A. A. GREEN.

METHOD OF INFLATING AND SEALING HOLLOW SPHERICAL OBJECTS.

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1,159,932.

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Fig. 1.

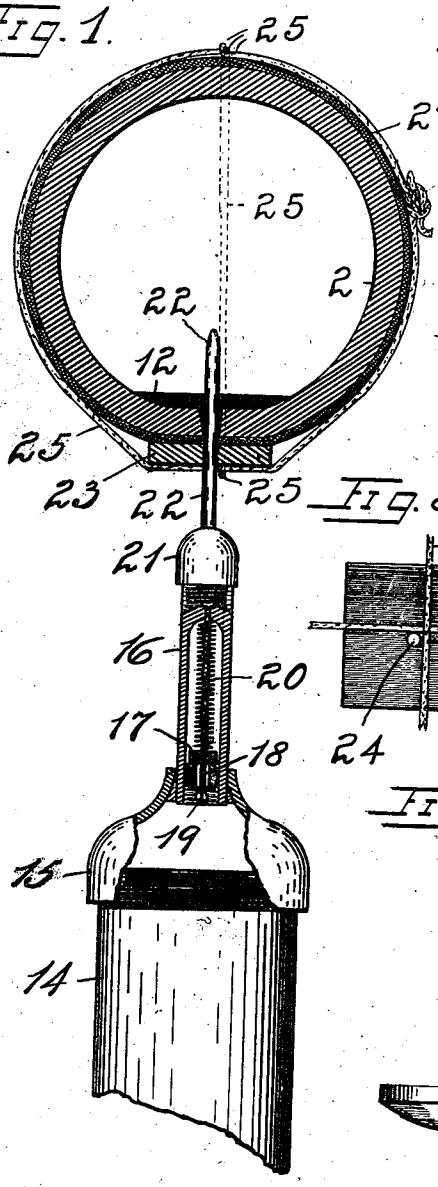


Fig. 2.

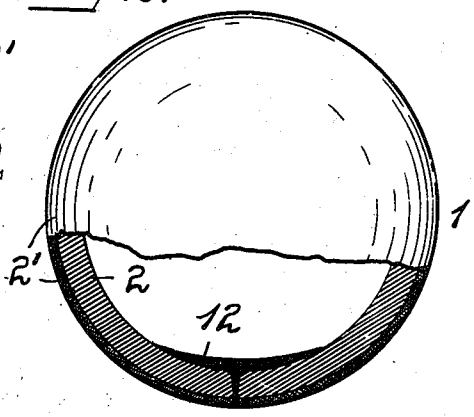


Fig. 3.

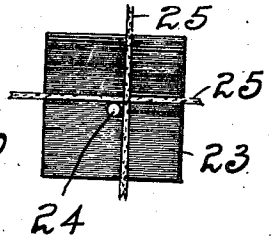


Fig. 4.

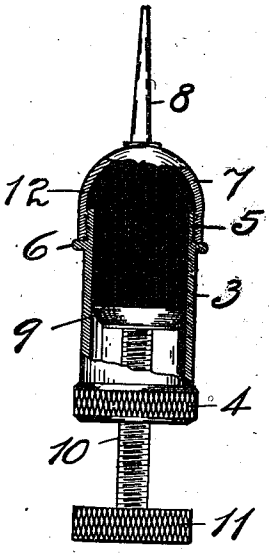
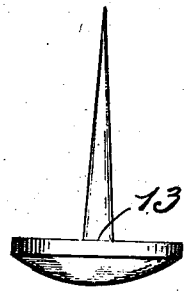


Fig. 5



WITNESSES:

A. W. Knutson

C. D. Richards.

INVENTOR:

Allen A. Green,

By H. M. Richards,

atty.

UNITED STATES PATENT OFFICE.

ALLEN AYRAULT GREEN, OF GALESBURG, ILLINOIS, ASSIGNOR OF ONE-HALF TO HAROLD M. HOLLAND, OF GALESBURG, ILLINOIS.

METHOD OF INFLATING AND SEALING HOLLOW SPHERICAL OBJECTS.

1,159,932. Specification of Letters Patent. Patented Nov. 9, 1915.

