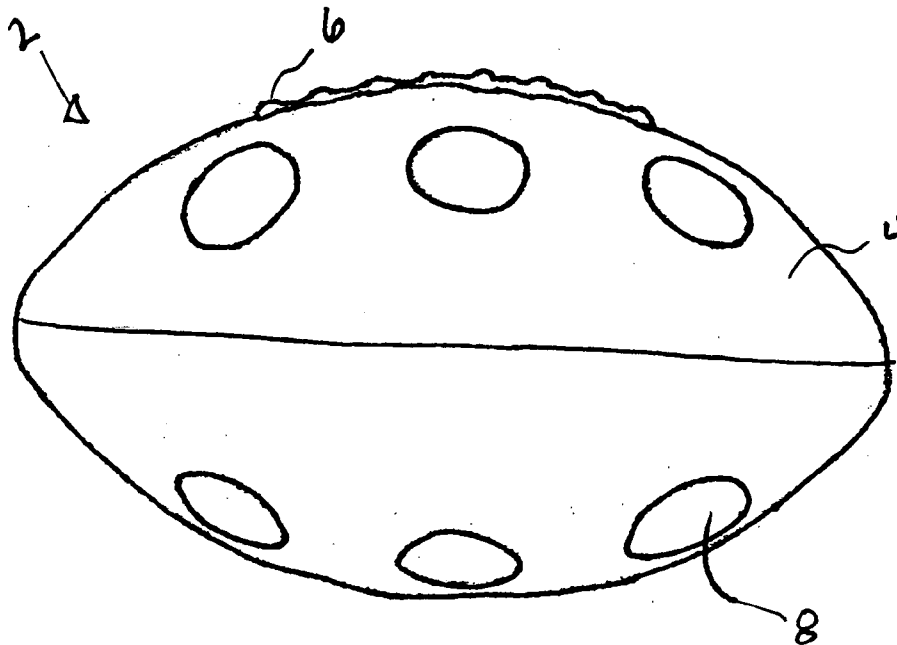


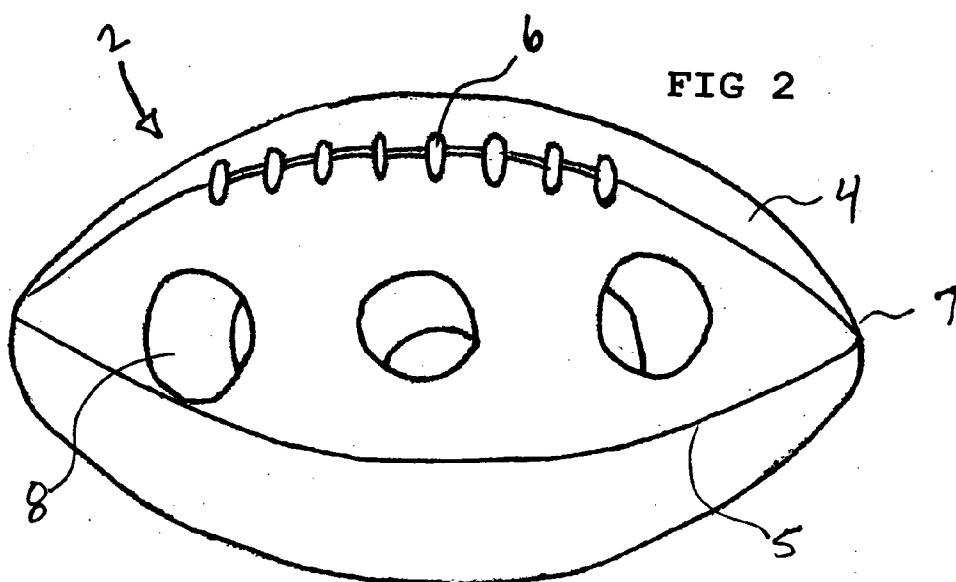
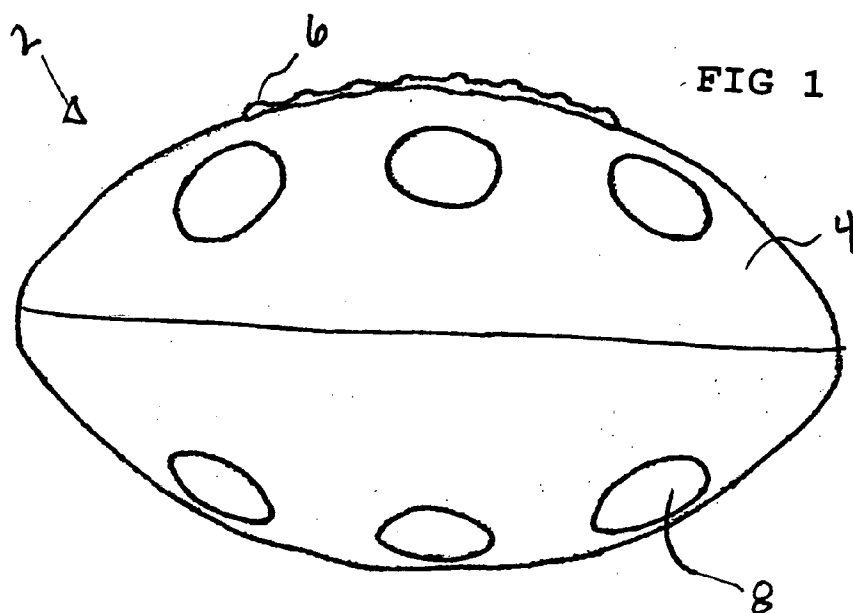


