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Edlefsen

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[54] **RACKET WITH REPLACEABLE STRING FRAME**

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[21] Appl. No.: **298,999**

Related U.S. Application Data

[62] Division of Ser. No. 129,059, March 29, 1971, Pat. No. 3,707,288.

[52] **U.S. Cl.** ..... **273/73 L**

[51] **Int. Cl.** **A63b 51/00**

[58] **Field of Search** .... 273/73 R, 73 C, 73 D, 73 E, 273/73 H, 73 J, 73 L

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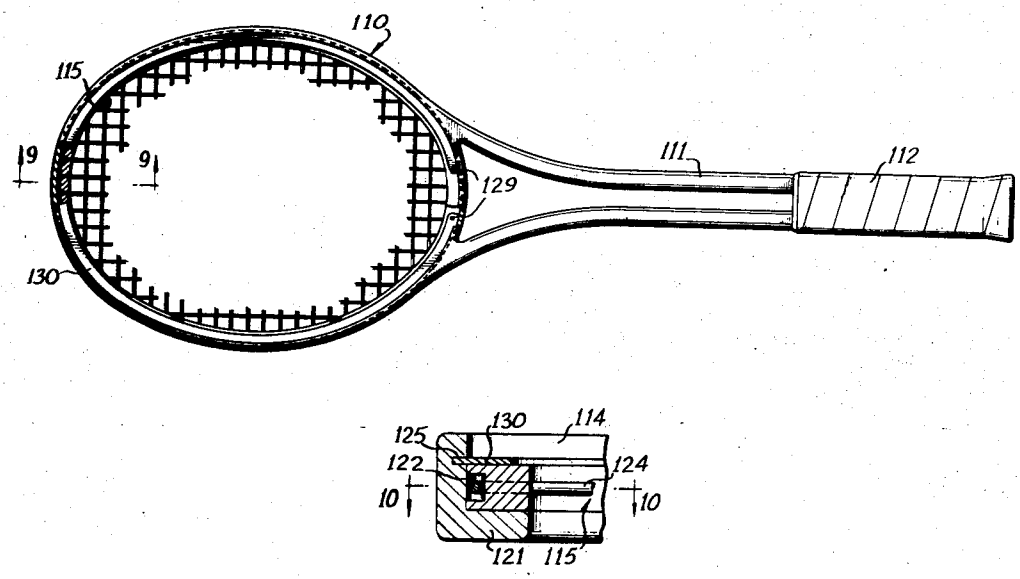
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Assistant Examiner—Richard J. Apley
Attorney, Agent, or Firm—Jones, Thomas & Askew

[57] **ABSTRACT**

A racket for use in playing tennis or similar games, the racket having a removable playing surface. The racket-frame is provided with an opening, and a removable string-frame is provided to carry the playing surface. The string-frame can be easily removed from the racket-frame, and another string-frame with a new playing surface can be inserted into the racket-frame and secured by fastening means.

