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E. E. HORNER

2,018,559

TENNIS BALL

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Fig. 1.

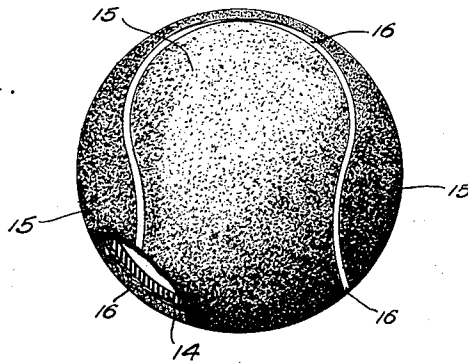


Fig. 2.

Fig. 3.

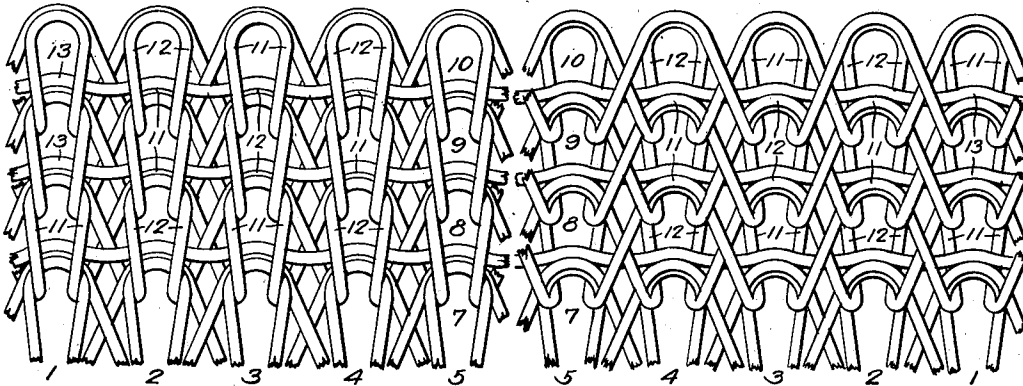


Fig. 4.

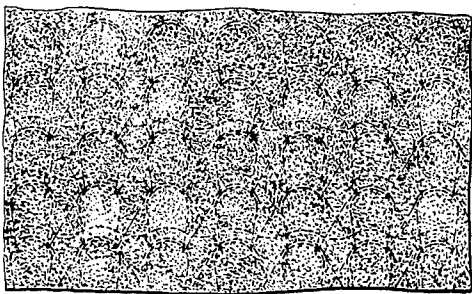
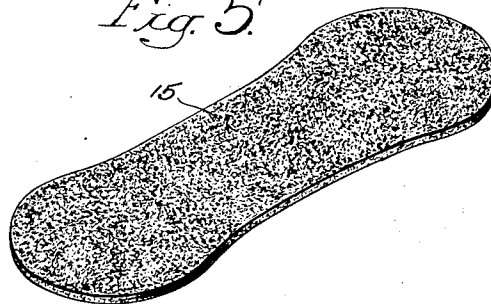


Fig. 5.



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TENNIS BALL

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3 Claims. (Cl. 273-61)

This invention relates to play balls, and particularly to the provision of an improved cover for a tennis ball, with a view of increasing the useful playing life of the ball in regular games on grass, clay, macadam, or concrete courts.

The life of a tennis ball, for regular game play, is determined by the ability of the ball to retain roughness of surface against the abrasive action produced by contact with court and racket, for the reason that, as the ball surface becomes worn and smooth the ball loses its effectiveness of control proportionately.

Heretofore the covers of tennis balls have been composed of woven fabric, wherein warp threads are disposed substantially parallel to each other and are crossed by and interwoven with weft or filling threads which likewise are disposed substantially parallel to each other, producing a fabric of relatively rigid construction.

The woven fabric is brushed or otherwise treated to raise a nap thereon, for providing the desired rough surface on the tennis ball, but, due to the nature of the woven fabric, the extent to which the fabric may be napped is quite limited, thus, when the ball is put into play, the roughened surface formed by the nap wears off, down to the base fabric, producing a smooth surface on the ball and making it unfit for regular play.

Another disadvantage attending the use of the rigid woven fabric resides in the inability of such fabric to stretch uniformly and under even tension over the rubber ball forming the foundation of the tennis ball.

The present invention concerns a cover composed of knitted fabric which comprises main body yarns or threads formed into interlooped courses and wales of stitches and supplementary threads, inlaid in or intermeshing with such stitches, which provides a fabric capable of being stretched, or of yielding uniformly, in all directions, whereby the cover will snugly fit and adhere to the rubber ball at all points on the surface thereof.

