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(54) **CHILD ASSIST HANDRAIL**

KINDERHILFSGELÄNDER

RAMPE D'AIDE POUR ENFANT

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Description

[0001] The invention relates to a device comprising an auxiliary (assist) handrail, for example for children, to be mounted under an existing main handrail.

The auxiliary handrail being attachable under an existing main handrail, which device furthermore comprises bridge members for detachably fastening the auxiliary handrail to the main handrail;

wherein the bridge members each comprise a spacer member, an upper coupling member and a lower coupling member; wherein the spacer member is arranged for spacing apart the auxiliary handrail from the main handrail, the upper coupling members for coupling the spacer member with the main handrail and the lower coupling member for coupling the spacer member with the auxiliary handrail; and wherein the upper coupling member comprises a tension strap, which is connected with the upper coupling member by two connection points, and which is arranged for clamping the upper coupling member against the main handrail,

wherein furthermore a displacement/force-transformation-based strap-tensioning device is provided, arranged for tightening the tension strap such, that the upper coupling member is forcibly clamped against the main handrail,

[0002] Such a device is known inter alia from the U.S. patents US7032355, US5337528 and US6209854.

[0003] US 7,032,355 discloses a child's handrail assembly to be mounted beneath a main handrail. Pull-lock straps connect the handrail to the spacer members.

The assembly of US 7,032,355 has the disadvantage that in use the free ends of the straps remain positioned near the handrails, which is visually/aesthetically unappealing; and moreover, these loose end straps will hinder (or even possibly hurt) the hands of the adult as well as the child, when using the handrails.

Furthermore, the pull-lock-teeth strap-tensioning device in US 7,032,355 cannot establish accurately the required correct high-tension force and the straps cannot be easily tightened (re-drawn, re-tensioned) when in use.

US 2010/192731 discloses a spindle and nut arrangement for rotating oil filters of motor vehicles, wherein both ends of the tension strap are connected to the spindle nut.

[0004] US5337528 shows a device for use as a child assist handrail, to be mounted under an existing main handrail, wherein the main handrail and the auxiliary handrail are maintained at a distance from each other by means of spacers (suspension elements). The handrails are pulled towards each other, against the spacers by means of a strap (band) with a buckle, which strap is applied all around each of the elements. The strap is tensioned by means of a wedge (cinching element), inserted between the spacer and the main rail. This configuration has the disadvantage that use is being made

of a relatively long tension strap (that is a strap entirely fitted outside the two rails and the intermediate spacer) so that the total elongation in this (very long) strap is large and the mounting of the auxiliary rail is not very reliable.

[0005] US6209854 shows a configuration in which an auxiliary handrail is attached to the main rail by means of a number of bridge members (connector brackets). Each bridge member comprises: an upper coupling member for coupling of the spacer member with the main handrail, a spacer member for maintaining the auxiliary rail at a predetermined distance with respect to the main handrail, and a lower coupling member for coupling of the spacer member with the auxiliary handrail.

[0006] The upper coupling member is securely attached to the main handrail by means of cable ties (see for a definition http://en.wikipedia.org/wiki/Cable_tie and <http://nl.wikipedia.org/wiki/Tie-wrap>). This construction has the disadvantage that in practice such cable ties (NL: kabelbinders) are unpleasant in use because they are, in cross-section, narrow and relatively high and have edges, which are relatively sharp. When a user of the main handrail glides with his/her hands over the handrail, the ties - which mandatory have to be provided always twofold (!) around the main handrail at each bridge member - form a very annoying interruption of the sliding motion. Furthermore, the use of cable ties is visually/aesthetically unappealing. A further disadvantage is that the cable ties are smooth on the side of the main handrail, so that rotation and shift can not be prevented. Additionally, damaging of the (coating of) the main handrail can not be prevented either, due to the unavoidable rotation and the shift, in combination with the sharp edges of the cable ties. Finally, the removal of the auxiliary handrail by cutting loose or cutting the cable ties is not without risk of damaging the (main) handrail.

[0007] Object of the present invention is therefore to provide a both aesthetically and technically improved configuration, which remedies the disadvantages of the two configurations discussed above herein.

[0008] This object is achieved by the invention as defined in the appended claims.