4 Claims, 10 Drawing Figures



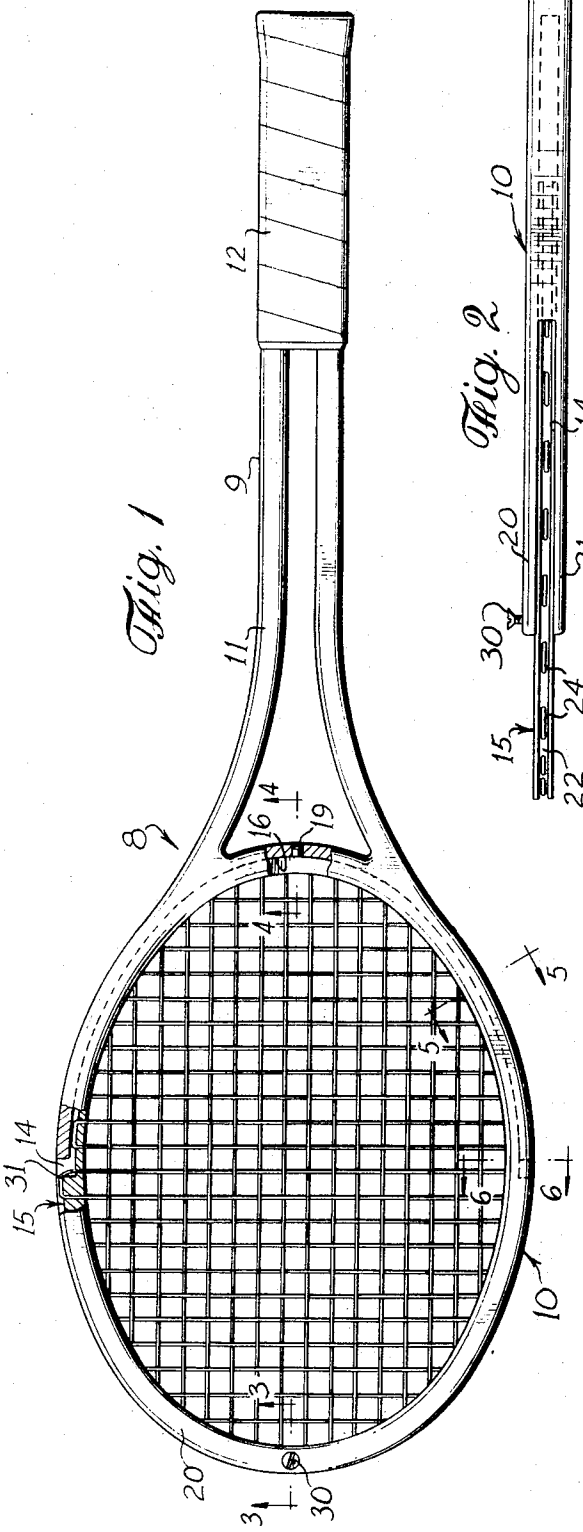


Fig. 1

Fig. 2

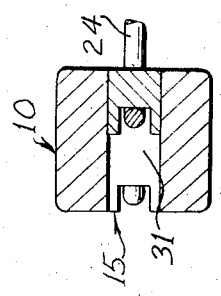


Fig. 6

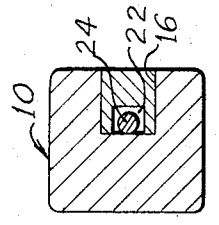


Fig. 5

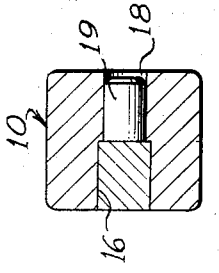


Fig. 4

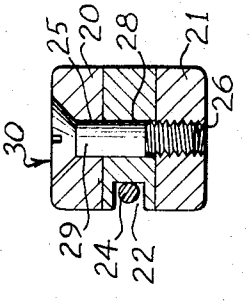


Fig. 3

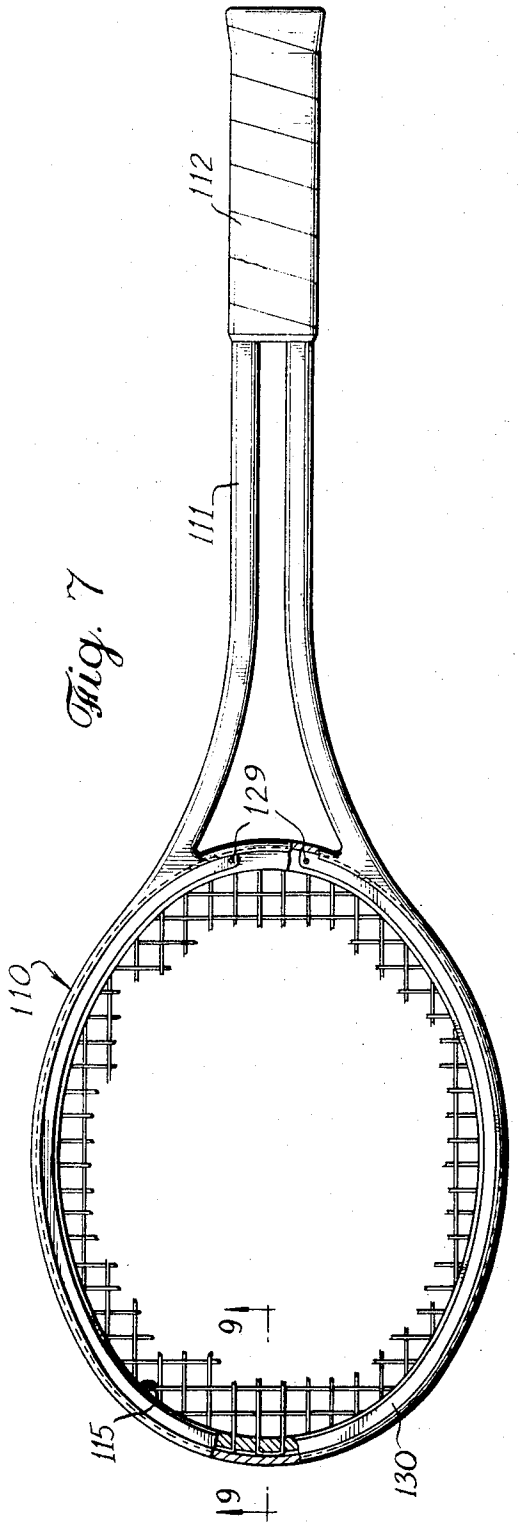


Fig. 7

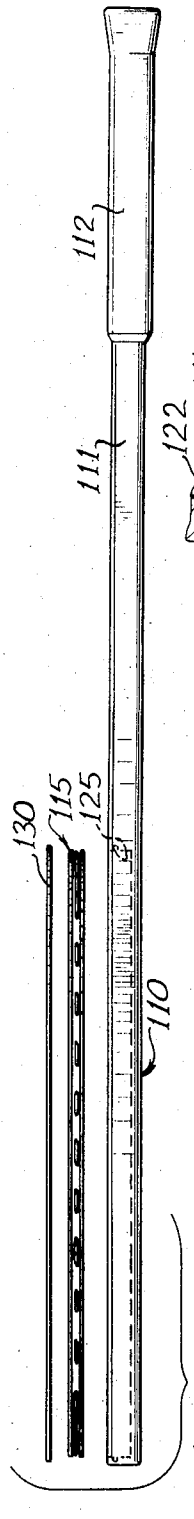


Fig. 8

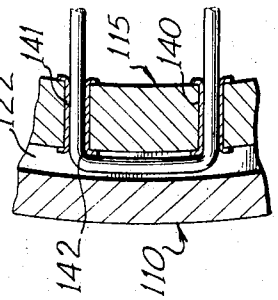


Fig. 10

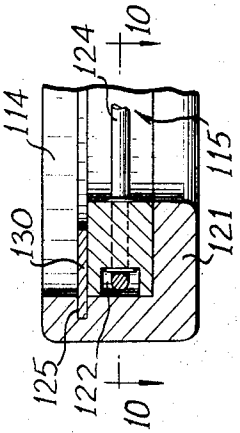


Fig. 9

RACKET WITH REPLACEABLE STRING FRAME

This application is a division of application Ser. No. 129,059, filed Mar. 29, 1971 and now U.S. Pat. No. 3,707,288.

BACKGROUND OF THE INVENTION

This invention relates to tennis rackets and similar rackets for use in sporting events, and is more particularly concerned with a racket in which the playing surface is readily removable and replaceable by another playing surface.

Tennis rackets, and the like, with removable strings have been known in the past, but prior art rackets have usually had such a complex arrangement to allow a string-frame to be inserted into the racket-frame that the entire racket became very unwieldy.

SUMMARY OF THE INVENTION

The present invention overcomes the above-mentioned and other difficulties by providing a substantially conventional tennis racket in which the racket-frame is open to receive a string-frame which is inserted into the racket-frame. Means are also provided to retain the string-frame within the racket-frame; and when the string-frame is inserted into the racket-frame the entire racket is rendered unitary with a small number of parts so that the racket remains light in weight and well balanced. Further, the racket of the present invention is so constructed that the ordinary tennis player can exchange the string-frame with relative ease.

These and other features and advantages of the present invention will become apparent upon a consideration of the following specification when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a top-plan view of a racket embodying one form of the present invention;

FIG. **2** is a partial front-elevational view of the racket shown in FIG. **1**, and showing the string-frame partially removed from the racket-frame;

FIG. **3** is an enlarged cross-sectional view taken substantially along the line **3—3** in FIG. **1**;

FIG. **4** is an enlarged cross-sectional view taken substantially along the line **4—4** in FIG. **1**;

FIG. **5** is an enlarged cross-sectional view taken substantially along the line **5—5** in FIG. **1**;

FIG. **6** is an enlarged cross-sectional view taken substantially along the line **6—6** in FIG. **1**;

FIG. **7** is a view similar to FIG. **1** but showing a modified form of the present invention;

