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(71) Applicant: **B. Financial S.r.L.**
24067 Sarnico (BG) (IT)

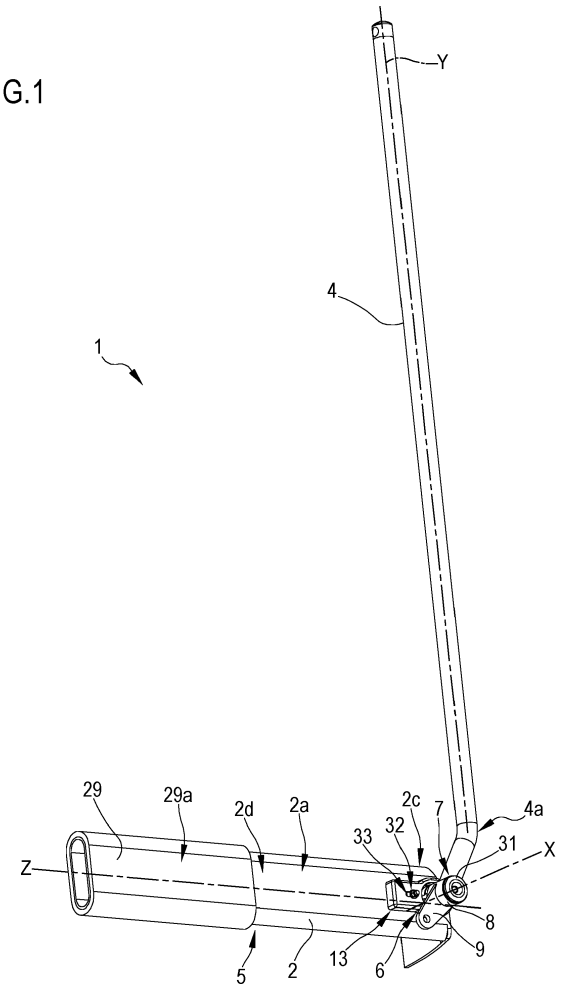
(72) Inventor: **BESENZONI, Giorgio**
I-24067 SARNICO (BG) (IT)

(74) Representative: **Contadin, Giorgio et al**
Praxi Intellectual Property S.p.A.
Via N. Tommaseo, 76/D
35131 Padova (IT)

(54) WALKABLE STRUCTURE OF DOCKING IN BOATS

(57) A walkable structure of docking (1) in boats comprising a main transit platform (2) which mainly develops along a longitudinal axis (Z) and defines an upper decking (3), at least one front gripping and/or support rod (4) coupled with at least one of the side edges (2a, 2b) and at the access end (2c) of said main transit platform (2) and operatively connected with actuation means (5) suitable to place the front rod (4) selectively between a rest position, in which the front rod (4) is positioned along a first linear direction (Z') parallel to the longitudinal axis (Z) of the main transit platform (2), and an operating position, in which the front rod (4) protrudes upwardly, in such a manner as to be available for the gripping of the hand of the user, from at least one of the side edges (2a, 2b) of the main transit platform (2) along a second linear direction (Y) which defines an angle, generally right, with the longitudinal axis (Z) of the main transit platform (2). In particular, the walkable structure of docking (1) comprises locking and safety means (6) operatively connected with said front rod (4) in such a way as to make said front rod (4) in said operating position stably bound and resistant to loads applied to it, counteracting its pliability, also under the traction or thrust exerted by said user on said front rod (4).

FIG.1



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Description

[0001] The present invention essentially is part of the nautical sector and concerns a walkable structure of docking in boats, typically although not exclusively an ascent/descent gangway to/from boats.

[0002] The walkable structure of docking of the present invention, preferably but not necessarily comprising constructive elements which are coupled telescopically with each other, has a higher use safety compared to the walkable structures of the prior art of equivalent use and can be installed for example on a boat so as to remain always protruding outside from the boat (and therefore visible on the outside) when it takes the rest or non-use position or in such a position it may be contained into a housing provided in the boat hull (thus being almost totally hidden from view).

[0003] As known, the walkable structure of docking in boats, such as for instance the well-known longitudinal ascent/descent gangways from them, are technical nautical accessories that take a horizontal or moderately inclined position and join two separate sites, allowing people to the simply walk or transport objects between the boats and the pier.

[0004] The walkable structures of docking currently available on the market include a walkable transit platform, generally composed of one or more elements telescopically coupled with each other and having a rectangular plan view and, in particular, a width such as to allow the passage of a single person and a length that allows to comfortably get on or get down from the boat moored at a given distance from piers, docks or wharfs of ports or docking areas to the mainland.

[0005] Such walkable structures of docking of known type present various constructive conceptions, different by type and mutual coupling of the component elements which in turn are made by using various materials which are increasingly sought and carefully designed also in the nautical field both in terms of performances and in aesthetic terms, and this inevitably due to the high value or quality of the boats where they're intended to be installed.