[0009] The use of a (flat) tension strap is known from US5337528. However, the present invention provides for eliminating the disadvantages of using and applying the tension strap in US5337528 (as a result of completely surrounding both handrails and the interposed spacer member with a rather long tension strap) by applying a tension strap according to the invention, which by means of two connection points is connected to the upper (located near the main handrail) coupling member, and which therefore is considerably shorter and therefore much more strain (stretch) resistant than the (entirely encircling) tension strap US5337528.

[0010] The tension strap, which is connected to the upper coupling member by means of two connection points, is manufactured from a material having a high tensile strength and a low stretch. For example, a tension strap material may be applied that is commonly used in

the transport sector for the securing of loads, for instance a polyester band-fabric. The English term for this type of straps is "tie down straps", "tie downs" or "lashing straps". However, a simpler single (non-woven) planar tension strap may also be used, for example manufactured by injection moulding.

[0011] Preferably, an anti-slip layer is provided between the tension strap and the main handrail. When a tension strap from polyester is applied, a band-fabric can be used in which, on the side of the main handrail, rubber or elastofibre is braided. When one (e.g. injection moulded) single tension strap is used, the anti-slip layer may be applied either separate from the tension strap or attached thereto, for example, by snap connections or by using 2K-injection moulding, whereby the anti-slip layer is integral with the tension strap.

[0012] By means of the displacement/force-transformation-based strap-tensioning device, a user/installer is able to tighten the tension strap (by exerting a higher and better dispensable force at constant mechanical work), causing the tension strap, by means of its connection points with the upper coupling member, to pull the upper coupling member with appropriate force against the main handrail, so that moreover the strap (and thus the connecting piece) will not displace along and/or rotate around the main handrail (in particular when it has a circular cross-section). Because the strap-tensioning device uses displacement/force-transformation - a general mechanical principle - the tension force can be set and established accurately, and be readjusted if required (re-drawing). As use is being made of a displacement/force-transformation-based strap-tensioning device - so that a relatively high clamping force can be generated - relatively broad straps may be used (with respect to "cable ties", etc.), which have a relatively large friction surface with respect to (the surface of) the main handrail. Thus as a result of the relatively high tension strength, the surface pressure is more than sufficient to provide for a good "grip" on the surface of the main handrail, without giving rise to damaging of the (coating of the) main handrail as a result of a (too) large surface load.

[0013] The strap-tensioning device according to the invention comprises a screw-tensioning member based on displacement/force-transformation by a screw/spindle arrangement. In this manner the clamping force (of the tension strap on the handrail) can be set accurately and may optionally be re-drawn. Using such a displacement/force-transformation-based strap-tensioning device ensures that the tension strap can be readily and effectively tightened at, and maintained on, the correct tension by any user (by occasional retensioning, which is usually required during heavy use). Such a displacement/force-transformation-based strap-tensioning device is known from e.g. US6209854, which uses cable ties, which - in addition to the previously mentioned disadvantages - can not be tightened at, and maintained on, the correct clamping tension. Such cable ties are designed to keep bundles of cables together and are in

practice not very suitable for the present purpose, which is related to the safety of children, requiring a good and lasting reliable connection between the main and children's handrail.

[0014] The bridge member not only provides a connection between the main and auxiliary handrail, preferably it is also arranged for spacing apart the auxiliary handrail from a rearward wall (stairway wall) or support body. In itself, this feature is known from the above-mentioned patent US6209854.

[0015] Preferably the lower coupling member is arranged for coupling with the auxiliary handrail from the bottom side, so that the user of the auxiliary handrail - the child - can slide comfortable his/her hands over the top side of the auxiliary handrail. This feature is known from patent document no. US5853166. Preferably the lower coupling member is arranged to substantially completely embrace (enclose) the auxiliary handrail.

[0016] The auxiliary handrail may comprises one or more auxiliary handrail segments, arranged for cooperating with one or more coupling pieces for joining together the auxiliary handrail segments, which jointly form a complete and continuous uninterrupted auxiliary handrail. The auxiliary handrail assembly may comprise straight and/or curved auxiliary handrail segments, which jointly form a continuous uninterrupted auxiliary handrail. The auxiliary handrail and the coupling pieces are preferably arranged such that each coupling piece can be inserted into a hollow of the respective outer end of the auxiliary handrail, and is substantially received therein. The cross-section of the auxiliary handrail is preferably substantially circular.

