

June 12, 1945.

G. H. PERRYMAN

2,378,034

TABLE TENNIS BALL MANUFACTURE

Filed Aug. 12, 1943

Fig. 1.

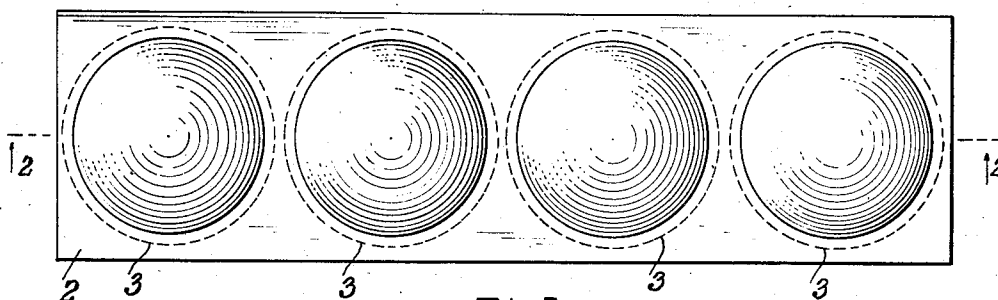


Fig. 2.

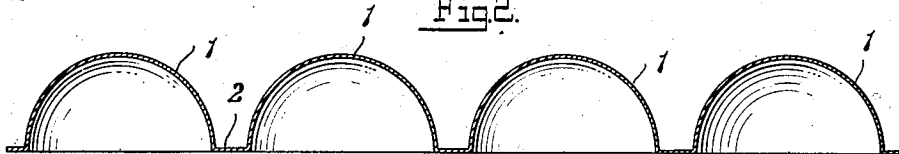


Fig. 3.

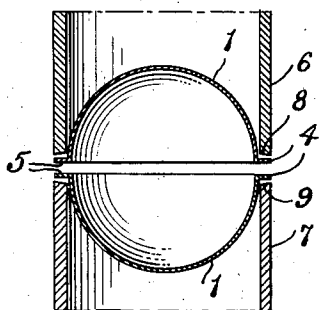


Fig. 4.

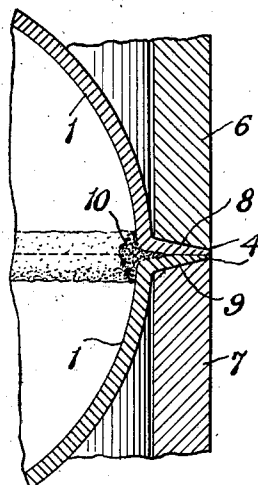


Fig. 5.

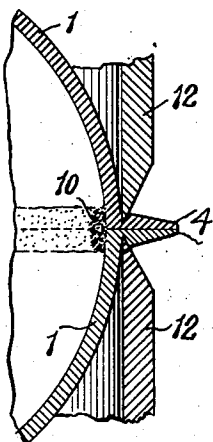
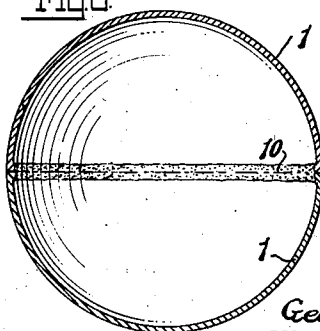


Fig. 6.



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TABLE TENNIS BALL MANUFACTURE

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Application August 12, 1943, Serial No. 498,296

1 Claim. (Cl. 154-16)

This invention relates to a means and method for making table tennis balls and similar hollow objects such as are made from thermo-plastic sheet material such as nitro-cellulose or cellulose acetate, and has for its object the provision of means by which improved balls can be speedily and economically manufactured.

As is well known, the conventional table tennis ball is manufactured of two halves or hemispheres which have their edges overlapped to form a joint between them, said overlapped parts being adhesively united. This tends to form an encircling "band" of double thickness around the ball, which sometimes acts to destroy its perfect globular contour and also impairs the balance of the ball.

It is the object of the present invention to provide a ball in which these overlapped parts of the ball halves are eliminated, and a butt joint of exceptional strength is provided between the two halves, and one which will produce a seam of scarcely perceptible nature.

The invention further contemplates an improved method of making the balls whereby means are provided to direct the flow of the adjacent solvent-softened flange material of the halves of the ball to the interior of the ball, whereby said solvent-softened material is disposed over the interior of the joint between the two halves and an exceedingly strong joint between the halves is the result.

Another object of the invention is to provide an improved die means by which the ball halves are pressed together so that the solvent-softened material is caused to be displaced inwardly or toward the interior of the ball to thereby build up an interior bridge over and around the joint between the ball halves.

In the accompanying drawing, wherein an embodiment of the invention is disclosed, Fig. 1 is a plan view of a strip of the sheet material from which the balls are formed, showing four ball halves formed thereon preparatory to being joined to four similar halves; Fig. 2 is a sectional view on the line 2-2 of Fig. 1, looking in the direction of the arrows; Fig. 3 shows two ball halves in readiness to be placed with their solvent-coated flanges in contact, and the die means for applying pressure on the flanges; Fig. 4 shows how the die means operates to compress the flanges together and cause an inward displacement of the solvent-softened portions of the flanges; Fig. 5 shows how the flanges are later trimmed away, and Fig. 6 is a sectional view through the completed ball.

