March 29, 1955 G. WALLER 2,705,148

AERIAL MISSILE BALL

Filed July 25, 1952

Fig. 1.

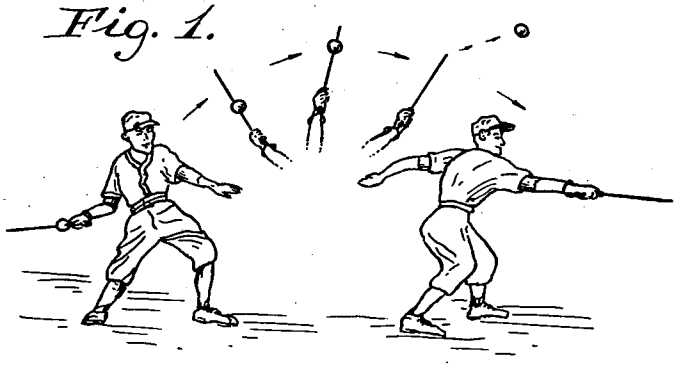


Fig. 2.

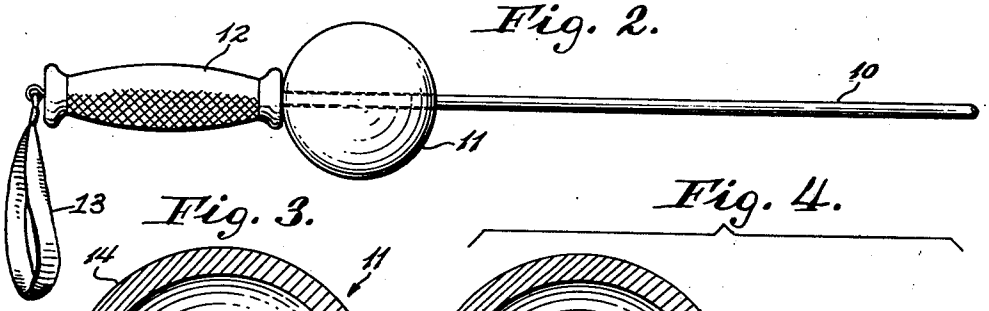


Fig. 3.

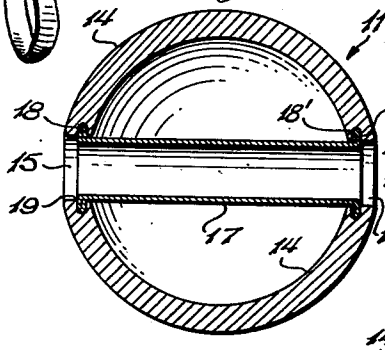


Fig. 4.

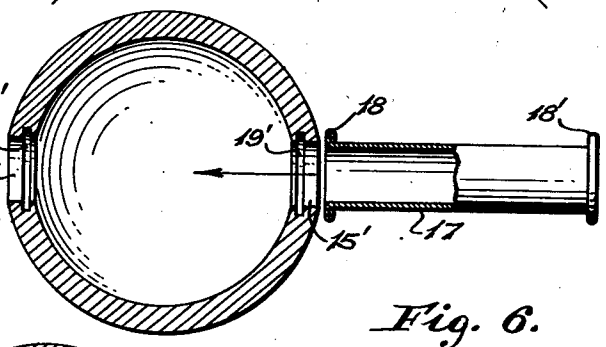


Fig. 5.

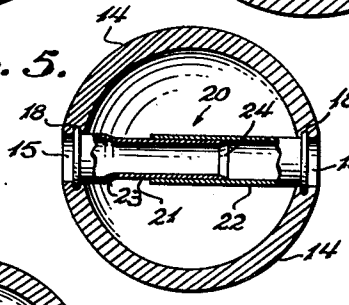


Fig. 6.

