

⑫

EUROPEAN PATENT SPECIFICATION

④⑤ Date of publication of patent specification: **04.04.90**

⑤① Int. Cl.⁵: **A 63 B 49/08, A 63 B 49/02**

②① Application number: **85300280.6**

②② Date of filing: **16.01.85**

⑤④ **Racquets.**

③⑩ Priority: **18.01.84 GB 8401281**

④③ Date of publication of application:
24.07.85 Bulletin 85/30

④⑤ Publication of the grant of the patent:
04.04.90 Bulletin 90/14

③④ Designated Contracting States:
DE FR SE

⑤⑥ References cited:
FR-A- 984 638
GB-A- 233 544
GB-A-2 094 643
GB-A-2 136 300
US-A-3 931 968

⑦③ Proprietor: **DIVERSIFIED PRODUCTS CORPORATION**
309 Williamson Avenue
Opelika, AL 36801 (US)

⑦② Inventor: **Mott, Jonathan Christopher**
Old Forge Cottage The Common
Wonersh Nr. Guildford Surrey, GU5 0PJ (GB)
Inventor: **Kelley, Robert C.**
1703 Calcutta Drive
Opelika Alabama, 36801 (US)

⑦④ Representative: **Stoole, Brian David**
Schlumberger Electronics (U.K.) Limited 124
Victoria Road
Farnborough Hampshire GU14 7PW (GB)

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European patent convention).

Description

Racquets

This invention relates to racquets, and is more particularly but not exclusively concerned with tennis and racquet-ball racquets having an extruded aluminium frame.

One well-known type of tennis or racquet-ball racquet comprises a substantially oval frame made from a single length of extruded aluminium tubing. The tubing is bent to form the oval shape of the frame, and has its opposite ends extending beside and parallel to each other from one end of the major axis of the oval shape of the frame to form the basis or foundation of the handle of the racquet. The handle is completed by a suitably shaped sleeve, which slides over and is bonded to the parallel ends of the tubing, while the oval shape of the frame is completed by a throat member, which is secured between the parallel ends of the tubing at the point where they begin to diverge to form the oval shape. A racquet of this general type is shown, for example, in US Patent No. 3 931 968.

It is an object of the present invention to provide an improved racquet of this general type.

According to the present invention, a racquet comprises:

a handle, a string-supporting frame having two end portions which converge toward said handle and extend longitudinally therethrough, and a throat member disposed between the converging sections of said end portions. The racquet is characterised by a handle structure comprising an internal handle member connected to said throat member, projecting into said handle between said end portions, and having a series of longitudinally arranged ratchet teeth; and an external handle member telescopically received on said end portions and having a series of longitudinally arranged ratched teeth which are complementary to and cooperate with the ratchet teeth on said internal handle member, whereby the handle is assembled by pushing said external handle member longitudinally onto said end portions so that said cooperating ratchet teeth progressively engage to lock the handle members together and firmly secure said throat member and said frame to the handle.

Thus the co-operating teeth on the internal handle member connected to the throat member and on the external handle member together produce a kind of ratchet action, which locks the handle member on the end portions of the tube and tends to pull the throat member down between these end portions. This considerably enhances the structural integrity of the racquet.

In a preferred embodiment of the invention, a longitudinal groove is provided in the part of the external surface of the tube which defines the internal periphery of the frame and the facing surfaces of the end portions of the tube, and the sides of the throat member adjacent these facing surfaces are each provided with at least one projecting tab which engages in this groove.

Thus the pulling effect resulting from the aforementioned ratchet action tends to lock these tabs more firmly in the groove.

The invention will now be described, by way of example only, with reference to the accompanying drawings, of which:

Figure 1 shows a racquet in accordance with the present invention;

Figure 2 is a side view of a throat member forming part of the racquet of Figure 1;

Figure 3 is a plan view, partly in section, of the throat member of Figure 2;

Figure 4 is a view of a detail of the throat member of Figure 2;

Figure 5 is a plan view, partly in section, of part of the handle of the racquet of Figure 1;

Figure 6 is a sectional side view of the handle part of Figure 5; and

Figures 7 and 8 are views of the opposite ends of the handle part of Figures 5 and 6.

