

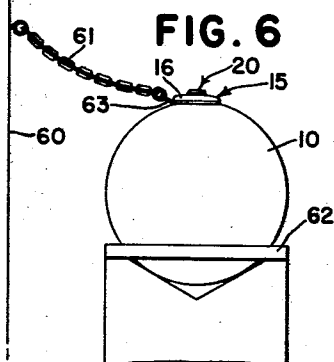
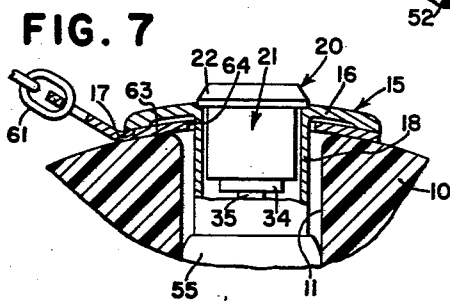
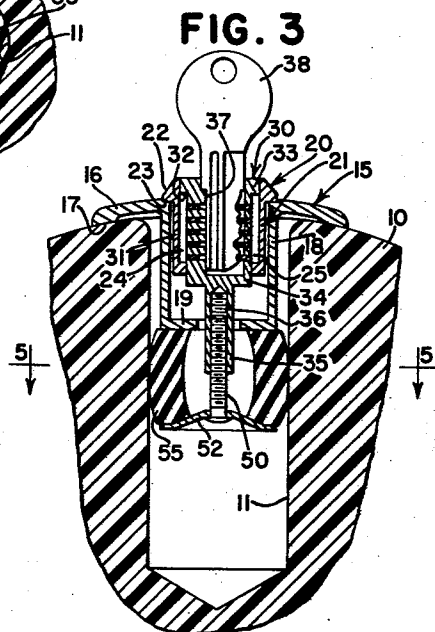
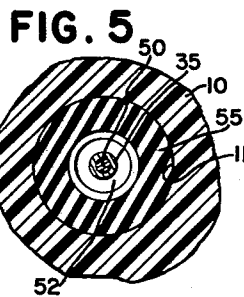
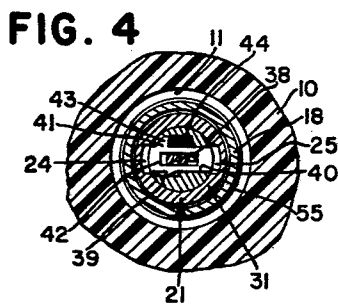
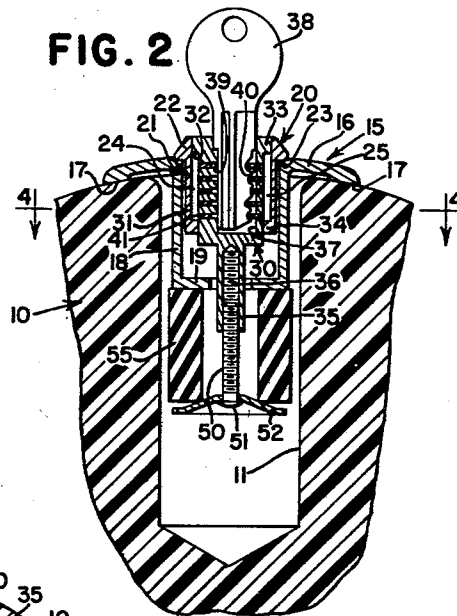
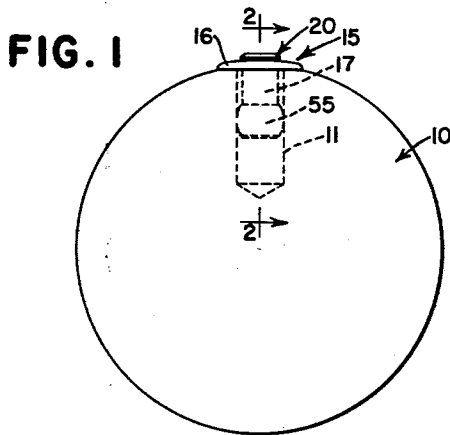
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BOWLING BALL LOCK

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BOWLING BALL LOCK

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This invention relates to the use of a locking device for a bowling ball which will prevent its use without the consent of the owner.

