PATENT SPECIFICATION

DRAWINGS ATTACHED

Inventor: WILLIAM CHARLES CARLTON

978,388

978,388

Date of Application and filing Complete Specification June 25, 1963.

No. 25135/63.

Complete Specification Published Dec. 23, 1964.

Index at acceptance:—A6 S28

International Classification:—A 63 h

COMPLETE SPECIFICATION

A Shuttlecock

PATENTS ACT, 1949

SPECIFICATION NO. 978,388

In accordance with the Decision of the Superintending Examiner, acting for the Comptroller-General, dated the thirtieth day of November, 1965, this specification has been amended under Section 29 in the following manner:-

Page 1, line 68, page 3, line 75, *before* "not more" *insert*" a maximum thickness of"

Page 2, lines 24 and 25, *delete* "not more than 1.5 millimetres and"

Page 2, line 26, *after* "millimetres" *insert* "and a maximum thickness of not more than 1.5 millimetres"

Attention is also directed to the following printer's error:-

Page 3 line 51, *for* "15" *read* "1.5"

THE PATENT OFFICE,
20th January, 1966

D 6042/4

In addition to performance there is a further quality which is also capable of continual improvement but subject to compromise with performance, and this quality is to some extent psychological and to some extent connected with 'feel'. When a badminton player 'smashes' his satisfaction is increased if there is appreciable resistance and a certain noise made on impact between shuttlecock and racket. A new feather shuttlecock of tournament quality and made from goose feathers has this quality.

It is the object of this invention to improve the psychological attraction with particular regard to the 'feel' and sound of shuttlecocks having skirts made of suitable synthetic materials, examples of which are suitable types

.3 millimetres and not more than 1.5 millimetres and being not more than 7 millimetres and not less than 2 millimetres in total breadth and the said winglike portion being not less than .075 millimetres thick, and the width of the said winglike portion being not less than 1.5 millimetres and the greatest said width being such that it does not create more than acceptable instability in the shuttlecock.

The invention is achieved by providing by a known method, for example, injection moulding, a shuttlecock made up of a cap and a flared skirt. The cap may be integral with the skirt or attached to the skirt after the skirt has been manufactured separately and the cap may incorporate separate covering.

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A 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 suitable synthetic materials such as some types of polyethylenes and some types of polyamides.

Shuttlecocks having skirts made of synthetic materials and acceptable to large numbers of badminton players have been in production since 1950 and some of these shuttlecocks have a performance comparable with some types of feather shuttlecocks.

The performance of any type of shuttlecock can be continually improved but there are a number of conflicting requirements which make great attention to detail essential and some compromise between weight and strength inevitable.

In addition to performance there is a further quality which is also capable of continual improvement but subject to compromise with performance, and this quality is to some extent psychological and to some extent connected with 'feel'. When a badminton player 'smashes' his satisfaction is increased if there is appreciable resistance and a certain noise made on impact between shuttlecock and racket. A new feather shuttlecock of tournament quality and made from goose feathers has this quality.

It is the object of this invention to improve the psychological attraction with particular regard to the 'feel' and sound of shuttlecocks having skirts made of suitable synthetic materials, examples of which are suitable types of polyethylenes and suitable types of polyamides.

This invention is that, in a shuttlecock, consisting of a cap and a flared skirt, the flared skirt being made of a suitable synthetic material, and the combination of the cap and flared skirt being such that the performance of a shuttlecock is obtained, and the flared skirt incorporating between seven and twenty-five stems spaced symmetrically about the axis of the shuttlecock, the shuttlecock being characterised in that between seven and twentyfive of the said stems incorporate for at least one centimetre of their length a part having a cross section made up of a bladelike portion and a winglike portion, the said bladelike portion having its broadest faces within 30° of parallel to a true radius from the axis of the shuttlecock and passing through the bladelike portion and the said winglike portion having its widest faces within 40° of a line at 90° to the same true radius from the axis of the shuttlecock and the said bladelike portion having a mean thickness of not less than .3 millimetres and not more than 1.5 millimetres and being not more than 7 millimetres and not less than 2 millimetres in total breadth and the said winglike portion being not less than .075 millimetres thick, and the width of the said winglike portion being not less than 1.5 millimetres and the greatest said width being such that it does not create more than acceptable instability in the shuttlecock.

