Jan. 26, 1932. D. R. MacKENZIE 1,842,456

PACKAGING OF GAS CONTAINED OBJECTS

Filed June 16, 1928

Fig. 1

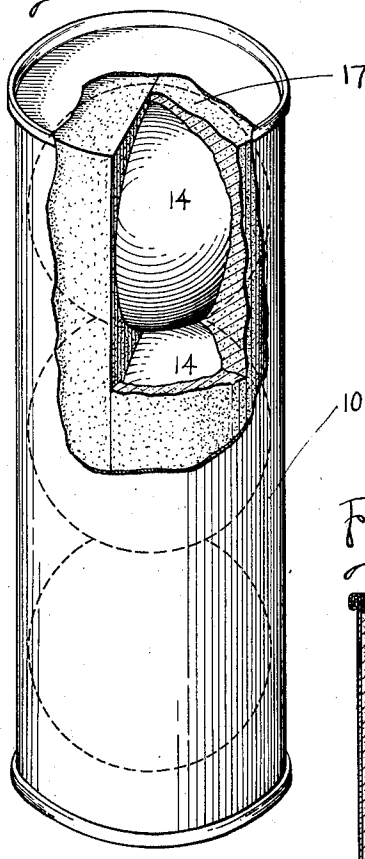


Fig. 2

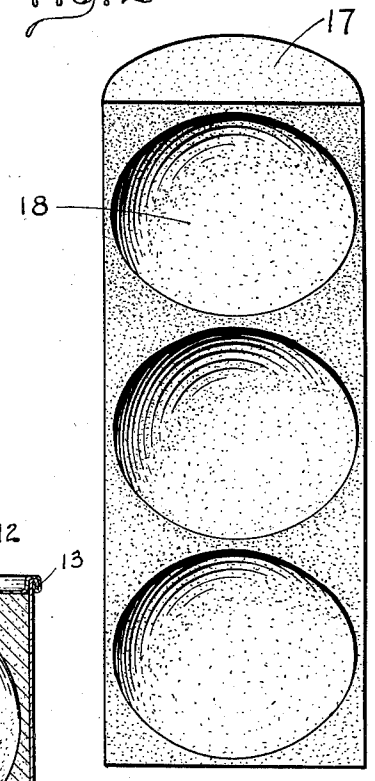
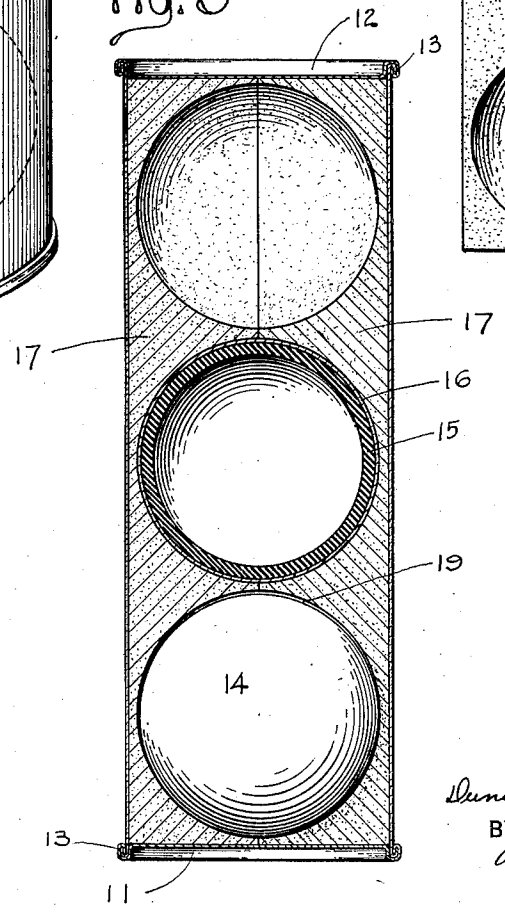


Fig. 3



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UNITED STATES PATENT OFFICE

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PACKAGING OF GAS CONTAINED OBJECTS

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This invention relates to the packaging of objects, such as tennis balls and the like, which contain a fluid under pressure and which are subject to deterioration from diminution of the pressure within the object.