A bowling ball conventionally has three finger openings by which the bowler may grip the ball; one of these openings receives the thumb, and the other two openings receive two fingers. There are, of course, other types of bowling balls in which only two openings are present, and the present invention could also be utilized with the latter.

Bowling, as it has become more and more popular, has reached the point where many individual bowlers own their own balls, and indeed are very reluctant to have the balls used by others, since once the bowler has become accustomed to one ball he feels the mere use by others affects his own handling of the ball.

However, the very nature of the ball, due to its shape and weight makes it very difficult to carry or transport. Particularly in tournament play, a bowler will bowl a series of lines and there will follow a delay before his turn comes up again. The bowler dislikes leaving his ball on a rack, since others might use it or it might be temporarily lost when it is his turn to bowl. Consequently, he is faced with the problem of keeping it with him or taking a chance on losing it either temporarily or permanently.

With this in mind, it is the main purpose of this invention to provide a locking mechanism which includes a plug that may be inserted into one of the finger openings of a bowling ball, and which may be locked therein so that the ball is useless until the plug is removed. By use of the locking mechanism, herein to be described, the plug cannot be removed except through use of a key which the owner may keep in his possession.

Specifically, it is proposed to provide a plug assembly which has an outer plate which lies adjacent the surface of the ball and has a main plug portion which is disposed in the finger opening. The plug portion is constructed to expand and contract relative to the walls of the opening and upon expansion will lock the plug portion against withdrawal from the ball. The expansion and contraction of the plug portion is controlled by a key which may be inserted to cause rotation of a part of the plug portion which in turn controls expansion and contraction of the wall-engaging part. Consequently, the key must be used to remove the plug from the ball.

It is also proposed as a further use of the before described plug assembly to use the latter for purpose of storage. It is contemplated that there could be provided a series of racks with plates which could be chained or otherwise fixed to a wall or other fixed member and the plugs could be inserted through the plates with the cap of the plug lying on the top of the plate. By tightening the plug in the ball, the plate would be clamped between the surface of the ball and the cap, and the ball would be locked on the rack until the owner used the key to remove the plug.

These and other objects will become apparent to those skilled in the art as the invention is better understood from the following description and as shown in the accompanying drawings.

FIGURE 1 is a view showing a bowling ball with the plug inserted in the thumb opening as shown in dotted representation.

FIGURE 2 is an enlarged vertical sectional view taken

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through the plug and the surrounding portion of the bowling ball.

FIGURE 3 is a view similar to FIGURE 2 showing the plug in a locked position.

FIGURE 4 is a sectional view taken along the line 4—4 of FIGURE 2.

FIGURE 5 is a sectional view taken along the line 5—5 of FIGURE 3.

FIGURE 6 is a view somewhat similar to FIGURE 1 showing a modified use of the invention.

FIGURE 7 is an enlarged sectional view of the outer portion of the plug and other locking mechanism.

Referring now to the drawings, a bowling ball 10 composed of hard rubber-metallic composition or similar conventional type material is provided with conventional type finger openings, one of which is indicated by the cylindrical wall 11. The openings are all internally of the ball and may be considered as extending radially inwardly from the surface of the ball although it should be understood that the axis of the opening does not necessarily be directed toward the spherical center of the ball. The plug herein to be described may be used in any of the finger openings in a bowling ball, although it would probably be inserted in the finger opening in which the thumb is inserted.