[0006] The choice of the construction materials is based, indeed, not only on technical and functional but also and more and more on aesthetic assessments: in particular, stainless steels, light corrosion-resistant alloys, tempered glass, precious woods such as teak, and/or technological polymers are increasingly used in order to significantly increase the technical aspects and the aesthetic quality features of the walkable structure of docking concerned and thus to satisfy the notoriously demanding and detailed requirements of the shipowner or in any case of the nautical sector market.

[0007] Typically, from a constructive point of view, the walkable structures of docking in boats include a main transit platform which mainly develops along a longitudinal axis and defines an upper decking and, preferably, is telescopically coupled with an auxiliary transit platform, usually fixed to the stern of the boat and of retractable type when it takes the non-use conditions where it is housed in a room made in the boat itself.

[0008] In such a case, the walkable structures of docking in boats of the prior art include some gripping and/or support rods (also known as "candlesticks"), coupled with the side edges of the auxiliary transit platform to be available to the handle of the user's hands for its easier and safer ascent or descent on or from the boat.

[0009] In the more technologically advanced embodiments, shown for example in the patent document published with WO2013042157 A1 in the name of the same applicant of the present patent application as well as in the patent document published with DE3310460 A1, walkable structures of docking of known type also include at least one front gripping and/or support rod coupled with at least one of the side edges of the main transit platform and operatively connected with the respective abovementioned gripping and/or support rods by means of a gripping rope (or tip, in nautical jargon).

[0010] The front rod is operatively connected with actuation means which selectively place it between a rest position, in which the front rod lies along a first linear direction parallel to the longitudinal axis defined by the main transit platform, and an operating position, in which the front rod projects upwardly, in such a manner as to be available for the gripping of the user's hand, from at least one of the side edges of the main transit platform along a second direction which defines an angle with the longitudinal axis of the main transit platform itself.

[0011] Under the action of the actuation means, the gripping and/or support rods arranged rearwards the front rod along at least one of the side edges of the auxiliary transit platform move integrally with the front rod being connected with it by means of the aforesaid gripping rope and, in particular, take the same operating position in the operating position and the rest position of the main transit platform.

[0012] When the walkable structure of docking is in the non-operating condition, the gripping and/or support rods are positioned parallel to the longitudinal axis defined by the main walkable transit platform and closely adjacent to the main platform and to the auxiliary transit platform, while, when the walkable structure of docking is in the operating condition, available to the walkway of the people, the gripping and/or support rods protrude from at least one of the side edges of the respective transit walkable platform along a direction that, depending on the embodiments, is orthogonal or oblique with respect to the plane of the walkable platform.

[0013] In detail, the walkable structures of docking in boats described in the patent publication WO2013042157 A1 allow people to access (and of course to leave) the boats themselves in more practical, safer and easier way than walkable structures of docking depict of front gripping and/or support rods, thus limiting compared to the latter the risks of accidental and dangerous fall of the persons or allowing walkway of the per-

sons on transit platforms of these walkable structures without requiring assistance of the crew and/or people present on the quay.

[0014] However, even these walkable structures of docking in boats of the prior art, more advanced for constructive design, just briefly described suffer from some acknowledged drawbacks.

[0015] In particular, when the front gripping and/or support rod is positioned in the operating position and the main transit platform (and also the auxiliary transit platform if provided as it is generally the case, although preferably only) is provided to the users' walkway, the front rod itself is to some extent still weak and rather unstable so that, while keeping the advantages highlighted above with respect to more traditional and minimal in terms of construction walkable structures of docking, it does not offer optimal safety conditions or otherwise required by the still precarious situation for people who intend to get on/get off to/from a boat and who trust in this component to perform the manoeuvre with greater ease and serenity, as if it were a normal gesture, even without service personnel or help people.

[0016] This is due to the fact that the front gripping and/or support rod is kept in the operating position (or open, raised or vertical position) simply by the actuation means, particularly and preferably by the hydraulic pressure exerted on the hydraulic cylinder which distinguishes the preferred constructive solution of these actuation means and which governs the entire movement of the main transit platform (and when provided also of the auxiliary transit platform) and the front rod.

[0017] It is sufficient even a small variation in the piston stroke of such a hydraulic cylinder, for example determined by a loss of oil pressure due in turn to elasticity of the supply tubes, leakages or gaps (operative situations often inevitable during continuous functioning, insofar as carefully planned and measured), to cause a complete uncontrolled and accidental rotation, in one direction rather than another, of the front rod while it is located in the operating position, with consequent dangerous absence of block in these operating conditions that negatively reflects in a loss of safety for the persons accessing a boat through walkable structures of docking.

[0018] The present invention intends, therefore, to remedy the drawbacks of the known technique just highlighted.

[0019] In particular, primary purpose of the present invention is to provide a walkable structure of docking in boats which provides a level of stability of the front gripping and/or support rod, especially when placed in the operating position, greater than the one offered by the equivalent walkable structures of the prior art.

[0020] Within this purpose, it is a first task of the invention to devise a walkable structure of docking which is able to guarantee the persons who are getting up or getting down to or from boats safety conditions greater than those ones ensured by similar walkable structures of known type, other factors involved in similar circumstances such as for instance the absence of assistants on board or on the quay being of course equal.

