

PATENT SPECIFICATION

689,532



Date of filing Complete Specification July 30, 1951.

Application Date May 24, 1951.

No. 12194/51.

Complete Specification Published April 1, 1953.

Index at acceptance.—Class 132(iii), S28.

COMPLETE SPECIFICATION

An Improved Shuttlecock

I, WILLIAM CHARLES CARLTON, of Parkstone Works, Wingletye Lane, Hornchurch, Essex, of British Nationality, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to shuttlecocks which embody one piece skirts which are in the form of a continuous circle near the trailing edge and particularly those in which stiffeners 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 stiffeners 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 by buckling if the pack is 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 stiffener 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. 3. During manufacture by the injection moulding process air is trapped when the rearmost cross rib is being formed by material flowing into it from the stiffeners and it is difficult to get a good joint at the meeting point of the material which occurs in the rearmost cross rib approximately midway between the stiffeners.

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 fine ribs in the trailing edge so that a fringe is formed composed of these fine ribs. These ribs are integral with, and fixed at one end to, the rearmost main cross rib of the shuttlecock and are free at the other end. The ribs 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 ribs perform as follows:—

1. During stowage in a tube the ribs 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 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 the fringe forms a convenient means of bleeding off the air trapped when the rearmost cross rib is being formed and a good joint is more readily made.

It should be noted that if the ribs 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 ribs—between .010" and .080". Thickness of the fringe ribs—as delicate as possible—.005" gives a satisfactory result. Width of fringe ribs—.005 to .020". Length—about .15" but considerable variation on this is permissible.

[Price

Pri

able. 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
 5 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
 10 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 accom-
 15 panying 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
 20 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 stiffeners
 25 2, to a skirt which is made up of six cross ribs 3, intermediate stems and minor cross ribs in the form of a grid iron 4, and shorter cross flexing ribs 5. The stiffeners are connected near the cap by the web 7
 30 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 which is in the form of a continuous circle is a fringe 6 consisting of many tiny individual extensions
 35 or ribs which are integral with the rearmost cross rib.

Referring to Figure 2 the fringe 6a is not streaming directly backwards but at

a slight angle to the usual line of flight of
 40 the shuttlecock and is here shown enlarged and is attached to the rearmost cross rib 3a and it will be seen that below 3a the fringe seems to be extended; this results from a convenient method of making the
 45 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 4a.

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

What I claim is:—

1. A shuttlecock comprising a cap and a one piece skirt embodying cross ribs projecting from stiffeners near the trailing edge of the one piece skirt and characterised in that from the rearmost cross rib
 65 and integral with it a plurality of fine ribs extend rearwardly to form a fringe.

2. A shuttlecock as in Claim 1 and characterised in that the fringe trails directly rearwardly.

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

4. A shuttlecock substantially as described in the specification and illustrated in the drawings herewith.

W. C. CARLTON.

PROVISIONAL SPECIFICATION

An Improved Shuttlecock

I, WILLIAM CHARLES CARLTON, of Parkstone Works, Wingletye Lane, Hornchurch, Essex, of British Nationality, do hereby declare this invention to be described in the following statement:—

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

Such shuttlecocks require sufficient
 90 length in the skirt to steady themselves quickly after impact; but when this length is obtained by joining the stiffeners by ribs too near the trailing edge, whilst the resulting shuttlecock may be made to
 95 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
 100 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
 105 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
 110 length associated with a stable shuttlecock is made up entirely of stiffener connecting ribs the shuttlecock is inclined to feel spongy on impact with the racket because of the air trapped in the cone of
 115 the skirt; a certain spread is, of course, necessary to obtain the correct length of flight.

I have found that the above disadvan-

tages may be overcome by making a considerable number of fine ribs in the trailing edge so that a fringe is formed composed of these fine ribs. These ribs are
 5 fixed at one end to the rearmost main rib of the shuttlecock and are free at the other end. The ribs trail backwards and may be made to trail directly backwards, but if
 10 they are made at an angle to the line of flight then additionally they will cause the shuttlecock to rotate during flight, and this is a secondary but optional object of the invention.

In service these ribs perform as follows:
 15 1. During stowage in a tube the ribs 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
 20 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 against the air, with consequent
 25 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 air-flow over the trailing edge. 30

It should be noted that if the ribs 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
 35 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 ribs—between 0.10" 40 and .080". Thickness of the fringe ribs—as delicate as possible—.005" gives a satisfactory result. Width of fringe ribs—.005 to .020". Length—about 15" but
 45 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
 50 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. 55

W. C. CARLTON.

FIG. 1.

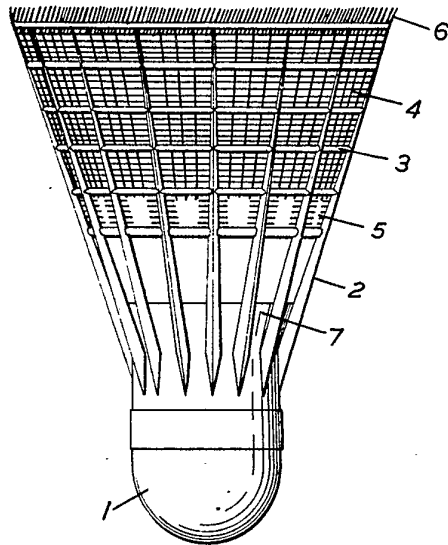


FIG. 2.

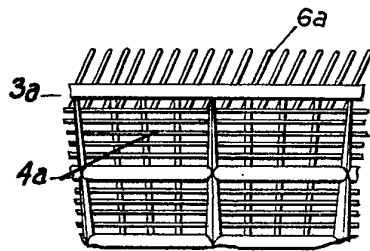


FIG. 3.