The racquet-ball racquet illustrated in Figure 1 is indicated generally at 10, and comprises an approximately oval frame 12 made from a single length of extruded aluminium tubing 14, which is bent to form the oval shape of the frame. The opposite ends 16, 18 of the tubing 14 extend beside and parallel to each other from one end of the major axis of the oval shape of the frame, to form the basis of a handle 20. A plastics handle member 22 fits over the ends 16, 18 of the tubing 14, to secure them together and further define the handle 20, while a plastics throat member 24 is secured between the ends 16, 18 of the tubing 14, at the point where they begin to diverge to form the oval shape of the frame 12, in order to complete the oval shape. The handle member 22 and the throat member 24 co-operate in a manner which will be described in more detail hereinafter with reference to Figures 2 to 8. The handle 20 of the racquet 10 is completed by covering the handle member 22 with a layer or layers of material whose surface is suitable for gripping, or is covered with a material suitable for gripping, such as leather.

The racquet 10 also comprises stringing, which is indicated generally at 26 in Figure 1 and is composed of nylon, gut or other suitable stringing material. The individual strings of the stringing 26 are secured to the frame 12 by passing them through respective wire string-securing loops, such as those indicated at 28 and 30, which project into the oval space enclosed by the frame 12 from the radially inner surface of the frame. As can be seen in Figure 1, the loops 28 project into the space within the frame 12 from the tubing 14; they are formed from a single, suitably-bent, piece of wire, which is secured in a dovetail-section groove in the tubing substantially as described in UK Patent Application No. 83 06050 (Publication No. 2 136 300A). Similarly, the loops 30 project into the space within the frame 12 from the throat member 24, and are preferably moulded into the throat member as described in UK Patent Application No. 83 27851 (Publication No. 2 148 133A).

The plastics throat member 24 is shown in more detail in Figures 2 to 4, from which it can be seen that the throat member comprises a main body 32, which is shaped to slot into the V-shaped space defined between the portions of the tubing 14 at the point where they begin to diverge from the end portions 16, 18 to define the oval shape of the frame. The sides of the body 32 are provided with projecting tabs 34, which are slotted (to make them resiliently compressible) and barbed, as shown in Figure 4, so that they can be pushed into, and can lock in, the aforementioned dovetail-shaped groove in the tubing 14. The loops 30 projecting from the throat member 24 are also formed from a single, suitably-bent, piece of wire, which is moulded into the body 32 as shown at 36.

Projecting downwardly from the centre of the throat member 24, parallel to and between the ends 16, 18 of the tubing 14, is an integrally-moulded elongate double ratchet member 40 of approximately rectangular cross-section. The two opposite sides of the ratchet member 40 which face respective ones of the ends 16, 18 of the tubing 14 are provided with identical elongated projecting tabs 42, which engage in the aforementioned dovetail-shaped groove in the tubing. The other two opposite sides of the ratchet member 40, i.e. the two sides which face perpendicularly away from the plane of the racquet 10, are provided with respective identical linear arrays of ratchet teeth 44, which are inclined (or biased) towards the main body 32 of the throat member 24.

The plastics handle member 22 is shown in more detail in Figures 5 to 8. As can be seen in these Figures, the handle member 22 comprises an annular flange 50 shaped to be a sliding fit over the ends 16, 18 of the tubing 14, an end socket 52 axially aligned with the flange 50 and shaped to receive the ends 16, 18 of the tubing 14, and two parallel connecting members 54 which are moulded integrally with the flange 50 and the end socket 52, and serve to connect them together and hold them in alignment. The inner surfaces of the connecting members 54 face into the space between the ends 16, 18 of the tubing 14 from the opposite sides of this space, and are provided with respective linear arrays of ratchet teeth 56. The tooth arrays 56 extend parallel to and are aligned with the tooth arrays 44 on the ratchet member 40 of the throat member 24, and the teeth 56 and 44 are complementary to each other.

