

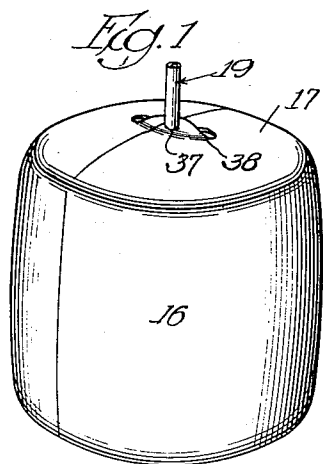
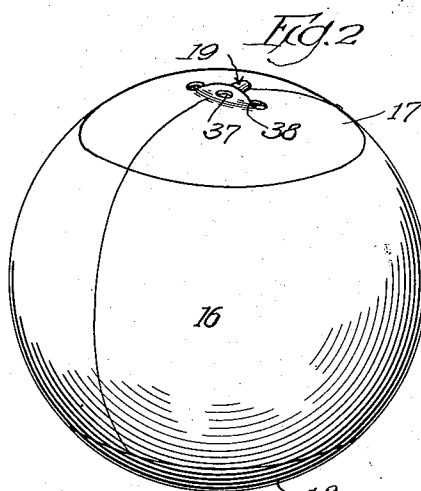
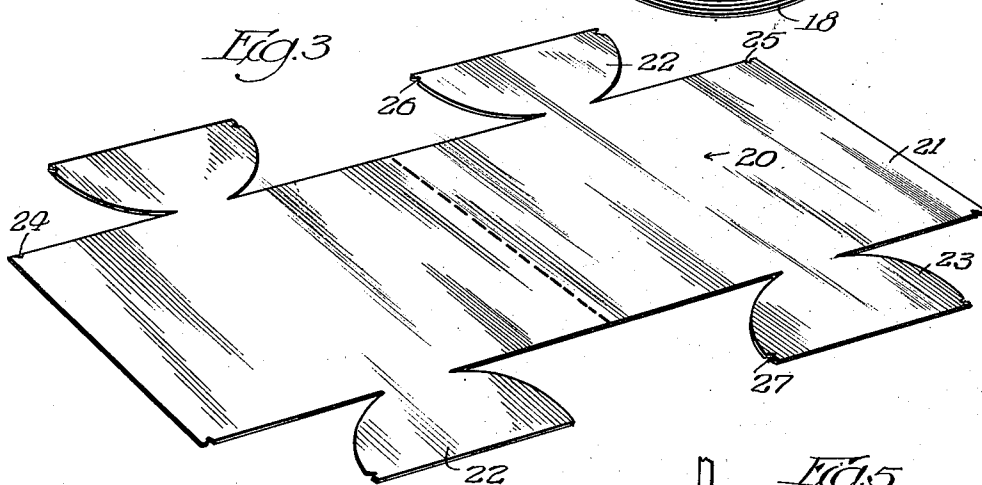
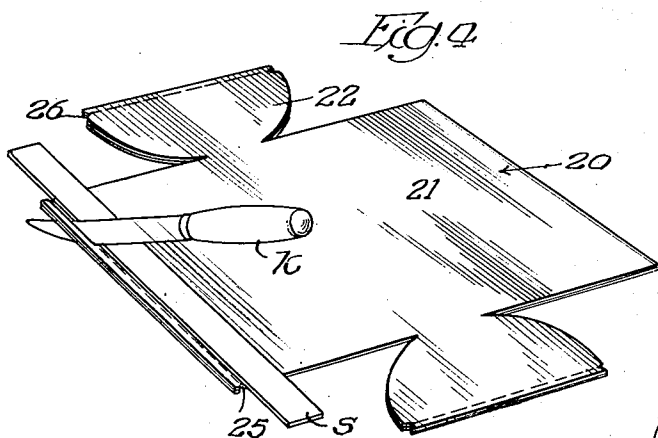
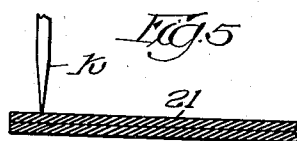
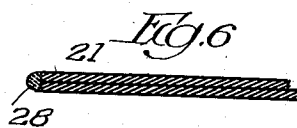
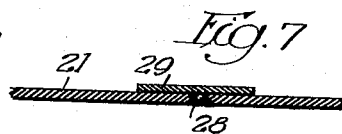
Dec. 31, 1935.

