

March 17, 1970

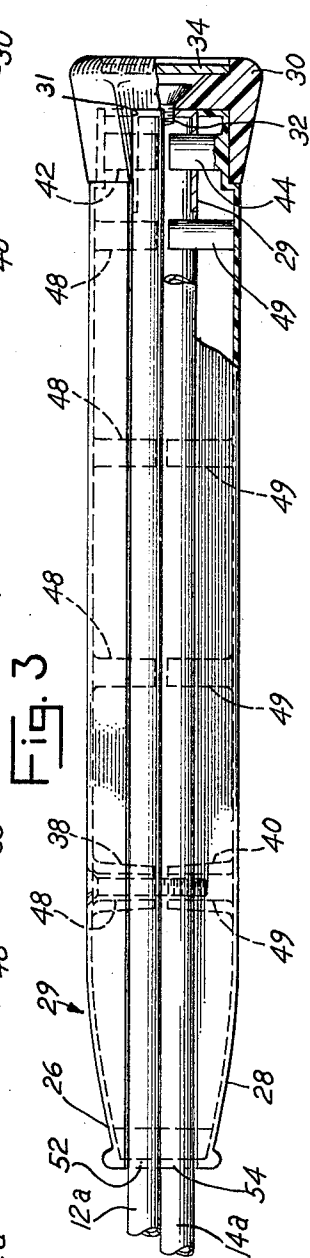
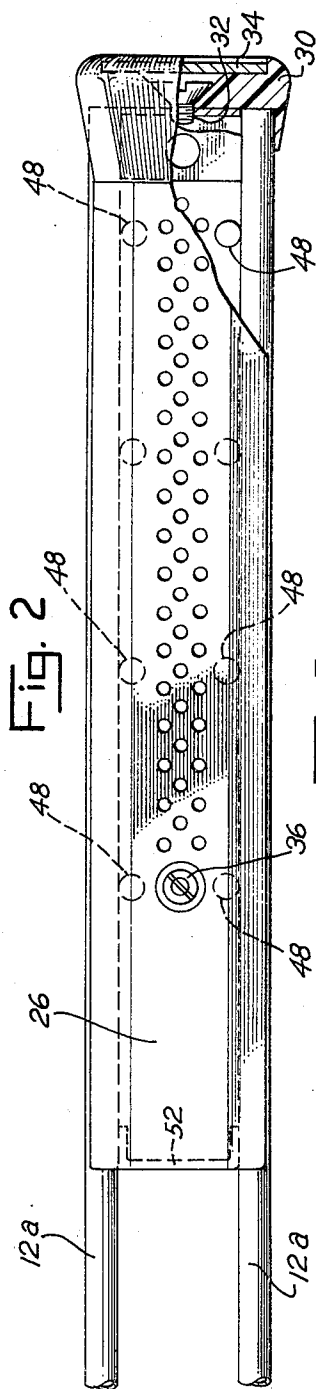
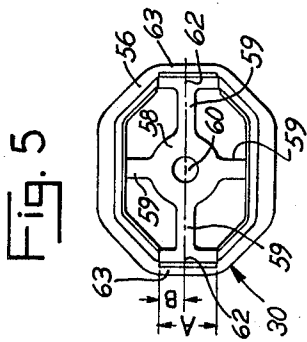
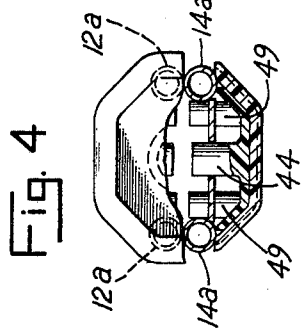
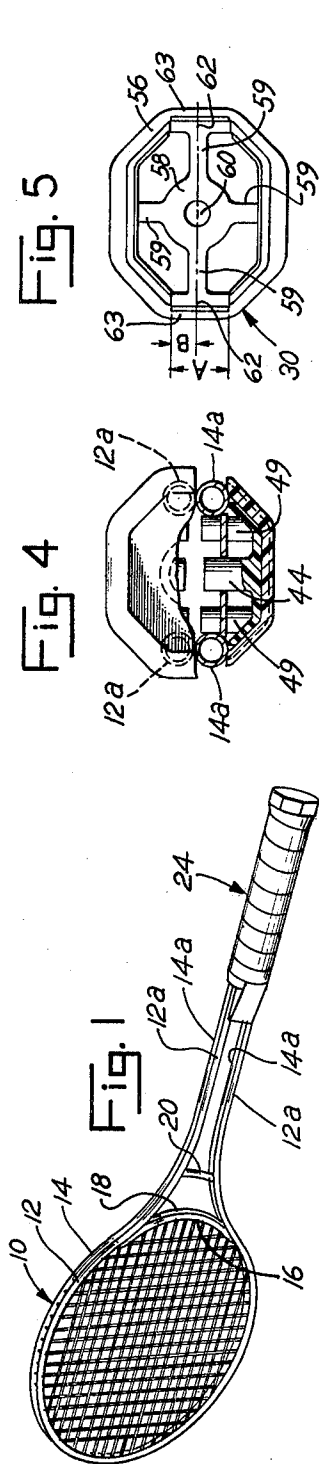
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3,501,148

