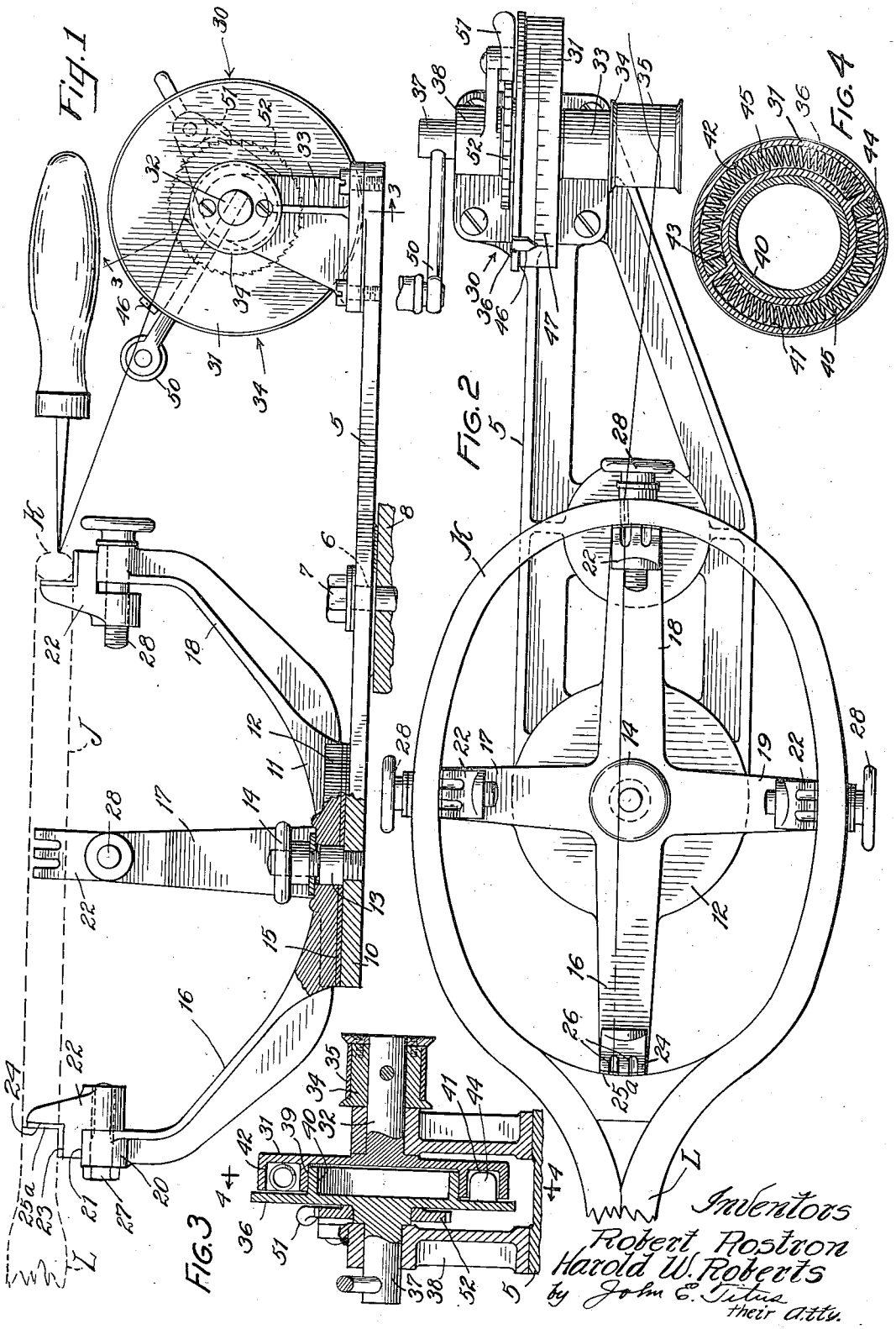
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TENNIS RACKET STRINGER

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TENNIS RACKET STRINGER

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This invention relates to improvements in means for stringing tennis rackets and the like, and an object of the invention is to provide means for facilitating and improving the work of stringing. Heretofore this work has been done almost entirely by hand, except in a few instances where complicated and expensive automatic machinery was available.