P. VAN CLEEF
BALL MANUFACTURE

2,025,918

Filed June 27, 1935

3 Sheets-Sheet 1



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2,025,918

BALL MANUFACTURE

Filed June 27, 1935

3 Sheets-Sheet 2

Fig. 8

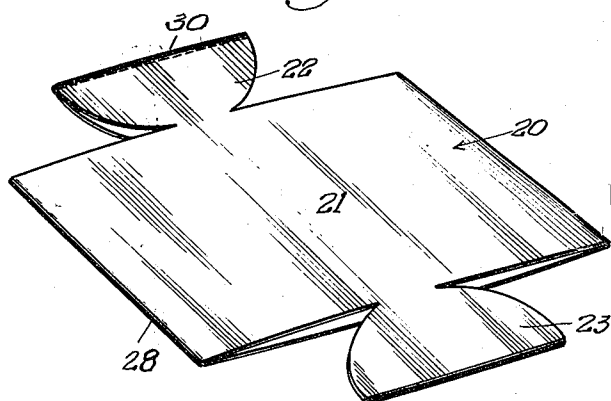


Fig. 10

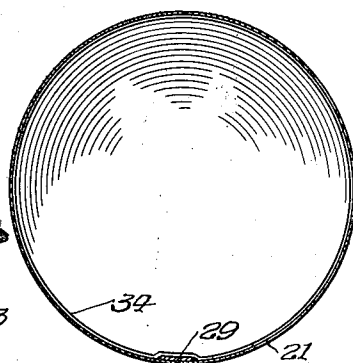


Fig. 9

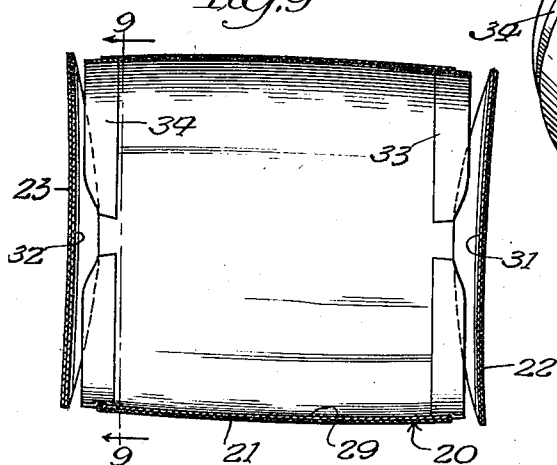


Fig. 11

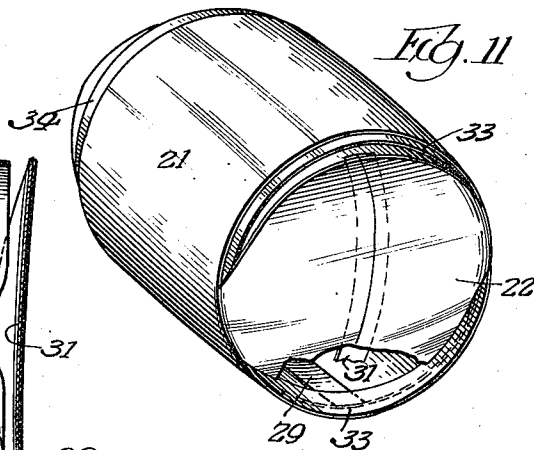


Fig. 13

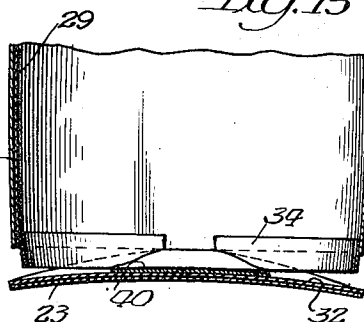
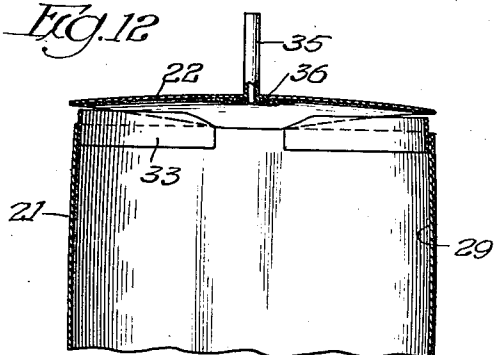


