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Description

This invention relates to spiral staircases.

Conventionally handrails for spiral staircases are of two forms. Firstly steel or aluminium core rails are known which are welded or bolted to the tops of the balusters and capped with various thermo-plastic cappings, the capping being heated to soften the plastics material and then fitted onto the core rail. The making of such core rails is a slow operation and the appearance of the finished plastic rail is not very pleasing.

Also known are tubular metal rails which are favoured for their comfort in use but are notoriously difficult to form and fix neatly. Usually the tubular handrail is bent in rollers, the shape being judged by eye, or in a mock-up jig, then the underside of the rail has to be accurately marked out for the position of each junction with a baluster, the connections being made by bolting or welding. This procedure is very time consuming and requires great skill to achieve a professional result.

A flexible tubular handrail clamped to a baluster is also known from DE 2259211.

It is an object of the present invention to provide a handrail for a spiral staircase which is easy to shape and to fit to the balusters.

Thus according to the invention there is provided a handrail for a spiral staircase, said handrail being of tubular flexible construction able to assume its required shape without preforming, together with clamping means mountable to the ends of the balusters of a spiral staircase and engageable with the flexible tubular handrail at any desired position along its length to clamp the handrail in position to the balusters characterised in that the handrail comprises a flexible spirally-wound metal tube having a narrow spiral groove and that each clamping means includes a loop of wire or cable accommodatable by passing over or around the handrail within the narrow spiral groove in the handrail and tensionable by suitable means to clamp the handrail in position.

The invention thus avoids the need to preform handrails to the required shape and accurately to mark out the underside of the rails for each junction with a baluster. Furthermore, use of a loop of wire or cable accommodatable within a narrow spiral groove in the handrail enables clamping to be achieved without creating any obstruction to a hand passing over the surface of the handrail and a neat and attractive fixing can be obtained.

The handrail according to the invention may comprise multiple tubular members one sliding within the other. Thus, for example, the handrail preferably comprises a flexible spirally-wound metal tube of essentially known construction e.g. that used in car exhausts or shower hand sets, although

made to the desired size and stiffness, and reinforced with an inner flexible plastic tube e.g. an ALCATHENE (Trade Mark) tube. Indeed, over any straight run of the flexible tubular handrail it may be reinforced with a rigid metal tube. The ends of the tube can be capped to provide a neat appearance.

The clamping means may take various forms. Preferably the clamping means include supports, each mountable to the end of a baluster as by bolts or screws so as to be pivotable about an axis perpendicular to the longitudinal axis of the baluster and to the axis of the tubular rail.

Preferably each support defines a cradle to receive and locate the tubular handrail. Thus each support may comprise two angled brackets, positionable back-to-back on opposite sides of the end of a baluster to define a generally Y-shaped support.

Tubular balusters may be provided, the ends to which the clamping means are to be mounted being flattened and drilled to take a fixing bolt or screw also serving as a pivot.

In a preferred embodiment the clamping means is so constructed that the act of mounting the clamping means to the baluster serves to tension the aforesaid elongate flexible member around the handrail. Thus, for example with a support formed of two angled brackets and a closed cable loop engageable with both brackets and passable over or around the handrail, the length of the loop is such that upon the brackets being bolted or screwed to the baluster the cable loop already in position is put under tension and the fixing is complete.

The handrail being flexible and in need of alignment it is desirable that the connection between the vertical baluster and the outer ends of the stair treads provide for vertical adjustment of the balusters relative to the stair treads. One suitable form of baluster mounting bracket is discussed in our European Patent Application No. 86302032.7 dated 19th March 1986 in connection with an embodiment of the present invention described hereinafter.

Preferred embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings wherein:- Figure 1 is a fragmentary side elevation showing a section of handrail, the upper end of a baluster and the clamping means,

Figure 2 is an end elevation of handrail, clamping means and baluster and also illustrating in partial cross-section the interconnection between the baluster and the tread of a staircase, and

Figure 3 is a scrap plan view partially in section illustrating the connection between the baluster and tread.

