Jan. 22, 1963 E. C. REED 3,074,144

TENNIS BALL COVER CLOTH

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FIG. 1

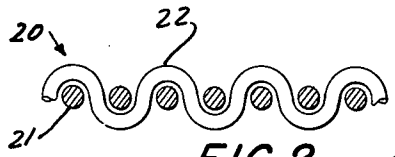


FIG. 2

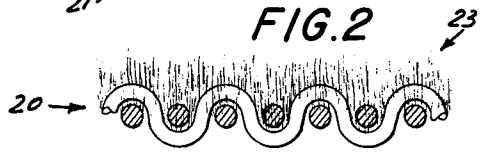


FIG. 3

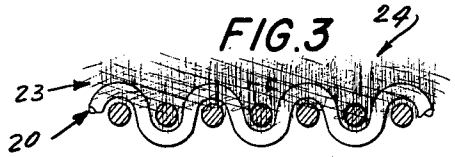


FIG. 4

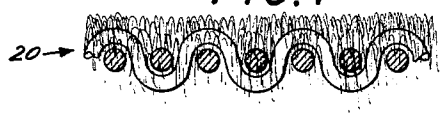
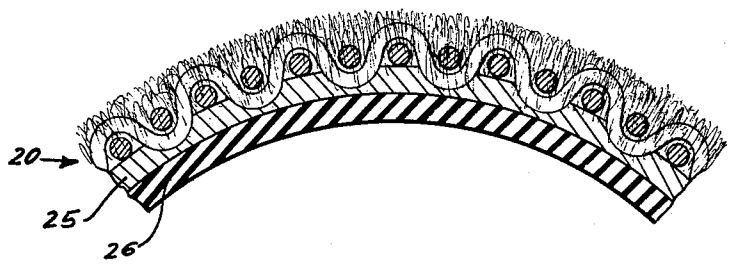


FIG. 5



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FIG. 6

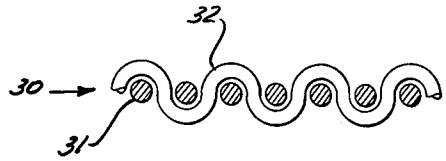


FIG. 7

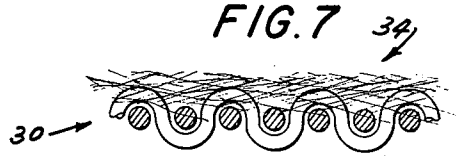
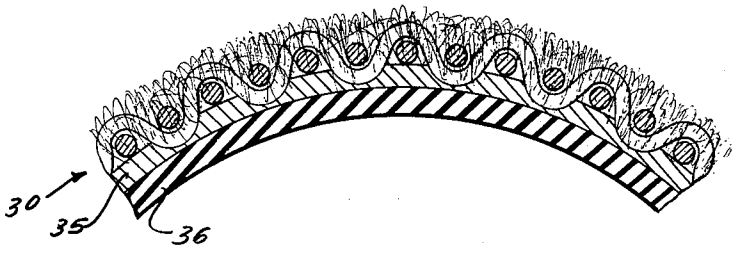


FIG. 8



FIG. 9



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FIG. 10

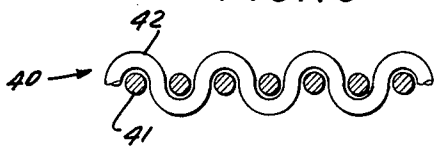


FIG. 11

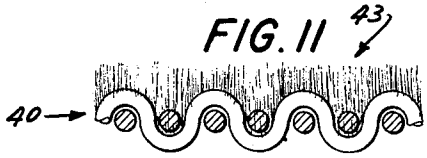
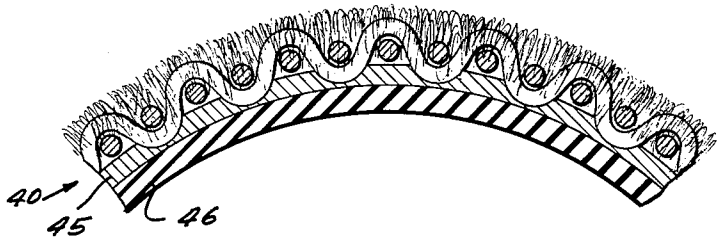


FIG. 12



FIG. 13



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United States Patent Office 3,074,144 Patented Jan. 22, 1963

3,074,144

TENNIS BALL COVER CLOTH

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Filed May 31, 1960, Ser. No. 32,853
6 Claims. (Cl. 28—79)

This invention relates generally to tennis ball covering cloth, and more particularly to a method and means for manufacturing tennis ball covering cloth.