The invention is achieved by providing by a known method, for example, injection moulding, a shuttlecock made up of a cap and a flared skirt. The cap may be integral with the skirt or attached to the skirt after the skirt has been manufactured separately and the cap may incorporate separate covering.

The part of the cap adjacent the stems may be flared.

The skirt is flared but can include an end collar adjacent the cap joining the roots of the stems and is made up of between seven and twentyfive stems arranged symmetrically around the axis of the shuttlecock and with vanes between the stems. The vanes may be of lattice construction with air spaces interspaced with ribs and the stems are members which support the vane in proper relationship to the cap. Between seven and twentyfive of the stems have incorporated in them a blade-like portion and a winglike portion combined and this combined portion has a length in each of the selected stems of not less than 1 centimetre. The bladelike portion has its broadest faces within 30° of parallel to a true radius from the axis of the shuttlecock and passing through the bladelike portion, and the winglike portion is made with its widest faces within 40° of a line at 90° to the same true radius. Additionally the bladelike portion has a mean thickness of not more than 1.5 millimetres and not less than .3 millimetres, and is not more than seven millimetres and not less than 2 millimetres in total breadth; further, the winglike portion is made so that it is not less than .075 millimetres thick and it should not be more than .3 millimetres thick otherwise performance may suffer. The width of the winglike portion is not less than 1.5 millimetres. The greatest width of the winglike portion may vary extensively depending on which part of the stem is selected to incorporate the characterising features of the invention; for instance the stems may be so close together near the cap that the winglike portion could be continuous round the circumference of the shuttlecock. The winglike portion may be intermittently wide and narrow where it passes a vane. Where there are no vanes branching from the stems a width in the winglike portion of 2 millimetres on one or both sides of the bladelike portion is suitable.

In practice it is preferable that all the stems of the shuttlecock should incorporate the characterising features of the invention and the length of the characterising portion should extend from the cap to the vane area and even well into the vane area.

So that there is no misunderstanding with regard to the terms used in this specification the terms concerned will now be used with reference to figures 1 and 2 of the accompanying drawings which show respectively a side elevation of a typical shuttlecock not incorporating the invention and a cross section through the stems of a nearly similar shuttlecock but which incorporates the invention.

The cap 1 is fixed to the skirt 2, which, it will be noted joins the cap at 7 where the cap itself is flared. The cap may be integral with the skirt or attached to a collar integral with the stems of the skirt. The cap may also be provided with additional covering.

The bladelike stems 3 form part of the skirt and hold the vanes 30 which may be a series of ribs branching from each side of each stem in proper relationship to the cap. The vane area may extend the full length of the skirt but preferably extends from the wide end of the skirt to between 70% and 30% of the total length of the skirt.

Referring again to figures 1 and 2. Figure 2 represents a cross sectional view through XX of the bladelike stems 3^1 of a similar shuttlecock to that shown in figure 1 but with winglike portions 4 added. The axis 5 of the shuttlecock is shown in relation to a cross section of the stems 3^1 and the line 5—6 then becomes a typical true radius from the axis 5. The true radius 5—6 passes through one of the stems 3^1 and the 'broad' faces as far as this specification is concerned, are the faces 8 and 9 of any of the stems 3^1 and the broad faces of the stem 3^1 which the true radius 5—6 passes through lie within 30° of parallel to this true radius 5—6. The 'wide' faces, as far as this specification is concerned, of the winglike portion 4 are the faces 10 and 11 and the wide faces of the winglike portion of the stem 3^1 which the true radius 5—6 passes through are arranged to lie within 40° of a line at 90° to the true radius 5—6. The same requirements hold for the broad faces of all stems 3^1 and the wide faces of all winglike portions 4 relatively to a true radius which passes through the respective stem.

The term 'thickness' when applied to the bladelike portion is the distance between the faces 8 and 9 and when applied to the winglike portion is the distance between the faces 10 and 11.