TENNIS RACKET HANDLE

Filed Feb. 28, 1968

2 Sheets-Sheet 1



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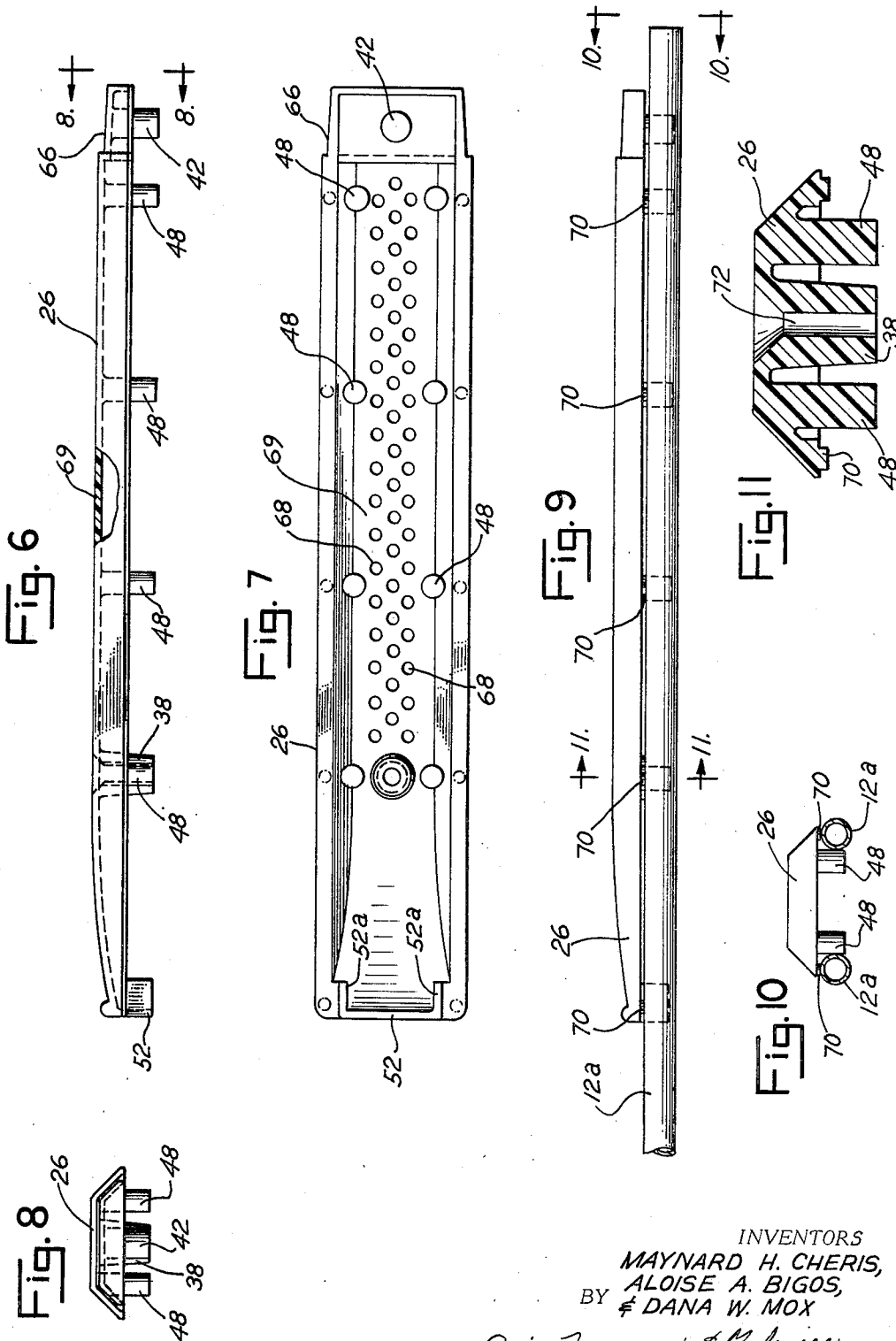
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TENNIS RACKET HANDLE

