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(54) **A SINGLE BEAM GANGWAY FOR A BOAT**

LANDGANG FÜR EIN SCHIFF MIT EINEM EINZIGEN TRÄGER

PASSERELLE À POUTRE UNIQUE POUR BATEAU

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EP 2 280 861 B1

Description

[0001] The present invention relates to a gangway for a boat, comprising at least a first gangway element and a second gangway element, in which each of said gangway elements comprises a supporting element, formed by a box-type section, and a panel placed above it to form a passage surface for the transit of persons, said supporting element and panel being assembled in such a way that the supporting element is positioned in the central plane of said panel, and in which the supporting element of the second gangway element can slide inside the supporting element of the first gangway element, so as to form a telescopically elongatable configuration.

[0002] A gangway of this type is known from patent application EP 1 719 695 A1 in the name of the present applicant, relating to a single-beam gangway which can be transported and positioned manually.

[0003] The gangway according to the invention is **characterized in that** each supporting element has a polygonal cross section with at least six sides, comprising:

- a rectilinear upper side which faces the corresponding panel,
- a pair of rectilinear lateral sides of equal length, which extend from corresponding ends of the assembly side to corresponding lateral vertices of the polygonal cross section, each forming an obtuse angle with the upper side, and
- a pair of further vertices of the polygonal cross section, positioned on opposite parts with respect to the central plane in such a way that they can be linked by a rectilinear segment parallel to the upper side and spaced apart from the upper side by a specified distance, and in such a way that each further vertex can be linked to the lateral vertex on the same part with respect to the central plane by means of a rectilinear segment which is parallel to the lateral side on the other part with respect to the central plane, and which is spaced apart from this lateral side by a distance equal to said specified distance.

[0004] Specific embodiments of the invention are defined in the dependent claims.

[0005] A preferred, but non-limiting, embodiment of the invention will now be described, with reference to the attached drawings, in which:

- Figure 1 is a perspective view of a gangway for a boat according to the invention;
- Figure 2 is a sectional view of the gangway of Fig. 1, taken along the central plane of this gangway;
- Figure 3 is a cross-sectional view of the gangway of Fig. 1, taken along the line III-III of Fig. 2;
- Figure 4 shows the cross section of the supporting elements of the gangway of Fig. 1;
- Figure 5 is an enlarged view of a detail of Figure 3;

and

- Figure 6 shows a further example of a cross section for the supporting elements of the gangway.

[0006] With reference to the drawings, these show a gangway 1 according to the invention, to be mounted on a boat S. The gangway 1 comprises a pair of elongate gangway elements, namely a proximal and a distal element 2 and 3, which form a surface P for the transit of persons to and from the boat S (part of which is shown in Fig. 2). In the present description, the terms "proximal" and "distal" are used with reference to the point of mounting of the gangway 1 on the boat S.

[0007] Each gangway element 2, 3 comprises a respective supporting element 4, 5, on which is mounted a panel 6, 7 (the panels 6, 7 are shown in broken lines in Figures 1 to 3) to form the passage surface P. The supporting elements 4 and 5 are positioned in the vertical central plane M of the respective panels 6 and 7. The supporting elements 4 and 5 are formed from sections made of lightweight material, for example a metallic material such as aluminium or titanium, or from a composite material such as carbon fibre. These sections have a box-shaped cross section, as is described more fully below. The supporting elements 4 and 5 are positioned so as to form a telescopically advanceable structure which can be elongated in order to achieve a specified maximum length of extension. As a general rule, the gangway 1 can comprise more than two gangway elements positioned so as to form a telescopic structure.

[0008] In particular, the distal supporting element 5 can slide inside the proximal supporting element 4. For this purpose, the distal supporting element 5 has a smaller cross section than that of the aperture formed by the section of the proximal supporting element 4. In order to maintain the alignment of the two box-shaped elements 4 and 5, pads 9 of wear-resistant material having a low coefficient of friction (visible in Figure 5) are mounted on the outer side of the walls of the distal element 5 and/or on the inner side of the walls of the proximal element 4.

[0009] The panels 6 and 7 are also made from lightweight material, for example composite material, wood, aluminium, or the like, and can have a frame (not shown). At the distal ends 4a and 5a of the supporting elements 4 and 5, there are mounted end elements 12 and 13, which rigidly connect the respective supporting elements 4 and 5 to the panels 6 and 7 placed above them. At the proximal end 4b of the proximal supporting element 4 there is mounted a connecting element 14, made from aluminium for example, which rigidly connects the supporting element 4 to the panel 6 placed above it. The connecting element 14 and the proximal end element 12 form spacing pieces between the proximal supporting element 4 and the panel 6 placed above. Guide elements 15 (visible more especially in Figure 3) are positioned on the lateral walls of the proximal end element and are engaged by the lateral ends of the distal panel 7. Consequently, the distal end element 13 provides a spacer be-

tween the distal supporting element 5 and the panel 7 placed above it, while the guide elements 15 provide a support surface for this panel 7 on the proximal supporting element 4. Thus, during the extraction of the distal element 5 from the proximal element 4, the panel 7 can slide between the upper wall of the section of the proximal supporting element 4 and the panel 6, by sliding in the guide elements 15.