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**Smith**(10) **Pub. No.: US 2009/0191990 A1**(43) **Pub. Date: Jul. 30, 2009**(54) **LIGHTED SPORTS PROJECTILE****Publication Classification**(76) Inventor: **Carson Smith**, Oregon City, OR  
(US)(51) **Int. Cl.**  
**A63B 43/06** (2006.01)(52) **U.S. Cl.** ..... **473/570**(57) **ABSTRACT**Correspondence Address:  
**MARK S. HUBERT P.C.**  
**516 SE MORRISON- SUITE 1200**  
**PORTLAND, OR 97214 (US)**

A sports projectile illuminated with a chemiluminescent light stick capable of producing a stroboscopic effect. The body is made of a soft, pliable material such as NERF® and the light stick(s) is carried through bores in the body. There are no ancillary components, only the light stick(s) and the soft, pliable body. Orifices or various other shapes are cut into the body of the sports projections allowing for the maximum light transmission.

(21) Appl. No.: **12/011,803**(22) Filed: **Jan. 29, 2008**



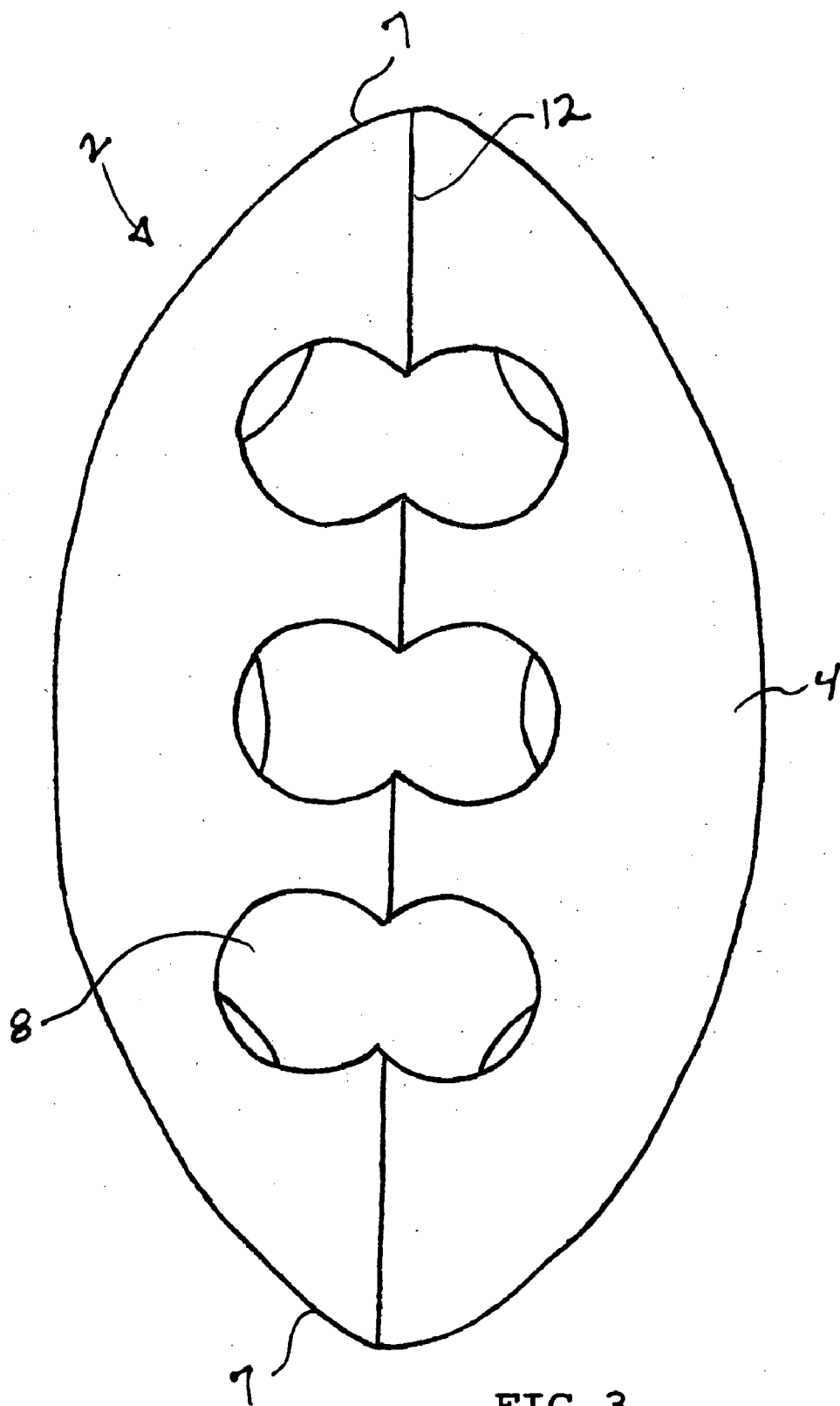
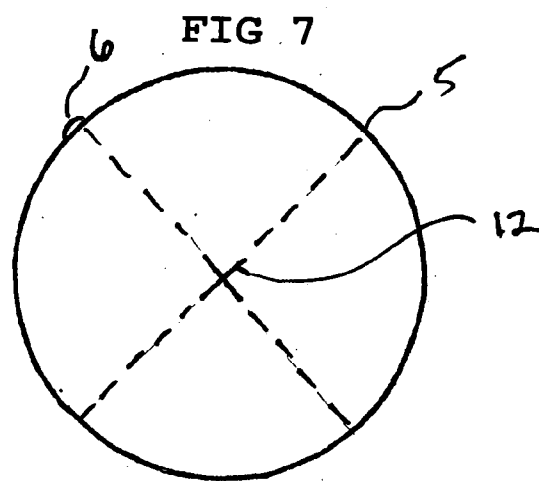
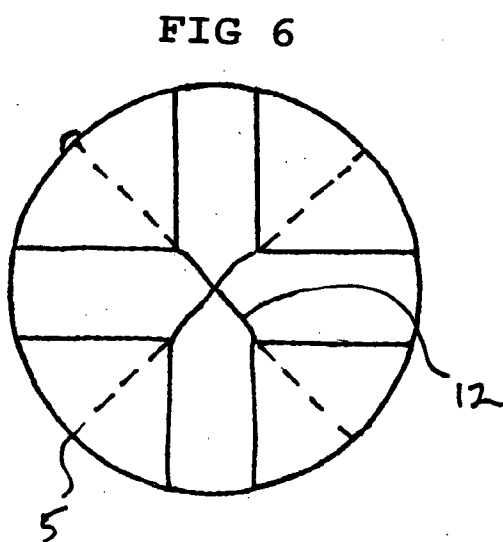
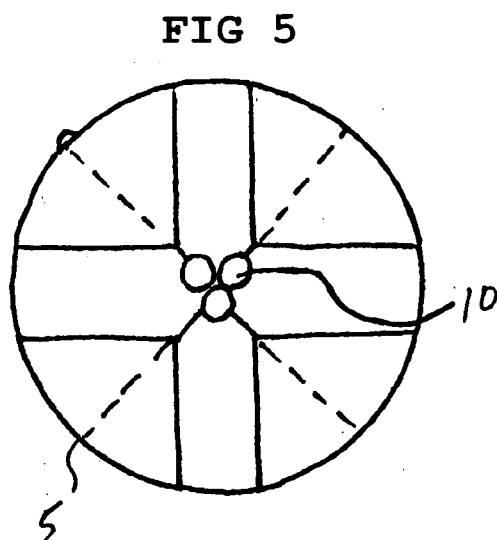
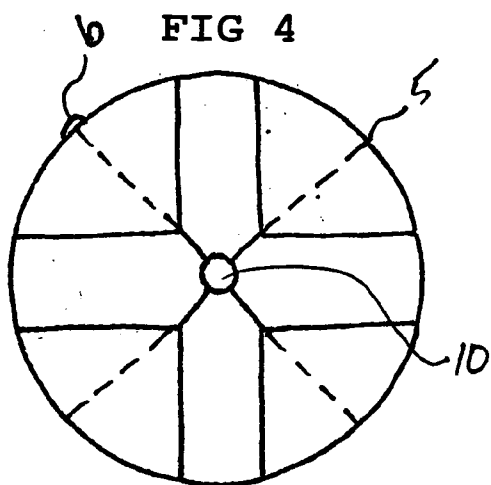
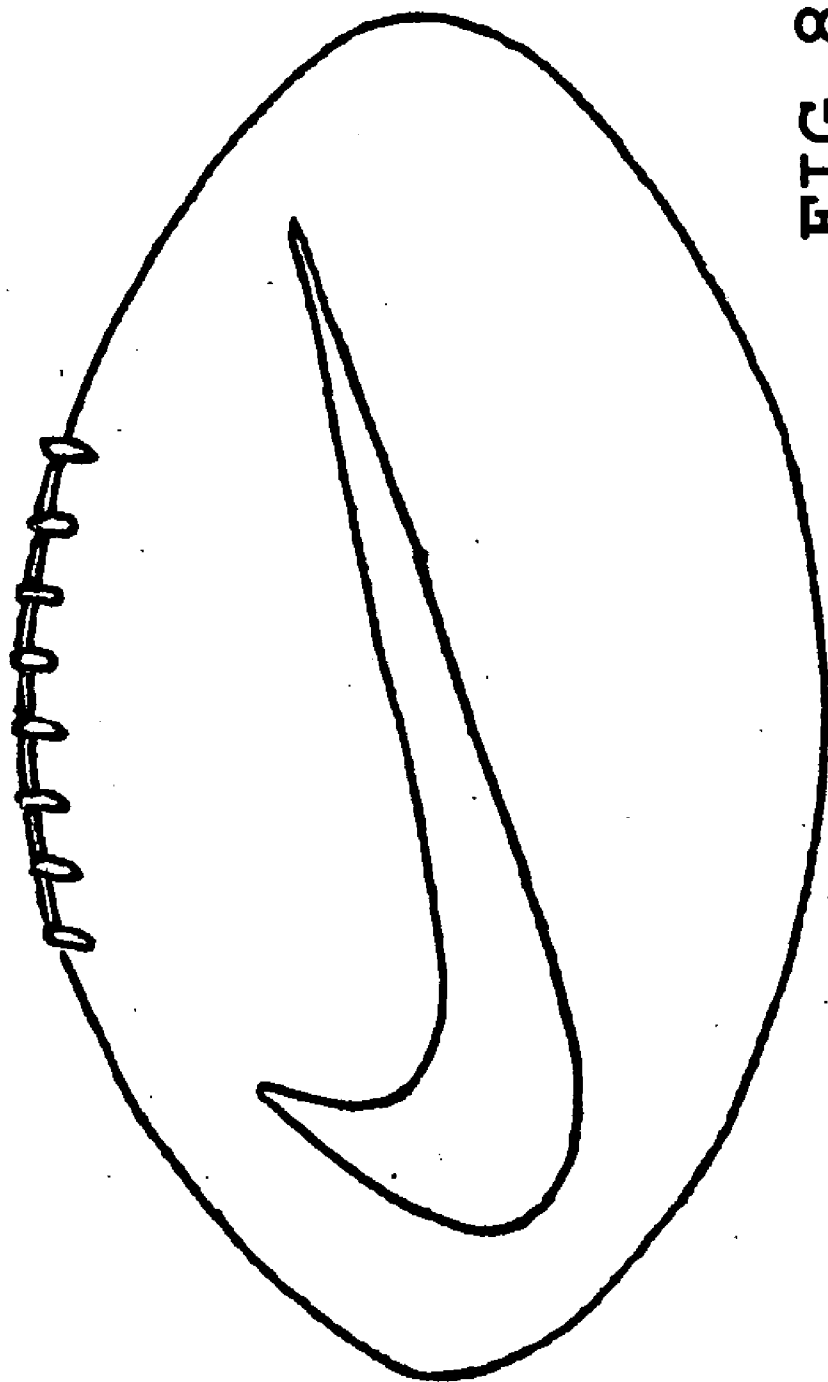


