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54 Racket.

57 There is described a racket, particularly tennis or squash racket, in which the mean mesh surface area of the string network is at least equal to 170 mm² for a tennis racket and at least equal to 100 mm² for a squash racket, whereby by mesh the geometrical figure is meant which lies completely enclosed between two pairs of strings crossing one another, such as they are present in a polygon defined by four straight lines which run two by two in parallel relationship with one another, and the lengths of which are equal to half the length of the longest axis in the one direction, and to half the length of the longest axis along a direction which crosses said first direction.

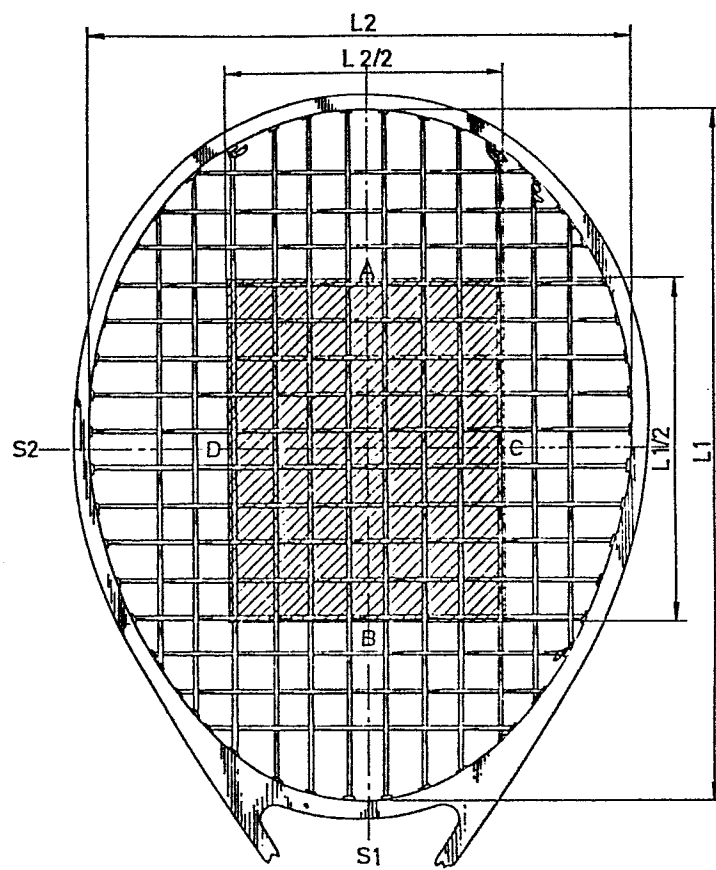


Fig.1.

Racket

This invention relates to a racket, particularly a tennis or squash racket.

5 The invention has more particularly for object to provide a tennis or squash racket which notably insures a better control of the ball. It is meant thereby that the ball contacts for a longer time the strings and enters more deeply the string network, in such a way that it is possible for the player to impart more spin to the ball.

10 To obtain this according to the invention, the mean mesh surface area of the string network is at least equal to 170 mm² for a tennis racket and at least to 100 mm² for a squash racket, whereby with network mesh the geometrical figure is meant which lies completely enclosed between two
15 pairs of strings crossing one another, such as they are present in a polygon defined by four straight lines which run two by two in parallel relationship and the lengths of which are equal to half the length of the longest axis in the one direction, and to half the length of the longest axis along a direction
20 which crosses said first direction. The definition of said axes will be further explained hereinafter.

According to an advantageous embodiment of a tennis racket according to the invention, the string diameter is at least 1.60 mm, while for a squash racket said string
25 diameter is at least 1.50 mm.

Other details and advantages of the invention will stand out from the following description, given by way of non limitative example and with reference to the accompa-

nying drawings, in which:

Figure 1 is a plan view of a possible embodiment of a tennis racket according to the invention.

Figure 2 is a plan view of a possible embodiment
5 of a squash racket according to the invention.

Figure 3 shows on a much larger scale, the figuration of a string.

The tennis or squash rackets according to said figures are of conventional type as far as the frame structure
10 thereof is concerned. There should be understood thereby that the frame may be made of any suitable material or materials, such as metal, wood or synthetic material, and combinations thereof. The size is not part either of the invention principle. The rackets according to the invention may be distinguished
15 in many ways.

