Nov. 27, 1934. R. J. NASH 1,982,448

MANUFACTURE OF TENNIS RACKETS AND THE LIKE

Filed March 16, 1934

Fig. 1.

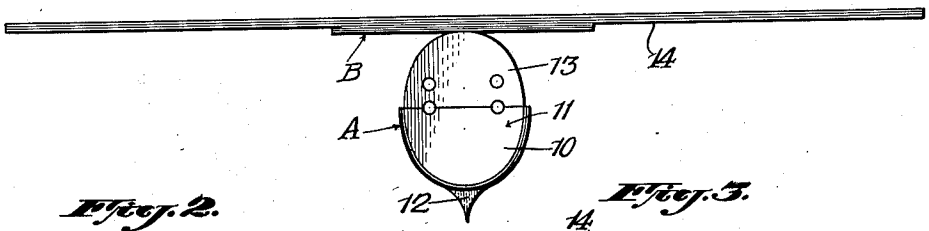


Fig. 2.

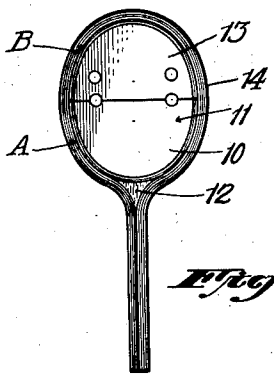


Fig. 3.

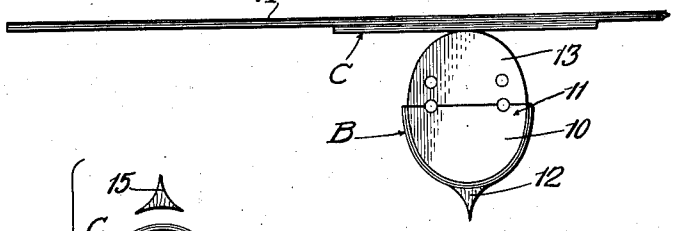


Fig. 4.

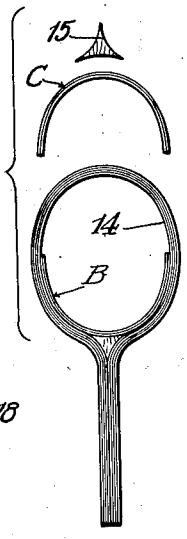


Fig. 5.

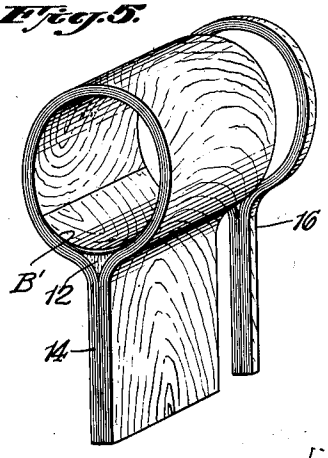


Fig. 7.

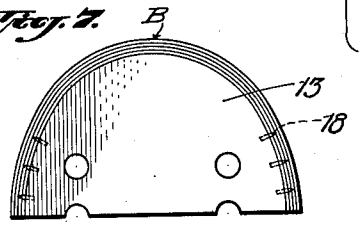


Fig. 9.

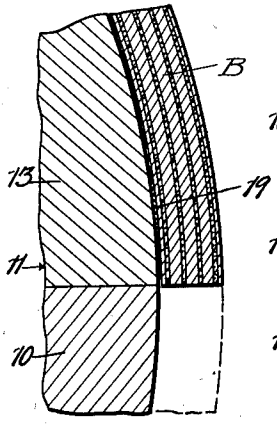


Fig. 8.