Figures 4 and 5 are side elevation views of an alternative interconnection between the baluster and tread.

Figure 6 is a plan view, in cross section, of the alternative interconnection between baluster and tread.

Referring to Figures 1 and 2 of the drawings there is shown a handrail 1, clamping means 2, baluster 3, tread 4 and mounting bracket 5 connecting the baluster to the tread. As will be described hereafter the connection between the mounting bracket 5 and the tread 4 readily allows for vertical adjustment of the baluster thus enabling the handrail 1 to be correctly aligned after having been connected to the balusters 3.

The handrail 1 is a spirally-wound metal tube of known construction and sold in different sizes for different purposes under the name "Tubelock" by TI Flexible Tubes Limited. For this purpose the tube is made of a size suitable to serve as a handrail and is reasonably stiff, consistent with being able to take up the required spiral shape without difficulty. This construction has a narrow spiral groove 6 on the outer surface and this is utilised by the clamping means 2 as described hereafter. Also illustrated is an inner stiffening sleeve or tube 7 for the handrail 1. The tube 7 is a sliding fit within the outer spirally-wound handrail 1.

The clamping means 2 comprises a support 8 and an endless loop 9 of stainless steel cable. The support 8 comprises two angle brackets 10 positionable on opposite sides of a flattened end 11 of a baluster 3 and drilled, as is the baluster, to enable the brackets to be screwed together and pivotably mounted to the end of the baluster 3. So assembled the brackets define a generally Y-shaped cradle or support which receives and locates the handrail 1.

On the inner faces of the outwardly angled arms of the brackets 10 are provided pairs of headed studs 12. The loop 9 is looped around the studs 12 of each bracket 10 and is passed over the handrail 1, the two runs of the loop being located in the groove 6. The cable loop 9 therefore does not stand proud of the outer surface of the handrail. The length of the loop is such that as the brackets 10 are presented on opposite sides of the end 11 of the baluster 3 and screwed together and to the baluster, the cable is automatically pulled tight and forces the handrail into place on the cradle support 8 provided by the clamping means 2.

Referring now to Figs. 2 and 3, the interconnection between the balusters 3 and the treads 4 will be described. Each tread 4 is provided with nosing or lipping 25. This lipping has a generally T-shaped channel formed therein as is clearly visible in Fig. 2. The lipping 25 includes a projecting rib 26 which engages a mating slot cut in the tread

whereby the lipping 25 can be firmly secured to the tread 4. The mounting bracket 5 for attaching each baluster 3 to a tread 4 comprises two parts 31, 32 cut from an extruded profile and a grub screw 33. A circular hole 34 is formed in each of the parts 31, 32 to provide collars which are a sliding fit with the end of a baluster 5. Each mounting bracket part 31, 32 is also provided with a machined slot 35 which is formed in the rectangular end thereof so that with the parts positioned one above the other the slots, in use, respectively receive one of two engaging portions 36, 37 of the T-shaped channel in the lipping 25 and are then slidable together in the channel. The part 31 which is to be disposed uppermost in use is also provided with a tapped hole 38 which receives the grub screw 33.

In order to secure a baluster 3 to a tread 4, the two metal parts 31, 32 are placed one above the other with their respective holes 34 aligned and their respective machined slots 35 facing oppositely. The baluster 3 extends through both collars. The grub screw 33 is partially screwed into the hole in the upper part 31, but not sufficiently for it to extend completely therethrough. The slotted ends of the parts 31, 32 when overlying one another are trapped within the channel of the lipping 25 but can be slid along the channel. The grub screw 33 is then turned to force the two parts 31, 32 apart.

The movement apart of the rectangular portions of the parts 31, 32 will be limited by the channel in the lipping 7, and continued tightening of the grub screw will cause the collars to diverge and thus wedge on the baluster 3. Sufficient tightening of the grub screw will cause the baluster to be friction held in the collars of the parts 31, 32 and thus prevented from vertical movement.