A remarkable feature of the racket according to the invention may be found in the mean mesh surface area of the string network.

For a tennis racket, said mesh surface area
20 is at least equal to 170 mm² and for a squash racket at least equal to 100 mm².

The mesh surface area may be computed as follows:

The string directions within the network area of the racket
25 are determined. The string direction is the mean direction of all those strings which lie within an angle of $\pm 10^\circ$ relative to the mean value. Normally two directions are found. Along said directions, the longest possible axes are determined within the striking surface area (S1 and S2 in figure 1; S3 and S4
30 in figure 2). When a plurality of axes are possible along a particular direction, that axis lying most symmetrically relative to a striking area is considered.

The lengths of said axes are shown in L1 and

L2 in figure 1, and in L3 and L4 in figure 2. On said axes, symmetrically relative to the crossing point of axes S1 and S2, or S3 and S4, the half spacings are drawn ($L1/2$ and $L2/2$ in figure 1, and $L3/2$ and $L4/2$ in figure 2). A polygon may now be drawn by ruling lines in parallel relationship with said axes through points A, B, C, D (figure 1), and A', B', C', D' (figure 2). As shown in figures 1 and 2, said polygons are rectangles. Said polygon may also have the shape of a diamond or other geometrical figure. The mean mesh surface area within said polygon may then be determined. Said mean mesh surface areas reach as already stated hereinabove, at least 170mm^2 for a tennis racket, and at least 100 mm^2 for a squash racket. The wording "mean mesh surface area" means the sum of the surface area of all those meshes which lie completely inside the just-defined polygon, divided by the number meshes in said polygon.

As already made clear in the opening lines, the string diameter for a tennis or squash racket is also a specific feature of the invention. For a tennis racket, said diameter is at least 1.60 mm, while for a squash racket said diameter is at least 1.50 mm. The strings may thereby be made from synthetic or natural material. Besides the above-defined string diameters and mesh surface areas, the rackets according to the invention may further be defined by the number strings thereof.

Along a direction in parallel relationship with the longest string, the number strings for a "midsize" tennis racket as well as for a squash racket, is at the most equal to 14. Along the other direction, said number is at the most 15.

For a so-called "oversized" tennis racket, the number strings is preferably equal to 14 when considering the strings which run in parallel relationship with the longest string spacing, and to 16 when considering the strings along the other

direction. The wording "oversized" means a racket which fulfills the following requirements:

- a) striking surface area larger than or equal to 548 cm²;
 - b) the longest length within the striking area is at least 30.5 cm;
 - c) the widest width within the striking area is at least 24.1 cm.
- A "midsize" racket is any racket which does not fulfill the above definition for the "oversized" racket.

Tennis and squash rackets of the above-described type which fulfill the above-defined features and the characteristics given in the appended claims, insure a better ball control because the string network grip on the ball is improved and the ball contact time with the string network is lengthened. The rackets according to the invention have a string network with a markedly enlarged mesh surface area. This results in the ball entering deeper the network surface (between the strings); the ball thus remains retained for a fraction of a second longer, whereby the player also has a fraction more time to control the ball. The use of strings with a larger diameter also secures a more shaped striking surface, which further favourably influences the ball control.

Due to using such strings, the strain on the strings may be increased up to 60 kg. Due to combining the trampoline action (due to the ball entering deeper the string network) with the higher strain, a racket is obtained with a very high efficiency. This means insuring a maximum energy transfer to the ball.

Due to limiting the string number, the number holes in the frame of the rackets according to the invention is also lowered, which enhances the frame strength or resistance.

It must be understood that the invention is in no way limited to the above embodiments and that many changes may be brought therein without departing from the scope of the invention as defined by the appended claims.

CLAIMS

1. Racket, particularly tennis or squash racket, in which the mean mesh surface area of the string network is at least equal to 170 mm² for a tennis racket and at least
5 equal to 100 mm² for a squash racket, whereby by mesh the geometrical figure is meant which lies completely enclosed between two pairs of strings crossing one another, such as they are present in a polygon defined by four straight lines which run two by two in parallel relationship with one another, and the
10 lengths of which are equal to half the length of the longest axis in the one direction, and to half the length of the longest axis along a direction which crosses said first direction.

