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None

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UK CL (Edition O) **A6D D2A**
INT CL^6 **A63B 41/00 41/02 41/08 41/10**

(54) Metal inflatable ball

(57) An inflatable ball comprises an inner inflatable layer made of sheet metal, intermediate layers of webbing sprayed with latex and wire mesh, and an outer layer of polyurethane foam. The ball carries an inflation valve and comprises a counterbalance thereto. The surface may be set out to a dimple pattern. The ball may be used as a football.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1995

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

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THE AERODYNAMICALLY CONTROLLABLE SOCCERBALL 2000

The most sluggish thing on a football pitch, is the ball. It is old-fashioned, imbalanced, too deformable, too heavy, and aerodynamically non-functional. It will hardly bounce at all, it hurts your foot when you kick it, especially when it is wet, and there is justifiably serious concern amongst the medical profession, that it can cause or contribute directly towards, the onset and/or development, of degenerative brain and nervous system conditions, due to the fact that the head is often used to strike or deflect its heavy old inertial mass. Reducing its (materials) weight makes it even less playable, as it then starts to behave like a balloon. Pumping up its pressure makes it more bouncy, but adds weight, stretches and splits the stitching, and renders it painfully hard to strike. That old leather patchwork football is useless and redundant.

The all new ACS 2000 is not a development of that old football. The ACS 2000 is a totally new and original conception: a purpose designed, light weight, big bounce, low inertia, high performance, high velocity, aerodynamically controllable; modern Soccer projectile: which will transform the game of Soccer into a faster paced, more interesting and exciting and more skillfully executed sporting spectacle - with more goals per match guaranteed as an inbuilt design objective.

CONSTRUCTION, MANUFACTURE AND MATERIALS

The ACS 2000 consists of:

A. The inner layer (or 'skin')

B. The intermediate layer

C. The outer layer

D. Inflation valve and reciprocal counterbalancing

Each layer contributes particular elements to the overall performance capabilities of the ball.

A.

THE INNER LAYER

Utilising existing aluminium can manufacturing technology and processes, form two perfect hemispheres of fine gauge mild tempered soft steel, so that the equator line clean cut edges will sit flush face to face with no gap or overlap and permanent weld into one perfect sphere with no imbalance or imperfection of any practical consequence.

Prior to joining the two hemispheres, implant and permanently weld into place, a non return inflation valve (see section D. for specification) into one hemisphere, or make a small cut out on both equator lines and weld the valve into place during the joining process.

Inflate the sphere to a pressure that will render it rigid enough to enable it to sit on a flat level surface and not exhibit any measurable deformation through the polar and equatorial planes.

NOTE:

The inner sphere provides shape and bounce, and its essential purpose, is to act as a non-deformable, or minimally deformable spring. The inner layer, in conjunction with the intermediate layer, is designed to do for the ACS 2000, what the steel belting does for the pneumatic tyre wall: i.e. it provides spring, shape, strength, rigidity and reformability.

Further inflate (A) to its pre-determined final pressure, so that it behaves as a solid when handled by man or machine, and so that layer B can be applied without any consequential deformation of A during the process.

Permanently seal valve. Scour surface with wire wool to provide a key for (B).

B.
THE INTERMEDIATE LAYER

With superglue or some other appropriate bonding agent, six pieces of hessian type webbing (of nylon, jute, or hemp), each extending from pole to pole in longitude, and across sixty degrees in the equatorial plane, are clean cut butt joined and bonded to A, so that the surface is completely covered with no overlap and no gap.

Spray with latex.

Form (utilising similar process to that for A) two clean cut perfect hemispheres, of fine guage mild tempered soft steel closely woven wire mesh; and tightly enclose A with mesh hemispheres permanently joined at the equator, with no imbalance or imperfection of any practical consequence.

Rotate sphere through 90 degrees and repeat webbing process. Spray with latex.

Enclose sphere with second wire mesh basket, so that wire mesh equators one and two, are opposed 90 degrees.

Spray with resin / nylon to provide a suitably receptive surface for the outer layer.

NOTE:

The intermediate layer acts as previously stated in conjunction with the inner layer, and also acts as a natural cushion and shock absorber, to prevent any kinking of A in extreme circumstances.

C.

THE OUTER LAYER

If an ACS 2000 were painted white, and photographed sitting in the middle of a well manicured lawn, then an observer of the picture in the frame, might be forgiven for thinking that he was looking at a golf ball.

SURFACE ELEMENTS

The fundamental concept of the Aerodynamically Controllable Soccerball 2000 is very simple, because it is the application of the same Natural Principle that gives the golf ball its aerodynamic qualities.

