Feb. 9, 1926. 1,572,542

N. LAWRENCE

TENNIS RACKET

Filed March 16, 1925

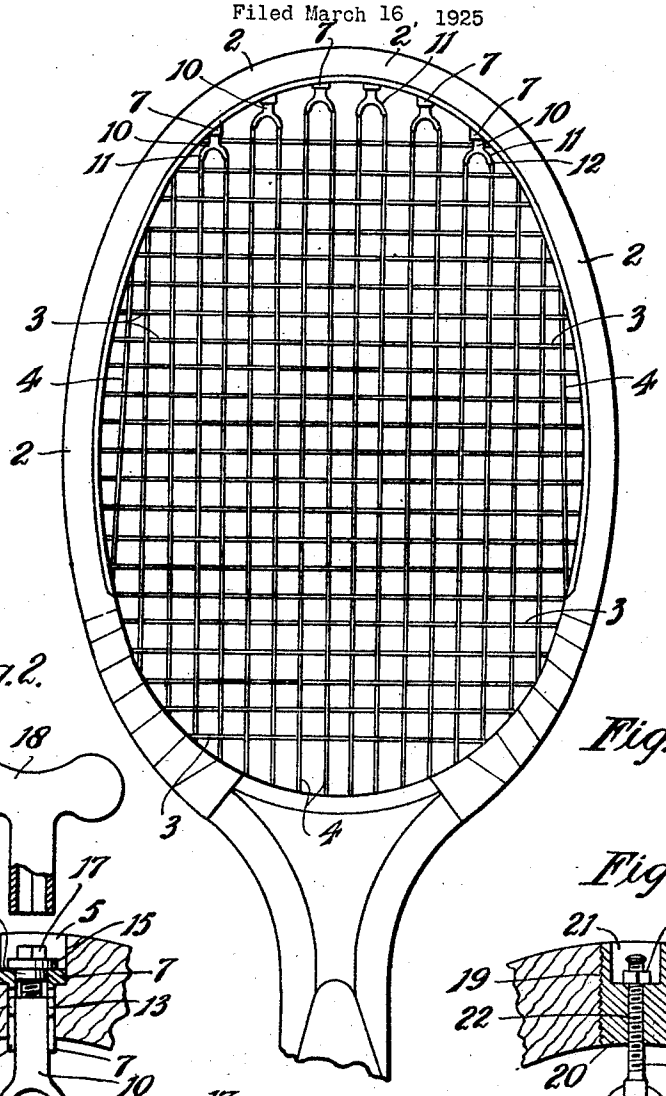


Fig. 1.

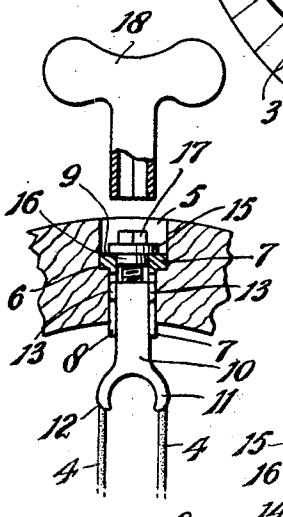


Fig. 2.

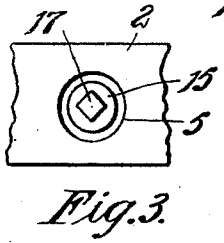


Fig. 3.

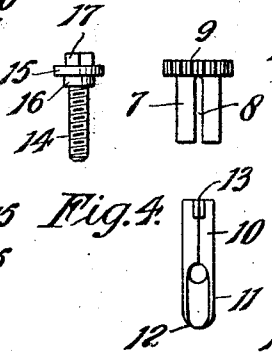


Fig. 4.

Fig. 5.

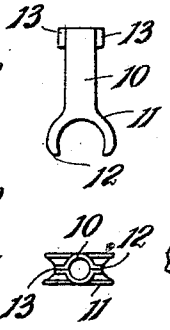


Fig. 6.

Inventor:
Nellie Lawrence
By Lewis Powell & Co. Attorneys

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UNITED STATES PATENT OFFICE.