[0017] Hereinafter, the invention is further explained by means of a few embodiments, with reference to some drawings.

Figure 1 shows in perspective a preferred embodiment of a device according to the invention;

Figure 2 shows a bridge member including a tension strap of the device shown in Figure 1;

Figure 3 shows an embodiment of an auxiliary handrail consisting of segments.

[0018] The Figures 1 - 3 show in full or in more detail a device 1 being attachable under an existing main handrail 3. The device comprises an auxiliary handrail 2, for example for children. The auxiliary handrail comprises one or more auxiliary handrail segments and the device further comprises bridge members 4 for detachably fastening the auxiliary handrail 2 to the main handrail 3.

[0019] The bridge members 4 each comprise: a spacer member 5, an upper coupling member 6 and a lower coupling member 7. The spacer member 5 is arranged for spacing apart the auxiliary handrail 2 from the main handrail 3, the upper coupling member 6 for coupling the spacer member 5 with the main handrail 3, and the lower

coupling member 7 for coupling the spacer member 5 with the auxiliary handrail 2. For example, the members 5, 6 and 7 are manufactured in one-piece by injection moulding.

[0020] The upper coupling member 6 of each spacer member 5 comprises a tension strap 8, which is connected by two connection points 9 and 10 with the upper coupling member 6, and which is arranged for clamping the upper coupling member 6 against the main handrail 3.

[0021] Furthermore a displacement/force-transformation-based strap-tensioning device 11 is provided, arranged for tightening the tension strap 8 such that the upper coupling member 6 is forcibly clamped against the main handrail 3. By means of the displacement/force-transformation-based strap-tensioning device 11 a user/installer is able to pull the tension strap 8 readily causing the tension strap 8, by means of its connection points 9 and 10 with the upper coupling member 6, to forcibly clamp the upper coupling member 6 with a predetermined force against the main handrail 3.

[0022] Moreover in this manner, the tension strap 8 (and thereby the spacer member 5) will not slide along and/or rotate around the main handrail 3 (in particular if it has a circular cross-section). Because the strap-tensioning device 11 uses displacement/force-transformation - a general mechanical principle - the tension force is relatively large and can also be excellently set (because a relatively large displacement results in a relatively small increase or decrease of the force) and can be readjusted (re-drawn), if desired.

[0023] The width of the tension strap 8 is preferably between 10 and 30 mm, and the thickness is between 1 and 2 mm.

[0024] The strap-tensioning device 11, as shown in Figure 2, is constructed as a screw-tensioning member comprising a screw spindle 12 that protrudes from the bottom to the top and is provided with a hexagonal socket 12', for example, so that the spindle 12 can be rotated. Around the spindle 12 a spindle nut 13 is provided, which forms part of - or is connected to - one end of the tension strap 8. By means of a connecting shaft 9 the tension strap 8 is attached to the upper coupling member 6; the tension strap is passed over the upper coupling member and is pressed against it. The other end of the tension strap is attached to a connecting shaft 10. Both connecting shafts 9 and 10 protrude into or through the wall of the upper coupling member 6, whereby the tension strap 8 presses the upper coupling member 6 directly into the (adjacent) main handrail 3. As a result a stable and reliable connection is formed between the upper coupling member 6 and the main handrail, which increases the (child) safety considerably.

[0025] If necessary, an anti-slip layer may be provided (not explicitly shown) between the tension strap 8 and the main handrail 3.

[0026] The spacer member 5 is, apart from being a connection between the main handrail 3 and the auxiliary handrail 2, preferably further arranged, by means of a

rear support 14, for spacing apart the auxiliary handrail 2 from a rearward positioned wall or a support body (not shown). The rear support 14 may be provided with a protective cover 15. Also, the rear support 14 may be provided with a screw hole (not shown) through which the rear support 14 may be screwed onto the wall or the support body.

[0027] The lower coupling member 7 is arranged for approximating the auxiliary handrail 2 from the bottom side, so that the lower coupling members 7 will cause the least possible inconvenience. Pursuant to the safety demands, the lower coupling members are arranged for substantially entirely enclosing the auxiliary handrail 2, providing the child's hands with some extra "grip" at regular intervals.

