Jan. 16, 1951 T. AMPHLETT 2,538,348

SHUTTLECOCK

Filed March 20, 1947

Fig. 1

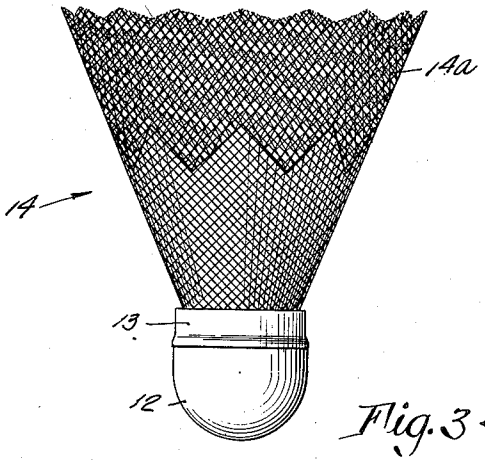


Fig. 3

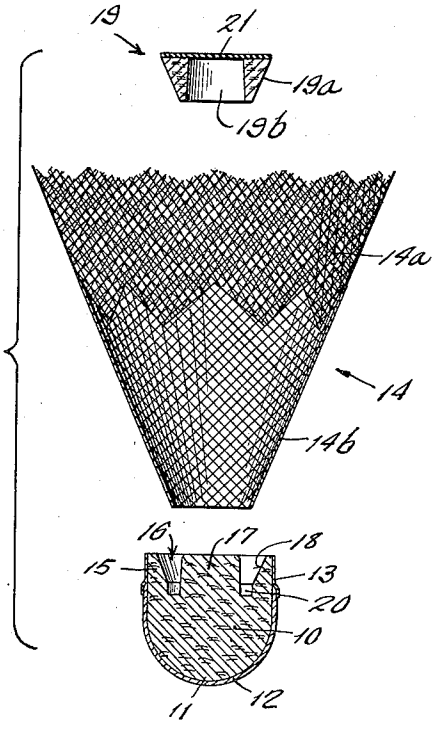


Fig. 2

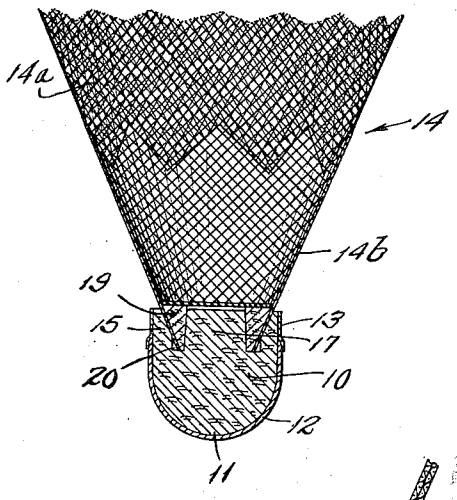


Fig. 4

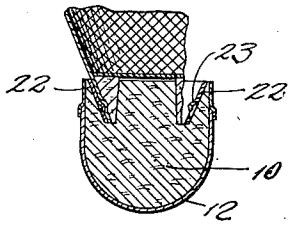
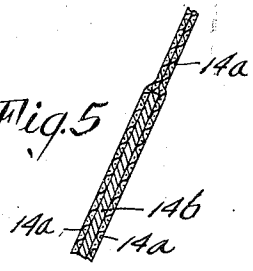


Fig. 5



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SHUTTLECOCK

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Application March 20, 1947, Serial No. 736,007

10 Claims. (Cl. 273—106)

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The present invention relates to shuttlecocks for use in connection with the game of badminton or the like and particularly to a shuttlecock having means for removably and replaceably mounting a vane thereon.

The vanes of the shuttlecock, which may be formed as a cone from feathers or quills or by a stiffened fabric, become damaged in play. Heretofore, they have been mounted on the body of the shuttlecock by being adhesively or otherwise permanently secured to the same so that when the vane is to be replaced it is necessary to break down the adhesive or other permanent securing means which many times destroys the shuttlecock.

According to the present invention the shuttlecock is provided with means for detachably connecting the vane to the body so that it remains in position throughout normal use of the shuttlecock but which permits the vane to be removed and replaced when desired.

In the present preferred form of the invention this is accomplished by providing the shuttlecock body with a socket to receive the end of the vane and a guided plug for pinching the vane against the side wall of the socket to hold it in place. The plug is held in place, against dislodgement during normal use, by friction and without the use of adhesives or other permanent fastening means so that it may readily be removed and replaced whenever it is desired to change or replace the vane.