Tennis balls are manufactured of a rubber body consisting of a thin shell and provided with a cloth covering. Air or gas under high pressure is provided within the rubber shell and experience has demonstrated that this pressure decreases from the time the tennis balls are manufactured, whether they are being used or are in storage, this being occasioned by the passing of air or gas or their constiuent parts through the rubber itself. This action is, of course, extremely slow but it is nevertheless sufficient to not only preclude long storage without loss of resiliency but is also sufficient to impair the characteristics of the ball and thus diminish its usefuleness. In the present manufacture of tennis balls in which no attempt is made to seal the balls in an hermetic container, it has been found that the balls suffer a substantial loss of pressure even within one month of storage, and this loss is sufficient to render the balls useless in official tournaments. In commercial manufacture of balls there is used an internal pressure ranging from twenty pounds per square inch to twenty-one pounds per square inch. This loss of pressure following manufacture and storage is so vital a factor that the United States Lawn Tennis Association requires that certain standards in resiliency be present in balls which are used in official tournaments. These rules require a given height of bounce of the ball dropped from a given height at a given temperature.

My invention has for its principal object the maintenance of the pressure in a tennis ball or other object in a standard type of metallic container and without the use of provided gas or air pressure outside of the ball. I have provided a method for making use of the standard type of can and have disclosed in the drawings, as a preferred embodiment of my invention the invention as applied to the packing of a convenient number of balls, namely three, in a convenient size ordinary cylindrical can having the standard seamed top and bottom. My invention contemplates the provision of fillers for enclosing the tennis balls to be packed, which fillers are adapted to fit closely within the standard cylindrical type of can and to act as barriers against the leaking of fluid from the interior of the ball so packed in the can.

The U. S. Lawn Tennis Association requires that a tennis ball be not more than $2\frac{5}{8}''$ in outside diameter and not less than $2\frac{1}{2}''$. I have provided filler blocks preferably made of compressed paper fibre which is light in weight and vary cheap in cost. These filler blocks can be made in various shapes and sections but for the purpose of illustrating the use of these fillers I have shown in the drawings and have described in this specification the blocks as consisting of two half sections which permit ready insertion of the balls to be packed and which when positioned together, enclose the balls in a manner permitting easy insertion of the filler blocks containing the balls within the can. The filler blocks are formed with spherical pockets for closely fitting the tennis ball when the mating filler blocks are placed together. The diameter of this pocket is sufficient to tightly fit the maximum tennis ball of $2\frac{5}{8}''$. If a tennis ball of the minimum diameter, namely $2\frac{1}{2}''$ is inserted in this pocket, there will obviously be a slight space between the outer wall of the ball and the inner wall of the pocket. The actual volume of this space is however very small and forms very little space into which air leaking from the ball can pass. The filler blocks I propose to use are made from compressed paper fibre which is pressed to a high degree in order to reduce, if not indeed overcome the porosity of the fibre structure. If desirable, the fibre blocks can be treated to coat the outer surfaces with some sort of filling material which will render the fibre blocks impervious to air.

Other materials besides fibre may be found to be more desirable for this purpose it being necessary to provide a substance which is very light and which at the same time is sufficiently close in texture to prevent the

passage of air, or too much air, into cells of the material used.

It is obvious therefore that with my invention I have provided for packing of the tennis balls within the standard type of container and this type of container is made and closed on standard types of can machinery. This standard container may be the highly efficient so-called sanitary seamed can which after filling may be covered and hermetically sealed in standard can closing machines. This therefore completely obviates the necessity of using any kind of a vented can or any can which must be supplied with fluid under pressure before the hermetic sealing is complete. I am aware that such vented cans have been used for packing tennis balls and have been supplied with fluid under pressure as is disclosed for example in the Stockton Patent No. 1,207,814, but by my method of packing the use of special processes is unnecessary.