A tennis ball consists generally of a spherical rubber core covered with a cloth having a felted surface. The surface of the cloth offers wind resistance in flight, and frictional contact with a tennis racket in the hands of a contestant, so that the path of the ball can be controlled. Without this control the game cannot be played satisfactorily.

The practical value of a tennis ball cover depends upon its ability to retain its surface as long as possible under conditions of play. Tennis ball cover cloth has been traditionally a woven fabric, largely composed of wool or wool and synthetic fibers. At the present time a tennis ball cover cloth is produced by weaving a fabric of wool or wool and other fibers, natural or synthetic, and raising a nap on the surface by some mechanical means, and later felting down this nap to produce the desired surface. In play, when this surface is worn away, the ball cannot be controlled and it is considered worn out.

My invention consists of the preparation of a fabric which has the necessary characteristics so that it will be firm enough to give the cover stability during the manufacture of the ball, with a smooth inside surface to allow good adhesion to the rubber core of the ball, and to be of such quality that it will accept the application or formation of a proper playing surface applied to it.

Such a cover is illustrated in the accompanying drawings in which:

FIGS. 1 through 4 show transverse cross sections of the cloth in various steps in its preparation in accordance with one form of my invention;

FIG. 5 shows a fragmentary enlarged section of a tennis ball covered with a cloth prepared in accordance with the preferred embodiment of my invention which has been illustrated in FIGS. 1 to 4;

FIGS. 6 through 8 show transverse cross sections of the cloth prepared in accordance with an alternate form of my invention;

FIG. 9 shows a fragmentary enlarged section of a tennis ball covered with a cloth prepared in accordance with the alternate form of my invention which has been illustrated in FIGS. 6 to 8;

FIGS. 10 through 12 show still another embodiment of my invention wherein transverse cross sections of the cloth prepared in accordance with this embodiment are illustrated; and

FIG. 13 shows a fragmentary enlarged section of a tennis ball covered with a cloth prepared in accordance with the embodiment of my invention illustrated in FIGS. 10 through 12.

FIGS. 1 through 13 are to a somewhat distorted and enlarged scale.

It is to be understood that the drawings are merely illustrative of one type of weave which has proven satisfactory, and that the invention is not limited to the type of weave shown.

Considering the first form of the invention, that shown in FIGS. 1 through 5. The fabric is designated generally by the numeral 20, the warp yarns by the numeral 21, and the filler yarns are designated by the numeral 22. The

rubber core of the ball has been designated by the numeral 26 and an adhesive, such as glue or cement, which is used to secure the covering fabric to the casing is designated by the numeral 25.

To prepare the fabric, which is illustrated in FIGS. 1 through 5, a base fabric 20 is selected which when woven will be firm enough to give the cover stability and which has a smooth enough surface to allow good adhesion to the rubber core of the ball. The fabric selected must also accept the application or formation of proper playing surfaces. I propose to use a base fabric consisting of warp and filler yarns.

Although this invention is not limited to a specific type of fabric, successful results have been obtained utilizing as base fabric wool; wool and synthetics and cotton; wool and cotton; wool and synthetics; cotton and synthetics; or all synthetics.

After the base fabric has been selected the surface is prepared by raising fibers from the fabric by any mechanical means known to the art such as by napping so that the fibers which are designated generally by the numeral 23 in FIG. 2 extend from the fabric on one side. The next step is the preparation of a batt of fiber which is composite of wool and other fibers, all wool or some other fiber or fibers to meet individual specifications. The batt of fiber designated generally by the numeral 24 in FIG. 3 is combined with the base 20 by needling using means well known in the art. FIG. 3 illustrates the step in the procedure immediately preceding the needling operation, and FIG. 4 illustrates the condition of the fabric after the needling operation.

After needling, the composite fabric can be felted as for example by the usual woolen finishing procedures such as by fulling, if it is desirable. Successful results have been obtained without the fulling or felting step, however, whether or not such step is utilized in the preparation of the tennis ball cover cloth according to my invention depends upon the desired finish, and therefore the step will be utilized or not utilized depending upon the type of finish desired. Also the fabric may be fulled before the napping and/or needling process or may be partially fulled before and partially after the napping and/or needling process.