It will be appreciated that by slackening off the grub screw 33 the height of the baluster is readily adjustable. Thus the flexible handrail can be correctly aligned without difficulty.

The aforesaid interconnection between the balusters 3 and the treads 4 is as described in our European patent application No. 86302032.7 dated March 19, 1986. This application also describes an advantageous means of attaching the spiral staircase treads or their mounting brackets to a central support column of a spiral staircase although of course other conventional means may be used for this purpose.

An alternative interconnection between the balusters 3 and treads 4 is illustrated in Figures 4, 5 and 6. A rail 41 of an all metal stair tread, formed with a generally T-shaped channel, is attached to the outer edge of the tread 4. The baluster mounting bracket includes an elongate member 40 comprising a T-shaped end part 40a, a central collar

part 40b and an opposite apertured end part 40c and clamping means in the form of a screw or bolt 42 and a nut or threaded block 43. T-shaped end part 40a slidably engages the T-shaped channel and extends substantially perpendicular to the rail 41, the curved collar part 40b embraces the baluster 3, and end part 40c extending parallel to rail 41 has a hole 44 therethrough into which a screw or bolt 42 is inserted and which engaged with threaded block 43 slidably trapped within rail 41.

In order to secure a baluster 3 to a tread 4, the nut or block 43 is inserted into the end of the rail 41 and moved along into the required position. The T-shaped end part 40a of member 40 is engaged with the rail, whilst collar part 40b embraces the baluster and the screw or bolt 42 can be inserted through the hole 44 in the end part 40c to be received by the nut or threaded block 43. As the screw or bolt 42 is tightened the nut or block 43 is brought up into contact with inner rim of the channel while the straight section of the collar 40 is brought nearer into contact with the rail 41, clamping the baluster 3 to the tread 4.

Slackening of the screw or bolt 42 releases the baluster 3, and allows the height to be easily and simply adjusted. Similarly the position of the baluster and mounting bracket along the edge of the tread 4 may be adjusted upon slackening.

This arrangement is potentially more robust than the previous interconnection described, and may be used in cases where greater stresses may be anticipated as for example with spiral staircases designed for outside use.

Claims

1. A handrail (1) for a spiral staircase, said handrail being of tubular flexible construction able to assume its required shape without preforming, together with clamping means (2) mountable to the ends of the balusters (3) of a spiral staircase and engageable with the flexible tubular handrail (1) at any desired position along its length to clamp the handrail (1) in position to the balusters (3) characterised in that the handrail (1) comprises a flexible spirally-wound metal tube having a narrow spiral groove (6) and that each clamping means (2) includes a loop of wire or cable (9) accommodatable by passing over or around the handrail within the narrow spiral groove (6) in the handrail and tensionable by suitable means (8,10) to clamp the handrail in position.
2. A handrail as claimed in claim 1, comprising multiple tubular members (1,7), one slidable

within the other.

3. A handrail as claimed in claim 2 comprising an external spirally-wound metal tube (1) reinforced with an inner flexible plastic tube (7).
4. A handrail as claimed in any of claims 1 to 3 wherein said clamping means includes supports (8) each mountable to the end of a baluster (3) so as to be pivotable about an axis perpendicular to the longitudinal axis of the baluster and to the axis of the handrail.
5. A handrail as claimed in claim 4 wherein each support (8) defines a cradle to receive and locate the handrail.
6. A handrail as claimed in claim 5 or 6 wherein each support (8) comprises two angled brackets (10), positionable back-to-back on opposite sides of the end of a baluster to define a generally Y-shaped support.
7. A handrail as claimed in any preceding claim so constructed that the act of mounting the clamping means (2) to a baluster (3) serves to tension the loop of wire or cable (9) around the handrail (1).
8. A spiral staircase having a handrail as claimed in any of claims 1 to 7.
9. A spiral staircase as claimed in claim 8 further comprising a baluster mounting bracket (40), said bracket including an elongate member comprising an end part (40a) adapted to be slidably mounted in a channel or groove provided in the outer edge of a stair tread (4), a central collar part (40b) slidably engagable with a vertical baluster (3), the other end part (40c) of said member being adapted to be clamped to said channel or groove, and clamping means (42,43,44) for clamping said other end part of said elongate member to said channel or groove thereby to clamp said baluster (3) to the stairtread (4).