[0010] At the proximal end 4b of the proximal supporting element 4 there is mounted a fork-shaped element 22 on the arms of which a pin 23 is mounted. The connecting element 14, and consequently the proximal supporting element 4 fixed thereto, is mounted rotatably on the pin 23. The fork-shaped element 22 can be fixed to a part of the boat S, as shown in Figure 2.

[0011] Linear actuators are provided in a conventional way to move the gangway 1. In particular, a cylinder 31, of the hydraulic or hydropneumatic type for example, is provided for rotation in the vertical plane, the bottom-side end 32 of this cylinder being pivoted on the proximal supporting element 4, while the free end 34 of its rod 33 can be mounted in an articulated way on a part of the boat S, as shown in Figure 2. A cylinder 41, of the hydraulic or hydropneumatic type for example, is provided for the extraction and retraction of the distal supporting element 5 with respect to the proximal supporting element 4, this cylinder being positioned inside the box-shaped section of the proximal supporting element 4, coaxially with it and with the box-shaped section of the distal supporting element 5. The bottom-side end 42 of the cylinder 41 is fixed to the proximal end 4b of the proximal supporting element 4, while the free end 44 of the rod 43 of this cylinder 41 is fixed to the distal end 5a of the distal supporting element 5.

[0012] According to the invention, and as shown in Figures 3 to 6, each supporting element 4, 5 has a polygonal cross section with at least six sides. In the preferred example of Figures 3 to 5, this polygonal cross section has exactly six sides. This cross section of the supporting elements 4 and 5 is formed by:

- a rectilinear upper side 51 which faces the corresponding panel 6, 7,
- a pair of rectilinear upper lateral sides 52, 53 of equal length, which extend from respective ends 54, 55 of the upper side 51 to respective lateral vertices 56, 57 of the polygonal cross section, each forming an angle of 120° with the upper side 51, in which the length of the upper lateral sides 52, 53 is less than the length of the upper side 51,
- a pair of lower rectilinear lateral sides 58, 59 of equal length, which extend from the lateral vertices 56, 57 respectively to further vertices 60, 61 respectively, each forming an angle of 120° with the adjacent upper lateral side 52, 53 respectively, in which the length of the lower lateral sides 58, 59 is equal to the length of the upper side 51, and
- a rectilinear lower side 62, which links the further

vertices 60, 61 to each other and which is parallel to the upper side 51.

[0013] The lower side 62 is spaced apart from the upper side 51 by a specified distance d1. Each lower lateral side 58, 59 is also parallel to the upper lateral side 52, 53 on the other part with respect to the central plane M, and is spaced apart from this upper lateral side 52, 53 by a distance of d2, d3 respectively, which is equal to the distance d1 between the lower side 62 and the upper side 51.

[0014] The inventors have discovered, by means of finite element (FEM) calculations, that this cross section is optimal in terms of the mechanical strength of the gangway according to the invention. A gangway having supporting elements with this cross section can also be used for lifting heavy loads such as tenders, despite its low weight.

[0015] However, the invention is not limited to this type of cross section, and comprises, in a more general way, polygonal cross sections with at least six sides, such as that shown in Figure 6, to which reference will now be made. Sides, vertices and distances corresponding to those of the cross section of Figure 4 are indicated by the same reference numerals. According to the invention, the polygonal cross section in general must comprise:

- a rectilinear upper side 51 which faces the corresponding panel 6, 7,
- a pair of rectilinear lateral sides 52, 53 of equal length, which extend from respective ends 54, 55 of the upper side 51 to respective lateral vertices 56, 57 of the polygonal cross section, each forming an obtuse angle with the upper side 51, and
- a pair of further vertices 60, 61 of the polygonal cross section, positioned on opposite parts with respect to the central plane M in such a way that they can be linked by a rectilinear segment (or chord) S1 parallel to the upper side 51 and spaced apart from the upper side by a specified distance, and in such a way that each further vertex 60, 61 can be linked to the lateral vertex 56, 57 on the same part with respect to the central plane M by means of a rectilinear segment (or chord) S2, S3 which is parallel to the lateral side 53, 52 on the other part with respect to the central plane M, and which is spaced apart from this lateral side 53, 52 by a distance d2, d3 equal to said specified distance d1. The further sides which are added to the upper side 51 and to the lateral sides 52, 53 can be rectilinear or curved. Preferably, the obtuse angle formed by each of the lateral sides 52, 53 with the upper side 51 is equal to 120°.

[0016] Clearly, in the specific example of Figure 4, the rectilinear segments S2 and S3 coincide with the lower lateral sides 58 and 59 respectively, while the rectilinear segment S1 coincides with the lower side 62.

