

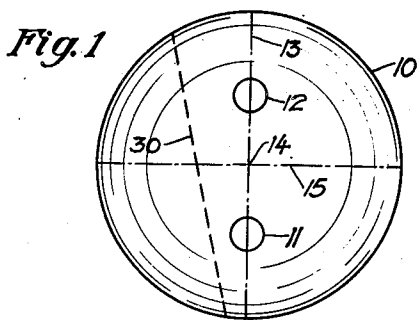
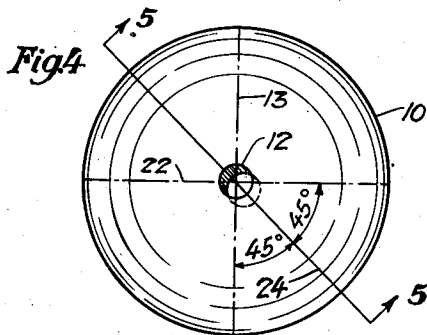
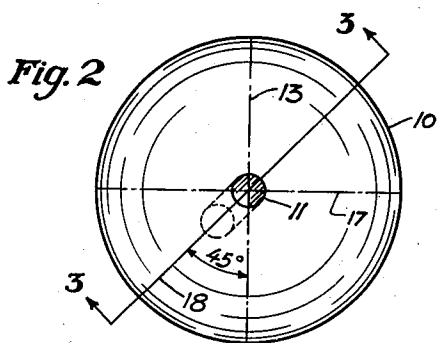
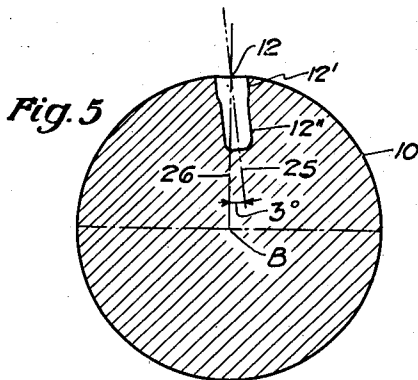
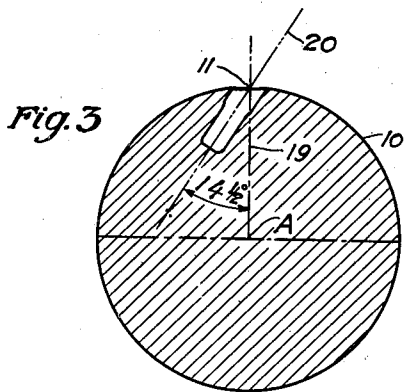
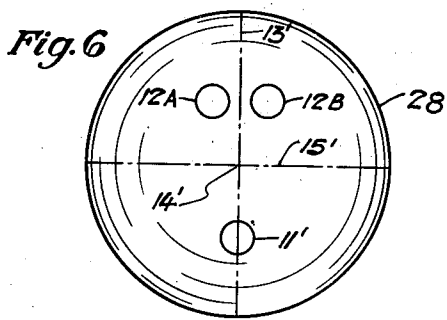
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2,253,872

BOWLING BALL

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BOWLING BALL

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2 Claims. (Cl. 273—63)

My invention relates to bowling balls, particularly to an improved arrangement of the openings which form the grip, and has for an object the provision of a grip which makes easier delivery of the ball, and which contributes to greater accuracy in the placement and control of the ball.

It has been customary to provide bowling balls of the larger size with a hole for the thumb, and one or more holes for the fingers, by means of which the ball is gripped for delivery. These thumb and finger holes are customarily in the form of straight cylindrical holes extending into the ball from the outer surface along approximately radial lines. In some instances there have been proposed slight departure from the strict radial drilling of the ball, although in every case of which I am aware, the axis of the thumb hole is directed inwardly and generally towards the center of the ball.

In carrying out my invention in one form thereof, I provide a thumb hole whose axis extends downwardly and to the left of a diametral line or plane extending between the thumb and finger holes and viewed with the thumb hole vertically below or behind the finger hole. Further in accordance with my invention, the finger hole as viewed with the ball in the aforesaid position slopes downwardly and to the right of the diametral line or plane.

My invention, together with other objects and advantages thereof, will be more fully understood upon reference to the following description and the accompanying drawing, forming a part of this specification and of which:

Fig. 1 is a plan view of a bowling ball embodying my invention, looking directly down at the point of symmetry between the thumb and finger hole;

Fig. 2 is a plan view looking down at the ball with the thumb hole at the top thereof;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a plan view looking down at the ball with the finger hole at the top, and the thumb hole below or behind it;

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 4;

Fig. 6 is a plan view, like Fig. 2, of a bowling ball embodying one form of my invention as applied to a grip comprising two finger holes and a thumb hole.