Revendications

1. Rampe (1) d'escalier en colimaçon, la rampe ayant une construction tubulaire flexible et pouvant prendre la configuration nécessaire sans mise en forme préalable, en coopération avec un dispositif de serrage (2) destiné à être monté aux extrémités des balustres (3) d'un escalier en colimaçon et à coopérer avec la rampe tubulaire flexible (1) à un emplacement

voulu quelconque de sa longueur afin que la rampe (1) soit serrée en position sur les balustres (3), caractérisée en ce que la rampe (1) comprend un tube métallique flexible spiralé ayant une étroite gorge hélicoïdale (6), et en ce que chaque dispositif de serrage (2) comporte une boucle de fil métallique ou de câble (9) destinée à passer autour de la rampe ou sur celle-ci dans l'étroite gorge hélicoïdale (6) formée dans la rampe et destinée à être tendue par un dispositif convenable (8, 10) qui assure le serrage de la rampe en position.

2. Rampe selon la revendication 1, comprenant plusieurs organes tubulaires (1, 7) qui peuvent glisser l'un dans l'autre.
3. Rampe selon la revendication 2, comprenant un tube métallique externe spiralé (1) renforcé par un tube flexible interne (7) de matière plastique.
4. Rampe selon l'une quelconque des revendications 1 à 3, dans laquelle le dispositif de serrage comprend des supports (8) destinés chacun à être monté à l'extrémité d'un balustre (3) afin qu'il puisse pivoter autour d'un axe perpendiculaire à l'axe longitudinal du balustre et à l'axe de la rampe.
5. Rampe selon la revendication 4, dans laquelle chaque support (8) forme un berceau destiné à loger et positionner la rampe.
6. Rampe selon la revendication 5 ou 6, dans laquelle chaque support (8) comprend deux pattes de support (10) pliées destinées à être placées dos à dos de part et d'autre de l'extrémité d'un balustre afin qu'elles délimitent un support ayant une forme générale en Y.
7. Rampe selon l'une quelconque des revendications précédentes, réalisée de manière que l'axe de montage du dispositif de serrage (2) sur un balustre (3) assure la mise sous tension de la boucle de fil ou de câble (9) autour de la rampe (1).
8. Escalier en colimaçon ayant une rampe selon l'une quelconque des revendications 1 à 7.
9. Escalier en colimaçon selon la revendication 8, comprenant en outre un support (40) de montage de balustre, ce support comportant un organe allongé comprenant une partie d'extrémité (40a) destinée à être montée par coulissement dans un canal ou une gorge formé au bord externe d'une marche d'escalier (4), une

partie centrale (40b) de collier destinée à coopérer par coulissement avec un balustre vertical (3), l'autre partie d'extrémité (40c) de l'organe étant destinée à être serrée contre le canal ou la gorge, et un dispositif (42, 43, 44) de serrage de l'autre partie d'extrémité de l'organe allongé sur le canal ou la gorge afin que le balustre (3) soit serré contre la marche d'escalier (4).