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3,501,148

TENNIS RACKET HANDLE

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Filed Feb. 28, 1968, Ser. No. 708,876

Int. Cl. A63b 49/08

U.S. Cl. 273—75

9 Claims

ABSTRACT OF THE DISCLOSURE

A handle for a steel frame tennis racket including elongated end portions, the handle including a pair of like elongated pallet pieces having projections extending inwardly from each of such pallet pieces engaging in opening means in a brace secured between the frame end portions for retaining the pallet pieces in predetermined position on the frame end portions. The pallet pieces are secured to one another by means including an end cap having a recess therein engaging over the end portions of the pallet pieces and a bolt remote from the end cap. A flexible strip of material, as, for example, leather is then spirally wound over the assembled pallet pieces to complete the handle assembly.

BACKGROUND OF THE INVENTION

This invention relates to rackets for tennis, squash, badminton or the like games and, more particularly, to an improved handle construction for such rackets.

Recently, tennis rackets made with a steel frame have become more popular. Essentially, the racket comprises a metal frame bent to shape and including generally parallel spaced-apart end portions. The metal frame may be formed of deformed tube as in U.S. Patent 3,206,204 or of pairs of spaced-apart tubes as in the copending application of Maynard H. Cheris and Aloise A. Bigos, Ser. No. 685,011, filed Nov. 22, 1967, and assigned to the same assignee as the present case.

The handle shown in U.S. Patent 3,206,204 is made from two like pieces of plastic retained on the end portions of the metal frame by wrapping a flexible strip of material, such as leather, spirally around the plastic pieces. Some slipping of the flexible strip on the plastic pieces has been encountered in use, resulting in improper feel of the handle to the player using the racket. In the absence of a rigid connection between the handle pieces, the handle could lose its rigidity. A common problem encountered with handles for tennis rackets is that excessive perspiration from the hand of the player will not be fully absorbed by the hand grip of the handle or evaporated into the air, with the result being that the handle loses its proper feel to the player.

An object of the present invention is to provide an improved handle construction for a metal frame racket wherein the deficiencies and disadvantages of prior constructions are obviated.

Another object of this invention is to provide an improved handle construction for a steel frame racket which is rugged and provides a comfortable and solid feel to the user over an extended period of time, and is lightweight.

Yet another object of this invention is to provide an improved handle construction for a steel frame racket, such handle construction comprising two like pallet pieces fixedly secured to one another by bolt means and by end cap means, the pallet pieces including projections cooperating with a brace between end portions of the steel frame for preventing longitudinal movement of the handle on the end portions of the frame.

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A further object of this invention is to provide an improved handle construction for a steel frame racket which includes two pallet pieces and a separate butt piece with an insert therein, the pallet pieces being drilled with small holes (1) to provide for ventilation, (2) to improve the adhesion of a flexible grip thereon and (3) to minimize the weight of the handle construction. Other objects and advantages of the present invention will become apparent hereinafter.

BRIEF DESCRIPTION OF THE DRAWING

The attached drawing illustrates a preferred form of the present invention wherein:

FIG. 1 is a perspective view of a metal frame tennis racket embodying the principles of the present invention;

FIG. 2 is a plan view of the handle construction of the present invention, with a portion thereof being cut away for clarity;

FIG. 3 is a side view of the handle construction of FIG. 2, with a portion being broken away for clarity;

FIG. 4 is an end view of the handle construction, with a portion being broken away for clarity;

FIG. 5 is a bottom view of the end cap of the handle construction;

FIG. 6 is a side view of one of the pallet pieces of the handle construction;

FIG. 7 is a bottom view of the pallet piece of FIG. 6;

FIG. 8 is an end view of the pallet piece taken generally along the line 8—8 of FIG. 6;

FIG. 9 is an illustration of a modified handle construction incorporating spaced pads on the pallet piece for providing handle size variations;

FIG. 10 is an end view taken generally along the line 10—10 of FIG. 9 further illustrating the modification of the handle construction; and

FIG. 11 is an enlarged cross-sectional view of a modified pallet piece taken generally along the line 11—11 of FIG. 9.