Claims

1. A gangway (1) for a boat (S), comprising at least a first gangway element (2) and a second gangway element (3), in which each of said gangway elements comprises a supporting element (4, 5), formed by a box-type section, and a panel (6, 7) placed above it to form a passage surface (P) for the transit of persons, said supporting element and panel being assembled in such a way that the supporting element is positioned in the central plane (M) of said panel, and in which the supporting element (7) of the second gangway element (3) can slide inside the supporting element (6) of the first gangway element (4), so as to form a telescopically elongatable configuration, **characterized in that** each supporting element has a polygonal cross section with at least six sides, comprising:

- a rectilinear upper side (51) which faces the corresponding panel (6, 7),
- a pair of rectilinear lateral sides (52, 53) of equal length, which extend from respective ends (54, 55) of the upper side (51) to respective lateral vertices (56, 57) of the polygonal cross section, each forming an obtuse angle with the upper side (51), and
- a pair of further vertices (60, 61) of the polygonal cross section, positioned on opposite parts with respect to the central plane (M) in such a way that they can be linked by a rectilinear segment (S1; 62) parallel to the upper side (51) and spaced apart from the upper side by a specified distance (d1), and in such a way that each further vertex (60, 61) can be linked to the lateral vertex (56, 57) on the same part with respect to the central plane (M) by means of a rectilinear segment (S2, S3; 58, 59) which is parallel to the lateral side (53, 52) on the other part with respect to the central plane (M), and which is spaced apart from this lateral side (53, 52) by a distance (d2, d3) equal to said specified distance.

2. A gangway according to Claim 1, in which said obtuse angle is equal to 120°.
3. A gangway according to Claim 2, in which the polygonal cross section of the supporting elements (4, 5) has six sides, and in which said rectilinear lateral sides form a pair of upper lateral sides (52, 53) having a length less than the length of the upper side (51), said polygonal cross section additionally comprising:

- a pair of lower lateral sides (58, 59) having equal lengths, in which each of said lower lateral sides extends from one of the lateral vertices (56, 57) to the further vertex (60, 61) on the same part with respect to the central plane (M), form-

ing an angle of 120° with the respective adjacent upper lateral side (52, 53), and in which the length of the lower lateral sides (58, 59) is equal to the length of the upper side (51), and

- a rectilinear lower side (62), which links the further vertices (60, 61) to each other and which is parallel to the upper side (51).

4. A gangway according to any one of the preceding claims, in which the supporting element (4) and the panel (6) of the first gangway element (2) are assembled with a space between them, and the supporting element (5) and the panel (7) of the second gangway element (3) are also assembled with a space between them, in such a way that the panel (7) of the second gangway element (3) can slide between the supporting element (4) and the panel (6) of the first gangway element (2).

5. A gangway according to any one of the preceding claims, comprising a linear actuator (41) for the extraction and/or retraction of the supporting element (5) of the second gangway element (3) with respect to the supporting element (4) of the first gangway element (2), this actuator being positioned inside the supporting element (4) of the first gangway element (2), coaxially with it and with the supporting element (5) of the second gangway element (3).

Patentansprüche

1. Landgang (1) für ein Boot (S), umfassend wenigstens ein erstes Landgangelement (2) und ein zweites Landgangelement (3), wobei jedes der Landgangelemente ein Trägerelement (4, 5), welches durch einen kastenartigen Abschnitt gebildet ist, und ein Panel (6, 7) umfasst, welches darüber angeordnet ist, um eine Durchgangsfläche (P) für den Durchgang von Personen zu bilden, wobei das Trägerelement und das Panel derart zusammengebaut sind, dass das Trägerelement in der Zentralebene (M) des Panels angeordnet ist, und wobei das Trägerelement (7) des zweiten Landgangelements (3) innerhalb des Trägerelements (6) des ersten Landgangelements (4) gleiten kann, um eine teleskopisch verlängerbare Konfiguration zu bilden, **dadurch gekennzeichnet,** **dass** jedes Trägerelement einen polygonalen Querschnitt mit wenigstens sechs Seiten aufweist, umfassend:

- eine geradlinige obere Seite (51), welche dem zugehörigen Panel (6, 7) gegenüberliegt,
- ein Paar von geradlinigen lateralen Seiten (52, 53), von gleicher Länge, welche sich von jeweiligen Enden (54, 55) der oberen Seite (51) zu

