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Coons

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[54] **PRESSURIZED STORAGE CONTAINER**

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[52] **U.S. Cl.** **206/315;** 215/352; 220/304; 220/378

[51] **Int. Cl.**.. **B65d 41/04;** B65d 53/02; B65d 85/00

[58] **Field of Search**..... 206/315; 215/270, 341–346, 215/352; 220/8, 254, 304, 357–358, 378; 273/61 D

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[57] **ABSTRACT**

A container for holding contents under air pressure wherein the container comprises a body and a cap with the body connecting by a threaded connection to the cap, the threaded connection including a stop so with the body completely threaded into the cap the inner end of the body is slightly spaced from the closed end of the cap, an O-ring seal mounted upon the body adjacent the inner end thereof, an inwardly extending annular flange formed upon the cap adjacent the closed end thereof, with the body completely threaded into the cap the flange engages the seal to establish an airtight connection between the cap and body, upon initial location of the cap upon the body an airtight connection is established therebetween and as the cap is tightened upon the body, air pressure is caused to increase within the container and maintained due to the interaction between the flange and the seal.

7 Claims, 4 Drawing Figures

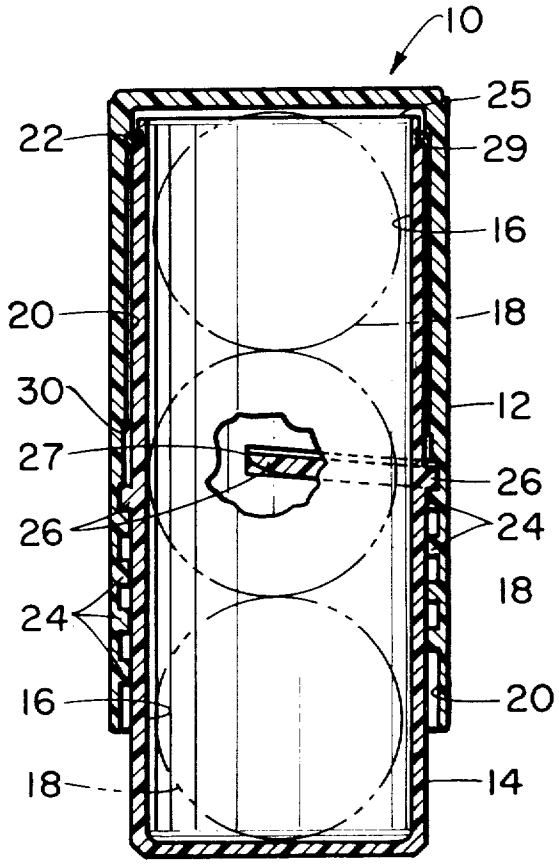

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Fig. 1.

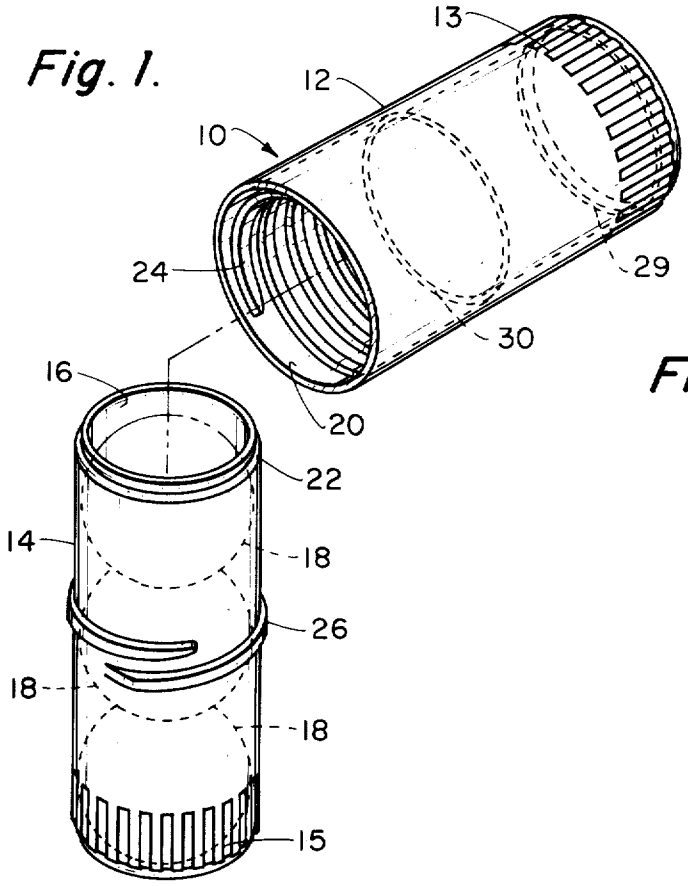


Fig. 2.

