March 24, 1970 J. R. LACOSTE 3,502,331

RACKETS FOR TENNIS OR SIMILAR GAMES

Filed Sept. 14, 1967

Fig. 2

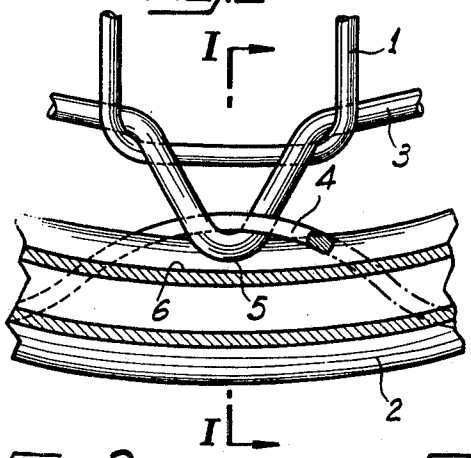


Fig. 1

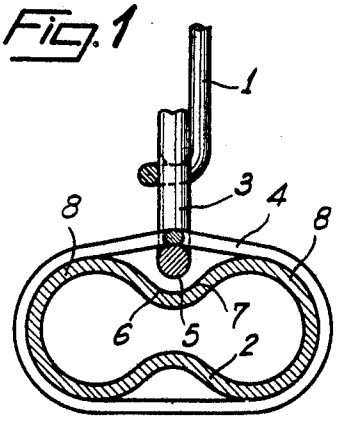


Fig. 3

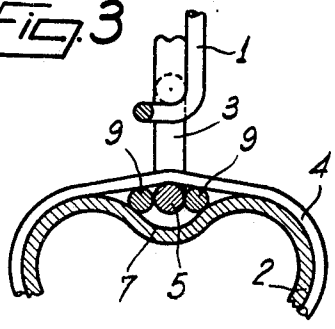


Fig. 4

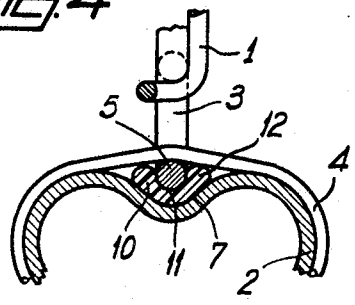


Fig. 5

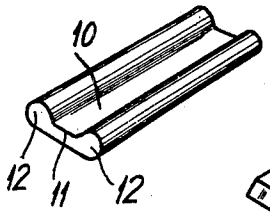


Fig. 6

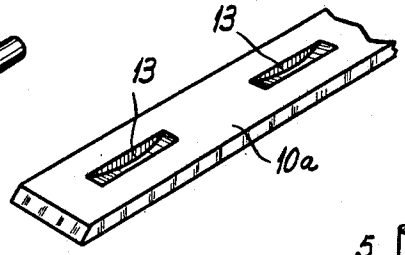


Fig. 7

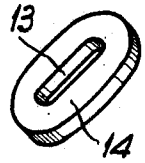


Fig. 8

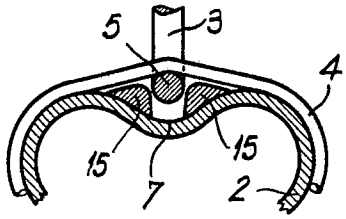
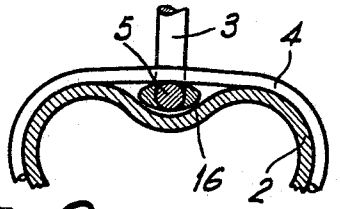


Fig. 9



Inventor
Jean René Lacoste

Watson, Cole, Grindle & Watson
Attorneys

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RACKETS FOR TENNIS OR SIMILAR GAMES

Jean René Lacoste, Paris, France, assignor to Patentex S.A., Fribourg, Switzerland, a corporation of Switzerland

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Claims priority, application France, Oct. 7, 1966, 79,157
Int. Cl. A63b 49/02, 51/00
U.S. Cl. 273—73 7 Claims

ABSTRACT OF THE DISCLOSURE

The specification discloses, in a known type of racket in which the strings are mounted on the frame through an intermediate annulus, stop members which prevent or limit lateral displacement of the annulus relative to the frame. The stop members take many forms, and can be continuous or discrete elements secured either to the frame or to the annulus so as to achieve the desired purpose.

