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MacDonald et al.

[11] **3,884,466**

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[54] **GAME BALL**

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[52] **U.S. Cl.** .... **273/65 EC;** 273/65 EE; 273/65 EF; 273/65 EG; 273/DIG. 20

[51] **Int. Cl.** **A63b 41/00**

[58] **Field of Search** ..... 273/106, 106.5, 58, 65, 273/199 R, 55 R; 46/60, 74

[56] **References Cited**

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Primary Examiner—George J. Marlo

[57] **ABSTRACT**

A game ball shaped like a football includes an air passage extending along the longitudinal axis thereof. The diameter of the air passage tapers from the opposite ends thereof to a constricted opening midway of the length thereof. The ball may be provided with a symmetrical arrangement of relatively heavy weights encircling the constricted opening.

3 Claims, 5 Drawing Figures

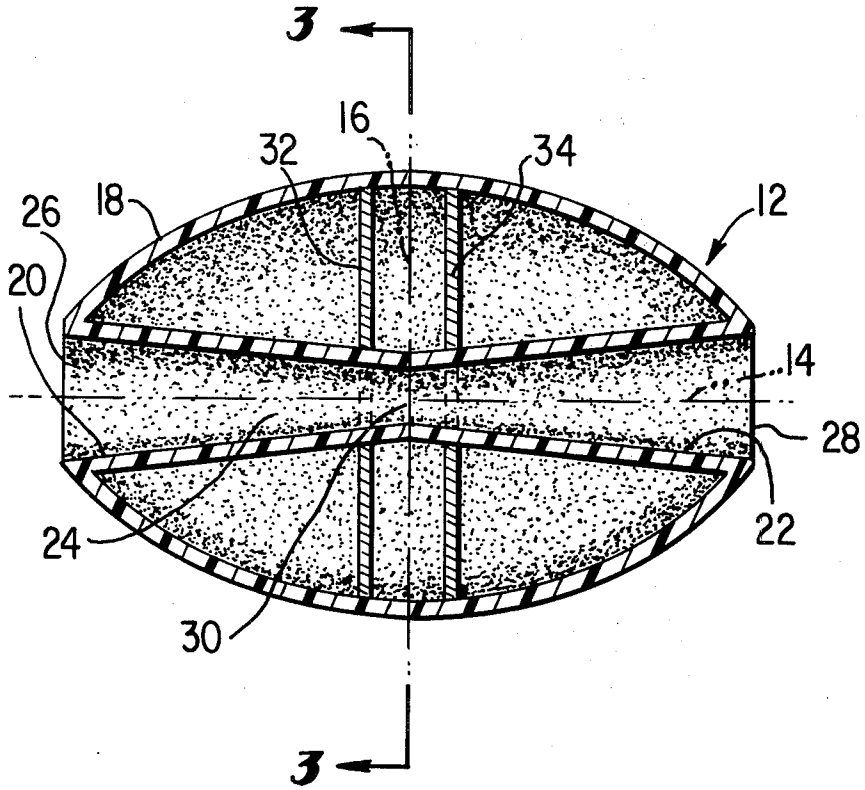


FIG. 1

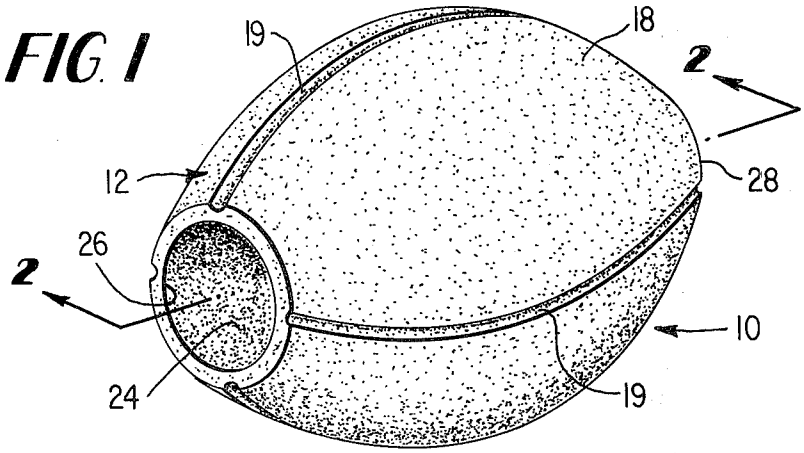


FIG. 2

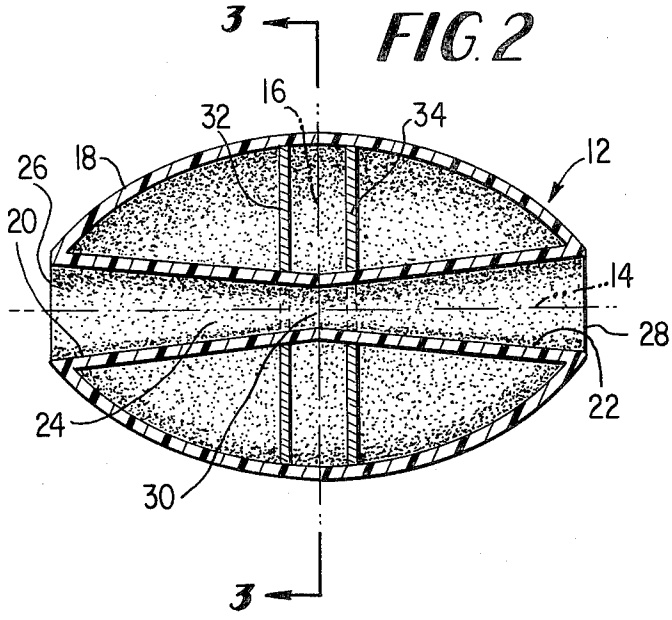
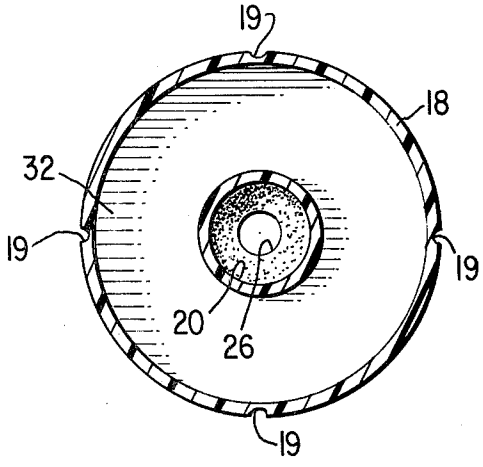


FIG. 3



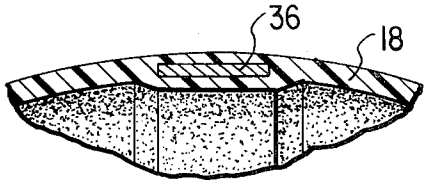


FIG. 4

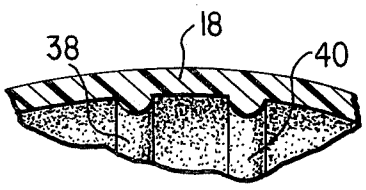


FIG. 5

GAME BALL

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention pertains to missiles and, more particularly, to missiles, such as game balls, adapted to be thrown through the air.

2. Description of the Prior Art

U.S. Pat. Nos. 1,023,504, 1,346,991, 1,597,308, 1,826,221, 2,902,023 and 3,002,314 are representative of prior art devices relating to aerial missiles; however, such prior art devices are specifically structured for specific purposes unrelated to the present invention.

