Dec. 22, 1970 W. C. CARLTON 3,548,484

METHOD OF PREPARING FOR STRINGING THE FRAME OF A GAMES RACKET

Filed March 27, 1969

Fig. 1.

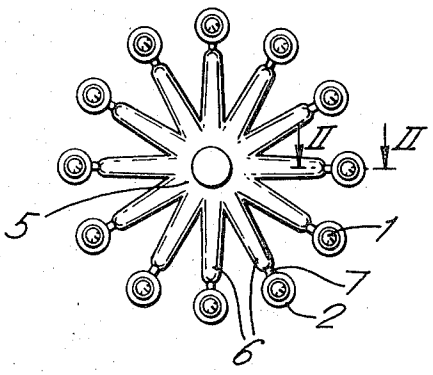


Fig. 2.

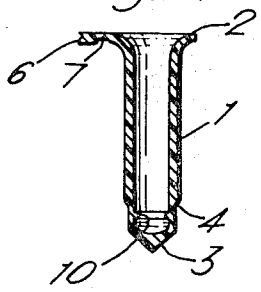


Fig. 3.

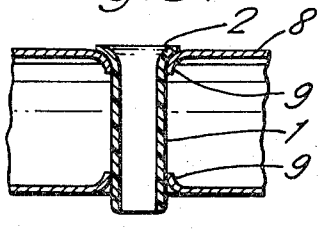
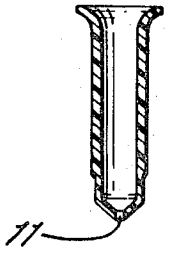


Fig. 4.



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METHOD OF PREPARING FOR STRINGING THE FRAME OF A GAMES RACKET

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U.S. Cl. 29—423 2 Claims

ABSTRACT OF THE DISCLOSURE

Improved grommets for the stringing apertures of badminton, tennis, squash and other games rackets are of tubular form having an outwardly-extending flange at one end and tapered at the other end. Grommets of this form are easily located in the stringing apertures of the racket. Nylon 12 and rigid p.v.c. are preferred materials for the grommet which conveniently has an external shoulder or step adjacent its tapered end. The grommets are used in a method of preparing a racket for stringing by inserting them, tapered end first, through the stringing apertures of the racket frame and then removing, such as by trimming, at least part of the protruding tapered ends. The external shoulder feature provides a ready guide as to a suitable amount by which the ends should be trimmed, of which the following is a specification.

This invention relates to tubular grommets for games rackets and to a method of preparing the frame of a games racket for stringing using such grommets.

The invention provides a tubular moulded grommet or insert for a games racket, which has an outwardly-extending flange at one end, and is tapered at the other end. Grommets of the invention are used in preparing for stringing the frame of a badminton, tennis, squash or other games racket, having a series of stringing apertures spaced around the head of the frame, in which said grommets are inserted, tapered end first, into the apertures, the grommets are pushed firmly into engagement with the apertures so that the tapered ends protrude beyond the inside of the head, and then the tapered ends are removed, for instance by trimming with a knife. Where the tapered end of the grommet is also closed insertion through the apertures in the frame is facilitated. Preferably, the closed end of the insert is tapered to a point, although the extremity of the taper may alternatively be rounded.

The grommets of the invention have the following advantages. First, we have found that if parallel-sided grommets are used their insertion into the apertures in the frames is frequently time-consuming, especially when the frame is a tubular frame, since the ends of the grommets may catch on the edges of the frame surrounding the apertures on the inside of the racket frame. Secondly, the inside of the racket frame after insertion of the grommets often has an uneven appearance since it is difficult to ensure that all the grommets project beyond the inside of the frame by the same amount.

In a preferred form of the method of the invention the grommet is inserted, tapered end first, into an aperture in the racket frame from the outside of the frame, the grommet being of such a length that when the flanged end engages on the outside of the frame the tapered end projects beyond the inside of the frame. The tapered end is subsequently removed so that an open-ended flanged grommet remains, the cut end projecting sufficiently beyond the inside of the frame to be deformed under the pressure exerted by the stringing which is subsequently

applied to the racket frame. Preferably, the exterior of the grommet has a shoulder positioned so that the shank of the grommet beyond the shoulder corresponds to the portion subsequently to be removed.

In manufacturing the grommets in a mould having a female part and a male part, the male part can with advantage be provided with an annular groove into which the moulding material can flow. The effect of this annular groove during withdrawal of the male part is to withdraw the moulding with said male part from the female part of the mould. The insert can then be removed from the male part much more readily than it could be if, as is normally the case, it remained in the female part. The annular groove on the male part of the tool causes the wall of the corresponding part of the grommet to be thicker than elsewhere. Whilst this would be undesirable if it were present in the grommet during stringing, it does not present a problem if it is situated in the part of the grommet which is removed prior to stringing.