Ansprüche

1. Handlauf (1) für eine Wendeltreppe, der rohrförmig flexibel ausgebildet ist, um ohne Vorformung eine geforderte Gestalt annehmen zu können, wobei eine an den Enden von Geländerpfosten (3) der Wendeltreppe montierbare Klemmeinrichtung (2) an jeder gewünschten Stelle längs des flexiblen rohrförmigen Handlaufes (1) mit diesem in Eingriff zu treten vermag, um den Handlauf (1) in seiner Stellung an den Geländerpfosten (3) zu halten, **dadurch gekennzeichnet**, daß der Handlauf (1) ein flexibles, spiralförmig gewundenes Metallrohr mit einer schmalen Spiralnut (6) umfaßt, und daß jede Klemmeinrichtung (2) eine Draht- oder Kabelschleife (9) enthält, die auf dem Handlauf in die schmale spiralförmige Nut (6) einsetzbar und zur Festklemmung des Handlaufes in seiner Stellung durch eine geeignete Einrichtung (8, 10) spannbar ist.
2. Handlauf nach Anspruch 1 mit Mehrfachrohrelementen (1, 7), die ineinander gleiten können.
3. Handlauf nach Anspruch 2 mit einem externen, spiralförmig gewundenen Metallrohr (11), das durch ein inneres flexibles Kunststoffrohr (7) verstärkt ist.
4. Handlauf nach den Ansprüchen 1 bis 3, bei dem die Klemmeinrichtung Halterungen (8) enthält, die jeweils an einem Ende eines Geländerpfostens (3) so montierbar sind, daß sie um eine zur Längsachse des Geländerpfostens und zur Achse des Handlaufes senkrechter Achse schwenkbar ist.
5. Handlauf nach Anspruch 4, bei dem die Halterungen (8) jeweils eine Gabel zur Aufnahme und zum Einstellen des Handlaufes definieren.
6. Handlauf nach Anspruch 5 oder 6, bei dem die Halterungen (8) jeweils zwei abgewinkelte Bügel (10) umfassen, die auf entgegengesetzten Seiten des Endes eines Geländerpfostens zur Bildung einer generell Y-förmigen Halterung

mit ihren Rückseiten zueinander einstellbar sind.

7. Handlauf nach den vorhergehenden Ansprüchen, der so ausgebildet ist, daß die Montage der Klemmeinrichtung (2) an einem Geländerpfosten (3) zur Spannung der Draht- oder Kabelschleife (9) auf dem Handlauf (1) dient. 5

8. Wendeltreppe mit einem Handlauf nach den Ansprüchen 1 bis 7. 10

9. Wendeltreppe nach Anspruch 8 mit einer Geländerpfosten-Montageklammer (40), die folgende Komponenten aufweist: ein langgestrecktes Element mit einem Endteil (40a), das gleitend in einem Kanal bzw. einer Nut in der Außenseite einer Treppenstufe (4) montierbar ist, eine gleitend mit einem vertikalen Geländerpfosten (3) in Eingriff tretende zentrale Schelle (40b), eine Einklemmmöglichkeit des anderen Endteils (40c) des Elementes in den Kanal bzw. die Nut und eine Klemmeinrichtung (42, 43, 44) zum Einklemmen des anderen Endteils des langgestreckten Elementes in den Kanal bzw. in die Nut zwecks Anklemmens des Geländerpfostens (3) an die Treppenstufe (4). 15
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FIG.1.

