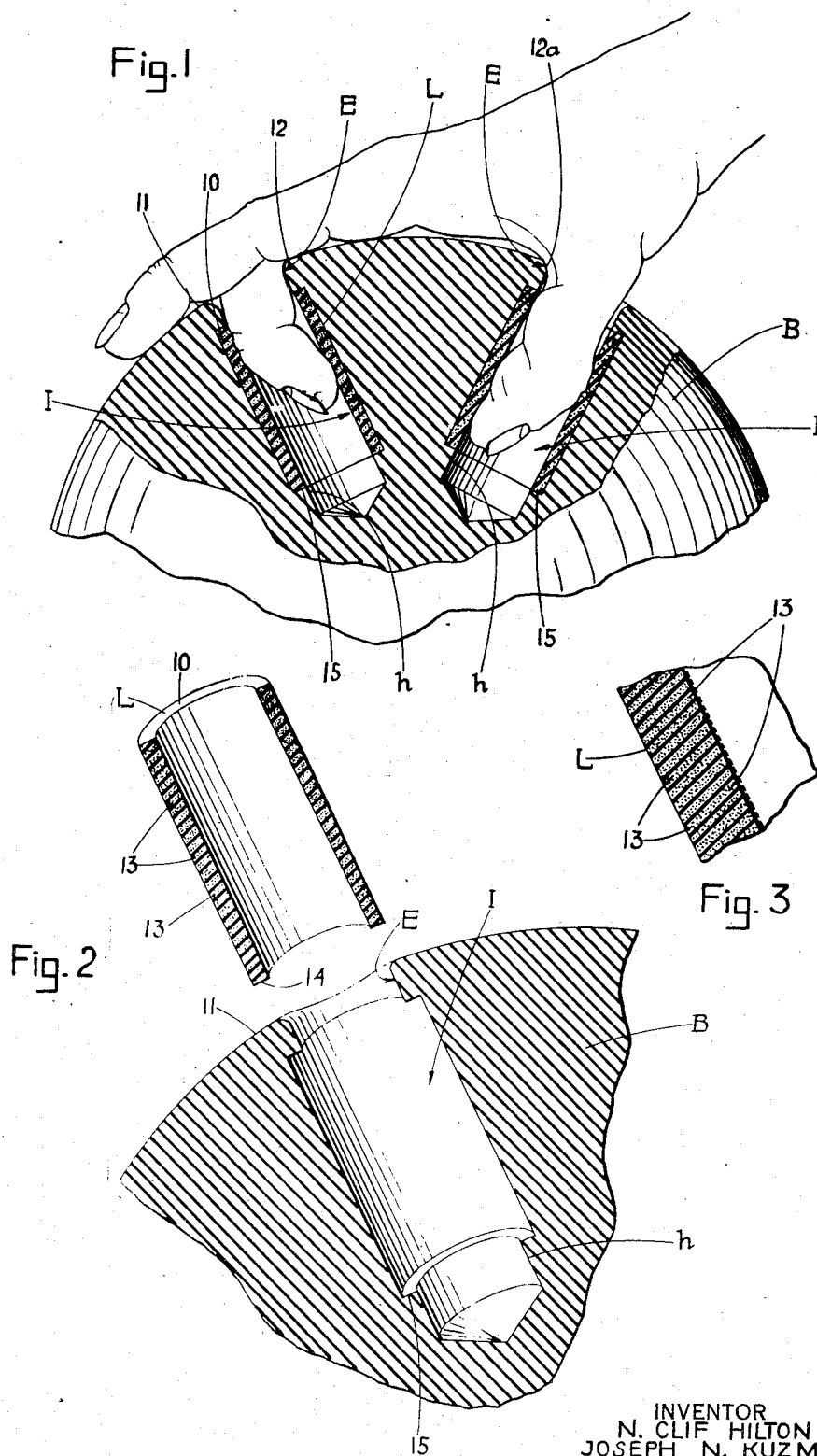


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BOWLING BALL FINGER GRIP

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BOWLING BALL FINGER GRIP

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This invention relates to a bowling or tenpin ball and more particularly to an improved finger gripping means for the finger holes thereof.

The usual bowling or tenpin ball is provided with two or three holes, one hole for the thumb and the other one or two holes for other fingers of the hand. These holes are provided so that the ball while in motion in the player's hand may be controlled by the player until released at the proper time for delivery. These holes are all drilled, whether radially or convergently to a point above the ball center, to provide a sufficient angle so that the player's fingers can grip, retain and control the ball. Inasmuch as the composition material of the ball is either hard rubber or synthetic resin, the wall surfaces of these finger grip holes are very smooth, with the disadvantage that the fingers are apt to slip out prematurely unless due care is taken, for example, through extreme muscular effort. The smooth surface, however, is a necessity, inasmuch as any undue friction in or at the finger grip holes produces an abrasion and soreness of the thumb and fingers which limits the time or number of games that may be played and which is injurious.

