Jan. 27, 1953 W. C. CARLTON 2,626,807

MOLDED SHUTTLECOCK

Filed Aug. 2, 1951

FIG. 1.

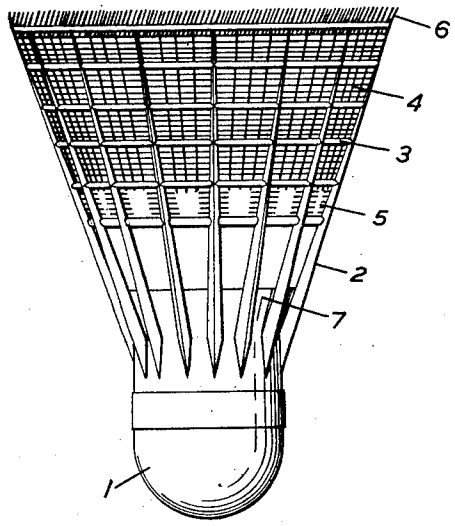


FIG. 2.

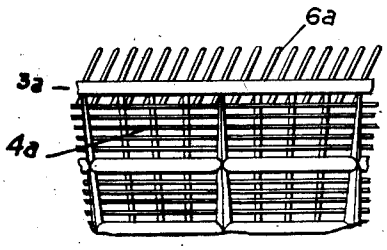
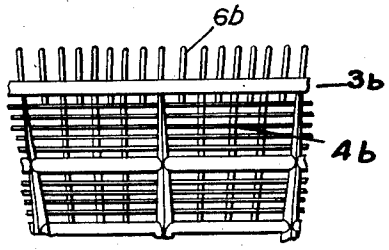


FIG. 3.



Inventor

William Charles Carlton

By John E Eastlack

Attorney

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UNITED STATES PATENT OFFICE

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MOLDED SHUTTLECOCK

William Charles Carlton, Hornchurch, England

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4 Claims. (Cl. 273—106)

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This invention relates to shuttlecocks of the type which embody one piece moulded skirts which are in the form of a continuous circle near the trailing edge; and particularly those in which the stems are connected by ribs near the trailing edge.

Such shuttlecocks require sufficient length in the skirt to steady themselves quickly after impact; but when this length is obtained by joining the stems by ribs too near the trailing edge, whilst the resulting shuttlecock may be made to meet the performance characteristics required by the laws of badminton there are several minor disadvantages which it is the object of this invention to overcome. The disadvantages are as follows: 1. It is desirable to pack shuttlecocks in as small a diameter tube as possible and shuttlecocks having a continuous circle near the trailing edge of the skirt are damaged in transit if the pack is the slightest too small in diameter; if on the other hand the diameter is too large, the shuttlecocks slide about in the tube with consequent inconvenience during unpacking and during the sale of one or two shuttlecocks from a tube of a dozen or so; 2. If the length associated with a stable shuttlecock is made up entirely of stem connecting ribs the shuttlecock is inclined to feel spongy on impact with the racket because of the air trapped in the cone of the skirt; a certain spread is, of course necessary to obtain the correct length of flight; and 3. During manufacture by an injection moulding process air is trapped when the rearmost cross rib is being formed and it is difficult to get a good joint in the space between the stems.

I have found that the above disadvantages may be overcome in a shuttlecock comprising a cap and a one piece skirt by making a considerable number of the fine integral projections from the trailing edge so that a fringe is formed composed of these fine projections. These projections are fixed at one end to the rearmost main cross rib of the shuttlecock and are free at the other end. The projections trail backwards and may be made to trail directly backwards, but they may also be made at an angle to the line of flight.

In service these projections perform as follows: 1. During stowage in a tube the projections in fringe form flex slightly against the side of the tube and prevent the shuttlecock from sliding about too freely and comparatively loose limits may be permitted to the tube manufacturer. 2. When in play, for short delicate shots, provided that the fringe is dense enough, the full length of the shuttlecock is brought into action

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against the air, with consequent rapid attainment of flight steadiness. 3. When struck hard in play, the fringe flexes and permits the rapid escape of air trapped in that area. 4 When in forward flight the fringe gives a satisfactory airflow over the trailing edge. 5. In manufacture by the injection moulding process the fringe forms a convenient means of bleeding off the air trapped when the rearmost rib is being formed and a good joint is more readily made.

It should be noted that if the projections composing the fringe are too far apart they serve very little useful purpose, and if they are too close together, so much weight is added that the advantages resulting from a longer effective shuttlecock are lost by the increased weight in the skirt. It is acceptable for the following dimensions to apply: Distance between the fringe projections—between .010" and .080". Thickness of the fringe projections—as delicate as possible —.005" gives a satisfactory result. Width of fringe projections—.005" to .020". Length—about .15" but considerable variation on this is permissible. It will be understood that these figures have been given to indicate the degree of delicacy required rather than by way of precise limitation. A free-running grade of polythene has been satisfactorily used in initial experiments but the invention could be adapted for use with any suitable material, in which case certain changes in the dimensions given above might be made with advantage.

In order that this invention may be clearly understood and readily carried into effect various examples will now be described with reference to the accompanying drawings in which:

Fig. 1 is a side elevation of a typical moulded shuttlecock embodying the invention.

Fig. 2 is an enlarged view of one form of the invention.

Fig. 3 is an enlarged view of another form of the invention.

Referring to Figure 1; the shuttlecock consists of a cap 1, connected by stems 2, to a skirt which is made up of six cross ribs 3, intermediate stems and minor cross ribs in the form of a gridiron 4, and shorter cross flexing ribs 5, all of said elements being integral with each other. The stems are connected near the cap by the web 7 and it will be understood that the cap is circular and dome like and the skirt circular and cone like. Fixed at one end to the rearmost cross rib is a fringe 6 consisting of many tiny individual projections which are integral with the rearmost cross rib.

Referring to Figure 2 the fringe 6*a* is not streaming directly backwards but at a slight angle to the usual line of flight of the shuttlecock and is here shown enlarged and is attached to the rearmost cross rib 3*a* and it will be seen that below 3*a* the fringe seems to be extended downwards; this results from a convenient method of making the tool and has no significance other than extra strength in the finished job. The intermediate stems and minor cross ribs are shown in greater detail at 4*a*.

Referring to Figure 3, the fringe 6b is fixed to the rearmost cross rib 3*b* and at right angles to it. It will be noticed that in this version of the invention every alternate piece of the fringe may conveniently form an extension of either a stem or an intermediate stem which forms part of the gridiron 4b. The fringe is on the same plane as the stems and gridiron and forms an extension of the cone area.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed—

What I claim is:

1. A shuttlecock comprising a cap and a moulded skirt composed of an inner part and an outer part, and incorporating stems flared outwardly from the cap and moulded integrally therewith, and having integral with each of the stems a plurality of ribs extending laterally from the stems in the area of the skirt remote from the cap, and characterized in that from the rearmost rib and integral with it, a plurality of fine projections extend rearwardly to form a fringe.

2. A shuttlecock as in claim 1 and characterized in that the fringe trails directly rearwardly.

3. A shuttlecock as in claim 1 and characterized in that the fringe is set at an angle to the usual line of flight of the shuttlecock.

4. A shuttlecock as in claim 1 and characterized in that a plurality of intermediate stems and minor cross ribs integral with the previously recited stems and ribs and with each other are provided to form a grid.

WILLIAM CHARLES CARLTON.

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