Fig. 12



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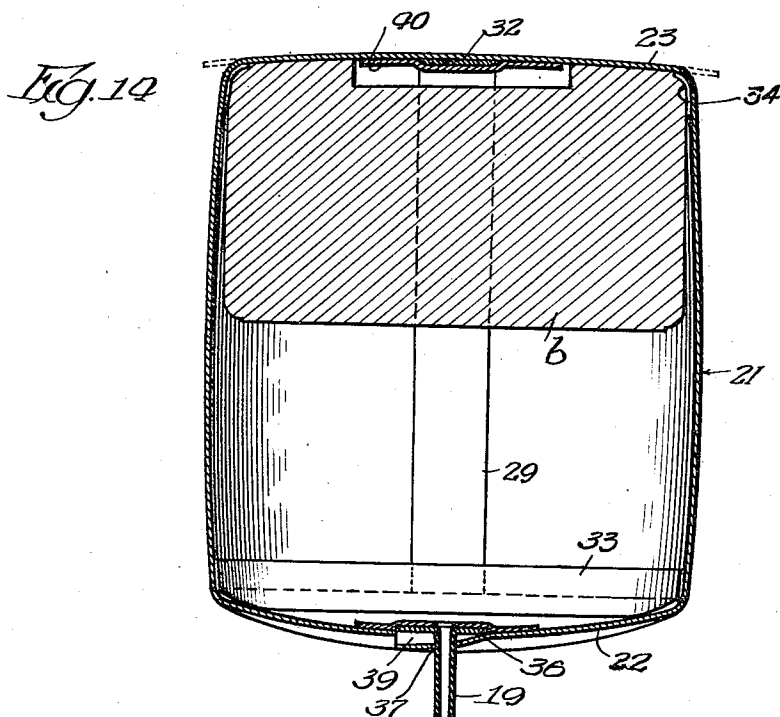
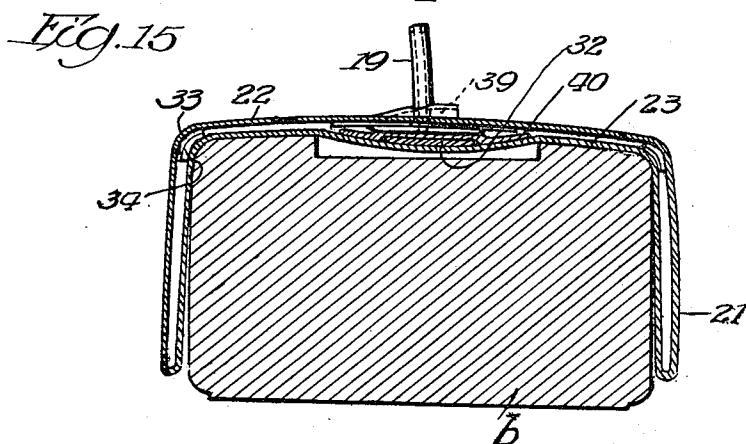
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2,025,918

BALL MANUFACTURE

Filed June 27, 1935

3 Sheets-Sheet 3



Inventor:
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UNITED STATES PATENT OFFICE

2,025,918

BALL MANUFACTURE

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Application June 27, 1935, Serial No. 28,785

3 Claims. (Cl. 154—16)

The invention relates generally to the manufacture of inflatable rubber balls. More particularly the invention relates to that type of rubber ball which consists of a continuous strip-formed side wall, a circular top at the upper margin of the side wall and a circular bottom at the lower margin of the continuous side wall, and has a valve whereby air may be introduced into it for purposes of inflation.