In throwing or hurling a missile, such as a game ball, hand grenade or the like, distance and accuracy are dependent upon control of the missile in the hand. Distance and accuracy are particularly difficult to control for missiles having a longitudinal axis longer than a lateral axis, such as a football, in that the missile must be perfectly thrown to rotate or spin about the longitudinal axis in order to obtain maximum distance and accuracy. The precision and coordination required to throw a football limits the number of people who can enjoy all facets of the sport of football as well as the number of people who can find enjoyment and relaxation in simply passing and catching a football.

SUMMARY OF THE INVENTION

The present invention is generally characterized in a missile adapted to be thrown through the air including a body and wall means forming a passage extending through the body to permit air flow therethrough, the body having an inconstant cross section therealong.

Accordingly, it is a primary object of the present invention to overcome the above-described difficulties in throwing a missile by constructing a missile with an air passage therethrough.

Another object of the present invention is to construct a missile with an air passage therethrough of inconstant cross section therealong.

A further object of the present invention is to form an air passage having a venturi-like configuration in a missile having an oblate spheroid shape, such as a football.

The present invention has an additional object in that rotation of a missile about its longitudinal axis is enhanced by channeling air through a central constriction in a passage aligned with the longitudinal axis such that the missile rights or adjusts itself to rotate about the longitudinal axis.

Yet another object of the present invention is to dispose weights in a body of a missile symmetrically about an axis transverse to an axis along which an air passage extends through the body.

Some of the advantages of the present invention over the prior art are that the missile of the present invention can be thrown great distances with increased accuracy and can be easily and inexpensively produced.

