April 8, 1969 F. G. J. GRISÉ 3,437,340

AERIAL PROJECTILE

Filed May 3, 1967

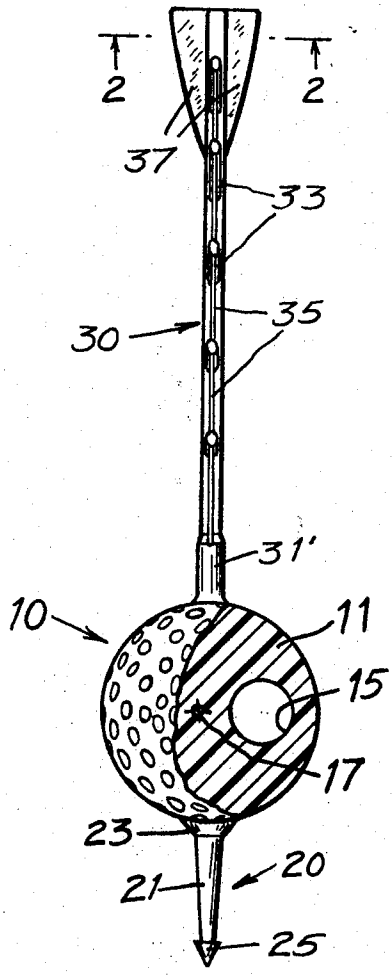


FIG. 1

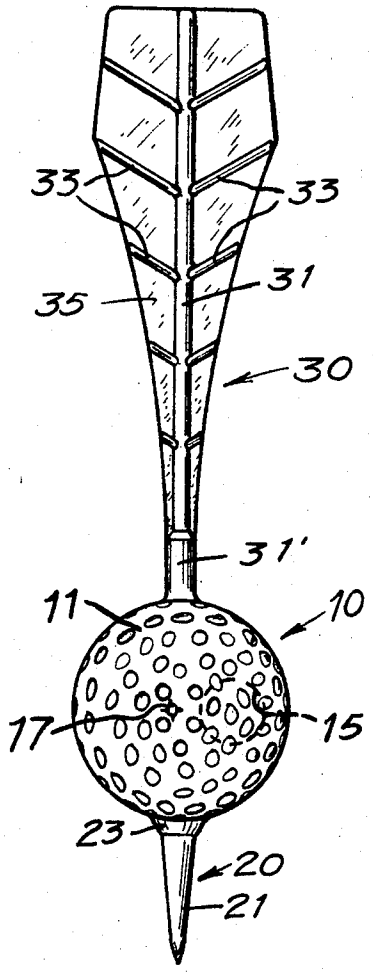


FIG. 3

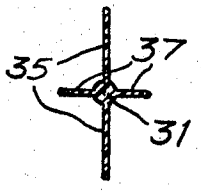


FIG. 2

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AERIAL PROJECTILE

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ABSTRACT OF THE DISCLOSURE

A unitary golf ball dart with an unbalanced weighted spherical body, an integral tee-shaped point projecting radially therefrom in one direction, and an integral flat elongated flexible very thin guide vane, stiffened by a single central and pairs of branching relatively thicker ribs, projecting radially therefrom in the opposite direction.

Background of the invention

This invention relates to projectiles used in aerial games, and particularly to such a projectile arranged to simulate a golf ball and to be hit by a golf club.

The prior art includes Osgood Patent No. 2,213,637 disclosing an aerial projectile comprising a rubber ball having the appearance and size of a golf ball, with a bore therethrough containing one end of a flexible rubber tube and a weight in the form of a threaded shank with a rounded end projecting beyond one side of the ball and midway within the free end of the flexible tube and with a pointed end projecting beyond the other side of the ball, and an elongated wooden shaft, with one end inserted in the free end of the flexible tube and split to receive two feather stabilizing vanes secured by rings encircling the tapered shaft.

The prior art also includes Smith et al. Patent No. 3,198,526 disclosing a lightweight hollow ball comprising a perforate shell structure of plastic material and an attachment comprising a shaft extending diametrically of the shell having a weighted point extending outwardly from one side of the shell, having a guide fin structure projecting outwardly from the other side of the shell, and having an integral fastener for retaining the shaft in the shell.

The aerial projectile of Osgood is characterized by a desirable concentration of weight in the ball **1**, but it also includes a substantial amount of weight relatively remote from the ball in the wooden shaft **8** supporting the stabilizing vanes **15** and **18**. Moreover, the Osgood aerial projectile consists of eight separate parts manufactured individually and then assembled.

