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STRINGS

Jacob van Rijswijk, Vijverhofstraat 38-60,
Rotterdam 1, Netherlands

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8 Claims

ABSTRACT OF THE DISCLOSURE

Strings for games racquets are provided which comprise a core consisting of one or more monofilaments of a synthetic long chain polymeric material and one or more helical wrappings of a synthetic long chain polymeric material, and in which a lubricant is contained in the core or between the wrapping and the core.

This invention relates to strings, especially to strings for use in stringing racquets for use in ball games, for example, badminton, squash and tennis.

It has been proposed to use synthetic long-chain polymeric materials, for example nylon and polyesters, for example, polyethylene terephthalate, as a material for use in producing strings for games racquets but it has been found that such strings have the disadvantage that after a while they become hard and brittle and break. Further, the strings are very stiff and stringing of racquets with the strings is difficult because of the difficulty in tightening the string to obtain the requisite degree of tension.

This invention is based on the observation that strings for games racquets, which strings are made from long-chain synthetic polymeric materials, are more pliable and have a considerably longer life, under normal conditions of use, if a lubricant is incorporated in the string during manufacture.

The string is a cored string made up from a core consisting of at least one monofilament of a long-chain synthetic polymeric material and at least one helical wrapping of a long chain synthetic polymeric material. When the core consists of a number of monofilaments, the monofilaments may be longitudinally aligned or twisted or plaited together. The monofilaments forming the core may be solid or have one or more axial bores extending along the whole of their length.

The strings may be made by methods known in the art or published in the literature for making such strings. Thus, for example, they may be made by coating the core with an adhesive suitable for bonding together the synthetic materials used for the core and the wrapping, for example an adhesive based on a solution of nylon in a solvent, for example a mixture of phenol and 1,1,2-trichloroethane, helically winding onto the core one or more layers of a synthetic long-chain polymer textile material and heating the combination to dry the adhesive, preferably while the string is under tension.

The adhesive is preferably a solution consisting of about 16% of nylon flake, in a mixture of about 32% of phenol and about 52% of 1,1,2-trichloroethane, the percentages being calculated on the weight of the solution. When using such an adhesive the completed string comprising the core and the helically wound wrapping is preferably dried by passing it through a tube through which a stream of air at a temperature within the range of from 60° C. to 70° C. is also passed.

When two or more layers of textile material are wound onto the core the direction of winding of each layer is

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preferably in a direction opposite to the direction of winding of the previous layer.

Suitable materials for both the core and the wrapping are, for example, polyamides, for example, a nylon, or polyesters, for example, polyethylene terephthalate. The material of the core may be the same as or different from the material of the windings.

The lubricant may be contained, as applicable, between the wrapping and the core, between the individual monofilaments forming the core or in the bore or bores in the monofilaments forming the core or in all these positions, as the construction of the string allows.

The lubricant may be applied in any desired manner. Thus, for example, if the core and the wrapping are not to be adhesively bonded together it can be applied to the outer surface of the core prior to application of the helical wrappings but such a method will generally not be practicable.

The lubricant is therefore preferably injected into the core, either into the bore or bores in the monofilament or monofilaments or into the spaces between the individual monofilaments by inserting an injector into the core and forcing the lubricant into the core under high pressure, preferably while simultaneously applying a reduced pressure to the other end of the string. In those strings in which the core is formed from a number of monofilaments, it is also possible to coat the monofilaments with the lubricant before they are brought together to form the core and to remove the lubricant on the surface of the core before applying and adhesively bonding the wrappings to the core.

The lubricant may be any oleaginous material which does not adversely affect the properties of the material or materials from which the string is made. Preferably the lubricant is a mineral oil or grease, for example, paraffin liquid, paraffin or a vegetable oil or grease, for example, soy bean oil, babassu oil, palm Kernel oil, palm oil, olive oil, coconut oil, castor oil, peanut oil or rape oil.

I claim:

1. A string for games racquets comprising a core consisting of at least one monofilament of a long chain synthetic polymeric material and at least one helical wrapping of a long chain synthetic polymeric material, said at least one monofilament having at least one axial bore extending along the whole of its length, which bore is filled with a lubricant.

2. A string for games racquets as claimed in claim 1 in which said polymeric material is nylon.

3. A string as claimed in claim 1, wherein the core consists of a plurality of monofilaments of circular cross section and a lubricant is contained in spaces between the monofilaments forming the core.

4. A string as claimed in claim 1, wherein there is more than one helical wrapping and the direction of winding of each wrapping is opposite to the direction of winding of the previous wrapping.

5. A string as claimed in claim 1, wherein the material for the core and the wrapping is a nylon.

6. A string as claimed in claim 1, wherein the lubricant is a lubricant selected from the group consisting of paraffin, liquid paraffin, soy bean oil, babassu oil, palm kernel oil, palm oil, olive oil, coconut oil, castor oil, peanut oil and rape oil.

7. A string for games racquets as claimed in claim 1 comprising an adhesive between said core and wrapping, said adhesive consisting essentially of a solution of nylon in a mixture of phenol and 1,1,2-trichloroethane.

8. A string for games racquets as claimed in claim 7 in which said solution comprises about 16% nylon, in a

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mixture containing about 32% phenol and 52% of 1,1,2-trichloroethane, said percentages being by weight and based on the solution.

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STANLEY N. GILREATH, Primary Examiner

W. H. SCHROEDER, Assistant Examiner

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