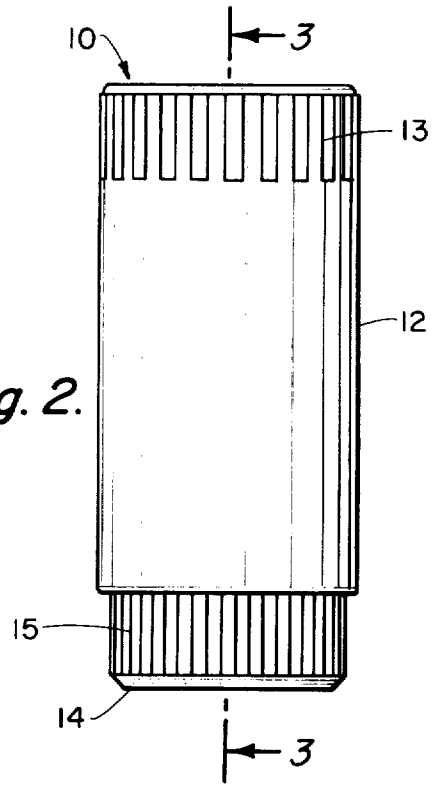


Fig. 3.

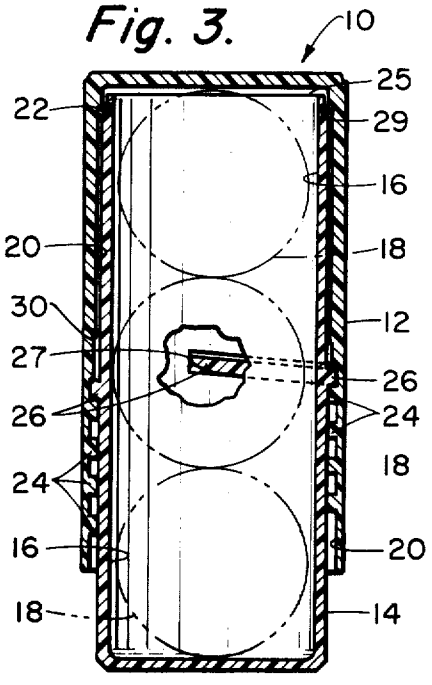
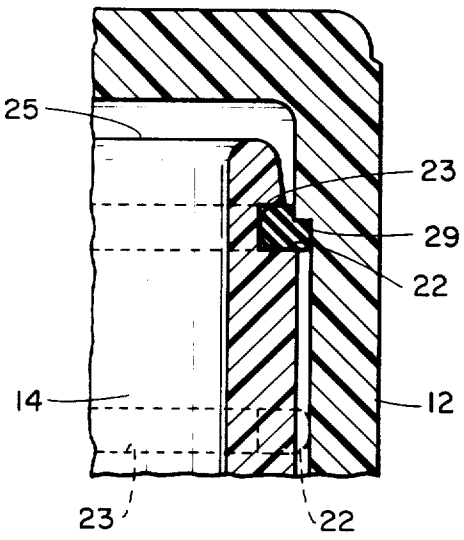


Fig. 4.



PRESSURIZED STORAGE CONTAINER

BACKGROUND OF THE INVENTION

This invention is an improvement of U.S. Pat. No. **3,819,040**, entitled PRESSURIZED STORAGE CONTAINER, by the present inventor.

Tennis balls are manufactured to close specifications in order to have a uniform product for use anywhere in the world. One of these specifications is that the ball must have a bounce between **53** inches and **58** inches when dropped on a concrete surface from **100** inches in height. In order to meet this specification and other specifications, tennis balls are made with a relatively thin wall of elastomeric material, covered on the outside with a felt fuzz, and filled with gas (such as air) under pressure. The balls are usually packaged in groups of three in a container having sufficient pressure to substantially equalize the pressure in the balls. This method of packaging maintains the physical characteristic of the balls until the container is opened. At this time the fresh balls begin to age in a primary way, that being the gradual escape of internal gas through the thin wall of the ball at all times and also the acceleration of this escape when the ball is hit with a racket.