The plug, here indicated in its entirety by the reference numeral 15, is composed of an annular cap 16 overlying the surface of the ball adjacent the opening 11 with an outer annular edge 17 thereof turned to lie on the surface of the ball 10. As may be readily apparent, the nature of the cap is such that it will be difficult to pry under the cap without injuring the ball. Integral with the cap is an annular and radially inwardly extending cup portion 18 which is disposed in the opening 11 and is spaced from the walls of the opening. The inner end of the cup portion is provided with an abutment surface or wall 19 disposed at right angles or normal to the wall of the opening 11.

A locking mechanism 20 is inserted in the opening of the cup portion 18. The locking mechanism includes a journal or casing 21 having an annular lip 22 which is received in an annular recess or shoulder portion 23 on the outer surface of the cap 16. Frictional engagement between the lip 22 and shoulder 23 will normally prevent relative rotation between the journal member 21 and cap 15. Also, if desired, they may be fixed to one another to prevent relative rotation. The internal surface of the journal 21 has diametrical oppositely disposed slots 24, 25.

As shown, the journal in effect is a casing in which a key-receiving barrel or shank portion, generally designated 30, is appropriately mounted. The journal or casing 21 is a hollow unitary member having an enlarged upper cylindrical or top portion 22 from which extends a radially extending and reduced annulus 31 which has the oppositely disposed slots 24, 25.

The outer lip 22 and annulus 31 are rigid with one another and form a shoulder 32 in which an overhanging part or lip 33 of the barrel 30 is seated.

According to the invention the barrel 30 constitutes a radially disposed shank portion received in the casing or journal 20 which under certain conditions may be rotated in the journal 20. The barrel or shank portion 30 includes in radially inwardly relation to one another the previously mentioned overhanging part 33, an intermediate cylindrical reduced part 34 and a still further reduced cylindrical part or stem 35. The stem 35 has an internal tapped cylindrical wall 36.

The barrel or shank portion 30 is provided with a radially disposed opening 37 for receiving a key 38 and is further provided with several superposed pairs of aligned channels 39 and 40, each aligned pair being adapted

to receive a plate tumbler broadly denoted at 41. In the present instance five plate tumblers 41 and their respective channels 39, 40 have been provided.

Each tumbler 41 is in the form of a plate having a central opening 42 through which passes the shank of the key 38 and an abutment 43 which by action of a spring 44 normally maintains or biases the respective plate tumbler so that its end rests in one of the slots 24, 25 so as to prevent the shank portion 30 from rotating in the casing or journal 21. However, mere insertion of the key 28 will operate to compress the respective springs 44 to free the barrel for rotation. Conversely, the key 38 cannot be removed until one of the slots 24, 25 is in position to receive the tumbler plates 41.

Threadedly received in the stem or small cylindrical portion 35 is a shank of a screw 50, the head 51 of which fits internally of a plate or wall 52 which is disposed normal to the wall of the opening 11. The abutment wall 19 has an opening therein through which the stem 35 will extend and is in opposed relation to the wall 52.

A ring 55 of plastic rubber or similar contractable and expandable material is positioned between the outer surface of the plate 52 and the abutment wall 19 and is disposed closely although slightly spacedly internally of the wall of the opening 11, the latter, of course, assuming the plug is disposed in a non-locked position.

Referring first to the operation of the plug as shown in FIGURES 1 through 5, to lock the plug 15 in the opening 11, the plug 15 is inserted in the opening 11 in its radially extended position, i.e., with the screw 50 threaded to an extended position whereby little or no pressure or compression is applied on the rubber ring or collar 55 by the plate 52. The cap 16 is placed to lie on the surface of the ball or as shown in FIGURES 1, 2 and 3. The key 38 is inserted in the barrel 30 so as to unlock the barrel for rotation in the casing or journal 21. The key is then turned to retract the screw 50 in the stem 35 whereupon the rubber collar 55 is compressed in a radial direction while at the same time is expanded in a direction normal to the wall of the opening 11. The key may be turned sufficiently to apply a large frictional engaging force between the outer surface of the collar 55 and the wall of the opening 11 as substantially shown in FIGURE 3. At this time the plug cannot be removed from the ball. The key 38 is removed and the ball remains locked against use. By reinserting the key 38 the plug may be adjusted to extend the spacing between the walls or plates 19, 52 to thereby disengage the collar 55 with the wall of the opening 11 and the plug may then be removed.