In use, the handle member 22 is fitted to the remainder of the racquet 10 by fitting the flange 50 over the ends 16, 18 of the tubing 14 and the extremity of the ratchet member 40 on the throat 24. As the handle member 22 is pushed further onto the ends 16, 18 of the tubing 14, the extremity of the ratchet member 40 enters the space between the connecting members 54, and the teeth 56 on the latter start to slide in a ratchet-like manner over the teeth 44 on the former. The further the handle member 22 is pushed onto the

ends 16, 18 of the tubing 14, the more the teeth 56 become engaged with the teeth 44, thus locking the handle member 22 in a progressively more firm manner against withdrawal from the ends 16, 18 of the tubing. The handle member 22 is pushed home until the extremities of the ends 16, 18 of the tubing 14 are fully received in the socket 52, at which point the teeth 44 and 56 are fully engaged. The handle 20 of the racquet 10 is then completed as described earlier.

It will be appreciated that the interlocking of the handle member 22 and the throat member 24 produces a very strong racquet. Thus the throat member is very firmly locked in its proper position between the ends 16, 18 of the tubing 14 at the point where they begin to diverge. Similarly, the handle 20 is very firmly locked in its proper position on the ends 16, 18 of the tubing 14. The handle member 22 and the throat member 24 therefore provide a self-locking and self-locating form of construction for the racquet 10. Furthermore, this construction requires no holes at all to be provided in the tubing 14 for the securing of the handle member 22 and the throat member 24 thereto.

Many modifications can be made to the described embodiment of the invention. For example, the tubing 14 can be drawn rather than extruded, and made from materials other than aluminium. Also, the stringing 26 can be secured to the frame 12 in ways other than that described, for example as described in UK Patent Application No. 82 00 722 (Publication No. 2 094 643).

Claims

1. A racquet comprising a handle (20), a string-supporting frame (12) having two end portions (16, 18) which converge toward said handle and extend longitudinally therethrough, and a throat member (24) disposed between the converging sections of said end portions, characterised by a handle structure comprising:

an internal handle member (40) connected to said throat member (24), projecting into said handle (20) between said end portions (16, 18), and having a series of longitudinally arranged ratchet teeth (44); and

an external handle member (22) telescopically received on said end portions (16, 18) and having a series of longitudinally arranged ratchet teeth (56) which are complementary to and cooperate with the ratchet teeth (44) on said internal handle member (40), whereby the handle is assembled by pushing said external handle member longitudinally onto said end portions so that said cooperating ratchet teeth progressively engage to lock the handle members together and firmly secure said throat member and said frame to the handle.

2. A racquet according to claim 1, characterised in that said internal handle member (40) has two series of outwardly directed ratchet teeth (44) on opposite sides thereof which face outwardly between said end portions (16, 18), and said

external handle member (22) has two series of inwardly directed ratchet teeth (56) which are complementary to and cooperate with said outwardly directed ratchet teeth (44).

3. A racquet according to claim 1 or claim 2, characterised in that said frame (12) has an inwardly opening groove, and said throat member (24) has projecting tabs (34) which engage said groove in the converging sections of said end portions (16, 18).

4. A racquet according to any preceding claim, characterised in that said external handle member (22) has a socket (52) adjacent the bottom end thereof for retaining the terminal ends of said end portions (16, 18).

5. A racquet as claimed in claim 1, characterised in that said frame (12) comprises:

an elongate hollow tube (14), having a central portion which is curved to form the greater part of the circumference of the frame of the racquet, and two ends which constitute said end portions (16, 18) and which extend substantially parallel to and adjacent each other to form the basis of said handle (20), said throat member (24) being disposed between said ends (16, 18) of the tube (14) where they respectively join said central portion, whereby said throat member forms the remainder of the circumference of the frame of the racquet;

said racquet further comprising stringing (26) secured to said central portion of the tube (14) and to said throat member (24), within the frame (12) formed thereby, and being further characterised in that said external handle member (22) fits over said ends (16, 18) of the tube (14), and said internal handle member (40) extends between said ends of the tube.

6. A racquet as claimed in claim 5, characterised in that a longitudinal groove is provided in the part of the external surface of the tube (14) which defines the internal periphery of the frame (12) and the facing surfaces of the ends (16, 18) of the tube, and the sides of the throat member (24) adjacent these facing surfaces are each provided with at least one projecting tab (34) which engages in this groove.

