Apr. 24, 1923. 1,452,803

A. HARRIS

RACKET FOR TENNIS AND LIKE GAMES

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FIG. 6.

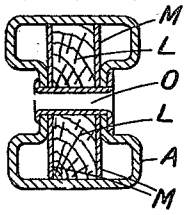


FIG. 5.

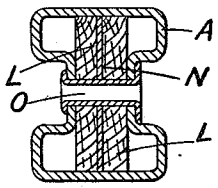


FIG. 1.

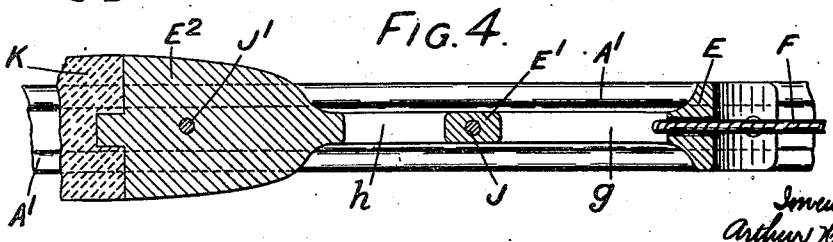
FIG. 7.

FIG. 8.

FIG 2.

FIG. 3.

FIG. 4.



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FIG. 9.

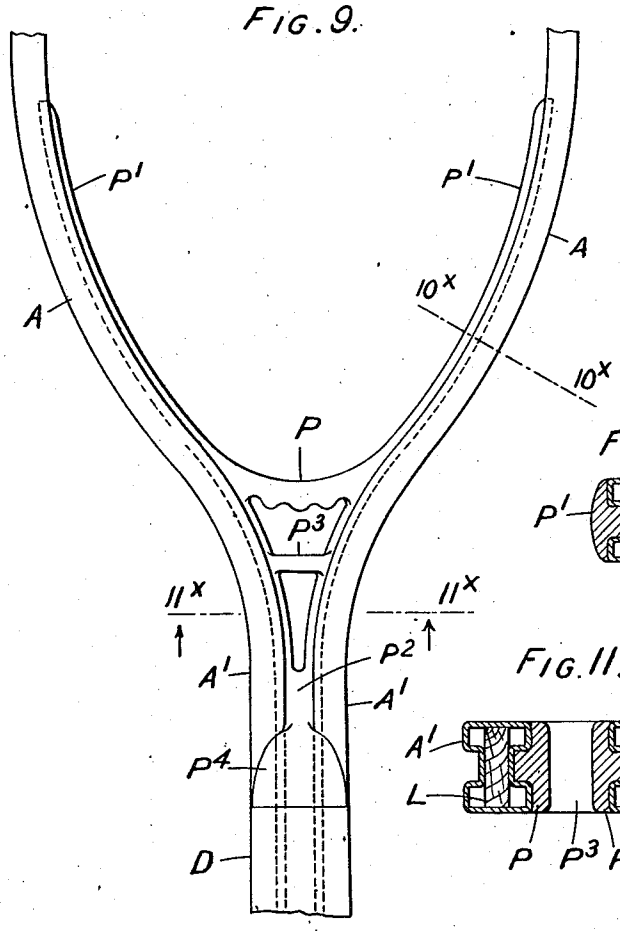


FIG. 10.

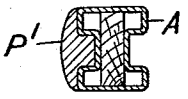


FIG. 11.

FIG. 12.

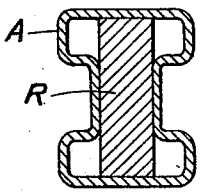


FIG. 13.

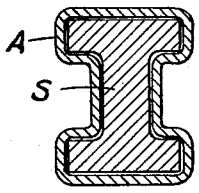


FIG. 14.

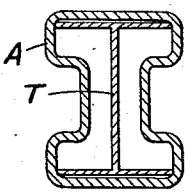
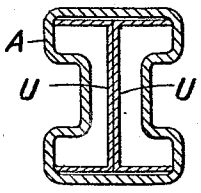


FIG. 15.



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UNITED STATES PATENT OFFICE.

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RACKET FOR TENNIS AND LIKE GAMES.

Application filed September 2, 1921. Serial No. 497,948.

