Nov. 18, 1958 W. C. CARLTON 2,860,879

SHUTTLECOCK

Filed Aug. 1, 1957 2 Sheets-Sheet 1

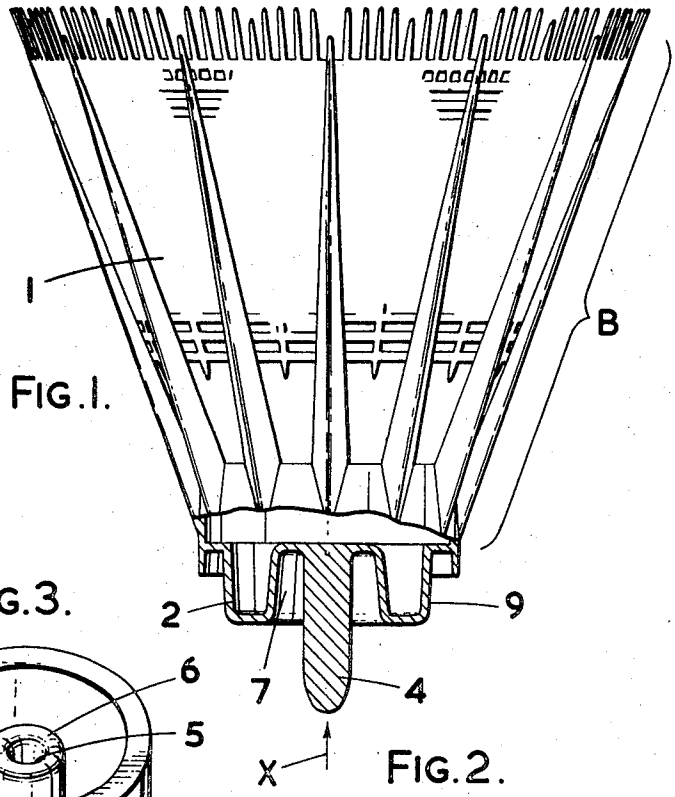


FIG. 1.

FIG. 3.

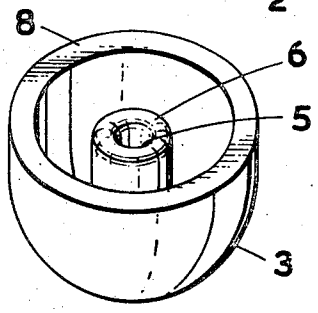


FIG. 4.

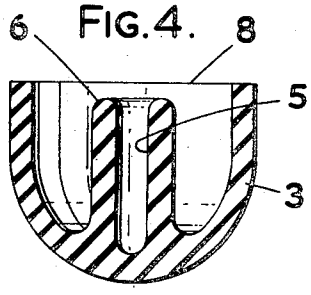
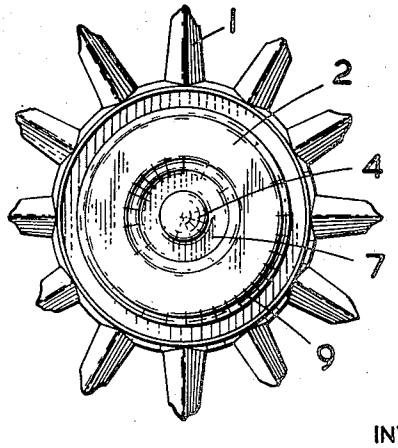


FIG. 2.



INVENTOR

W. C. Carlton

BY

ATTORNEY

Nov. 18, 1958 W. C. CARLTON 2,860,879

SHUTTLECOCK

Filed Aug. 1, 1957 2 Sheets-Sheet 2

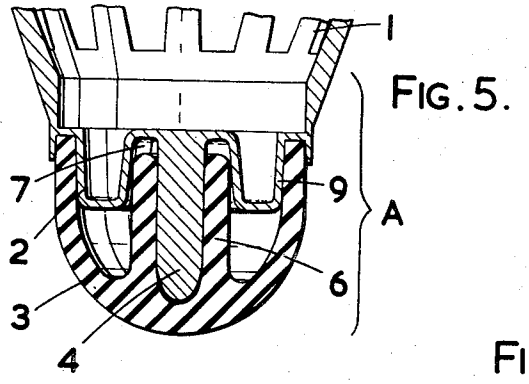


FIG. 5.

