

March 15, 1927.

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1,620,922

SHUTTLE FOR BADMINTON AND THE LIKE

Filed July 1, 1926

Fig. 1.

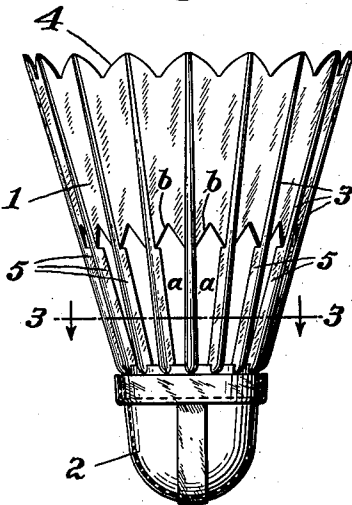


Fig. 2.

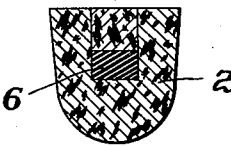


Fig. 3.

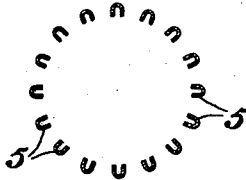


Fig. 5.

Fig. 4.

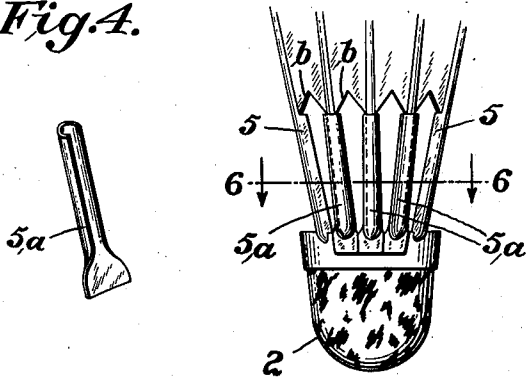
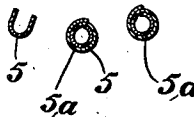


Fig. 6.



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SHUTTLE FOR BADMINTON AND THE LIKE.

Application filed July 1, 1926. Serial No. 119,884.

One object of my invention is to provide a shuttle for the games of badminton, battle-dore and shuttlecock, which while possessing all the qualities of such shuttles, which ordinarily are provided with an assembly of feathers as a flight controlling vane, will be featherless, but will have combined with the head portion a flight controlling vane of a more simple and less costly form, both as regards its manufacture and as regards its assembly with said head, said vane being of a character clearly visible in flight and as pleasing to the eye as the feathered construction.

Other objects will be set forth in the following description.

The invention consists in the features and combination and arrangement of parts hereinafter described and particularly pointed out in the claims.

In the drawings:

Figure 1 is a side view of a shuttle embodying the invention.

Fig. 2 is a sectional view of the head.

Fig. 3 is a cross sectional view on line 3—3 of Fig. 1.

Fig. 4 is a detail view of a supplemental rib or shaft reinforcement.

Fig. 5 is a detail view showing said reinforcement applied.

Fig. 6 is a cross section on line 6—6 of Fig. 5.

In carrying out the invention I have provided as a means to take the place of the feathers a form of flight controlling vane which will simulate the control exerted by feathers, as ordinarily employed, at all stages of the game. That is, not only when the shuttle is in full flight will this simulation in action take place, but throughout the whole period of play, including the moment at which the shuttle is struck and started on its flight, during the main part of its flight, and its action of turning downwardly quickly, head foremost, when the momentum is spent.

With the above objects in view, I employ a cone-like member 1 which may be constructed of various materials and in various forms. This is attached to the head 2 to act as a vane or tail member.