In order that the invention may be readily understood and carried into effect reference is now made to the additional accompanying drawings in which:—

Figure 3 shows an enlarged cross-sectional view of a single stem of a shuttlecock incorporating one form of the invention.

Figure 4 shows an enlarged cross-sectional view of a single stem of a shuttlecock incorporating another form of the invention.

Figure 5 shows an enlarged cross-sectional view of a single stem of a shtttlecock incorporating yet another form of the invention.

Figure 6 shows an enlarged cross-sectional view of a single stem of a shuttlecock incorporating still another form of the invention.

Figure 7 shows a side elevation of a shuttlecock incorporating the invention.

Referring to Figure 3, the bladelike portion 16 of stem 12 is in this instance parallel to the true radius 5^1, 6^1, and the winglike portion 17 is at right angles to the true radius 5^1 6^1 and on both sides of the bladelike

portion but is intermediate the ends of the bladelike portion.

Referring now to Figure 4, the stem 13 has its bladelike portion 18 at an angle 19 which is at 29° to the true radius 5^2 6^2, and it will be noted that this angle is just within 30° which is the maximum scope it is desired to cover with this invention. The winglike portion 20 is at an angle of 90° to the true radius 5^2 6^2.

Referring now to Figure 5, the typical stem 14 has its bladelike portion 21 at an angle 19^1 which is at 20° to the typical true radius 5^3 6^3 and the winglike portion 22 is at an angle 23 which is 39° to a typical line 27 at right angles to the true radius 5^3 6^3; this angle of 39° is just within the scope it is desired to cover with this invention.

Referring to Figure 6 the typical stem 15 has its bladelike portion 24 at an angle 19^2 which is less than 30° to the true radius 5^4 6^4 and its winglike portion 25 at an angle 26 which is at an angle 39° to a typical line 27^1 at 90° to the true radius but in this instance, to distinguish the example from that shown at Figure 5 the line 27^1 is on the other side of the true radius 5^4 6^4.

The examples given are by way of indication and not limitation and any suitable combination of bladelike portion and winglike portion may be used to give a total length of not less than 1 centimetre incorporated in each of between seven and twentyfive stems arranged symmetrically around the axis of the shuttlecock.

Referring now to figure 7: the cap 31 is manufactured separately from the skirt 32 which has 16 stems 33 from which branch a number of vanes or ribs 34. The stems 33 incorporate a bladelike portion 35 and a winglike portion 36 from the cap outwards for a distance of 4 centimetres and the minimum breadth of the stems for this 4 centimetres is 2.5 millimetres and the thickness of the bladelike portion is 1 millimetre at the edge remote from the axis and .25 millimetres at the edge nearest the axis and tapered uniformly so that the mean thickness is more than .3 millimetres. Moreover each winglike portion 36 is not less than .075 millimetre thick and not less than 15 millimetres wide.

WHAT WE CLAIM IS:—

(1) A shuttlecock, consisting of a cap and a flared skirt, the flared skirt being made of a suitable synthetic material, and the combination of the cap and flared skirt being such that the performance of a shuttlecock is obtained, and the flared skirt incorporating between seven and twentyfive stems spaced symmetrically about the axis of the shuttlecock, the shuttlecock being characterised in that between seven and twentyfive of the said stems incorporate for at least one centimetre of their length a part having a cross section made up of a bladelike portion and a winglike portion, the said bladelike portion having its broadest faces within 30° of parallel to a true radius from the axis of the shuttlecock and passing through the bladelike portion and the said winglike portion having its widest faces within 40° of a line at 90° to the same true radius from the axis of the shuttlecock and the said bladelike portion having a mean thickness of not less than .3 millimetres and not more than 1.5 millimetres and being not more than 7 millimetres and not less than 2 millimetres in total breadth and the said winglike portion being not less than .075 millimetres thick, and the width of the said winglike portion being not less than 1.5 millimetres and the greatest said width being such that it does not create more than acceptable instability in the shuttlecock.

(2) A shuttlecock substantially as described and/or as illustrated in any of Figures 2 to 7 of the accompanying drawings.

