Aug. 27, 1935. G. MILLER 2,012,283

METHOD FOR RESTORING PRESSURE IN TENNIS BALLS

Original Filed Sept. 4, 1929

FIG. 1.

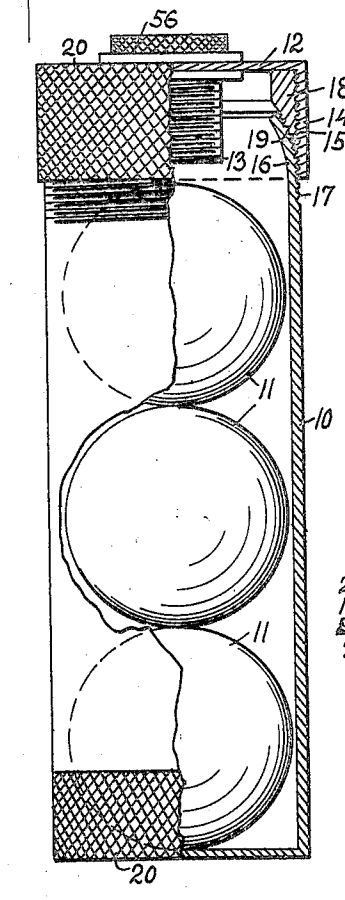


FIG. 2.

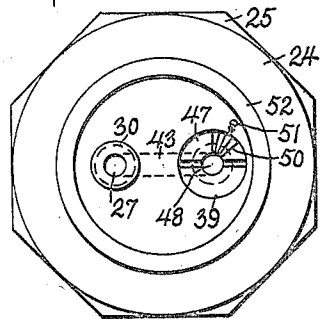
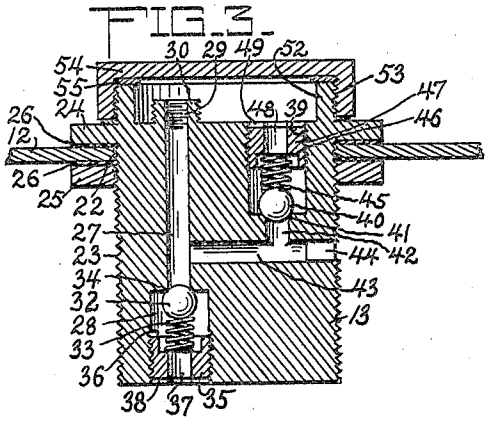


FIG. 3.



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METHOD FOR RESTORING PRESSURE IN TENNIS BALLS

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Original application September 4, 1929, Serial No. 390,317. Divided and this application January 14, 1933, Serial No. 651,695

8 Claims. (Cl. 273—61)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

This invention relates to a method and means for restoring and retaining a desired pressure in tennis balls and the like, and is a division of an application filed September 4th, 1929, Serial No. 390,317, and patented May 23, 1933 No. 1,911,125 for Pressure ball container.

As is well known, tennis balls are elastic because they have air or gas under pressure therein, and to be acceptable, a tennis ball must have a desired amount of "bounce" or rebound when dropped a predetermined distance on a hard surface. This distance is regulated by the tennis association, and balls which do not comply with such conditions are not allowed in play. As sold when fresh, balls are usually in the proper condition, and there have recently appeared on the market balls sold either in cans or covers whereby the balls are protected against losing the pressure therein by being sealed in a can or container having a pressure equal to the pressure in the balls. This serves to keep the balls fresh until the can or container is opened, and the can or container being then destroyed by the act of opening, is thrown away. Thereafter, the ball begins to lose its life and to go dead through the pressure escaping, either as a result of being hit by the rackets in play or by being exposed to the atmosphere.

This invention has for an object to reliven "dead" balls as well as to keep the balls fresh while they are in the possession of the player after he has removed them from the original container, and to restore the pressure in the balls that may escape during play.

A further object of this invention is to provide a method whereby the player may restore the balls to their original freshness, after they have been played with, and to provide a method of keeping them fresh indefinitely until he is again ready to use them in play.

With the foregoing and other objects in view, this invention comprises the methods disclosed and claimed in the following specification taken in consideration with the accompanying drawing, wherein like references denote corresponding parts.

Figure 1 shows a cross section, and partly in section, of one embodiment of the invention with balls placed therein,

Figure 2 is an enlarged top plan view of a valve with the dust cover removed, and

Figure 3 is an enlarged cross section of the valve.