Other objects and advantages of the present invention will become apparent from the following description of the preferred embodiment taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of an aerial missile according to the present invention;

FIG. **2** is a longitudinal cross section taken along line **2—2** of FIG. **1**;

FIG. **3** is a cross section taken along line **3—3** of FIG. **2**;

FIG. **4** is a broken view in longitudinal section of a modification of the missile of the present invention; and

FIG. **5** is a broken view in longitudinal section of another modification of the missile of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

An aerial missile **10** according to the present invention is illustrated in FIGS. **1, 2** and **3** and includes a body **12** having an oblate spheroid configuration, such as that of a football, with transverse longitudinal and lateral axes **14** and **16,** respectively, longitudinal axis **14** being longer than lateral axis **16** and defining an axis of rotation for the missile when thrown through the air. The body **12** is generally hollow and formed of any suitable material which is lightweight, pliable and easily molded; in the particular embodiments of the present invention, a plastic material was utilized. Body **12** includes an outer casing **18** having equally spaced grooves **19** therein and providing the football-like, oblate spheroid configuration and a pair of continuous, frusto-conical walls **20** and **22** forming an air passage **24** from an opening **26** on one side of the body **12** to an opening **28** in the opposite side of the body. The passage **24** is coaxial with the longitudinal axis **14** of the body and is symmetrical about the lateral axis **16** of the body.

As is shown in FIG. **2,** the passage **24** has a venturi-like configuration with the constriction or point of smallest cross section **30** disposed at the lateral axis **16** such that openings **26** and **28** have greater cross-sectional areas than constriction **30.** While passage **24** is preferably defined by frusto-conical walls as described above and shown in FIG. **2,** the passage **24** can have any desired configuration with the cross section thereof being inconstant or varying along the longitudinal axis **14** to channel air through the body **12.**

A pair of discs **32** and **34** are disposed in the body **12** symmetrically with respect to lateral axis **16** and in parallel planes transverse to the longitudinal axis **14.** The discs **32** and **34** are formed of a heavy material, such as lead, to add additional weight to the missile **10** and can be mounted between walls **20** and **22** and casing **18** in any suitable manner, such as by being partially embedded therein or by retaining ribs formed on the body **12.**

Modifications of the missile **10** are illustrated in FIGS. **4** and **5** wherein additional weight is provided for the missile by a cylindrical band **36** of heavy material, such as lead, embedded in the casing **18** aligned with the lateral axis **16** and by forming the casing **18** with a pair of annular, thickened ribs **38** and **40** disposed in parallel planes transverse to the longitudinal axis **14** and symmetrical about the lateral axis **16,** respectively.

In order to throw the aerial missile **10** of the present invention, one wraps his hand around outer casing **18** in the same manner as a football is grasped and, upon throwing movement of the arm, the missile **10** is released to impart a spin or rotation to the missile generally about the longitudinal axis **14.** The channeling of air through the passage **24** will correct for any imprecision in release of the football to assure its rotation about the longitudinal axis; and, since air resistance is

minimized with the missile rotating about its longitudinal axis, the missile can be thrown great distances with increased accuracy. The symmetrical arrangement of the additional weight in accordance with any of the modifications of FIGS. **1–5** provides momentum and stability for the missile **10** without creating any imbalance which would adversely affect rotation about the longitudinal axis.

While the body **12** of the missile **10** has been illustrated as an oblate spheroid, the body can have any desired configuration, such as a sphere, a spheroid, an ellipsoid or the like, such configuration preferably being a shape of figure or revolution. Thus, any conventional game ball, such as a baseball, a softball, a football or the like, as well as any object or projectile adapted to be thrown or projected through the air can be constructed in accordance with the present invention. The passage **24** can have any cross section inconstant along its length, such as a hyperbola, a venturi funnel, or any irregular cross section, it being preferable that the configuration of the passage **24** permit smooth laminar-like air flow therethrough.

Inasmuch as the present invention is subject to many variations, modifications and changes in detail, it is intended that all matter described above or shown in the accompanying drawings be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. A ball having an oblate spheroid contour being substantially symmetrical about a longitudinal axis and adapted to be manually thrown through the air, having a through passage in said longitudinal direction, said passage forming a cross-sectional air passage which has maximum crosssectional area at opposing longitudinal ends of said ball and continuously decreasing to a minimum cross-sectional area at substantially a mid-point region between said opposing ends.

2. The ball as recited in claim **1** where said ball includes weight means disposed symmetrically about said mid-point region with respect to said longitudinal axis.

3. The ball as recited in claim **2** where said weight means includes at least a pair of disc members secured internal said ball on opposing sides of said mid-point region.

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