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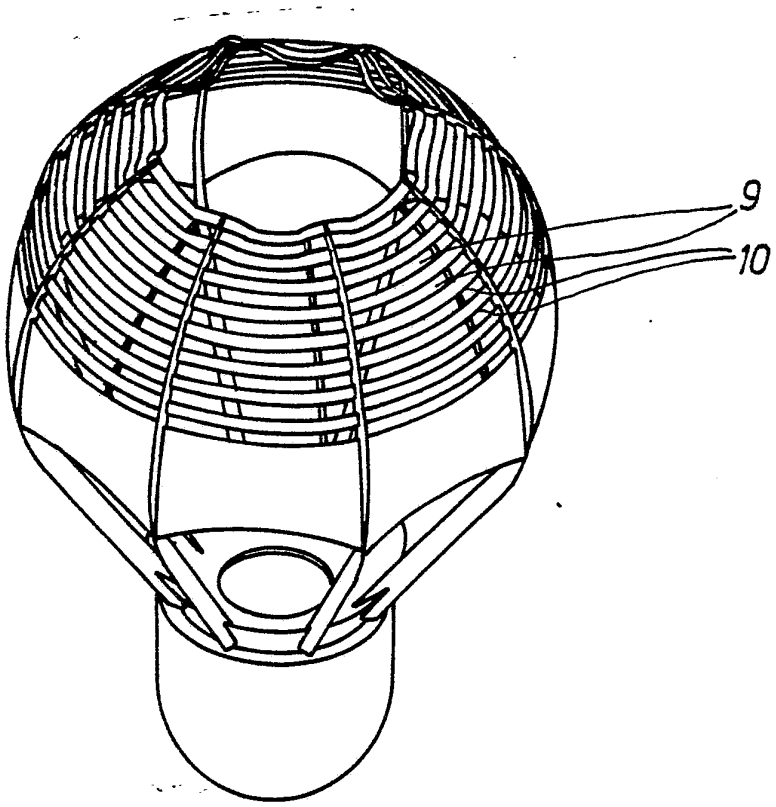
With international search report.

(54) Title: A SHUTTLECOCK

(57) Abstract

A shuttlecock comprising a head terminated by an essentially hemispherical front part (1), the backwardly facing part of which being connected to a moulded skirt (3). According to the invention the skirt is terminated by one or several introverted parts (5) which are preferably circular and are optionally provided with apertures (9) and at the same time the introverted parts are wavy along their outer fringes. The apertures (9) are optionally interrupted by some unsymetrically located tail flaps providing a certain air resistance and in connection with the wavy fringe having the effect that the shuttlecock during its flight is rotating around its longitudinal axis.



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Title: A Shuttlecock

Technical Field

The invention relates to a shuttlecock comprising a head terminated by an essentially hemispherical front part, the backwardly facing part of which being connected to a moulded skirt.

Background Art

Shuttlecocks are known, in which the skirt is constituted by goose feathers. Such shuttlecocks are, however, rather expensive. The skirt is consequently now being made of plastics or nylon, as it is attempted to imitate the feather skirts in order to obtain the same flight of the shuttlecock during the play.

Disclosure of Invention

To obtain this effect, the shuttlecock must partly be of the same weight as the shuttlecock made of feathers, and the ratio of weight of the shuttlecock head to the skirt must be the same, and finally the air resistance must show the same characteristic feature.

It has proved difficult to meet these requirements, and most commercially available shuttlecocks comprising skirts of plastics do have the drawback that it has not been possible to impart the necessary rigidity to the skirt, without the skirt being too heavy compared to the head. During the first part of the flight, where the air resistance is great on account of the high velocity, the skirt will consequently flutter or fold up, and not until the velocity has slackened sufficiently because of the air resistance, will the rigidity of the

skirt cause it to straighten out and thereby enable it to control the flight properly.

It is the object of the present invention to provide a shuttlecock comprising a skirt of plastics, where the skirt has the proper weight compared to the head and is sufficiently rigid to avoid fluttering and simultaneously allows an extensive adjustment of the material of the skirt with a view to obtaining a desired air resistance dependent on the velocity of the shuttlecock.