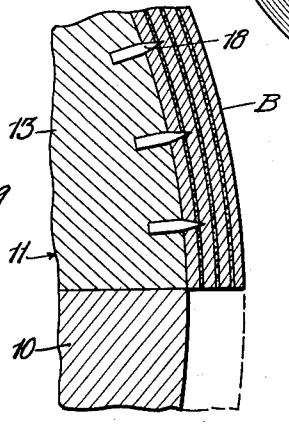
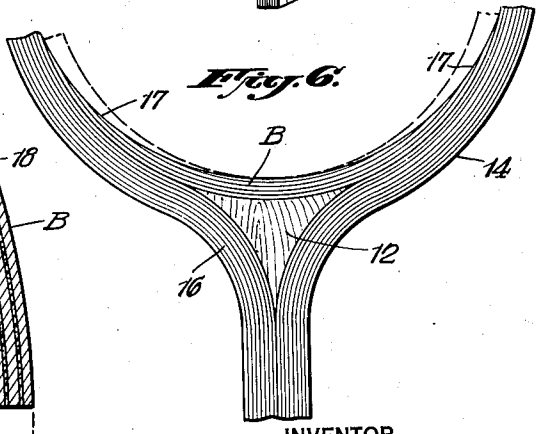


Fig. 6.



INVENTOR
ROBERT JOHN NASH.
BY Ueina & Rauber
ATTORNEYS

Patented Nov. 27, 1934

1,982,448

UNITED STATES PATENT OFFICE

1,982,448

MANUFACTURE OF TENNIS RACKETS AND THE LIKE

Robert John Nash, Birmingham, England, assignor to Dunlop Tire and Rubber Corporation, Buffalo, N. Y., a corporation of New York

Application March 16, 1934, Serial No. 715,886
In Great Britain April 5, 1933

3 Claims. (Cl. 144—309)

My invention relates to the making of racket frames for tennis and similar games and more particularly to the forming and mounting of "insertions", that is, the strip extending around the inside of the racket head adjacent the throat.

The invention is applicable particularly to the formation of the racket frame by bending strip material about an elliptical core or former from the top part of the racket to the throat and handle, and particularly to the bending in this manner of laminated material, such as layers of ply wood faced with glue or similar adhesive, as described in my co-pending application Serial No. 715,885 filed March 16, 1934.

An object of the invention is to provide a method whereby in the formation of a racket frame by bending in the above described manner unshaped insertion material is shaped and formed so that it may be mounted for a subsequent frame.

In my invention a strip of insertion material is placed on the top surface of a former of oval or elliptical cross-section, and the strip of material to be bent into a frame is placed on top of the insertion material so that as the frame strip is wrapped about the former it bends and wraps the insertion material about the upper part of the former and holds it tightly between the former and the strip of frame material.

The lower part or half of the former is covered or enclosed in an insertion that has already been shaped in a previous bending operation, and with the insertion material being shaped forms a complete enclosure for the surface of the former about which the frame strip is being bent.

The insertion material may be of laminated material, such as ply wood. Only the inner surfaces are coated with glue or adhesive and, therefore, when the racket frame has been shaped and set and removed from the former the insertion that has been shaped during the bending movement is readily removable. The previously shaped insertion, however, at the lower part of the former at which the throat of the racket is formed has been glued on its outer surface so that when the racket frame is set it forms an integral part of the latter. A wedge may be mounted on the preformed insertion to fill the space between the insertion and the bended frame, or this wedge may be omitted to form an open throat racket.

The strip of material to be formed into a racket and the insertions are preferably of a width sufficient to form several rackets of the required thickness, and after being shaped and set this material is cut into separate rackets of the desired thickness.

The method of forming the insertion and of mounting it is illustrated in the accompanying drawing in which

Fig. 1 shows diagrammatically a face view of a former having a shaped insertion mounted in position and a strip of insertion material positioned between the upper part of the former and a strip of racket frame material ready to be bent and shaped; Fig. 2 is a similar view of the former and insertion material and the racket frame strip after the bending operation has been completed; Fig. 3 is a view similar to Fig. 1 showing the mounting of the insertion formed in the operations of Figs. 1 and 2; Fig. 4 shows a plan view of a racket having the insertion mounted in place; Fig. 5 is a perspective view showing the manner in which several rackets are cut from a shaped strip of frame and insertion; Fig. 6 is an enlarged view of the throat portion of a racket showing the manner in which the insertion is finished and Figs. 7, 8 and 9 are detail views showing the manner in which the racket material is removably secured on the frame during the shaping operation.

Referring more particularly to Fig. 1 of the drawing, an insertion A formed in a previous bending of a racket frame is mounted on the lower half of a two-part former 11, a wedge 12 of suitable shape made, for example, as described in my co-pending application Serial No. 715,887 filed March 16, 1934 may be mounted in position on the lower part of the insertion A that is to form the throat of the racket.