[0028] Figure 3 shows an embodiment in which the auxiliary handrail 2 comprises two or more auxiliary handrail segments 2', arranged for cooperating with one or more coupling pieces 16 for joining together (interconnecting) the auxiliary handrail segments. This assembly jointly forms a complete and continuous uninterrupted auxiliary handrail 2, predominantly due to the ring-shaped ridges 17 on the outside of the coupling pieces 16. The entire auxiliary handrail 2 may comprise straight and/or curved auxiliary handrail segments 2', which jointly together form a continuous uninterrupted auxiliary handrail 2. As shown in Figure 4, the auxiliary handrail 2 and the coupling pieces 16 are preferably arranged such that each coupling piece 16 can be inserted into a (whether or not continuous) hollow 18 within the respective end of the auxiliary handrail 2, and is substantially received therein. The cross-section of the auxiliary handrail 2 is preferably substantially circular. The coupling piece 16 may optionally be part of the lower coupling member 7 of the bridge member 4.

Claims

1. Device (1) comprising an auxiliary handrail (2) being attachable under an existing main handrail (3), which device furthermore comprises bridge members (4) for detachably fastening the auxiliary handrail to the main handrail;
 - wherein the bridge members each comprise a spacer member (5), an upper coupling member (6) and a lower coupling member (7); wherein the spacer member is arranged for spacing apart the auxiliary handrail from the main handrail, the upper coupling members for coupling the spacer member with the main handrail and the lower coupling member for coupling the spacer member with the auxiliary handrail;
 - and wherein the upper coupling member comprises a tension strap (8), which is connected with the upper coupling member by two connection points (9, 10), and which is arranged for clamping the upper coupling member against the main handrail,

wherein furthermore a displacement/force-transformation-based strap-tensioning device (11) is provided, arranged for tightening the tension strap such, that the upper coupling member is forcibly clamped against the main handrail,

characterized, in that

the strap-tensioning device (11) is provided inside the spacer member (5);

the strap-tensioning device comprises a screw spindle (12) and a corresponding spindle nut (13) arranged around it; wherein the screw spindle (12) protrudes inside the spacer member (5) from the bottom to the top;

wherein the spindle nut (13) is connected to one end of the tension strap (8);

wherein the tension strap (8) is pulled and tensioned by rotating the screw spindle (12).

2. Device according to any one of the preceding claims, wherein an anti-slip layer is provided between the tension strap and the main handrail. 20
3. Device according to any one of the preceding claims, wherein a rear support (14) is provided for spacing apart the auxiliary handrail from a rearward wall or support body. 25
4. Device according to any one of the preceding claims, wherein the lower coupling member (7) is arranged for approximating the auxiliary handrail from the bottom side. 30
5. Device according to any one of the preceding claims, wherein the lower coupling member is arranged to substantially completely embrace the auxiliary handrail. 35
6. Device according to any one of the preceding claims, wherein the auxiliary handrail (2) comprises one or more auxiliary handrail segments (2'), arranged for cooperating with one or more coupling pieces (16) for joining together the auxiliary handrail segments, which jointly form a complete and continuous uninterrupted auxiliary handrail. 40
7. Device according to claim 6, wherein the auxiliary handrail assembly comprises straight and/or curved auxiliary handrail segments, which jointly form a continuous uninterrupted auxiliary handrail. 45
8. Device according to claim 6 - 7, wherein the auxiliary handrail and the coupling pieces are arranged such that each coupling piece can be inserted into a hollow (18) of the respective end of the auxiliary handrail, and is substantially received therein. 50
9. Device according to any one of the preceding claims, wherein the cross-section of the auxiliary handrail is 55

substantially circular.