DESCRIPTION OF THE PREFERRED EMBODIMENTS OF THE INVENTION

Referring to FIG. 1, there is illustrated a tennis racket 10 embodying the principles of the present invention. Though the racket is sometimes hereafter called a tennis racket, it is readily apparent that the principles of the invention may be applied to metal frame rackets for use in other games, such as badminton and squash. The racket 10 comprises a frame defined by a pair of metal tubular members 12 and 14 disposed in parallel relationship and bent intermediate the length thereof to form a racket head, with the end portions 12a and 14a being brought together in substantially parallel spaced relationship. The loop defined by tubular members 12 and 14 is closed by a pair of separate brace or frame members 16 and 18 disposed in generally parallel relationship. Pin means are provided between the complementary pairs of frame members 12, 14, 16, and 18 to secure the frame members to one another in spaced apart relationship and to provide supports for the racket strings. The specific detail of the frame construction forms no part of the present invention and reference may be made to the copending application of Maynard H. Cheris and Aloise A. Bigos, Ser. No. 685,011 filed Nov. 22, 1967, for a more detail of the frame construction forms no part of the invention to which the handle of the present invention may be applied.

A cross-brace member 20 is provided in the throat area of the frame construction. The cross-brace 20 rigidifies the frame. It also functions to prevent a tennis ball from lodging in the open area frame portions 16, 18. In addition, the cross-brace member may be made from a

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tubular member which is adapted to receive a mass therein for weighing the racket frame.

Turning now to FIGS. 2, 3 and 4 there is better illustrated the handle construction 24 of the present invention. The handle assembly 24 includes a pair of like molded plastic pallet pieces 26 and 28 disposed on opposite sides of tubular frame end portions 12a and 14a. The extremities of the end portions 12a and 14a remote from the racket head are secured in spaced-apart relationship by a U-shaped clip member 29, which is brazed, welded or otherwise secured to the end portions 12a and 14a.

The handle construction 24 includes an end cap or butt piece 30, which is adapted to engage with the two pallet pieces 26 and 28 and to be secured to the clip 29 by suitable fastening means 32 as, for example, a small screw. The screw 32 extends through an opening in the end cap 30 and engages within an opening in the base portion of clip 29. The opening in the end cap 30 is closed by a decorative insert member 34 received in the recessed portion of the end cap and suitably secured therein. The two pallet pieces are secured to one another on opposite sides of the end portions 12a and 14a remote from the end cap 30 by means of a screw member 36 adapted to engage within aligned openings in tubular projections 38 and 40 formed in the pallet pieces 26 and 28, respectively.

As best seen in FIG. 3, the U-shaped clip 29 is provided with an opening in each side portion thereof for receiving projections 42 and 44 respectively, extending toward one another from the pallet pieces 26 and 28. The projections 42 and 44 engage within the openings in the U-shaped clip 29 to prevent longitudinal movement of the handle with respect to the frame end portions 12a and 14a along the axis of the end portions 12a and 14a.

The means for securing the pallet pieces 26 and 28 to one another include the screw 36 as well as the end cap 30 which engages over the end portions of the pallet pieces 26 and 28 to retain them to one another and is secured to clip 29 that is in turn secured to the end portions 12a and 14a.

It is noted that there are a plurality of spaced projections extending from the pallet pieces 26 and 28 along the length thereof. The projections are spaced longitudinally of the handle or pallet pieces and are spaced inwardly from the edges thereof. The projections 48 on the pallet piece 26 and the projections 49 on the pallet piece 28 cooperate with the tubular end portions 12a and 14a, respectively, to maintain the end portions 12a and 14a in desired spaced-apart relationship. The exterior surface of the projections 48 and 49 bear against the tubular end portions and function to rigidify the handle construction when the pallet pieces 26 and 28 are secured to one another about the end portions 12a and 14a. The projections 48 and 49 are spaced inwardly from the side edge of the pallet pieces a distance approximately equal to the width of the frame end portions whereby the edges of the pallet pieces 26 and 28 and the exterior of the frame end portions lie in about the same plane so as to smoothly accommodate a flexible hand grip positioned on the pallet pieces.

The lefthand side of the pallet pieces 26 and 28 as viewed in FIGS. 2 and 3 are each provided with a mall portion 52 and 54, respectively, extending transversely of the pallet pieces. When in assembled relationship, the planar ends of the transverse walls 52 and 54 are adapted to be brought substantially into abutting position with one another so as to present a clean finished appearance to the user.