NELLIE LAWRENCE, OF GREENWICH, NEAR SYDNEY, NEW SOUTH WALES, AUSTRALIA.

TENNIS RACKET.

Application filed March 16, 1925. Serial No. 16,028.

To all whom it may concern:

Be it known that I, NELLIE LAWRENCE, a subject of the King of Great Britain, residing at "Calton Lodge," Greenwich Road, Greenwich, near Sydney, in the State of New South Wales, Commonwealth of Australia, have invented new and useful Improvements in Tennis Rackets, of which the following is a specification.

This invention relates to improvements in tennis rackets, and its object is to provide improved means whereby the racket strings can be readily and conveniently tensioned to the degree required by a player, and also slackened at the end of a game, or at the termination of play, or at other times as may be found desirable.

Devices that are provided on tennis rackets for adjusting the tension of the strings must be exceptionally strong to be effective, and it is essential also that they should be light and arranged in such a manner that the correct balance of the racket will not be affected. A further requirement is that the tensioning devices should be of a character tending to cheapness of production and ease of application to the racket frames.

The present invention has been devised to provide a tennis racket having string tensioning means or devices, which will satisfactorily meet all the requirements herein briefly referred to and will enable a player to conveniently replace and tension any broken string, without necessitating any special skill in the stringing of tennis rackets.

Experience in the playing of lawn tennis and observation have established that the longitudinal strings and those arranged at and adjacent to the centre of the racket are the ones most liable to break by reason of constant wear and variations in climatic conditions, and in one representative form of my invention I provide a tennis racket having means for tensioning and slackening the twelve leading longitudinal strings, but it is to be understood that the invention is not limited to devices for tensioning the longitudinal strings only, or any particular number of strings of the tennis racket.

Reference is now made to the accompanying drawings wherein:—

Figure 1 is a view in elevation of a tennis racket fitted with string tensioning means according to the invention.

Figure 2 is a fragmentary sectional view on an enlarged scale showing one of the string tensioning devices and a key for operating said devices.

Figure 3 is a plan view of Figure 2.

Figure 4 is a detail view of the integers of one of the string tensioning devices.

Figure 5 is a fragmentary sectional view of a modified form of a string tensioning device included in the invention.

Figure 6 is a plan view of Figure 5, but with the screw and nut shown therein removed.

Referring to the construction illustrated in Figures 1 to 4 of the drawings, 2 indicates the frame of a tennis racket, 3 the transverse strings and 4 the longitudinal strings. Bored through the upper portion or head of the racket frame 2 are six holes 5, each of which is formed with a shoulder 6.

Tightly forced into said holes 5 are metal bushes 7, each of which is formed with two oppositely disposed guide slots 8. Said metal bushes are each furnished at their upper ends with a head 9 which bears against the shoulder 6, and has a milled or serrated edge to ensure a tight driving fit being formed by the bush in the hole 5 in the head of the racket frame.

A tubular stem 10 is longitudinally slidable within each of the bushes 7, and it is constructed at its lower end with a crescent-shaped guide in the form of a grooved half-ring 11 adapted to receive a length of catgut which is looped, as shown in Figure 1, to provide two longitudinal strings 4 of the tennis racket. The extremities of the said half-ring 11 are slightly inturned and chamfered at 12 in order to prevent the racket strings guided thereover being cut or

otherwise damaged by any sharp contacting edges.

The tubular stem 10 is screw-threaded internally and it is provided at its upper end with two oppositely arranged lugs or feathers 13 which fit into the guide slots 8 formed in the bush 7. A finely threaded screw 14 is loosely passed through the bush 7, and it screws into said tubular stem 10. This screw is constructed with a flange 15 adapted to bear against the head 9 of the bush, and a collar 16 which fits snugly within the upper end of said bush and forms a guide for said screw. At the upper end of the screw 14, there is formed a square-shaped head 17 which enables said screw to be conveniently rotated by the use of a suitable key 18.