FIG 3





**FIG 8**

## LIGHTED SPORTS PROJECTILE

### BACKGROUND OF THE INVENTION

[0001] The present invention relates to a sports projectile that is adapted for use in low light situations. It is designed to provide safety and a minimal of damage potential, while presenting an aesthetically appealing throwing projectile. More particularly, the present invention relates to a soft, durable, spongy football that presents as an alluring toy to market to sports enthusiasts of all ages; perfect for evening tailgating events.

[0002] In the past, previous attempts to illuminate sports balls have relied heavily on battery powered devices. Such devices require numerous components (i.e., batteries, light emitting elements such as light bulbs, and the housing units for these components). All of these additional components are cumbersome and the added weight increases the chance for injury or property damage should the projectile not be caught by the intended recipient.

[0003] Recently, various sports balls have been coated with a phosphorescent paint or material. The ball has to be "charged" by exposure to light in order to "glow-in-the-dark." This approach, allows the game ball to remain light weight, but does not provide a very intense light.

[0004] Additionally, sports balls have been developed that use chemiluminescent light sticks. One such device is shown in U.S. Pat. No. 5,683,316 to Campbell. A game ball is shown which includes hollow tubular flexible housing for receiving the chemiluminescent light stick. The problem with additional internal components still exists; additional weight is added decreasing the safety factor and potentially altering the aerodynamics of the ball. U.S. Pat. No. 6,726,580 to Peterson also discusses plastic tubing to hold the light stick and threaded screw caps, for retaining the light stick. These additional elements are not soft and can lead to injury.

[0005] A significant feature of the present invention is the complete omission of any additional parts; there is simply the spongy, foam-like projectile and the chemiluminescent light stick. Orifices are bored through the spongy, foam-like material, allowing the projectile to be extremely light weight, and the additional safety benefit of providing a simulated stroboscopic effect (temporal aliasing) when thrown. Since there is nothing between the light emitted by the chemiluminescent light stick and the human eye, the highest optical efficiency is achieved. The ball comes alive as light is cast out from its orifices as it bounces, spins, or moves.

[0006] Henceforth, a lighted, spongy sports projectile, with no additional components, capable of producing a stroboscopic effect would fulfill a long felt need in the sports industry. This new invention utilizes and combines known and new technologies in a unique and novel configuration to overcome the aforementioned problems and accomplish this.

### SUMMARY OF THE INVENTION

[0007] The general purpose of the present invention, which will be described subsequently in greater detail, is to provide a novel lighted sports projectile, which is not anticipated, rendered obvious, suggested, or even implied by any of the prior art, either alone or in any combination thereof.

[0008] In accordance with the invention, an object of the present invention is to provide an improved lighted sports projectile with the maximum light transmission.

[0009] It is another object of this invention to provide an improved lighted sports projectile with enhanced safety features.

[0010] It is a further object of this invention to provide an improved lighted sports projectile that is easy to throw and catch.

[0011] It is still a further object of this invention to provide an improved lighted sports projectile capable of producing a stroboscopic effect.

[0012] It is still a further object of this invention to provide an improved lighted sports projectile capable of producing varying degrees of light intensity.

[0013] It is yet a further object of this invention to provide an improved lighted sports projectile that is water resistant.

[0014] The subject matter of the present invention is particularly pointed out and distinctly claimed in the concluding portion of this specification. However, both the organization and method of operation, together with further advantages and objects thereof, may best be understood by reference to the following description taken in connection with accompanying drawings wherein like reference characters refer to like elements. Other objects, features and aspects of the present invention are discussed in greater detail below.

[0015] In this respect, before explaining at least one embodiment of the invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and to the arrangements of the components set forth in the following description or illustrated in the drawings. The invention is capable of other embodiments and of being practiced and carried out in various ways. Also, it is to be understood that the phraseology and terminology employed herein are for the purpose of descriptions and should not be regarded as limiting.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0016] FIG. 1 is a side perspective view of the lighted sports projectile;

[0017] FIG. 2 is a side perspective view of the lighted sports projectile rotated approximately 45 degrees;

[0018] FIG. 3 is a longitudinal cross-sectional view;

[0019] FIG. 4 is an axial cross-section view taken at the midpoint of the lighted sports projectile with a chemiluminescent light stick inserted;

[0020] FIG. 5 is an axial cross-section view taken at the midpoint of the lighted sports projectile with multiple chemiluminescent light sticks inserted;

[0021] FIG. 6 is an axial cross-section view taken at the midpoint of the lighted sports projectile with the chemiluminescent light stick withdrawn;

[0022] FIG. 7 is an axial cross-section taken at the  $\frac{1}{4}$  and  $\frac{3}{4}$  positions along the longitudinal axis of the projectile;

[0023] FIG. 8 is a side perspective view of an alternative embodiment of the projectile illustrating a sport's logo thereon.