Background of the invention

In his prior U.S. Patent No. Re. 26,128 the applicant had disclosed a tennis racket in which the strings of the racket are secured to the frame of the racket by using a crenellated annulus which lies inside the frame and which provides anchoring points for the strings. The annulus is secured to the frame by winding a spiral of wire or like elongate material round the frame and the annulus.

This arrangement has been found to have a disadvantage in that the practice it is found difficult to avoid leaving a certain play between the annulus, the spiral and the frame. Even if the spiral is very strongly tightened, the tension of the stringing of the racket tends to pull the annulus inwardly away from the frame.

When this play is present, if a ball strikes the string at a position near the frame, the annulus can slip on the spiral. This produces a slght noise which players are not used to and which some consider to be a nuisance.

It is possible of course to fixedly secure the annulus onto the frame, for example, by welding, but this is not preferred because mounting the annulus to the frame by means such as a spiral gives the racket an excellent suppleness.

It would also be possible to make the frame out of a profiled member which has two bead portions joined by a restricted neck, the restricted neck between the beads being so narrow that a comparatively deep channel is formed between the beads, in which the tops of the crenellations are closely held. Such a construction envisaged in my U.S. Patent No. Re. 26,128. It is however, often more convenient to use frames with quite wide and shallow beads or even without beads altogether; these are easier to make and coat protectively.

Summary of the invention

The invention provides a racket in which the strings are mounted to the frame through an intermediate annulus, and stop means are provided to act between the annulus and the frame to prevent or strictly limit the amount of lateral movement which the annulus can make relative to the frame. By "lateral movement" I mean movements having a component perpendicular to the plane of the stringing.

Stop members may be achieved by providing continuous or discontinuous elements on the frame by securing to it wires, profiled channel members or studs. Equally, stops may be formed by deposition of a suitable material on the frame or locally on the annulus.

Particular embodiments of the invention will now be described by way of non-limitative example, with reference to the accompanying drawings. In the drawings:

FIGURE 1 is a partial view in section on the line I—I of FIGURE 2,

FIGURE 2 is an elevational view partially in section, both FIGURES 1 and 2 illustrating a type of racket to which the invention can be applied,

FIGURE 3 is a partial view in transverse section of a first embodiment of the present invention,

FIGURE 4 is a similar view of a second embodiment,

FIGURES 5 to 7 are views in perspective of various embodiments of stop elements, and

FIGURES 8 and 9 are partial views in transverse sections of third and fourth embodiments of the invention.

In FIGURES 1 and 2 there is shown part of a racket to which the invention can be applied. This racket is of the type disclosed in U.S. Patent No. Re. 26,128. It must be understood, however, that this is only an example from this type and that in particular the sectional shape of the frame as well as the mode of attaching the annulus to the frame may be other than that shown.

In this example of the type, strings **1** are mounted to the frame **2** by means of a crenellated annulus **3** attached to the frame by a wire **4** wound in a spiral round the frame and through the tops of the crenellations.

Under the tension of the strings **1** even if at first the spiral is strongly tightened, the tops **5** of the crenellations tend to move apart from the adjacent wall **6** of the frame which results in the formation of play at this region.

The disadvantages of this have been explained in the preamble.

In the first embodiment of the invention shown in FIGURE 3, there has been inserted, along the whole length of the frame, in the internal groove **7** of the frame, two stop elements such as wires or cables **9**. These are inserted between the frame **2** and the spiral **4** and on either side of the tops **5** of the crenellations of the annulus **3**, and act as stops which prevent or limit any lateral displacement of the annulus **3** relative to the frame.

