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2,354,790

SHUTTLECOCK

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Fig. 1.

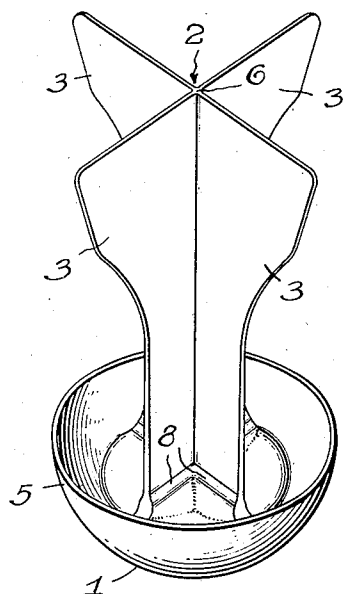


Fig. 2.

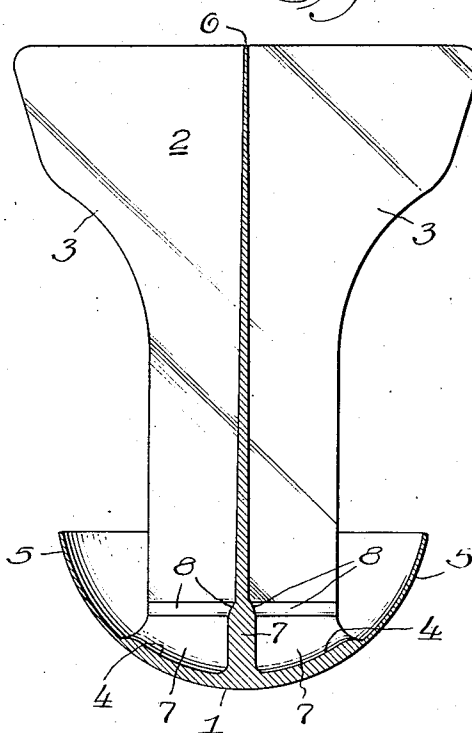
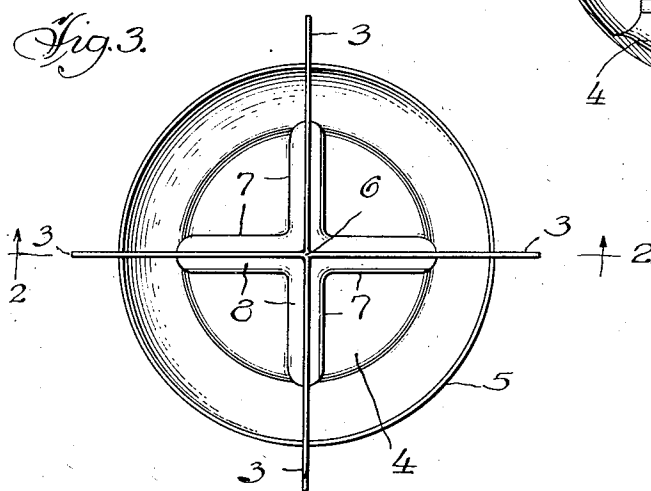


Fig. 3.



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SHUTTLECOCK

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10 Claims. (Cl. 273—106)

This invention relates to a shuttlecock for use in playing such games as badminton and other similar games, wherein the shuttlecock is struck by rackets in the hands of the players.

Shuttlecocks as heretofore known have generally been of such fragile nature that they could be used only a short time, often times no longer than one game, and sometimes becoming damaged beyond use in less than one game. By far the greater number of shuttlecocks heretofore in use have used feathers for the tail piece, which feathers easily became broken thus rendering the shuttlecock incapable of further use. Also, to get the maximum of efficiency and use from a shuttlecock it is extremely vital that the shape and construction of the same be precisely correct to fully meet the many rigid requirements in its use.

Among the objects of my invention are to overcome the disadvantages and make possible the advantages referred to above.

A further object is to make a shuttlecock of plastic material of such durable construction as to have a long lifetime of active usefulness.