FIG. **8** is an exploded front-elevational view of the racket shown in FIG. **7**;

FIG. **9** is an enlarged cross-sectional view taken substantially along the line **9—9** in FIG. **7**; and

FIG. **10** is a cross-sectional view taken substantially along the line **10—10** in FIG. **9**.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now more particularly to the drawings, and to that embodiment shown in FIGS. **1** through **6** in the accompanying drawings, it will be seen that a tennis racket assembly **8** is provided which includes a handle or string-frame support **9** and a string-frame **15.** The string-frame support includes an elliptically shaped or

oval racket-frame **10** at one end, and a central shank **11** terminating in a hand grip **12** at its other end. The racket-frame **10** and the shank **11** are here shown as formed integrally, but it will be understood by those skilled in the art that the two pieces can be formed separately and joined together by numerous known means.

The racket-frame **10** has the usual oval configuration, and the racket-frame **10** is bifurcated along approximately one half the portion thereof remote from the shank **11** to form opening or slot **14** and is provided with an inwardly facing arcuate slot or channel **16** along its remaining internal surface adjacent shank **11** into which the string-frame **15** can be removed for inserted. The opening **14** extends substantially halfway around the end of the racket-frame **10** that is most remote from the shank **11** and channel **16** is aligned with opening **14.**

The inwardly opening channel **16** is provided, substantially along the centerline of the racket, with an aligning hole **18** to receive an aligning peg **19** that is formed integrally with the string-frame **15.**

It will be seen that, in the vicinity of the opening **14,** the racket-frame **10** is reduced to a pair of flat strips **20** and **21.** These strips are, however, well supported when a string-frame **15** is placed within the racket-frame **10** as will be understood more fully hereinafter.

Referring now particularly to the string-frame **15,** it will be seen that the half of the string frame **15** that corresponds with the opening **14** of the racket-frame **10** is substantially the same width as the strips **20** and **21,** and is provided with an outwardly facing peripheral groove **22** to receive the strings **24.** By this means the strings **24** are recessed within the racket to prevent undue abrasion of the strings.

Substantially along the centerline of the racket, and at the end more remote from the shank **11,** fastening means are provided which comprise aligned holes **25** and **26** in the strips **20** and **21,** respectively, of the racket-frame **10,** and a hole **28** in the string-frame **15.** It will be seen in FIG. **3** that the hole **25** and the hole **28** are sufficiently large to receive the shank **29** of a screw **30** while the hole **26** is threaded to receive the threaded end of the screw **30.** Thus, the string-frame **15** can be placed within the racket-frame **10,** and the screw **30** can be passed through the holes **25** and **28** and then threadedly engaged in the hole **26** to secure or clamp together the entire outer end of the string-frame **15.** The string-frame **15** is under cut on opposite sides thereof to form shoulders **31** so that the portion of the string-frame **15** that is to be adjacent to the shank **11** is sufficiently small to be received within the channel **16** of the racket-frame **10.** Again, this portion of the string-frame **15** is provided with an outwardly facing channel **32** so that the strings **24** will not interfere with the string-frame's fitting properly within the channel **16.**

From the foregoing it should now be readily seen that a string-frame **15** can be inserted through the opening **14** in the racket-frame **10** until the aligning peg **19** is received within the hole **18.** This assures precise alignment of the string-frame **15** with the racket-frame **10;** then, the screw **30** will be passed through the holes **25** and **28** which should now be aligned, and the screw **30** is rotated to engage the threaded hole **26** in the strip **21** of the racket-frame **10.** Once the screw **30** is tightened, the string-frame **15** is well secured within the racket-

frame **10** and the entire assembly is substantially unitary and ready for play.

It will be realized that the screw **30** can be provided with a slot such that a coin or the like can be used to remove and insert the screw so that the player need have no tools available in order to exchange the string-frame **15** in his racket.

Attention is now directed to FIGS. **7** through **10** of the drawings wherein another embodiment of the racket is shown. It will be seen in FIG. **7** that the racket includes a racket-frame **110,** a shank **111** connected thereto, and a handle **112** at the end of the shank **111.** The racket-frame **110** is provided with an opening **114** through which a string-frame **115** is inserted.

In this embodiment, the opening **114** in the racket-frame **110** is formed by making the periphery of the racket-frame **110** in an L-shape in cross-section, as best seen in FIG. **9,** so that there is a lower flange **121** while the upper side of the racket-frame **110** is open.