Referring now to FIG. 5, there is better illustrated the construction of the end cap 30. The cap 30 which is preferably molded from a plastic material, as for example, Cyclocac "T," as are the pallet pieces 26 and 28, includes a generally tubular outer portion 56. Provided internally in the cap 30 is a hub portion 58 retained to the tubular portion 56 by means of ribs 59. A central hole or opening 60 is provided in the hub 58 to permit

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passage of a fastening screw 32 therethrough, which screw 32 engages with the U-shaped clip 29 to retain the end cap 30 in position. Recesses 62 are formed in diametrically opposed internal surfaces of walls 63 of the tubular portion 56 of end cap 30 to facilitate reception of the ends of the end portions 12a and 14a of the frame within the end cap 30. A U-shaped recess 31 is provided in opposite sides of the tubular portion 56 to permit some flexibility of the remaining wall portions of the end cap toward and away from one another to further enhance assembly of the end cap 30 onto the frame end portions and the pallet pieces mounted thereon.

Referring to FIGS. 6, 7 and 8, there is better illustrated the detail of a pallet piece 26. Each pallet piece which is integrally molded from a suitable plastic, is generally trapezoidal in cross-section (FIG. 8) and is preferably comprised of a thin-walled member, rather than a solid block. It has been found that in the present design a hollowed-out structure will give essentially the same strength as a solid block portion while reducing the weight thereof. The tubular projection 38 is provided with a countersunk hole therethrough for receiving a fastening means. It will be apparent that a self-threading screw may be utilized to secure the two pallet pieces to one another. The transverse wall 52 may include rearwardly or downwardly extending portions 52a. The U-shaped configuration of the transverse wall 52 would provide greater strength than if a planar portion depended or extended outwardly from the pallet piece 26.

A shoulder or recessed portion 66 is provided in the rear end of the pallet piece 26. The recessed surface is provided with a draft of approximately 2° such that the surface tapers toward the end of the pallet piece 26. The surfaces defining the recess in the end cap have a complementary taper. The purpose of this taper is to facilitate reception of an end cap 30 over the ends of the pallet pieces 26 and 28 during assembly of the handle parts and to provide extended surface area between the cap 30 and the pallet pieces 26 and 28, note for example, FIG. 3.

A feature of the invention is the provision of a plurality of holes or openings 68 extending through the top wall 69 of the pallet piece 26. Similar holes will be provided in the top surface of the pallet piece 28. The holes 68 serve several important purposes. After the pallet pieces and end cap are assembled, a flexible strip of material, very often leather or a like material, is wrapped about the pallet pieces to provide a more desirable hand grip. Ordinarily, the perspiration of the user will be absorbed within the hand grip or will be evaporated. If the perspiration is not readily removed, then the grip will become slippery and it will be difficult for the user to retain proper control and feel of the handle. If has been found that the provision of air holes in the handle pallet pieces provides for internal ventilation and enhances evaporation of the moisture. Furthermore, the provision of the holes improves the adhesion of the leather grip to the handle as the leather will tend to dig into some of the holes and be more firmly retained on the pallet pieces. The openings further reduce the weight of the handle.

Referring to FIGS. 9, 10, and 11, there is illustrated a modification of a pallet piece to accommodate a plurality of grip sizes. Provided on the pallet piece 26 at spaced intervals are spacer pads 70 which are adapted to engage with adjacent frame end portions. As shown, the spacer pads 70 are adapted to engage with the exterior of tubular end portion 12a. The spacer pads may be made of varying length in order to accommodate different size hand grips. As a specific example, the handle construction may be readily varied to provide handle sizes of 4⅜ inch, 4½ inch, 4⅝ inch and 4¾ inch. In the event the handle size is to be 4⅜ inch then no spacer pad is provided on either pallet piece. (FIGS. 6 and 7 illustrate a pallet piece having no spacer pads, with the location only of the spacer pads being indicated

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in FIG. 7.) In the event the handle size is to be $4\frac{1}{2}$ inch, then the spacer pads will each extend .030 inch from the surface of the pallet piece. For a $4\frac{3}{4}$ inch handle, the spacer pad will extend .065 inch and for a $4\frac{1}{2}$ inch handle, the spacer pad will extend .097 inch from the pallet piece.