2. Racket, particularly tennis racket, as defined in claim 1, in which the string diameter is at least 1.60 mm.

15 3. Racket, particularly tennis racket of the so-called "midsize" type, as defined in either one of claims 1 and 2, in which the number strings along that direction with the highest number strings, is at the most equal to 15.

20 4. Racket, particularly tennis racket of the so-called "midsize" type, as defined in any one of claims 1 to 3, in which the number strings along that direction with the smallest number strings, is at the most equal to 14.

25 5. Racket, particularly tennis racket of the so-called "oversized" type, as defined in either one of claims 1 and 2, in which the number strings along that direction with the highest number strings, is at the most equal to 16.

30 6. Racket, particularly tennis racket of the so-called "oversized" type, as defined in any one of claims 1, 2 and 5, in which the number strings along that direction with the smallest number strings, is at the most equal to 14.

7. Racket, particularly squash racket, as defined in claim 1, in which the string diameter is at least 1.50 mm.

8. Racket, particularly squash racket, as defined

in either one of claims 1 and 7, in which the number strings along that direction with the highest number strings, is at the most equal to 15.

5 9. Racket, particularly squash racket, as defined in any one of claims 1, 7 or 8, in which the number strings along that direction with the smallest number strings, is at the most equal to 14.

10 10. Racket, particularly tennis or squash racket, in which the string diameter for a tennis racket is at least 1.60 mm, and the string diameter for a squash racket is at least 1.50 mm.

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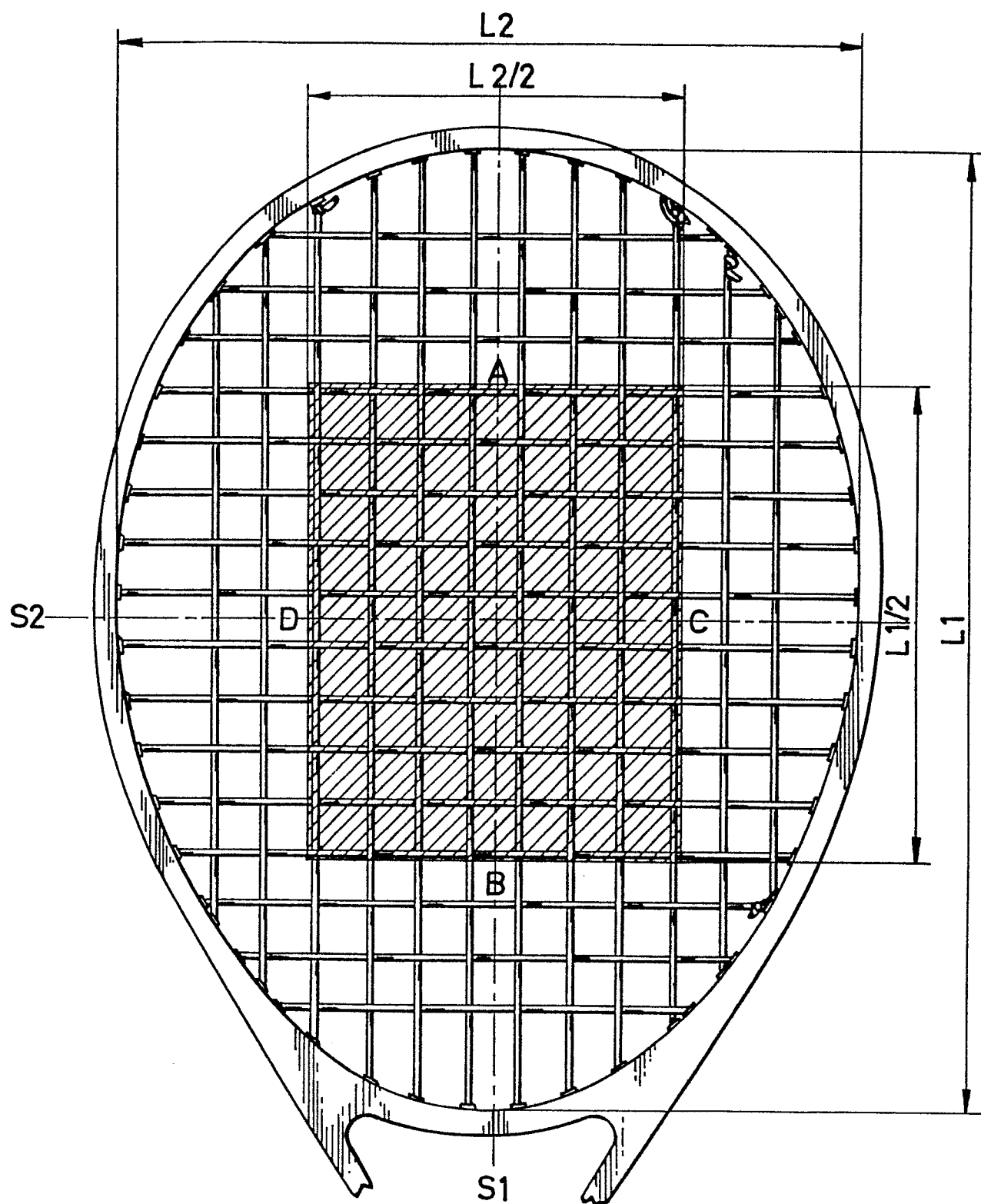


