

## PATENT SPECIFICATION

1,113,707

DRAWINGS ATTACHED.

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## COMPLETE SPECIFICATION.

**Improvements in or relating to Racket Frames and to Methods of Manufacturing same.**

We, THE CARLTON TYRE SAVING COMPANY LIMITED, of Shire Hill, Saffron Walden, Essex, a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to racket frames, for example for Badminton, Tennis and Squash rackets, which incorporate a strung frame, and to methods of manufacturing such racket frames.

In this specification the term "frame" means the looped portion of a racket within which the stringing is carried out, as distinct from the shaft of the racket which connects the frame to a handle.

Rackets with metal frames are known but it has been found that frequently such rackets suffer from the disadvantage that when the metal frame is apertured and stringing is applied to the frame through the apertures, the sharp edges of the steel around the apertures frequently sever the strings, either during the actual stringing process or during subsequent use of the racket.

It is an object of this invention to provide in a racket having a suitable metal frame a means whereby the above indicated disadvantage can be alleviated.

According to one feature of the invention there is provided a metal racket frame for stringing, characterised in a coating on said said frame of a plastics material which has been formed by the application of powdered plastics material to the heated surface of the frame prior to the application of stringing to the frame.

According to another feature of the invention there is provided a method of manu-

facturing a metal racket frame for stringing, characterised in applying to the heated surface of said frame powdered plastics material so that said material melts and forms a plastics coating on said frame, prior to the application of stringing to the frame.

In order that the invention may be clearly understood and carried into effect it will now be more fully described with reference to the accompanying drawings in which:—

Figure 1 shows a badminton racket to which the invention is to be applied,

Figure 2 shows on an enlarged scale a part of the frame portion of the racket to which the invention is to be applied,

Figure 3 shows, on the same scale as Figure 2, a longitudinal section through the part of the racket frame in Figure 2 but after the invention has been applied,

Figure 4 shows a section through Figure 2 at IV—IV but after the invention has been applied,

Figure 5 shows a racket having a frame of different cross section to which the invention is to be applied, and

Figure 6 shows, on an enlarged scale a section through the racket frame of Figure 5 at VI—VI but after the invention has been applied.

Referring now to Figures 1, 2, 3 and 4, the looped portion or frame 1 of the racket is made, in this instance of tubular steel, the shaft 2 is also made of steel, and joined to the frame 1 by welding or integral with it. The handle 3 is suitably connected to the shaft 2. The tubular section is, in this instance, but not necessarily as shown in Figure 4, the outside of the tube having a hollow 6 in which the strings may nest. The tube is provided with a number of holes 4 on opposite walls, the edges of these holes

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being provided with flanges 5, the free edges of which are towards the inside of the tube. The holes and flanges are so positioned that the strings may pass straight through them from the inside to the outside of the frame.

5 After the frame 1 has been completed and, if the shaft 2 is being attached as in this case by welding, after the shaft 2 has been attached, and any heat treatment operations have been completed, the metal frame is preferably lightly etched and is then heated to, in this instance, a temperature of about 10 425°C and is then immediately plunged into a suitable nylon powder through which air is passing. The frame is then agitated and a nylon coat will cover the surface of the frame and particularly the flanges and the edges of the holes. The coating around the holes achieves two results, first it enables a tapered spike to be used to fix the strings in place during the stringing or re-stringing operation, and secondly it covers the sharp edges of the metal around the holes and provides a surface upon which the strings bed and alleviates the breakage of the strings.

Referring now to Figures 5 and 6, the frame 1<sup>1</sup> is, in this instance, made of a solid extrusion, shown in cross section in Figure 6. Holes 4<sup>1</sup> are provided for the strings and into these holes are fitted eyelets 5<sup>1</sup> which cover the sharp edges of the holes. The extrusion is so designed that a recess 6<sup>1</sup> is provided in which the strings may nest and are to some extent protected from accidental damage. The frame is then given its nylon coat 7<sup>1</sup> in similar manner to the previously described example. The nylon coats the eyelets as well as the frame and achieves a similar result to that in the previous example.

The invention is not limited to the types of racket frames described, other suitable metal frames may be used.

#### WHAT WE CLAIM IS:—

1. A metal racket frame for stringing, characterised in a coating on said frame of a plastics material which has been formed by the application of powdered plastics material to the heated surface of said frame prior to the application of stringing to the frame.
2. A method of manufacturing a metal racket frame for stringing, characterised in applying to the heated surface of said frame powdered plastics material so that said material melts and forms a plastics coating on said frame, prior to the application of stringing to the frame.
3. A racket frame according to Claim 1 or a method according to Claim 2, characterised in that said metal frame is formed from a metal tube having apertures in said tube for the stringing and flanges around said apertures projecting towards the interior of said tube, and said plastics coating extends over said flanges.
4. A racket frame according to Claim 1 or 3 or a method according to Claim 2 or 3, characterised in that said plastics material is a nylon.
5. A racket frame according to Claim 1 substantially as described with reference to Figures 1, 2, 3, 4, 5 and 6 of the accompanying drawings, or modified as herein described.
6. A method of manufacturing a racket frame according to Claim 2 substantially as described with reference to Figures 1, 2, 3, 4, 5 and 6 of the accompanying drawings, or modified as herein described.
7. A racket frame when manufactured by a method according to any of Claims 2, 4 and 6.
8. A racket having a metal frame according to Claim 1, 3, 4, 5 or 7.

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