W. C. CARLTON.

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olished at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies may be obtained.

978,388 COMPLETE SPECIFICATION
3 SHEETS

This drawing is a reproduction of the Original on a reduced scale.
SHEET 1

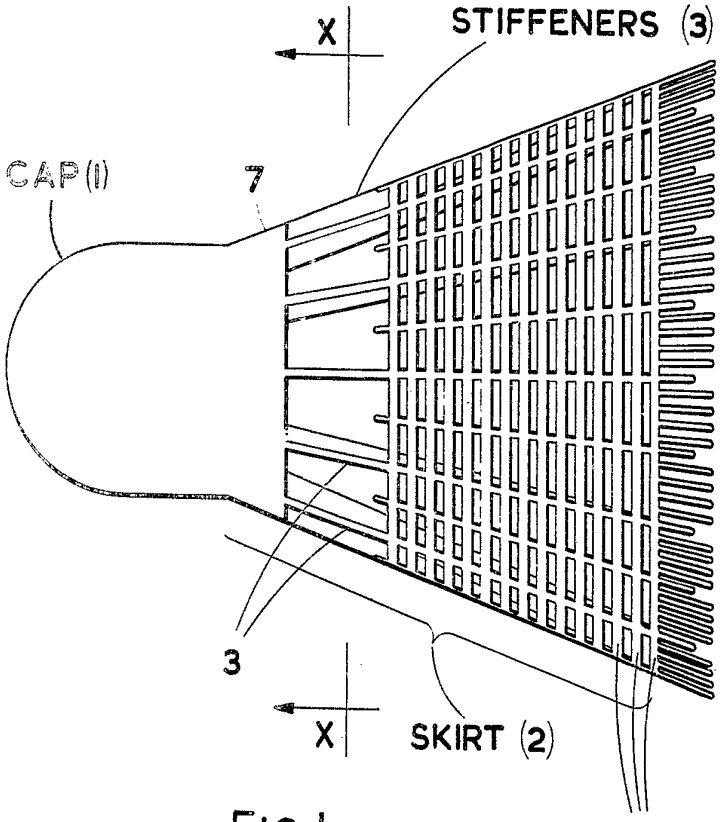

FIG. 1.

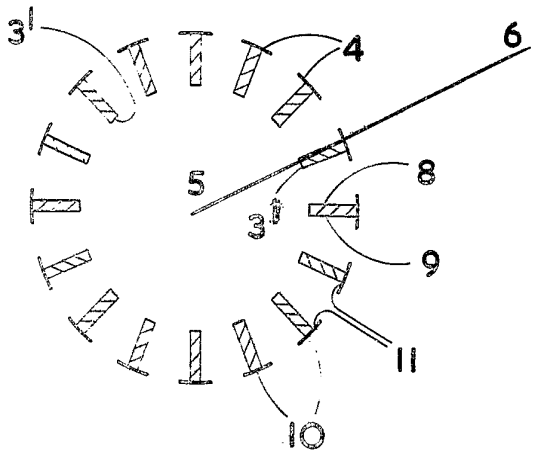

FIG. 2.

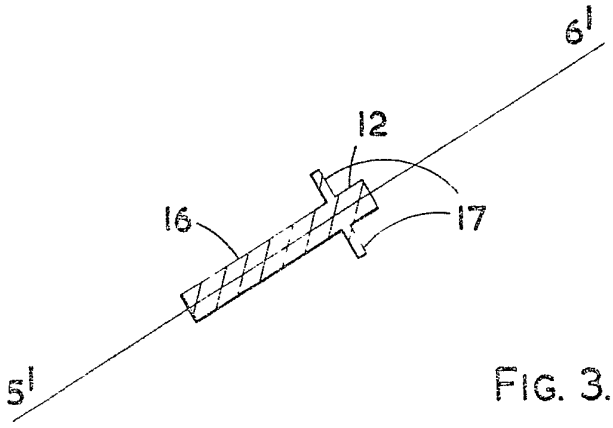

FIG. 3.