It will be appreciated that as the pallet pieces are spaced further from one another to provide for different size handles, the end cap interior surface will have to be appropriately modified in order to receive the pallet pieces therewithin. Critical are the length of the side wall interior surface which contains recess 62 and the location of the side wall with respect to the transverse centerline of the end cap. In FIG. 5, the length of the internal surface of the side wall is designated A and the distance from the centerline to the end of the side wall internal surface is designated B. The following table illustrates the variance in dimensions A and B to accommodate handle sizes corresponding to those considered above. The dimensions stated for the illustrative embodiment are in inches.

Handle End Cap Size	Dimension A (FIG. 5)	Dimension B (FIG. 5)
$4\frac{1}{2}$ -----	.500	.250
$4\frac{3}{4}$ -----	.560	.280
$4\frac{1}{2}$ -----	.630	.315
$4\frac{1}{2}$ -----	.694	.347

From the foregoing, it appears evident that in the illustrated embodiment of FIG. 5, the recess 62 coincides in length with the internal surface of side wall 63. For larger size handles, recess 62 would lie within the side wall, since the recess is uniformly .500 inch wide.

In FIG. 11 there is shown a detail cross-sectional view of a pallet piece. The pallet piece 26 is provided with a countersunk hole 72 in a tubular projection 38 for receiving a fastening screw 36 to connect the pallet pieces to one another at a place remote from the distal end of the pallet pieces.

There has been provided by the present invention an improved handle assembly for a metal frame tennis racket which incorporates two pallet pieces and a separate butt piece having an insert therefor. The two pallet pieces and butt piece are adapted to be readily molded from a suitable synthetic resin. The two pallet pieces are secured to one another by a bolt means remote from the end cap or butt piece. The butt piece itself functions to join the ends of the pallet pieces in assembled relationship. Projections extending inwardly from the ends of the pallet pieces engage in openings in a U-shaped clip joining the frame end portions to prevent longitudinal movement of the handle on the frame end portions.

The pallet pieces are provided with small holes for ventilation and to improve the adhesion of the hand grip to the pallet pieces so as to prevent movement thereof with respect to the pallet pieces during use. The racket handle is light weight yet rugged and has a solid feel to the user. The handle is comfortable because it is vented and the leather grip is firmly bonded to the pallet pieces. The end of the handle provides a smooth, seamless appearance.

While there has been shown and described presently preferred embodiments of the invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention and, therefore, it is intended in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. In a racket comprising a frame formed of metal tubular members having substantially parallel spaced-apart end portions joined by a brace and a handle secured to said end portions, the improvement comprising said handle including a pair of like elongated pallet pieces disposed on opposite side of the end portions, projection means extending from said pallet pieces adjacent the end thereof, said projection means engaging in opening means in said brace to fix said pallets against movement laterally in the plane of said end portions and against any longitudinal movement relative to said end portions for retaining the pallet pieces in predetermined position on said end portions, means securing the pallet pieces to one another remote from the projection means, an end cap having a recess therein engaging the pallet pieces, and means securing said end cap to at least one of said brace and pallet pieces.

2. A racket as in claim 1 wherein said handle includes a flexible covering provided over said assembled pallet pieces.

3. A racket as in claim 2 wherein a plurality of holes are provided in the pallet pieces to provide for ventilation of the assembled handle and to improve the adhesion of the flexible covering to the pallet pieces.

4. A racket as in claim 3 wherein the flexible covering is comprised of a strip of flexible material spirally wound over the pallet pieces.

5. A racket as in claim 1 wherein the securing means comprise bolt means engageable in aligned openings in said pallet pieces for securing the pallet pieces fixedly to one another.

6. A racket as in claim 1 wherein spacer pads are provided on the pallet pieces at spaced intervals along the length thereof and adjacent the side edges of the pallet pieces, the spacer pads being positioned to engage the frame end portions to space the pallet pieces a predetermined distance from one another so as to establish a predetermined handle grip size.

7. A racket as in claim 1 wherein elongated projections extend inwardly from adjacent the side edges of the pallet pieces, said elongated projections being spaced along the length of the pallet pieces, said elongated projections being spaced inwardly from the side edges a distance approximately equal to the width of the frame end portions and abutting the frame end portions so as to rigidify the handle.

8. A racket as in claim 1 wherein the projection means comprise a pin-like member extending from each pallet piece and the brace comprises a U-shaped clip member having openings in the arms thereof, the pin-like projections engaging in said openings for preventing longitudinal movement of the handle on the frame end portions.

9. A racket as in claim 1 wherein the extreme ends of the pallet pieces are recessed and have sides tapering toward the rear edge, the recess of the end cap having a complementary taper for facilitating mounting of the end cap on the pallet pieces.

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