The importance of having tennis balls with uniform physical characteristics must not be minimized. Those who are serious tennis players, either the relatively few competitors in tournaments or the many more competitors in recreational play, appreciate the feel of striking a good ball with a racket. It is well known that old defective balls will not go where they are hit and that in trying to compensate for the deficiencies in an old ball, a player will often ruin a good stroke that has been developed with much practice. Some of the best players would rather not play at all rather than play with defective balls.

Once the tennis ball pressurized container which is in common use has been opened, the balls which are not being used and are located in that container begin their deterioration. Also, once a ball has been used, it would be desirable to relocate the used ball in a pressurized atmosphere in order to decrease the ball's deterioration.

In the past, there have been several types of containers which have been proposed for such use. However, such previously known containers are complex in construction and therefore costly to manufacture and also require to be connected with a source of pressurized gas once the container is reclosed. As a result, such containers have not achieved any significant commercial success and as of the present day, no repressurizing type of container is known to be employed which repressurizes by interconnecting members.

The pressurization which is required in the containers in which the balls are sold is approximately **13** pounds per square inch. This pressure is not so significantly high as to require a separate pressurizing apparatus to be connected with the container to repressurize the container. It is one object of this invention to employ the use of a pressurizing means incorporated with the container which can be readily applied manually.

SUMMARY OF THE INVENTION

The container of this invention provides for a body portion and a cap portion. Once the cap portion is initially inserted upon the body portion, an air-tight connection is established therebetween through an O-ring

seal mounted upon the body, closing off the interior of the body portion of the container to the ambient. Means are provided between the cap and the body portion such as a threading arrangement which permits the cap to be tightened upon the body. As a result, the volume of the space within the body portion of the container is decreased. This decreasing of the volume causes a compression of the gas, which is normally air, within the body. The arrangement between the cap and the body is such so that with the cap completely tightened upon the body, the pressurization of the gas within the body will be approximately **13** pounds per square inch. Therefore, the tennis balls which are to be located within the container will again be placed within a pressurized environment. Means are provided between the cap and body to maintain and prevent leakage of the established pressurized environment, such means being described in the Abstract of the Disclosure and reference is to be had thereto.

BRIEF DESCRIPTION OF THE DRAWING

FIG. **1** is an isometric view of the container of this invention showing the cap disassociated from the body;

FIG. **2** is a side view of the container of this invention showing the cap completely closed about the body;

FIG. **3** is a cross-sectional view of the container of this invention taken along line **3—3** of FIG. **2**; and

FIG. **4** is an enlarged cross-sectional view of a portion of FIG. **3** showing the means to maintain the pressurization of the container of this invention.

DETAILED DESCRIPTION OF THE SHOWN EMBODIMENT

Referring particularly to the drawing, there is shown in FIG. **1** the container **10** of this invention which is basically composed of a cap **12** and a body **14.** The body **14** includes an interior chamber **16** which is adapted to receive a plurality (normally three in number) of tennis balls **18.** However, it is to be understood that although this invention is described in reference to the use of tennis balls, it is considered that the apparatus of this invention may be employed for other types of game balls or to pressurize other types of contents. The device of this invention could be readily used for handballs and racquet balls with the container body and cap being scaled to provide the required pressure.

The cap **12** also includes an interior chamber **20.** The size of chamber **20** is just slightly larger than the body **14** so that body **14** can be telescopingly received in chamber **20** establishing a close interfit between body **14** and cap **12.** An O-ring seal **22** is mounted within an annular groove **23** formed in body **14** adjacent the inner end **25.** Seal **22** is formed of a conventional resilient material such as rubber. The purpose of the seal **22** is to insure that an airtight connection is established between the cap **12** and the body **14** when the cap **12** is inserted upon the body **14.**

Located within chamber **20** adjacent the closed end of cap **12** is an inwardly extending annular flange **29.** The function of flange **29** will be explained further on in the specification.

Secured to the cap **12** within the chamber **20** is an internal thread **24.** Fixedly mounted upon the body **14** is a thread **26.** Threads **24** and **26** cooperate together to move body **14** within cap **12.** The inner end of thread **24** terminates in a stop **27.** With thread **26** in contact with stop **27,** the inner end **25** is just slightly spaced

from the closed end of cap **12** forming a gap therebetween. In this position the O-ring seal **22** is tightly pressed against flange **29** and actually deforms slightly (approximately nine thousandths of an inch). This produces an extremely air-tight connection between cap **12** and body **14** and prevents leakage of the pressurized air from chamber **20**. In essence, the cooperation between the flange **29** and the seal **22** is a secondary seal with the primary seal being the O-ring seal **22** in tight contact with the wall of section **30**. As illustrated by the dotted line position of the groove **23** and O-ring seal **22** in FIG. **4**, the O-ring seal **22** seals against the wall section **30** as it moves to its upper full line position in FIG. **4**.