In the form of the invention shown in FIGURES 6 and 7, the locking plug is used to lock the ball in a stored condition. In this form, a chain 61 is fixed to a wall 60. The ball will rest in a conventional type rack as indicated at 62. On the end of the chain 61 is provided a circular plate 63 which is dishd to lie on the surface of the ball 10. The plate 63 is provided with an opening 64 for receiving the plug 15. The cap 16 will normally rest on the outer surface of the plate 63.

As is rather obvious from viewing FIGURES 6 and 7, by inserting the plug and locking the plug in the ball as previously described, the plate 63 will be clamped between the cap 16 and the surface of the ball 10. The ball may be left in a stored position on a rack and there will be no fear of its being stolen or accidentally used so long as the owner has removed and has possession of the key.

While only one modification of the invention has been shown, it should be recognized that other forms, variations, and modifications will occur to those skilled in the art. Therefore, it should be understood that the present detailed description was given for the purpose of concisely and completely illustrating the principles of the invention, and it was not the intention to limit or

narrow the invention beyond the broad concept herein claimed.

What is claimed is:

1. A plug adapted to close the finger opening in a bowling ball comprising: a cap formed to and adapted to lie adjacent the surface of the ball beyond the outer edge of the finger opening; a journal supported by the cap extending into the opening with the outer surface thereof spacedly from the walls of the opening; a first shank member carried in said journal for rotation relative thereto and having an inner threaded end projecting inwardly of the journal; means selectively locking the shank member against relative rotation to the journal; a second shank member radially co-extensive and threadedly attached to the threaded end of the first shank member, said shank members being extensible and retractable upon relative rotation; a wall member disposed normally to the wall of the opening on the inner end of the second shank member; a ring disposed in the space between the journal and wall of the opening and extending from the inner surface of the cap to an inner annular end; and an annular flexible member surrounding the shank members with its outer surface adaptable for contact with the wall of the opening and extending between the annular end and the wall member and expandable and contractable normally to the wall of the opening upon retraction and extension respectively of the shank members.

2. A plug adapted to close the finger opening in a bowling ball comprising: a cap adapted to lie adjacent the surface of the ball beyond the annular edge of the finger opening; a journal supported by the cap extending into the opening; a first shank member carried in said journal for rotation relative thereto and having an inner threaded end projecting inwardly of the journal; means selectively locking the shank member against relative rotation to the journal; a second shank member radially co-extensive and threadedly attached to the threaded end of the first shank member, said shank members being extensible and retractable upon relative rotation; first and second wall members disposed normally to the wall of the opening with the first of the wall members on the inner end of the second shank member and the second of the wall members being rigid with the cap; and an annular flexible member surrounding the shank members between the first and second wall members with its outer surface adaptable for contact with the wall of the opening and expandable and contractable normally to the wall of the opening upon retraction and extension respectively of the shank members.

3. A plug adapted to close the opening in a bowling ball comprising: a cap adapted to lie adjacent the surface of the ball beyond the annular edge of the finger opening; a locking mechanism supported by the cap and disposed in the opening and including a shank member parallel to the axis of the opening; a second shank member co-extensive with the first shank member and extensible and retractable with the first shank member upon relative rotation; a pair of spaced apart wall members disposed normally to the wall of the opening with one of the wall members on the second shank member and the other of the wall members being held against movement; and an annular flexible member surrounding the shank members between the wall members with its outer surface adaptable for contact with the wall of the opening and expandable and contractable normally to the wall of the opening upon retraction and extension respectively of the shank members.