- jeweiligen lateralen Ekken (56, 57) des polygonalen Querschnitts erstrecken, wobei jede einen stumpfen Winkel mit der oberen Seite (51) bildet, und
- ein Paar von weiteren Ecken (60, 61) des polygonalen Querschnitts, welche auf entgegengesetzten Teilen bezüglich der Zentralebene (M) derart angeordnet sind, dass sie durch ein geradliniges Segment (S1; 62), welches zu der oberen Seite (51) parallel ist und von der oberen Seite durch einen festgelegten Abstand (d1) beabstandet ist, verbunden werden können, und derart dass, jede weitere Ecke (60, 61) mit der lateralen Ecke (56, 57) auf dem gleichen Teil bezüglich der Zentralebene (M) mittels eines geradlinigen Segments (S2, S3; 58, 59) verbunden werden kann, welches zu der lateralen Seite (53, 52) auf dem anderen Teil bezüglich der Zentralebene (M) parallel ist, und welches von dieser lateralen Seite (53, 52) durch einen mit dem festgelegten Abstand gleichen Abstand (d2, d3) beabstandet ist.
2. Landgang nach Anspruch 1, wobei der stumpfe Winkel 120° beträgt.
 3. Landgang nach Anspruch 2, wobei der polygonale Querschnitt der Trägerelemente (4, 5) sechs Seiten aufweist, und wobei die geradlinigen lateralen Seiten ein Paar von oberen lateralen Seiten (52, 53) bilden, welche eine Länge aufweisen, die kleiner als die Länge der oberen Seite (51) ist, wobei der polygonale Querschnitt zusätzlich umfasst:
 - ein Paar von unteren lateralen Seiten (58, 59) mit gleichen Längen, wobei jede der unteren lateralen Seiten sich von einer der lateralen Ecken (56, 57) zu der weiteren Ecke (60, 61) auf dem gleichen Teil bezüglich der Mittelebene (M) erstreckt, um einen Winkel von 120° mit der jeweiligen benachbarten oberen lateralen Seite (52, 53) zu bilden, und wobei die Länge der unteren lateralen Seiten (58, 59) der Länge der oberen Seite (51) gleich ist, und
 - eine geradlinige untere Seite (62), welche die weiteren Ecken (60, 61) miteinander verbindet und welche zu der oberen Seite (51) parallel ist.
 4. Landgang nach einem der vorhergehenden Ansprüche, wobei das Trägerelement (4) und das Panel (6) des ersten Landgangelements (2) mit einem Abstand dazwischen zusammengebaut sind, und das Trägerelement (5) und das Panel (7) des zweiten Landgangelements (3) ebenfalls mit einem Abstand dazwischen zusammengebaut sind, derart, dass das

Panel (7) des zweiten Landgangelements (3) zwischen dem Trägerelement (4) und dem Panel (6) des ersten Landgangelements (2) gleiten kann.

5. Landgang nach einem der vorhergehenden Ansprüche, umfassend einen linearen Aktuator (41) für das Ausziehen oder/und Einziehen des Trägerelements (5) des zweiten Landgangelements (3) bezüglich des Trägerelements (4) des ersten Landgangelements (2), wobei dieser Aktuator innerhalb des Trägerelements (4) des ersten Landgangelements (2) mit diesem und mit dem Trägerelement (5) des zweiten Landgangelements (3) koaxial angeordnet ist.

Revendications

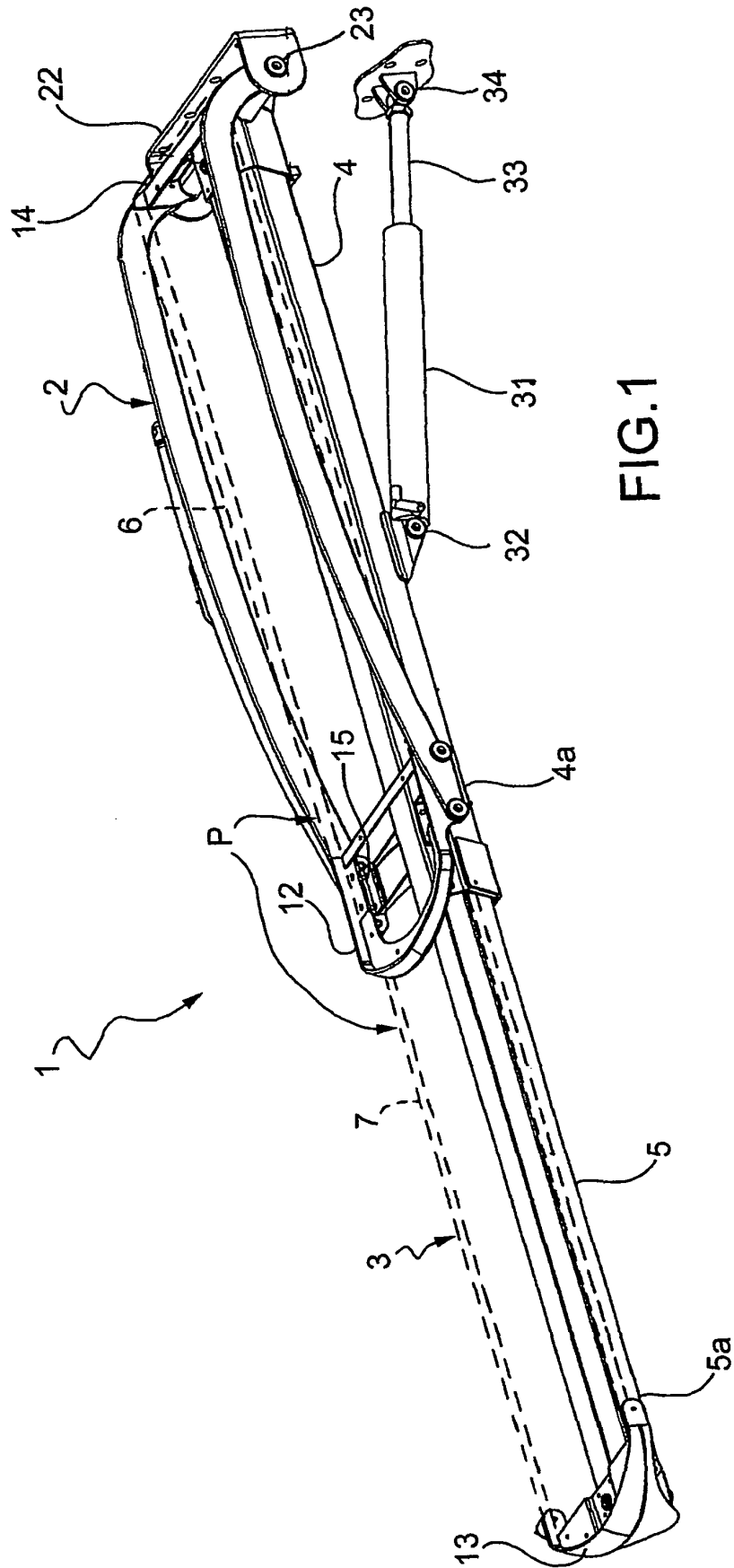
1. Passerelle (1) pour bateau (S), comprenant au moins un premier élément de passerelle (2) et un second élément de passerelle (3), dans lequel chacune desdits éléments de passerelle comprend un élément de support (4, 5), formé par une section de type boîte, et un panneau (6, 7) placé au-dessus de lui pour former une surface de passage (P) pour le passage de personnes, ledit élément de support et le panneau étant assemblés de sorte que l'élément de support soit positionné dans le plan central (M) dudit panneau, et dans laquelle l'élément de support (7) du second élément de passerelle (3) peut coulisser à l'intérieur de l'élément de support (6) du premier élément de passerelle (4), de manière à former une configuration pouvant s'allonger de manière télescopique, **caractérisée en ce que** chaque élément de support a une coupe transversale polygonale avec au moins six côtés, comprenant :