The primary object of the invention is to provide a method of making a ball of this type which is an improvement upon and more simple than the various methods heretofore employed and includes as the essential steps thereof of first forming a blank consisting of an elongated, rectangular strip having a pair of substantially semicircular pieces along each of its side edges then uniting the end edges of the strip together to form the side wall of the ball and by folding and properly cementing the semicircular pieces forming the top and bottom of the ball.

Another object of the invention is to provide an improved method of ball manufacture which includes the application of reinforcing strips of rubber to the meeting or abutting edges of the side wall of the ball and the top and bottom.

Other objects of the invention and the various advantages and characteristics of the present method of ball manufacture will be apparent from a consideration of the following detailed description.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by claims at the conclusion hereof.

In the drawings which accompany and form a part of this specification or disclosure and in which like numerals of reference denote corresponding parts throughout the several views:

Figure 1 is a perspective showing a ball made in accordance with the improved method in a partially inflated condition;

Figure 2 is a perspective showing the ball in a fully inflated condition;

Figure 3 is a perspective of the blank which is used in carrying out the method to form the continuous side wall and the top and bottom of the ball;

Figure 4 is a perspective showing the blank folded in half and the end margins of the strip thereof being cut to provide raw end edges;

Figures 5, 6 and 7 are detail sectional views showing the manner in which the end edges of

the strip of the blank are secured together in abutting relation;

Figure 8 is a perspective showing the blank after the straight edges of the semicircular top and bottom forming pieces have been united or secured together in abutting relation;

Figure 9 is a sectional view showing the blank after reinforcing strips of rubber have been applied to the side margins of the side wall forming strip of the blank;

Figure 10 is a section on the line 10—10 of Figure 9;

Figure 11 is a perspective showing the blank before sealing the rounded or curved edges of the bottom and top forming members to the adjacent side edges or margins of the strip of the blank;

Figure 12 is a sectional view showing the blank after application of the valve to the semicircular top-forming pieces;

Figure 13 is a fragmentary sectional view showing the lower portion of the blank after application of a balancing disk to the semicircular bottom-forming pieces of the blank;

Figure 14 is a detail sectional view showing the manner in which the rounded or curved edges of the bottom forming pieces of the blank are secured to the adjoining side edge of the strip in order to seal the bottom of the ball; and

Figure 15 is a sectional view showing the manner in which the curved margins of the top forming pieces are secured to the adjoining side wall forming strip.

The method which forms the subject matter of the invention contemplates the manufacture or fabrication of an inflatable rubber ball consisting of a continuous side wall 16, a top 17, a bottom 18, and a valve 19. The first step of the method comprises forming a blank 20 from a thin sheet of elastic rubber. This blank, as shown in Figure 3 of the drawings, consists of an elongated strip 21, a pair of substantially semicircular pieces 22 along one of the side margins of the strip, and a pair of substantially semicircular pieces 23 along the other or opposite side margin of the strip. If desired the blank may be formed by way of a cutting die of the proper shape or by superposing a pattern on the rubber sheet and then either cutting the sheet around the pattern or marking the sheet by moving a marking implement, such as a pencil, around the edges of the pattern and then by way of a knife or scissors cutting the sheet on the outline resulting from the marking operation. The strip 21 of the blank 20 has parallel side edges and parallel end edges and as hereinafter described forms the side wall 16