Preferably a portion of the surface of the socket is provided with a taper corresponding to the taper of the conical vane and a guide post. The plug is slidably mounted on the guide post and is provided with a cooperating surface for clamping the end of the vane against said tapered portion.

The vane attaching means of the present invention is so constructed and arranged that it may or may not alter the weight, distribution or playing characteristics of the shuttlecock as required.

Other features and advantages will be apparent from the specification and claims when considered in connection with the drawings in which:

Figure 1 shows a side elevation of a shuttlecock of the present invention.

Fig. 2 is a longitudinal sectional view of one form of the invention.

Fig. 3 is an exploded view of Fig. 2.

Fig. 4 is a longitudinal sectional view partly broken away of another form of the invention.

Fig. 5 is a detailed section through the vane.

As shown in the drawings the body 10 which

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may be made of cork or other suitable body material is provided at one end with a semispherical surface 11 which is usually contacted by the racket or other implement used during the playing of the game of badminton or other similar games. The outer surface of the body may be covered with a protecting cover 12 of kid, rubber, lacquer or other protective material and the upper edge covered by a band 13 adhesively secured to or shrunk into place as is well known in the art. This band not only finishes the cover but also reinforces the wall at the upper end of the body as will be described.

A vane 14 is connected to the body for the purpose of steadying the shuttlecock in flight. While the vane may be made up of quills or feathers, conically arranged, in the illustrated form of the invention, the vane is a cone formed from layers of stiffened open mesh porous fabric 14*a* with a layer of less porous material, such as paper or the like material 14*b* disposed about the apex of the cone between the layers 14*a* as shown in Figs. 3 and 5, and extending along the sides and shaped as required to vary the porosity of the vane and produce the desired flight characteristics of the shuttlecock.

The means for mounting the vane to the body according to the present invention comprises an annular wall 15 preferably integral with the body and extending upwardly from said other end of the body producing a vane receiving socket 16 in the end thereof.

A center post 17 projects axially from the body within the socket and transforms the socket into an annular recess. While the center post may be of various materials, in the herein disclosed form of the invention it is made integral with the cork body.

The walls of the socket are preferably tapered at 18 adjacent the outer end as shown in Fig. 3, so that they have the same taper as the vane and will engage and support the end of the vane when the latter is inserted in the socket.

According to the present invention the vane is detachably clamped and held in the socket by means of a clamping plug 19 having a tapered surface 19*a* and a bore 19*b* extending therein to receive the center post which guides and supports the same. The clamping plug is preferably made of a resilient and slightly compressible material. The presently preferred plug is made of cork, the same material as that of the body, in which case the weight and balance of the body is not substantially altered, with the plug in place, from a body of the same shape. However, the plug

may be of lighter or heavier material to vary the center of gravity of the body if desired.

When the annular plug is pushed into the recess it pinches the vane against the tapered wall, and since it is guided and supported by the post and backed up by the post, it frictionally grips the vane and holds it in place during normal use of the shuttlecock. Should there be any tendency of the wall 15 to flex outwardly under pressure of the plug it will be resisted by the band 13.

If desired, the inner end of the recess may be made cylindrical as shown at 20 in Fig. 3. This will enhance the gripping of the vane, for, as the plug is pushed in, it causes a slight bend at the vane at the joint between the cylindrical and tapered portions because the cylindrical wall does not back up the vane and permits the vane to yield under pressure of the tapered plug. This effectively binds the vane to the joint between the two surfaces.

If the bore 19b extends through the plug, so as to transform the plug into an annulus, the upper end may be closed by a cover 21 of fiber, paper or the like secured to and extending over the end of the plug.

In some instances it may be desired to increase the frictional hold on the vane by inserting friction means in the socket. While the friction means may take many forms, it is herein illustrated as comprising light sheet metal fingers 22 anchored to the body, the fingers having barbs or the like 23 projecting from their faces and against which the vane is forced by the plug as it is moved to clamping position.

When the vane becomes damaged or it is desired to remove and replace the same it is merely necessary to remove the plug by overcoming the friction grip of the plug. One way of accomplishing this is by rocking the vane sideways and walking the plug out of the socket similar to the removal of a cork from a bottle neck.

Thus it will be seen that the vane is sufficiently held in position during normal use by the vane and the plug may be forcibly removed, should it be desired to remove the same, without destroying the body of the shuttlecock or the plug.

Variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

I claim:

1. A shuttlecock comprising a body having a socket at one end provided with a securing means centering post therein, the outer part of the socket being tapered inwardly and forming a tapered outer wall surrounding the centering post; a vane having one end positioned within the socket; and securing means detachably mounted on the center post by a friction fit and having means engaging the end of the vane positioned within the socket for pinching the vane against the outer wall of the socket and detachably securing the vane to the body.

2. A shuttlecock comprising a body having a conical socket with a tapered outer wall at one end surrounding a plug centering post therein; a vane having one end positioned within the socket; and a plug having a post receiving bore therein and tapered outer surface, said plug frictionally engaging the post and having the outer surface engaging and pinching the vane against the outer wall of the socket and detachably securing the vane to the body.

3. A shuttlecock comprising a cork body having a rounded nose at one end and a conical socket with a tapered outer wall at the other end surrounding a plug centering post therein terminating adjacent the said outer end; a vane having one end positioned within the socket; and a removable cork plug having a post receiving bore therein disposed within the socket and having a surface for frictionally engaging said end of the vane and pinching the vane against the outer wall of the socket to detachably secure the vane to the body.

4. A shuttlecock comprising a body having a conical socket at one end provided with a plug centering post therein; a vane having one end positioned within the socket; a conical plug having a post receiving bore therethrough disposed within the socket, said plug having an internal and external frictional fit on said post and in said socket for pinching the vane against the outer wall of the socket and detachably securing the vane to the body; and means for closing the outer end of the bore in the plug.

5. A shuttlecock comprising a body having a conical socket at one end provided with a tapered outer wall surrounding a plug centering post; a vane having one end positioned within the socket; and a conical plug having a post receiving bore therein frictionally mounted on the centering post, and friction enhancing means positioned between the plug and the outer wall of the socket for detachably securing the vane to the body.

6. A shuttlecock comprising a body having a conical socket at one end provided with an inwardly tapering outer wall surrounding a plug centering post; a conical vane comprising layers of stiffened open mesh porous fabric having a layer of less porous material disposed therebetween adjacent the apex of the cone, said vane having the apex portion positioned within the socket; and a plug having a center post receiving bore therein slidable on the post and disposed within the socket for pinching the vane against the outer wall of the socket and detachably securing the vane to the body.

7. A shuttlecock comprising a body having a rounded portion at one end; an annular recess formed in the other end of the body and having an outer wall provided with a tapered inner surface joining with a cylindrical inner surface on the outer wall; a vane having a tapered surface corresponding to the taper on the recess disposed with the surface within the wall; and a tapered annular plug disposed within and closing the recess, said plug extending into the portion of the recess formed by the cylindrical surface and pinching the vane against the edge formed by the tapered and cylindrical inner surfaces to removably hold the vane on the body.

8. A shuttlecock comprising a vane; a body having a rounded portion at one end; and means for detachably securing the vane to the body comprising an annular wall projecting from the other end of the body and having a tapered inner surface for receiving an end of said vane, a plug centering post axially disposed within the wall, and a tapered plug having a bore slidably mounted on the post, said plug frictionally engaging the post and the said end of the vane and pinching the vane against the wall to removably hold the vane on the body.

9. A shuttlecock comprising a body having a rounded portion at one end; an annular wall pro-

jecting from the other end of the body and having a tapered inner surface joining with a cylindrical surface; a plug centering post axially disposed and surrounded by the wall; a vane having a tapered surface corresponding to the taper on the wall disposed with the surface in engagement with the wall; and a tapered plug having a bore to slidably receive the post disposed within the wall to pinch the vane against the edge formed by the joining of the two inner surfaces of the wall and removably hold the vane.

10. A shuttlecock comprising a cork body having a rounded portion at one end; an integral annular wall projecting from the other end of the body and having a tapered inner surface joining with a cylindrical surface; an integral plug centering post axially disposed and surrounded by the wall; a vane having a tapered surface corresponding to the taper on the wall disposed with the surface in engagement with

the wall; and a tapered cork plug having a bore to slidably and frictionally receive the post, said plug being disposed within the wall to pinch the vane against the wall and removably hold the vane to the body.

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Certificate of Correction

Patent No. 2,538,348 January 16, 1951

THEODORE AMPHLETT

It is hereby certified that error appears in the above numbered patent requiring correction as follows:

In the grant, line 3, and in the heading to the printed specification, line 5, State of incorporation, for "Massachusetts" read *Delaware*;

and that the said Letters Patent should be read as corrected above, so that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 17th day of April, A. D. 1951.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.