[0021] It is another task of the present invention to make available a walkable structure of docking in boats in which the components, in particular the front gripping and/or support rod, when they are positioned in the operating conditions, are less susceptible to breakage or wear compared to known walkable structures of docking, as a result of their continuous solicitation by the persons.

[0022] It is a further purpose of the invention to realize a walkable structure of docking in boats which achieves the purposes and fulfill the tasks described above without this negatively affecting the overall aesthetic impact of the product when at work.

[0023] It is a last but not least purpose of the present invention to create a walkable structure of docking in boats which present high mechanical resistance in all its constituent elements when it takes the operating conditions.

[0024] The foregoing purposes are achieved by means of a walkable structure of docking in boats according to claim 1 attached hereto, as hereinafter referred for the sake of exposure brevity.

[0025] Additional technical features of detail of the walkable structure of docking in boats of the invention are contained in the relevant dependent claims.

[0026] The abovementioned claims, in the following specifically and concretely defined, shall mean to form integral part of the present description.

[0027] Advantageously, the walkable structure of docking in boats of the invention provides the front gripping and/or support rod - in its operating position in which it protrudes upwardly and cantilevered from the main transit platform - a greater stability than that one ensured by the equivalent walkable structures of the prior art.

[0028] This depends on the fact that the walkable structure of docking in boats of the present invention comprises locking and safety means (not provided in any way and totally absent in the relevant known art, constituted by the patent publication WO2013042157 A1, closest to the present invention), operatively connected with the front rod in such a way as to make it, when it is placed in the operating position, firmly bound and resistant to loads applied to it, counteracting its pliability, also under the force of traction or thrust exerted by the user on the front rod typically during the ascent phase of the boat but also during the opposite phase of descent from the boat itself.

[0029] Still advantageously, again by virtue of the innovative structural design feature just highlighted, the walkable structure of docking in boats of the present invention assures people to access to the main transit platform more safely and confidently than similar walkable structures of known type.

[0030] Equally advantageously, the walkable structure of docking in boats of the invention allows the shipowner to avoid devoting a specific staff member on boar to the management of the accesses to the boat by the guests,

generally less practical in the walkway of transit platforms such as the nautical use gangways and who, therefore, thanks to the invention, can use a walkable structure of docking even by themselves, without the help or the assistance of personal devoted to this issue on the boat.

[0031] Equally advantageously, the walkable structure of docking in boats of the invention, thanks to the locking and safety means which is provided with, gives to the front rod when in the operating position exercise mechanical strength greater than the walkable structures of docking of the prior art, so that the stresses which the front rod is subjected due to the gripping by the hand of the users are less critical compared to the current situation, to the advantage of the constructive and functional life cycle of the structural assembly concerned - front rod and its mechanical system of connection with the main transit platform - which is longer than that one of the known walkable structures of docking.

[0032] Moreover, in advantageously way, the provision of the locking and safety means presents an almost insignificant incidence on the overall aesthetic impact of the walkable structure of docking of the invention, since these locking and safety means comprise component elements mostly hidden to the sight and which cooperate with other mechanical organs of the walkable structure of the invention which, even in their specificity and particularity, remain inevitably in view as the mechanical members of which the equivalent walkable structures of the known art are provided with.

[0033] The foregoing purposes and advantages, as well as other ones which will emerge in the course of this patent text, will appear to a greater extent from the description which follows, relating to a preferred embodiment of the walkable structure of docking in boats of the invention, given by indicative and illustrative, but not limitative, way with reference to the accompanying drawings, in which:

- figure 1 is a simplified and partial assonometric view of the walkable structure of docking of the invention in operating conditions;
- figure 2 is an enlargement of a constructive assembly of figure 1;
- figures 3 and 4 are two distinct simplified views of the constructive assembly of figure 2;
- figure 5 is the inner side view of figure 2;
- figure 6 is a simplified view of figure 5;
- figures 7 and 8 are two distinct simplified views of figures 3 and 4;
- figure 9 is a simplified and partial assonometric view of the walkable structure of docking of the invention in non-operating conditions;
- figure 10 is a simplified enlargement of a constructive assembly of figure 9;
- figure 11 is a simplified view of the constructive assembly of figure 10;
- figure 12 is a simplified view of figure 11;
- figure 13 is a truncated front view of figure 1;
- figure 14 is the view of figure 13 along the section plane XIV-XIV;
- figure 15 is a front view of the walkable structure of docking of the invention in the passage from the non-operating condition of figure 9 to the operating conditions of figure 1;
- figure 16 is the view of figure 15 along the section plane XVI-XVI;
- figure 17 is a front view of figure 9;
- figure 18 is the view of figure 17 along the section plane XVII-XVIII.

[0034] The walkable structure of docking in boats (not shown), such as yachts or superyachts, of the invention is illustrated in a simplified and schematic view at figures 1 and 9, in each of which is globally numbered with 1.