Rotation of said screw 14 by the key 18 in clockwise direction causes the tubular stem 10 with the grooved half-ring 11 to be drawn upwardly into the bush 7 so that the two longitudinal strings 4 passing over said half-ring are simultaneously tautened to the required degree. The lugs or feathers 13 on the stem 10, by being slidably accommodated in the longitudinal guide slots 8 formed in the bush, restrain the stem 10 and its half-ring member 11 against turning movement within said bush.

By rotating the screw 14 in the opposite direction the said stem 10 with its half-ring 11 is moved outwardly from the bush 7 and the strings 4 are thus slackened as desired.

The stem 10, the lugs or feathers 13 thereon, and the grooved half-ring 11 at its lower end are of integral construction, and they may be constructed from one shaped blank of sheet metal of approved gauge by the use of appropriate dies in metal working operations to thus ensure necessary strength combined with lightness.

According to the modification of the invention illustrated in Figures 5 and 6, holes 19 are formed in the head of the racket frame 2 and metal plugs 20 are screwed into said holes. Each of said plugs is formed with a deep recess 21 and a central hole 22, through which a solid screw-threaded stem 23 is loosely passed. The lower end of said stem carries a grooved half-ring 24, over which the longitudinal racket strings 4 are guided, and it has a nut 25 fitted on its upper end which is accommodated in the recess 21 formed in said plug. Rotation of the nut 25 in one direction by means of a key or suitable device causes the screw-threaded stem 23 to be drawn into said plug 20 and thereby tension the two longitudinal racket strings 4 passing over said grooved half-ring, while rotation of said nut in the opposite direction causes the said stem 23 to move outwardly from the plug 20 and thus slacken the racket strings 4.

The central hole 22 formed in each plug 20 may be elliptical in shape as is shown in Figure 6, and the screw-threaded stem 23 passing through said hole 22 is slightly flattened to prevent it from having turning movement therein. The upper end of the screw-threaded stem 23 is burred over to prevent the nut 25 from becoming completely unscrewed from said stem when the racket strings are being slackened.

The two types of string tensioning devices applied to tennis rackets are deemed to be representative forms of my improvements, but I am aware that several modifications in construction, design and arrangement may be made within the ambit of the invention as defined by the appended claiming clauses.

What I do claim is:—

1. Improved means for tensioning the strings of a tennis racket consisting of a series of independently operatable devices fitted to the racket frame in spaced relationship, each of said devices consisting of a bush rigidly fitted into said frame, a tubular internally threaded stem adapted for longitudinal slidable movement in said bush, a connecting piece at the inner end of said stem for operative engagement with a racket string, a screw passed loosely through said bush and screwed into said stem, a head on said screw adapting it for key rotation, and means restraining said stem against turning movement in said bush.

2. Improved means for tensioning the strings of a tennis racket according to claim 1, and wherein the connecting pieces at the inner ends of the stems consist of grooved members accommodating the looped portions of racket strings.

3. Improved means for tensioning the strings of a tennis racket according to claim 1, and wherein the connecting pieces at the inner ends of the stems consist of grooved crescent shaped members accommodating looped portions of adjacent racket strings, and wherein the extremities of said crescent shaped members are fashioned to prevent cutting action on said strings.

4. Improved means for tensioning the strings of a tennis racket according to claim 1, and wherein guide slots are formed in the bushes and feathers are provided on the stems and slidably fit in said slots to restrain said stems against turning movement.

5. Improved means for tensioning the strings of a tennis racket according to claim 1, and wherein each of the bushes has a head with a serrated edge and the screw has a collar adapted to fit within the bush and a flange to bear against the head of said bush.

6. Improved means for tensioning the strings of a tennis racket consisting of a series of tensioning devices fitted to the racket frame in spaced relationship, each

of said devices comprising a hollow member immovably secured in a hole bored in the frame, a movable screw passed loosely through such member, and a connecting piece for operative engagement with a racket string movable toward and from the hollow member immediately consequent upon the movement of the screw.

7. Improved means for tensioning the strings of a tennis racket, according to claim 6, and wherein the connecting pieces consist of grooved crescent-shaped members accommodating looped portions of adjacent racket strings, and wherein the extremities of said crescent-shaped members are inturned to prevent cutting actions on said strings.

In testimony whereof I affix my siguature.

NELLIE LAWRENCE.