Patentansprüche

1. Vorrichtung (1) umfassend einen Hilfshandlauf (2), der unter einem bestehenden Haupthandlauf (3) anbringbar ist, die Vorrichtung ferner umfassend Brückenelemente (4) zum lösbaren Befestigen des Hilfshandlaufs am Haupthandlauf; 5
wobei die Brückenelemente jeweils ein Abstandshalterelement (5), ein oberes Kupplungselement (6) und ein unteres Kupplungselement (7) umfassen; 10
wobei das Abstandshalterelement zum Beabstanden des Hilfshandlaufs vom Haupthandlauf angeordnet ist, die oberen Kupplungselemente zum Verbinden des Abstandshalterelements mit dem Haupthandlauf angeordnet sind, und das untere Kupplungselement zum Verbinden des Abstandshalterelements mit dem Hilfshandlauf angeordnet ist; 15
und wobei das obere Kupplungselement einen Spannriemen (8) umfasst, der durch zwei Verbindungspunkte (9, 10) mit dem oberen Kupplungselement verbunden ist, und der zum Festklemmen des oberen Kupplungselements am Haupthandlauf angeordnet ist, 20
wobei ferner eine Riemenabspannungsvorrichtung (11) basierend auf Verschiebung/Kraftumwandlung bereitgestellt ist, die zum Festziehen des Spannriemens angeordnet ist, sodass das obere Kupplungselement zwangsläufig gegen den Haupthandlauf festgeklemmt wird, **dadurch gekennzeichnet, dass** 25
die Riemenabspannungsvorrichtung (11) innerhalb des Abstandshalterelements (5) bereitgestellt ist; die Riemenabspannungsvorrichtung eine Schraubspindel (12) und eine entsprechende Spindelmutter (13), die rund um die Spindel angeordnet ist, umfasst; 30
wobei die Schraubspindel (12) innerhalb des Abstandshalterelements (5) von unten nach oben vorsteht; 35
wobei die Spindelmutter (13) mit einem Ende des Spannriemens (8) verbunden ist; 40
wobei der Spannriemen (8) durch Drehen der Schraubspindel (12) gezogen und gespannt wird. 45
2. Vorrichtung nach einem der vorstehenden Ansprüche, 50
wobei eine rutschhemmende Schicht zwischen dem Spannriemen und dem Haupthandlauf bereitgestellt ist.
3. Vorrichtung nach einem der vorstehenden Ansprüche, 55
wobei eine hintere Abstützung (14) bereitgestellt ist, um den Hilfshandlauf von einer hinteren Wand oder einem Stützkörper zu beabstanden.

4. Vorrichtung nach einem der vorstehenden Ansprüche, wobei das untere Kupplungselement (7) dafür angeordnet ist, den Hilfshandlauf von der Unterseite her anzunähern. 5
 5. Vorrichtung nach einem der vorstehenden Ansprüche, wobei das untere Kupplungselement (7) dafür angeordnet ist, den Hilfshandlauf im Wesentlichen vollständig zu umklammern. 10
 6. Vorrichtung nach einem der vorstehenden Ansprüche, wobei der Hilfshandlauf (2) ein oder mehrere Hilfs- handlaufsegmente (2') umfasst, die dafür angeordnet sind, mit einem oder mehreren Kupplungsteilen (16) zusammenzuwirken, um die Hilfshandlaufseg- mente, die zusammen einen vollständigen und kon- tinuierlich ununterbrochenen Hilfshandlauf bilden, miteinander zu verbinden. 15 20
 7. Vorrichtung nach Anspruch 6, wobei die Hilfshand- laufbaugruppe gerade und/oder gekrümmte Hilfs- handlaufsegmente umfasst, die zusammen einen 25 kontinuierlich ununterbrochenen Hilfshandlauf bil- den.
 8. Vorrichtung nach Anspruch 6 - 7, wobei der Hilfs- handlauf und die verbundenen Teile derart angeord- net sind, dass jedes Kupplungsteil in eine Vertiefung (18) des jeweiligen Endes des Hilfshandlaufs einge- setzt werden kann und im Wesentlichen darin auf- genommen wird. 30 35
 9. Vorrichtung nach einem der vorstehenden Ansprü- che, wobei der Querschnitt des Hilfshandlaufs im We- sentlichen kreisförmig ist. 40
- cement avec la rampe auxiliaire ;
et dans lequel l'élément d'accouplement supérieur comprend une sangle de tension (8) qui est reliée à l'élément d'accouplement supérieur par deux points de raccordement (9, 10) et qui est agencée pour serrer l'élément d'accouplement supérieur contre la rampe principale,
dans lequel un dispositif de tension de sangle (11) basé sur le mouvement / la transformation par force étant en outre prévu et agencé pour serrer la sangle de tension, de manière que l'élément d'accouple- ment supérieur soit serré de manière forcée contre la rampe principale,
caractérisé en ce que le dispositif de tension de sangle (11) est prévu dans l'élément de dispositif d'espacement (5) ;
le dispositif de tension de sangle comprend une bro- che de vis (12) et un écrou de broche correspondant (13) disposé autour de celle-ci;
dans lequel la broche de vis (12) fait saillie à l'inté- rieur de l'élément de dispositif d'espacement (5) de bas en haut ;
dans lequel l'écrou de broche (13) est relié à une extrémité de la sangle de tension (8) ;
dans lequel la sangle de tension (8) est tirée et mise en tension par rotation de la broche de vis (12).
2. Dispositif selon l'une quelconque des revendications précédentes, dans lequel une couche antidérapante est prévue entre la sangle de tension et la rampe principale.
 3. Dispositif selon l'une quelconque des revendications précédentes, dans lequel un support arrière (14) est prévu pour écarter la rampe auxiliaire d'une paroi arrière ou d'un corps de support.
 4. Dispositif selon l'une quelconque des revendications précédentes, dans lequel l'élément d'accouplement inférieur (7) est agencé pour se rapprocher de la rampe auxiliaire par le côté inférieur.
 5. Dispositif selon l'une quelconque des revendications précédentes, dans lequel l'élément d'accouplement inférieur est agencé de manière à entourer sensiblement complètement la rampe auxiliaire.
 6. Dispositif selon l'une quelconque des revendications précédentes, dans lequel la rampe auxiliaire (2) comprend un ou plusieurs segments de rampe auxi- liaires (2'), agencés pour coopérer avec une ou plu- sieurs pièces d'accouplement (16) pour relier en- semble les segments de rampe auxiliaires, qui for- ment ensemble une rampe auxiliaire complète et ininterrompue en continu.
 7. Dispositif selon la revendication 6, dans lequel l'as- semblage de rampe auxiliaire comprend des seg-