[0035] It is in any case as a widely innovative and ameliorative evolution of the walkable structure of docking shown in patent document published as WO2013042157 A1 in the name of the same applicant of the present invention.

[0036] As it can be seen in the main although incomplete figures 1 and 9 just mentioned, the walkable structure of docking 1 includes:

- a main transit platform 2 which mainly develops along a longitudinal axis Z and defines an upper decking 3;
- in this case, a pair of front gripping and/or support rods 4 (only one of which visible in the accompanying figures), coupled with respective side edges 2a, 2b and at the access end 2c of the main transit platform 2 and operatively connected with actuation means, only partly visible in the figures that follow where are schematically and generally indicated with the reference number 5, suitable to place the front rods 4 selectively between a rest position, in which the front rods 4 are positioned along a first linear direction Z' parallel to the longitudinal axis Z of the main transit platform 2, and an operating position, in which the front rods 4 protrude upwardly, in such a way as to be available for the gripping of the user's hand, from the respective side edges 2a, 2b of the main transit platform 2 along to a second direction Y which defines an angle, typically right, with the longitudinal axis Z of the aforesaid main transit platform 2.

[0037] In accordance with the invention, the walkable structure of docking 1 comprises locking and safety means, on the whole numbered with 6, operatively connected with the front rod 4 in such a way as to make the front rod 4 itself, in the operating position, stably bound and resistant to loads applied to it, especially at the cantilevered upper end 4b, counteracting its pliability, also under the force of traction or thrust exerted by the user on the front rod 4.

[0038] In particular, the second direction Y along to which each of the front rods 4 protrudes upwardly when

it takes the operating position is orthogonal to the longitudinal axis Z of the main transit platform 2, so that the angle defined between the second direction linear Y and the longitudinal axis Z is right, while each of the front rods 4 is externally joined to one of the corresponding side edges 2a, 2b of the main transit platform 2 when these front rods 4 take the rest position.

[0039] More specifically, the locking and safety means 6 are coupled partly with the side edges 2a, 2b of the main transit platform 2 and partly with the respective front gripping and/or support rods 4.

[0040] Furthermore, the locking and safety means 6are, preferably, placed at the access end 2c and on the outer wall 2d of the side edges 2a, 2b of the main transit platform 2 and at a lower end 4a of the front gripping and/or support rods 4.

[0041] In addition, the locking and safety means 6 cooperate, in the specific case through at least the front rods 4, with the actuation means 5 which, when driven by the operator for example by means of an electronic control unit, place the locking and safety means 6 between a working position, coincident with the operating position of the front rods 4, and a release position, coincident with the rest position of these front rods 4.

[0042] In a preferred but not exclusive way, the locking and safety means 6 are in this case operatively connected with rotation means, as a whole numbered with 7 and clearly visible also at figures 2-4, which couple each of the front rods 4 with the platform main transit 2 and which cooperate with the actuation means 5 in such a way as to place by rotation the front rods 4 selectively between the rest position (shown in figure 9) and the operating position (shown in figure 1) and to place the locking and safety means 6 selectively between the release position and the working position respectively.

[0043] In particular, the rotation means 7 are arranged at the access end 2c of the main transit platform 2 and define a transverse rotation axis X which is orthogonal to the longitudinal axis Z of the main transit platform 2 and around which each of the front rods 4 is set in rotation by the actuation means 5 during its passage from the rest position to the operating position and vice versa.

[0044] Preferably but not necessarily, the rotation means 7 comprise a movable sleeve 8 (of course, in this case in the sense of "rotating") placed along the aforementioned transversal rotation axis X and integral, at one side, with a respective front rod 4 and, at the opposite side, with a lever arm 9 pivoted in such a transverse rotation X axis of the movable sleeve 8 and indirectly and transitively connected with the actuation means 5.

[0045] The movable sleeve 8 can be made, as in the case described, in single body and thus be monolithic with the front rod 4 and/or with the lever arm 9, or, in alternative embodiments of the invention (not shown), be coupled with at least one of the front rod and the lever arm through junction means of the type per se known to the person skilled in the art, not illustrated in the appended figures and comprising, for example, a bead of weld material for welding.

[0046] Figures 5 and 6 further show that, according to the preferred embodiment described herein of the invention, the locking and safety means 6 include:

- a strike tooth 10 projecting from the inner wall 11a of an annular body 11 which surrounds a through hole 12 made in a contrast plate 13 externally coupled in this case with both the side edges 2a, 2b of the main transit platform 2;
- a first slot 14, better visible in figure 4, made in the outer surface 15a of a thickening washer 15 externally fixed to both the side edges 2a, 2b of the main transit platform 2 and received in the through hole 12 of the contrast plate 13;
- a second slot 16 made in the outer wall 8a of the movable sleeve 8 and at a first end 8b of the latter particular: the first end 8b is arranged adjacent and facing the thickening washer 15 in such a manner that the second slot 16 is aligned, in a direction parallel to the transverse axis X, and communicates with the first slot 14 when each of the front rods 4 takes the operating position.