This object is according to the invention obtained by the skirt being terminated by one or several introverted parts, which are preferably circular. Thereby the introverted parts have a stiffening effect, so that the fluttering or folding up of the skirt during the flight is avoided.

If the upper introverted parts of the skirt are carried by mutually separated stiffening means, so that air can penetrate to the said introverted parts, a further stiffening effect will be obtained, the skirt being pressed outwards as a result of the "parachute effect".

The invention also relates to a method of producing a shuttlecock by moulding. According to the invention the moulded skirt is pulled out of the mould. A small amount of mould parts will thus do, whereby the price of the shuttlecock will be reduced.

Brief Description of the Drawing

The invention will be explained below with reference to the accompanying drawing, in which

Fig. 1 is a shuttlecock according to the invention,

Fig. 2 is a sectional view of the shuttlecock of Fig. 1,

Fig. 3 is a top view of the shuttlecock,

Fig. 4 is a large-scale view of the shuttlecock,

Fig. 5 is an alternative embodiment of the shuttlecock, and

Fig. 6 is a top view of the shuttlecock shown in Fig. 5.

Best Mode for Carrying out the Invention

The shuttlecock shown in Fig. 1 comprises an essentially hemispherical head 1, the backwardly facing part of which being connected to a skirt 3. The head 1 may be of plastics or leather-coated plastics or cork. The upper introverted part or parts 5 of the skirt are carried by mutually separated stiffening means 7, so that air may penetrate to the said introverted parts 5. The skirt is thereby pressed outwards as a result of the "parachute effect".

It is thus indicated how it has been possible, in spite of the requirements on the distribution of weight in the shuttlecock to provide a shuttlecock which is nevertheless sufficiently rigid, as the inventor, instead of imitating the conventionl shuttlecocks has provided a construction which adapts itself to the characteristics of the plastic and simultaneously satisfies the standard specifications for shuttlecocks.

The total weight of the shuttlecock is about 4.70 g, the cork weighing 2.17 g and the plastic skirt weighing 2.53 g.

It should be noted that the introverted parts per se offer a certain stiffening.

The introverted parts are not necessarily curved. They may also be edged.

The shuttlecock may be produced by moulding, by the moulded skirt being pulled out of the mould, the elasticity of the material being utilized.

In an alternative embodiment - cf. Figs. 5 and 6 - the introverted parts of the shuttlecock are provided with apertures 9 and at the same time the introverted parts are wavy along their upper fringes. The apertures 9 are optionally interrupted by some unsymmetrically located tail feathers 10 providing a certain air resistance and in connection with the wavy fringe having the effect that the shuttlecock during the flight are rotating about its longitudinal axis, in the same manner as a discharged projectile. As a result undesired movements of the longitudinal axis of the shuttlecock during the flight are avoided. The flaps just have to be located unsymmetrically in proportion to the central line between two stiffening means. The wavy fringe further provides a certain elasticity.

Claims:

1. A shuttlecock comprising a head terminated by an essentially hemispherical front part (1), the backwardly facing part of which being connected to a moulded skirt (3), c h a r a c t e r i s e d by the skirt (3) being terminated by one or several introverted parts (5), these parts optionally being provided with apertures.

2. A shuttlecock in accordance with claim 1, c h a r a c t e r i s e d by the introverted parts (5) of the skirt being curved.

3. A shuttlecock in accordance with claim 2, c h a r a c t e r i s e d by the introverted curved parts being essentially circular.

4. A shuttlecock in accordance with claim 3 or 4, c h a r a c t e r i s e d in that the introverted parts along their upper fringes are wavy (Figs. 5 and 6).

5. A shuttlecock in accordance with claim 4, c h a r a c t e r i s e d in that the transverse flaps are provided in the aperture of the introverted parts for guiding, i.a. the rotation of the shuttlecock.

6. A shuttlecock in accordance with claims 1-5, c h a r a c t e r i s e d in that in the introverted parts of the skirt (3) slots for wind catchers are provided.

7. A shuttlecock in accordance with claims 1-6, c h a r a c t e r i s e d in that the upper introverted part of the skirt is carried by mutually separated stiffening means (7) so that air can penetrate to the said introverted parts (5).

8. A method of producing a shuttlecock according to claim 1 by moulding, c h a r a c t e r i s e d in that the moulded skirt (3) is pulled out of a mould, the elasticity of the material being utilized.