In the particular form shown in Fig 1, this conical vane is made of a light fabric stiffened with glue or the like. I prefer a

coating or filling of celluloid, cellulose acetate or similar material, rendered slightly flexible with a usual ingredient and closing the interstices of the fabric. In mentioning the fact that the celluloid coating or filling may be rendered slightly flexible, it is to be understood that the cone-like vane is substantially a stiff body, i. e., stiff enough to maintain its conical formation at all times and under all impacts to which the head of the device may be subjected. This cone-like vane is attached at its smaller end to the head 2 of the device, which as in ordinary practice, is made of cork. To strengthen this structure and to further stiffen that portion of the substantially stiff conical vane, which is nearest the cork member, and which corresponds to the zone of the ordinary feathered shuttle where the shafts of the feathers are located, I provide, if desired, ridges, creases corrugations, or flutings 3 in the direction longitudinally of the cone. These corrugations may extend throughout the length of the cone, or they may decrease or smooth out towards the large end of the cone.

As a means of attaching the cone-like vane or tail to the head, the small end of the cone is adapted to fit around the butt end of the cork head, where it is united to said head by cement.

The rear edge or rim of the cone, desirably, may be cut in saw tooth fashion as at 4 to give the effect of tips of the trimmed or pointed feathers of the ordinary shuttle and the spaces between the ribs of the flutes may be cut out, or they may be left intact and darkened to give the effect of spaces between the rib-like portions which simulate the shafts of feathers, or the whole surface of the cone may be printed or embossed to imitate feathers.

The cone-like tail or vane may be made of paper which is stiff, or stiffened, so as to maintain its shape at all periods and conditions of play. Whatever the material of which the cone-like vane may be composed, it has according to my invention, capacity to maintain its cone-like form, and strength to resist tendency to collapse or to telescope under the impact when the shuttle is struck on the nose. This impact will take place largely during the flight of the shuttle and is of sufficient force to reverse or change the

direction of flight. At such times the general shape of the shuttle must be preserved and therefore any of the various means of stiffening the light material of which the vane is composed is employed by me.

Instead of constructing the cone-like vane as above described, it may be made of sheeted celluloid in which is incorporated fine cotton or silk fibre or the like, which fibre would take the place of the fabric above described. Tough paper such as the fibrous Japanese variety (rather than pulped) may be employed as the base of the cone-like vane, which, when coated or impregnated with celluloid, will provide a strong and durable vane sufficiently stiff to maintain its form under all conditions of play.

That portion of the fabric or other material of which the vane may be composed may be slit longitudinally, midway between the rib lines. The portions thus provided are rolled or turned inward into partly tubular or U form in cross section as at 5, which will simulate the shafts of the ordinary feathered construction, and add strength to the vane. This formation will occur at the apex of the rib-like formation, resulting from the fluting above mentioned. It will be noted that the hollow side of these shafts are directed inwardly.

In another form of the vane tubular and/or semi-tubular pieces may be employed to reinforce the shaft portions of the vane, this feature being used where spaces are opened up between the ribs as just described. These reinforcing members or sections are similar to quills and split quills in their general shape. These are indicated at 5^a.

They are made, desirably, of the same material as the vane. These supplemental ribs or shaft members are cemented to the main quill or shaft members in concentric relation thereto.

They are substantially tubular in cross section and their edges may be lapped and cemented together. Each of these reinforcing quill sections may be formed with a substantially flat portion at its end which is cemented to the head of the shuttle, and covered by a trimming band.

It will be noticed that the spaces *a* between the shafts or quills of the vane are defined at the rear by converging edges at *b*. These tapered spaces contribute to the simulation of the ordinary feathered vane where the web portions of the feathers diverge from the shafts and overlap each other. In the present form these triangular spaces *a* are formed by cutting the material away at this point, though it will be understood that this need not be done, but instead this portion of the material may be folded back or inwardly and cemented to the body of the vane.

I have also improved the shuttle in respect

to the feature of weighting its head. For the best behavior of the shuttle its center of gravity should not lie nearer the vane or tail portion than the butt of the cork, that is to say: If the shuttle be laid lengthwise across a knife edge, this edge being at the butt of the cork head, the tendency should be to overbalance with the cork end down.

The allowable weight of the shuttle is so slight, say about .18 to .20 oz. that the least shift, longitudinally of any portion of the total weight is important.