of the ball. The pieces 22 along one of the side margins of the strip and the pieces 23 along the other side margin of the strip form respectively the top and bottom of the ball. During forming of the blank 20 a pair of V-shaped notches 24 are cut in one end of the strip 21 and a pair of V-shaped notches 25 are cut in the other end of the strip. The notches 24 are located one opposite the other in the side edges of the strip and are equidistantly spaced from the adjoining end edge of the strip. The notches 25, like the notches 24, are located one opposite the other. They are disposed in the side edges of the strip 21 and are spaced from the adjoining end edge of the strip a distance equal to the distance between the notches 24 and the end edge of the strip that adjoins said notches 24. The substantially semicircular pieces 22 are the same in size and have a radius which is the same as that of the cylindrical side wall 16 which as hereinafter described is formed by joining together the end margins of the strip 21. As shown in the drawings, the pieces 22 are joined to the strip 21 at the mid joints of their curved edges. By having the pieces 22 joined to the strip as stated the straight edges of the pieces extend parallel to the side edges of the strip 21 of the blank. The distance between the points at which the pieces 22 join the strip 21 is equal to one half of the distance between the notches 24 and the notches 25. Because of this the pieces 21 are disposed one diametrically opposite the other when the strip is formed into a band in order to form the side wall 16 of the ball. The pieces 22 are slightly more than truly semicircular and have V-shaped notches 26 in the curved edges thereof at points slightly inwards from the end portions of their straight edges. These notches 26 are preferably cut in the pieces 22 at the time that the blank 20 is formed and are positioned from the edge of the strip 20 to which the pieces 22 are joined or attached a distance corresponding or equal to the radius of the pieces 22. The semicircular pieces 23 are exactly the same in size as the pieces 22. They are disposed one directly opposite one of the pieces 22 and the other directly opposite the other of the pieces 22 and are joined to the adjacent side margin of the strip 21 of the blank 20 at the mid points of the curved edges thereof. V-shaped notches 27 are cut in the portions of the curved edges of the pieces 23 at points inwardly of the end portions of the straight edges of the pieces. These notches 27 are preferably cut in the pieces 23 at the time that the blank 20 is formed and are spaced from the edge of the strip 21 to which the pieces 23 are joined a distance equal to the radius of the pieces.

After forming the blank 20 the end edges of the strip 21 of the blank are joined or united together in order to form the band which constitutes the side wall 16 of the ball. This is done or accomplished by centrally folding the strip 21 and bringing the end edges of the strip into registry with one another as shown in Figure 4. After folding the strip 21 in this manner the portions of the strip that are outwardly of the notches 24 and 25 are cut away. The cutting is preferably done by placing a straight edge *s* so that it extends from the superposed notches in one of the side edges of the strip 21 to the superposed edges in the other side edge of the strip and then running a knife *k* along the straight edge as illustrated in Figures 4 and 5 of the drawing. After the cutting operation or step a coating 28 of rubber cement (see Figure 6) is applied to the raw

or cut end edges of the strip 21 and the strip is then opened up or manipulated so as to bring the raw or cut end edges into abutting relation. As soon as the cut end edges of the strip are brought into abutting relation the coating 28 of rubber cement serves to join or secure them together. As soon as the rubber cement sets a strip 29 of rubber (see Figure 7) is cemented to the inner face of the strip 21 along the coating 28. This rubber strip 29 is preferably of such length that it extends from one side edge of the strip 21 to the other and serves to reinforce or strengthen the joint between the abutting end edges of the strip. As soon as the end edges of the strip 21 are joined together the strip is in the form of a band and constitutes the continuous side wall 16 of the ball. The joining together of the end edges of the strip 21 of the blank 20 constitutes the second step of the improved method.

The third step of the method consists in joining together in abutting relation the straight edges of the pieces 22 in order to form at the top of the blank a disk or circular member which constitutes the top 17 of the ball. In joining the straight edges of the pieces 22 together the pieces are first by proper folding of the strip 21 placed one over the other in edge to edge relation. Thereafter the portions of the pieces 22 that are outwardly of the notches 26 are cut away and a coating 30 of rubber cement is applied to the raw or cut edges. Immediately after application of the coating 30 the pieces 22 are manipulated so as to bring the cut or raw edges into abutting relation. Upon hardening of the coating 30 a strip 31 of rubber is cemented to the inner faces of the pieces 22 so that it underlies the aforementioned coating of rubber cement and reinforces the joint or seam between the abutting edges of the pieces 22. By cutting away the portions of the members 22 that are disposed outwardly of the notches 26 the pieces 22 are formed so that they are truly semicircular in shape and when joined together at the straight edges thereof form the circular top 17 of the ball.

The fourth step of the method consists in joining together the straight edges of the pieces 23 in order to form a disk or circular member which constitutes the bottom 18 of the ball. The straight edges of the pieces 23 are joined together in the same manner as the straight edges of the pieces 22 are joined together and that is by cutting off the portions thereof that are disposed outwardly of the notches 27 and then after application of a coating of rubber cement to the cut or raw edges of the pieces 23 manipulating the pieces so as to bring the raw edges into abutting relation. In order to reinforce the joint or seam between the abutting edges of the pieces 23 a strip 32 of rubber is cemented to the inner faces of the pieces so that it extends along the rubber coating.

