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Carbon fibre reinforced racket

The present invention relates to a novel carbon fiber reinforced racket for various games, such as tennis, squash, badminton, and the like.

Recently, the conventional racket made of wood has been discarded because such rackets are subject to certain disadvantages from the standpoint of weight, strength, balance, density, mechanical properties, etc. Many experts in this art have produced rackets wherein the frame is constructed of alloy. A racket of such a material possesses a very high degree of strength, but unfortunately the user thereof tends to get hurt in the elbow by the shock and vibration caused especially by his smashing.

The use of glass fibre reinforced plastic or graphite material has become widespread during these days. Yet in spite of many desirable qualities of such rackets, the art has been unable to solve the problems, such rigidity of the frame, so as to develop a satisfactory racket frame.

Referring to Figure 1, there is shown a thin film of carbon fibre 10 shaped for incorporation into the convention racket. After the frame is removed therefrom,

a lot of carbon fibre 11 remains unused. As the fibres thereof are at a right angle to the racket frame and the lateral fibres thereof are short, the conventional carbon fibre racket frame does not provide sufficient resistance to shock and vibration.

Accordingly, a main object of this invention is to provide a novel carbon fibre reinforced racket to overcome the above-mentioned disadvantages of the conventional rackets.

The invention provides a carbon fibre reinforced facket comprising strings, a grip and a racket frame comprising frame core sections, said frame having two opposed faces to each of which at least one sheet of farbon fibre reinforcing material is adhered, wherein the orientation of the fibres in the sheet material bears a constant angular relationship to a line inwardly spaced from the outer peripheral edge of the racket by a constant distance, said distance being selected so that in the area of the head of the racket the line is intermediate the inner and outer peripheries of the faces of the frame core sections.

The present invention will become more clearly understood from the following detailed description of the

invention when read with reference to the accompanying drawings in which:

Figure 1 is a perspective view showing how the conventional carbon fibre racket frame reinforcement is shaped;

Figure 2 is a perspective view of a carbon fibre reinforced racket of the present invention;

Figure 3 shows a first embodiment of the present invention; and Figure 4 shows a second embodiment of the present invention.

Referring to Figure 2, there is illustrated reinforced carbon fibre racket 20 according to the present invention comprising strings 21, a grip 22 and a racket frame 25. The reinforced racket appears to be similar to the conventional racket in outer appearance, but the racket frame 25 thereof includes a core section 26 to the opposed faces of which there are adhered by adhesive, in the present example epoxy resin, a plurality of carbon fibre reinforcing sheets 37 with fibres arranged at constant angular relationships to a line 35 intermediate the inner and outer peripheries of the faces of the core section 26. It is to be noted that the racket frame may be made of wood, alloy or other carbon fibre

plastics materials.

A first embodiment of the present invention is shown in Figure 3. Each reinforcing sheet 27 has a thickness of 0.6-1 mm and has a proportion of its fibres 28 oriented at an angle which is between $+15^{o}$ to $+45^{o}$ and a proportion at an angle between -15^{o} to -45^{o} to said intermediate line 35 of the core section 26. The reinforcing sheets 27 will confer on the racket 20 high strength especially when the latter is being used to smash.

Referring to Figure 4, a second embodiment of the present invention is shown. The fibres 29 of each reinforcing sheets 27 are arranged parallel to the central line 35 of the core 26 and are crossed by laterally extending fibres whereby to increase resistance to shock or vibration.

It will be understood by those skilled in this art that the above emobidments are simply for explanation purpose and many variations will be made possible according to the principle of the present invention. The scope of the present invention will be described in the appended claims.

CLAIMS:

1. A carbon fibre reinforced racket comprising strings, a grip and a racket frame comprising frame core sections, said frame having two opposed faces to each of which at least one sheet of carbon fibre reinforcing material is adhered, wherein the orientation of the fibres in the sheet material bears a constant angular relationship to a line inwardly spaced from the outer peripheral edge of the racket by a constant distance, said distance being selected so that in the area of the head of the racket the line is intermediate the inner and outer peripheries of the faces of the frame core sections.

2. A racket as claimed in claim 1, wherein the carbon fibres are arranged at between $+15^{o}$ to $+45^{o}$ and -15^{o} and -45^{o} to said line.

3. A racket as claimed in claim 1, wherein at least a portion of the carbon fibres are arranged to lie parallel to said line.

4. A carbon fibre reinforced racket substantially as hereinbefore described with reference to

(a) Figures 2 and 3

(b) Figure 4

of the drawings.

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