Sept. 19, 1933. S. J. BATES 1,927,654

BOWLING BALL

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Fig. 1.

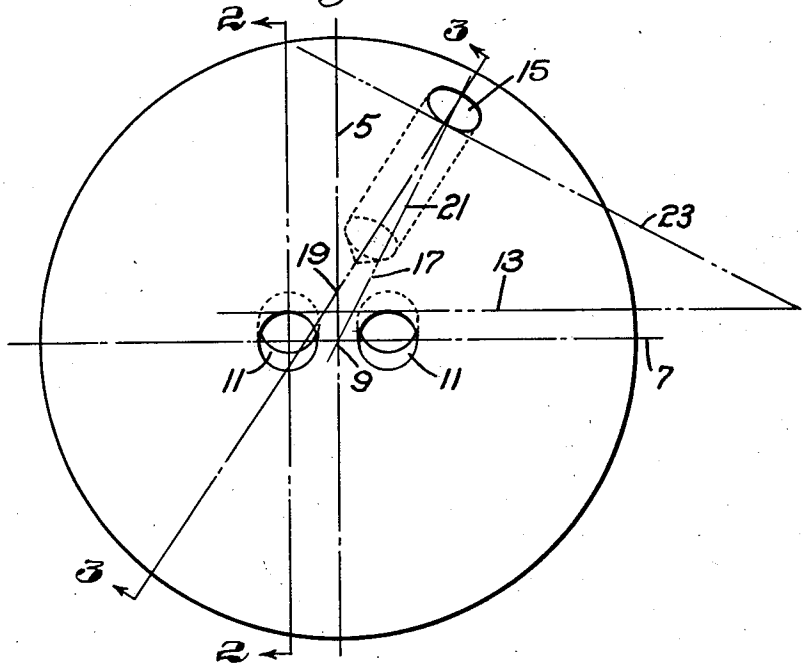


Fig. 2.

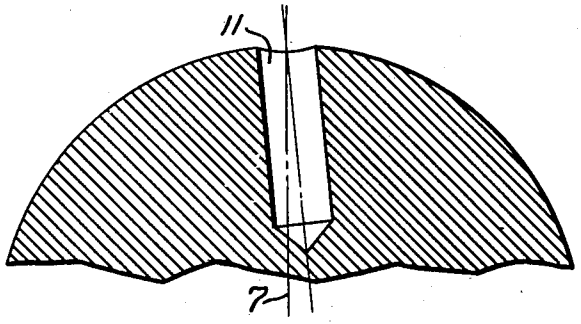
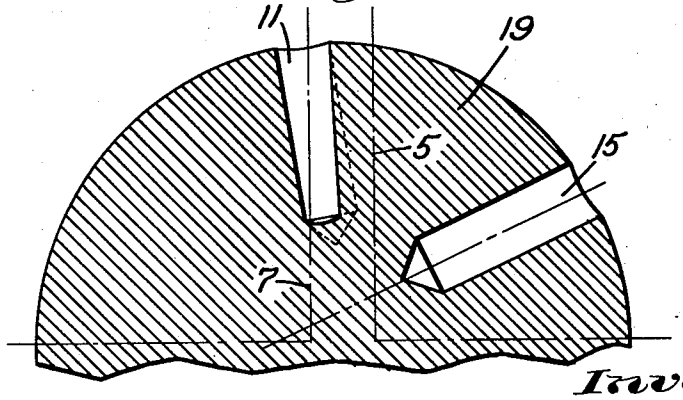


Fig. 3.



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BOWLING BALL

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5 Claims. (Cl. 273—63)

This invention relates to bowling balls and the object is to provide such a ball with an improved arrangement of finger-receiving recesses whereby the ball may be held with a restful, easy grip without unnatural flexure of muscles and released easily and accurately without the possibility of introduction of forces in the release which would interfere with the accurate movement of the ball down the alley.

My invention will be well understood by reference to the following description of an illustrative embodiment thereof shown by way of example in the accompanying drawing, wherein:—

Fig. 1 is a plan view of a bowling ball substantially as it would be seen by a player holding it suspended in position ready to be delivered; and

Figs. 2 and 3 are partial sections on the lines 2—2 and 3—3 of Fig. 1 respectively.