[0047] At the light of what has just been described for the preferred embodiment of the locking and safety means 6, the strike tooth 10 is firmly snapped into the first slot 14 and the second slot 16 so that said front gripping and/or support rods 4 keep the operating position that ensures the main advantages offered by the present invention.

[0048] As shown in the figures so far cited but with greater clarity the details of figures 7 and 8, the movable sleeve 8 is, purely at favourite title, placed externally to a fixed peg 17 that supports it and that protrudes from the thickening washer 15 along the transverse rotation axis X.

[0049] In preferred but not limiting manner, the rotation means 7 include angular end-of-stroke means, as a whole marked with 18 and better visible in the accompanying figures 6-8, suitable to stop the rotation of the front rods 4 immediately before the latter take the operating position or the rest position and immediately before the locking and safety means 6 themselves take respectively the working position or the release position.

[0050] More in detail, the angular end-of-stroke means 18 preferably comprise:

- a first flat wall 19 and a second flat wall 20 defined by an arcuate notch 21 made in the first end 8b of the movable sleeve 8 and which extends for the whole thickness of the mobile sleeve 8 itself and for a length along the transverse axis X equal to the depth of the second slot 16;
- a first fixed pin 22 projecting from the thickening washer 15 (to which is made integral by welding) parallelly to the fixed peg 17, with respect to which it is spaced apart, and from the outer face 13a of the

contrast plate 13 in such a way as to be opposite to the strike tooth 10.

[0051] In order to get the stop of the angular stroke, therefore, the first flat wall 19 contrasts with the first fixed pin 22 in order to stop rotation of the respective front rods 4 immediately before they take the aforesaid operating position and the second flat wall 20 contrasts with the first fixed pin 22 in order to stop rotation of the front rods 4 immediately before they take the aforesaid rest position.

[0052] Preferably but not necessarily, the arcuate notch 21 defines an arc of circumference of value not lower than 90° but widely lower than the round angle, typically between 90° and 95°.

[0053] As far as the previously mentioned through hole 12 of the contrast plate 13 is concerned, by way of pure preferred but not binding example it presents a profile of substantially elliptical shape in such a way as to allow the relative sliding of the contrast plate 13 with respect to the thickening washer 15 (which, as said, is in this case fixed) and the movable sleeve 8 (which is such only in rotation but not in linear translation) contained into the through hole 12 for an annular portion (not shown for the sake of simplicity) having a linear length along the transverse axis X also in this case equal to the depth of the second slot 16 made in the movable sleeve 8.

[0054] In an appropriate and advantageous but not limiting way, the contrast plate 13 is placed in proximity of the free end 2e of the side edges 2a, 2b of the main transit platform 2, as it can be derived in particular from figures 1, 2, 5 and 6: it follows that, in this way, the through hole 12 is closer to the access end 2c of the main transit platform 2 than a reinforcement shank 23 of the contrast plate 12, monolithic to the annular body 11 from which projects parallelly to the longitudinal axis Z of the main transit platform 2.

[0055] Figures 5 and 6 also emphasize that the reinforcement shank 23 presents in the inner surface 23a facing the respective side edges 2a, 2b of the main transit platform 2 an elongated seat 24 which is separated from the through hole 12 by means of an intermediate flap 25 of the annular body 11 and which receives in a decentralized position a second fixed pin 26 projecting from the outer wall 2d of the main transit platform 2 parallelly to the first fixed pin 22; these construction particulars are useful and functional in relation to the technical features of the walkable structure of docking 1 which are going to be described.

[0056] Indeed, the contrast plate 13 comprises, at preferred but appropriate title, elastic return and thrust means, indicated as a whole with 27 and visible in figures 2-8, 11 and 12.

[0057] These elastic return and thrust means 27 are suitable to be loaded when the two front rods 4 simultaneously pass from the rest position (shown in figure 9) to the operating position (shown in figure 1) and vice versa, respectively for:

- pulling the contrast plate 13 back towards the intermediate area 2f (to be understood in the sense of the longitudinal direction parallel to the longitudinal axis Z) of the side edges 2a, 2b of the main transit platform 2 (basically, therefore, towards the stern of the boat) causing snap engagement of the strike tooth 10 into the first slot 14 and into the second slot 16 for stably positioning the front rods 4 in the operating position, as clearly visible in figures 13 and 14;
- pushing the contrast plate 13 towards the end access 2c of the main transit platform 2 causing disengagement of the strike tooth 10 from the first slot 14 and from the second slot 16 in order to release the front rods 4 so that they can rotate in the direction opposite to that one of ascent and descend taking the rest position (typically, observing from the outside or frontally the side edge 2a of the main transit platform 2, the front rods 4 and the rotation means 7 rotate clockwise around the transverse axis X during the ascent towards the operating position and counter-clockwise during the opposite descent movement towards the rest position), as clearly visible in figures 17 and 18.

[0058] More precisely, the elastic return and thrust means 27 comprise preferably but not exclusively a torsion spring 28 contained into the elongated seat 24 of the reinforcement shank 23, placed along a third linear direction Z" parallel to the longitudinal axis Z of the main platform transit 2 and provided with a first end 28a cooperating in abutment with the second fixed pin 26.

