PATENT SPECIFICATION 996,695

DRAWINGS ATTACHED.

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996,695

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COMPLETE SPECIFICATION.

Shuttlecock.

We, THE CARLTON TYRE SAVING COMPANY LIMITED of Shire Hill, Saffron Walden, Essex, a British Company do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This specification relates to shuttlecocks having skirts made of synthetic materials as distinct from natural feathers.

Shuttlecocks of all types vary considerably in performance; feather shuttlecocks must of necessity vary because no two quills are exactly alike, but by the very careful selection of quills an acceptable standard of performance for net play in top-class badminton is obtainable, but even with feather shuttlecocks, superb turnover is not necessarily compatible with resistance to collapsing after a number of severe smashes. With regard to shuttlecocks having skirts made of synthetic materials, the difficulties of combining performance in net play and resistance to collapsing in the smash are increased.

It is emphasised that however good the performance of a shuttlecock may be either at the net or in resistance to collapsing in the smash, it is normally possible to improve it and whilst the difference may be small between one type of shuttlecock and another, the commercial advantage of even the smallest improvement is extremely great.

The object of this invention is to make a small but very important improvement in net play in the performance of shuttlecocks having synthetic skirts.

In this specification the cap is the small end of the shuttlecock especially adapted to be struck by the racket, the skirt is the flared portion of the shuttlecock; there may be an intermediate portion between cap and skirt which, for the purposes of this specification, may be considered a part of the skirt, or a part of the cap, the main stems are longitudinal members which form a connection between the main ribs and other parts of the shuttlecock; the main ribs are members integral with the main stems and branching out from the main stems, the main ribs need not necessarily be at right angles to the main stems; the intermediate stems are smaller cross members which branch from the main ribs, these intermediate stems do not necessarily branch from the main ribs at right angles and may originate or terminate at main stems; there may also be intermediate ribs between the main ribs; by the term ' adjacent the main stems ' is meant that area between the stems which is up to one third of the distance from one stem to another; by the term ' remote from the main stems' is meant that area in the middle one third of the distance between the main stems.

In this specification the dimension of the intermediate stems which is particularly referred to as being ' thickened ' or ' thin ' is the transverse dimension of the respective stem radially of the axis of the shuttlecock. If desired, however, the transverse dimension of the stem in the tangential direction of the shuttlecock skirt may, in addition, be either ' thickened ' or ' thin ' correspondingly to the respective radial dimension.

According to the invention there is provided a shuttlecock comprising a cap and a skirt made of synthetic material, in which the skirt comprises main stems, main ribs branching from these main stems, and intermediate stems branching from the main ribs, characterised in that the thickness of at least two intermediate stems in each area adjacent a main stem is less than the thickness of at

least two intermediate stems in each area remote from the main stem.

The invention may be developed so that it is combined with a fluted skirt.

A shuttlecock according to the invention may comprise, in a known manner, a cap and secured to this cap, or integral with it, a shuttlecock skirt which has been moulded. The skirt may additionally be fluted. In the moulding operation main stems which flare from the area of the skirt near the cap are moulded and main ribs branch from these main stems. The main ribs may branch from the main stems at right angles or angles other than right angles. Integral with the main stems and main ribs are moulded the intermediate stems: these intermediate stems branch from the main ribs. There are at least six intermediate stems between each adjacent pair of main stems and the thickness of at least some of these intermediate stems are different according to the positions occupied by the respective intermediate stems between the main stems. In the area adjacent the main stems these said intermediate stems are less thick than in the area remote from the main stems. The intermediate stems may be approximately at right angles to the main ribs and the main ribs may be approximately at right angles to the main stems. In this case each intermediate stem may be in only one area. Alternatively, the intermediate stems may branch from the main ribs in such a way that one end of an intermediate stem is adjacent one main stem and the other end is adjacent the next main stem, having cut through the area remote from both main stems. Alternatively, intermediate stems may originate in an area adjacent a main stem and terminate in an area remote from the main stem, or vice versa.

In any of these cases, and referring to at least two intermediate stems in each area, the thickness of these said intermediate stems in the area adjacent the main stems is less than the thickness of at least two stems in the area remote from the main stems. An intermediate stem crossing from one area to another may have a varying thickness so that its thickness in an adjacent area is less than its thickness in a remote area.

In order that the invention may be clearly understood and readily carried into effect, it will now be more fully described with reference to the accompanying drawings, in which:—

Figure 1 is a side elevation of a shuttlecock according to one embodiment of the invention.

Figure 2 is a plan view of the shuttlecock of Figure 1, and

Figure 3 is a section through XX of Figure 1 on an enlarged scale.

Figure 4 is a scrap view showing an alternative rib arrangement.

In one embodiment of the invention as shown in the drawings the shuttlecock comprises a cap A, which may be made of any suitable material such as cork, rubber, sponge rubber or expanded plastic, one suitable plastic being polyvinyl chloride. The cap A is secured in any convenient manner to a one piece moulded synthetic skirt B. Examples of suitable synthetic materials for the skirt B are polythene and polyamides. By way of example the skirt B may have at its narrower end a collar H which is secured, such as by adhesive material, within a recess in the cap A. The skirt B comprises a plurality of main stems C which extend along the length of the skirt B in known manner. In the illustrated embodiment there are sixteen main stems C, although a smaller or greater number may be employed, and each main stem extends inwardly of the projected outer surface of the skirt by an increased amount as the cap end of the skirt B is approached. Each main stem C may be inclined to the radial direction of the skirt B as indicated most clearly in Figure 2. The wider ends of the main stems C, together with, in this embodiment, two transverse rings G, constitute an intermediate portion of the shuttlecock.

