

Oct. 10, 1933.

J. O. GOODWIN

1,930,167

METHOD OF COVERING BALLS

Filed Dec. 16, 1931

2 Sheets-Sheet 1

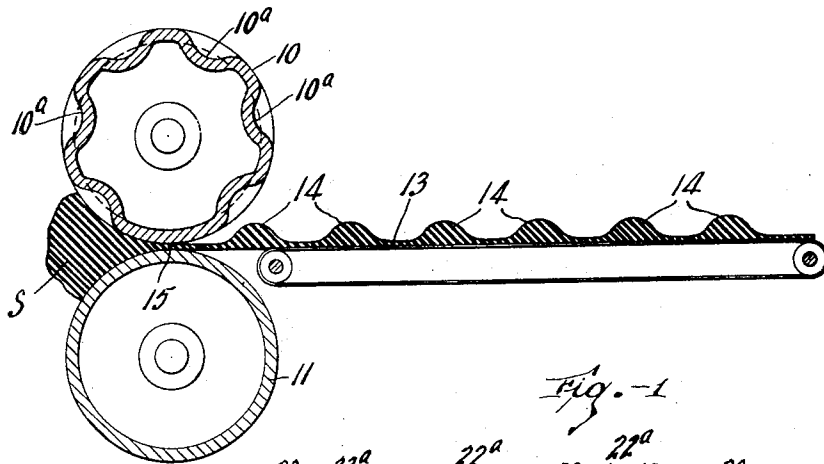


Fig. -1

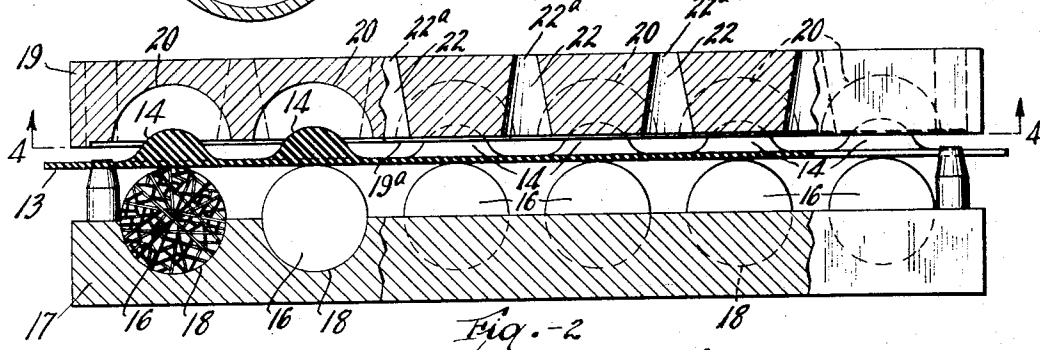


Fig. -2

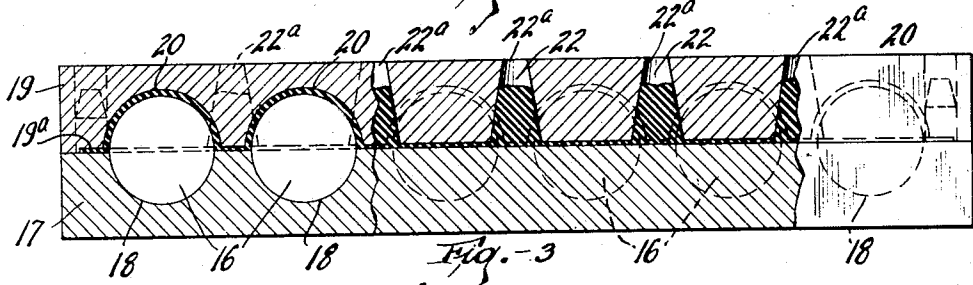


Fig. -3

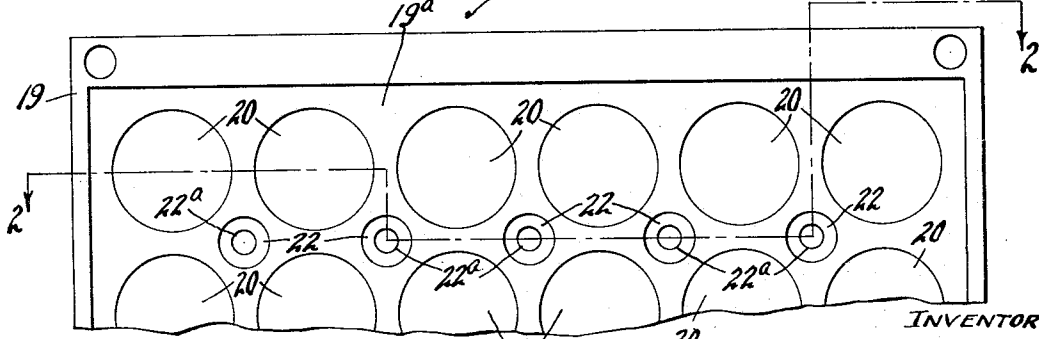


Fig. -4

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2 Sheets-Sheet 2

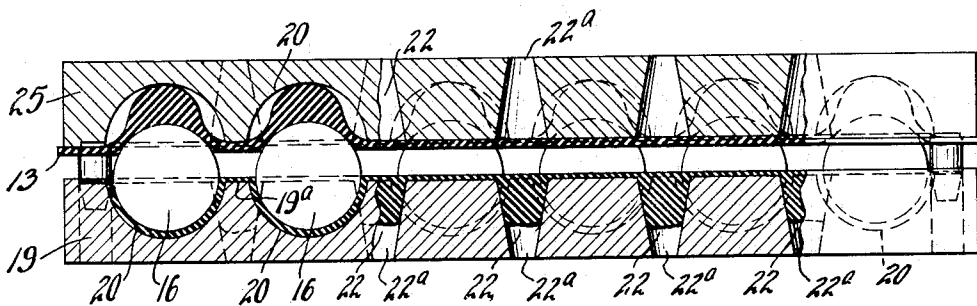


Fig.-5

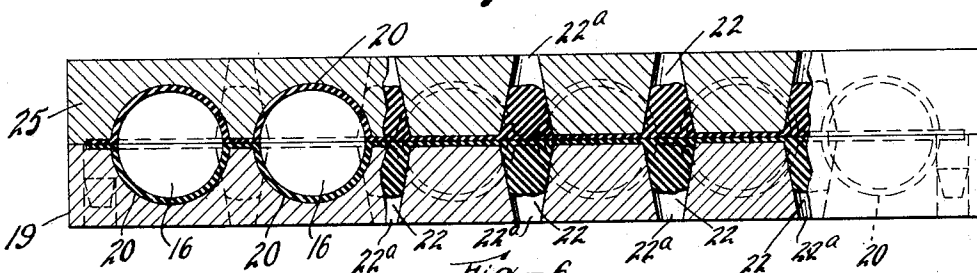