As a retaining means to hold the string-frame **115** in the racket-frame **110,** there is provided a snap-ring **130** to be received within a peripheral groove **125** in the racket-frame **110.** The snap-ring **130** is of a substantially conventional variety in which the snap-ring **130** is made of a resilient material such as spring steel and is biased to spring open. The ends of the snap-ring **130** are provided with holes **129** so that a tool can be inserted into the holes to compress the snap-ring **130** and remove the snap ring from the groove **125** in order to remove the string-frame **115** from the racket-frame **110.**

The string-frame **115** in this embodiment has a uniform perimeter which is provided with an outwardly facing groove **22** to allow the strings **124** to be recessed so that they will not interfere with the string-frame's entering the racket-frame **110.**

In the event the string-frame **115** is made of a relatively hard material it is possible that the corners of string-holes **140** may be sharp enough to cut the strings and thereby greatly reduce the life of the strings in the string-frame **115.** To diminish this possibility, bushings **141** are placed within the holes **140** and provide blunt corners **142** to prevent cutting the strings **124.** The bushings **141** may be made of a plastic material, or the like, so that the bushing will be relatively soft and unable to cut or otherwise damage the strings **124.**

From the foregoing it will be seen that in this embodiment a string-frame **115** can be slipped through the opening **114** into the racket-frame **110.** Since both the string-frame **115** and the racket-frame **110** are of an oval or otherwise non-circular configuration, there is little danger that the string-frame **115** will be misaligned with the racket-frame **110.** When the string frame **115** is sufficiently well seated on the flange **121** of the racket-frame **110,** the snap-ring **130** can be depressed by placing a simple tool such as a conventional pair of pliers, or the like, into the holes **120** of the snap-ring **130** and compressing the snap-ring **130** sufficiently to pass through the opening **114.** The snap-ring **130** is then released to enter the groove **125** and be held therein by its own outward bias.

It will thus be seen that according to the present invention there is provided a very lightweight racket with very few parts, but one in which the string-frame can be readily exchanged by the ordinary player. Very few tools are required to make the exchange and extremely little mechanical skill is required to exchange the string-frame. Accordingly, a player can have one racket but carry several pre-strung string-frames. If the strings in the racket become too severely worn, or break, the entire string-frame can be very quickly removed, and another string-frame inserted so that play with the racket may be resumed.

While this invention has been described in detail with particular reference to preferred embodiments thereof, it will be understood that variations and modifications can be effected within the spirit and scope of the invention as described hereinbefore and as defined in the appended claims.

I claim:

1. A racket having a replaceable string-frame, said racket including a shank, a handle at one end of said shank and a racket-frame at the opposite end of said shank and fixed thereto, said racket-frame being configured to hold said string-frame, said string-frame carrying a string playing surface, said string-frame having substantially the same configuration as said racket-frame, said racket-frame having an upwardly extending flange means substantially perpendicular to the plane of said playing surface and an inwardly extending flange means, the inner periphery of said racket-frame defining an opening therein, said inwardly extending flange extending into said opening to receive said string-frame, and retaining means to secure said string-frame within said racket-frame, said retaining means being removably located on said upwardly extending flange means and extending inwardly therefrom and being opposite said inwardly extending flange means and spaced therefrom a distance substantially equal to the thickness of said string-frame.

2. A racket according to claim **1** and further characterized in that the string-frame has an outwardly facing peripheral groove to recess the strings of the playing surface.

3. A racket according to claim **2** wherein said string-frame has a plurality of holes communicating with said peripheral groove to recess the strings of the playing surface and a plurality of bushings is receivable within the plurality of (holes).

4. A racket having a replaceable string-frame, said racket including a shank, a handle at one end of said shank and a racket-frame at the opposite end of said shank and fixed thereto, said racket-frame being configured to hold said string-frame, said string-frame carrying a string playing surface, said string-frame having substantially the same configuration as said racket-frame, said racket-frame being approximately L-shaped in cross section comprising an upwardly extending flange substantially perpendicular to the plane of the playing surface and an inwardly extending flange to receive said string-frame an inwardly facing groove located in said upwardly extending flange and away from said inwardly extending flange a distance substantially equal to the thickness of said string-frame, and a snap ring receivable within said inwardly facing groove for locking said string-frame in said racket-frame.

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