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(56) Documents Cited

None

(58) Field of Search

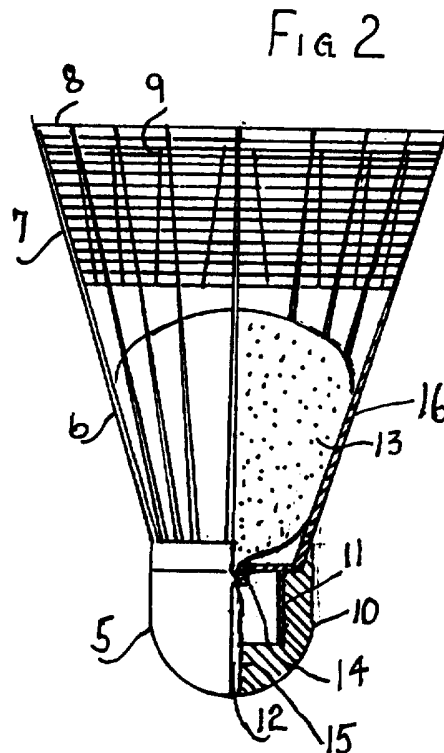
UK CL (Edition O) **A6S**

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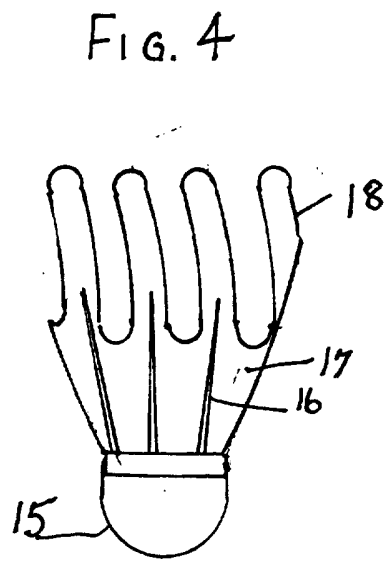
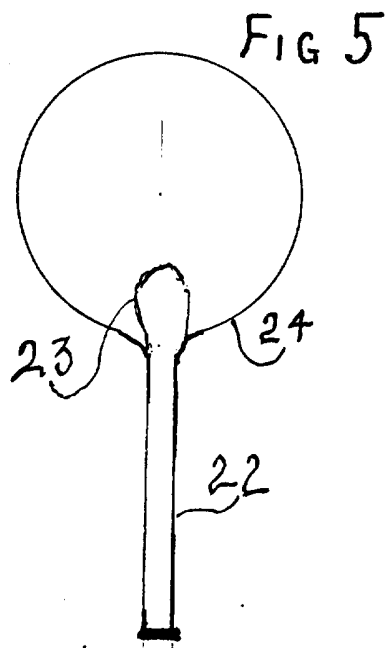
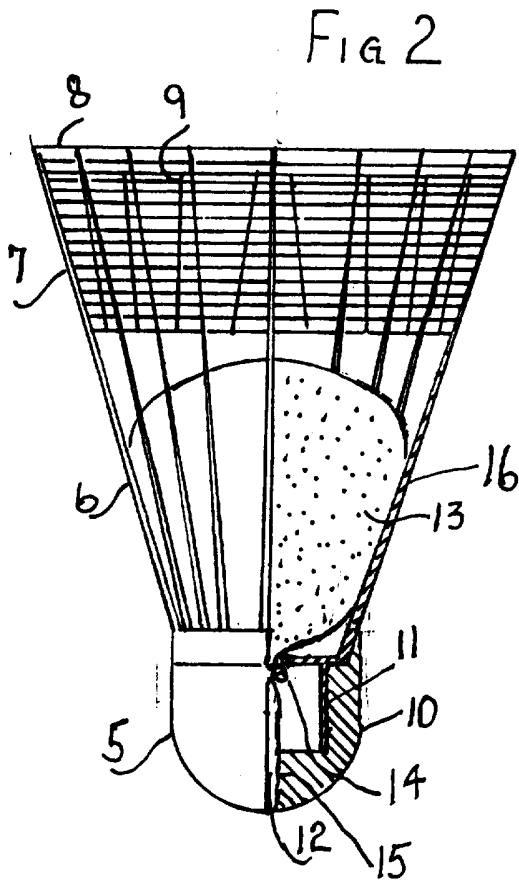
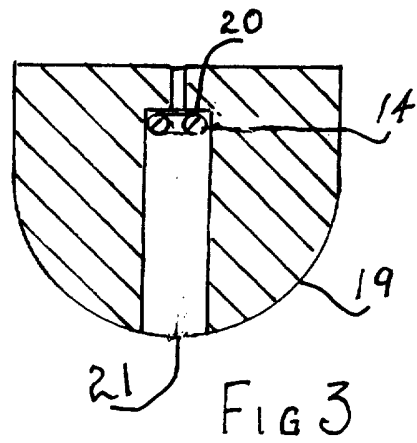
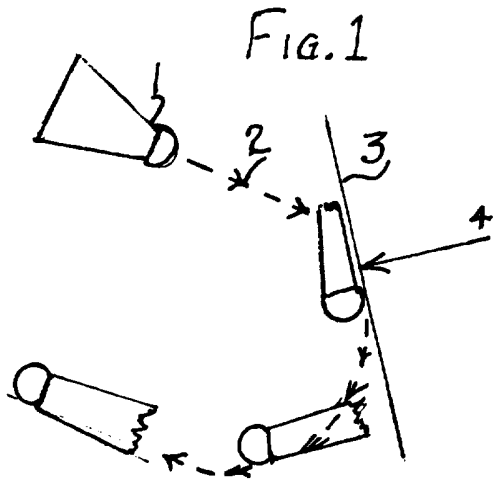
ONLINE:WPI