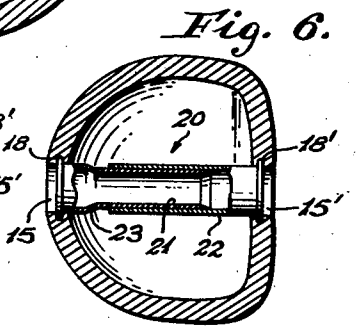
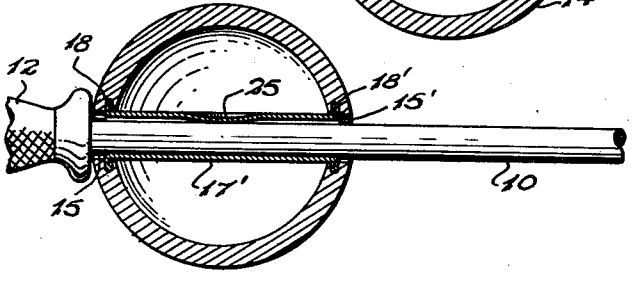


Fig. 7.



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2,705,148

AERIAL MISSILE BALL

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6 Claims. (Cl. 273—106)

My invention relates generally to games or amusement devices, and more particularly to a ball throwing or ball projecting game in which the ball employed is characterized by its ready adaptability to the projecting device while at the same time maintaining all normal ball characteristics required by a ball player.

The game for which the ball is especially adapted is played with a throwing or projecting shaft over which the ball is slid so that if the player grasps the shaft at one end with the ball near his hand and executes the proper throwing motion, the ball will be projected off the stick by centrifugal force, as will be hereinafter more fully described. I have found that the ball can be thrown great distances and with great speed and accuracy.

It is, therefore, a primary object of my invention to provide a ball which is adapted to be slid over a projecting shaft or stick while at the same time maintaining all normal and desirable ball characteristics.

I have found that a solid ball is unacceptable because if caught by a player at high speeds considerable sting is experienced. Therefore it is desirable to make the ball hollow thereby greatly reducing the stinging effect. However, a hollow ball having very thin walls I have found unacceptable since it is too light and does not possess the required inertia for projecting it from the throwing shaft. Furthermore, a very thin-walled ball may bounce too much for this type of game.

I have found that the ideal ball adaptable to the above described game should be hollow to minimize stinging, and yet should have walls of sufficient thickness to provide the proper inertial characteristics required by the game.

In order that the ball may be slid over the throwing stick, I have provided two diametrically opposite openings or holes in the walls of the hollow ball. Also, in order that the end of the stick does not catch on the openings as it leaves the stick, I have provided a tubular member extending through the ball, the ends of which are embedded or secured to the hole-defining portions of the walls of the ball. In one modification of my invention I have formed the tube in two portions which fit one over the other in telescopic relation to thereby increase the resiliency of the ball along the tube diameter thereof. In another modification, I have provided the tube with an inwardly projecting resilient shaft-engaging portion for purposes to be hereinafter more fully described.

Having generally described the nature of my invention, I refer now to the appended drawings illustrating the preferred embodiments thereof; the drawings aiding the understanding of the following detailed description of my invention.

In the drawings:

Fig. 1 is a pictorial view of my invention in use;

Fig. 2 is an elevational view of a ball mounted on the projecting shaft ready for use,

Fig. 3 is a sectional view of the ball showing the details of its construction;

Fig. 4 is an exploded sectional view similar to Fig. 3;

Fig. 5 is a sectional view of a modification of my invention;

Fig. 6 is a view similar to Fig. 5 in which the operation of the modification is illustrated; and,

Fig. 7 is a view similar to Fig. 1 showing another modification of my invention.

Referring now to the drawings, wherein like reference characters designate corresponding or similar parts in the various views, **10** indicates the throwing or projecting

shaft over which the ball **11** is slid. The shaft may be provided with a handle **12** and a wrist strap **13**. Thus the player may grasp the handle **12** with the wrist strap over his wrist and project the ball to a fellow player. Then, on receiving a return throw, the player may use both hands to catch the ball without having to put down its throwing shaft. The shaft may be made of any suitable rigid, smooth material such as wood or metal. I have found that for outdoor use the overall length of the shaft, exclusive of the handle, may be approximately twenty-two inches while the handle into which the shaft is secured may be approximately eight inches long.

