



(12) **EUROPEAN PATENT APPLICATION**

(21) Application number : **92310054.9**

(51) Int. Cl.<sup>5</sup> : **A63B 51/00**

(22) Date of filing : **03.11.92**

(30) Priority : **12.11.91 GB 9124040**  
**12.11.91 GB 9124031**  
**23.01.92 GB 9201462**

(72) Inventor : **Haines, Robert Christopher**  
**10 Woodsome Park**  
**Fenay Bridge, Huddersfield HD8 0JW (GB)**

(43) Date of publication of application :  
**19.05.93 Bulletin 93/20**

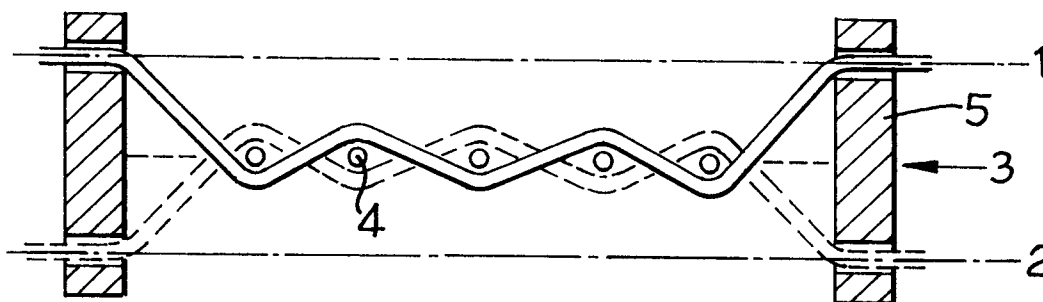
(74) Representative : **Fenwick, Elizabeth Anne et al**  
**BTR Group Patent and Trade Mark Service, P**  
**O Box 504**  
**Erdington, Birmingham B24 9QH (GB)**

(84) Designated Contracting States :  
**AT BE DE ES FR IT NL**

(71) Applicant : **DUNLOP LIMITED**  
**Silvertown House Vincent Square**  
**London SW1P 2PL (GB)**

(54) **Games racket.**

(57) A games racket frame particularly for tennis has a novel stringing system in which individual holes are used for main- and cross-strings and the holes lie in one of two notional planes parallel to the plane of interlaced main- and cross-strings such that successive string ends enter holes positioned in different notional planes and for over two-thirds of the total number of main- and cross-strings both ends of each string go through holes in the same notional plane.



**Fig. II**

The present invention relates to a games racket for example for tennis, squash or badminton. The improvement resides in a novel stringing system which gives beneficial playing effects to the resulting racket.

Most games rackets comprise a head frame portion and a handle portion, the head frame portion being provided with holes extending therethrough and two sets of strings one substantially longitudinal (the "main" strings) and one substantially lateral (the "cross" strings), the main strings and the cross-strings interlacing with each other to provide substantially planar playing surfaces. The strings constituting the "mains and "crosses" may or may not cross at right angles. As the head frame portion is strung by passing strings through the holes, to a great extent the configuration of the strings will of course be determined by the configuration of these holes. Most rackets are made so that the axis of each hole lies within a central plane defined by the interlaced main- and cross- strings, termed the plane of interlaced strings in the following description.

We have found an advantageous effect where the holes for the strings are arranged to lie other than in the plane of interlaced strings and in a particular configuration.

According to the present invention, a games racket comprises a head frame portion defining a substantially planar assembly of interlaced main- and cross-strings which pass through individual holes in the head frame portion which are axially positioned in one of two notional planes parallel to the plane of interlaced main- and cross-strings and positioned one on each side and equidistant from said plane of interlaced main- and cross-strings such that successive ends of the main-strings and of the cross-strings enter holes positioned alternately in different notional planes, wherein for over two-thirds (66.67%) of the total number of main- and cross-strings both ends of each string go through holes in the same notional plane.

According to a further aspect of the present invention a method of stringing the head frame portion of a games racket comprises providing holes in the frame for main- and cross-strings the holes being positioned in two parallel notional planes and the strings being threaded through said holes such that successive ends of the main- and of the cross-strings enter holes positioned alternately in different notional planes, the main- and cross-strings interlacing with each other in a plane between and parallel with the notional planes and equidistant therefrom, wherein for over two-thirds (66.67%) of the main- and cross-strings both ends of each string go through holes in the same notional plane.

One way of achieving this configuration is to provide an odd number of main-strings and an odd number of cross-strings.