Another object is to provide a shuttlecock of such shape and arrangement of parts that it will meet the wide range of requirements of such a device.

A still further object is to provide a novel shape and arrangement of head, and combination of the same with a novel form of tail vane so as to give the greatest efficiency and durability in use.

Other objects, advantages and capabilities will later more fully appear.

My invention further resides in the combination, construction and arrangement of parts illustrated in the accompanying drawing, and while I have shown therein a preferred embodiment, I wish it understood that the same is susceptible of modification and change without departing from the spirit of my invention.

In the drawing:

Fig. 1 is a perspective view of a shuttlecock embodying my invention.

Fig. 2 is an enlarged longitudinal section taken on the line 2—2 of Fig. 3.

Fig. 3 is a plan view looking toward the free end of the vanes of the shuttlecock of Figs. 1 and 2.

Referring more in detail to the drawing my improved shuttlecock comprises a head 1 integrally connected to the tail piece 2, the head being spherically shaped into the form of a cup, and the tail piece having a plurality of vanes 3, 55

preferably four, although other numbers of vanes may be used as desired, three also giving very good results.

The hollow cup-shaped head 1 at its central, inner, forward end 4, is of greater thickness than the marginal portions 5. The vanes 3 radiate laterally outwardly from a common axis 6 which axis also passes through the center of the spherical cup-shaped head 1. The vanes 3 shortly before they join the head 1, within the head, are of increased thickness as shown at 7, these thickened portions merging in the inclined shoulders 8 into the thinner portions of the vanes 3, which vanes may be of tapering thickness or not, as desired.

It is thus seen that the thickened portions 7 and 8 of the vanes together with the thicker portion 4 of the head are symmetrically arranged with relation to the common axis of the tail piece and the head. It is also to be noted that the vanes are flat, and are of smaller width at the bottom (as viewed in Fig. 2) and flare outwardly at the top to a width greater than the diameter of the head. The head may, however, be greater in diameter than the tail, if a speed that slow is desired. This increased width is greatest at the free end of the tail piece and is not extended too far back. This gives a quicker and more pronounced turning over of the shuttlecock immediately after being struck.

The head 1 is preferably a little less than a half sphere in height (as viewed in Fig. 2), although this proportion might be somewhat deviated from without departing from the spirit of my invention. The weight is concentrated in the head by the increased thickness of the vanes and head as described above, which gives the proper amount of increase in weight and strength of the head, to give the proper balance to the parts. The size of the head, controls the speed of flight, and may be increased or decreased to obtain the desired resistance to flight through the air. The tail of my novel shuttlecock governs the direction and stability of flight and the head provides resistance to flight.

My improved shuttlecock is preferably made of plastic material of a resinous nature, many of the plastic resins being suitable, but I prefer a plastic material that possesses suitable lightness and yet considerable toughness to give greater length of life of usefulness. Among some of the possible plastic materials which I may use may be mentioned thermo-plastic resins, thermo-setting resins, phenol-formaldehyde, phenol-furfural, synthetic resins, natural resins such as lignin, vinsol

and the like, urea-formaldehyde, phenolic resins, vinyl resins, acetate-butyrate, vinyl esters, mixtures of vinyl esters and vinyl benzene, vinyl acetate, vinyl propionate, vinyl butyrate, and other resins and plastic materials obtainable on the market, some of which may be obtained under trade names. The plastic material used may be molded under heat and pressure, or otherwise as desired, by any of the known methods for forming such plastic articles.

I prefer to make my novel shuttlecock of a plastic material that is not too brittle, but is sufficiently tough that it will be capable of long use without breaking or becoming damaged in normal use.

Having thus disclosed my invention, I claim:

1. A shuttlecock comprising a hollow, spheroidal, cup-shaped head having vanes integrally connected to the inside central part of the head and extending rearwardly therefrom, said vanes extending laterally radially in planes that intersect in a longitudinal axis common to both the vanes and the head, said vanes and head being made of plastic material, the forward central portion of the head being of greater thickness than the marginal portion.