7. A racquet as claimed in claim 5 or claim 6, characterised in that the external handle member (22) incorporates a socket (52) to receive and define the spacing between the ends (16, 18) of the tube (14).

8. A racquet as claimed in any one of claims 5 to 7, characterised in that said internal handle member (40) has a respective set of teeth (44) on each of two opposite sides thereof, each set cooperating with a respective set of inwardly directed teeth (56) formed on an internal surface of the external handle member (22).

Patentansprüche

1. Ein Schläger, bestehend aus Griff (20), Saitenbespanntem Rahmen (12) mit zwei Endstücken (16, 18) die an oben-geannten Griff zusammenlaufen und der Länge nach hindurch, und ein

Halsstück (24), zwischen den oben-geannten zusammenlaufenden Endstücken liegend, dadurch gekennzeichnet, daß die Griffstruktur aus folgendem besteht:

5 einem inneren Griffteil (40) verbunden mit oben-geanntem Halsstück (24), eingearbeitet in oben-geannten Griff (20) zwischen o.g. Endstücken (16, 18) und eine Reihe von längsweisen Ratschenzähnen aufweisend (56) die komplementär und kooperativ mit den Ratschenzähnen (44) an o.g. inneren Griffteil (40) angebracht sind, wobei der Griff montiert wird, indem o.g. äußeres Griffteil längsweise in die o.g. Endteile gedrückt wird, so daß o.g. kooperative Ratschenzähne progressiv die Griffteile zusammenkoppeln und die o.g. Halsstücke und o.g. Rahmen fest und sicher mit dem Griff verbinden.

2. Ein Schläger nach Anspruch 1, dadurch gekennzeichnet, daß o.g. inneres Griffteil (40) zwei Reihen nach außen gerichteter Ratschenzähne (44) aufweist, an gegenüberliegenden Seiten davon, nach außen gerichtet zwischen o.g. Endstücken (16, 18) und o.g. äußeres Griffstück (22) zwei Reihen nach innen gerichteter Ratschenzähne (56) aufweist, die komplementär und kooperativ mit o.g. nach außen gerichteten Ratschenzähnen (44) in einandergreifen.

3. Ein Schläger nach Anspruch 1 oder Anspruch 2, dadurch gekennzeichnet, daß o.g. Rahmen (12) eine nach innen gerichtete Rille aufweist, und o.g. Halsstück (24) hervorstehende Riegel (34) aufweist, die mit o.g. Rille in den zusammenlaufenden Teilen der o.g. Endstücke (16, 18) in einandergreifen.

4. Ein Schläger nach jeglichem vorhergehenden Anspruch, dadurch gekennzeichnet, daß o.g. äußeres Griffstück (22) eine Fassung aufweist (52), anschließend an das untere Ende davon, zum Zweck der Haltung der Endstücke der o.g. Stücke (16, 18).

5. Ein Schläger wie in Anspruch 1 dadurch gekennzeichnet, daß o.g. Rahmen (12) besteht aus:

45 einem verlängerten hohlen Rohr (14) mit Mittelteil, das gebogen ist und den größeren Teil des Umfangs des Schlägers darstellt, und zwei Enden, die o.g. Endstücke (16, 18) darstellen, und die größtenteils parallel zu und anliegend an einander die Basis des o.g. Griff (20) darstellen, indem o.g. Halsstück (24) zwischen o.g. Enden (16, 18) des Rohrs (14) liegt, wo sie entsprechend mit o.g. Mittelstück zusammenkommen, wodurch o.g. Halsstück den Rest des Umfangs des Schlägerrahmens darstellt;

55 o.g. Schläger zusätzlich bestehend aus Saitenspannung (26), befestigt an o.g. Mittelstück des Rohrs (14) und o.g. Halsstück (24), innerhalb des dadurch geformten Rahmens (12), und weiter dadurch gekennzeichnet, daß das äußere Griffstück (22) über o.g. Enden (16, 18) des Rohrs (14) bestestigt ist, und o.g. inneres Griffstück (40) bis zwischen o.g. Enden des Rohrs reicht.