In carrying out this part of the invention the weighting member 6 is located in a deep bore or seat recess made in the butt of the cork, to carry it well towards the nose of the same.

By thus locating the weighting member I am enabled to further stiffen or reinforce that portion of the fabric cone corresponding to the shafts of the feathers by applying in my present form of shuttle a heavier coat or body of glue or celluloid without altering the location of the center of gravity as this exists in the known form of shuttle having the vane of feathers.

These two features, i. e. the coating of the cone adjacent the back of the head with a heavy layer for stiffening purposes, and the locating of the weighting plug forward of the back of the head while related to each other in the location of the center of gravity are independent of each other to a certain extent, since it is possible to use a comparatively heavy coat or a comparatively heavy impregnation of the material of the cone to some degree and yet keep the center of gravity as low as it is in feathered shuttles, without so shifting the location of the weighting element. But a greater degree of thickening of the coating can be tolerated with this change in the weight location with the result that a maximum stiffening of the cone can be secured. It will be understood that where I refer to the cone as stiffened, I do not mean to say that necessarily the cone wall is rigid, but that the stiffening is in such degree as to maintain the shape under various conditions of use in substantial simulation of the feathered form of vane.

In applying a comparatively heavy coat of the stiffening material near the small end of the cone, I graduate this layer from its thickest portion at the point of union with the head to the thinnest portion at the opposite extremity of the vane.

This makes my form of vane simulate the feather form in the distribution of weight and strength corresponding to the shaft portion of the natural feathers.

I overcome any weakening of the cork member which might result from this recessed construction by cementing in a plug

of cork. It readily will be appreciated that the cone vane of the present invention as compared with a feathered vane is much simpler and the labor involved in making and applying the cone form is much less, no boring of holes (usually from fifteen to seventeen) being necessary as in the ordinary form where the shafts of the feathers must be positioned symmetrically by properly spacing the holes and must be secured therein with glue, these shafts being further held by binder means such as a cord passing around the circle of shafts and secured thereto, all of which structural features are rendered unnecessary by my invention.

I claim:

1. A shuttle for the game of badminton and the like comprising a head and a featherless vane or tail member attached thereto of cone-like form and adapted to substitute the usual feathers and to extend away from the head to the same extent as said usual feathers, the wall of said vane or tail being substantially stiff to maintain its form under normal conditions of play.

2. A shuttle for the game of badminton and the like comprising a head and a featherless vane or tail member attached thereto of cone-like form and adapted to substitute the usual feathers and to extend away from the head to the same extent as said usual feathers, said vane having spaced stem portions at its end adjacent the head, and the vane surface being continuous at the other end.

3. A shuttle for the game of badminton and the like comprising a head and a featherless vane or tail member attached thereto of cone-like form, the wall of which is stiffer

in that portion near the base than toward the larger end.

4. A shuttle for the game of badminton and the like comprising a head and a featherless vane or tail member attached thereto of cone-like form, the wall of which is provided with openings.

5. A shuttle for the game of badminton and the like comprising a head and a featherless vane or tail member attached thereto of cone-like form, the wall of which is ribbed or fluted with openings between said ribs.

6. In combination in a shuttle for the game of badminton and the like, a head, a vane of sheet material of cone-like form having the material of its wall slitted and rolled to form shafts in simulation of the shafts of feathers.

7. In combination in a shuttle for the game of badminton and the like, a head, a vane of sheet material of cone-like form having openings in its wall leaving portions between in simulation of shafts of feathers, and supplemental shaft portions attached to the main shaft portions to reinforce the same.

8. In combination in a shuttle for the game of badminton and the like, a head, and a cone-like vane of sheet material having rib portions of substantially U-shape in cross section and supplemental rib portions of channel form fitted with their channel face to the convex face of the main ribs.

9. A device according to claim 8 in which the supplemental rib members have substantially flat portions attached to the head of the shuttle.

In testimony whereof, I affix my signature.
ADDISON T. SAUNDERS.