[0059] The figures so far cited also show that the contrast plate 13 comprises fixing means, numbered on the whole with 32 and of the type known per se (for example a bolt and a washer), applied to the threaded free end of the second fixed pin 26 and projecting from the outer face 13a of the contrast plate 13 which, together with the thickening washer 15 and the movable sleeve 8, contribute to the support of the contrast plate 13 itself.

[0060] As far as the actuation means 5 are concerned, they are suitably although not necessarily arranged below the main transit platform 2 and place the front rods 4 in the operating position and in the rest position with the aid of a handle rope, not represented for the sake of simplicity in the accompanying drawing tables, which is respectively placed in tension and released in the operating position and in the rest position of the front rods 4.

[0061] The actuation means 5 are of the type known per se to the person skilled in constructing components intended for the nautical field and of this specific kind of applications (moving of transit platforms of walkable gangways of docking).

[0062] This specific and preferred moving system of the front rods 4 - that selectively places them between the rest position and the operating position previously defined - belonging to the walkable structure of docking 1 of the invention distinguishes from that one described in the patent application WO2013042157 A1 in the name

of the same applicant of the present invention as being independent from the direct action of the telescopic piston which, preferably, constitutes the actuation means.

[0063] In the version of the walkable structure of docking described in the prior art document published as WO2013042157 A1, the hydraulic cylinder, in its last few millimetres of stroke, rotates the rod (or rods) and raises the handrail which, with the aim of help and safety, is available to users for gripping as they get on aboard of the boat, walk or get off from this: the action of such a hydraulic cylinder is direct, sudden and with maximum force, such a component acting directly with all its push.

[0064] In the version of walkable structure of docking of the invention, the handle rope associated with the front rods 4 and, in the specific and preferred case, also the elastic return and thrust means 27 (in this case the torsion spring 28), allow to better and more smoothly dose the ascent movement towards the operating position (open position) and descend towards the rest position (closed position) of the front rods 4 themselves: in the invention, such a movement is suitably slower, more gradual, more controlled and it occurs with less force (the handle rope acting as damper element) compared to that one obtained with the system of the prior patent application WO2013042157 A1.

[0065] It is observed in figures 14, 16 and 18 that the movable sleeve 8 is provided, at a second end 8c opposite the first end 8b, of a plugging cap 31 which closes the movable sleeve 8 advantageously preventing the entry inside of it - and the otherwise consequent and inevitably negative contact with the locking and safety means 6 - of any impurities, water or other extraneous body which could over time causing a certain wear thereof.

[0066] Preferably and usually, the walkable structure of docking 1 of the invention also includes an auxiliary transit platform 29, with respect to which the main transit platform 2 is slidingly and telescopically associated in such a way as to define a first position, in which the main platform 2 is substantially unusable and falls almost entirely within the overall dimensions defined by the auxiliary platform 29 (see in this respect the detail of figure 10), and a second position, in which the main platform 2 protrudes along the longitudinal axis Z from the auxiliary platform 29, becoming an extension of the auxiliary platform 29 itself that thus defines an upper decking 30 not coplanar but raised above the upper decking 3 of the main platform 2 and closer to the boat (see in this regard the details of figures 2-4).

[0067] In particular, the main transit platform 2 is slidingly coupled with the auxiliary transit platform 29 through guide means, not shown for the sake of convenience of exposition and of the type per se known in the nautical sector.

[0068] Furthermore, the walkable structure of docking 1 of the invention comprises one or more rear gripping and/or support rods, not visible in the accompanying figures, each of which is coupled with both the side edges 29a, 29b of the auxiliary transit platform 29 and operatively connected with the respective front gripping and/or support rods 4 by the handle rope cited above, not shown as already said, available to the user when the front rods 4 and the rear rods are in the operating position in order to facilitate the ascent, the walkway and descent on or from the main transit platform 2 and on or from the auxiliary transit platform 29.

[0069] The rear rods (not shown) therefore take the same operating position of the front rods 4 in the operating position and in the rest position, moving integrally thereto as a result of the driving of the actuation means 5 which, in particular, are operatively connected with the main transit platform 2 so as to position it with respect to the auxiliary transit platform 29 selectively between the first position and the second position defined above.

[0070] In use, it is assumed herein that the walkable structure of docking 1 of the invention is at the beginning in the non-operating conditions of figures 9-12, 17 and 18, for example wholly contained within a room made at the stern of the boat and mostly with the main transit platform 2 almost completely contained within the overall dimensions of the larger auxiliary transit platform 29.

[0071] In similar non-operating conditions, the strike tooth 10 is only and purely facing, but decoupled, to the first slot 14 of the thickening washer 15, while the second slot 16 is removed according to an angle of 90° from the first slot 14, as it can be observed in particular in figure 18, and also while the first flat wall 19 contrasts with the first fixed pin 22 defining a first configuration of the angular end-of-stroke means 18.

