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(54) Improvements in and relating to playballs.

(57) Hollow non-inflated sportsball consisting of a shell
formed from foamed ethylene-vinyl-acetate co-polymer.

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DESCRIPTION

Hollow inflated sportsballs are well known and many superior sportsballs are made from ethylene-vinyl-acetate co-polymer (E.V.A.). No hollow uninflated sportsball has hitherto been made in E.V.A. The present invention is based on the surprising discovery that a hollow non-inflated sportsball can be made from E.V.A.

Thus, in accordance with the present invention there is provided a hollow non-inflated sportsball consisting of a shell formed from a foamed E.V.A.

The invention also provides a method of manufacturing a hollow non-inflated sportsball comprising the steps of heating a measured quantity of finely ground E.V.A. to which has been preblended a small quantity of a blowing agent having a gas evolution substantially at the fusion temperature of the E.V.A. in a rotating mould until the material is distributed evenly throughout the mould, fused

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and cured, the mould then being cooled and opened to release the ball.

The ball is then decorated and coated with a polyurethane flexible lacquer to increase its resistance to scuffing. The E.V.A. may comprise a blend of E.V.A. with pigments.

By the term sportsball is herein meant a ball in the size range eight to eleven inches in diameter (203 to 280 mm) which range includes inter alia the size 5 and size 4 Rugby ball, the basket ball, the five-a-side and volley ball together with the football and netball. Diameter is taken to mean in the case of a non-spherical ball the longest sectional chord through the ball.

All these sportsballs have to possess specific properties of bounce, hitherto obtained by internal pressurization, and it is surprising that in accordance with the present invention the sportsball is not inflated yet possesses good bounce properties and is not susceptible to puncture.

The shell has a wall thickness of at least $1/30$ th of the said diameter of the ball. It is preferred to make the wall of the shell within the size range six to eight millimetres.

The mix of the composition of the wall of the shell is preferred to be in the ranges set out below -

45 wt. % to 75 wt. % of A the remainder except for impurities and pigment if any being B, where A is 28 wt. % of vinyl acetate melting index 5.0 ground to 400μ remainder ethylene vinyl co-polymer and where B is 18 wt. % of vinyl acetate melting index 150 ground to 300μ remainder ethylene vinyl co-polymer.

To the mix a blowing agent is added the agent being chosen to give gas evolution at the fusion temperature of the said composition said agent being provided in the mix at one hundredth part $\pm 0.5\%$ of the total weight of the mix. The heating of the mix and blowing agent is effected at a suitable temperature within limits of $\pm 5^{\circ}$.

EXAMPLE

An eight and one half inch diameter (220 mm) split spherical mould was charged with a mix of 400 grammes of 50 wt. % of A the remainder plus impurities being B, where A was 28 wt. % of vinyl acetate melting index 5.0 ground to 400 μ remainder ethylene vinyl co-polymer and where B was 18 wt. % of vinyl acetate melting index 150 ground to 300 μ remainder ethylene vinyl co-polymer to said mix was added 4.3 grammes of an activated formulated azodicarbonamide blowing agent.

The mould was closed and clamped and whilst rotating in two orthogonal planes it was heated to approximately 270°C for some ten minutes by hot air.

The foamed E.V.A. was fully cured after ten minutes and the rotating mould was cooled. At the completion of cooling the mould was opened and the ball removed.

The ball was found to have a wall thickness of 0.275 inch (6.98 mm) and was decorated and

coated with a polyurethane lacquer to increase its resistance to wear and scuffing.

CLAIMS

1. A hollow non-inflated sportsball as herein defined consisting of a shell formed from foamed ethylene-vinyl-acetate co-polymer.
2. The hollow non-inflated sportsball according to claim 1, wherein the thickness of the shell is at least 1/30th of the diameter as herein defined of the ball.
3. A method of manufacturing a hollow non-inflated sportsball comprising the steps of heating a quantity of powdered ethylene vinyl acetate co-polymer together with a blowing agent providing an evolution of gas substantially at the fusion temperature of the ethylene vinyl acetate in a rotating mould that is heated until the foamed ethylene vinyl acetate is evenly distributed within the mould and cured.

4. The method according to claim 3 wherein the mould is given a mix of 45 wt.% to 75 wt.% of A the remainder except for impurities and pigment if any being B; where A is 28 wt.% of vinyl acetate melting index 5.0 ground to 400 μ remainder ethylene vinyl co-polymer and where B is 18 wt.% of vinyl acetate melting index 150 ground to 300 μ remainder ethylene vinyl co-polymer to which is added a 1/100th part of the said mix by weight of a blowing agent that evolves gas substantially at a temperature of fusion of the mix to foam said mix.

5. The method according to claim 4 wherein the mould is given a mix of 50 wt.% to 70 wt.% of A.

6. The method according to claim 4 or claim 5 wherein the blowing agent is azodicarbonamide.

7. A method of manufacturing a hollow non-inflated sportsball with particular reference to the single Example given above.

8. A method of manufacturing a hollow non-inflated sportsball substantially as herein described.



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DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.3)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
	DE - A1 - 2 723 625 (DELACOSTE) * claims 1, 11, 14, 15; page 19, lines 1 to 4 and 12 to 18 *	1,3,4,6,7	A 63 B 39/00 A 63 B 45/00 B 29 C 5/04
	DE - U - 7 426 417 (OBERMAIER) * claim 1; page 1, lines 7 to 11; page 3, lines 25 to 32 *	1,3	
A	FR - A - 1 094 707 (DELACOSTE) * whole document *	1,3	TECHNICAL FIELDS SEARCHED (Int. Cl.3)
A	US - A - 2 838 798 (P. REKETTYE) * column 1, lines 39 to 57 *	1	
A	FR - A - 1 173 486 (V. & E. PLASTICS LTD.) * abstract, points 1 and 3 *	3	A 63 B 39/00 A 63 B 41/00 A 63 B 45/00 B 29 C 5/04
A	FR - A1 - 2 360 324 (CHEVRIER) * claims 1, 2 *	3	
A	GB - A - 1 055 467 (DUNLOP RUBBER CO. LTD.) * claim 5 *	7	CATEGORY OF CITED DOCUMENTS X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
☒ The present search report has been drawn up for all claims			&: member of the same patent family, corresponding document
Place of search Berlin		Date of completion of the search 06-01-1982	Examiner CLOT



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DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
P	Chemical Abstracts .95, no. 6, 10 August 1981 Columbus, Ohio, USA SUMITOMO CHEMICAL CO. "Crosslinked cellular olefin polymer balls contain- ing core" page 50, column 2, abstract no. 44374r & JP - A - 81 - 17233 (19.02.1981) -----	1,3, 6,7	
			TECHNICAL FIELDS SEARCHED (Int. Cl. ³)