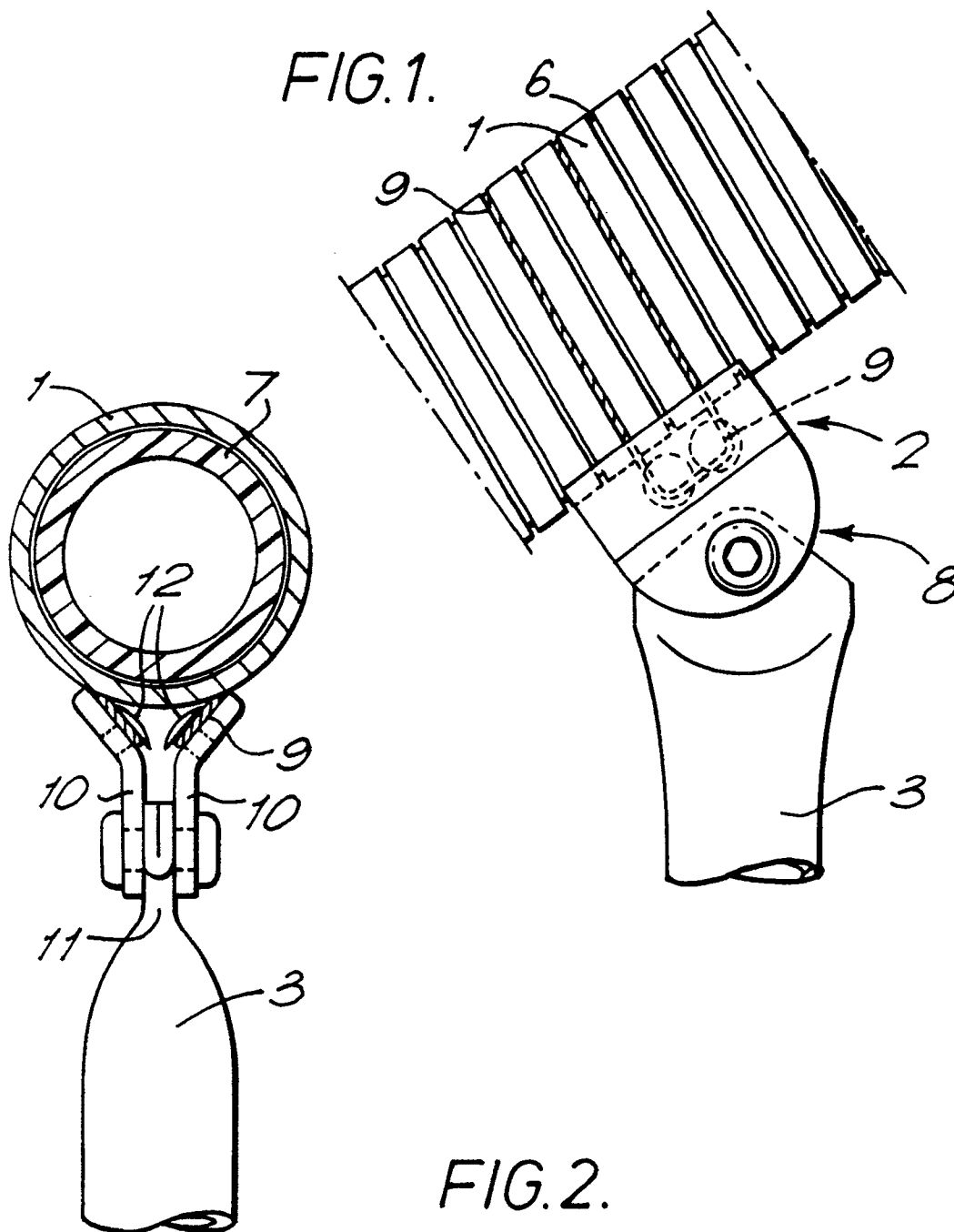
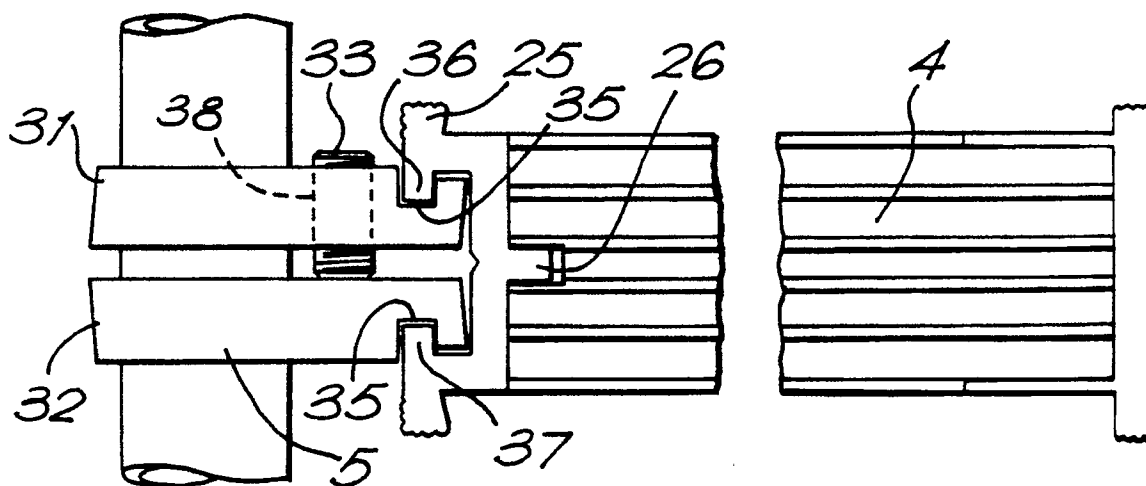


FIG.2.