The ball **11** is preferably made of an elastic material such as rubber and is made hollow, for the above-mentioned reasons, and may be, for example, about 2½ inches in diameter. I have found that a wall thickness of between ¼" and ⅜" is desirable to give the ball sufficient inertia to be carried off the end of the stick **10** by centrifugal force. Also, such a wall thickness provides excellent anchorage for the ends of internal tube, to be described. Thus, the walls **14** of the ball **11** are provided with preferably circular openings **15** and **15'** which lie on a common diameter of the ball **11**. A tube **17** is provided, as described, having its ends flanged or bent as shown at **18** and **18'** so that the ends can be securely embedded and held in annular slots or grooves **19** and **19'** in the openings **15** and **15'** by the compressive force exerted by the elastic material of which the ball is fashioned. Of course annular grooves **19—19'** may be omitted if the character of the rubber or other material out of which the ball **11** is fashioned is resilient enough to enable the flanged ends **18—18'** to embed themselves in the walls of the openings **15—15'**. As shown particularly in Fig. 4, the diameter of the flanges **18—18'** is substantially larger than the diameter of the openings **15—15'** and the grooves **19—19'** have a diameter slightly smaller than the diameter of the flanges **18—18'** so that flanged ends of the tube **17** will be securely held in the openings by the compressive action of the elastic material. The tube **17** may be made of any suitable material such as aluminum, brass, steel, etc., and may be of a thickness of about 1/32" to 1/16 inch. Of course, the internal diameter of the tube, as described above, should be slightly larger than the diameter of the shaft over which it is to fit. I have found that a clearance of 1/32 to 3/64 inch to be sufficient.

It will be noted that in the form of my invention shown in Figs. 3 and 4 the holes **15—15'** are quite long and that the grooves **19—19'** are located toward the inner end of these holes. This is important because this structure provides protection for the flanged ends **18—18'** of the tube **17**. Furthermore, if the ball should happen to land on the end of the tube **17** there will be a certain amount of resiliency left and the ball will bounce to a degree and not land like a "dud."

In playing the game, the player grasps the handle **12** with the strap **13** around his wrist and places the ball over the end of the projecting stick **10** and slides it down to the end of the handle. Then, keeping in mind the overhand motion of a pitcher (see Fig. 1), he brings his arm forward and at a time determined by the speed of the overhand stroke and/or the amount of the backswing, the ball will fly off the end of the stick by centrifugal force. I have found that with practice great speed and accuracy can be obtained. I have also found that with an overhand swing the ball can be thrown to great heights and thus provide fielders with practice at receiving "high flies." Of course, with different throwing motions a great variety of ball trajectories can be obtained—from the above-mentioned "high flies" to "liners" and "grounders."

In Figs. 5 and 6 I have shown a modification of my invention wherein the single tube **17** of Figs. 3 and 4 is replaced by a two element tube **20**. As shown, the tube **20** comprises two elements **21** and **22** each having one end flanged as at **18** and **18'**, respectively, as in Figs. 3 and 4, for securing the sections **21—22** to the walls **14** of the ball **11**. The diameter of section **21** is reduced at **23** so that it will fit within the tube element **22** thus forming a telescopic structure. The inner end of element **21** is tapered as at **24** so that if the stick is inserted

through the tube from the right, the end of the stick won't catch on the end of the tube element.

In this embodiment of my invention it can be seen that if the ball should land on the tube diameter of the ball, the two tube elements **21—22** are free to move within each other thereby providing substantially normal compressibility as shown in Fig. 6 and normal bounce of the ball is possible. The natural tendency of the ball to return to its spherical shape will return the telescopic tube elements **21—22** to their original extended position as shown in Fig. 5. Of course it may be desirable, under certain circumstances, to provide a spring to return the ball to its spherical form. This may be accomplished by placing a coil spring around the tube **20** with its ends butting against the ball walls **14** adjacent the flanges **18—18'**.