Revendications

1. Dispositif (1) comprenant une rampe auxiliaire (2) pouvant être fixée sous une rampe principale exis- tante (3), ledit dispositif comprend en outre des élé- ments de liaison (4) pour fixer de manière amovible la rampe auxiliaire à la rampe principale ;
dans lequel les éléments de liaison comprennent chacun un élément de dispositif d'espacement (5), un élément d'accouplement supérieur (6) et un élé- ment d'accouplement inférieur (7) ; dans lequel l'élé- ment de dispositif d'espacement est agencé pour espacer la rampe auxiliaire de la rampe principale, les éléments d'accouplement supérieurs pour ac- coupler l'élément de dispositif d'espacement avec la rampe principale et l'élément d'accouplement infé- rieur pour accoupler l'élément de dispositif d'espa- 45 50 55

ments de rampes auxiliaires droits et/ou courbes, qui forment ensemble une rampe auxiliaire ininterrompue en continu.

8. Dispositif selon les revendications 6 à 7, dans lequel la rampe auxiliaire et les pièces d'accouplement sont disposées de telle sorte que chaque pièce d'accouplement peut être insérée dans une cavité (18) de l'extrémité respective de la rampe auxiliaire et y est sensiblement reçue. 5 10
9. Dispositif selon l'une quelconque des revendications précédentes, dans lequel la section transversale de la rampe auxiliaire est sensiblement circulaire. 15