In the case of the golf ball, it is the physical effect of air turbulence, caused by pressure differentials produced by the dimpled surface, that results in its ability to fly and display, a wide range of controllable short and long distance trajectories; incorporating varying degrees and/or combinations of applied topspin, underspin or sidespin (i.e. hook, slice, fade, drag etc.).

The number of dimples per unit area, their perimeter profiles, and their depth, are variable factors that have a direct determining influence on the particular aerodynamic performance capabilities of the ball. And in the case of the ACS 2000, which is envisaged with such a dimpled surface, the actual diameter, depth, and perimeter profile of the number of dimples required to produce optimum soccerball performance, can be determined once the total weight (which itself is an important variable in the equation) has been determined.

Bearing in mind the fact that the inner layer is designed to be minimallly deformable and inflated to high pressure, and that the aerodynamic qualities of the ACS 2000 will increase the number of opportunities for the player to head the ball during the course of a game, and that the surface is dimpled: the user-friendly surface layer of the ACS 2000, is envisaged as a resilient and hard wearing, yet compressible sponge-like material*, similar in density to pumice stone, but soft and flexible - not hard: so that when the ball is struck by the head, the outer layer also acts as a shock absorber between the skull and the cushioned inner layer, while the inner layer in conjunction with the intermediate layer, serve(s) to maximise the transfer of energy from the head to the ball, and minmise the inertial impact of the ball on the skull.

*Something similar to a compound like PolyUrethane foam, of the type that is used for cavity wall insulation is one possibility, as such can be sprayed onto the intermediate layer, and then surface-formed and heat or cold set in a press. The outer layer can be bonded to the intermediate layer and finished, using an application of the same process that is used to apply and dimple the plastic surface layer, to a golf ball.

D.
INFLATION VALVE

The design objective, is to produce (within physical limits), a perfectly spherical minimally deformable, big bounce, light weight, low inertia, spring loaded, aerodynamically controllable, high velocity modern Soccer projectile: that does not contain any inbuilt imbalance, gravitational or aerodynamic, so that it is capable of being delivered from one place to another, through a wide variety of rolling, bouncing, and airborne trajectories, with predictable pinpoint accuracy by the skillful player.

The size and weight of the inflation valve is best kept to a minimum. And with the valve permanently implanted into the inner layer at (say) the north pole, the resulting gravitational imbalance will cause a wobble and a precession as the ball flies through the air, and so an element of unpredictability will be evident in its trajectory.

VALVE WEIGHT COUNTERBALANCE

A drop of solder, equal in mass to the valve and positioned at the south pole on the interior surface of the inner sphere (A), prior to sealing it, will act as an effective counterbalance through the polar plane. Four further drops of equal mass will be required at 0, 90, 180 and 270 degrees on the equatorial plane.

INFLATION

As the health and sporting objective, is to produce a ball that weighs as little as possible and is yet fully controllable, I think it might be a good idea to inflate the ACS 2000 to high pressure with Helium. This will serve to keep its inertial mass and weight to a minimum, and to enhance its high velocity spring loaded aerodynamic qualities.

SURFACE APPEARANCE

The material of the ACS 2000 surface layer, can be made in any colour, and can be painted or decorated in any number of plain or spectacular ways.

The geometrical principles of the Geodesic Dome, allow for a wide variety of pattern options and the functional objective is to combine the depth, perimeter profile(s) and number of dimples , to produce a surface on which all points are aerodynamically equivalent to each other.

The exact pattern and configuration of the surface layer can be determined once the weight of the end product has been determined.

CLAIMS

1.
A unique type of ball designed for recreational and sporting purposes, the fundamental conceptual element of which is a perfect sphere, including five-point internally located valve weight counterbalancing to render it gravitationally equivalent throughout; formed of sheet metal and inflated to high pressure to render it minimally deformable, and permanently sealed.

2.
A metal sphere as claimed in Claim 1, where the sphere is covered by bonding onto it, layers of webbing latex and wire mesh which act as a shock-absorbent cushion.

3.
A metal sphere as claimed in Claim 1 or Claim 2, where the sphere is covered by bonding onto its surface, a layer of resilient foam compound which is heat or cold set with a dimpled surface, the pattern and configuration of which, is an expression of the geometrical principles of the 'Geodesic Dome' and the practical purpose of which, is to produce a surface with optimum aerodynamically functional characteristics throughout.

The Patent Office

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Claims searched: 1 to 3 **Date of search:** 21 February 1997

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

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Other:

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
	NONE	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.