Currently known techniques for molding plastics would seem to suggest molding such an aerial projectile directly in one piece. However, such a configuration varying from a very heavy section at the ball to very thin sections at the stabilizing vanes does not lend itself to successful fabrication by any previously recognized plastic molding techniques.

The corresponding embodiment of a practice golf ball shown in FIG. 2 of Smith et al. evidently includes no more than half as many separate parts, all consisting of relatively thin sections, so that this configuration of the Smith et al. ball could be produced in one piece by known plastic molding techniques.

Unfortunately, such a ball, regardless of its method of manufacture, would still not provide any substantial concentration of weight in the spherical body of the ball consisting entirely of a thin section.

Summary

The instant invention provides an aerial projectile and more particularly a golf ball dart arranged to be set up

on turf or in a driving tee such as the one illustrated in Osgood Patent No. 2,432,209 to be driven by a golf club, and characterized by a relatively hard and heavy spherical body portion the size and substantially the weight of a standard golf ball associated with a tee-shaped point and a relatively long, very thin, flexible guide vane portion in a configuration uniquely adapted to be produced directly in one piece using an established plastic molding technique.

The key to this unique capability of the golf ball dart comprising the instant invention is the arrangement of a central rib and pairs of ribs branching therefrom of sufficient cross section and so distributed over the area of the guide vane portion as to permit a fluid plastic molding material to flash between the respective ribs and form the entire very thin membrane constituting the remainder of the guide vane portion interconnecting and supported by the several ribs.

The instant invention also provides a golf ball dart so arranged and balanced its mode of flight is a clear indication of the degree of skill with which it has been struck by a golf club. If the golf ball dart is hit squarely, it travels a straight path in a stable attitude with its point forward and its guide vane portion in a relatively fixed trailing position. Alternatively, if the golf ball dart is hit so as to produce a hook or a slice, it follows an exaggerated arcuate path to the left or right of the desired path with the guide vane portion gyrating around the line of flight so that its free end describes a circular path generally concentric to the line of flight.

The latter capability of the golf ball dart comprising the instant invention is attributed to an arrangement whereby the weight of the spherical body portion is so distributed its center of gravity is at least slightly offset radially from a given central axis about which the golf ball dart is symmetrical.

Thus, it is an object of the present invention to provide a golf ball dart with almost all of its weight concentrated in its spherical body portion and having a relatively long, very thin, and flexible guide vane portion, yet capable of being molded directly into a unitary one piece assembly, and a further object of the present invention to provide a golf ball dart responsive to its mode of flight to the manner in which it has been struck by a golf club, so that it may serve to instruct a golfer in the proper use of a golf club.

Brief description of the drawing

FIG. 1 is a side view, partially broken away of the preferred embodiment of the instant invention,

FIG. 2 is a sectional view taken on line **2—2** of FIG. 1, and FIG. 3 is a front view of a slightly modified embodiment of the instant invention.

Description of the preferred embodiment

Referring now to the drawing, wherein like reference numerals refer to like or corresponding parts, and particularly to FIG. 1, reference numeral **10** generally designates a golf ball dart including a spherical body portion **11**, an integral pointed portion generally designated by reference numeral **20**, and an integral guide vane portion generally designated by the reference numeral **30**.

As indicated in FIG. 1, the spherical body portion **11** is composed almost entirely of a solid plastic material. However, due to normal shrinkage of the plastic material as the mold is cooled, a relatively small void **15** is formed within the body **11**. By controlling the manner in which the mold is cooled after the golf ball dart **10** is formed within the mold, the void **15** can be located in the preferred location displaced radially from the central axis of symmetry, so the center of gravity **17** of the spherical body portion **11** is offset radially from the cen-

tral axis of symmetry. In this manner, the golf ball dart is given the degree of unbalance which makes it respond to the manner in which it is struck by a golf club with the different modes of flight described above.

In order to best simulate a regulation golf ball, the spherical body portion is preferably made the size and substantially the weight of a standard golf ball, and may be provided on the surface of the spherical body portion with a series of depressions of the size and shape and at the spacing provided on a standard golf ball.

The tee-shaped pointed portion **20** including a tapered shank **21** is preferably joined to the spherical body portion by a faired or flared section **23** as shown in FIG. 1, and may also include a slightly enlarged pointed tip **25** as shown in FIG. 1, to hold the golf ball dart more firmly in place when it is driven against a vertical target such as the one illustrated in Osgood Patent No. 2,432,209.