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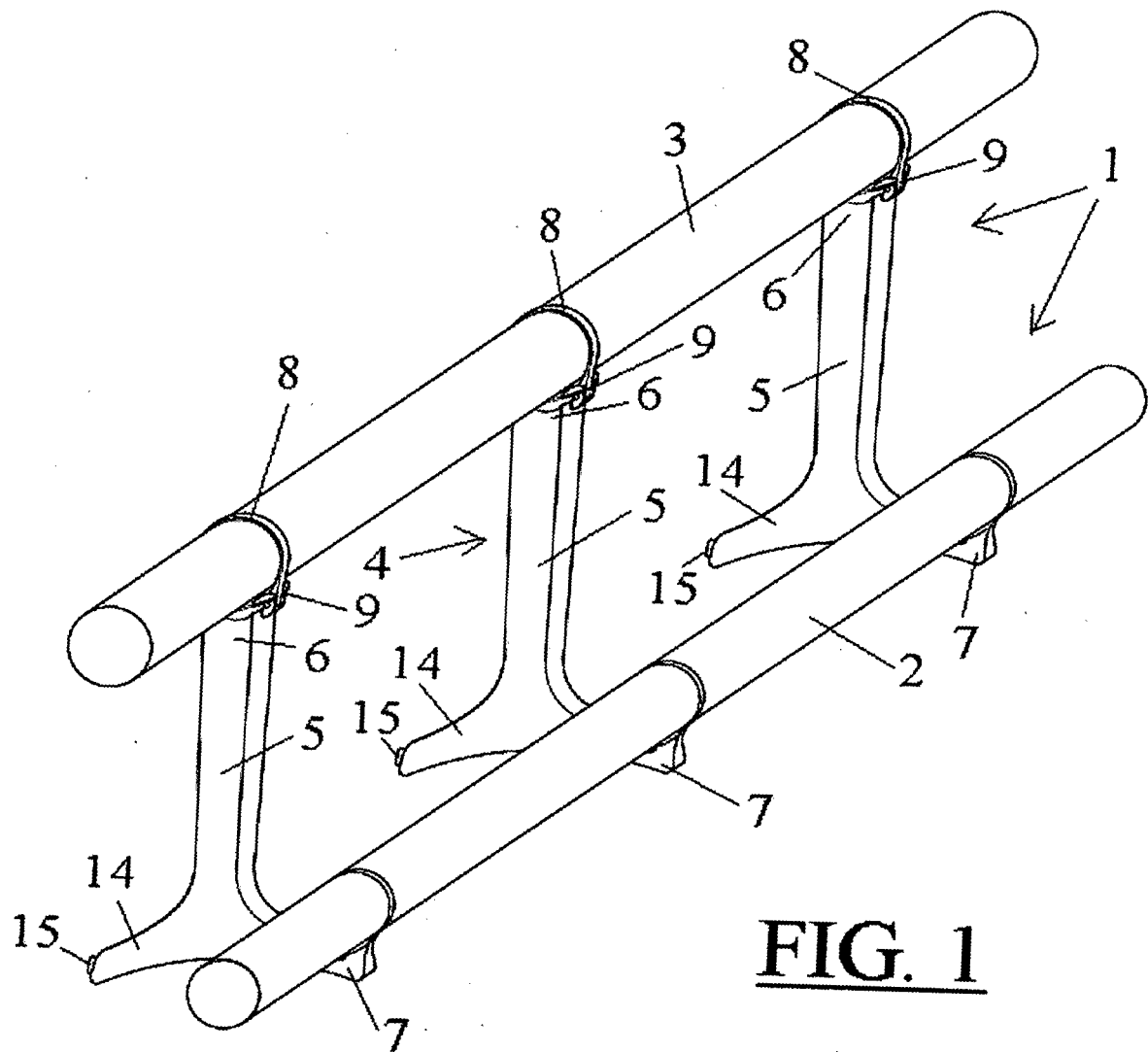
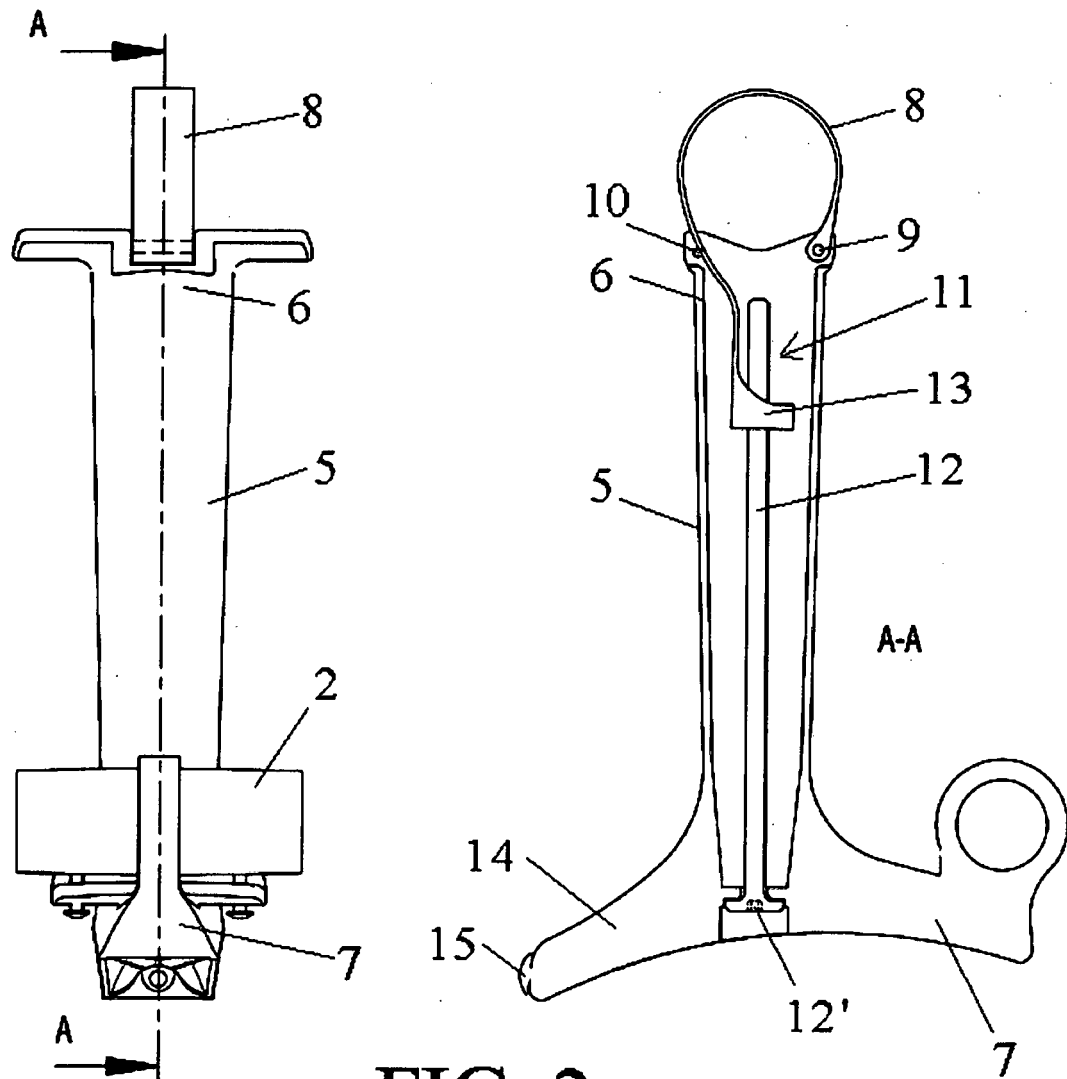