The wider end of the skirt B, that is the end remote from the cap A, comprises a mesh-like array of stems and ribs as shown in Figures 1 and 2. The mesh-like array comprises a plurality of main ribs D which branch from the main stems C, in this example substantially at right angles to the main stems C, the main ribs D interconnecting adjacent main stems C as indicated. From the main ribs D branch intermediate stems E, also substantially at right angles to the main ribs D, so that the intermediate Stems E extend longitudinally of the skirt B between the main stems C. As can be seen from Figures 1 and 2 the intermediate stems E interconnect adjacent main ribs D, and there may, for example, be fourteen intermediate stems E between each pair of adjacent main stems C. In the particular embodiment illustrated the mesh-like array is shaped between each pair of adjacent main stems C to form fluting J.

Referring more particularly to Figure 3 which shows in section one set of fourteen intermediate stems E between a pair of adjacent main stems C, it can be seen that the thickness either in a circumferential or radial direction or both of at least two intermediate stems E in each of the areas adjacent the main stems C is less than the corresponding thickness of at least two intermediate stems E in the area remote from the main stems C. In the particular embodiment of the invention illustrated,

there are four thickened intermediate stems E in the remote area and the remaining ten intermediate stems are all thin stems. This particular arrangement may be modified, however, within the scope of the invention, provided that there are two thickened intermediate stems E in the remote area and two thin intermediate stems E in each of the adjacent areas.

Although the invention has been particularly described with reference to the embodiment illustrated in the accompanying drawings this may be modified in various ways. For example the numbers of main stems and ribs and intermediate stems may be varied, and if desired intermediate ribs F in Figure 1 may be provided branching from the intermediate stems or vice-versa.

Furthermore and referring now particularly to Figure 4, as previously stated, the main ribs D^1 need not branch from the main stems C^1 at right angles, and the intermediate stems E^1 need not branch from the main ribs at right angles. In the event that the intermediate stems are so inclined to the main stems that most intermediate stems lie within both a remote and an adjacent area, it must be arranged that parts of at least two intermediate stems in one adjacent area are thinner than parts of at least two intermediate stems in a remote area. In this event it will be appreciated that one of the thinner parts may be a part of the same stem as one of the thicker parts.

WHAT WE CLAIM IS:—

1. A shuttlecock comprising a cap and a skirt made of synthetic material, in which the skirt comprises main stems, main ribs branching from the main stems and intermediate stems branching from the main ribs, characterised in that the thickness of at least two intermediate stems in each area adjacent a main stem is less than the thickness of at least two intermediate stems in each area remote from the main stems.

2. A shuttlecock as in Claim 1 and characterised in that the features in Claim 1 are combined with a fluted skirt.

3. A shuttlecock substantially as described with reference to the accompanying drawings or modified as herein described.

For and on behalf of
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996695 COMPLETE SPECIFICATION
1 SHEET
This drawing is a reproduction of the Original on a reduced scale

FIG. 1.

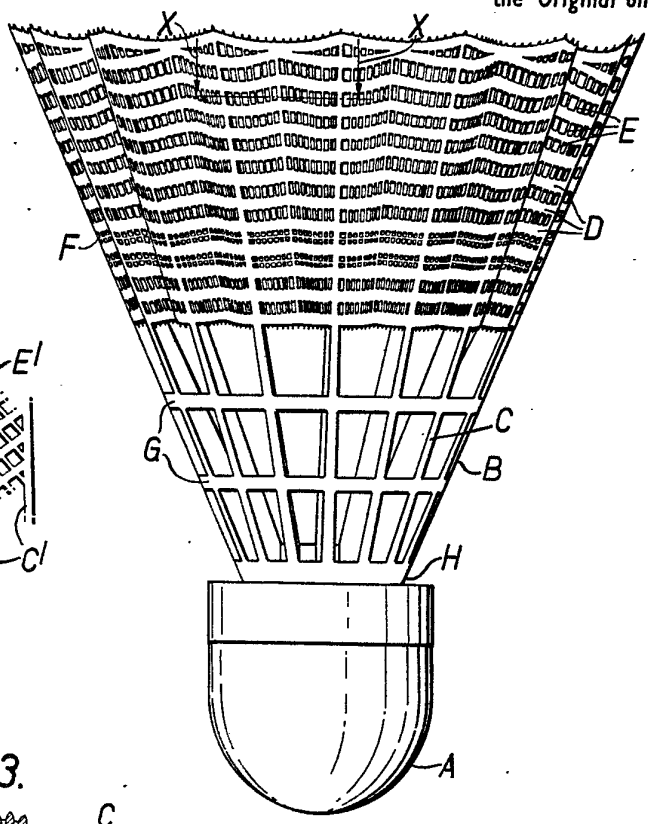

FIG. 4.

FIG. 3.

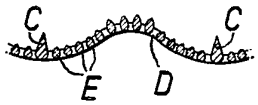

FIG. 2.