FIG. 6.

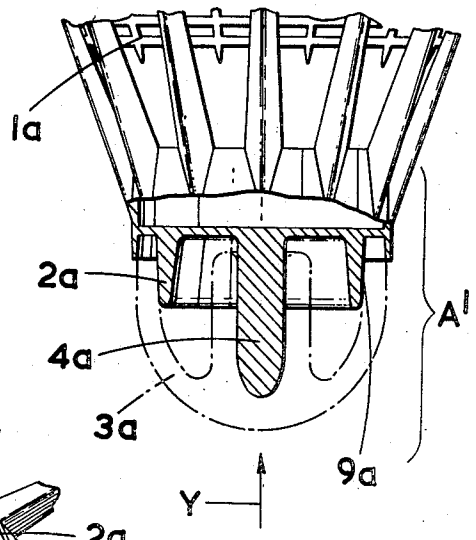
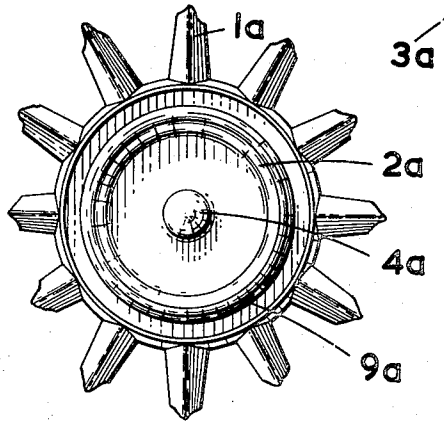


FIG. 7.



INVENTOR
W. C. Carlton

BY

ATTORNEY

United States Patent Office 2,860,879
Patented Nov. 18, 1958

2,860,879

SHUTTLECOCK

William C. Carlton, Hornchurch, England

Application August 1, 1957, Serial No. 675,688
Claims priority, application Great Britain May 15, 1957
2 Claims. (Cl. 273—106)

This invention relates to shuttlecocks, and particularly to the shuttlecock cap.

In this specification the cap of the shuttlecock is that part of the shuttlecock normally struck by the racket and indicated in the drawings herewith by the bracket A in Fig. 5 and the bracket A^1 in Fig. 6; the skirt of the shuttlecock is the flared portion indicated in Fig. 1 by the bracket B; the cap is made up of two parts, the cap end, which is usually moulded in one piece with the shuttlecock skirt, and the cap covering which is a separate item made of a rubber-like substance; the landing referred to is a surface on the cap end which locates the inner face of the outer annular part of the cap cover, this landing is indicated as the item **9** on Figs. 1, 2 and 5, and as the item *9a* on Figs. 6 and 7; each annular part referred to is a ring of rubber like material forming part of the cap cover, the rings are integral and concentric with each other and are indicated on Figs. 3 and 4 by the ring **8** and the ring **6**.

A difficulty in shuttlecock manufacture is to fix the cap covering to the cap end in such a way that the fixing will give reasonable service. A number of solutions have already been proposed to the problem but these have involved either relying entirely on an adhesive, or a re-entrant moulding or an extra fixing part other than adhesive.

An examination has been made of the cause of failure of adhesive fixing, and it has been found that the rubber-like cap cover expands on impact with the floor or racket, more than the cap end, and this causes a gradual breakdown of the adhesive joint. The object of this invention is to overcome this difficulty, and provide a shuttlecock cap which is very quickly assembled.

This invention is that, in a shuttlecock comprising a cap and a flared skirt, the cap being made up of a cap end and a cap covering and the cap end incorporating at least a spigot and a landing, the cap is characterised in that the cap cover made of a rubber like substance incorporates at least two integral, concentric annular parts, and the inner surface of the inner annular part tightly surrounds the spigot on the cap end, and the inner surface of the outer annular part rests against the landing on the cap end.

