Jan. 27, 1953 W. C. CARLTON 2,626,806

SHUTTLECOCK

Filed June 23, 1950

FIG. 1.

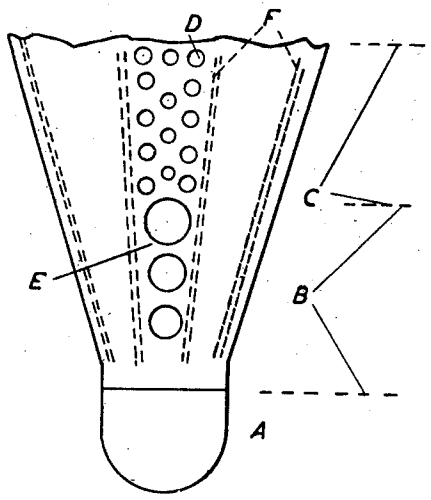


FIG. 3.

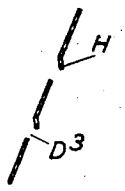
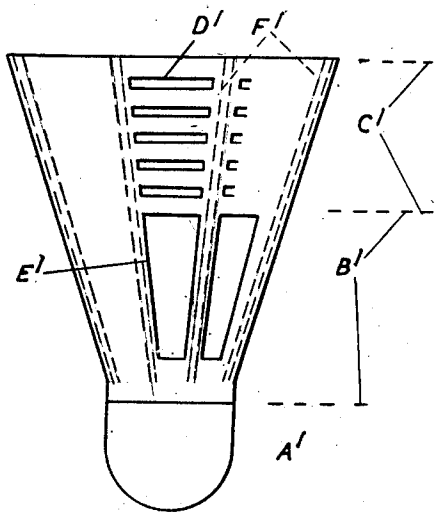


FIG. 2.



William C. Carlton Inventor

By John E Eastlack

Attorney

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SHUTTLECOCK

William Charles Carlton, Hornchurch, England

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4 Claims. (Cl. 273—106)

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This invention relates to shuttlecocks and is useful when it is desired to substitute a manufactured material for the feather flights normally used.

It has previously been proposed to use flights made of Celluloid and also flights made of fabric. The laws of badminton, however, require that the shuttlecock should not exceed 85 grains in weight and that it should not travel further than 43 feet when hit with a normal full underhand stroke. It is the object of this invention to make a shuttlecock which will comply with these regulations, and also certain other requirements of badminton players. Fabric is wasteful of weight because the material criss-crosses so that it is composed of thick and thin sections regardless of strength requirements, thereby unnecessarily increasing the weight. In addition, when struck with a racket it collapses and it therefore requires stiffening substantially throughout its entire surface which further increases the weight. A plain Celluloid flight does not present sufficient resistance to the air and in addition is too heavy in the skirt to reverse readily when struck and when being used in small distance shots. Alternatively it must be made so thin that it breaks too readily.

I have found that if a resilient substance (so that it does not have to be stiffened afterwards except locally) is used to make the flight and this is made with small holes over most of its surface it will combine lightness with wind resistance and it will fill the requirements of a feather in a shuttlecock. It will be understood that stiffening may be necessary locally to meet certain strength requirements but this strength may be put exactly where required as distinct from carrying weight where strength is not required.

Production time can be saved by developing the cone section of the shuttlecock from a flat sheet of material suitably holed and stiffened. This is then curled into a cone and fixed to a base. The material used may be Celluloid, or a resilient mix of polyvinyl chloride, or polythene. Other suitable materials will readily suggest themselves. When selecting a material it must be remembered that a shuttlecock flight tends to flatten when hit sideways and the material must, therefore have a good recovery to its normal position.

The object of the invention is to enable a satisfactory shuttlecock to be made of manufactured material, reference being had to the accompanying drawings, in which:

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Fig. 1 shows a side elevation of the shuttlecock of one form of the invention.

Fig. 2 shows a side elevation of a shuttlecock of another form of the invention.

Fig. 3 shows a sectional view of a formed edge.

Fig. 1 shows a side elevation of one form of the invention comprising a base A, and a skirt having an inner portion B fixed to and extending from the base A and further having an outer portion C continuing and extending from the inner portion B, the dotted lines giving approximately the areas of the inner and outer skirt portions.

The base A is made of cork and kid or other suitable materials and in this instance is recessed to take the inner edge of the skirt. The skirt is made in one piece from sheet suitable plastic about .007'' thick, and in the sheet many openings of varying size are made approximately as shown in the drawing. The openings are grouped lengthwise of the skirt and stiffeners F are placed on opposite sides of the grouped openings to prevent the shuttlecock collapsing when hit end-on with force. The openings are continued in spaced lengthwise groups with stiffeners on opposite sides of each group all around the shuttlecock but to prevent confusion only the openings in the centre panel are shown.

The openings D in the outer skirt portion, and E in the inner skirt portion are circular in form, with the openings E being of materially greater area than the openings D so that air may readily escape through the inner skirt portion B in order to facilitate reversal of the shuttlecock after being struck in play.

In order that lightness and air resistance may be combined suitably, the openings such as D in the outer skirt portion should be relatively small and closely spaced.

Fig. 2 shows an alternative design to indicate that the combination of lightness with free edges to create wind resistance may be obtained in a variety of ways. In this case A^1 is the base as before; B^1 is the inner portion of the skirt, and C^1 is the outer portion of the skirt. In this example the openings are grouped lengthwise of the skirt and are made of quadrilateral shape with the openings E^1 in the inner skirt portion being of materially greater area than the openings D^1 in the outer skirt portion. Stiffeners F^1 are added in the same manner as the stiffeners F described in connection with Fig. 1, care being taken not to cover the openings E^1 and D^1. In this form, the openings such as D^1 in the outer skirt portion should be relatively small and close-

ly spaced so that lightness and air resistance are combined in the same manner as in the form shown in Fig. 1.

Fig. 3 shows a sectional fragment including modified openings D^3 of a typical outer skirt portion made to the above designs as regards the arrangement of the openings but with the trailing edges of the openings out-turned to form lips as shown at H so as to intercept air flow in a more pronounced manner than with a plain opening. It will be understood that the edges of the openings in this type of shuttlecock also could be designed to slow down twisting or encourage it.

It will be understood that all sizes quoted or shown are approximate only and will vary according to the materials used and the conditions under which the shuttlecock is to operate.

Variations may be made without departing from the scope of the invention as defined by the following claims.

I claim:

1. A shuttlecock comprising a base with a one piece flared skirt incorporating longitudinal spaced stiffeners fixed to it, that part of the skirt adjacent the base being referred to as the inner skirt and that part remote from the base being referred to as the outer skirt, the skirt being made of an inherently resilient material and being characterized in that holes are present both in the inner and outer skirt, holes in the inner skirt being bigger in area than holes in the outer skirt, and there being in the outer skirt a plurality of small holes for lightness and air resistance between each pair of adjacent stiffeners.

2. A shuttlecock as in claim 1, and characterized in that there are holes in the skirt which are quadrilateral.

3. A shuttlecock as in claim 1, and characterized in that there are holes in the skirt which are circular.

4. A shuttlecock as in claim 1, and characterized in that material forming the trailing edge of some of the holes is lipped outwardly so as to intercept air-flow when the shuttlecock is travelling forwardly.

WILLIAM CHARLES CARLTON.

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