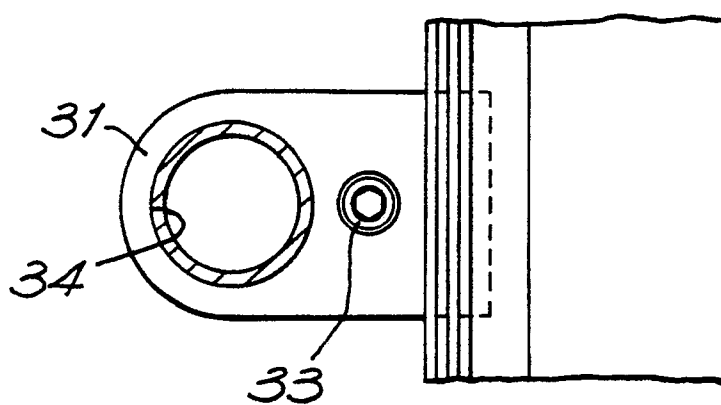


FIG. 3.

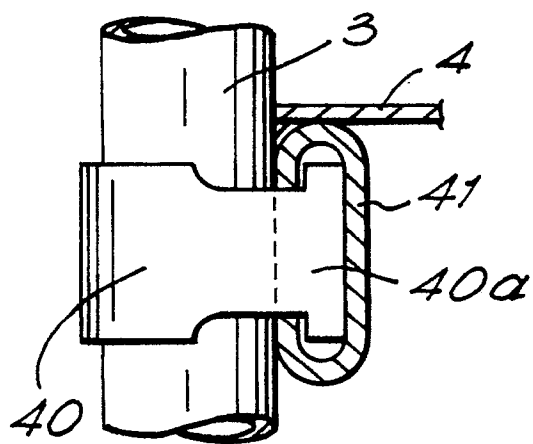


FIG. 4.

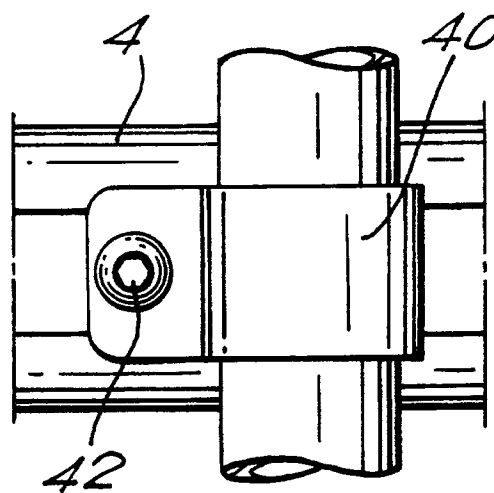


FIG. 5.

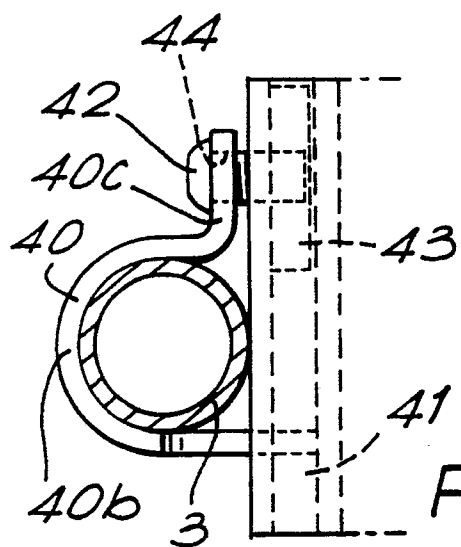


FIG. 6.