Fig. 9.

Witnesses
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UNITED STATES PATENT OFFICE.

ELEAZER KEMPSHALL, OF BOSTON, MASSACHUSETTS.

MANUFACTURE OF GOLF-BALLS.

SPECIFICATION forming part of Letters Patent No. 704,462, dated July 8, 1902.

Application filed March 15, 1902. Serial No. 98,321. (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 Manufacture of Golf-Balls, of which the following is a specification.

This invention relates to solid gutta-percha balls for use in golf and other games. Balls made of this material usually lose their shape when exposed to the sun—as, for instance, during a game—and the principal purpose of my invention is to overcome this objection. I apprehend that the softening caused by the heat relieves the molecular strains throughout the material, and that it hence assumes a shape in which the particles will suffer less strain. As gutta-percha possesses to a phenomenal degree the power of rebounding or flying when struck a hard blow by a club, it is of especial value for golf-balls, and hence it is highly desirable to minimize or eliminate the liability of the ball to become misshapen by the softening.

Referring to the drawings forming part of this specification, Figure 1 is a cylindrical bar of commercial gutta-percha. Fig. 2 is a view of a length cut from the end of the bar and sufficient to form a golf-ball. Fig. 3 shows one method of rendering the Fig. 2 article soft by means of heat, and Fig. 4 shows the form assumed thereby when softened. Fig. 5 shows the next step in the process of manufacture. Fig. 6 shows the article produced by the Fig. 5 process as being reheated, and Fig. 7 a form it may assume when softened. Fig. 8 shows the final stage in producing a ball; and Fig. 9 is a view, partially in section, of the completed ball.

Similar characters of reference designate like parts in the figures.

From the usual cylindrical bar A of gutta-percha as it is supplied in commerce I cut off a cake B, which may be heated in any suitable way—as, for instance, by putting it into hot water C, Fig. 3, thus rendering the same soft or plastic and moldable, the heat having the effect of increasing the diameter and reducing the length, as at D, Fig. 4. While the gutta-percha is in the heated and soft condition at D, I compress it into spherical form by means of suitable dies E and F, Fig. 5, which work in a cylindrical jacket G and are provided with knife-edges at H, which when the dies come together trim off a fin J from the ball. The ball is held under compression in the dies until it cools and hardens. The ball produced by the steps above enumerated may be used for the game of golf, but is liable to become misshapen when exposed to the heat of the sun, and my invention consists principally in reheating and recompressing said ball at least once, and this may be done if it be again thrown into hot water, as at L, Fig. 6, whereby the ball is reheated and resoftened and tends to a certain extent to resume the Fig. 4 form, as will be seen at Fig. 7. It will be noted, parenthetically, that Fig. 7 represents properly the distortion of the usual gutta-percha ball of commerce when heated by the sun or otherwise. While the ball is in the heated and soft condition shown at Fig. 7 it is put into dies, as at N and O, Fig. 8, which are brought together with great force, so as to put the ball under compression, and the compression is maintained until the ball cools and hardens, the finished ball being illustrated at P, Figs. 8 and 9, and preferably being provided with brambles Q by means of pits formed in the dies and in the mold.

It is found that the ball is not liable to become misshapen when heated, thus rendering it much more valuable for the game of golf than the usual soft gutta-percha ball. It is also found that it possesses the quality of being much more reliable in action than the usual solid ball.

I apprehend that the reheating of the ball after being once compressed relieves substantially all of the strains among the molecules of the material, so that upon heating the finished ball there is not sufficient tendency of the molecules to recover their normal condition to effect a distortion of the ball, and I consider within my invention balls made by subjecting the gutta-percha to a third or subsequent heating and compression. It is also noted that the repeated workings and compressions have the effect of eliminating air-spaces, and thus of rendering the ball very compact, and hence better adapted for the requirements of the game, particularly since the presence of air-spaces tends to displace

its center of gravity from the central point of the ball, and thus renders the latter erratic in action.

The herein-described playing-ball is made the subject-matter of my pending application, Serial No. 100,429, filed March 28, 1902.

Having described my invention, I claim—

1. The process in producing a playing-ball, consisting in repeatedly heating a mass of gutta-percha to an extent to soften the same, and each time compressing it to the shape of a ball while heated and soft, and also maintaining the compression at each operation until the ball cools sufficiently to become hard.

2. The process in producing a playing-ball, consisting in heating gutta-percha to an extent to soften it; molding it under pressure, while heated and soft, to approximate its final form; maintaining the pressure until the ball cools sufficiently to become hard; resoftening the ball by heating it; recompressing it while warm and soft; and maintaining the compression until the ball cools sufficiently to become hard.

3. The process in producing a playing-ball, consisting in heating gutta-percha, molding it under compression while heated into an approximate form, reheating the ball so as to soften it, recompressing the ball while hot, and maintaining the compression until the ball is cooled and hardened.

ELEAZER KEMPSHALL.

Witnesses:
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