Referring to Fig. 1, a bowling ball 10 is provided with a thumb hole 11, shown vertically below or behind a finger hole 12. The distance be-

tween the two holes varies in accordance with the size of the bowler's hand, and is selected for the comfortable gripping of the ball. With the thumb in place in hole 11, the inside of the second joint of the middle finger rests against the edge of the finger hole 12. In drilling the two holes 11 and 12 the ball 10 may be first marked with chalk along a great circle 13, and the centers for the two holes marked thereon with the proper distance between them determined by the size of hand, and in the usual manner. The intersection 14 between the great circle 13 and a great circle 15 at right angles to it defines a point of symmetry between the holes 11 and 12.

My invention is primarily concerned with the direction and extent of the pitch of the holes of the grip. The nature of the thumb hole may be best understood by rotating the ball upwardly, or about its horizontal axis, from its position as shown in Fig. 1 to the position shown in Fig. 2, with the marking for the center of the thumb hole located centrally of the ball 10. A great circle 17 is then drawn through the center of thumb hole 11.

A third great circle 18 is then drawn intermediate the first and third quadrants as formed by great circles 13 and 17. The projection of the axis of thumb hole 11 lies along the trace of great circle 18 and extends downwardly into the third quadrant of the ball. This is best shown in Fig. 3, which is a section taken along the line 3—3 which coincides with the plane including the great circle 18. With a vertical radius 19 of the ball 10 the axis 20 of the hole 11 forms an angle of $14\frac{1}{2}^\circ$, although my invention in its broader aspect includes a thumb hole extending into the third quadrant, and preferably, a thumb hole forming an angle of between $7\frac{1}{2}^\circ$ and 30° , measured in the foregoing manner.

In drilling the thumb hole the ball may be placed in a semispherical chuck forming the tail-piece of a lathe. The ball is held or fixed therein, and the tail piece adjusted for a pitch of approximately one and one-quarter inches. That is, along the plane through the great circle 18 the pitch is one and one-quarter inches (shown in Fig. 3), as contrasted with prior suggested pitches of one-eighth inch or one-quarter inch in directions toward the fourth or upper left hand quadrant of the ball, as viewed in Fig. 1.

The nature of the finger hole 12 may be best understood in a similar manner. The ball is turned downwardly from its position in Fig. 1, until the finger hole 12 is at the top of the ball, as shown in the plan view of Fig. 4. The verti-

cal great circle 13 and a horizontal great circle 22 are shown for reference purposes. A great circle 24 is shown dividing the second and fourth quadrants. The projection of the axis of the finger hole 17 coincides with the trace of the plane of the great circle 24; the hole 12 extends downwardly and to the right in the second quadrant of the ball. As shown in Fig. 5, the axis 25 of hole 12 forms an angle of 3° with the vertical radius 26, and this angle may range between 2° and 10°.

The finger hole 12 may be drilled by setting the tallstock of a lathe for a ¼ inch radial pitch and a ¼ inch pitch into the second or lower right-hand quadrant of Fig. 4. The definition of the holes 11 and 12 in terms of the pitch is the same as that used by the artisans or machinists who customarily drill the holes of the grip; and the manner of defining them is believed in accord with instructions by Brunswick-Balke-Collender Co. as to drilling of the holes of the grip.

In Fig. 6 I have shown a three-hole ball 28, provided with a thumb hole 11', identical with the one of Figs. 1-3, and two finger holes 12A and 12B, located equally to the right and left of great circle 13'. The pole 14', formed by the intersection of vertical and horizontal great circles 13' and 15' is also the center of symmetry of the grip. The two finger holes 12A and 12B, except for their spacing to the left and right of the great circle 13', are identical with the finger hole 12 of Figs. 1, 4, and 5. When the ball 28 is moved so that each hole occupies the position of the hole 12 of Fig. 4, the sectional view of Fig. 5 applies to the ball 28 of Fig. 6.

A grip embodying my invention is particularly adapted for delivery of the ball in a manner which imparts a hook to the ball, a delivery which produces travel of the ball in a fairly straight line down the alley, and then movement of it in a sharp hook, striking the 1-3 pocket at a substantial angle, the more effectively to knock down, or sweep from the alley, all of the pins. Additionally contributing to an increased number of strikes is the fact that the grip is so constructed that the ball travels or rolls along a minor circle 30, Fig. 1, and as it strikes the pins it produces an action like that of a weighted ball, because the greater mass of the ball extends to one side of the smaller circle defining the path of the ball in the alley, and the more effectively sweeps down the pins.

After experimenting over a substantial period of time, I have found that the best form of my invention now comprises a thumb hole, inclined at the 14½° angle described above and with the finger hole at the angle of 3° defined and described in the foregoing. Broadly, however, I deem my invention to cover a ball having a thumb hole which extends downwardly and to the left of the trace of diametral plane 13; and a ball having a finger hole which slopes downwardly and to the right of the trace of diametral plane 13.