(GRANTED UNDER THE PROVISIONS OF THE ACT OF MARCH 3, 1921, 41 STAT. L., 1313.)

To all whom it may concern:

Be it known that I, ARTHUR HARRIS, of Glenroy, Squirrel's Heath, Romford, in the county of Essex, England, have invented certain new and useful Improvements in Racquets for Tennis and like Games, (for which I have filed applications for patent in Great Britain, #23,203, filed August 6, 1920, and #34,836, filed December 9, 1920), of which the following is a specification.

This invention relates to racquets for tennis and like games, including lawn tennis, squash racquets, lacrosse and badminton, in which strung racquets or bats are used.

The present improvements are directed especially to such racquets as are made mainly, partly or wholly of metal, pressed moulded or rolled into a hollow rectangular section or any other section compatible with durability, lightness and strength.

Any metal answering to these requirements will do for the purpose of the invention, and this may be used either as the sole metal portion of the racquet or as its chief constituent.

To protect the gut or string from being cut by the metal the holes in the frame may be lined with round-edge eyelets, or, if preferred the edges of the holes may be rounded or formed with a rounded or bevelled lip.

Alternatively, the holes for the stringing which are made in the metal may be larger than the corresponding holes in the wood in order to prevent the strings from being cut by the edges of the holes in the metal.

The racquet being hollow is of light construction, and is strengthened with a core or filling of suitable light material. Such a combination of a hollow metal racquet and a wood filling for example, is virtually the equivalent of a wood racquet reinforced with a metal sheathing. (The expression "wood" throughout this description includes cane or any other corresponding light material.) The wood and the metal, when combined, mutually strengthen or support one another, consequently, the metal and the wood portions (or either of them) can be of less substance or strength, than if the racquet were formed of either of these materials alone.

The sectional shape of the metal is preferably more or less of rectangular H form, but may be double-concave, U or "egg-shaped square," (i. e., square with bulging sides) and provided with channels where the stringing lies. These sections may be either solid or hollow.

When the racquet is of H section the usual wedge in the neck portion is extended in the form of a crescent or pair of horns so as to give additional rigidity to the head.

The handle may be also of partly or entirely hollow metal, covered with any desired material, and either formed integral with or separately fastened to the head frame.

Typical forms of my invention are illustrated by the accompanying sheet of drawings in the further description of which reference thereto will be made.

Figure 1 is a general perspective view of a complete racquet.

Figures 2 and 3 respectively are cross sections upon the lines 2—2 and 3—3.

Figure 4 is a longitudinal section upon the line 4—4 of Fig. 1.

Figures 5, 6, 7 and 8 are alternative shapes of the cross section of the frame forming the head.

Figure 9 is a broken view of a slightly modified construction of racquet viewed in elevation.

Figures 10 and 11 are cross sections (increased to twice the size) of Fig. 9, upon lines 10^x—10^x and 11^x—11^x.

Figures 12 to 15 are cross sections of the hollow frames showing four varieties of linings.

Referring to Figs, 1 to 4, the frame consists of a member of metal A which is both hollow and of H section and is bent to the proper curvature to form the usual outline of the head, the handle portion being straight in the form of two nearly or virtually parallel strips A^1 A^1, seen in section in Figs. 2 and 3. These straight portions continue up to the further end of the handle where it is bound with a leather or other band B. The external channel of the H metal is filled up with wood or any other suitable material C at the straight portion to make it flush, whilst a broad strip D of wood is added at back and front of the handle. Alternatively the handle portion may be entirely covered over with some heat non-conducting material.

The two strips A^1 A^1 are held apart near

the neck by the wedge E which instead of wood, as usual, is made of metal. Such wedge E is held by its edges in the inner channels of the two lengths A^1 A^1, and it extends into the neck and curved portions of the latter where they merge into the frame A, and they continue some distance into the frame, either the short distance as shown in Figure 1, or up to half the height of the head or further. As shown in Fig. 4, a portion of the stringing F is threaded through the wedge E, the latter being cut away to leave gaps *g h* for lightness. The solid portion E^1 between the gaps *g h* forms a cross piece in what is really a skeleton wedge, and a pin or rivet J is caused to pass through such cross piece E^1 and through the strips A^1 A^1, as seen in Figures 1, 2 and 4. Another pin or rivet J^1 (Figs. 1 and 4) is also provided at another place through the solid part of the wedge at a thickened portion E^2 at the junction of said wedge with the non-metallic part of the handle, indicated in section by K, Figure 4.