Table tennis balls are usually made from nitro-cellulose, often known under the trade name of "Celluloid," or from cellulose acetate or similar thermoplastic material. In carrying out the method of the present invention and forming the halves of the ball, a number of these halves, such as four, are formed in a strip of the sheet material while it is relatively soft, by the operation of a suitable die. In Figs. 1 and 2 are shown four ball halves 1 pressed from a strip 2 and in readiness to be cut therefrom, if it is desired to make the balls one at a time. In such cases, the halves may be cut out of the strip 1 along the dotted lines 3 to provide each ball half so cut out, with the flange 4. However, in the interest of speedy production, it will be found desirable to simultaneously make four or more balls, and in so doing, two strips such as are shown at 1 in Figs. 1 and 2, and each containing four ball halves, are placed together in the manner hereafter explained.

A coating of a solvent, such as acetone, ethyl acetate or any other suitable solvent, is then applied to the outer faces 5 of the flanges, or those parts of the two strips 1 which are located between the formed ball halves, and the hemispheres are then placed together with their solvent-coated flanges in contact to form the spheres. In Fig. 3, the position of two hemispheres just prior to being placed together, is shown, and while the following description will apply to the making of a single ball, it will be understood that it applies to the simultaneous manufacture of a number of balls, such as for example, four as shown in the strip 1. Before pressure is applied upon the flanges in the manner hereafter described, it is necessary that any air trapped within the ball to be formed and/or the material of the ball itself, shall be subjected to heat so that when the subsequent cooling of the material of the ball itself, and/or the air trapped within the ball occurs, the pressure within the ball is materially reduced and the tendency of the ball halves to separate, due to interior pressure while the material of the joint is in a semi-plastic condition, will be obviated. This heating of the material of the ball itself and/or the air within the ball, can be done in several ways, one satisfactory way being to subject the ball halves to the action of heat just before placing them together and before sealing to form the ball. Or the ball halves may be heated after placing them together but before compressing them. By this latter method, the expanding air within the ball will cause the ball to

"breathe" in the seam and allow the pressure to escape before the ball halves are compressed together by the annular sealing die.

When the heated halves are placed together as above described, the flanges 4, with their solvent-coated faces 5 in contact, are subjected to pressure between two annular sealing dies 6 and 7. Each of these two dies is of annular or tubular form, so that it fits closely around a ball half, and since the two dies are inaccurate axial alignment they will, when brought toward one another, automatically and accurately align the two ball halves.

It will be noted in Figs. 3 and 4 that each of the dies 6 and 7 is provided with an inclined operative surface, that shown at 8 being provided on the face of the die 6, while a similar surface is shown at 9 on the die 7. When the two dies 6 and 7 are brought toward one another, they compress the flanges 4 between the surfaces 8 and 9. It will be noted that these co-operating die surfaces 8 and 9 diverge in a direction toward the interior of the ball, and as shown in Fig. 4, the result of pressure applied to the flanges 4 between these surfaces is to cause a considerable portion of the solvent-softened portions of the flanges to be displaced or forced inwardly toward the interior of the ball and caused to be built up over the interior surface of the seam in and around the joint between the ball halves on the inside of the ball. The displaced portions of the flanges 4 thus form a bridge 10 over the seam or joint between the two ball halves on the inside of the ball and acts to securely unite the halves into a sphere.

When the halves have been united by the drying of the solvent, the then united flanges 4, 4 are cut or trimmed off, this being done by the dies 12, 12 illustrated in Fig. 5, which come together to such an extent as to nearly penetrate the flanges 4, without these dies actually contacting with one another, permitting the flanges 4 to be easily stripped off after having been treated by the dies 12, 12. The ball is thereafter

heated in a die to expand the air trapped within the ball, this blowing the ball up to the interior shape of such heating die and thereby removing irregularities. The ball is thereafter tumbled to remove shine or glaze, or any imperfections on its surface. In its final form, the ball is smooth and unglazed and with the seam or joint between the halves scarcely imperceptible.

It will be seen from the foregoing that while the ball is composed of halves united by a butt joint, the joint, formed in the manner described, is an exceedingly strong one due to the disposition of the solvent-softened material being displaced inwardly and being built up on the interior of the ball and actually across the seam. The effect of the spread of the solvent-softened material is to provide a bridge across the joint to securely unite the halves. It will be further noted that the ball has no overlapping parts so that good balance is attained since the relatively small and uniformly built-up interior ring of the solvent-softened material is insufficient to cause any material effect on the balance of the ball.

What I claim is:

In the method of making table tennis balls and the like from thermo-plastic material, the steps of forming ball halves each provided with a radially extending circumferential flange, softening the adjacent surfaces of the flanges only with sufficient solvent to enable the material of said surfaces to be displaced under pressure and placing said surfaces in contact, subjecting the flanges only of the ball halves to pressure by pressure means which confines said pressure solely to the flanges without contacting with or imposing pressure on any other parts of the ball halves, whereby the solvent-softened contacting faces of the flanges are the only parts of the ball halves affected by said pressure, said pressure forcing the solvent-softened portions of the flanges inwardly and into the interior of the ball halves to build up and extend over and coat the joint between the ball halves.

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