To briefly describe the hand stringing, the racket is clamped in a special form of a vice which grips the end of the frame and the handle. Two lengths of gut or other suitable string material are used, one for making the longitudinal strings and one for the cross strings. In starting the operation, the length of gut is looped through the two adjacent string holes which are provided at the upper end of the frame, and then the two ends are worked back and forth through the other string holes, proceeding from the two middle strings toward the sides of the frame. As each string is drawn through the proper hole, in each end of the racket, the gut is wrapped about three times around the hand or a wooden peg, and pulled taut, the tension being roughly determined or judged by twanging the string. Then a slender awl is worked through the hole, beside the string, to hold the tension until the next string is threaded back across the racket and drawn tight. This is continued out to the sides of the frame where the ends are finally passed along under several of the loops where the string passes from one hole to the next at the outer side of the frame, and the end is tied to the last loop.

When the longitudinal strings are all in place, the cross strings are put in place by knotting the end of the second length of gut in the first cross string hole at the top of the racket, and then strung back and forth and woven between the longitudinal strings, each cross string being drawn to what is adjudged to be the desired tension, and the awls inserted to hold the tension as the stringing progresses. At the bottom of the racket frame, the end is brought out and secured to the adjacent loops on the outside of the frame.

Numerous difficulties arise in handling the gut, holding the tension, and so on, so that it is obvious that even an indifferent job of hand stringing requires considerable skill and experience, especially in obtaining the right tension in the strings, to provide the degree of resiliency to which a player is accustomed. An expert's game depends greatly on the reaction of his racket, and it is therefore desirable to be able to string the racket to suit the player.

The racket frame is quite flexible, the frames being made as narrow as possible and also perforated with a large number of closely spaced holes, so that, in drawing up the lengthwise strings, the frame is apt to be bowed out at the sides, and when the cross strings are tensioned, the sides are drawn back more or less and the tension in the long strings is altered.

Accordingly objects of the present invention are to provide means for holding the racket so that it is readily accessible from all sides, and for holding it against undue distortion during the stringing. Further objects are to provide a puller which will hold the strings after tightening and leave the hands free to insert the awls or holders, and to provide means for accurately determining the tension of each string. Another object is to provide a holder which can be rotated so that the operator will not have to continually change position as he is working from one end of the racket to the other.

Further objects and advantages will become apparent in the following description, with reference to the accompanying drawing, in which an illustrative embodiment of the invention is shown.

Fig. 1 is a side elevation of the device, with portions broken away, and parts shown in section.

Fig. 2 is a plan view of the same.

Fig. 3 is a detail section on the line 3—3 of Fig. 1.

Fig. 4 is a section taken on the line 4—4 of Fig. 3.

A flat base frame 5 has a hole 6, in the medial portion thereof, by which it may be rotatably secured, as by a bolt 7, to a table or other suitable support 8. At one end of the base is provided a circular boss 10 on which is rotatably mounted a vice frame 11, said frame having a circular turntable base portion 12 secured to the face of the boss 10 by a stud 13, fixedly secured in the center of the boss, and a nut 14 which is threaded on the upper end of the stud which projects through the base 12. A disc of friction material 15 is inserted between the turntable and the face of the boss to prevent the vice from turning too freely.

Extending upwardly from the turntable portion 12 are four arms 16, 17, 18, and 19, at substantially right angles to each other. The upper ends of the arms are provided with horizontally disposed bosses 20 having flat surfaces 21 at the top thereof; and on each of said flat surfaces is mounted a clamp 22 which has a horizontal seating surface for supporting the racket J, and an upwardly projecting finger portion 24 which engages the frame K of the racket internally. The finger portions 24 are padded with felt 25a, and to avoid the string holes in the frame the fingers are slotted at 26.

On the arm 16 the clamp is rigidly secured by a screw 27 which extends through the boss 20, and is threaded into the tail portion of the clamp. This particular clamp is used to engage in the bottom of the frame, adjacent to the handle L. In the remaining arms the clamps are adjustably secured by horizontally disposed screws 28, the clamps for engaging the sides of the frame, on the arms 17 and 19, being loosely mounted on the flat surface 21 so that they may be rotated slightly on the adjusting screw so that they may be shifted laterally to uncover the adjoining string holes.