The interior of each member or strip A and A^1 in the neighbourhood of the curved neck, and for some distance (or entirely) down the handle and half way or thereabouts (or more or less) around the head (if necessary), is strengthened by the insertion of a filling L of wood which can be slid into place by inserting it at the two open ends of the strips A^1 A^1 (which form part of the handle of the racquet) and driving it in by force, if necessary. The wood filling L, as shown in Figures 2, 3, and 6 is held between two thin metal liners M M of spring steel or the like, which greatly enhance the rigidity of the racquet besides helping the wood filling to slide smoothly into place. The combined thickness of the filling L and the liners M M on either side occupies the whole space between the two near walls of the hollow H formation, whilst their width extends the entire breadth of the interior, acting as an internal strengthening web.

In the form illustrated in Figures 1 to 4 the wedge E is in the member A^1 and completely fills the width of said channel, (see Fig. 2), but the wedge E is considerably thickened at the end E^2 (see Fig. 4) where it adjoins the handle, this thickening being a gradual one as seen most clearly in Figs. 1 and 4.

The liners M M may, be replaced by a single metal liner N, Fig. 5, of thin flexible metal having wood L L on each side of it. The invention is not, however, confined to the use of wood filling strips combined with metal liners, as it may be practicable to provide liners made entirely of wood or entirely of metal.

Referring particularly to Figures 5 and 6 the metal and wood filling L M or L N as the case may be, where it lies in the head portion or frame A of the racquet, is perforated and fitted with hollow rivets O for receiving the stringing F, the ends of such rivets O being enlarged so as to overlap the edges of the corresponding holes in the member A. The end (or ends) of each rivet is round mouthed to prevent it from cutting the string.

In Figure 7 is shown a sectional view of another shape of metal member A where the external channels are semi-circular, whilst a further modification of shape is shown in Figure 8 where the member A is curved throughout its entire width or thickness. In each of these two Figures 7 and 8 the holes for the stringing are shown by *a*.

In Figures 9 to 11, the wedge P differs slightly in shape from the wedge E. The wedge P is extended at its two upper corners into horns P^1 lying within the groove upon the concave surface of the H section head A. The thickness of the wedge P is equal to that of the handle as is seen in Fig. 11, and the horns P^1 are likewise equal in thickness to the frame A, as shown in Fig. 10, a central rib in the portion P fitting into the groove of the H section. The straight portion P^2 of the wedge (Fig. 9) is therefore flush with the handle, and a mound P^4 is provided to enable the stem P^2 to merge with the handle portion D.

In Figure 12, a metal liner of plain rectangular section R is illustrated, consisting of very light metal having a certain resiliency, and occupying the entire thickness (from back to front) of the member A.

In Figure 13, a liner S of solid H section is shown occupying the whole area of the hollow interior of the strip A.

In Figure 14, the liner consists of a thin H section which leaves unfilled spaces in the member A, but nevertheless corresponds with the two dimensions of the same.

In the Figure 15, two channels U U are shown, arranged back to back in the member A, and producing a somewhat similar kind of lining to the lining T in Fig. 14.

I claim—

1. A racquet having a frame comprising a hollow metallic member bent in the required form and the ends of which form handle portions, said member presenting a channel on its inner side, a handle fitted between said handle portions, and a wedge at the inner end of the handle and fitted in said inner side channels of said handle portions of the said member.

2. A racquet having a frame comprising a hollow metallic member bent in the required form, and presenting channels in its inner and outer sides, and a wood filling in said hollow member.

3. A racquet having a frame comprising a hollow metallic member bent in the re-

quired form and presenting channels in its inner and outer sides, a wood filling in said hollow member, and metal liners on opposite sides of the wood filling.

4. A racquet having a frame comprising a hollow metallic member bent in the required form and the ends of which form handle portions, said member presenting channels on its outer and inner sides, a handle fitted between said handle portions of the frame, a wedge at the inner end of the handle and fitted in the inner channels of the handle portions of the frame, filler strips in the outer channels of the said handle portions, and a filling in said hollow metallic member.

In testimony whereof I have signed this specification 4th day of August, 1921.

ARTHUR HARRIS.