- un côté supérieur rectiligne (51) qui est tourné vers le panneau correspondant (6, 7),
- une paire de côtés latéraux rectilignes (52, 53) de longueur égale, qui s'étendent d'extrémités respectives (54, 55) du côté supérieur (51) aux sommets latéraux respectifs (56, 57) de la coupe transversale polygonale, chacun formant un angle obtus avec le côté supérieur (51) et
- une paire d'autres sommets (60, 61) de la coupe transversale polygonale, positionnée sur des parties opposées par rapport au plan central (M) de sorte qu'ils puissent être liés par un segment rectiligne (S1; 62) parallèle au côté supérieur (51) et espacé du côté supérieur d'une distance spécifiée (d1), et de sorte que chaque autre sommet (60, 61) puisse être lié au sommet latéral (56, 57) sur la même partie par rapport au plan central (M) à l'aide d'un segment rectiligne (S2, S3 ; 58, 59) qui est parallèle au côté latéral (53, 52) sur l'autre partie par rapport au plan central (M), et qui est espacé de ce côté latéral

(53, 52) d'une distance (d2, d3) égale à ladite distance spécifiée.

2. Passerelle selon la revendication 1, dans laquelle ledit angle obtus est égal à 120 °. 5
3. Passerelle selon la revendication 2, dans laquelle la coupe transversale polygonale des éléments de support (4, 5) a six côtés et dans laquelle lesdits côtés latéraux rectilignes forment une paire de côtés latéraux supérieurs (52, 53) ayant une longueur inférieure à la longueur du côté supérieur (51), ladite coupe transversale polygonale comprenant de plus : 10
 - une paire de côtés latéraux inférieurs (58, 59) 15
 - ayant des longueurs égales, dans laquelle chacun desdits côtés latéraux inférieurs s'étend d'un des sommets latéraux (56, 57) à l'autre sommet (60, 61) sur la même partie par rapport au plan central (M), formant un angle de 120 ° 20
 - avec le côté latéral supérieur adjacent respectif (52, 53), et dans laquelle la longueur des côtés latéraux inférieurs (58, 59) est égale à la longueur du côté supérieur (51) et
 - un côté inférieur rectiligne (62), qui relie les 25
 - autres sommets (60, 61) l'un à l'autre et qui est parallèle au côté supérieur (51).
4. Passerelle selon l'une quelconque des revendications précédentes, dans laquelle l'élément de support (4) et le panneau (6) du premier élément de passerelle (2) sont assemblés avec un espace entre eux et l'élément de support (5) et le panneau (7) du second élément de passerelle (3) sont également assemblés avec un espace entre eux, de sorte que le panneau (7) du second élément de passerelle (3) puisse coulisser entre l'élément de support (4) et le panneau (6) du premier élément de passerelle (2). 30 35
5. Passerelle selon l'une quelconque des revendications précédentes, comprenant un dispositif d'actionnement linéaire (41) pour l'extraction et/ou le retrait de l'élément de support (5) du second élément de passerelle (3) par rapport à l'élément de support (4) du premier élément de passerelle (2), ce dispositif d'actionnement étant positionné à l'intérieur de l'élément de support (4) du premier élément de passerelle (2), de manière coaxiale à celui-ci et à l'élément de support (5) du second élément de passerelle (3). 40 45 50