9. A shuttlecock essentially as described above with reference to the accompanying drawing.

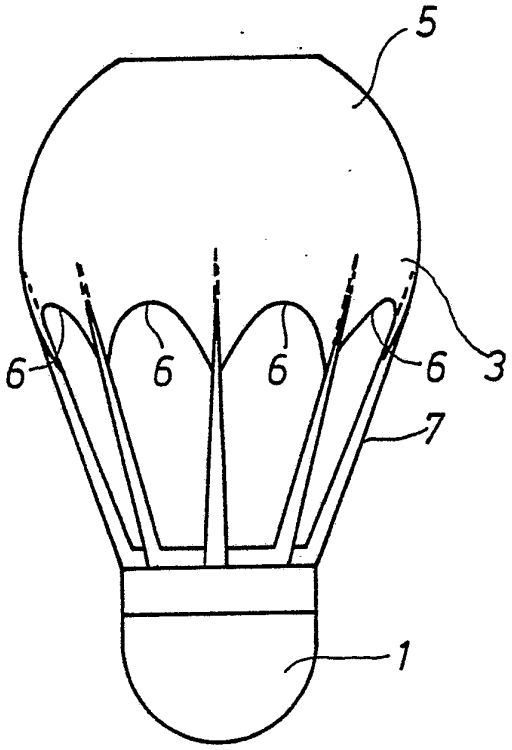

Fig.1

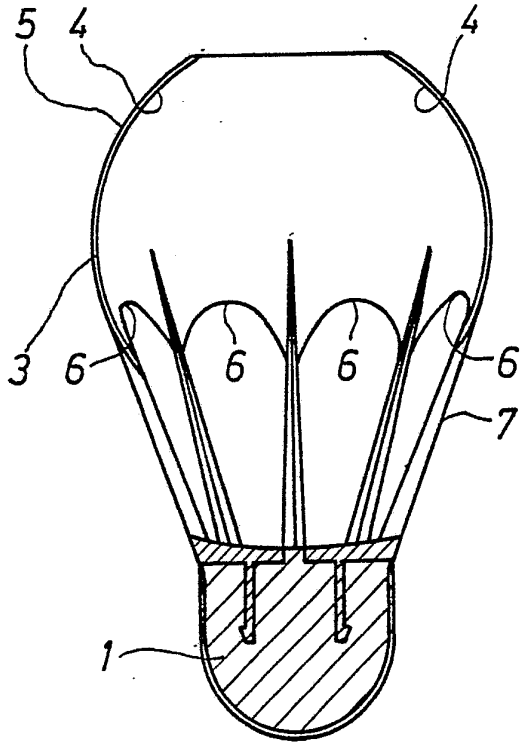

Fig.2

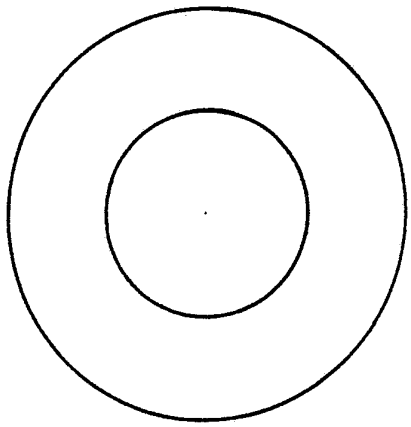

Fig.3

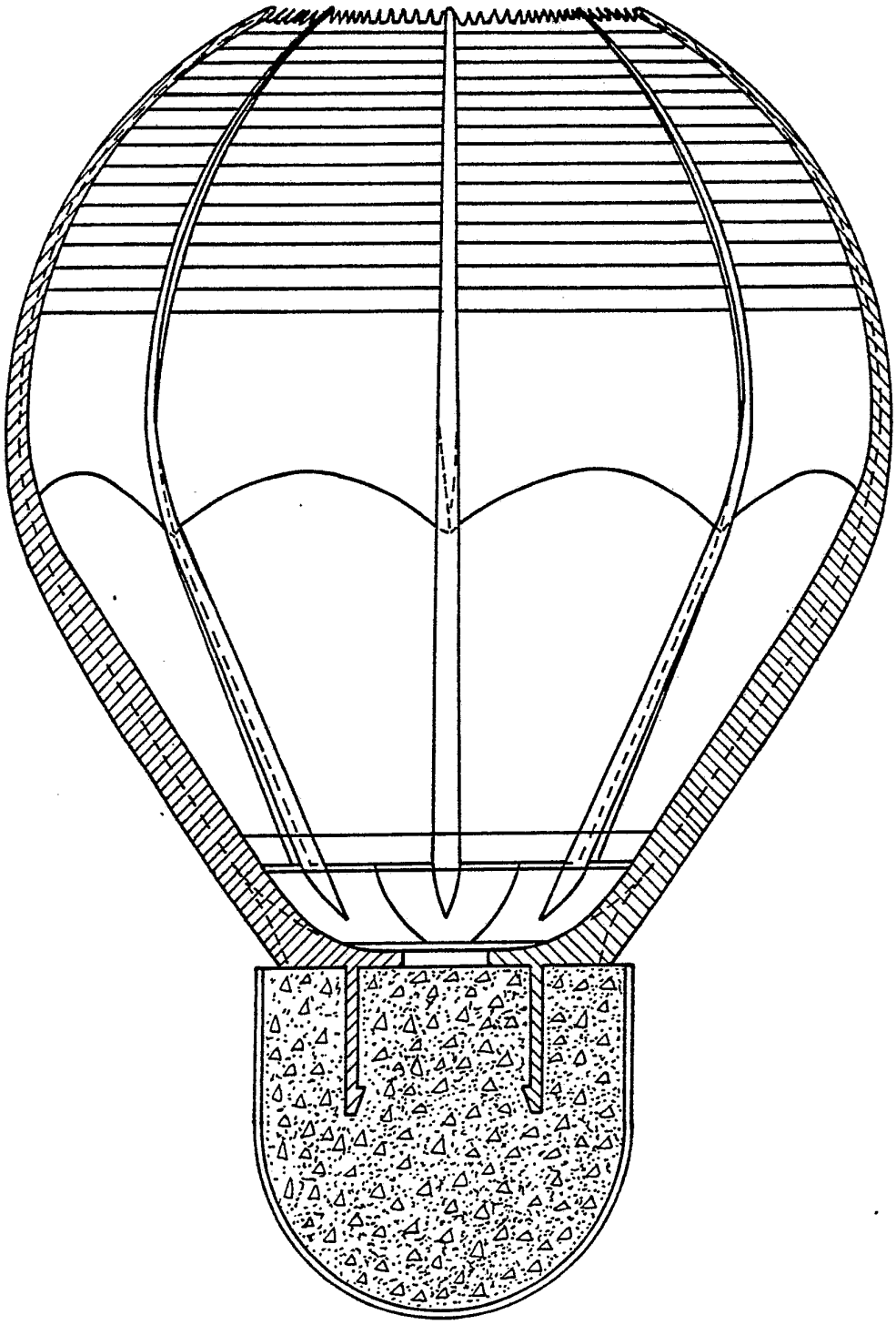

Fig.4

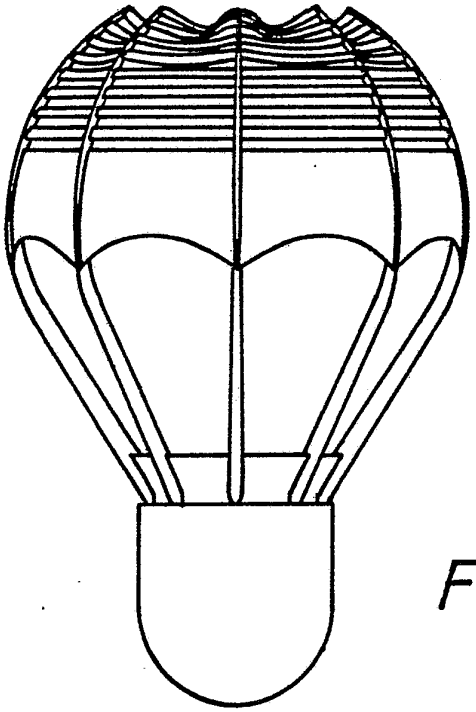

Fig.5

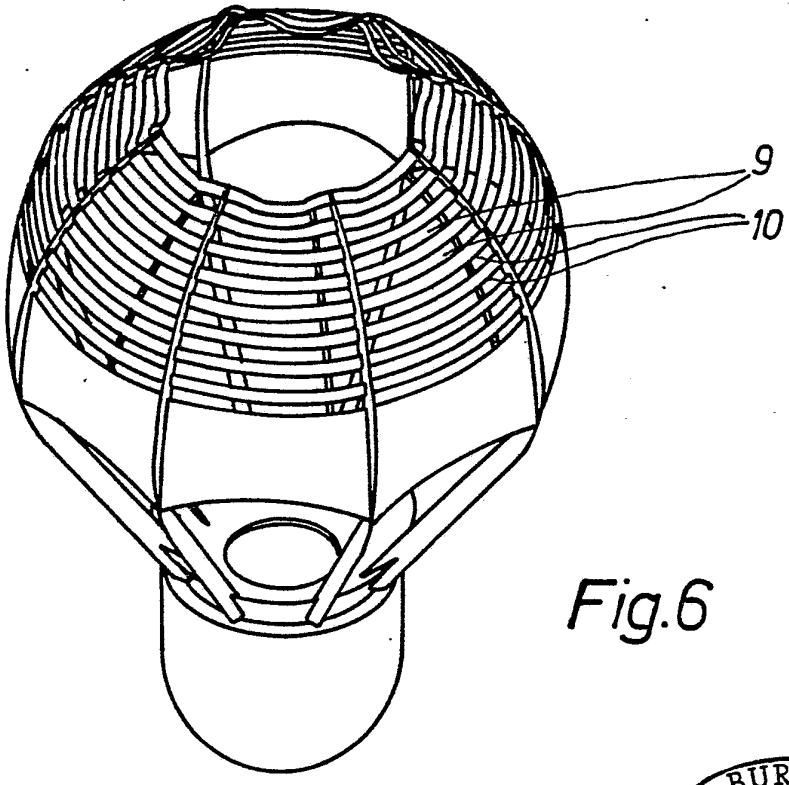

Fig.6

INTERNATIONAL SEARCH REPORT

International Application No PCT/DK83/00067

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [3]

According to International Patent Classification (IPC) or to both National Classification and IPC 3

A 63 B 67/18

II. FIELDS SEARCHED

Minimum Documentation Searched [4]

Classification System	Classification Symbols
IPC	A 63 B 67/00,18, 65/00,07
US Cl	273:95, 106

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [5]

SE, NO, DK, FI classes as above

III. DOCUMENTS CONSIDERED TO BE RELEVANT [14]

Category *	Citation of Document, [16] with indication, where appropriate, of the relevant passages [17]	Relevant to Claim No. [18]