A potential playing advantage of the present invention is that for ball contact near the frame, the ball is supported primarily by half the number of strings than would normally be the case and this has the effect of lessening the shock of ball impact felt by the player. This generally improves the uniformity of feel of the racket for ball contact over the whole strung playing surface.

A further playing advantage of such an arrangement is that as the string bed (playing surface) is deformed by a ball contacting the strings, the tension in adjacent strings changes in that one increases and the other decreases. This has the effect of causing alternate strings with high tension to bite more deeply into the ball surface than they would otherwise do, so that increased spin can be imparted to the ball. Greater bite will also be obtained for instance for a shuttlecock cork which can be advantageous in the game of badminton.

Normally the major benefits of the invention will be realised if the main- and cross-strings positioned in the central region of the head of the racket (i.e. enclosed by the rectangle or quadrilateral inscribed within the racket head defined either by the two outermost cross-strings and the two corresponding main-strings or the two outermost main-strings and the two corresponding cross-strings) meet the stated requirements of both ends of each string going through holes in the same notional planes. These strings constitute over 66.67% of the total number of strings of the racket and typically over 75%. However, the number of strings meeting these criteria may be increased to 100% and this allows the full area of the string surface to contribute to the desirable qualities referred to and to provide the ultimate in racket performance.

In a preferred embodiment of the present invention then at each of those places where the ends of main- and cross-strings are adjacent, holes for these strings are positioned in the said notional planes and in a plane perpendicular both to the plane of interlacing and to the tangent to the head frame portion at this point. Other than where the ends of the main- and cross-strings are adjacent the holes are offset in relation to each other rather than being aligned in planes perpendicular to the plane of interlacing. It is possible as a modification of this embodiment for there to be more than one pair of adjacent ends of main- and cross-strings, in which case the two string holes for each pair are positioned not only in different notional planes but also in a plane perpendicular both to the plane of interlacing and to the tangent to the head frame portion at these positions.

An embodiment of the present invention will now be described by way of example only with reference to the drawings in which:-

Figure 1 is a part side view of a novel games racket head portion;

Figure II is a section through the racket head portion across the frame of Figure I; and

Figure III is a part front view of the novel games racket head shown in Figures I and II.

Referring to Figures I and II, holes in the racket frame 5 for the cross-strings lie in two notional planes 1, 2 one on each side of the plane of interlaced strings 3 parallel to and equidistant from it. The holes alternate from one notional plane to the other and are offset from each other within and between these planes to give appropriate spacing to the mesh of the string net. Although not shown there is an odd number of cross-strings. Although not shown clearly, the main-strings 4 are in the same configuration and there is an odd number of these also. Figure II illustrates the way adjacent string-ends alternate from one notional plane to the other and that opposite ends of strings lie in the same notional plane. In Figure III the main- and cross-strings positioned in the central region of the head of the racket [i.e. enclosed by the rectangle or quadrilateral inscribed within the racket head defined either by the two outermost cross-strings and the two corresponding main-strings (area A<sub>1</sub> B<sub>1</sub> C<sub>1</sub> D<sub>1</sub>) or the two outermost main-strings and the two corresponding cross-strings (area A<sub>2</sub> B<sub>2</sub> C<sub>2</sub> D<sub>2</sub>)] meet the requirements of both ends of each string going through holes in the same notional planes. The games racket head shown is of a tennis racket but in the drawing the numbers of main- and cross-strings have been reduced for reasons of clarity. Normally a tennis racket would have a larger number of each type of string.

It will be appreciated that as the main- and cross-strings are interlaced, the main body of strings will remain in a plane which is identical to the plane which they would occupy in a conventionally strung racket. However, near the frame individual strings will depart from this plane so that they can pass through holes arranged in the notional separate planes on each side of the plane of interlaced strings.

## Claims

1. A games racket comprises a head frame portion (5) defining a substantially planar assembly of interlaced main- and cross-strings which pass through individual holes in the head frame portion which are axially positioned in one of two notional planes (1, 2) parallel to the plane of interlaced main- and cross-strings (3) and positioned one on each side and equidistant from said plane of interlaced main- and cross-strings (3) such that successive ends of the main- and of the cross-strings enter holes positioned alternately in different notional planes (1, 2) characterised in that for over two-thirds (66.67%) of the total number of main- and cross-strings both ends of each

string go through holes in the same notional plane (1 or 2).