2. A shuttlecock comprising a hollow, spheroidal, cup-shaped head having vanes integrally connected to the inside central part of the head and extending rearwardly therefrom, said vanes extending laterally radially in planes that intersect in a longitudinal axis common to both the vanes and the head, said vanes and head being made of plastic material, the forward central portion of the head being of greater thickness than the marginal portion, and the ends of the vanes where they join the head being for a short distance thicker than the remaining portions of the vanes.

3. A shuttlecock of plastic material comprising an open hollow head the exterior face of which is substantially spherically shaped, the central forward wall of the head being substantially thicker than the remaining portion of the head, a plurality of radially extending vanes integrally joined with the thicker portion of the head, and inside of the head, the vanes and head being coaxial, those portions of the vanes at and to a short distance away from the head being thicker than the remaining portions of the vanes, said vanes for the greater portion of their length being of less total width than the diameter of the head, and for the remainder of their length spreading out to a total width greater than the diameter of the head, whereby when the shuttlecock head is struck by a racket of a player the head will assist in reducing the speed of flight, the shuttlecock will quickly turn over, and the vanes will govern the direction and stability of flight.

4. A shuttlecock comprising a cup-shaped head having a smooth outer face and a substantially thin wall forming a hollow interior, vanes integrally connected at one end to the inner face of the hollow head and extending rearwardly therefrom, said vanes extending laterally radially in planes that intersect in a longitudinal axis common to both the vanes and the head, the vanes each being flat from within the hollow head

to their free ends, the radially extending intersecting vanes being positioned within the hollow of the head and extending a substantial distance out of the same, whereby when the shuttlecock head is struck by a racket of a player the head will reduce the speed of flight, the shuttlecock will quickly turn over, and the vanes will govern the direction and stability of flight.

5. A shuttlecock comprising a cup-shaped head having a smooth outer face and a substantially thin wall forming a hollow interior, a plurality of intersecting vanes radiating from an axis common to that of both the vanes and the head, said vanes being connected to the inner face of the hollow head and extending rearwardly therefrom, the hollow open sides of the cup-shaped head facing toward the vanes, and the rim of the head being laterally spaced from the vanes.

6. A shuttlecock comprising a cup-shaped head having a convex outer face and an approximately thin curved wall having a circumferential free edge rim and forming a hollow interior, a plurality of intersecting vanes radiating from an axis common to that of both the vanes and the head, the radiating and intersecting part of said vanes extending into the hollow head and being secured to the inner face thereof and protruding rearwardly therefrom, whereby when struck the hollow head will reduce the speed of flight, the shuttlecock will quickly turn over, and the vanes will govern the direction and stability of flight.

7. A shuttlecock comprising a hollow, cup-shaped head having integrally connected therewith intersecting vanes radiating from an axis common to that of both the vanes and the head, the hollow open side of the cup-shaped head facing toward the vanes, said radiating vanes extending into the hollow of the cup-shaped head.

8. A shuttlecock comprising a hollow, cup-shaped head having integrally connected therewith intersecting vanes radiating from an axis common to that of both the vanes and the head, the hollow open side of the cup-shaped head facing toward the vanes, said radiating vanes extending into the hollow of the cup-shaped head, the ends of the vanes farthest removed from the head being of greater width than the radiating vane ends that enter the hollow head.

9. A shuttlecock comprising a hollow, cup-shaped head having integrally connected therewith vanes radiating from an axis common to that of both the vanes and the head, the hollow open side of the cup-shaped head facing toward the vanes, said radiating vanes extending into the hollow of the cup-shaped head, the ends of the vanes farthest removed from the head being of an overall diametrical width greater than the diameter of the head.

10. A shuttlecock comprising a hollow, cup-shaped head having vanes integrally connected along angular junction lines to the inside central portion of the head and extending rearwardly therefrom, said vanes extending laterally radially in planes that intersect in a longitudinal axis common to that of both the vanes and the head, the intersecting vanes being spaced from the inside of the head except at the angular junction lines where they are joined thereto.

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