In the convenient practice of this method there is shown at 10 a container or can of a size to contain a plurality of tennis balls 11, preferably three balls being placed therein. This can is closed by a cover 12 and has a valve 13 to admit pressure therein. The cover 12 has a flange 14 which is internally threaded as at 15, while the mouth 16 of the can 10 is externally correspondingly threaded at 17. The can and cover may be of any suitable metal or alloy as will not allow pressure to readily escape therethrough, and will preferably be of as light a metal as possible, to reduce the weight of the complete article. The threads will be machined therein so as to fit each other as nearly as possible. The cover flange 14 will have a sealing material 18 placed therein as shown, which will partially cover the threads and will preferably be of a metal or alloy softer than that of the container 10, and may be of lead or like material. The mouth 16 will be slightly tapered inwardly as at 19 so that the cover 14 may be more easily placed thereon and screwed thereon. This taper 19 will also have the effect of pressing some of the softer sealing material 18 between the threads 17 on the can and the threads 15 on the cover, so as to form a pressure tight closure therefor. Due to the excess threads and sealing material present as shown, it is obvious that the cover may be removed and replaced an indefinite number of times, and that new sealing material 18 may be added when that present is finally worn away. The outside of the cover flange as well as the outside of the can near the bottom may be knurled as at 20 so as to give a better grip to the hands when opening or closing the can 10.

The valve 13 provides for the admission and regulation of the pressure in the can and may be attached through an opening in the can, either in the bottom or in the cover, and is here shown as being through an opening 22 which may be threaded as shown if desired, to correspond to threads 23 on the outside of the valve body 13. Valve body 13 has a projecting flange 24, while a retaining nut 25 may be screwed about the valve body inside the can or cover to hold it in place, there being either or both washers 26 above or below the cover so as to make a pressure tight closure, washers 26 being of rubber or soft sealing metal, as lead or the like.

Projecting through valve body 13 is an opening 27 which is enlarged at the inner end as at 28. The opening 27 will be screw threaded at 29 to correspond with the standard thread of an internal male pump, such as the small bicycle pumps in ordinary use, and a threaded projecting flange 30 may surround this opening so that a female

threaded pump may be used if desired, or this flange may be connected to the air pumps in use at most gasoline stations. As is obvious, this threaded flange can be omitted if desired, and then only an internal male pump can be used. In the enlarged opening 28, a ball valve 32 is held by a spring 33 against a beveled ball seat 24 formed at the inner end of the opening 27. The ball spring 33 will be held in place by a threaded plug 35 which is screwed into opening 28, there being a spring retaining shoulder 36 recessed into the plug. An opening 37 through the plug 35 admits the air into the can, and plug 35 has a slot 38 whereby a screw driver may be used to assemble it.

Another threaded opening 39 identified in size with opening 28 is formed on the outside of the valve body 13, and a ball valve 40 is held therein against a ball seat 41 formed against a small interior opening 42. This opening 42 is connected with opening 27 through a by pass 43 which is drilled into the side of the valve body 13 through openings 42 and 27 and then has its end permanently sealed by a solder plug 44 or the like. The ball valve 40 is held in place by a valve spring 45 which is seated against a recessed shoulder 46 in a threaded plug 47 screwed into the opening 39. This plug 47 is identical with plug 35, and has a similar opening 48 to allow air to pass therethrough and has a screw driver slot 49 for adjusting the tension of the spring 45.

This plug 47 may have graduations on its outer end as at 50 to coact with a zero mark 51 on the valve body to assist in adjusting the pressure exerted by spring 45. A flange 52 projecting from the valve body is threaded at 53 to receive a dust cap 54 there being a washer 55 placed inside the dust cap. The cap may be also knurled as at 56 to assist in removing and replacing the cap.

In operation, the tennis balls usually two or three in number, will be placed in the can at the end of the day's play. The cover 12 is then placed and screwed down until it is tight, the tapered edge of the mouth pressing into the sealing material 18. The dust cap 54 is then removed and a pump applied to the pressure opening 27. A small bicycle pump (not shown) may be used, and may be kept in a special pocket in the tennis racket cover, and the can 10 may also be kept in a pocket in the tennis racket cover as the balls were formerly kept. When the air is pumped into the opening, it will force its way past the ball 32 and through openings 36 and 28 into the can. The ball valve 40 acts as a pressure regulator, being held in place by the spring 45. The tension of the spring 45 may be adjusted by turning the plug 47, the graduations 50 and zero 51 assisting in setting the tension. Ordinarily the tension of ball valve 40 will be so set as to yield when the pressure in the can is just slightly more than the pressure in a fresh or "live" tennis ball. Then, any additional pressure will not pass pressure valve 32, but will go through the by pass 43 to escape past the regulating valve 40 through opening 48 to the outside of the can, and the sound of this escaping air will warn the user that the desired pressure in the can has been reached. If the balls have been played with very hard, or have been left out of the can for quite a while, the pressure in such balls is apt to be much less than that desired. In such a case the plug 47 may be turned so as to increase the pressure of spring 45 against ball 40, whereby an increased pressure will result in the can when pumped, before the regulating valve will open. The balls will thus be kept in a pressure greater than that already in the balls, and this excess pressure will leak into the balls to restore them to the desired pressure in the same manner that the pressure in the balls leak out to the atmosphere to deaden the balls when they are kept without the protection of this pressure container. When the desired pressure is reached, the dust cap 54 may be replaced and this will assist in preventing any escape of pressure through the valve mechanism.