The material from which the moulded grommets are made is chosen such that it will withstand the tension of the strings without flowing away from them when backed by the material of which the frame is made. Moreover said material is chosen to be strong enough to prevent the tension of the strings from forcing the metal of the racket frame through the grommet. Preferably the material chosen for the grommets should be sufficient to withstand a tension of 70 lbs. in the case of tennis rackets and a tension of 24 lbs. in the case of badminton rackets. The grommets are preferably of a material which, after assembly of the grommets in the apertures of the frame, will permanently deform under the tension of the strings of the racket. Suitable plastics materials for the grommets are nylon twelve and rigid polyvinylchloride, but the invention is not limited to the use of these particular materials.

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

FIG. 1 is a plan view of a plurality of inserts (grommets) according to one embodiment of the invention, the inserts all being integral, in a readily removable manner, with a common supporting member,

FIG. 2 is a section, on an enlarged scale, through one of the inserts of FIG. 1, taken on the line II—II, and

FIG. 3 shows in section, and on the same enlarged scale, an insert in an aperture in a racket frame, the end of the insert on the inside of the frame having been cut off.

FIG. 4 shows in section and on the same enlarged scale, as an alternative embodiment, an insert with a tapered but not closed end.

In the embodiment shown in FIGS. 1, 2 and 3 of the drawings a plurality of flanged inserts of plastics material are integrally moulded together as shown in FIG. 1. Each insert **1** is of the form shown in FIG. 2, having at one end an outwardly directed flange **2** and being closed and tapered at the other end **3**. In this embodiment the closed end **3** is tapered to a point, although if desired the extremity of the taper may be radiused. The insert has a small pullout flange **10** which has resulted from a groove in the male portion of the moulding tool. The exterior of the insert **1** is provided with a shoulder **4** as indicated, near the closed end **3**. The purpose of the shoulder **4** will be explained more fully hereinafter.

As shown in FIG. 1 twelve inserts **1** are integrally moulded from a suitable plastics material together with a star shaped supporting member **5** having twelve limbs, one for each insert **1**. Each limb **6** is integral, via a thinner portion **7**, with the flange **2** of the respective insert **1**. By way of example the plastics material of the insert **1** and

supporting member 5 may be nylon 12 or rigid polyvinylchloride.

In order to apply the inserts to apertures through a racket frame, an insert 1 is detached from its respective limb 6 by breaking the thinner portion 7 and said insert 1 is then inserted, closed end 3 first, into an aperture through the frame from the outside of the frame until the flange 2 engages the outside surface of the frame around the aperture. The length of the sleeve 1 is arranged to be such that in this position the shoulder 4 projects beyond the inside surface of the racket frame, the closed end 3 projecting even further beyond said inside surface. This is repeated for the other apertures through the racket frame and subsequently the closed ends 3 of the inserts 1 in said apertures are all cut off at the shoulders 4 so that the remaining ends of said inserts 1 project sufficiently beyond the inside of the racket frame to enable material of said inserts adjacent said cut off ends to be deformed by stringing which is subsequently applied to the racket frame.

FIG. 3 shows an insert 1 in position in an aperture in a racket frame 8 for stringing, the insert 1 having been cut off at its shoulder 4. In this particular embodiment the racket frame 8 is formed from a metal tube, the apertures through the tube for the stringing having integral flanges 9 projecting towards the interior of the tube from the inside and the outside of the racket frame. When stringing is applied to the racket frame 8 the end of the insert 1 remote from the flange 2 after cutting off becomes deformed by said stringing over the respective flange 9. Alternatively, if desired said end may be flanged, using a suitable tool, after cutting off but before stringing is applied to the frame.

In some racket frames the lengths of the inserts 1 may be required to be different for different apertures in the racket frame. This may, for example, be the case when a part of the outside surface of the racket frame is recessed to accommodate stringing between some of the apertures. In this event those apertures which terminate in the recess will be of smaller depth than other apertures which are provided away from the region of the recess, and different lengths of moulded inserts are preferably employed for the different depths of apertures. All inserts are then cut off so as to project by substantially the same amount from the inside of the racket frame.

FIG. 4 shows an insert which is tapered but open ended at 11.

Having now described my invention, what I claim is:

1. A method of preparing for stringing the frame of a games racket said frame comprising a head having spaced along the length thereof a series of stringing apertures, comprising inserting into said apertures, tapered end first, grommets having an elongated tubular portion, a flange extending outwardly from one end of said tubular portion, and a tapered extension portion extending from the end of said tubular portion opposite said one end thereof, pushing the grommets firmly into engagement with the apertures so that said tapered extension portions protrude beyond the inside of the head, and then removing at least the ends of said tapered extension portions.

2. A method as claimed in claim 1, in which the exterior of the grommet has, in or adjacent said tapered extension portion, a step at which there is a substantial change in the width of the grommet, the width of the grommet immediately on that side of the step further from said flange being less than the width immediately on that side of the step nearer said flange, and said tapered extension portions are removed by cutting the grommets adjacent said step.

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