Feb. 20, 1951 G. S. RADFORD 2,542,356

PLAY BALL AND METHOD OF MAKING THE SAME

Original Filed Nov. 22, 1940

Fig. 1

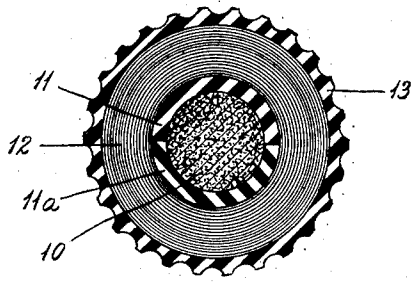


Fig. 2

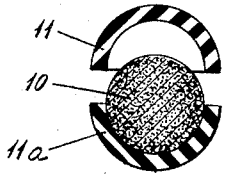


Fig. 3

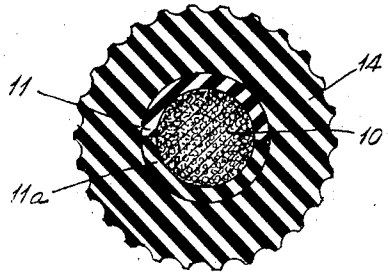
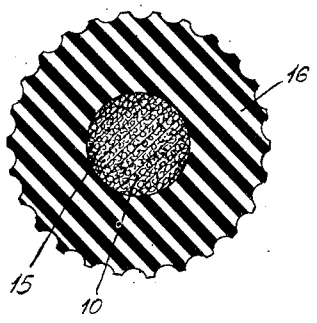


Fig. 4



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PLAY BALL AND METHOD OF MAKING THE SAME

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7 Claims. (Cl. 154—18)

1

The present invention relates to play balls and to methods of making the same and particularly to the formation of the centers for such balls as are used in the games of golf, baseball and the like.

This application is a division of my copending application Serial No. 366,539, filed November 22, 1940, now Patent No. 2,376,084, granted May 15, 1945.

Heretofore, "liquid" cores or centers have been used with the inherent disadvantage of leakage and unbalance. Further, such cores or centers were difficult to make satisfactorily because of the nature of the material of the center.

The present invention has for an object the elimination of the "liquid" core used in balls of this type and substitution therefor of a core of dry, freely movable, pulverant material, preferably under pressure or tension.

In my copending application I have described and claimed the formation of a core by magnetically holding the particles in position while the core is being made and also a ball having a core with freely movable magnetically arranged particles therein.

According to the herein described invention, I form a center of dry, compacted pulverant material in surface to surface engagement and temporarily secure together at least the contacting surfaces of outer particles of the pulverant material forming the center to provide a self-sustaining pellet. The pellet thus formed may be readily handled and incorporated in a ball. For example, it may be covered with a resilient cover and a body of elastic material therearound or may be covered directly by the body of the elastic material. In each case the mass of pulverant material is maintained under pressure or tension by the cover and substantially fills the cavity in the center of the ball. The pulverant material preferably is secured together in such a manner that when the pellet is covered to form the center or core, or the ball or center is struck, the particles are disconnected and become free to move or flow in the center of the ball while it is in use.

In forming the temporarily self-sustaining pellet the particles may be secured together by applying an adhesive to the particles in the outer surface thereof or if made of a material capable of being sintered, the outer surface may be sintered to form a temporary crust about the pellet to render it self-sustaining. Either crust will be shattered upon the center being covered or the center or ball being struck and will let the particles move freely in the center.

2

By the improved method, balls having cores loaded with pulverant material such as dry sand, zinc stearate, dust, blanc fixe, powdered mica, graphite, carbonyl iron powder, etc., may be readily manufactured and by selecting the material having proper specific gravity which can be weighed out with precision and easily handled without danger of leakage or evaporation may have their weight characteristics changed.

Balls made according to the present invention having a freely movable pulverant center are highly resilient and better balanced and are not likely to deteriorate due to leakage.

Other features and advantages will hereinafter appear.

In the accompanying drawings—

Figure 1 is a sectional view of a ball embodying the center of the present invention.

