This invention relates to bowling balls and a method of providing relocated finger holes therein.

It frequently becomes desirable to alter the dimensional span between the finger holes in bowling balls and the like in order to provide a more comfortable and/or functional means for grasping or retaining the ball in the bowler's hand.

One of the conventional methods of relocating finger holes involves filling one or more of the original finger holes with suitable plastic material such as vulcanized rubber and redrilling the new finger hole. Generally, the difference in location between the original and relocated hole is only a fraction of an inch; therefore, a portion of the substantially cylindrical surface that constitutes the boundary of the relocated finger hole will be defined by the material (e.g., vulcanized rubber) initially employed in the manufacture of the ball, hereinafter referred to as the "initial drilling material," and another portion will be defined by the filler material. A distinct line of cleavage marks the junction of the initial bowling ball material with the filler material and provides a constant source of irritation to the fingers of the bowler. Furthermore, initial bowling ball material such as vulcanized rubber does not easily fuse, or form a molecular bond, with the filler material.

In order to obviate this source of irritation, it has been necessary to mill out an area that is large enough to contain or circumscribe the original finger holes as well as the proposed confines of the relocated holes. The enlarged cavity formed by the removal of the milled out material may then be filled by inserting a preformed plug under pressure. The exterior or exposed surface of the plug is then shaped so that it substantially conforms to the spherical contour of the ball; the relocated finger holes are then drilled into the plug. This procedure requires the use of equipment such as presses, as well as sanding and milling machines, that are ordinarily not used or found in ball-drilling establishments, and requires the removal of a relatively large segment of the ball which tends to cause a weight imbalance. Furthermore, the pressure employed in inserting the plug into the cavity frequently fractures the ball.

I have developed an improved method of relocating one or more finger holes that simplifies conventional procedures; that does not destroy the balance of the ball or alter its normal spherical contour; that produces relocated finger holes that are permanent, smooth and free from unbroken surfaces or cleavage lines, etc.

Other advantages of my invention will appear from the following description and claims in conjunction with the accompanying drawings, which illustrate by way of an example, an embodiment of the invention.

In accordance with the present invention, one or more relocated finger holes may be bored into the ball in proximity to the corresponding original holes. A preformed, tubular liner having a predetermined inside finger diameter is inserted into the relocated hole so that the substantially cylindrical interior of the liner defines the relocated finger hole. The tube may be made of plastic such as vulcanized rubber, Lucite, etc., or any other material having a predetermined, smooth inside surface adapted to receive a finger. If desired, the bottom end of the liner may be sealed. The corresponding original finger holes are then filled with moldable material that is capable of assuming properties that are similar to the initial bowling ball material. In cases wherein a relocated finger hole intersects a portion of the original corresponding finger hole, the void formed by the remaining portion of the original hole (defined by a portion of the exterior surface of the liner and the remaining portion of the original hole) is filled.

In the drawings:

Figure 1 is a plan view of a bowling ball and shows the finger holes that are used in securely grasping the ball. The dotted concentric circles are shown merely to indicate the intended or proposed location of two of the finger holes;

Figure 2 is a fragmentary vertical section view taken on the line A—A of Figure 1 and shows an original finger hole;

Figure 3 is a fragmentary section view taken on the line A—A of Figure 1 after the relocated hole defined by the outer dotted concentric circle on line A—A is drilled;

Figure 4 is similar to Figure 3, however, the liner is shown seated in the relocated hole and the remaining portion of the original hole is shown after the insertion of filler material; and

Figure 5 is a fragmentary plan view of Figure 4. A tubular liner 5 is selected having a predetermined, smooth inner surface 11 adapted to receive the user's finger. The proposed location of the relocated hole may then be marked in proximity to the corresponding original hole 3. The dotted concentric circles in Figure 1 mark the proposed location of the interior and exterior surfaces 11 and 12, respectively, of the liner, and Figure 2 shows the original finger hole 3, as viewed on the line A—A of Figure 1, prior to the drilling of the corresponding relocated hole 6.

The relocated hole 6 may then be drilled as indicated by the confines of the outer, dotted concentric circle. The liner is then inserted into the relocated hole. In the particular embodiment herein described, a part of the liner will extend into the portion of the original hole that is within the boundaries of the relocated hole. In Figure 3, the intersection of the original and relocated holes is shown at 8. If desired, the lower end of the liner may be sealed as shown at 10 in Figures 4 and 5.

Moldable filler material 9 is then inserted into the void between the exterior surface 12 of the liner and the remaining surface 7 of the original hole. The outer, exposed extremities of the liner and/or filler material are then shaped (i.e., by filing and/or sanding said exposed surfaces) so as to conform to the spherical contour of the ball.

This operation may be repeated in relocating finger hole 2 or another finger hole.

Example

An ordinary vulcanized rubber bowling ball with an original hole 1 inch in diameter was placed on the bed of a bowling ball drill press and centered to position so that the center of the relocated hole was ½ inch from the center of the original hole. A 1/4 inch end miller was employed to excavate this position to a depth of 2 1/2 inches. A hollow Lucite tube having an outside diameter of 1/4 inches, an inside diameter of 1 inch, and an overall length of 2 1/4 inches was inserted under pressure into the relocated hole. The cavity or void outside the tube was filled with a doughy mixture containing 2 parts, by weight, of polymeric methyl methacrylate, and 1 part, by
weight, of monomeric methyl methacrylate (a promoter
and benzoyl peroxide catalyst were added so that the
resinous material hardened by an exothermic reaction at
room temperature). Upon hardening, the exposed sur-
face of the liner and filler was filed and sanded to con-
form to the contour of the ball.

Although the present invention has been described in
conjunction with preferred embodiments, it is to be under-
stood that modifications and variations may be resorted
to without departing from the spirit and scope of the in-
vention, as those skilled in the art will readily under-
stand. Such variations and modifications are considered
to be within the purview and scope of the invention and
the appended claims.

I claim:

1. A method of providing a bowling ball having an
original finger hole therein with a substantially cylin-
drical relocated finger hole defined by forming means
comprising, sequentially, forming a relocated finger hole that
intersects an original finger hole, said relocated hole being
capable of receiving permanent tubular forming means,
inserting permanent tubular forming means having a
smooth inside surface into said relocated hole, and filling
the remaining portion of the original hole with filler ma-
terial having properties that are analogous to the initial
bowling ball material, said forming means serving to ex-
clude filler material from the relocated hole and there-
after providing a tubular protective liner for the relocated
finger hole.

2. A method of providing a bowling ball having an
original finger hole therein with a substantially cylin-
drical relocated finger hole defined by forming means com-
prising, sequentially, forming a relocated finger hole that
intersects an original finger hole, said relocated hole being
capable of receiving permanent tubular forming means,
inserting into said relocated hole a permanent tubular
forming means having a smooth inside surface and being
substantially coextensive with the desired cylindrical
boundaries of the relocated hole, and filling all of the re-
mainning portion of the original hole which extends outside
the periphery of said forming means with filler material
having properties that are substantially analogous to the
initial bowling ball material, said forming means serving
to exclude filler material from the desired relocated hole
and permitting the forming of a substantially cylindrical
relocated finger hole.

3. The method of claim 1 wherein the filler material is
acrylic resin.

4. The method of claim 2 wherein the filler material is
acrylic resin.

References Cited in the file of this patent

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