55



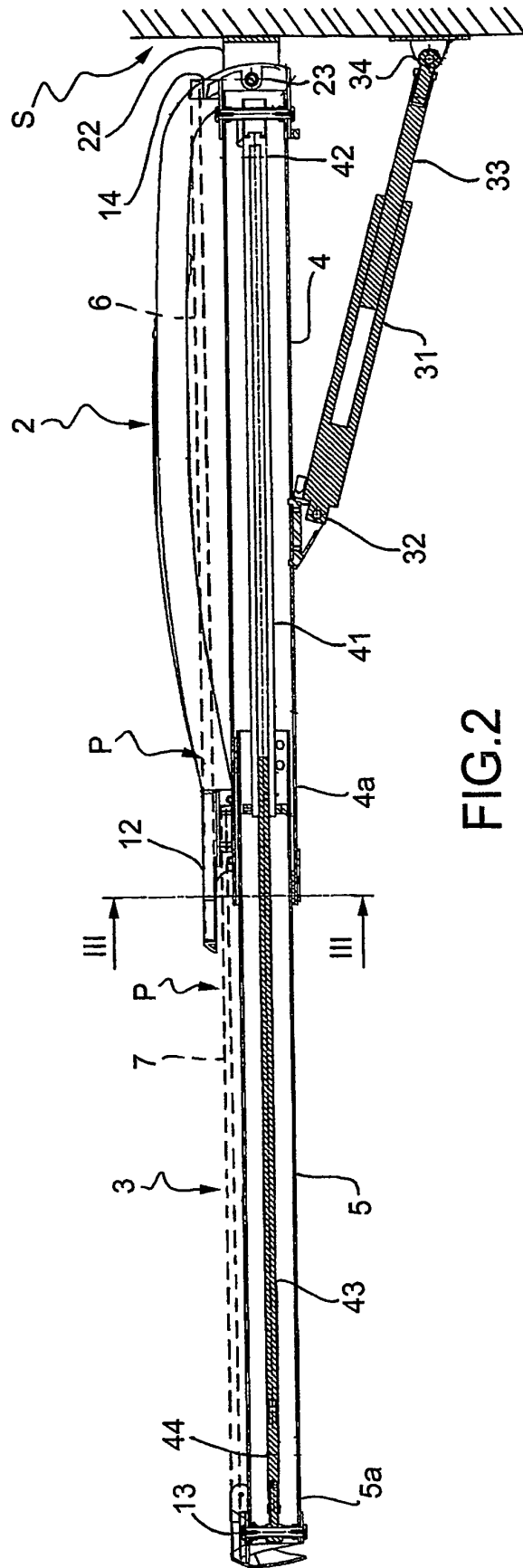


FIG.2

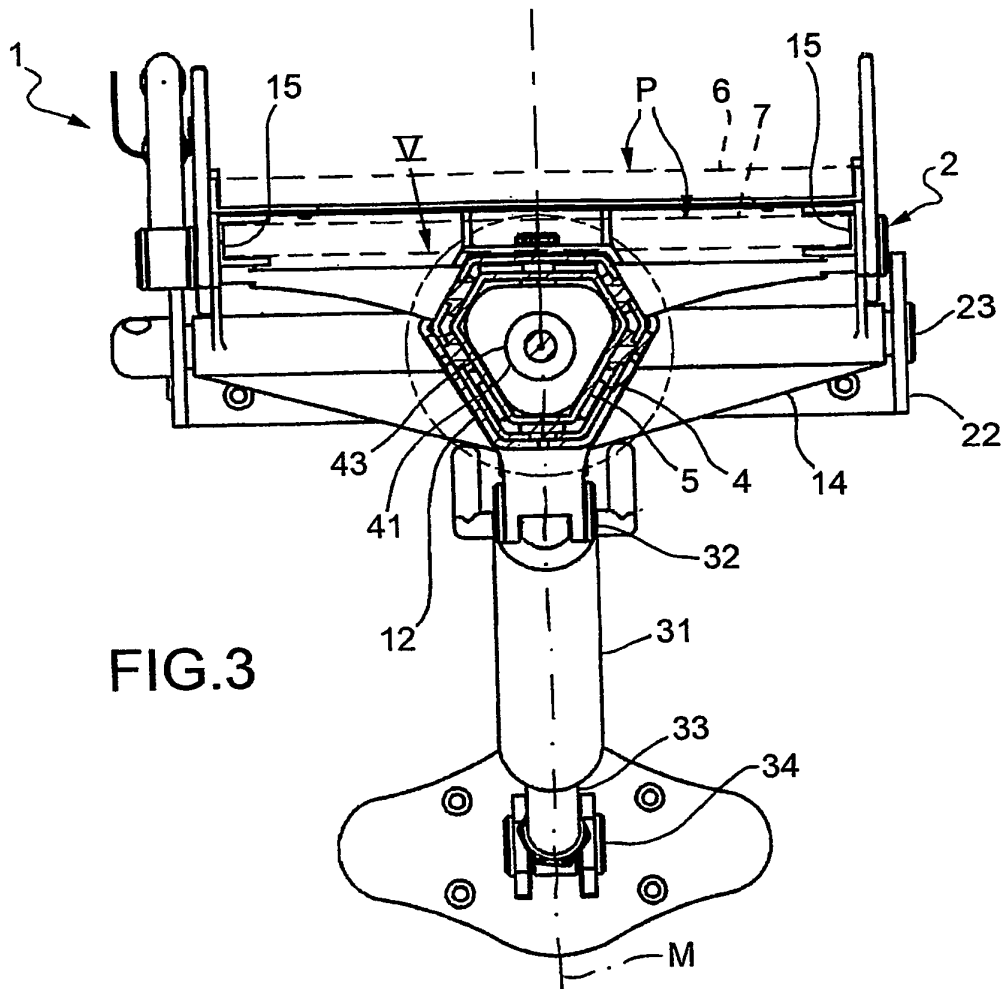


FIG.3