Bowling balls of the larger size are commonly provided with holes to receive one or more of the fingers of the hand and a hole for the thumb by means of which the ball is grasped for delivery and in accordance with my invention I provide an improved arrangement for such holes. On account of the symmetrical character of a sphere, accurate description and definition of a construction embodying the invention is difficult. For purposes of description, therefore, it is convenient to consider the ball, as shown in Fig. 1, as arbitrarily divided into quarters by diametral planes 5 and 7 forming great circles which may be referred to by the same numerals and of which 5 may be considered the primary circle and 7 the circle secondary thereto. The intersection of these circles defines the pole 9. On the actual ball this pole may be considered the symmetrical center of the finger-receiving recess or recesses as distinguished from the thumb-receiving hole, arranged substantially symmetrically about the planes of the circles 5 and 7 at the pole 9. Herein I have shown by way of an example a three-hole ball having two finger-receiving holes, the centers of which lie on the circle 7 at opposite sides of the pole 9 at least substantially equidistant therefrom and which extend inwardly parallel to each other. In the form of ball illustrated the axes of the openings are inclined to the diametral plane 7, as seen in Fig. 2, providing a hole having what is known as a Western or part Western pitch as distinguished from a so-called Eastern pitch in which the holes extend in a diametral plane.

When a finger or fingers are inserted in the ball to lift the same, the palmar sides of the finger makes effective engagement with the wall of its hole to grip the ball. In the case of a ball with two finger holes and with these holes undercut, that is, inclined to the diametral plane, as is here illustrated by way of example and not by way of limitation, the position of the fingers is uniquely determined. When a hole is under-cut the finger naturally engages under the outermost side of the hole, toward the right in Fig. 2. By "outermost" I mean nearest the surface of the sphere. In the case of two holes a common tangent plane corresponds to the plane of the palmar sides of the fingers that is, substantially coincides with the plane in which the palmar sides of the fingers are presented when the ball is grasped. Thus in the example shown the plane whose trace on the surface of the sphere is indicated at 13 corresponds to the plane of the palmar sides of the fingers of the hand. It will be understood that the matter is relative and that in general the plane will be determined by the normal action of grasping the ball having regard to the general arrangement of the openins thereon.

It will be seen that the plane 13 is perpendicular to the diametral plane 5 of the primary great circle and the latter may be considered as defined or determined in that manner.

The thumb hole 15 is offset laterally from the finger holes 11 toward the side of the thumb. We are considering now a ball for a right-handed user, and the hole 15 therefore opens in the upper right quadrant, viewing Fig. 1. The location of the hole, that is, its distance from the planes 5 and 7, will depend upon the size of the hand for which the ball is intended. The axis of hole 15 is inclined to the radius of the sphere. In Fig. 1 I have shown an arc of a great circle 17 connecting the center of the opening and the pole 9. The axis of the hole intersects the plane of this great circle 17 at the center of the opening and extends therefrom in the plane 19 of a small circle (the words being used in the geometrical sense) corresponding to the section line 3—3 in Fig. 1 and to the section of Fig. 3, which plane defines with the plane of the great circle an angle 21 diverging from the plane of great circle 17 toward the left in Fig. 1, that is, toward the little finger side of the gripping hand. Otherwise described, the axis extended intersects the plane of the primary great circle 5 before intersecting the plane of the secondary great circle 7.

I have herein described the finger holes 11 as being of "part Western" pitch and so herein, as indicated in Fig. 3, the hole 15 is shown as similarly pitched, the extension of the axis in its plane 19 falling above the center.

Referring now to Fig. 1, it will be understood that if two fingers, say the middle and ring finger, are inserted in the holes 11 and the thumb in the hole 15, the palmar surfaces of the fingers will engage the walls of holes 11 substantially along the tangent plane 13 and the ball of the thumb will seat on a supporting surface corresponding substantially to a plane 23 tangent to

the side of the opening and perpendicular to the plane of the small circle 19. This surface is the "outermost" surface of the hole in the sense that it is nearest the surface of the sphere. These planes 13 and 23 converge inwardly in the general direction of the center of the ball and also laterally to the radial or thumb side of the grasping hand.