Since the guide vane portions **30** of the respective embodiments of the instant invention are identical aside from the inclusion of a pair of small stabilizing fins **37** in the embodiment illustrated in FIG. 1, the following description of the guide vane portion **30** relates to FIG. 3 as well as to FIG. 1. The guide vane portion **30** includes an elongated central rib **31** and several spaced pairs of ribs **33** branching from opposite sides thereof and also extending to the periphery of the guide vane portion **30**. The guide vane portion **30** also includes a very thin and light membrane **35** interconnecting and supported by the ribs **31** and **33**, in turn joined to the spherical body portion **11** through a short section **31'** of rib **31** somewhat heavier in cross section than the remainder of rib **31** as shown in FIGS. 1 and 3.

The guide vane portion illustrated in FIG. 1 also includes an opposed pair of small stabilizing fins **37** supported on opposite sides of the central rib **31** adjacent its free outer end and disposed in a plane perpendicular to the plane of membrane **35** as shown in FIG. 2.

The small stabilizing fins **37** serve to suppress the gyration of the guide vane portion **30** about the line of flight, so that only a relatively large deviation from the proper manner of striking a golf ball will be indicated by gyration of the guide vane **30**. Thus, the embodiment of a golf ball dart illustrated in FIGS. 1 and 2 is most suitable for the use of a golfer with a relatively limited degree of golfing skill.

The embodiment of a golf ball dart illustrated in FIG. 3, omitting the small stabilizing fins **37**, is responsive in its mode of flight to even a small deviation from the proper manner of striking a golf ball. Thus, this embodiment of a golf ball dart is most suitable for the use of a golfer with a high degree of golfing skill.

The view of FIG. 3 shows to best advantage the peripheral shape of the guide vane portion common to both embodiments of the golf ball dart illustrated in the drawing, consisting of a relatively wide transverse section at and near the free outer end of the guide vane portion, and tapered to a minimum transverse section the width of the central rib adjacent to the spherical body portion.

The embodiment in FIG. 3 also includes a modified tee-shaped pointed portion not including an enlarged pointed tip **25**, unnecessary when the driven golf ball dart is allowed to strike the ground rather than a vertical target.

Both embodiments of the instant invention may be made from any plastic material such as nylon or polyethylene or the like, moldable by known molding techniques and suitable to form in a single molding operation a unitary golf ball dart having a relatively hard and heavy spherical body portion, a relatively stiff pointed portion, and a relatively light and flexible guide vane portion.

While it has been indicated above the unbalanced weight of the spherical body portion is conveniently achieved by the presence of a radially offset void, it will be readily apparent the same unbalance can be achieved by incorporating within the molded spherical body portion a concentrated relatively heavier weight offset radially from the central axis of symmetry.

What is claimed is:

1. An aerial projectile adapted to be driven by a hand-held club, comprising a relatively hard and heavy spherical body portion, a relatively short and stiff pointed portion projecting radially from one side of said body portion and integrally connected thereto, a relatively long, very thin, and flexible guide vane portion projecting radially from the opposite side of said body portion and integrally connected thereto, said portions all being symmetrical about a given axis extending diametrically of said body portion and along the longitudinal axes of said pointed portion and said guide vane portion, said guide vane portion including an elongated central rib extending lengthwide thereof, spaced pairs of branching ribs extending from opposite sides of said central rib to a peripehral edge of said guide vane portion, and very thin planar membranes having a thickness less than the thickness of said ribs and interconnecting and supported by said central rib and said pairs of branching ribs, all of said portions, ribs and membranes having structural characteristics resulting from having been simultaneously made and interconnected in a one step molding operation.

2. An aerial projectile as described in claim **1**, wherein said guide vane portion is relatively wide at and adjacent its free end and is tapered to a minimum width at its other end adjoining said body portion.

3. An aerial projectile as described in claim **2**, wherein said central rib also supports an opposed pair of stabilizing fins perpendicular to said guide vane portion adjacent its free end.

4. An aerial projectile as described in claim **1**, wherein said body portion is the same size as and substantially the same weight as a golf ball.

5. An aerial projectile as described in claim **1**, wherein the weight of said body portion is so distributed within said body portion as to have a center of gravity offset from the given axis of symmetry.

6. An aerial projectile as described in claim **5**, wherein said spherical body portion encloses a relatively small void centered about a point offset from the given axis of symmetry and is otherwise solid.

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U.S. Cl. X.R.

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