6. Ein Schläger wie in Anspruch 5, dadurch gekennzeichnet, daß eine längsweise Rille in der äußeren Oberfläche des Rohrs (14) existiert, die

die innere Peripherie des Rahmens (12) definiert und die gegenüberliegenden Oberflächen der Enden (16, 18) des Rohrs, und diese gegenüberliegenden Oberflächen ausgerüstet sind mit mindestens einen hervorstehenden Riegel, (34) in dieser Rille befestigt.

7. Ein Schläger wie in Anspruch 5 oder 6, dadurch gekennzeichnet, daß das äußere Griffstück (22) eine Fassung (52) enthält, um die Endstücke (16, 18) des Rohrs (14) zu lassen und die Abstände zwischen den Enden zu definieren.

8. Ein Schläger wie in Ansprüche 5 bis 7, dadurch gekennzeichnet, daß o.g. inneres Griffstück (40) entsprechende Zahne (44) auf beiden von gegenüberliegenden Seiten aufweist, jede Seite davon mit entsprechenden nach innen gerichteten Zähnen des äußeren Griffstücks (22).

Revendications

1. Une raquette comprenant une poignée (20), un cadre soutenant les cordes (12) ayant deux portions d'extrémité (16, 18) qui convergent vers la dite poignée et se prolongent longitudinalement, et un membre de gorge (24) disposé entre les sections convergentes des dites portions d'extrémité, caractérisé par une structure de poignée comprenant:

un membre de poignée interne (40) relié au dit membre de gorge (24), se projetant dans la dite poignée (20) entre les dites portions d'extrémité (16, 18), et ayant une série de dents à cliquets arrangées longitudinalement (44); et

un membre de poignée externe (22), reçu télescopiquement sur les dites portions d'extrémité (16, 18) et ayant une série de dents à cliquets arrangées longitudinalement (56) qui sont complémentaires de et coopèrent avec les dents à cliquets (44) sur le dit membre de poignée interne (40), au moyen duquel la poignée est assemblée en poussant longitudinalement le dit membre de poignée externe sur les dites portions d'extrémité de façon à ce que les dites dents coopérantes à cliquets s'engagent progressivement pour assembler les membres de la poignée ensemble et bloquer fermement le dit membre de gorge et le dit cadre à la poignée.

2. Une raquette en accord avec la revendication 1, caractérisée en ce que le dit membre de poignée interne (40) à deux séries de dents à cliquets dirigées vers l'extérieur (44) sur les côtés opposés qui font face vers l'extérieur entre les dites portions d'extrémité (16, 18), et le dit membre de poignée externe (22) a deux séries de dents à cliquets dirigées vers l'intérieur (56) qui sont complémentaires de et coopèrent avec les dites dents à cliquets dirigées vers l'extérieur (44).

3. Une raquette en accord avec la revendication

1 ou la revendication 2, caractérisée en ce que le dit cadre (12) a une rainure ouvrant vers l'intérieur, et que le dit membre de gorge (24) a des pattes en saillie (34) qui s'engagent dans la dite rainure dans les sections convergeantes des dites portions d'extrémité (16, 18).

4. Une raquette en accord avec toutes les revendications précédentes, caractérisée en ce que le dit membre de poignée externe (22) a une base (52) à côté de l'extrémité inférieure pour retenir les extrémités terminales des dites portions d'extrémité (16, 18).