Application filed May 10, 1915. Serial No. 27,140.

To all whom it may concern:

Be it known that I, ALLEN AYRAULT GREEN, a citizen of the United States, and a resident of Galesburg, in the county of Knox and State of Illinois, have invented a new and useful Method of Inflating and Sealing Hollow Spherical Objects, of which the following is a specification.

In my co-pending application, Serial No. 828,529, filed March 31, 1914, is disclosed a ball inflater and sealer which is well adapted for carrying out a portion of the steps of the method hereinafter disclosed. However, primarily in order to clearly demonstrate that a variety of devices or appliances may be utilized in carrying out those steps I have in the accompanying drawings shown and shall presently describe other but similar means for effecting the same purpose.

Tennis and other hollow balls are originally filled or inflated to the proper degree of resiliency when made, but from either use or lack of use they soon lose their air content and become non-resilient or "dead", in which condition they are practically valueless. Prior to my invention (above referred to) there was not, to my knowledge, any successful means or method whereby such balls could be restored to their original condition of resiliency. I do not desire it to be understood from the foregoing, however, that I have concerned either the prior or the present invention alone with the re-filling and re-sealing of hollow spheres, for both inventions are adapted equally as well for primary or original inflation and sealing.

It is one purpose and object of this invention to provide a novel method of inflating and sealing new balls.

Another purpose and object is to provide a novel method of re-inflating and re-sealing old balls, whether used or unused.

It is a further object to provide a method of sealing hollow balls with cement or a similar substance, in such manner that none of the sealing material will exude either during the process of sealing or afterward.

As above stated, the invention may be carried out with devices differing in construction. I have in the accompanying drawings shown very simple means for carrying it into effect.

In said drawings: Figure 1 is a vertical central sectional view of a tennis ball in process of receiving the final step in my improved process or method; Fig. 2, an elevation, partly in section, of a completed ball; Fig. 3, an enlarged bottom plan detail; Fig. 4, an elevation, partly in section, of an injector for the sealing material; and Fig. 5, an elevation of a thumb-awl.

Premising that my invention is not limited or confined to the means shown in said drawings, I now proceed to a detailed description thereof.

1 designates an ordinary type of tennis ball comprising an inner casing 2 of rubber and an outer casing of fabric, 2'. For convenience these two elements may hereinafter be termed the wall.

3 designates a seal-containing tube or injector comprising a tubular casing 4 having at one end an apertured head 4 and at its other end a threaded annular projection 5. 6 designates an annular shoulder providing a seat for the cap 7 which is fitted with the usual nozzle 8. 9 indicates a piston head. 10 designates the rod secured thereto and threadedly engaged with the opening in the head 4, and 11 is the actuating head therefor. 12 designates the semi-liquid cement or other sealing material. All these parts are well known in the art of injectors.

13 designates an ordinary type of puncturing tool having a large head for convenience of manipulation.

14 designates a fragment of an air pump tube or casing having a cap 15 into which is sweated an air valve comprising a tube 16, check-valve or valve proper 17, valve stem 18 having a head 19, and valve-return spring 20.

21 indicates a cap suitably secured on the outer end of the tube 14, and 22 designates a hollow needle open at its tip.

23 designates a pressure pad or block of leather or other suitable material, preferably provided with a central opening 24, although this opening may be made with the tool 13 during the course of the operation presently described.

25 indicates an ordinary cord, gut, or the like.

In carrying out my improved method I first secure the pad or block 23 in place on any desired spot or place on the surface of the ball 1, preferably by crossing the cord 25 thereover, passing it around the ball with its portions crossed as shown clearly in Fig.