Fig.-6

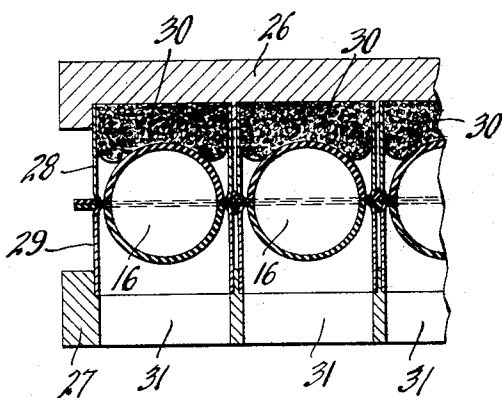


Fig.-7

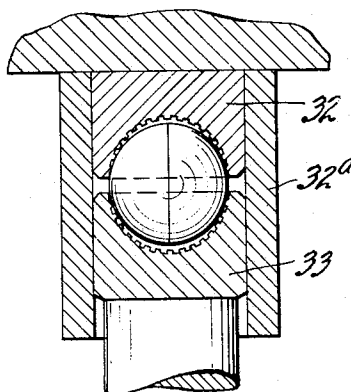


Fig.-8

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1,930,167

METHOD OF COVERING BALLS

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Application December 16, 1931
Serial No. 581,295

8 Claims. (Cl. 154—17)

This invention relates to methods for applying plastic covers to articles such as balls and particularly golf balls.