5. Une raquette en accord avec la revendication 1, caractérisée en ce que le dit cadre (12) comprend:

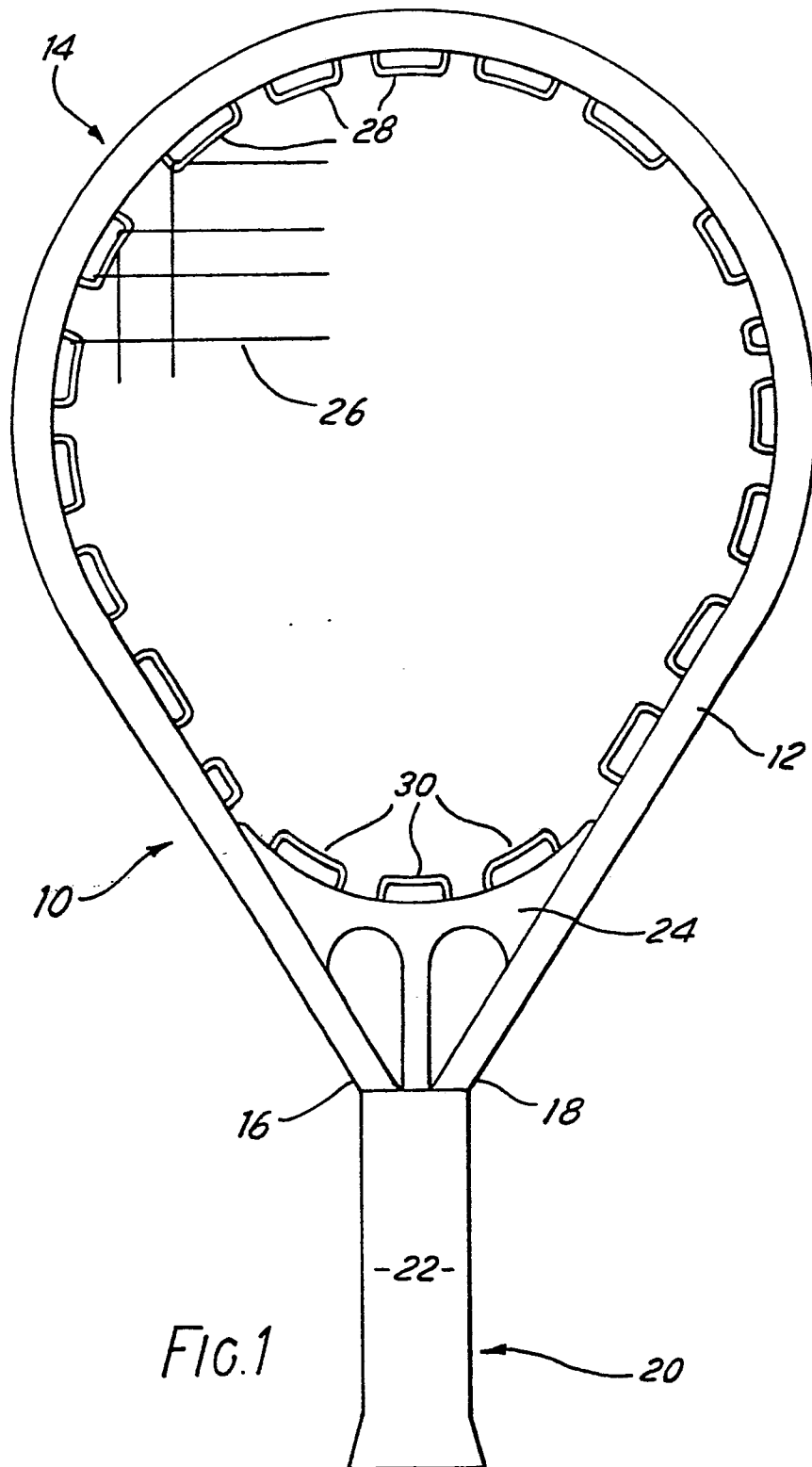
un tube creux allongé (14), ayant une portion centrale qui est courbée pour former la plus grande partie de la circonférence du cadre de la raquette, et deux extrémités qui constituent les dites portions d'extrémité (16, 18) et qui s'étendent substantiellement parallèle à et à côté l'une de l'autre pour former la base de la dite poignée (20), le dit membre de gorge (24) étant disposé entre les dites extrémités (16, 18) du tube (14) où elles rejoignent respectivement la dite portion centrale, au moyen duquel le dit membre de gorge forme le reste de la circonférence du cadre de la raquette;