At one side of the vice, and mounted on the opposite end of the base 8, is provided a string puller 30 for drawing the strings through the frame and tensioning the same. The puller comprises a drum 31 having a central shaft 32 which is rotatably mounted in and extends through a bearing bracket 33, fixedly mounted on the base 5. On the outer end of the shaft 32 is removably secured a winding spool 34 on which is secured a friction facing band 35 of yielding material, such as soft rubber.

As shown more clearly in Fig. 1 the winding drum is mounted below the plane of the clamps 22 and a racket clamped therein so that the string is pulled radially outward and at an angle downwardly to permit the unobstructed insertion of string wedging means such as a fastening awl at the outer side of the string hole. When the string is tensioned by the ratchet winding drum the racket as held by the clamps 22 is prevented from turning by the string which extends radially outward from the axis of the clamping means.

In cooperative relation with the drum is a driving disc 36 which has a shaft 37 rotatably mounted in a bearing bracket 38, fixed to the base in alignment with the bracket 33. In the inner face of the drum is a circular recess 39 in which is loosely engaged a circular flange 40, formed on the inner face of the driving disc 36; and also formed in the inner face of the drum are two arcuate recesses, 41 and 42, in which are engaged oppositely disposed lugs 43 and 44, formed on the disc. A coiled spring 45 is inserted in each recess, 41, 42, and the springs are compressed between the corresponding lugs and the opposite ends of the channel recesses, so that, normally, the disc is urged in counterclockwise rotation, as viewed in Fig. 1, with respect to the drum, with the lugs thereon in contact with the end walls of the recesses.

A handle 50 is inserted in the outer end of the disc shaft 37, and a pawl 51, pivotally mounted on the bracket 38, is provided for holding the disc in clockwise rotation, the pawl being engageable, when thrown to the left, with a ratchet wheel 52 which is secured to the outer side of the disc 36.

A finger 46 is formed on the periphery of the driving disc, which indicates on a suitable scale 47, provided on the periphery of the drum, the rotational position of the drum with respect to the disc, and, consequently, the compression of the springs and the amount of torque applied to the drum.

In stringing a racket with a device of this invention, the racket is placed on the vice in the manner shown in Fig. 1 and Fig. 2. The clamp on the arm 18 is then drawn outward so that the frame of the racket is gripped internally between the clamps on the arms 16 and 17. Then the clamps on the arms 17 and 19 are tightened, and all of the clamps adjusted to hold the frame in the desired shape.

A length of gut is looped through the two string holes at the top of the racket, and awls are inserted in the holes beside the strings to prevent slipping. The strings are threaded across the frame and the ends, first one and then the other are wound around the drum spool 34, and drawn up tight by pulling the handle back until the index shows the desired tension. The retaining awls are inserted, and the ends threaded back and tightened, the vice being rotated to bring the free ends adjacent to the puller.

In connecting the free ends of the string to the drum, the bight of the string is placed over the spool, wrapped around under the same, and then crossed under the standing portion of the string to form a lock against the soft spool facing the handle is then pulled back to rotate the drum against the tension of the springs. Until the string is tight, the drum turns freely with the disc, but when the string is tightened, the springs are further compressed since the drum is held back. The pull on the handle is continued until the finger 46 moves over the dial to the marking which indicates the desired tension, which is held by the pawl 51, leaving the hands free to insert the awls, or otherwise secure the strings.

Manifestly, this invention greatly facilitates the stringing. More accurately tensioned rackets can be obtained, and a greater degree of tension can be secured than is possible by the hand method, and less skill is required. The vice may be rotated so that the operator does not have to change position in working from one side of the racket to the other, and the base may also be swung about to obtain the most suitable position of the device as a whole. The frame is firmly held in place, and distortion in drawing up the strings is prevented. The tension is accurately determinable whether the strings are long or short, which is difficult without the pulling device because the shorter strings give a higher musical note under the same tension.

Having thus described our invention, we claim:

1. A string tensioning device for a portable racket restringer comprising a pair of spaced bearings fixedly mounted on a base, a flanged disc disposed between the bearings and having a drum shaft projecting through one bearing, a string winding drum fixedly mounted on the outer end of the drum shaft, a driving disc rotatably supported on said disc and having a drive shaft extending through the other bearing, a spring compressed between the discs, and a ratchet for holding the driving disc against counter-rotation.

2. A device as described in claim 1 having means for indicating relative movement between the discs to show the tensioning of the string.

3. A device according to claim 2 including a stop for limiting counter movement between the discs.

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