The general purposes of the invention are to provide a simple, economical method for covering golf or like balls or other articles whereby the ball center will be accurately centered in the completed ball and the ball will fly or roll true and also to provide a method which will produce a golf ball of accurate size.

Heretofore, it has been proposed to mold first one half and then the other half of a cover of sheet plastic material such as balata directly onto the ball center in order to impregnate the covering material somewhat into the ball center and to insure that the center will be centralized, and not under stresses tending to distort it as where premolding covers are applied. Due to the flow of the cover stock, however, under the pressure of the mold, the thickness of the covers in the balls heretofore made in this manner has not been uniform, and consequently the resulting balls have not been true.

One purpose of the present invention is attained by molding first one-half of the ball cover onto a plurality of balls and then the other half of the ball cover onto said balls in such a way as illustrated in the accompanying drawings as to obtain covers of uniform thickness throughout.

Another purpose of the invention is attained by making the ball before final molding slightly oversize and finally molding first while cold so as to set up sufficient compression in the ball center to cause the cover material when the mold is subsequently heated to be forced into the usual depressions in the mold surface to form the design sharply on the ball, the cold molding forming no rind or flash on the finished ball which would require trimming, such flash as may occur by flowing of the covering material between the mold parts being easily brushed off.

Of the accompanying drawings,

Figure 1 is an elevation, partly in section, diagrammatically illustrating equipment for forming the cover stock and illustrating the cover stock issuing therefrom;

Figure 2 is an elevation, partly in section, along line 2—2 of Figure 4, showing the assembly of a mold with the ball cores or centers and covering stock for applying the covering stock to one side of the ball centers;

Figure 3 is a similar view illustrating the mold as closed under pressure to mold said covering stock;

Figure 4 is a fragmentary plan view along line 4—4 of Figure 2;

Figure 5 is a view similar to Figure 1 showing the upper half of the mold of Figure 1 being assembled as the lower half with a mold part and cover stock for applying the latter to the other side of the golf ball centers;

Figure 6 is a similar view showing the mold closed under pressure;

Figure 7 is a fragmentary section through a punching device for punching the cover balls out of the web of cover stock by which they are connected; and

Figure 8 is a fragmentary section through a finishing mold in which the covers may be finished on the balls.

Referring to the drawings, the numerals 10 and 11 indicate cooperating rolls in a plastic forming machine through which cover stock S, such as balata which has been worked at the proper consistency to be flowable, may be passed to be formed into sheets 13 having projections or mounds of material 14, 14 formed thereon, roll 10 having cavities 10^a, 10^a therein for forming said mounds. A cutter such as the cutter 15 may be associated with said forming machine to cut the sheets 13 to the desired length.

Golf ball centers 16, 16 which may comprise cores (not shown) on which rubber thread is wound as indicated in Figure 1 are placed in one mold part 17 having cavities 18, 18 therein into which half of each of the centers fit. A sheet 13 of the still plastic balata is placed over said golf ball centers with the mounds 14 centered over the golf ball centers and an upper mold part 19 is assembled therewith. The mold part 19 has cavities 20, 20 therein, the vertical axes of which are centered with respect to cavities 18. The cavities 20 are of sufficient size to form the cover stock to the required thickness about the exposed surfaces of the golf ball centers when the mold is closed under sufficient pressure to cause the stock to flow. The mold part 19 is preferably countersunk as indicated at 19^a about the cavities 20 and spaces 22, 22 are provided into which the excess cover stock may flow, the spaces being vented through the mold as at 22^a, 22^a. The countersink 19^a provides a space between the molds for the flow of stock to spaces 22 and also forms a connecting web of the excess cover stock whereby the covered balls may be handled as a unit.

As the pressure is applied to the mold, the rubber in the mounds 14 is forced progressively downwardly between the ball centers and the

walls of the cavities 20, the excess flowing into the spaces 22 as illustrated in Figure 3. This avoids the formation of thin walls at the tops of the ball centers and effectively squeezes from the cavities 20 any air which may be entrapped therein. Sufficient balata, due to its resistance to flowing, is forced into the interstices of the ball centers effectively to bond the cover stock thereto without setting up stresses such as would distort the ball centers.