After forming the disks or circular members which constitutes the top and bottom of the ball a pair of reinforcing strips 33 are applied to the margin of the strip 21 having the pieces 22 and a pair of reinforcing strips 34 are applied to the margin of the strip 21 having the pieces 23. The strips 33 are formed of rubber and are cemented to the inner face of the strip 21 so that they extend around the margin of the strip between the points at which the pieces 22 are joined to the strip 21 and the outer half portions thereof project beyond the adjoining edge of

the strip 21 (see Figure 9). The strips 34, like the strips 33, are formed of rubber. They are cemented to the inner face of the strip 21 of the blank 20 so that they extend around the margin of the strip between the points at which the semicircular bottom forming pieces 23 are joined to the strip 21 and the outer half portions thereof project beyond the adjoining or contiguous side edge of the strip 21. The strips 33 and 34, as hereinafter described, serve as a medium for securing the curved or rounded edges of the pieces 22 and 23 in abutting relation with the side edges of the strip 21 of the blank 20.

After cementing or applying the strips 33 and 34 to the side edges of the strip 21 of the blank 20 the valve 19 is attached to the semicircular top forming pieces 22 as shown in Figure 12 of the drawings. The valve comprises a rubber tube 35 and an attaching piece 36. One end of the tube extends through and is secured to the central portion of the attaching piece 36. In applying the valve the pieces 22 are first cut so that at the central portion of the meeting edges thereof they have a round hole 37 and an arcuate slit 38 at one side of the hole. Thereafter the attaching piece 36 is cemented at its margins to the inner faces of the top forming pieces 22 so that the tube 35 is aligned with the hole 37, and the central portion thereof forms with the superjacent portion of the pieces 22 a pocket 39. The tube 35 is adapted to extend through the hole 37 for ball inflating and deflating purposes. Because the tube is formed of rubber it is collapsible and after being used to inflate the ball may be withdrawn from the hole and doubled over within the pocket by inserting an element into the pocket through the slit 38 and pushing the tube towards the portion of the pocket that is remote from the slit. Preferably the valve 19 is of the type and character shown and described in Letters Patent of the United States No. 1,994,790, granted March 19, 1935, to Ward E. Roedding. Applying the valve 19 to the top forming pieces 22 of the blank 20 constitutes the fifth step of the improved method.

The sixth step of the method consists in cementing a rubber disk 40 to the central portion of the meeting edges of the bottom forming pieces 23 of the blank 20. This disk is preferably the same in weight as the valve 19 and serves to balance the ball.

After applying or attaching in place the valve 19 and the balancing disk the covered or rounded edges of the bottom forming pieces 23 are joined in abutting relation to the contiguous side edge of the strip 21 and thereafter the curved or rounded edges of the top forming pieces 22 are joined to the other side edge of the strip 21 of the blank 20.

In securing in place the rounded edges of the bottom forming pieces 23, a cylindrical wooden block *b* is employed. This block is cylindrical and is slightly smaller in diameter than the band which constitutes the side wall 16 of the ball and is formed by the strip 21 after the end edges of the latter are secured together in abutting relation by the coating 28 of rubber cement and the reinforcing strip 29. The block *b* has rounded or bevelled corners and is adapted to be inserted into the strip-formed band and positioned so that one corner thereof is substantially on a level with the side edge of the strip 21 that has the semicircular bottom forming pieces 23. After placing the block *b* in its proper position

rubber cement is applied to the outer or free portions of the rubber strips 34 and thereafter the curved marginal portions of the pieces 23 are brought into contact with the portions of the strips 34 having the coating of rubber cement. The block serves as a form or support and permits the person carrying out the method to press the curved marginal portions or bottom-forming pieces 33 into firm contact with the rubber strips 34. Attachment or joining of the rounded or curved margins of the pieces 23 to the strips 34 constitutes the seventh step of the method and results in closing or sealing of the bottom of the ball.