More specifically, in delivering the ball, it is first supported comfortably in the left hand, with the thumb and finger of the right hand relaxed and comfortably occupying the respective holes therefor. The shift from the initial stance into the delivery is accomplished by a smooth backward movement of the right hand and arm, the palm of the right hand being retained in the downward position, with the left hand preferably guiding the ball until the beginning of the backward swing. The ball is then swung in a forward di-

rection through the natural arc formed by the right arm pivoting from the shoulder, and as the forward end of the stroke is approached the forearm naturally and smoothly moves across the body to the left for the "follow-through." As the ball leaves the hand it first disengages itself from the thumb, which lies forwardly of plane 13, then generally normal to the direction of the alley, and the ball then disengages itself from the middle finger, the latter serving as a guide during the last part of the delivery, during which the finger is withdrawn as the arm and hand are abruptly raised for the follow-through. The foregoing movements are preferably carried out as the bowler steps forward toward the foul line, in the usual manner, the ball leaving the hand as the bowler glides forward. Because this delivery is natural, with all muscles largely in relaxed position during the entire delivery, there occurs a minimum of fatigue, which makes for sustained accuracy and higher average bowling scores. For example, I have bowled as many as 40 or 50 games in a single evening without material or excessive fatigue, and with no abrasion of thumb or middle guiding finger. Moreover, those to whom I have introduced my improved grip have quickly and greatly improved their bowling average.

After delivery of the ball with the natural, graceful swing, it rolls in a fairly straight path down the alley along a minor circle, such as the circle 30 of Fig. 1, with a left-hand spin. As the ball approaches the pins the spin causes the ball rather quickly to move toward the left, with the heavier portion of the ball striking and sweeping the pins from their upright positions. If the leftward movement or hook for a given natural delivery is not adequate, correction is made by pointing the thumb more directly toward the objective, and vice versa. Thus, the angular position of the thumb serves as a governor, or throttle, for control of the degree of hook imparted to the ball.

I have further found that it is important for both the thumb and forefinger snugly to fit within their respective holes, without undue tightness. I therefore form the finger hole 12 with a slightly enlarged entrance portion 12', Fig. 5, and a narrower end portion 12''. This compensates for the small taper of the finger from the knuckle toward the outer joint. The actual difference in diameter between the inner portion 12'' and outer portion 12' may be of the order of 1/16". The fit is preferably sufficiently tight as to produce a partial vacuum when the finger is quickly withdrawn, the partial vacuum frequently causing a "pop." The identical construction is preferably utilized for the balls of the type shown in Fig. 6.

The same arrangement may be provided for the thumb hole 12, although not necessary or preferred, and it is to be understood that instead of the differing diameters of the two sections a tapering hole may be provided, tapering from a slightly larger entrance, about a sixteenth of an inch.

It is to be further understood that for a left-handed bowler, the holes, either for a two hole or three hole ball, are formed in directions opposite to those described for the right-hand balls 10 and 28, and although some of my claims may be specific to a ball for a right-handed bowler, I intend them to cover my invention as applied to a ball for a left-handed bowler.

With further reference to the term pitch as used in the art of bowling, it may be defined as the distance to the axis of the hole from the

center of the ball as measured along a line drawn from the center of the ball and normal to the axis of the hole; or it is the shortest distance from the center of the ball to the axis of the hole. Thus the thumb hole 11 may have a pitch of from about $\frac{1}{2}$ " to about $2\frac{1}{4}$ " intermediate the third quadrant, Figs. 1, 2, and 6. The foregoing applies, of course, to the standard bowling ball, having a circumference of 27 inches.

While I have shown embodiments of my invention, it is to be understood that I do not limit myself thereto, since many modifications may be made, and I therefore contemplate by the appended claims to cover any such modifications as fall within the spirit and scope of my invention.

What I claim is:

1. A bowling ball grip comprising a bowling ball having a thumb hole and at least one finger hole spaced from said thumb hole with openings to said holes symmetrically disposed with respect

to a diametral circle of the ball which passes through the center of said thumb hole, said thumb hole extending in a direction away from the little finger side of the hand, and at least one finger hole extending in a direction slightly toward the little finger side of the hand.

2. A bowling ball grip for a right-hand bowling ball, including spaced thumb and finger holes, characterized by a thumb hole whose axis extends intermediate the third quadrant of the ball as viewed from directly above the thumb hole with the finger hole spaced along a vertical, diametral plane ahead of said thumb hole, and the axis of which thumb hole forms with a radius of the ball to the surface center of the thumb hole an angle of between 7 and 30°, and the axis of said finger hole forming with a radius of the ball to the surface center of the finger hole an angle of about 3°.

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