After the cover stock has thus been shaped about the ball centers, the mold parts are separated.

As shown in Figure 5, mold part 19 is next assembled with a sheet 13 of plastic cover stock for the exposed sides of the golf ball centers and with a similar mold part 25 which is utilized to apply the cover stock about said exposed halves of the ball centers, the mold parts 19 and 25 being closed under pressure for this purpose and the forming of the stock being as described above.

After the balls have thus been covered, the covered balls, in a connecting web of the covering stock, are removed from the mold.

The covered balls are next removed from the web with which they are connected as by placing them in a punching or other suitable apparatus, Figure 7, comprising upper and lower members 26 and 27 respectively carrying cooperating punching dies 28 and 29, yielding pads 30 being associated with the upper dies, and apertures 31 being arranged through member 27 from the lower dies whereby the punched out balls will be caused to pass out of the apparatus through apertures 31.

The balls are preferably made so that the volume of the balls issuing from the punch will be slightly greater than the desired finished volume. There is no distortion or strain in the balls up to this time. These balls are then placed in a finishing mold (Figure 8) which may comprise upper and lower mold members 32 and 33 arranged in a sleeve 32^a and having registering cavities therein for forming the ball, the surfaces of the cavities being provided with inwardly extending projections for forming dimples or other suitable design in the ball and the meeting faces of the mold preferably being smooth finished for intimate contact. This mold is closed under high pressure about the ball while cold. This causes the ball to be compressed inwardly in all directions without distortion, the compression being taken up by inward yielding of the ball centers which is permitted by the interstices between the thread, and the cover stock being set by the cold does not flow between the mold parts.

Heat is then applied to the ball to shape the cover thereon, the cover stock flowing at the surface of the ball into the spaces between the projections, the compression in the ball aiding to force the cover stock into the mold spaces to fill out the mold cavity and sharply form the design on the ball. After the balls have been thus molded the molds are cooled while maintaining the pressure thereon. The initial over-size formation of the ball is such that the flow of the rubber into the depressions in the mold and the cooling relieves the compression in the ball and the balls are easily removed from the mold. The balls are removed from the molds and are aged, painted, etc., in the customary way and are found to be true and of accurate size and free of inner distorting stresses.

Modifications of the above-described method

may be resorted to without departing from the spirit thereof or the scope of the appended claims.

What is claimed is:—

1. That method of covering ball centers with a plastic material which comprises holding a plurality of balls by one side with the other sides exposed, applying a sheet of the plastic material with mounds of said material thereon over said exposed sides with said mounds centered with the ball centers, molding said plastic material about said exposed sides so as to cause the excess material in said mounds to flow downwardly and outwardly about said exposed sides, and so as to form a web of said material connecting said ball centers, holding the ball centers by the sides thereof thus covered, applying a similar sheet of plastic material over and molding it in a similar way about the uncovered sides of said ball centers, punching the covered balls from said sheets, said balls being so formed of a volume slightly greater than the desired finished volume, cold molding said balls under pressure in a mold of the desired finished diameter with recesses therein for forming the desired design on the ball to compress the ball, applying heat to said ball while said pressure is maintained whereby the plastic material will flow into said recesses to form said design, and cooling the balls while under pressure in the mold.

2. That method of covering ball centers with a plastic material which comprises holding a plurality of balls by one side with the other sides exposed, applying a sheet of the plastic material with mounds of said material thereon over said exposed sides with said mounds centered with the ball centers, molding said plastic material about said exposed sides so as to cause the excess material in said mounds to flow downwardly and outwardly about said exposed sides, and so as to form a web of said material connecting said ball centers, holding the ball centers by the sides thereof thus covered, applying a similar sheet of plastic material over and molding it in a similar way about the uncovered sides of said ball centers, and punching the covered balls from said sheets.

3. That method of covering ball centers with a plastic material which comprises holding a plurality of balls by one side with the other sides exposed, applying a sheet of the plastic material with mounds centered with the ball centers, molding said plastic material about said exposed sides so as to cause the excess material in said mounds to flow downwardly and outwardly about said exposed sides, holding the ball centers by the sides thereof thus covered, and applying a similar sheet of plastic material over and molding it in a similar way about the uncovered sides of said ball centers.