4. A plug adapted to close the finger opening in a bowling ball comprising: a cap adapted to lie adjacent the surface of the ball about the finger opening; a first shank member extending axially in respect to the finger opening supported by the cap and extending into the opening and having an inner threaded end; means selec-

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tively locking the shank member against rotation relative to the cap; a second shank member co-extensive and threadedly attached to the threaded end of the first shank member, said shank members being extensible and retractable axially upon relative rotation; a pair of wall members disposed normal to the wall of the opening and being structurally related to the shank members to move toward or away from one another upon retraction or extension respectively of the shank members; and an annular flexible member surrounding the shank members with its outer surface adaptable for contact with the wall of the opening and disposed between the wall members, said flexible member being expandable and contractable normally in response to axial movement of the shank members.

5. A plug adapted to close the finger opening in a bowling ball comprising: a cap adapted to lie adjacent the surface of the ball and at least partially over the finger opening; a first shank member supported by the cap and extending into the opening and having an inner threaded end; means selectively locking the shank member against rotation relative to the cap; a second shank member axially co-extensive and threadedly attached to the threaded end of the first shank member, said shank members being extensible and retractable axially upon relative rotation; axially spaced wall members disposed normal to the wall of the opening and being connected to the shank members to move toward and away from one another in response to retraction or extension of the shank members; and an annular flexible member surrounding the shank members and disposed between the wall members with its outer surface adaptable for contact with the wall of the opening, said flexible member being expandable and contractable toward or away from the wall of the opening in response to axial movement of the shank members.

6. A plug adapted to close the finger opening in a bowling ball comprising: a cap adapted to lie adjacent the surface of the ball and at least partially over the finger opening; shank means rotatably supported by the cap and extending into the opening; axially spaced wall means in the opening and disposed normal to the wall of the opening, said wall means being operatively connected to the shank means to move toward and away from one another in response to rotation of the shank means; means selectively locking the shank means against rotation relative to the cap; and an annular flexible member surrounding the shank means with its outer surface adaptable for contact with the wall of the opening and disposed between the wall means whereby said flexible member will expand and contract toward and away from the wall of the opening in response to rotation of the shank means.

7. A plug adapted to close the finger opening in a bowling ball comprising: a cap adapted to lie adjacent the surface of the ball and at least partially over the finger opening; shank means rotatably supported by the cap and extending into the opening; spaced apart wall means disposed normal to the wall of the opening, said wall means being operatively connected to the shank means to move toward and away from one another in response to rotation of the shank means; an annular flexible member surrounding the shank means and between the wall means with its outer surface adaptable for contact with the wall of the opening whereby said flexible member will expand and contract relative to the wall of the opening in response to rotation of the shank means; and means selectively locking the shank means and cap against relative movement.

8. A plug adapted to close the finger opening in a bowling ball comprising: a cap adapted to lie adjacent the surface of the ball and at least partially over the finger opening; shank means rotatably supported by the cap and extending into the opening; and wall engaging means on the shank means adaptable for contact with the wall

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of the opening, said latter means being operatively connected to the shank means to expand and contract toward and away from the wall of the opening in response to rotation of the shank means; and means selectively locking the shank means and cap against relative rotation.

9. A locking device for a bowling ball having finger openings comprising: a plate having a shank opening and adaptable for external support; a cap adapted to lie adjacent the surface of the plate and at least partially over the shank opening; shank means rotatably supported by the cap and extending through the shank opening and into one of the finger openings of the ball whereby the plate will be retained between the cap and the surface of the ball; wall engaging means on the shank means adaptable for contact with the wall of the finger opening, said latter means being expandable and contractable normally relative to the wall of the finger opening in response to rotation of the shank means; and externally controllable locking means for preventing rotation between the cap and shank means.