To use the balls again, the cover is removed by unscrewing it. Should the pressure make it difficult to turn the cover in spite of the knurled portion in the cover and can, the pressure may be released by merely pressing a slender object such as a match stick or dull nail through opening 27 against ball 32, and the cover will then be more easily removable.

Should the pressure in the balls be very low, or should it be necessary or desirable to restore the pressure more rapidly, the regulating valve may be so adjusted to admit a much greater pressure into the can than normal, and allow it to remain in the can for a limited period of time until the ball has reached the proper pressure, and then the pressure is relieved and by readjusting the regulating valve, restored to the proper degree. Or, instead of the player owning such a container himself, the ground keeper at the tennis courts could keep such a can, and for a nominal fee could subject a player's "dead" balls to a very excessive pressure for a short time to quickly restore them to "live" or playing condition before the balls are played with. Tables of figures would be furnished the ground keeper, which would set forth the amount of pressure and period of time a ball should be kept therein to quickly restore the pressure. The condition of the ball may be determined by allowing it to drop from a standard distance and measuring its "bounce"; a ball that lacks 5 inches of bounce being subjected to less pressure, or less time, than a ball lacking 10 inches of the desired amount of bounce. The ground keeper can easily determine the amount of "bounce" necessary by dropping the ball onto a cement sidewalk alongside a yardstick or similar measured stick and watching the height to which it bounces, and with the figure determined by the "bounce" the tables will inform the ground keeper how much pressure and time is necessary to restore the ball to live condition. Obviously, when used by a ground keeper at a tennis court, a much larger container holding a great plurality of balls would be used, which container is not limited to the particular one disclosed except within the limit of what is hereinafter claimed.

Thus, it will be apparent that this invention provides a method preserving and restoring the desired pressure in tennis balls or the like, to keep the balls "alive" for an indefinite period of time, so that one set of balls may last a complete season, or even several seasons, and still remain as fresh and as lively as when new.

The invention described herein may be manufactured and used by or for the Government of the United States for governmental purposes without the payment of any royalty thereon.

Having thus set forth and disclosed the nature of this invention, what is claimed is:

1. A method of retaining and restoring internal gas pressure to tennis balls and the like, comprising exposing the external surface of the ball to a higher gas pressure than that in said ball.

2. A method of restoring a desired internal

gas pressure in tennis balls and the like, comprising subjecting the ball to a gas pressure higher than the desired pressure, and allowing the ball to remain under such higher pressure until the pressure in said ball reaches the desired pressure.

3. A method of restoring and retaining the desired internal gas pressure in tennis balls and the like, comprising subjecting the ball to a higher gas pressure until the pressure in the ball reaches the desired pressure, and then subjecting the ball to a gas pressure equal to the desired pressure to retain the desired pressure.

4. A method of restoring the gas pressure within "dead" tennis balls, comprising subjecting the entire external surface of "dead" ball to a predetermined gas pressure in excess of the desired pressure for a limited period of time.

5. A method of restoring gas pressure to the cavity within a tennis ball rendered less useful or "dead" by loss of internal pressure due to use or age, comprising exposing the external surface of such used ball to a higher gas pressure than that within the same until such higher pressure has penetrated through the imperforate wall of the ball.

6. A method, practicable with a readily openable and closable receptacle, of restoring a desired gas pressure within a tennis ball rendered less useful by loss of internal pressure due to use or age, comprising subjecting the exterior surface of the used ball to a gas pressure within the receptacle higher than the desired gas pressure, allowing such used ball to remain in such high pressure until the high pressure penetrates the imperforate wall of said ball and causes the interior pressure in said ball to reach the desired pressure and then removing the ball from said receptacle and pressure for re-use.

7. A method, practicable with a readily openable and closable receptacle, of restoring and retaining the desired gas pressure within the cavity of a closed container chiefly useful outside said receptacle, comprising placing the container in the receptacle, subjecting the exterior surface of the container to a higher gas pressure within the receptacle for such a limited period of time that the gas pressure within the container reaches the desired gas pressure, then subjecting the container to a gas pressure within the receptacle equal to the desired gas pressure to retain said desired gas pressure in the container, and finally removing the restored container from the receptacle for re-use.

8. A method, practicable with a readily openable and closable receptacle, of restoring and retaining the desired gas pressure in the cavity of a tennis ball having less than the desired gas pressure, comprising placing the tennis ball within the receptacle, passing an externally generated gas pressure through a readily openable and closable opening into the receptacle sufficiently high to compensate for the lower-than-desired gas pressure within the tennis ball and passing some of the receptacle contained gas pressure through the wall of the ball until the gas pressure in the receptacle and the gas pressure in the tennis ball cavity will equalize to the desired gas pressure within the ball, retaining the ball with said desired gas pressure within the receptacle until ready for use and then removing the gas pressure and ball from the receptacle.

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