The invention is developed so that an inner annular groove on the cap end is adapted to receive the top of the inner annular part on the cap cover.

The mating surfaces between cap cover and cap end may be secured additionally by adhesive if required.

The principles behind the invention are:

(*a*) To make the main joint between cap end and cap cover in such a way that the "working" which occurs in rubber-like substances when they are squeezed, is remote from the main securing surfaces between cap end and cap cover.

(*b*) To reduce fatigue at the top of the spigot on the cap end by using the annular part on the cap end to reduce the sideways movement of the inner annular part on the cap cover.

The invention is achieved by making a flared shuttlecock skirt, complete with moulded cap end, the end cap being formed so that there is a spigot in the centre of the cap end. This spigot is of substantially smaller diameter than the outer diameter of the cap end. An outer annular landing is provided on the cap end, and this landing engages, on its outermost surface with the inner surface of the outer annular part of the cap cover, below described.

The cap covering is moulded of a rubber-like substance so that it incorporates at least two annular parts, the inner one of which is considerably smaller in its inside diameter than the outside diameter of the spigot. When the inner annular part in the cap cover is forced over the spigot on the cap end its inner surface fits tightly and may be still further secured by adhesive if required. The outer annular part in the cap cover is made so that when assembled, its inner surface rests against the landing on the cap end, and its inner surface is located by this landing.

When the shuttlecock is struck in play the outer annular part of the cap cover is subjected to distortion and working, whereas the inner ring remains comparatively undisturbed except at the joint with the outer annular part.

By forming the cap end so that an annular groove surrounds the spigot, leaving approximately the thickness of the inner annular part on the cap cover, fatigue is reduced at the top of the spigot on the cap end.

In order that this invention may be readily understood and carried into effect, a description follows referenced to the accompanying drawings in which:

Fig. 1 is a side elevation of a typical flared shuttlecock skirt with cap end.

Fig. 2 is a partial plan view of the above in the direction of the arrow X.

Fig. 3 is a perspective view of a typical cap cover.

Fig. 4 is a section through the cap cover in Fig. 3.

Fig. 5 is a section showing the assembly of the cap cover in Fig. 3 to the end cap in Fig. 1.

Fig. 6 is a side elevation, partly in section of an alternative form of the invention.

Fig. 7 is a partial plan view of Fig. 6 in the direction of the arrow Y.

Referring now to Figs. 1, 2, 3, 4 and 5, a flared shuttlecock skirt **1** is moulded integrally with a cap end **2** which is designed to mate with a cap cover **3** moulded from a rubber-like material. The cap end **2** is provided with a spigot **4** which is of a diameter which makes it a tight fit against the inner surface of the inner annular part **5** of the cap cover **3**. The wall **6** of the inner annular part **5** of the cap cover **3** is adapted to be a snug fit in the inner annular groove **7** in the cap end **2** as shown in Fig. 5.

The wall of the outer annular part **8** is adapted to fit snugly with its inner surface against the landing **9** in the cap end **2**, as shown assembled in Fig. 5.

Referring now to Figs. 6 and 7, an alternative construction is given, which shows the original form of the

invention without the development using the annular groove to receive the top of the inner annular part of the cap cover.

In Figs. 6 and 7, 1*a* is the flared skirt, 2*a* is the cap end, 4*a* is the spigot, 9*a* is the landing, and a similar cap cover 3*a* is provided to nest as shown.

What we claim is:

1. In a shuttlecock having a cap and a flared skirt, said cap being made up of a cap end and a cap cover, and said cap end incorporating a spigot and a landing; and said cap being characterised in that the said cap cover incorporates inner and outer integral concentric annular parts, and the inner surface of the inner annular part

tightly surrounds the said spigot on the said cap end, and the inner surface of the outer annular part rests against the said landing on the said cap end.

2. A shuttlecock as in claim 1 and characterised in that the said cap end has an inner annular groove immediately surrounding the said spigot adapted to snugly receive the said inner annular part on the said cap cover.

References Cited in the file of this patent

UNITED STATES PATENTS

2,666,643	Miller	Jan. 19, 1954
2,804,305	Nash	Aug. 27, 1957