In order to eliminate this tendency for the ball to slip out of the player's hands prematurely, chalk and other sticky materials have been used, but only with partial success. It has also been suggested to roughen the wall surfaces of the holes, or to provide inserted hard liners having rough areas, or to use liners made of cork, soft rubber and other resilient materials, all to produce frictional gripping means. The difficulty, however, with all of these suggestions is that the finger contacting or engaging surfaces are rendered rough instead of being smooth, and, therefore, while they provide the required friction for gripping purposes, they present the undesired friction that gives rise to abrasion and soreness of the fingers.

We have found that an effective solution of the problem resides in the provision of a wall structure for the holes in which effective finger gripping is made possible while friction is either minimized or substantially entirely eliminated. The ideal structure is a wall surface in these holes which permits of proper gripping engagement with normal muscular effort and which presents a completely smooth and frictionless passage to the withdrawing fingers when the ball is released. This solution we accomplish by forming the wall structure of the holes so that in the entrant end region thereof, which is a re-

gion not required for gripping purposes, the surface is left hard and smooth and frictionless, while in the inner region thereof, which is the region required for gripping, a surface is provided which is deformable for producing a gripping means. With this construction, friction to the withdrawing fingers is effectively minimized. To approximate the ideal condition, we prefer to substantially entirely eliminate friction surfaces, and to this end the deformable surface is made to comprise a compressible and yieldable member, deformation of which by finger pressure engagement provides the desired gripping, and release of which from the gripping finger pressure offers a lubricated and hence a smooth and frictionless face for the withdrawing fingers. By this means, effective finger holding or gripping is made available and possible without friction, and the undesired friction is obviated. The provision of a bowling ball with an improved finger grip means of this nature is the desideratum of our present invention.

To the accomplishment of the foregoing and such other objects as may hereinafter appear, the invention further consists in the structural combinations hereinafter sought to be defined in the claims and described more in detail hereinbelow in connection with the appended drawing, in which:

Fig. 1 is a view of a bowling ball partly shown in section and disclosing the improved finger hole gripping means of our present invention and showing the manner of its use;

Fig. 2 is an enlarged view of the same taken in cross-section and showing parts detached for purposes of clarity and for purposes of illustrating the manner of assembling the same; and

Fig. 3 is a fragmentary view taken on a still further enlarged scale, showing in cross-section the character of one of the parts thereof.

Referring now more in detail to the drawing, the bowling or tenpin ball embodying our present invention comprises the usual bowling ball B, customarily made of hard rubber or a synthetic resin, and provided with the bored or drilled finger holes *h*, *h*, two or three in number, arranged convergently as shown to present a sufficient angle so that the player's fingers may grip, retain and control the ball.

To accomplish the object of the invention, one or more of the holes *h*, *h* is provided with a wall structure so designed that effective finger gripping is made possible while friction is either minimized or substantially entirely eliminated. A dominant factor in accomplishing this object

resides in subdividing the wall structure of the hole *h* into its entrant end region *E*, which is a region not required for gripping purposes, and its inner region *I*, which is the region that is required for gripping engagement, and of building these two regions consonant with the principle of this subdivision. A second important factor resides in so building the wall structure at the inner region *I* that suitable gripping areas are afforded when finger pressure is exerted and a smooth and frictionless surface is obtained when finger pressure is released.

In thus subdividing the wall structure of the hole *h*, the entrant end region *E* of the hole is left unmodified so that this region presents the hard, smooth and frictionless surface of the ball body itself. The inner region *I* is counter-sunk as best shown in Fig. 2 of the drawing, to receive an inserted cylindrically shaped compressible and resilient liner *L*, the inner cylindrical surface of which is flush with the surface of the wall region *E*, as most clearly shown in Fig. 1 of the drawing. The top end 10 of the liner may extend any desired distance below the spherical surface 11 of the ball, the amount of this distance depending upon the desired height of the unmodified wall region *E*. As clearly shown in Fig. 1 of the drawing, only the foreparts of the fingers extending into the inner region of the hole are needed for gripping engagement; and hence the resilient liner *L* is localized at this inner region *I* of the hole. Being thus localized, the area of the liner which moves past withdrawing fingers is reduced to a minimum. Also as clearly shown in Fig. 1, such parts as the crook of the middle finger which engages the entrant end of one of the holes at 12, and the base and fleshy portion of the thumb which engages the entrant end of an adjacent hole at 12^a, and which finger parts being under some tension are in close and taut engagement with these ball parts, should under no conditions contact any but smooth and frictionless surfaces; and, therefore, the provision at the entrant end of the holes of the wall portions *E*, which are hard, smooth and frictionless, free these finger parts from all abrasive contact or rubbing. Also, when the ball is released and the fingers are withdrawn, these hard and smooth wall surfaces *E* present a frictionless moving surface to the withdrawing fingers.