(54) **An improved shuttlecock**

(57) A shuttlecock comprising at least a cap and a flared skirt the flared skirt incorporating a balloon. In one form the shuttlecock is developed so that the said balloon incorporates a plurality of extending fingers (18, Figure 4) arranged in a form which flares outwardly from the cap. In another form the shuttlecock comprises a cap 5, an inner skirt incorporating stems 6, an outer skirt incorporating at least minor stems 7 and a balloon 13 adapted to support the stems and to fill in at least part of the spaces between the stems and to improve visibility. The inlet for the balloon incorporates a non-return valve (14, Figure 3) and may pass through the cap.



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An improved shuttlecock.

This invention is in the field of sports equipment and relates to shuttlecocks .

In this specification all shuttlecocks have a cap, and a flared skirt and for clarity in the description the skirt is divided into an inner and an outer skirt. There are two main types of shuttlecocks, those having a skirt made of feathers and those having a skirt made of plastic material. Feather shuttlecocks have a cap usually made of cork, the inner skirt being the stems (or quills) and the outer skirt being made up of minor stems (or the quills extensions) which spread into the vane. Plastic shuttlecocks have a cap made either of cork or moulded material, the inner and outer skirt are usually moulded in one piece.

The skirt of the best feather shuttlecocks is made of goose feathers which overlap in the outer skirt; such shuttlecocks have the following desirable characteristics; the turnover at the net is good, the whole shuttlecock is rigid, rotates in flight and the outer skirt is very light; when struck severely its skirt does not collapse, it decelerates rapidly and makes a resounding 'crack', a commercial advantage very pleasing to the player and the spectator. Such shuttlecocks have two main disadvantages, they are expensive and, if mis-hit, for instance by the edge of the racket, a stem breaks and the flight becomes irregular so that the shuttlecock has to be discarded sometimes after only one or two minutes play.

The skirt of a plastic shuttlecock has stems in the inner skirt (replacing quills in the feather) becoming minor stems in the outer skirt connected by a series of substantially

circumferential ribs in turn connected by a plurality of intermediate stems. Cheaper models are made of very flexible material such as polythene whilst the more expensive models are made of stiffer material such as nylon. Within these broad groups are various grades of stiffness, the better models being stiffer but more brittle and therefore breaking more easily. In models made according to the prior art, the deeper, stiffer and more numerous the stems, the quicker the skirt recovers after collapsing when struck severely but the poorer the turnover. The turnover can be improved by reducing the number and or cross-sectional area of stems, minor stems, ribs and intermediate stems. Spinning can be induced by inclining the stems and/or indenting stretched parts of the outer skirt. The more the skirt is filled in by stems, minor stems, ribs and intermediate stems the better the 'crack' and the more visible the shuttlecock but the worse the turnover. Manufacture is a matter of compromise between stiffness, 'crack', visibility and turnover. Such shuttlecocks are known from GB 887172, GB 907700, GB 908684, GB 1046708. Some of these specifications are known in other countries.

When a new feather shuttlecock is struck severely, because of its rigidity the cap and feathers move together so that when the shuttlecock is in good condition collapsing is negligible but when even a new plastic shuttlecock is struck severely it can be shown by high speed photography that the skirt collapses until it is almost flat as shown in figure 1; the collapse is prolonged because the skirt is not strong enough to return to a substantially circular shape as it passes through the air so that when struck severely in a 'smash' the shot may become unplayable and when struck severely in a 'lob' the 'length', as dictated by the laws of badminton, may become unpredictable.

In this specification the terms stem and quill are synonymous.

The technical problems to be overcome are: in both the feather and the plastic shuttlecock - to provide a gradual support for the stems so that they are less likely to break when mis-hit and in the plastic shuttlecock - 1) to support the stems to prevent the collapse of the skirt or make the recovery so quick as to make the collapse unimportant: 2) to fill in the spaces between the stems sufficient to make the 'crack', 3) to improve visibility and turnover.

In accordance with the invention, in a shuttlecock having a cap, and a flared skirt, a balloon is incorporated in the the flared skirt.