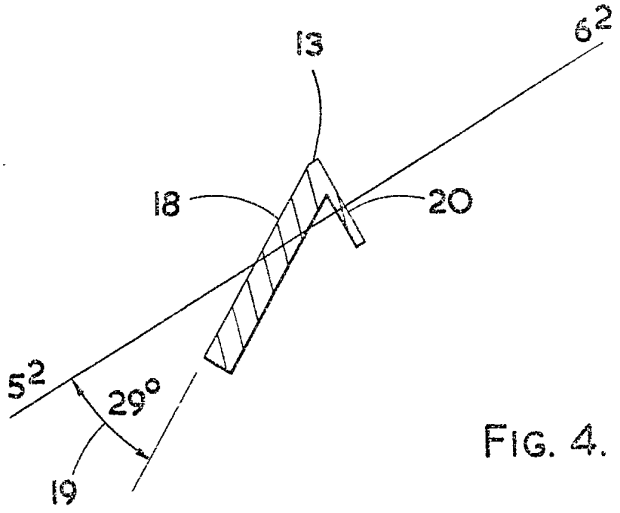

FIG. 4.

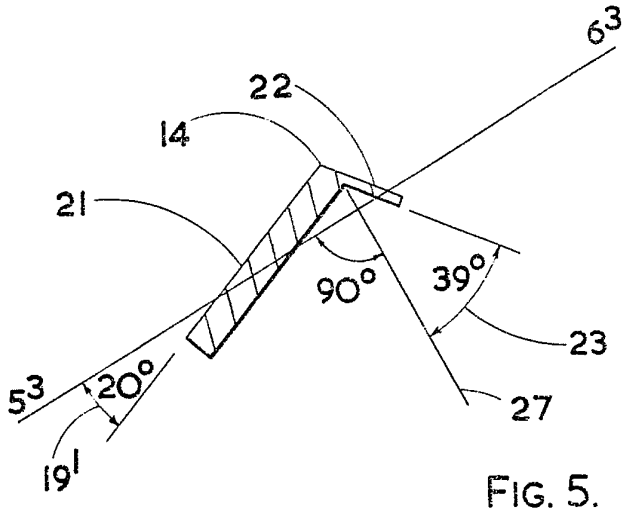

FIG. 5.

978,388 COMPLETE SPECIFICATION
3 SHEETS

This drawing is a reproduction of the Original on a reduced scale.
SHEETS 2 & 3

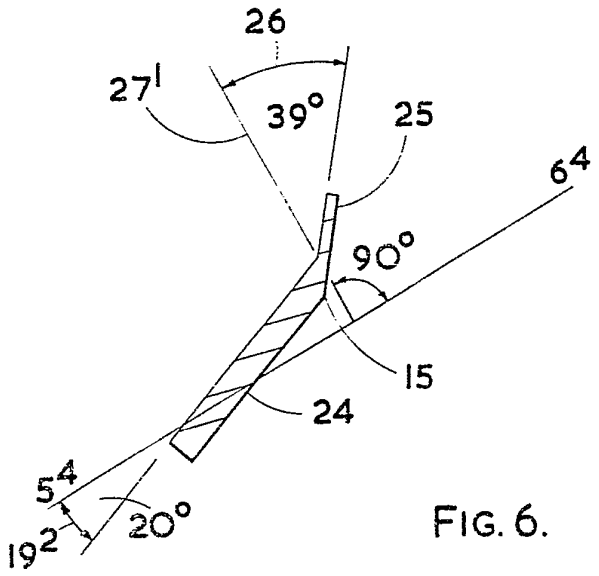

FIG. 6.