1, and then knotting the ends as shown in same figure. The cord should be drawn sufficiently taut to cause that portion of the pad to be distorted or pressed into a substantially flat or plane surface. For the purposes of this specification and the appended claims, the pad or block 23 may be defined as a distorting element. Any other suitable means than the cord 25 may be employed for retaining it in position. The puncturing tool is then,—if the hole 24 has been pre-formed—inserted through said hole and through both elements (which together constitute the wall) of the ball. If the hole 24 has not been pre-formed it may be provided by the same operation. It will be observed (Fig. 1) that the opening thus made in the wall of the ball will be in the shape of a cone the base of which is on the concave side. This is due primarily to the distorted or displaced condition of the portion moved by the distorting element 23. Upon withdrawing the tool 13 the nozzle 8 of the injector 3 is inserted through the punctures in both the pad and ball and a suitable quantity of any suitable cement or other puncture-sealing material is injected into the ball, and the nozzle withdrawn. Air is then forced into the ball cavity, by means of the air-pump shown or in any other suitable manner, until the ball has been inflated to the proper degree of resiliency, which may be determined either by pressure with the fingers or by careful watching of the strain or stress upon the cord. The air valve 17 prevents escape of air while the needle 22 is in place, and immediately upon its withdrawal, which is now to be accomplished, the sealing material will follow it and fill the conical cavity, but will not exude. The element 23 may however if desired be moved laterally to destroy the coincidence of the puncture therein with the one in the ball, in order to prevent a remote possibility of the escape of either the air or the cement. After a short time the cord 25 may be released and the element 23 removed, whereupon the ball is set aside a sufficient length of time for the sealing material to harden, which will depend, of course, upon its nature.

I desire it to be clearly understood that the two steps of introducing cement into the ball cavity and forcing air thereinto are interchangeable, or, in other words, that either may precede and the other follow:—

What I claim is:

1. A method of sealing hollow spherical objects, consisting in distorting a portion of the object, puncturing the distorted portion, and injecting sealing material through the puncture.

2. A method of inflating and sealing hollow spherical objects, consisting in distorting a portion of the object, puncturing the distorted portion, injecting sealing material through the puncture, and forcing air through the puncture.

3. A method of sealing hollow spherical objects, consisting in securing a distorting element against a portion of the surface of the object, puncturing the object through the distorting element, and injecting sealing material through said distorting element and puncture.

4. A method of inflating and sealing hollow spherical objects, consisting in securing a distorting element against a portion of the surface of the object, puncturing said object through said distorting element, and forcing air and sealing material through said distorting element and puncture.

5. A method of sealing hollow balls, consisting in securing a distorting element against a portion of the surface of the ball, puncturing the ball through said distorting element, injecting sealing material through the puncture, and moving the distorting element to destroy the coincidence of the puncture therein with the one in the ball.

6. A method of sealing hollow balls which consists in distorting a portion of the wall of the ball and injecting sealing material through the distorted portion while it is distorted.

7. A method of sealing hollow balls which consists in depressing a portion of the wall of the ball and injecting sealing material through the depressed portion while it is depressed.

8. A method of inflating and sealing hollow balls, which consists in distorting a portion of the wall of the ball and injecting air and a sealing material through an opening in the distorted portion while it is distorted.

9. A method of inflating and sealing hollow balls, which consists in depressing a portion of the wall of the ball and injecting air and a sealing material through an opening in the depressed portion while it is depressed.

10. A method of sealing hollow balls, which consists in securing a punctured object upon the ball and distorting a portion of the wall of the ball thereby, and injecting sealing material through the punctured object and through the distorted portion of the ball while said portion is distorted.

11. A method of inflating and sealing hollow balls, consisting in securing a punctured object upon the ball and distorting a portion of the ball thereby, and injecting sealing material and air through the punctured object and through the ball wall into its cavity while said portion is distorted.

12. A method of filling and sealing hollow balls, which method consists in puncturing the wall of the ball, introducing through the puncture a sealing material and causing it to flow into the ball cavity, and then, by

means of an instrument, injecting compressed air through the puncture and beyond the compound, and then withdrawing the instrument, the compressed air causing the sealing material to flow into the puncture.

13. A method of inflating and sealing hollow objects, which method consists in introducing, by means of an instrument, sealing material through an opening in the wall of the object, withdrawing the instrument, inserting a hollow needle through the sealing material in the object, then pumping air into the ball-cavity, through said needle, and then withdrawing the needle and permitting the expansive air to force the sealing material into said opening.

In testimony that I claim the foregoing as my invention I hereto affix my signature at Galesburg, Knox county, Illinois, this 30th day of April, 1915.

ALLEN AYRAULT GREEN.

Witnesses:
EDWARD WILLIAMS,
EULALIA T. LACKENS.