A strip B of insertion material is placed on the top portion of the upper half B of the former and arranged symmetrically with respect to the vertical center line of the former. The length of the strip B is sufficient to extend to the upper edges of the shaped insertion A. The lengths of the insertions are preferably each equal and equal to half of the circumference of the complete former 11. A strip 14 of laminated material or ply wood suitably glued on the inner surfaces of the plies is then placed on the insertion material B and also arranged symmetrically with respect to the center line of the former. The strip 14 is then bent about the former compressing the insertion material B between the upper part of the former and the strip 14. The shape and positions of the insertion material B and the shaped insertion A of the racket forming strip 14 is as shown in Fig. 2. The outer sur-

faces of the insertion material B are not provided with glue or adhesive, nor is the inner surface of the shaped insertion A lying adjacent the former part 10.

The outer surface of the shaped insertion A is, however, covered with glue or adhesive as is also the wedge 12 so that when the bending operation has been completed and the shaped racket permitted to set and dry, the insertion A is united with the frame while the insertion B may be removed. Thereupon the insertion B is spaced about the former in the position previously occupied by the shaped insertion A and a third strip C of insertion material spaced in the position similar to that of insertion material B in Fig. 1.

When the strip 14 of frame material is then bent about the former, as described above, the insertion B is now united to the racket, as shown in Fig. 4. The newly formed insertion C may then be removed, as indicated in Fig. 4, leaving the completed racket with the insertion B. A new wedge 15 may then be mounted on the newly formed insertion C and the cycle of operations repeated indefinitely, one insertion being shaped from strip material during the same operation in which the previously formed insertion is mounted on a frame as the frame is being shaped.

It will be understood that any desired means may be employed in bending and shaping the frame as, for example, that described in my copending application Serial No. 715,885 filed March 16, 1934.

When the shaped frame with the insertion B has been formed, it may be sawed or subdivided into a number of separate rackets 16, as indicated in Fig. 5. These separate rackets may then be finished as by trimming and beveling the edges 17 and 18 of the insertion B, as indicated in Fig. 6, to give the inner surface of the frame a smooth curvature.

During the setting of the shaped strip on the former, and the handling incidental thereto, the insertion material being shaped may be held in position on the former by any suitable means. For example, in Fig. 7 it is retained in position by means of small pointed pins 18 projecting from the surface of the former half 13 into the ply wood structure of the insertion material. The arrangement of these pins is shown on a larger scale in Fig. 8. These pin marks may be in the part of the insertion that is removed in the later finishing of the racket. Or the insertion material being shaped may be removably retained by means of thin strips of paper 19 positioned as shown in Fig. 9 and coated with adhesive sufficiently strong to retain the shaped insertion in position until it is to be removed.

Through the above invention, therefore, an insertion is always formed in one bending operation for use in a subsequent bending of shaping operation. It also enables an elliptical former to be used whereas if the space above the insertion were not thus filled with material being shaped, the former would have to be larger at this point to give the racket proper shape.

While the invention has been described as using a wedge, such as 12, it is understood that this wedge may be omitted for the formation of an open throat racket.

Various modifications may be made by those skilled in the art without departing from the invention as defined in the following claims.

What I claim is:

1. A method of making racket insertions and shaping a strip of racket frame material which comprises placing a shaped insertion on the lower throat part of an elliptical form, placing unshaped insertion material on the top of said former arranged symmetrically to the vertical center line thereof, placing a strip of racket frame material on said unshaped insertion material and wrapping said frame strip about said former to bend the insertion material around said former to meet the ends of the shaped insertion at the lower part thereof.

2. A method of forming racket frames which comprises placing a strip of insertion material on the top part of a former and between said former and a strip of racket frame material, wrapping said strip about said former to shape said insertion material to the curvature of said former and between said strip and said former, setting and removing the insertion thus formed, placing it at the lower throat-forming surface of a former, placing a second strip of insertion material on the upper part of said former, said lower insertion having adhesive on its outer surface and wrapping an unshaped strip of racket frame material about said former and insertion material from the top of said former symmetrically to the throat portion thereof.

3. The method of claim 2 in which a wedge piece is inserted on the throat part of said shaped insertion.

ROBERT JOHN NASH.