[0072] Starting therefore from these conditions, if necessary, the operator drives, for example by means of an electronic control unit, the actuation means 5 thus determining the progressive, controlled and as slow, exit of the main platform 2 from the auxiliary platform 29 along the longitudinal axis Z.

[0073] In such a movement, the main platform 2 drags with it the rear gripping and/or support rods and the front rods 4, interconnected by means of a handle rope which, in this way, is progressively stretched: this involves the progressive and consecutive rise firstly of the rear rods and subsequently of the front rods 4 which thus are placed in the open position (operating position), projecting upwardly from the side edges 29a, 29b and 2a, 2b of the respective platforms 2 and 29.

[0074] In particular, the raising (or lifting) movement of the front rods 4 takes place by rotation of the same, and consequently of the movable sleeve 8 monolithic to them, around the transverse rotation axis X, clockwise by looking frontally from the outside the side edge 2a (or the plane of the sheet that contains the attached figures) of the main transit platform 2.

[0075] Always during or following this movement of telescopic exit of the main transit platform 2 from the auxiliary transit platform 29 along the longitudinal axis Z, the torsion spring 28 of the elastic return and thrust means 27 is compressed against the second fixed pin 26 within the elongated seat 24, in such a way that, when the front

rods 4 and the movable sleeve 8 integral with them have completed the rotation around the transverse axis X as a result of the stop of the operation of the actuation means 5, the elastic return of the torsion spring 28 that consequently derives causes a slight but significant retraction of the contrast plate 13 (according to the direction given by the arrow having reference H_1 in figure 14 and also by the arrow having reference H_2 in figure 15 which indicate the direction of action of the elastic return and thrust means 27 during the lifting of the front rods 4).

[0076] Such a backward movement of the contrast plate 13 causes the snap engagement of the strike tooth 10 into the first slot 14 of the thickening washer 15 and into the second slot 16 of the movable sleeve 8, slots 14 and 16 which, meanwhile, are aligned and communicate each other along a direction parallel to the transverse axis X.

[0077] The short backward sliding movement of the contrast plate 13 along the third linear direction Z" is allowed by the particular substantially ellipse-shaped profile of the through hole 12 made in the main body 11 of the contrast plate 13 as well as by a through slit 33 made in the reinforcement shank 23 and through which the threaded free end of the second fixed pin 26 passes to be protruding from the outer face 13a of the contrast plate 13 together with the fixing means 32.

[0078] It is thus obtained he operation of the locking and safety means 6, shown in figures 5, 6, 13 and 14: the two front rods 4 are so firmly locked in place, ready to effectively counteract the user's grip assuring him conditions of absolute safety, in any case higher than those ones assured by the equivalent walkable structures of the known art, during the ascent, the walkway and the descent on or from the boat.

[0079] When the use of the walkable structure of docking 1 of the invention is no longer necessary, at least temporarily, the operator again drives the actuation means 5 which however operates in direction opposite to the previous one, causing the progressive and almost total telescopic return of the main transit platform 2 within the auxiliary transit platform 29.

[0080] Starting from the operating condition of figure 14, therefore, the front rods 4 and the rear rod are lowered by performing a rotation opposite to the previous one (in particular anticlockwise when looking frontally from the outside the side edge 2a of the main platform transit 2); also in this movement, the elastic return and thrust means 27 are compressed, loading themselves.

[0081] When, in the backward movement of the main transit platform 2, the contrast plate 13 collides with its rear edge against the front part of the auxiliary transit platform 29, the return movement of the main platform 2 is ended (and with it the operation of the actuation means 5); furthermore, this impact causes the release of the elastic return and thrust means 27, whose kinetic energy stored during the backward phase of the main platform 2 now causes a slight but still significant forward sliding (or forward thrust, according to the direction given by the arrow indicated with G in figure 18) of the contrast plate 13 which, in turn, causes the total separation of the strike tooth 10 from the first slot 14 and the second slot 16 which, for the effect of the free rotation in the opposite direction to the previous one of the movable sleeve 8 and with it of the front rod 4, misaligns from the first slot 14.

[0082] The locking and safety means 6 thus assume the release (not operating) position and the front rods 4 definitively get down by gravity even by a short angular distance until the end-of-stroke in which they lie side-by-side the main platform transit 2 and the auxiliary transit platform 29, substantially parallel to them.

[0083] By means of the invention, therefore, it is obtained the rigid block of the front rods 4 in the fully open position (operating position) until the contrast plate 13 does not collide against the fixed element (given by the front part of the auxiliary transit platform 29), thus unlocking the locking means and safety means 6 (specifically, by freeing the strike tooth 10 from the first slot 14 and the second slot 16): this feature allows that the front rods 4 are more rigid and more solid at the grip of the user compared to what happens in the known art, both when they are fully extended (operating position or open position) and also slightly retracted towards the rest position (or closed position).