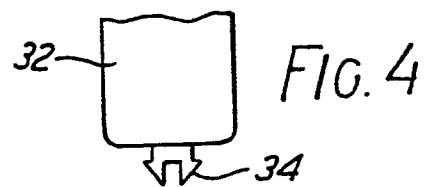
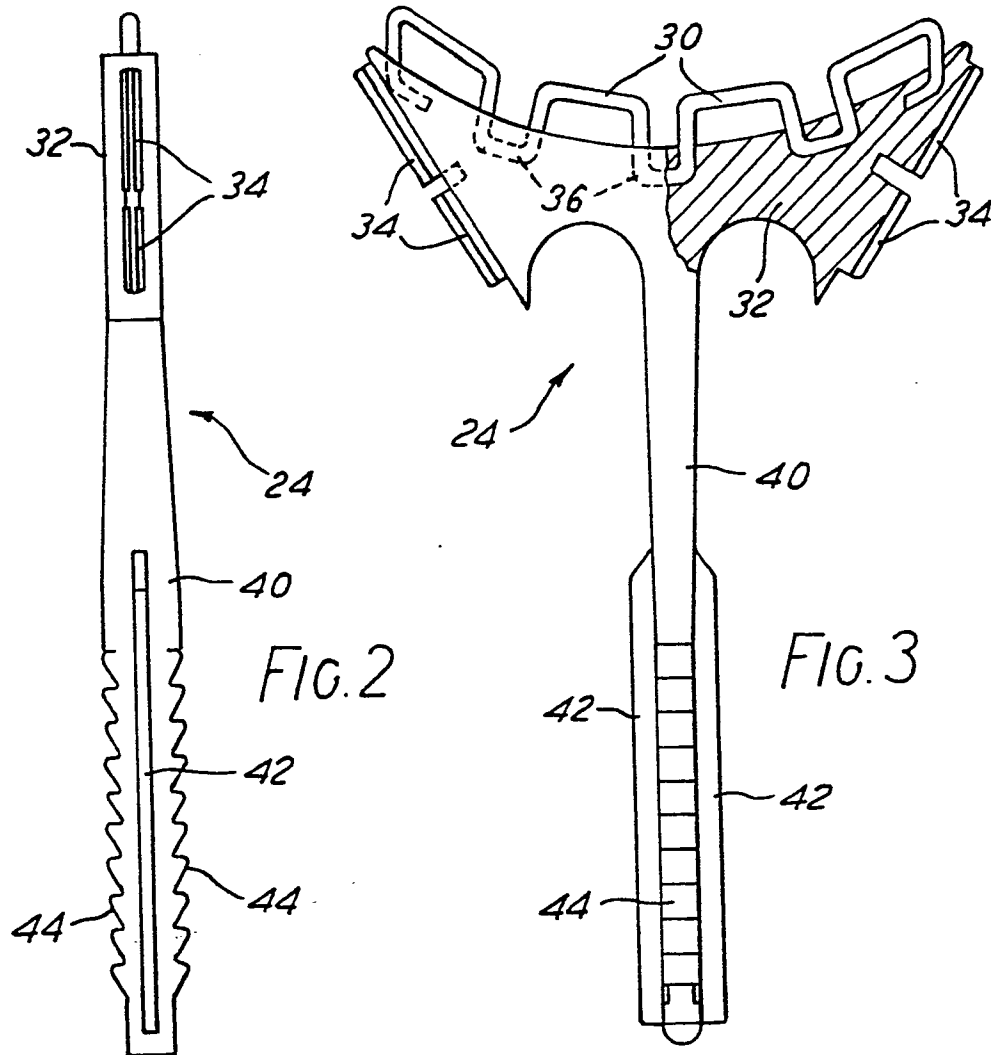
la dite raquette comprend de plus le cordage (26) attaché à la dite portion centrale du tube (14) et du dit membre de gorge (24), à l'intérieur du cadre (12) ainsi formé, et caractérisé de plus en ce que le dit membre de poignée externe (22) s'engage sur les dites extrémités (16, 18) du tube (14), et le dit membre de poignée interne (40) s'étend entre les dites extrémités du tube.

6. Une raquette en accord avec la revendication 5, caractérisée en ce qu'une rainure longitudinale est fournie dans la partie de la surface externe du tube (14) qui définit la périphérie interne du cadre (12) et les surfaces opposées des extrémités (16, 18) du tube, et les côtés du membre de gorge (24) adjacents à ces surfaces opposées sont chacun munis d'au moins une patte en saillie (34) qui s'engage dans cette rainure.

7. Une raquette en accord avec la revendication 5 ou la revendication 6, caractérisée en ce que le membre de poignée externe (22) incorpore une base (52) pour recevoir et définir l'espace entre les extrémités (16, 18) du tube (14).