2. A games racket according to Claim 1 characterised in that it has an odd number of main-strings.
3. A games racket according to Claim 1 or 2 characterised in that it has an odd number of cross-strings.
4. A games racket according to Claim 1, 2 or 3 characterised in that for over 75% of the total number of main- and cross- strings both ends of each string go through holes in the same notional plane.
5. A games racket according to any preceding claim characterised in that for substantially 100% of the main- and cross- strings both ends of each string go through holes in the same notional plane.
6. A games racket according to any previous claim characterised in that at each place where the ends of the main- and cross- strings are adjacent then holes for these strings are positioned in said notional planes and in a plane perpendicular both to the plane of interlaced main- and cross- strings and to the tangent to the head frame portion at this point.
7. A games racket according to Claim 6 characterised in that there is more than one pair of adjacent ends of main- and cross- strings.
8. A method of stringing the head frame portion of a games racket comprises providing holes in the frame for main- and cross-strings the holes being positioned in two parallel notional planes and the strings being threaded through said holes such that successive ends of the main- and of the cross-strings enter holes positioned alternately in different notional planes, the main- and the cross- strings interlacing with each other in a plane between and parallel with the notional planes and equidistant therefrom, characterised in that for over two-thirds (66.67%) of the main- and cross-strings both ends of each string go through holes in the same notional plane.

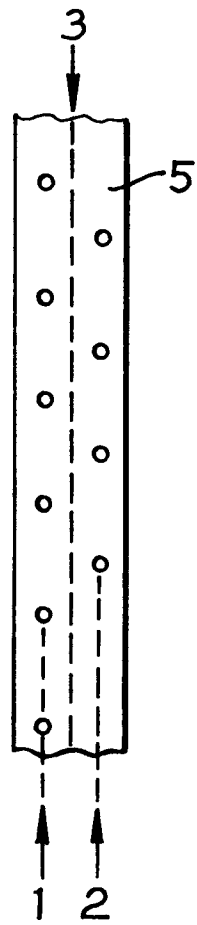


Fig. I

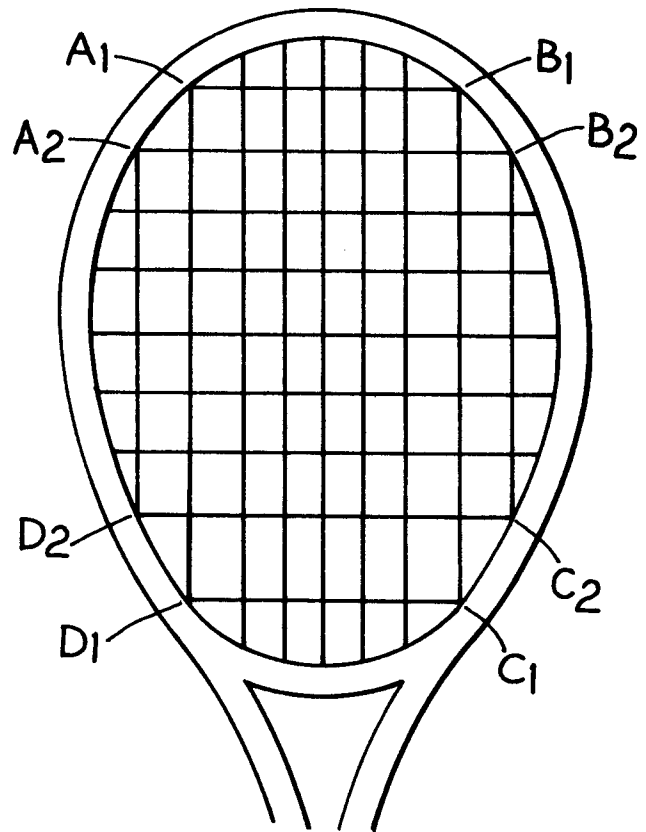


Fig. III

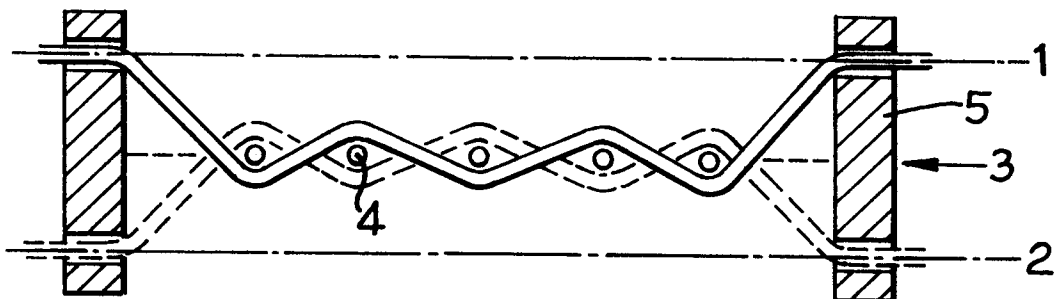


Fig. II