### DETAILED DESCRIPTION

[0024] The preferred embodiment of lighted sports projectile according to this invention is illustrated in FIGS. 1 and 2. Its novel design provides for the following features that enhance the safety factor of utilizing this invention in the dark: limited mass (by massive orifice sizes), limited velocity (due to reduced mass and friction introduced by the massive orifices), adjustable overall mass and velocity for experi-

enced players (by addition of numerous light sticks), compressibility, adjustable brightness (by adding more light sticks for differing conditions), stroboscopic effect (enhanced by the large orifices), maximum light transmission, enhanced gripability (from the large orifices) and a monolithic structure (no ejected pieces).

[0025] In the illustrated embodiment the illuminated projectile is shaped like a standard American football 2. Body 4 of football 2 is made from a soft, spongy polymer material. One such material is commonly known as a NERF®. NERF is made from a solid, spongy cellular material produced by the reaction of polyester with a diisocyanate while carbon dioxide is liberated by the reaction of a carboxyl with the isocyanate. Polyester resin reacts with a compound while CO<sub>2</sub> is simultaneously released by another reaction. It is this gas that creates open pockets within the polyurethane that, in turn, makes the material soft and light. Use of the NERF® material reduces the mass of the object and subsequently the potential for injury should someone or something be struck by the ball.

[0026] Referring now to FIGS. 4, 5, and 6 for illustrative purposes body 4 is marked into quarter sections by four exterior longitudinal grooves spaced 90° apart 5. Body 4 includes simulated laces 6 (made of the NERF® material) in the style of a regulation American football. Additionally, the body 4, includes twelve round orifices 8 extending axially into the midpoint of the body 4 (only six are visible in FIG. 1). FIG. 4 shows the axial cross-section of the preferred embodiment at the mid-point of the football 2 with one light stick 10, while FIG. 5 shows the axial cross-section at the mid-point of football 2 with three light sticks 10 and FIG. 6 shows the axial cross-section of the preferred embodiment at the mid-point of the football 2 with no light stick. There are four sets of orifices 8 bored normally inward from the side of body 4. Each set of orifices is arranged in groups of three orifices wherein the three orifices' midpoints are aligned along an axis extending between the ends of the football. There are four of these axes equally spaced about the exterior of the football. In this configuration all orifices 8 the same distance from the end of the football meet up at a point along the longitudinal center axis of the football.

[0027] The orifices 8 allow the highest degree of light transmission from the chemiluminescent light stick 10. Since there is no additional barriers between the light stick 10 and the human eye, there is no additional refraction of the emitted light. The emitted light travels directly from the light stick to the eye.

[0028] The orifices 8 limit the mass of the football 2, which in turn limits the at speed the object can be thrown further decreasing the risk of injury should the football not be caught by the intended recipient. Additionally, the orifices 8, serve as an additional means to grip the football 2, making the football 2, easier to catch again decreasing the risk of injury. The combination of the spin imparted by throwing of the football 2, and the light emitted from the four orifice sets creates a stroboscopic effect, increasing the visibility and hence safety of the football 2.

[0029] A typical commercial light stick 10 consists of a glass vial holding a hydrogen peroxide solution encased in a plastic tube holding a phenyl oxalate ester and a dye. When the plastic tube is bent the fragile glass vial is broken and the two solutions mix. The chemicals immediately react to one another, and the atoms begin emitting light. The particular dye used in the chemical solution gives the light a distinctive color.