The arrangement described permits a relaxed grip on the ball and an easy, smooth release. This may be well understood if the hand of the reader is held in an easy, partly closed position with the fingers partly flexed. Considering the middle and ring fingers and the thumb, it will be seen that while they more or less closely converge, the thumb does not point centrally but toward the little finger side. Also the tangent plane to the palmar surfaces of the fingers and the tangent plane to the ball of the thumb converge together to a point at the thumb side of the hand. The openings provided by the geometrical construction explained thus provide supporting surfaces in the planes 13 and 23 respectively corresponding to this natural restful position of the hand. The ball may thus be held with a relaxed grip with no twisting of the thumb, undesirable in itself and which would also tend to create an involuntary pressure from the little finger which might disturb the course of the ball when delivered. When the ball is released and the fingers leave the openings, the thumb leaves substantially in the plane 23, the edge of the opening being released over the ball of the thumb rather than over the side thereof, promoting accuracy in delivery. This arrangement also obviates abrasion of the thumb and the consequent soreness thereof well known to bowlers using balls of conventional construction.

I am aware that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and I therefore desire the present embodiment to be considered in all respects as illustrative and not restrictive; reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

I claim:

1. A bowling ball which for purposes of definition is considered as divided by relatively perpendicular primary and secondary diametral planes defining by their intersection a pole on the surface thereof, the ball being recessed substantially symmetrically of said pole to provide a flinger grip, the recessing presenting at one side a supporting surface for engagement with the palmar side of the finger, a tangent plane to said surface being perpendicular to said primary diametral plane, and a thumb hole offset to the thumb side of said primary diametral plane and having its axis inwardly directed non-radially to intersect said primary diametral plane before intersecting the secondary diametral plane.

2. A bowling ball which for purposes of definition is considered as divided by relatively perpendicular primary and secondary diametral planes defining by their intersection a pole on the surface thereof, the ball having a pair of finger holes opening to the surface of the ball substantially symmetrically about said pole and presenting surfaces for engagement with the palmar side of said fingers, a common tangent plane thereto coinciding substantially with the plane engaged by the palmar sides of the fingers received in said holes when the ball is grasped and said tangent plane being perpendicular to the plane of said primary diametral circle, and a thumb hole offset to the thumb side of said primary diametral plane and undercut to provide an outermost surface for engagement by the ball of the thumb, a plane tangent to said surface and the above-mentioned plane tangent to the finger holes converging in the direction of the center of the ball and laterally in the direction of the thumb side of the hand inserted in the holes.

3. A bowling ball which for purposes of definition is considered as divided by relatively perpendicular primary and secondary diametral planes defining by their intersection a pole on the surface thereof, the ball having a pair of finger holes opening to the surface of the ball substantially symmetrically about said poles and undercut to provide outermost surfaces to receive the palmar sides of the fingers, a common tangent plane to said surfaces coinciding substantially with the plane engaged by the palmar sides of the fingers and said tangent plane being perpendicular to the plane of said primary diametral plane, and a thumb hole offset to the thumb side of said primary diametral plane and undercut to provide an outermost surface for engagement by the ball of the thumb, a plane tangent to said surface and the above-mentioned plane tangent to the finger holes converging in the direction of the center of the ball and laterally in the direction of the thumb side of the hand inserted in the holes.

4. A bowling ball which for purposes of definition is considered as having relatively perpendicular primary and secondary great circles thereon defining a pole, said ball being recessed to provide a finger grip, the recessing opening to the surface of the sphere along said secondary circle and being arranged therealong symmetrically about said pole, and a thumb hole opening well within the quadrant which lies forwardly and at the thumb side of the pole between said circles and having its axis in the plane of a small circle which intersects the great circle drawn between said pole and the intersection of said axis of the thumb hole with the surface of the sphere at an angle which diverges to the little finger side of the grasping hand.

5. A bowling ball which for purposes of definition is considered as having relatively perpendicular primary and secondary great circles thereon defining a pole, said ball being recessed to provide a finger grip, the recessing opening to the surface of the sphere along said secondary circle and being arranged therealong symmetrically about said pole, and a thumb hole opening well within the quadrant which lies forwardly and at the thumb side of the pole between said circles and having its axis in the plane of a small circle which intersects the great circle drawn between said pole and the intersection of the said axis of the thumb hole with the surface of the sphere at an angle which diverges to the little finger side of the grasping hand and which also, when produced, extends above the center of said small circle.

SULLEY J. BATES.