After cementing or securing in place the pieces 23 the block *b* is removed from the strip formed band which constitutes the side wall of the ball and the lower portion of the band is folded or telescoped within the upper portion of the band so as to bring the ball bottom 18 slightly below the level of the reinforcing strips 33. Thereafter the block is inserted into the telescoped part and the rounded or curved margins of the top forming pieces 22 are secured to the strips 33 by applying rubber cement to the free or outer portions of the strips 33 and pressing the aforementioned marginal portions of the pieces 22 into firm contact with the cement coated portions of the pieces 22 into firm contact with the cement coated portions of the strips. Securing the curved or rounded margins of the pieces 22 to the strips 33 constitutes the eighth step of the method and results in closure or sealing of the top of the ball. In securing the bottom and top forming pieces in place the curved edges of the pieces are brought into abutting relation with the side edges of the strip 21 and are cemented to such edges.

The final step of the improved method consists in placing the ball on a sheet metal form 40 (not shown) and subjecting it to steam under the proper conditions in order to cure it.

The ball that is formed by the herein described method of manufacture or fabrication is exceptionally strong due to the reinforcement of the various abutting edges of the parts thereof. When the ball is inflated to its fullest extent it is spherical in form as shown in Figure 2 of the drawings.

The invention is not to be understood as restricted to the details set forth, since these may be modified within the scope of the appended claims, without departing from the spirit and scope of the invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent is:

1. That improvement in the manufacture of an inflatable ball of the continuous side members and circular top and bottom member type which includes first forming from sheet rubber a one-piece blank consisting of an elongated, straight sided strip and on each side of the strip a pair of substantially semicircular pieces having the mid points of the curved edges thereof joined to the contiguous side edge of the strip at points that are spaced apart a distance substantially equal to one-half the length of the strip, then joining together in abutting relation the end edges of the strip in order to form the continuous side member of the ball, then bending inwardly the pieces of each pair and securing the straight edges thereof in abutting relation in order to form the top and bottom members of the ball, then applying a valve to one of the members of 75

the ball, and finally securing the rounded edges of all four pieces of the blank to the contiguous portions of the side edges of the strip in order to anchor or secure in place the top and bottom members and complete the ball.

2. That improvement in the manufacture of an inflatable ball of the continuous side wall and circular top and bottom type which includes first forming from sheet rubber a one-piece blank consisting of an elongated, straight sided strip and on each side of the strip a pair of substantially semicircular pieces having the mid points of the curved edges thereof joined to the contiguous side edge of the strip at points spaced apart a distance substantially equal to one-half the length of the strip, then joining in abutting relation the edges of the strip in order to form the continuous side wall of the ball, then bending inwardly the pieces of one pair and joining the straight edges thereof in abutting relation in order to form the top of the ball, then bending inwardly the pieces of the other pair and joining the straight edges thereof together in order to form the bottom of the ball, then applying a valve to the piece-formed top, and finally securing the rounded edges of all four semicircular pieces of the blank to the contiguous portions of the side edges of the strip in order to seal the top and bottom to the side wall and complete the ball.

3. That improvement in the manufacture of

an inflatable ball of the continuous side wall and circular top and bottom type which includes first forming from sheet rubber a one-piece blank consisting of an elongated straight sided strip and on each side of the strip a pair of substantially semicircular pieces having the mid points of the curved edges thereof joined to the contiguous side edge of the strip at points spaced apart a distance substantially equal to one-half the length of the strip, then joining in abutting relation the end edges of the strip in order to form the continuous side wall of the ball, then bending inwardly the pieces of each pair and joining together in abutting relation the straight edges of the pieces in order to form the top and bottom of the ball, then applying rubber strips to the inner faces of the portions of the side margins of the strip between the juncture points of the pieces in such a manner that portions thereof project outwardly beyond said marginal portions and then applying a valve to the piece-formed top of the ball and finally securing the rounded edges of all four pieces to the projecting parts of the rubber strips and cementing the rounded edges of said four pieces into abutting relation with the contiguous portions of the side edges of the strip in order to secure in place the top and bottom and complete the ball.

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