10. A plug adapted to close the finger opening in a bowling ball comprising: a surface plate extending beyond the outer edges of the opening and lying closely adjacent the surface of the ball; a plug assembly connected to the plate disposed in the opening, said plug assembly having expandable and contractable portions adapted to contact the wall surface of the opening upon expansion, said plug assembly further having portions extensible and retractable lengthwise of the opening; means connecting the latter portions with the former portions to effect expansion and contraction of said former portions in response to extension and retraction of said latter portions; and key-operated locking means externally controlled relative to the plate selectively effecting extension and retraction of said latter portions.

11. A plug adapted to close the finger opening in a bowling ball comprising: a surface plate extending beyond the outer edges of the opening and lying closely adjacent the surface of the ball; a plug assembly connected to the plate and disposed in the opening, said plug assembly having expandable and contractable portions thereof and adapted to contact the wall surface of the opening upon expansion, said plug assembly further having portions extensible and retractable relative to the axis of the opening; means connecting the latter portions with the former portions whereby radial expansion and contraction will occur in response to extension and retraction of said latter portions; and key-operated locking means externally controlled relative to the plate portion selectively effecting extension and retraction of said latter portions.

12. A plug adapted to close the finger opening in a bowling ball comprising: a surface plate covering the opening and extending beyond the outer edges of the opening and lying closely adjacent the surface of the ball; a plug assembly connected to the plate disposed in the opening having expandable and contractable portions thereof and adapted to contact the wall surface of the opening upon expansion, said plug assembly further having a portion rotatably supported on said surface plate; means connecting the latter portion with the former portions whereby radial expansion and contraction will occur in response to rotation of said latter portion; and lock means preventing rotation of said latter portion.

13. A plug assembly insertable in the finger opening of a bowling ball comprising: a casing disposed in the opening adjacent the outer surface of the ball; a structure carried by said casing internally of the opening for rotation relative thereto; a collar of resilient material supported on the structure to expand and contract relative to the wall of the opening in response to rotation of the structure and to contact the wall upon expansion; and lock means between the casing and structure preventing rotation of the latter.

14. A plug assembly insertable in the finger opening of a bowling ball comprising: a casing disposed in the open-

ing adjacent the outer surface of the ball; a structure carried by said casing internally of the opening for rotation relative thereto; a wall-engaging member supported on the structure and responsive to rotation of the structure to expand and contract relative to the wall of the opening and to contact the wall upon expansion; and lock means between the casing and structure preventing rotation of the latter.

15. A method of preventing use of a bowling ball comprising: inserting a plug in the finger opening of the ball; expanding the plug to contact the wall of the finger opening; and locking the plug against contraction.

16. The invention defined in claim 15 further characterized by placing a plate with a plug opening against the surface of the ball; inserting the plug through the opening in the plate; and providing a connection between the plug and plate to hold the plate on the surface of the ball.

17. The invention defined in claim 16 further characterized by connecting the plate to an external object whereby the ball will be restricted against movement away from the object.

18. A method of locking a bowling ball against use comprising: inserting the stem portion of a mushroom shaped plug into a finger opening until the head of the plug lies on the surface of the bowling ball; expanding the stem portion toward the wall of the opening until the surface thereof frictionally engages the wall of the opening, and contracting the stem portion lengthwise of the opening whereby upon contact of the surface with the

wall the contraction will tighten the head against the ball surface; and locking the stem portion against both expansion and contraction.

19. A method of locking a bowling ball against use comprising: placing a plate with an opening on the surface of the ball with the opening in registry with a finger opening, inserting the stem portion of a mushroom shaped plug through the plate opening and into the finger opening until the head of the plug lies on the surface of the plate; expanding the stem portion toward the wall of the finger opening until the surface thereof frictionally engages the wall of the finger opening, and contracting the stem portion lengthwise of the opening whereby upon contact of the surface with the wall the contraction will tighten the head against the plate; locking the stem portion against both expansion and contraction, and anchoring the plate to a fixed object.

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