Fig. 2 is a sectional view partially exploded of the core showing the self-sustaining pellet of the present invention.

Fig. 3 is a sectional view of another type of ball embodying the center of the present invention.

Fig. 4 is a sectional view of still another form of ball.

As shown in the drawings, the ball of the present invention comprises a center 10 formed of compacted dry, mobile particles of pulverant material.

By "pulverant material" it is meant natural or comminuted materials in fine particles in a finely divided state whether they be in the shape of grains, powder, dust, irregular, flaky, round or in other substantially similar normally dry, mobile and free flowing form.

Examples of suitable pulverant material which may be used are dry sand, zinc stearate, dust, blanc fixe, powdered mica, graphite, carbonyl iron powder, iron dust or similar material. These materials are mobile in that they have the characteristic of being movable and free flowing when embodied in the center.

According to the present invention the center 10 is formed by compacting the pulverant material until the particles are in close interfitted relation and preferably in surface engagement. This may be done by jarring, vibrating or any other suitable way. By the term "interfitted" as used herein is meant the positioning of the particles with respect to one another as a result of the jarring or vibrating of the particles during compacting so that there is a minimum of unfilled space in the center.

The compacted particles are then provided with

a temporary shell by causing the contacting surfaces of the particles in the outer layer to adhere to one another so as to form a temporarily self-sustaining pellet. This may be accomplished according to the present invention by coating the outer particles with an adhesive material or binder, or by coating the inner surface of a mold in which the particles are compacted with an adhesive material or binder which is transferred to the outer particles so as to temporarily secure the particles together. Lacquer, glue or castor oil, are examples of adhesives or binders which may be used.

If the pulverant material be of a nature which is capable of sintering, the outer particles may be sintered to form a shell thereabout to temporarily hold the pulverant material in the form of a self-sustaining pellet.

"Sintering" as used herein refers generally to the act of cohesively uniting pulverant material, or even slightly fusing or melting the outer surface of a pellet of pulverant material, enough to temporarily hold a mass of such material together long enough to assemble the same, for example, in a spherical or other shell-like member.

Diverse forms of pulverant materials, particularly powdered metals, and various methods of sintering, applicable with the present invention, are set forth in considerable detail in the book Principles of Powder Metallurgy by W. D. Jones, London, Edward Arnold & Co., 1937.

With any of these procedures the pellet of pulverant material is preferably only temporarily held together, as by a temporary cohesively or adhesively bonded surface and assumes a completely pulverant condition again.

The pellet thus formed may be readily handled and incorporated in a ball without danger of leakage or deformation which would produce an out of balanced ball.

In incorporating the pellet into a ball, it may be used as a center upon which the elements are laid to build up a ball or, it may be covered by a core which is made up of rubber or other resilient material into cupped hemispherical halves 11, 11*a* which are secured together to enclose the pellet.

The pellet is preferably slightly larger than the cavities in the core so that when the core is assembled, the pulverant material will be placed under compression by said assembled core members and insure a complete filling within the core and a lively ball.

During the assembly of the core members about the pellet, the pressure thereon may be sufficient to break down the temporary adhesion between the particles so that the cavity therein is completely filled with closely packed freely movable particles of pulverant material. If the pressure is not sufficient to break down the shell on the pellet, it may be rolled or struck to break the adhesion between the particles and free them. After the core is completed, it may be wrapped with the usual elastic band 12 and provided with a cover 13 of the usual cover material as shown in Fig. 1, or if desired a solid body and cover 14 of resilient material may be applied directly to the core in lieu of the rubber windings as shown in Fig. 3.

In the form of the invention shown in Fig. 4, the ball is made up omitting the core surrounding the pellet and incorporating the temporarily self-sustaining pellet directly in the cavity 15 of a spherical shell 16, which shell has a single wall of sufficient thickness to make the ball of the desired outside diameter. Here, too, the cavity is preferably slightly smaller than the pellet so as to maintain the pulverant material under pressure or tension.

The ball of the present invention will have a center cavity filled with freely movable, dry pulverant particles which are under pressure and which will not leak or form an unbalanced center.