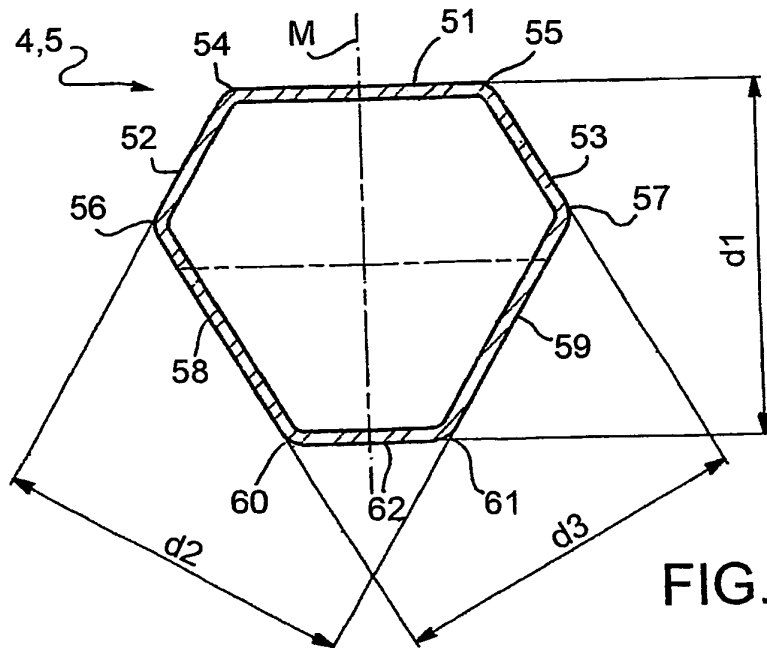


FIG.4

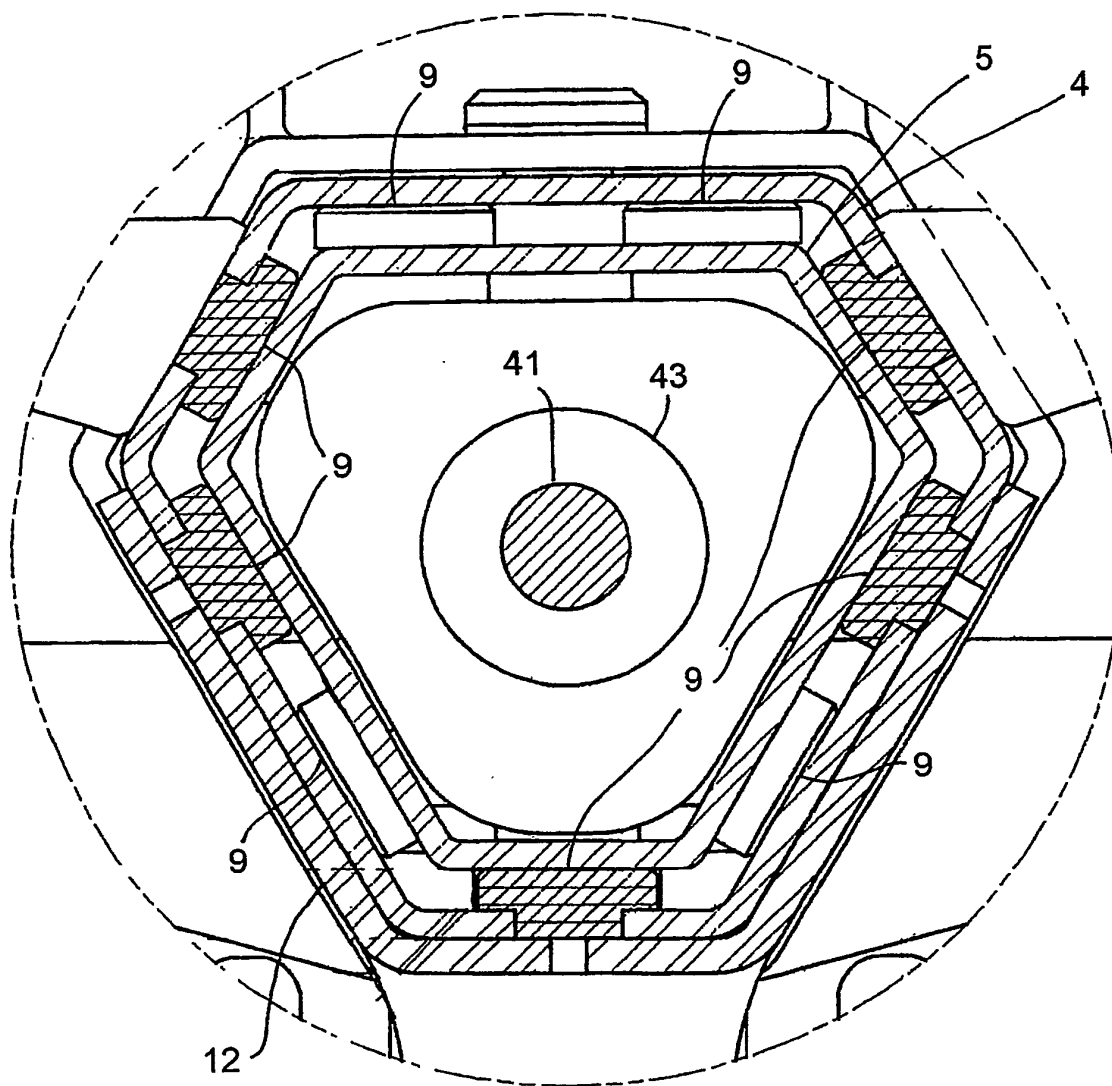


FIG.5

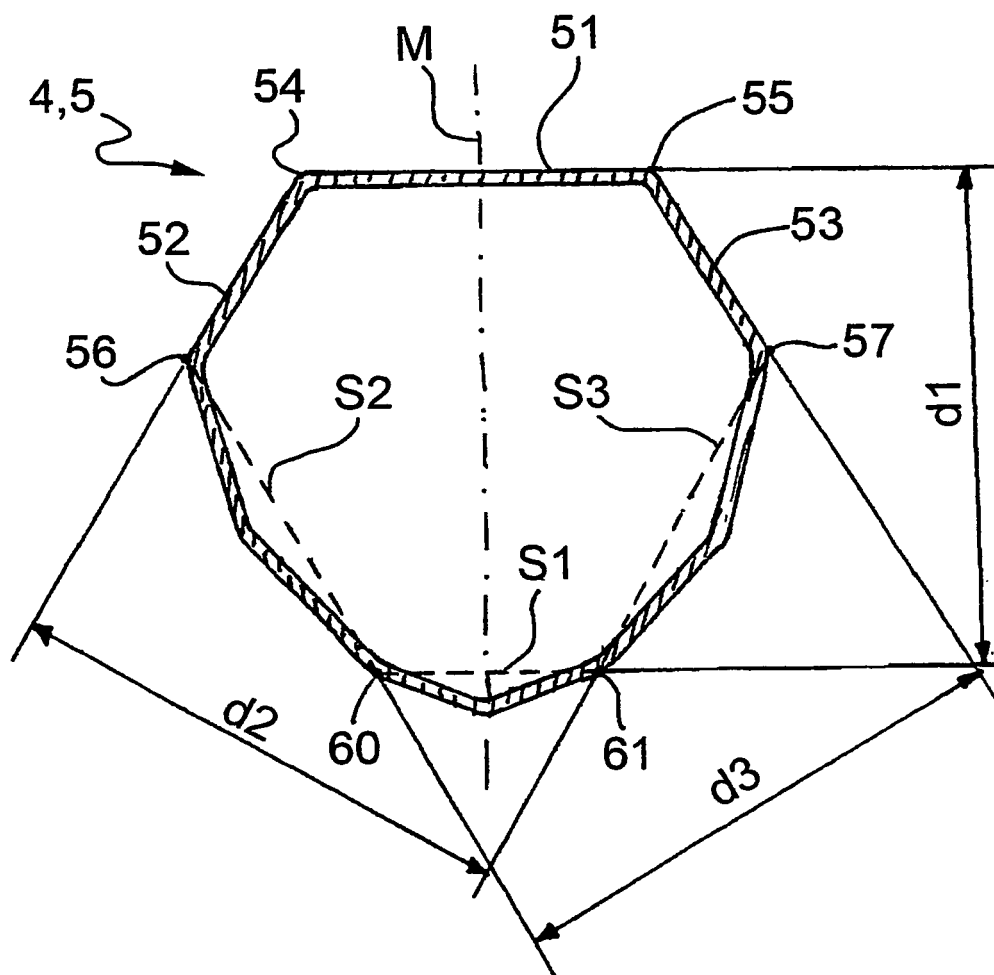


FIG.6

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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