8. Une raquette en accord avec toutes les revendications de 5 à 7, caractérisée en ce que le dit membre de poignée interne (40) a un ensemble respectif de dents (44) sur chacun de ses deux côtés opposés, chaque ensemble coopérant avec un ensemble respectif de dents dirigées vers l'intérieur (56) formé sur une surface interne du membre de poignée externe (22).





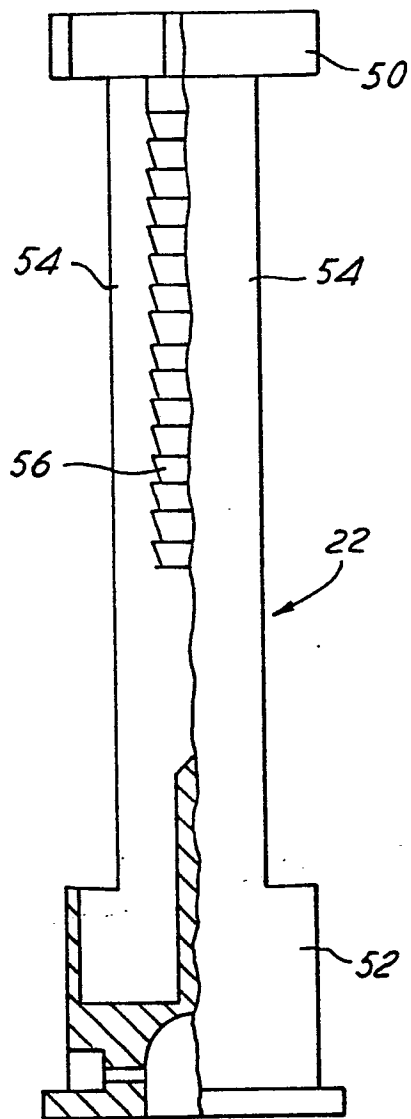


FIG. 5

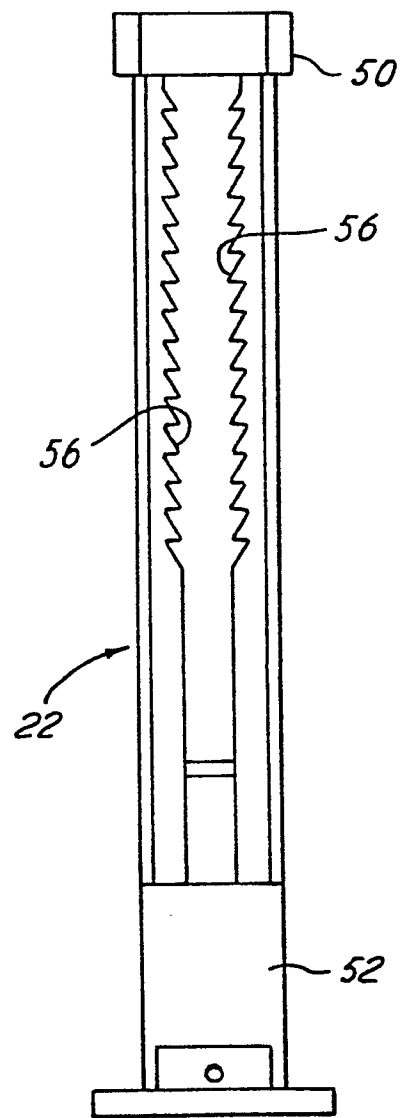


FIG. 6

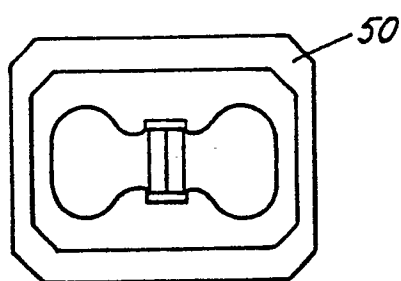


FIG. 7

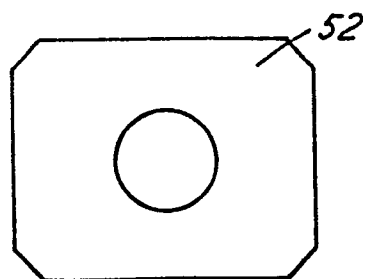


FIG. 8