The back portion of the fabric can then be sheared if desired so that it will adhere more readily to the rubber ball core. This step is not necessary for success in practicing this invention, however, it may be found desirable.

The fabric 20 as shown in FIG. 5 is then secured to the core 26 of the ball by means of the glue or cement indicated by the numeral 25.

An alternate or second form of this invention is illustrated in FIGS. 6 through 9 in which the fabric is designated generally by the numeral 30, the warp yarns by the numeral 31 and the filler yarns by the numeral 32.

In this embodiment the base fabric 30 is selected in the same manner as was the base fabric 20 in the first form of the invention. A batt of fiber is prepared as in the first form of the invention, however, in this embodiment the batt of fiber is applied to the base fabric as shown in FIG. 7 where it is designated generally by the numeral 34 and combined with the base 30 by needling without the intervening napping step. FIG. 7 illustrates the batt prior to needling. FIG. 8 illustrates the batt and fabric after needling.

Just as in the first form of the invention, the fabric can be felted or fulled if desired and the back of it can be sheared if desired.

FIG. 9 illustrates the cloth prepared in accordance with the second embodiment of my invention glued by means of glue 35 to rubber core 36 of the ball.

Thus, it is seen that the second form of this invention

illustrated in FIGS. 6 through 9 is identical to the first form of the invention with the exception that herein the batt of fiber **34** is applied to the base fabric without napping.

A third form of this invention is shown in FIGS. 10 through 13 in which the base fabric is designated by the numeral **40**, the warp yarns are designated by the numeral **41** and the filler yarns by the numeral **42**. In this form of the invention fabric **40** is selected in the same manner as the base fabrics are selected in the first two embodiments of the invention. The base fabric after selection is subject to a napping process to develop the nap **43** shown in FIG. 11, and then subjected to a needling process to arrive at a fabric such as illustrated in FIG. 12.

This embodiment differs from the first embodiment in that there is no utilization of a batt of fiber and the base fabric is subjected to the needling procedure without the addition of this fiber batt. Just as in the first and second forms of the invention, the fabric can be felted or fulled if desired and the back of it can be sheared, if desired. FIG. 13 illustrates a cloth prepared in accordance with the third form of this invention glued or cemented by means of glue **45** to the rubber core **46** of a tennis ball.

In order to accurately describe the end product and the resulting "hold" of the needled fiber where it is engaged by the base fabric, the term "locked in" can be used indicating a force fit as distinguished from engagement due to cementing or resulting from the fiber being part of the base fabric.

It has been found that the tennis ball cover cloth prepared in accordance with the teachings of this invention can readily be applied to the surface of the rubber core of a tennis ball and has a wearing surface which maintains the characteristics desirable for play over long periods of time.

Thus, among others, the several objects in the invention as specifically aforenoted, are achieved. Obviously, numerous changes in construction and rearrangement of parts may be resorted to without departing from the spirit of the invention as defined by the claims.

I claim:

1. A tennis ball covering cloth comprising a single ply of woven base fabric whose warp and filler yarns are selected from the group consisting of: wool yarns; synthetic yarns; wool, synthetic and cotton yarns; wool and cotton yarns; and synthetic and cotton yarns; said single ply fabric being tightly woven and providing thereby on one side of the fabric a smooth closely woven surface which is adapted to adhere closely to the rubber core of the tennis ball and constitutes the inside surface of said covering cloth on the ball, the other surface of said single ply woven fabric being napped, needled and thereafter fulled and firmly matted, said firmly matted outer surface of said single ply woven fabric being resistant to wear and having a dense nap.

2. A tennis ball covering cloth as claimed in claim 1 wherein said single ply is formed of wool.

3. A tennis ball covering cloth as claimed in claim 1 wherein said single ply is formed of synthetic.

4. A tennis ball covering cloth as claimed in claim 1 wherein said single ply is formed of synthetic and cotton.

5. A tennis ball covering cloth as claimed in claim 1 wherein said single ply is formed of wool and cotton.

6. A tennis ball covering cloth as claimed in claim 1 wherein said single ply is formed of wool, synthetic and cotton.

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