The stop members **9** can be of any suitable material, for example can be of metal, of synthetic resins such as polyamides or polyesters. Good results are obtained from simply using racket strings as members **9**.

The section of stop members such as **9** is not necessarily circular and uniform; it could be triangular or even of a more complex shape adapted for example to that of the gap left free between the frame, the annulus and the spiral (or other attachment member).

Examples of such elements are shown in FIGURES 4 and 5. A profiled stop element **10** is inserted in the groove **7** which lies between the beads **8** of the frame. The element **10** lies between the frame on the one hand and the annulus **3** and spiral **4** on the other hand. It is preferably of a not too rigid material such as a synthetic resin. The profile has a thin web **11** and lateral beads or flanges **12** which flanges are to be placed on either side of the tops **5** of the crenellations in order to limit the region available for their displacement. In the modified form shown in FIGURE 6, a stop element **10***a* is predominantly of simple rectangular cross-section but has at appropriate intervals housings **13** into which the tops of the crenellations are to be lodged.

In FIGURE 7 there is shown a stud **14** formed, for example, in synthetic resin and in which there is provided a housing **13** like those of the before mentioned profile and

serving the same purpose. Each crenellation top is introduced into the housing of a stud **14** placed between the said top and the frame and under the spiral or other attachment member.

In the third embodiment of the invention shown in FIGURE 8, the displacement of the annulus laterally relative to the frame is prevented or limited by providing localized bosses **15** on the frame on either side of the tops of the crenellations of the annulus; these bosses can be formed by deposition of a suitable substance, for example solder.

The fourth embodiment of the invention shown in FIGURE 9, a result equivalent to that given in the previous embodiment is obtained by forming, on the top **5** of the crenellation, a local thickening **16** likewise for example by deposition of solder.

It is evident that modifications can be made within the scope of the present invention as defined by the appendant claims; these are included within my invention. In particular, substitution of means equivalent to those which I have illustrated are included.

What I claim and desire to secure by Letters Patent is:

1. A games racket having a stringed area, an annulus surrounding the stringed area and supporting the strings, a body frame surrounding the annulus and supporting the annulus, and specific stop members on each lateral side of the annulus and interposed laterally between the annulus and the frame, wherein said annulus is crenellated and said stop members entrap laterally the tops of the crenellations of said annulus relative to said frame and wherein said stop members are discontinuous, each having a central recess and upstanding edge parts, the central recess receiving one top of one crenellation.

2. A games racket having a frame enclosing an oval area, said frame having a peripheral groove facing the oval area, stringing under tension in the oval area, an annulus supporting the stringing on the frame, retaining means round the frame and the annulus to retain the annulus outwardly within the groove of said frame against the tension of the stringing, separate stop elements restricting lateral displacement of the annulus relative to the frame being provided at each lateral side of the annulus at least where it is entrapped by the retaining means.

3. A games racket according to claim **2** wherein the stop elements are provided by deposition of molten material on one of the frame and the annulus.

4. A games racket according to claim **2** wherein stop elements are provided by at least one continuous member extending around the inner peripheral face of the frame and secured to the frame.

5. A games racket according to claim **2** wherein the stop elements are made up of least one member secured to the frame, the member having recessed portion at its mid-width and upstanding portions at each side of the recessed portion, the upstanding portions adapted to abut each lateral side of the annulus.

6. A games racket according to claim **2** wherein the frame is formed of an elongate member having a central thin web and thicker beads at each lateral side of the thin web, the stop elements being between the laterally inward shoulders of the bead and the annulus.

7. A games racket according to claim **2** wherein a single continuous member overlies the web and the shoulders of the beads.

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RICHARD C. PINKHAM, Primary Examiner

RICHARD J. APLEY, Assistant Examiner