Fig.1.

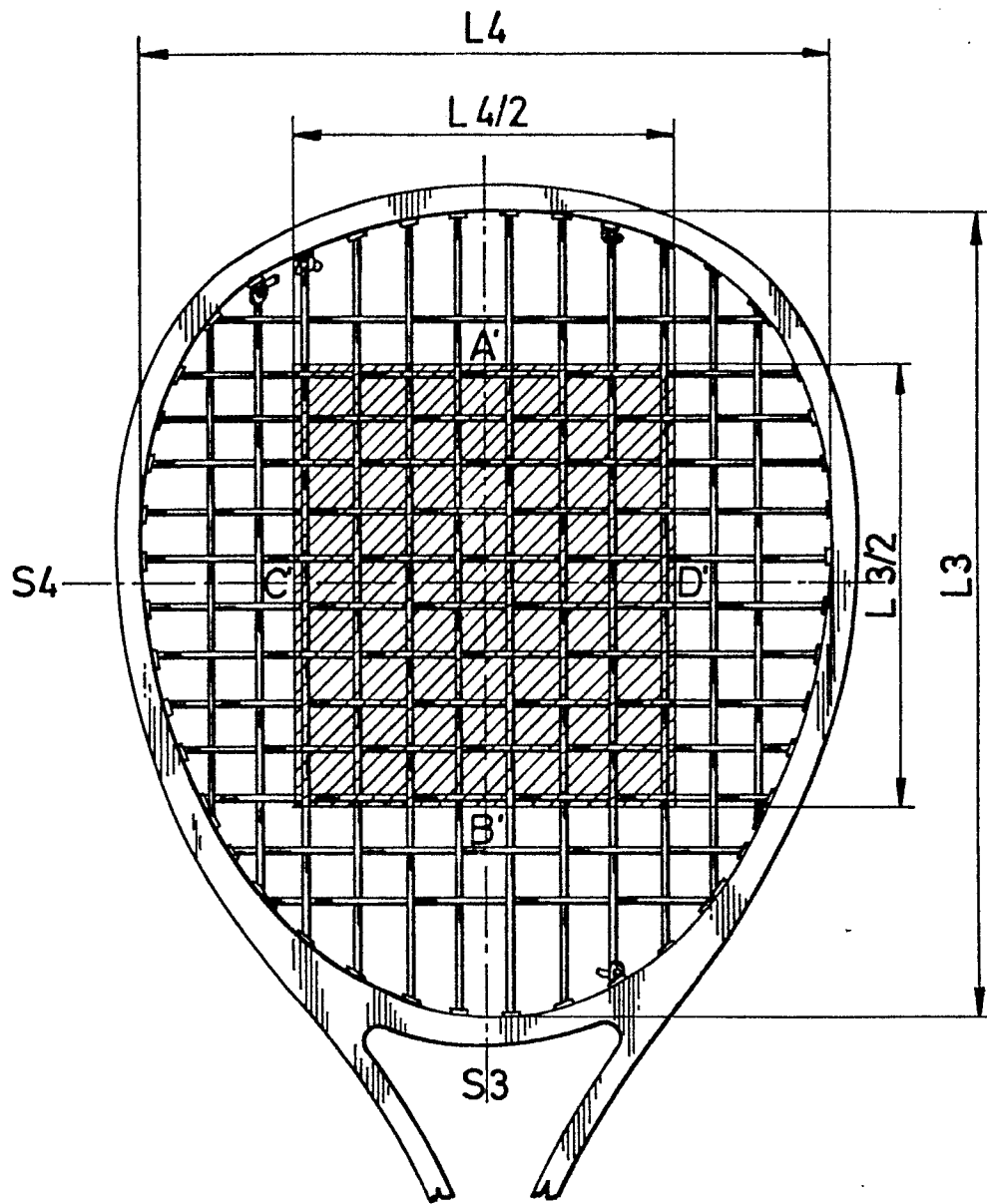


Fig.2.

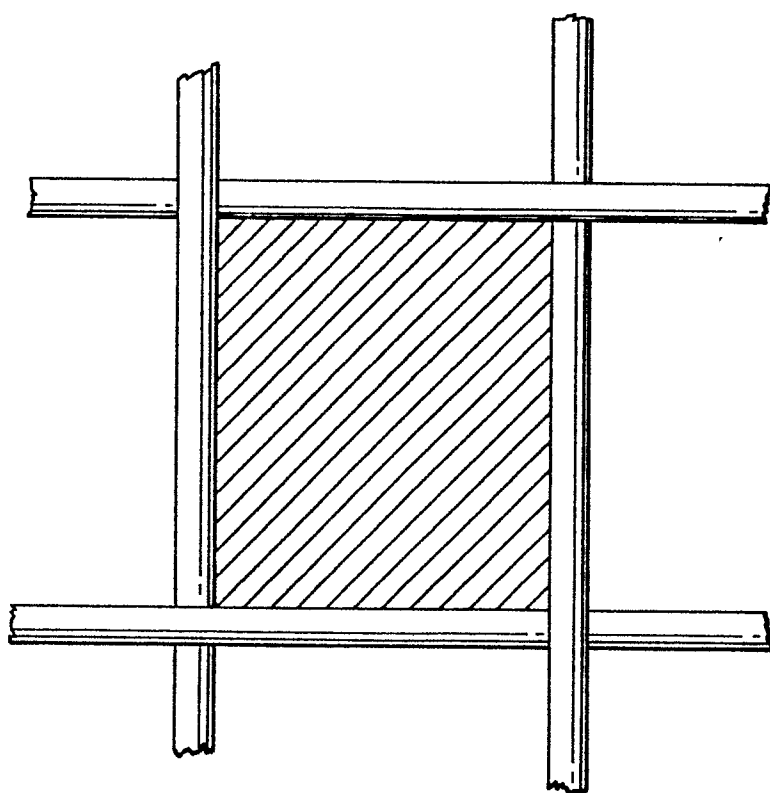


Fig.3.



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
X	FR-A-2 409 058 (F.R. LACOSTE) * Page 3, lines 15-26; page 7, lines 14-17; figure 3 *	1,3,4, 8,9	A 63 B 51/00
Y		2,5-7, 10	
Y	FR-A-2 495 477 (SOCIETE IREB) * Page 4, line 23 - page 5, line 15 *	2,7,10	
Y	FR-A-2 299 048 (PRINCE MANUFACTURING INC.) * Page 2, lines 34-39; page 3, lines 29-41 *	5,6	
A	US-A-4 013 289 (B. KAMINSTEIN) * Column 2, lines 10-20; figure 2 *	1	TECHNICAL FIELDS SEARCHED (Int. Cl. 4) A 63 B
A	DE-A-3 015 960 (KUEBLER & CO.) * Page 5, third line from top page *	2,7,10	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 24-03-1986	Examiner GERARD B.E.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	