The compressible and resilient liner *L* is preferably made of soft rubber. The body thereof will, therefore, be deformable by finger pressure engagement to provide gripping areas wherever finger engagement takes place as clearly illustrated in Fig. 1 of the drawing. In this way, an effective gripping means is provided. To substantially completely eliminate friction to the withdrawing fingers when pressure is released, the resilient liner *L* has a lubricant incorporated therein which exudes at the exposed liner face and renders the same smooth and frictionless. The lubricant is preferably so incorporated in the liner as to render the same self-lubricating. We have found that certain waxes, particularly paraffin wax, when incorporated into the soft rubber, has the faculty of blooming out or exuding to the surface in a microscopic layer. This layer does not increase in thickness unless it is removed from use or some other means; and as soon as the layer is removed, another layer forms which again is inert until it is removed. We have found that this phenomenon produces the right amount of lubrication for the desired slippage, which permits the player's fingers to be with-

drawn from the ball without friction or abrading action taking place. The waxy layer affords the desired amount of lubrication for slippage to take place, entirely precluding the tendency for irritation to the fingers due to the natural high coefficient of friction which is common even to yielding soft rubber.

The waxy substances may be incorporated in the usual manner on differential rolls during the milling or mixing operation. The waxes are of sufficient low melting point so that the friction produced in milling melts them and distributes them throughout the rubber mass in an extremely fine subdivision, and it may be assumed that these particles are distributed throughout the pores of the rubber, as is illustrated at 13, 13 in Figs. 2 and 3 of the drawing. The mechanics of the phenomena apparently is that the wax particles tend to migrate from the pores of the rubber to the surface and are permitted to do so only if no or very little of the wax itself is present on the surface. The exuding of the wax is properly facilitated by the pressure of the fingers when the ball is in use.

The provision of the resilient cylindrically shaped liner *L* and its housing below the exterior surface of the ball also enables the parts to be readily assembled and retained in assembled condition without the use of other holding means. Thus, to assemble the parts, the rubber liner *L* as shown in Fig. 2 need only be contracted transversely and inserted into the hole *h*, and when released, the liner will expand into the counter-sunk bore and be held therein against displacement by the engagement of the upper end 10 of the liner by the top wall *E* and the engagement of the lower end 14 of the liner by the shoulder 15. When the liner is worn, or if after long use the lubricant should run dry, the liner may be readily removed by a suitable implement and replaced by a fresh liner.

The bowling ball finger gripping means of our present invention, the manner of making the same, and the advantages in use will, in the main, be fully apparent from the above-detailed description thereof. It will be further apparent that changes may be made in the construction thereof and in the arrangement of the parts, without departing from the principles of the invention as above set forth or as defined in the following claims.

We claim:

1. A bowling ball having a finger receiving hole, the wall structure of the hole being divided into an entrant end region and an inner region, the wall at the entrant end region forming part of the ball body and being hard, smooth and substantially frictionless, and the wall at the inner region comprising a compressible and resilient liner containing a lubricant, the liner face being rendered by the lubricant smooth and substantially frictionless when uncompressed.

2. A bowling ball having a finger receiving hole, the wall structure of the hole being divided into an entrant end region and an inner region, the wall at the entrant end region forming part of the ball body and being hard, smooth and substantially frictionless, and the wall at the inner region comprising a soft rubber liner having a lubricant incorporated therein, the lubricant exuding at the exposed liner face rendering the same smooth and substantially frictionless.

3. A bowling ball having a finger receiving hole, the wall structure of the hole comprising a compressible and resilient liner containing a lubri-

cant, the liner face being rendered by the lubricant smooth and substantially frictionless when uncompressed.

4. A bowling ball having a finger receiving hole, the wall structure of the hole comprising an inserted soft rubber liner having a lubricant milled into the body thereof, the lubricant exuding at the exposed liner face rendering the same smooth and substantially frictionless when the liner is in an uncompressed state.

5. A bowling ball having a finger receiving hole, the wall structure of the hole being divided into an entrant end region and an inner region, the wall at the entrant end region forming part of the ball body whereby such wall presents a

hard, smooth and substantially frictionless surface, and the wall at the inner region comprising an inserted compressible and resilient liner.

5 6. A bowling ball having a finger receiving hole, the wall structure of the hole being divided into an entrant end region and an inner region, the wall at the entrant end region being part of the ball body whereby such wall presents a hard, smooth and substantially frictionless surface, the inner region of the hole being undercut and provided with an inserted soft rubber liner, the face of which is flush with said entrant end wall.

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