4. That method for covering balls comprising providing a mold part with cavities for confining one half of each of a plurality of balls arranged in spaced relation, forming sheets of plastic covering stock with correspondingly spaced projections thereon to provide an excess of covering stock, applying said sheets over said ball centers with said projections aligned with the respective ball centers, applying a second mold part with correspondingly spaced cavities therein for forming one-half of the covering of the desired thickness for each ball over said sheet with said cavities aligned with said balls and said projections, applying pressure to said second mold part whereby the excess of said stock in said projections is progressively forced downwardly about

the ball centers and between the mold parts until said second mold part seats upon said first mold part, said mold parts being adapted to define a space about said cavities when seated, said second mold part having spaces therein for receiving the excess of stock squeezed between said mold parts, removing the first mold part to expose the uncovered halves of the ball centers, similarly applying a similarly formed sheet of covering stock over said uncovered halves of said ball centers, similarly applying and pressing a third mold part similar to said second mold part onto said last-named sheet of stock into seating relation with said second mold part, removing the covered balls from the mold parts, and removing the covered balls from the web of stock connecting them.

5. That method for covering balls comprising providing a mold part with cavities for confining one half of each of a plurality of balls arranged in spaced relation, forming sheets of plastic covering stock with correspondingly spaced projections thereon to provide an excess of covering stock, applying said sheets over said ball centers with said projections aligned with the respective ball centers, applying a second mold part with correspondingly spaced cavities therein for forming one-half of the covering of the desired thickness for each ball over said sheet with said cavities aligned with said balls and said projections, applying pressure to said second mold part whereby the excess of said stock in said projections is progressively forced downwardly about the ball centers and between the mold parts until said second mold part seats upon said first mold part, said mold parts being adapted to define a space about said cavities when seated, said second mold part having spaces therein for receiving the excess of stock squeezed between said mold parts, removing the first mold part to expose the uncovered halves of the ball centers, similarly applying a similarly formed sheet of covering stock over said uncovered halves of said ball centers, similarly applying and pressing a third mold part similar to said second mold part onto said last-named sheet of stock into seating relation with said second mold part, removing the covered balls from the mold parts, removing the covered balls from the web of stock connecting them, and molding the covered balls to final shape.

6. That method for covering balls comprising providing a mold part with cavities for confining one half of each of a plurality of balls arranged

in spaced relation, forming sheets of plastic covering stock with correspondingly spaced projections thereon to provide an excess of covering stock, applying said sheets over said ball centers with said projections aligned with the respective ball centers, applying a second mold part with correspondingly spaced cavities therein for forming one-half of the covering of the desired thickness for each ball over said sheet with said cavities aligned with said balls and said projections, applying pressure to said second mold part whereby the excess of said stock in said projections is progressively forced downwardly about the ball centers and between the mold parts until said second mold part seats upon said first mold part, removing the first mold part to expose the uncovered halves of the ball centers, similarly applying a similarly formed sheet of covering stock over said uncovered halves of said ball centers, similarly applying and pressing a third mold part similar to said second mold part onto said last-named sheet of stock into seating relation with said second mold part, removing the covered balls from the mold parts, and removing the covered balls from the web of stock connecting them.

7. That method for covering golf balls which comprises so applying a plastic covering to a ball center that the volume of the ball is slightly greater than the final volume and the center will be substantially free of compressive stresses, cold molding the ball under pressure in a mold of the required final size and shape so that the covering material will not exude from the mold and so that the ball center will be under compression in the cover, and then heating the ball in the mold so that the plastic covering will flow under the expansive force of the compressed ball center to fill out the mold.

8. That method for covering golf balls which comprises so applying a plastic covering to a ball center that the volume of the ball is slightly greater than the final volume and the center will be substantially uncompressed, cold molding the ball under pressure in a mold of the required final size and shape so that the covering material will not exude from the mold and so that the ball center will be under compression in the cover, then heating the ball in the mold so that the plastic covering will flow under the expansive force of the compressed ball center to fill out the mold, and finally cooling the ball while in said mold under pressure.

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