In a shuttlecock having a cap, a flared skirt and a balloon, the said balloon incorporates a plurality of extending fingers arranged in a form which flares outwards from the cap.

The invention is developed so that in a shuttlecock having a cap and an inner skirt comprising stems and an outer skirt incorporating at least minor stems there is incorporated in the part enclosed by the said inner skirt a balloon adapted to support at least the said stems and minor stems, fill in at least part of the spaces between the stems and improve visibility.

A shuttlecock incorporating a balloon and an inner skirt in which the said balloon is adapted to be inflated through the cap end of the inner skirt.

A shuttlecock incorporating a balloon and in which the balloon incorporates a non-return valve.

A shuttlecock made in accordance with the invention has a number of advantages. The balloon supports the shape both remote from and adjacent to the racket when the shuttlecock is struck severely so that collapse is largely prevented and, because of the air pressure within the balloon any collapse is corrected almost simultaneously to a substantially circular shape. The stems in the inner skirt in both feather and plastic shuttlecocks are given a flexible gradual support so that breakage of the stems is reduced. The stems may be reduced in number and, in plastic shuttlecocks, their cross sectional area may be shaped to improve the flow of material during injection and thus improve turnover and because the spaces between the stems is filled by the balloon the visibility is improved and the shuttlecock makes a 'crack' when struck severely.

The invention will now be described by way of example and with reference to the accompanying drawings in which:

Figure 1 is a diagrammatic view of a shuttlecock with a plastic skirt approaching, striking and leaving a racket face.

Figure 2 is a diagrammatic view of a shuttlecock partly in half section showing the cap, inner skirt, balloon and outer skirt.

Figure 3 is a diagrammatic view of a cork cap.

Figure 4 is a diagrammatic view of a shuttlecock incorporating flared fingers which form at least part of the outer skirt.

Figure 5 is a diagrammatic view of a balloon with a long inlet.

Referring to figure 1, the shuttlecock 1, moving in the direction of the arrow 2 is struck by the racket face 3 moving in the direction of the arrow 4. Both sides of the skirt flatten and remain collapsed as the flight continues but will slowly recover unless intercepted.

Referring now to figure 2, a shuttlecock incorporating a flared skirt is shown diagrammatically partly in half section. On the left is the outside of the cap 5, the inner skirt incorporating stems 6 which continue into the outer skirt and become the minor stems 7, the said minor stems 7 spread into the ribs 8 and the intermediate stems 9. The flared skirt may be made up of feathers, the quills are then the stems and the extensions of the quills then become the minor stems which spread into the vane.

On the right, the shuttlecock is shown in half section, the inside of the cap 10 made of moulded material surrounds the base of the skirt 11 through which passes the inlet 12 of the balloon 13 also shown in half section. The inlet 12 incorporates a non-return valve 14; a tubular hole 15 is left in the cap 5 through which a pump needle is inserted to inflate the balloon 13. The inflated balloon 13 supports the stems of the shuttlecock of which stem 16 is an example.

After inflation, the residue of the inlet of the balloon is cut off.

Referring now to figure 3 there is shown an arrangement for a cork cap 19 suitable for use with a skirt and a balloon. The cap 19, usually covered with skin or fabric has a very light plastic thrust plate 20 inserted in the cork to distribute the load exerted by the pull of the balloon against the non-return valve 14. The plastic thrust plate 20 may be inserted at the top of the hole 21 or securely

cemented to the top of the cap in which case the hole 21 may be reduced in size .

Referring now to figure 4 the shuttlecock comprises a cap 15, moulded stems 16 the main body of the balloon 17 and inflated fingers 18 integral with the main body of the balloon. The fingers may be shaped to cause rotation.

Referring to figure 5 is a balloon with a comparatively long inlet 22 shown in the deflated condition 23 and inflated 24.

Claims..

1. A shuttlecock comprising a cap and a flared skirt and characterised in that the flared skirt incorporates a balloon
2. A shuttlecock as in claim 1 and characterised in that the said balloon incorporates a plurality of extending fingers arranged in a form which flares outwards from the cap.
3. A shuttlecock as in claim 1 in which the said skirt incorporates an inner skirt incorporating stems and an outer skirt incorporating at least minor stems and characterised in that the said shuttlecock includes a balloon adapted to support the said stems, to fill in at least part of the spaces between the said stems and to improve visibility.
4. A shuttlecock as in claim 1 and characterised in that the inlet of the said balloon passes through the said cap.
5. A shuttlecock substantially as described herein with reference to figures 2 - 5 of the accompanying drawings.



Application No: GB 9609734.0
Claims searched: 1 - 5

Examiner: Roger Casling
Date of search: 4 July 1996

Patents Act 1977
Search Report under Section 17

Databases searched:

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

UK Cl (Ed.O): A6S

Int Cl (Ed.6): A63B

Other: Online:WPI

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.