The operation of the container **10** of this invention is as follows: A person grasps both the body **14** and the cap **12** and causes a turning movement to occur therebetween by the application of manual force. Turning of the body **14** in respect to the cap **12** is facilitated by gripping area **15** on body **14** and gripping area **13** on cap **12**. This causes the thread **24** to be moved along the thread **26** until the cap **12** can be disassociated from the body **14**. It is to be noted that the depressuration of the chamber **16** is accomplished gradually and no ejecting of the cap **12** is caused. Once the cap **12** has been removed from the open end of body **14**, the ball (or balls) **18** which is stored within the chamber **20** can be readily removed.

Let it be assumed that only a single ball **18** has been removed from the chamber **20**. The operator then relocates the cap **12** upon the body portion **14** so that thread **24** becomes coupled with the thread **26**. In this initial position an air-tight seal is established between the O-ring **22** and the smaller diameter section **30** of the cap **12**. It is to be noted that the diameter of the thread **24** is equal to or greater than the diameter of the section **20** in order to permit passage of the O-ring **22** past the thread **24**. With the air-tight connection being initially established between the cap **12** and the body **14**, as the cap **12** is rotated about the body **14**, a recompression occurs within the chamber **16**. The longitudinal movement of the cap **12** upon the body **14** is preselected so that the compression of the gas within the chamber **16** is to the value of approximately **13** pounds per square inch with three balls located in the chamber **16**. Therefore, the balls which are not in use and are being retained within the chamber **16** are not caused to deteriorate but are stored in a satisfactory pressurized environment. New tennis balls are pressurized internally to a value of about **13** psi.

It is to be understood that with one or two balls removed from chamber **16**, a pressurization of less than the initial **13** psi would result. However, a partial pressurization is better than no pressurization.

At the time the operator decides to relocate the ball that is being used within the container **10**, the container **10** is opened, the ball inserted in the container **10** and then closed. This causes a pressurization of the gas within chamber **16** and prevents the ball that was used from deteriorating as well as the unused balls.

What is claimed is:

1. A pressurized container comprising:

a body having an interior chamber to be pressurized;

a rigid cap for compressing air in said interior chamber, said cap being longitudinally and bodily movable relative to said body from an initial position to a completely closed position;

first means located between said cap and said body to establish an air-tight connection therebetween, said first means causes establishment of said air-tight connection when said cap and body are in said initial position and maintains said air-tight connection during movement of said cap in either direction between said completely closed position and said initial position, thereby resulting in gradual change in pressure in said interior chamber as said cap moves in either direction between said positions, said first means including pressure maintaining means, said pressure maintaining means connects with said first means only when said cap is in said completely closed position thereby insuring substantial non-leakage over a period of time of the pressurized air within said interior chamber; and

second means mounted on both said cap and said body, said second means capable of interlocking to effect movement from said initial position to said completely closed position and to result in securement of said cap upon said body in said completely closed position.

2. The container as defined in claim **1** wherein:

both said body and cap being cylindrical in configuration;

said second means comprises a threaded arrangement including a first thread mounted upon said cap and a second thread mounted upon said body.

3. The container as defined within claim **2** wherein:

said first thread is on the interior surface of said cap and said second thread is on the exterior surface of said body, said threads becoming coupled at said initial position and remaining coupled during movement of said cap to said completely closed position.

4. The container as defined in claim **3** wherein:

said first means comprises an O-ring seal which is formed of a resilient material, said seal being located between said second means and said interior chamber for all positions of said cap between said initial position and said completely closed position.

5. The container as defined in claim **1** wherein:

said first means comprises an O-ring seal which is formed of a resilient material, said seal being located between said second means and said interior chamber for all positions of said cap between said initial position and said completely closed position.

6. The container as defined in claim **5** wherein said pressure maintaining means comprises:

said O-ring seal being mounted within said body adjacent the open end of said body, an annular flange attached to said cap, said annular flange protruding into said chamber, said annular flange contacting said O-ring seal when said container is in said completely closed position.

7. The container as defined in claim **5** wherein said pressure maintaining means comprises:

said O-ring seal being mounted within said body adjacent the open end of said body, an annular flange attached to said cap, said annular flange protruding into said chamber, said annular flange contacting said O-ring seal when said container is in said completely closed position.

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