FIG. 1



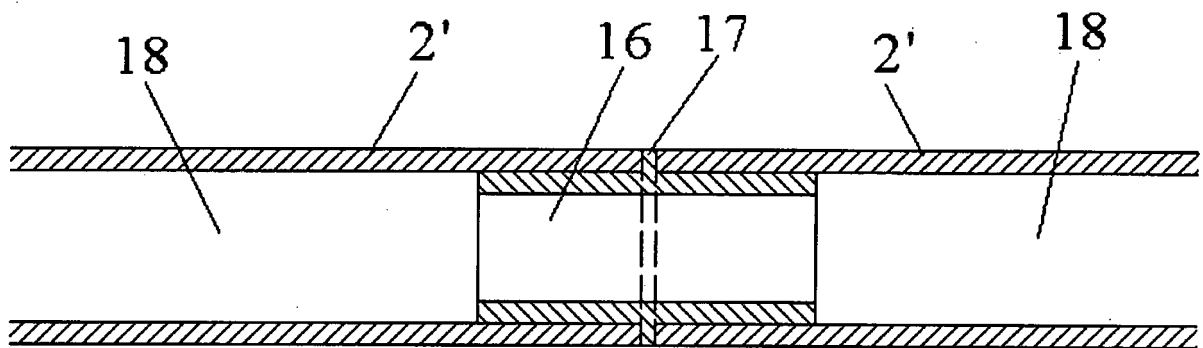


FIG. 3

REFERENCES CITED IN THE DESCRIPTION

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