The process of the present invention eliminates many of the disadvantages of the prior processes in the manufacture of liquid or paste center balls. In these prior processes, it was difficult to keep the liquid center or paste center in truly spherical form during the handling, and in an effort to do so, they were usually frozen due to the expansion and contraction. Under the freezing step and its subsequent thawing out, it was difficult to maintain proper balance of the ball. Then, too, the pellets or cores formed were difficult to handle and many times leaked or became out of balance.

These difficulties have been overcome by the present invention wherein the dry particles are compacted into true spherical form and while so compacted the outer particles are caused to adhere together to form a temporarily self-sustaining pellet. This pellet may be readily handled and maintains its size throughout the ball-forming operation. It will not be misshapened or deformed so as to become out of balance and of course will not leak.

In the broader aspects of the invention if the particles are of sufficient resilience the outer skin may be made to withstand pressures during use of the ball and may take the place of the core 11. This is accomplished by sintering the shell into a firm mass or coating the particles with a strong resilient binder so that both provide a complete housing for the freely movable, dry particles therein.

Further, to insure a smooth flowing action between the pulverant particles and to prevent any frictional or abrasive action therebetween, the same may be given a light covering or film of noncorrosive fluid; for example, glycerin may be used with iron and other pulverant materials. Carbon tetrachloride is also satisfactory as a lubricant for most of the pulverant materials. When such lubricant is used, or when certain pulverant materials are used which set up a corrosive action when associated with rubber, it is proposed to use Neoprene or other of the now well-known noncorrosive or less corrosive rubber substitutes for the cores or as a lining for the cores. Glue and other anti-oxidant linings may also be used in any of the now well-known ways of lining or coating the inner surface of play balls.

Variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

I claim:

1. The method of making centers for balls which consists in moving the freely movable particles of pulverant center material into close interfitted relation; temporarily adhering the outer particles together to form the thus arranged particles into a self-sustaining pellet; sealing the pellet within a resilient cover with the particles completely filling the cover; and destroying the adhesion between the particles to render all of the particles freely movable within the cover.

2. The method of making balls which consists in the steps of subjecting a predetermined amount of pulverant sinterable material to pres-

sure to form thereof a self-sustaining body of pulverant material; sintering an outer shell upon the compacted material to temporarily hold it together as a pellet; and locking the pellet in at least one recessed resilient member completely to fill said member under pressure.

3. The method of making centers for balls which consists in moving the freely movable particles of pulverant sinterable center material into close interfitted relation; and sintering the outer particles together to produce a thin outer shell on the thus arranged particles to form a compact temporarily self-sustaining pellet; sealing the pellet into a resilient cover with the pellet completely filling the cover therefor; and breaking apart the sintered particles to render all of said particles freely movable within the cover.

4. The method of making centers for balls which consists in moving the freely movable particles of pulverant center material into close interfitted relation; temporarily holding the thus arranged particles to form a self-sustaining pellet; enclosing the pellet within a resilient cover with the particles completely filling the cover; sealing the cover; and subsequently removing the temporary holding of the particles to provide freely movable particles within the cover.

5. The method of making centers for balls which consists in moving the freely movable dry particles of a mass of pulverant center material into close interfitted relation; temporarily securing the outer particles together to form a self-sustaining pellet; sealing the pellet in a resilient cover with the pellet completely filling the cover therefor and the cover applying a pressure to the pellet; and separating the secured together

particles to provide a mass of freely movable dry particles within the cover.

6. The method of making a play ball comprising forming a center of dry, pulverant mobile particles; temporarily securing the outer particles together to form a self-sustaining structure; enclosing the center with a resilient cover with the particles completely filling the cover therefor; and breaking down the shell on the enclosed center to render the particles freely movable within the cover.

7. In a play ball center, the combination of a filling of freely movable, dry particles of pulverized sinterable material, the particles being interfitted into close relation and having a sintered outer shell forming a self-sustaining pellet; and an elastic cover enclosing said pellet, the filling material completely filling the interior of said cover.

GEORGE S. RADFORD.

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