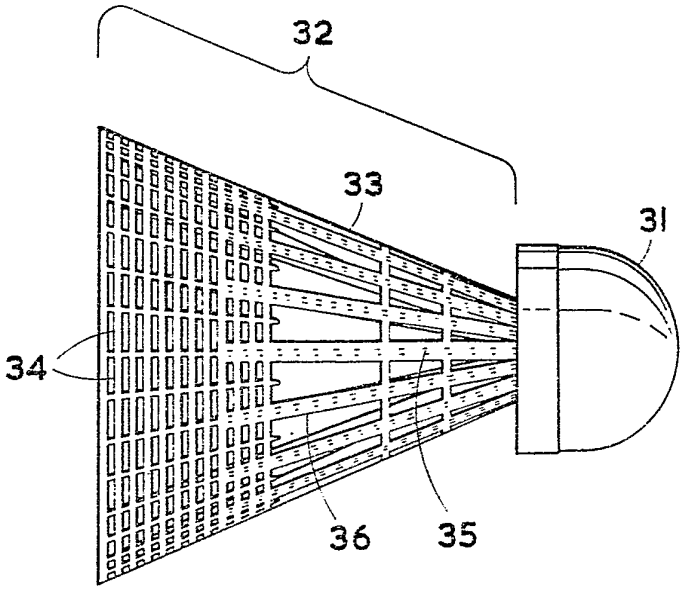

FIG. 7.

978,388 COMPLETE SPECIFICATION
3 SHEETS
This drawing is a reproduction of the Original on a reduced scale.
SHEETS 2 & 3

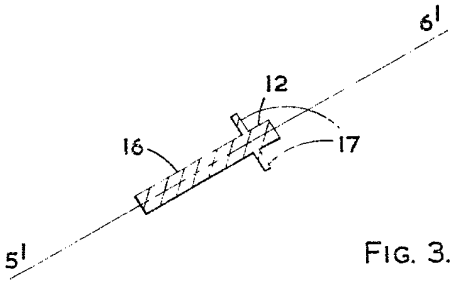

FIG. 3.

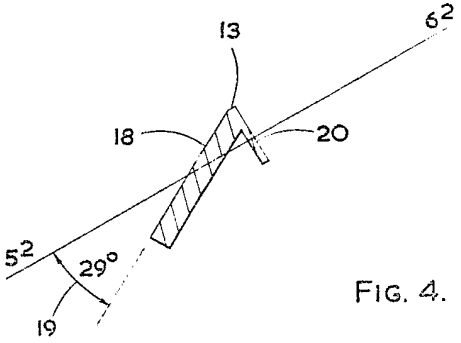

FIG. 4.

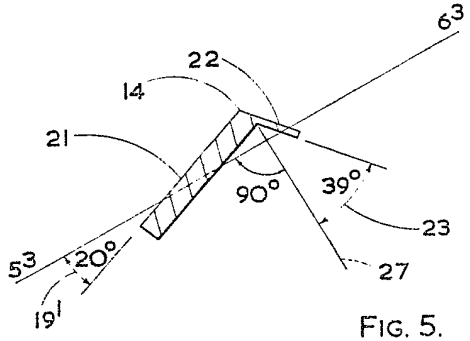

FIG. 5.

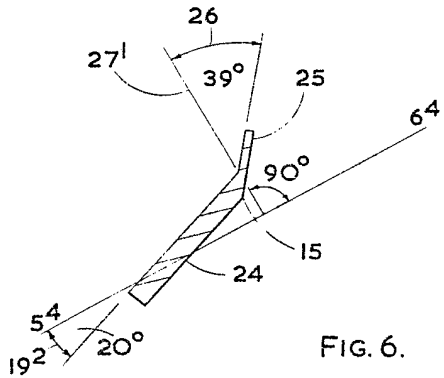

FIG. 6.

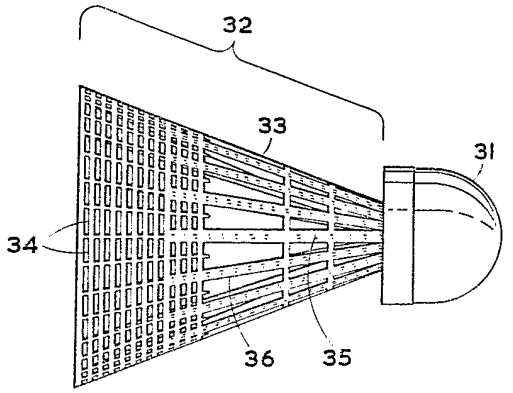

FIG. 7.