The knitted fabric is preferably composed, throughout, of woolen yarns and is treated under what is known in the woolen art as a fulling process, whereby the wool fibers of the main and supplementary yarns are caused to intermesh or become entangled with each other in each stitch and with the fibers of the yarns in the stitches of adjacent courses and wales, such interentangling of the fibers extending completely through and over the entire area of the fabric and providing a cover which will present a roughened

surface until the fabric is practically worn through to the underlying rubber ball.

The said interentangling of the wool fibers, together with the particular form of stitch employed, makes the knitted fabric cover substantially ravel-proof, whereby fraying of the cover at small cuts, produced in the cover by contact with small sharp stones, etc., on the court, is practically eliminated, whereas in the case of the woven fabric cover small cuts produced therein will permit the fabric to ravel or fray at and around the cut, thus making the ball unfit for regular play.

Comparative tests between balls having the conventional woven covers and balls having knitted fabric covers, made and applied in accordance with the principles of the present invention, with all other conditions being equal, have proven that the ball made according to the present invention is capable of a playing life substantially twice that of the ball having the woven cover, as a result of the above noted differences of structure in the covers of the two balls.

In the accompanying drawing:

Fig. 1 illustrates an outside view partly broken away, a ball made in accordance with the principles of the present invention;

Figs. 2 and 3, respectively, diagrammatically illustrate the opposite faces of the knitted fabric of which the cover is composed, as it comes from the knitting machine;

Fig. 4 diagrammatically illustrates a piece of fabric after undergoing the fulling process; and

Fig. 5 is a perspective view of one of the cover units of which two are used to completely cover the ball, as shown in Fig. 1;

As shown in Figs. 2 and 3, the knitted fabric comprises substantially parallel stitch wales 1, 2, 3, 4, 5, etc. produced by the knitting of successive stitch courses 7, 8, 9, and 10, etc., wherein alternate stitches of each course, such as those in wales 1, 3, 5, etc., are formed of regular stitches composed of one thread 11 while the stitches of the intermediate wales 2, 4, etc. in each course are formed of a second thread 12, the thread forming the regular stitch in each of said wales being formed into tuck stitches in the adjacent wales and superimposed upon the regular stitches in said wales, as clearly illustrated in Figs. 2 and 3.

Inlaid within the stitches of the fabric is a plurality of supplementary threads 13 which extend across the wales 1, 2, 3, 4, 5, etc. in each course of stitches.

The provision of a regular and a superimposed tuck stitch in each course at each wale provides a ravel-resisting construction which is further accentuated, during the fulling process, by the said interentangling of the fibers of the threads 11, 12 and 13 throughout the fabric.

After fulling, units similar to that shown in Fig. 5 are cut from the fabric illustrated in Fig. 4. Two of the units 15 are needed to produce a complete cover for the ball, as in Fig. 1. The two units are then coated on one side with a suitable adhesive substance, preferably composed or including a high percentage of rubber, after which the foundation rubber ball 14 and the cover units 15, 15 are assembled in a suitable mold, with a filling substance 16, composed of rubber or rubber compound, in the joints between the adjacent edges of the two cover units 15. The assembly is then subjected to a suitable vulcanizing process in which the units 15 are integrally united to the underlying rubber ball 14 and to each other along said edges through and by the filled seams 16.

Due to the ability of the knitted fabric to yield in all directions under substantially equal tension at all points, the units 15 are readily changed from the flat form shown in Fig. 5 to the spherical form of the underlying rubber foundation ball 14, whereby the cover snugly conforms to and maintains intimate contact with the surface of the rubber ball at all points, thereby providing a finished ball having substantially perfect balance.

While a particular form of stitch and thread assembly is shown in Figs. 2 and 3, it will be quite obvious that other forms of stitches, or

other methods of interlooping the threads to produce the cover fabric may be resorted to without departing from the essential features of the invention, and while the claims refer to a knitted fabric, the term knitted is used illustratively to distinguish from a woven fabric and is intended to be of a scope broad enough to include netted and similar fabrics, which for the purposes of the invention may be a full equivalent for a knitted fabric of the type shown in Figs. 2 and 3.

I claim:

1. The combination of a rubber ball, a cover composed of two substantially similarly shaped half sections of knitted felted fabric stretched over the spherical surface of the ball in opposed ball-enveloping relation to each other to conform to the shape of said surface, adhesive means for permanently securing said half sections together, and to the spherical surface of the ball.

2. The combination of a rubber ball, a cover composed of two substantially similarly shaped half sections of knitted felted fabric stretched over the spherical surface of the ball in opposed ball-enveloping relation to each other to conform to the shape of said surface, an adhesive rubber substance for permanently securing said half sections together, and to the spherical surface of the ball by vulcanization of said rubber substance.

3. A spherical playing ball consisting of a rubber body and a multi-piece cover formed of a plurality of blanks cut from a plane sheet of knitted felt shaped upon and secured edge-to-edge in vulcanized union upon the ball surface.

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