[0030] Referring now to FIG. 3, the body 4 includes a cut 12 along the longitudinal centerline extending internally along the entire length of body 4 and extending through the two ends of the football. The perforation 12 (or X slit) allows the light stick 10 to be inserted (slidably engaged) into the body 4 through either end 7 of football 2. Perforation 12 serves as a "sloppy fit" bore although in reality it is just an "X" shaped cut. (Reference FIGS. 6 and 7 at the 1/3, middle and 2/3 positions of the football.) This "sloppy fit" easily accommodates any variations in length and diameter of light sticks 10 produced by different manufactures. The compressibility of the NERF® material allows 1 or more light sticks 10 to be inserted via perforation 12 into the same body 4 to increase brightness (See FIGS. 4 and 5). This X slit 12 design allows the football 2 to remain as a monolithic foam unit as the x slit 12 extends from end to end of the football 2 and can be made by passing a long razor cutter through the football 2. This allows simplification in fabrication. Essentially, the present invention can be made from an existing foam sports throwing object with a minimum of tooling, procedures and cost. Since it is the friction of the light stick with the foam in the x slit 12 that retains the light stick 10 in place, as more sticks are added, the foam is compressed more and the friction increases. This is important as it secures the light sticks 10 further as the football gains mass and can be thrown faster and further. This serves as another self regulating safety feature. Essentially, there is no cavity in which to retain the light sticks.

[0031] Once light stick 10 has been activated and inserted into the body 4, through the x slit 12, the football 2 can be thrown at night or in dimly lit places. The football's visibility is safely linked to the velocity and distance with which the football can be thrown. As the number of light sticks 10 utilized at once increases, so does the football's overall mass and the distance the object can be thrown. Thus the safety feature is self regulating. FIG. 8 illustrates an alternative embodiment when different shapes could be cut into the body of the projectile. The large orifices act to increase the wind drag along the surface and thus increase the spiraling effect when the ball is thrown. This in turn speeds up the stroboscopic effect, thereby enhanced visibility.

[0032] The overall end to end length about the surface of the projectile is approximately 10-12 inches, the diameter is approximately 5-6 inches and the orifice diameter is 1-2 inches, with the preferred embodiment having dimensions of 11 inches 5.5 inches and 1.5 inches respectively. This dimension is dictated primarily by the size of commercially available light sticks 10.

[0033] The above description will enable any person skilled in the art to make and use this invention. It also sets forth the best modes for carrying out this invention. There are numerous variations and modifications thereof that will also remain readily apparent to others skilled in the art, now that the general principles of the present invention have been disclosed.

[0034] As such, those skilled in the art will appreciate that the conception, upon which this disclosure is based, may readily be utilized as a basis for the designing of other structures, methods and systems for carrying out the several purposes of the present invention. For example other sports throwing projectiles may be similarly configured such as softballs, baseballs etc. It is important, therefore, that the

claims be regarded as including such equivalent constructions insofar as they do not depart from the spirit and scope of the present invention.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is as follows:

1. An illuminated sports projectile comprising:  
a monolithic body; and  
at least one chemiluminescent light stick, wherein said light stick is visibly housed within said body.
2. The illuminated sports projectile of claim 1 wherein said projectile is made of a compressible spongy material which has at least one cut along the longitudinal centerline of the body, and wherein said body has at least two orifices extending from an outer surface of said body normally to said longitudinal centerline of said body.
3. The illuminated sports projectile of claim 2 wherein said orifices intersect.
4. The illuminated sports projectile of claim 3 wherein said projectile is in the shape of a football, with an oval of revolution configuration having two ends.
5. The illuminated sports projectile of claim 4 wherein said number of orifices is 12 and are arranged in 4 substantially similar sets of 3 orifices with the midpoints of each set equally

spaced along a line extending between the ends of said football, and wherein said sets are arranged equidistant from adjacent sets.

6. The illuminated sports projectile of claim 5 wherein there are three intersections formed by the convergences of one orifice from each set.

7. The illuminated sports projectile of claim 6 wherein said orifices are circular right cylinders.

8. The illuminated sports projectile of claim 7 wherein the number of light sticks is one.

9. The illuminated sports projectile of claim 7 wherein the number of light sticks is two.

10. The illuminated sports projectile of claim 7 wherein the number of light sticks is three.

11. The illuminated sports projectile of claim 7 wherein said orifices are cylindrical designs selected from the set of designs including sports team logos, sporting good manufacturers logos.

12. The illuminated sports projectile of claim 6 wherein the number of cuts is two and said cuts intersect.

13. The illuminated sports projectile of claim 1 wherein said projectile is configured in the shape of a sports ball selected from the set of sports balls including, soccer balls, footballs, basketballs, softballs, rugby balls and golfballs.

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