A	FR, A5, 564 734 (M L VAILLANT) 9 January 1924	
A	US, A, 2 360 173 (N R TANGER) 10 October 1944	
A	US, A, 3 904 205 (M ROBINSON) 9 September 1975	
A	US, A, 3 831 943 (F W POPPELWELL) 27 August 1974	
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* Special categories of cited documents: [15]

"A" document defining the general state of the art which is not considered to be of particular relevance

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search [2]	Date of Mailing of this International Search Report [2]
1983-10-12	1983 -10- 20
International Searching Authority [1]	**Signature of Authorized Officer [20]**
Swedish Patent Office	Christer Bäcknert

Form PCT/ISA/210 (second sheet) (October 1981)

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

V. [X] OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE [10]

This International search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. [ ] Claim numbers . .. ., because they relate to subject matter [12] not required to be searched by this Authority, namely:

2. [X] Claim numbers 8, 9 because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out [13], specifically:

Claim 8 does not concisely state the technical features of the method of producing the shuttle cock, see Rule 6.3 (b)(ii).

The claim 9 rely on references such as "as described" "with reference to the accompanying drawing". This is not allowed according to Regulations under the Patent Cooperation Treaty, Rule 6.2a.

VI. [ ] OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING [11]

This International Searching Authority found multiple inventions in this international application as follows:

1. [ ] As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.

2. [ ] As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. [ ] No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. [ ] As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

[ ] The additional search fees were accompanied by applicant's protest.

[ ] No protest accompanied the payment of additional search fees.