Tennis balls which ordinarily at present must be made at the height of the season require a great deal of expensive high tension work within a short space of time while by the use of my invention these balls can be made at convenient periods throughout the year and stored for a relatively long period without impairing in any way the quality of the tennis ball. In my method therefore it is unnecessary to make use of special machinery, and this, therefore, will automatically result in a decreased manufacturing cost and a high efficiency.

Reference should now be had to the drawings, wherein,

Fig. 1 illustrates a perspective view of a can filled according to my invention, parts of the can and contents being broken away to disclose the relative position of the filler blocks and the tennis ball;

Fig. 2 is a perspective view of one of a pair of filler blocks, the view illustrating the pockets for receiving the tennis balls; and

Fig. 3 is a longitudinal section taken through a can and contents closed according to my invention, the upper pocket of the filler block being disclosed with the tennis ball removed, the center tennis ball being shown in cross-section and the lower pocket of the filler block being shown as containing a minimum size ball.

The numeral 10 designates the ordinary tin can of commercial use provided with a bottom 11 and a top 12 united to the can body by the standard double seam 13. Tennis balls 14 consisting of the standard inner rubber shell 15 and canvas covering 16 are disclosed in the drawings, Figure 3 illustrating one of the tennis balls in cross-section. Filler blocks of fibre or other suitable material consisting of half shell sections 17, provided with pockets 18 are adapted when two of the half shells 17 are placed together as shown in Fig. 3 to so co-operate as to form by means of mating pockets 18 a chamber for the reception of the tennis ball 14. The chamber formed by the pockets 18 is of a dimension to fit the maximum diameter of a tennis ball made according to the standards of the U. S. Lawn Tennis Association. When the minimum size ball allowed by this association is placed into the chamber as illustrated in the lower part of Fig. 3 of the drawings, a void space 19 exists between the outer wall of the tennis ball and the inner wall of the pockets 18. As previously described, when the extreme case is assumed where three minimum size balls are placed in the pockets of the half molds 17, the combined volume of the three spaces 19 is only equivalent to $\frac{1}{32}$ of a cubic inch which as previously mentioned will result in providing a space for the leaking of only sufficient air to reduce the pressure within the balls less than one-half of an ounce. The outer diameter of the filler block 17 is such as to tightly fit the inside wall of the can 10 and some slight variation in this is of course possible, and also a space may exist between the mating sides of the filler blocks 17. The margin of safety in making use of filler blocks of this type is sufficiently great as is proven by actual computation to cause no difficulty in the use of this method of packing. The maximum amount of leakage space within the can 10 after the same is seamed with the tennis balls in position can be eight ounces or one-half pound without exceeding the allowable variation for a tennis ball.

It is thought that this invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that many changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. The method of preserving the resiliency of tennis balls by reducing the outward leakage of their compressed gaseous contents, which consists in packing the ball, having internal fluid pressure, in a container, and filling substantially all of the space in said container with solid material which minimizes the space in said container which can be occupied by air, and then hermetically sealing the container.

2. The method of preserving the resiliency of tennis balls by reducing the outward leakage of their compressed gaseous contents, which consists in packing the ball, having internal fluid pressure, in a container, and filling substantially all of the space in said container with solid material made substantially impervious to air which minimizes the space

in said container which can be occupied by air, and then hermetically sealing the container.

3. An hermetic container for packing and storing an object containing fluid pressure, such as a tennis ball, which comprises companionable parts fitting together and combinedly fitting the ball having internal fluid pressure, and entirely enclosing it in substantially full-face contact with said ball, the said parts comprising filler blocks for substantially filling an interior of a metallic container for hermetically sealing the tennis balls therein, and creating counteracting pressure within the container by the small leakage from said ball, said container hermeticaly enclosing said parts and ball.

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