In another modification of my invention shown in Fig. 7, I have provided the tube member **17** with a shaft-engaging resilient detent portion or flexible finger **25**. This finger may be formed by cutting parallel slits part way along the tube wall and bending the resulting free portion of the tube wall inwardly. Thus there is provided a portion of the tube which is of smaller diameter than the normal diameter of the tube so that when the shaft is inserted through the tube the detent or finger **25** will frictionally engage the shaft. This frictional engagement should be rather light because it should not materially affect the trajectory of the ball. The main advantage gained by providing the friction between the tube and the shaft is that the player may very accurately control the direction and height of the projected ball by varying the placement of the ball on the shaft. For example if the ball is placed at the butt of the shaft, the player may obtain maximum height and speed. If he places the ball near the free end of the shaft, minimum range and speed is obtained. Likewise, various ball trajectories may be obtained by properly selecting the point along the shaft at which the ball is placed. Another important advantage gained by this modification is that when the ball is placed on the shaft it will remain in position until the player projects it. For example, if, in throwing the ball, the player let the tip or free end of the shaft drop below the horizontal the ball will not slide off the stick by action of gravity. I have found this a great advantage because in performing the proper overhand throwing motion it is not necessary to keep the tip of the stick above the level of the hand.

Since many changes could be made in the above described construction and many apparently widely different embodiments of this invention could be made without departure from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. A game ball adapted to be slidably overfitted on an elongated shaft for projection therefrom by centrifugal force when said shaft is swung by an operator, said ball comprising a hollow body of elastic material and having a pair of diametrically opposite openings in the wall thereof, an open-ended cylindrical tube of substantially rigid material having an internal diameter slightly greater than the diameter of said shaft and extending from opening to opening within said hollow body, said openings having a diameter substantially equal to the external diameter of said tube, and a flange at each end of said tube having a diameter substantially greater than the external diameter of said tube whereby the flanged ends of said tube will be securely held in the openings in said body wall by the compressive action of said elastic material.

2. A game ball adapted to be slidably overfitted on an elongated shaft for projection therefrom by centrifugal force when said shaft is swung by an operator, said ball comprising a hollow body of elastic material and having a pair of diametrically opposite openings in the wall thereof, an open-ended cylindrical tube of substantially rigid material having an internal diameter slightly greater than the diameter of said shaft and extending from opening to opening within said hollow body, said openings having a diameter substantially equal to the external diameter of said tube, a flange at each end of said tube each having a diameter substantially larger than the external diameter of said tube, and annular grooves in the body wall defining said openings, said grooves having a depth slightly smaller than the diameter of said flanges whereby the flanged ends of said tube will be securely held in the openings in said body wall by the compressive action of said elastic material.

3. A game ball adapted to be slidably overfitted on an elongated shaft for projection therefrom by centrifugal force when said shaft is swung by an operator, said ball comprising a hollow, substantially thick walled body of elastic material and having a pair of diametrically opposite openings in the wall thereof, an open-ended cylindrical tube of substantially rigid material having an internal diameter slightly greater than the diameter of said shaft and extending from opening to opening within said hollow body, a flange at each end of said tube having a diameter substantially larger than the external diameter of said tube, and annular grooves in the body wall defining said openings, said grooves having a depth slightly smaller than the diameter of said flanges whereby the flanged ends of said tube will be securely held in the openings of said body wall by the compressive action of said elastic material, and said grooves further being disposed closely adjacent the internal surface of said hollow body such that the flanged ends of said tube will lie at a substantial distance from the exterior surface of said hollow body whereby to provide a substantially elastic surface adjacent said rigid tube member.

4. A game ball adapted to be slidably overfitted on an elongated shaft for projection therefrom by centrifugal force when said shaft is swung by an operator, said ball comprising a hollow body of elastic material and having a pair of diametrically opposite openings in the wall thereof, an open-ended cylindrical tube of substantially rigid material having an internal diameter slightly greater than the diameter of said shaft and extending from opening to opening within said hollow body, said tubular member comprising at least two telescopically interfitting tube portions, and means for securing one end of each tube portion in the opening-defining wall of said hollow body, whereby said ball may be depressed along any diameter thereof including the diameter along which said tubular member extends.

5. A game ball of the character set forth in claim 4 wherein each portion of said tubular member is substantially shorter than the diameter of said ball but substantially longer than the radius of said ball.

6. A game ball of the character set forth in claim 4 wherein said securing means comprises a flange at one end of each of said tube portions having a diameter substantially greater than the diameter of each of said tube portions and said wall openings having a diameter substantially equal to the external diameter of each of said tube portions whereby the flanged ends of said tube portions will be securely held in said openings by the compressive action of said elastic material.

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