[0084] This doesn't occur with the mechanism discloses in the prior document WO2013042157 A1 in which, in the returning phase from the operating position to the rest position, the front rods 4 get down immediately: the reason for this situation lies in the fact that the walkable structure of docking described therein totally lacks of the locking means in the sense provided by the current invention, i.e. capable of effectively and stably keep the front rod/rods in the operating position (or open position) and defers this crucial function to the actuation means, with the resulting disadvantages already highlighted previously. According to the description just given, it is understood, therefore, that the walkable structure of docking in boats of the present invention achieves the purposes and reaches the advantages already yet mentioned.

[0085] Upon implementation, changes could be made to the walkable structure of docking in boats of the invention consisting, for example, in the locking means of type and composition different from those ones described above and illustrated in the accompanying figures.

[0086] In addition, further embodiments of the walkable structure of docking which is exclusively claimed herewith, not shown in the drawings that follow, will be able to provide for only one front rod placed on only one of the side edges of the main transit platform, which does not affect the advantage brought by the present invention.

[0087] Similarly, in the embodiment briefly described in the previous paragraph, the walkable structure of docking in boats of the invention will include one or more rear gripping and/or support rods on only one of the side edges of the auxiliary transit platform.

[0088] In addition to this, alternative embodiments, yet not shown, of the invention could exist in which the walkable structure of docking in boats described comprises a number of auxiliary transit platforms greater than one, that number being able to vary depending on the design choices and construction and application constraints.

[0089] It is, finally, clear that several other changes could be made to the walkable structure of docking concerned, without departing from the principle of novelty intrinsic in the inventive idea expressed herein, as it is clear that, in the practical implementation of the invention, materials, shapes and sizes of the illustrated details could be changed, as needed, and replaced with others technically equivalent.

[0090] Where the constructive features and techniques mentioned in the following claims are followed by reference numbers or signs, those reference signs have been introduced with the sole objective of increasing the intelligibility of the claims themselves and therefore they have no limiting effect on the interpretation of each element identified, by way of example only, by these reference signs.

Claims

1. Walkable structure of docking (1) in boats comprising:

   - a main transit platform (2) which mainly develops along a longitudinal axis (Z) and defines an upper decking (3);
   - at least one front gripping and/or support rod (4) coupled with at least one of the side edges (2a, 2b) and at the access end (2c) of said main transit platform (2) and operatively connected with actuation means (5) suitable to place said front rod (4) selectively between a rest position, in which said front rod (4) is positioned along a first linear direction (Z') parallel to said longitudinal axis (Z) of said main transit platform (2), and an operating position, in which said front rod (4) protrudes upwardly, in such a manner as to be available for the gripping of the hand of the user, from at least one of said side edges (2a, 2b) of said main transit platform (2) along a second linear direction (Y) which defines an angle with said longitudinal axis (Z) of said main transit platform (2),

   characterized in that it comprises locking and safety (6) operatively connected with said front rod (4) in such a way as to make said front rod (4) in said operating position stably bound and resistant to loads applied to it, counteracting its pliability, also under the traction or thrust exerted by said user on said front rod (4).

2. Structure (1) according to claim 1), **characterized in that** said locking and safety means (6) are coupled in part with at least one of said side edges (2a, 2b) of said main transit platform (2) and in part with said front gripping and/or support rod (4).

3. Structure (1) according to claim 1) or 2), **characterized in that** said locking and safety means (6) are placed at said end access (2c) and on the outer wall (2d) of at least one of said side edges (2a, 2b) of said main transit platform (2) and at a lower end (4a) of said front gripping and/or support rod (4).

4. Structure (1) according to any of the preceding claims, **characterized in that** said locking and safety means (6) cooperate, through at least said front rod (4), with said actuation means (5) which, when operated, place said locking and safety means (6) between a working position, coincident with said operating position of said front rod (4), and a release position, coincident with said rest position of said front rod (4).

5. Structure (1) according to any of the preceding claims, **characterized in that** said locking and safety means (6) are operatively connected with rotation means (7) which couple said front rod (4) with said main transit platform (2) and which cooperate with said actuation means (5) in such a way as to place by rotation said front rod (4) selectively between said rest position and said operating position and to place said locking and safety means (6) selectively between said release position and said working position respectively.

6. Structure (1) according to claim 5), **characterized in that** said rotation means (7) are arranged at said access end (2c) of said main transit platform (2) and define a transverse rotation axis (X) which is orthogonal to said longitudinal axis (Z) of said main transit platform (2) and around which said front rod (4) is rotated by said actuation means (5) during its passage from said rest position to said operating position and vice versa.

7. Structure (1) according to claim 5) or 6), **characterized in that** said rotation means (7) include a movable sleeve (8) placed along a transverse rotation axis (X) and integral at one side with said front rod (4) and at the opposite side with a lever arm (9) pivoted at said transverse rotation axis (X) of said movable sleeve (8) and indirectly connected with said actuation means (5).

8. Structure (1) according to claim 7), **characterized in that** said locking and safety means (6) comprise:

   - a strike tooth (10) projecting from the inner wall

(11a) of an annular body (11) which surrounds a through hole (12) made in a contrast plate (13) externally coupled with at least one of said side edges (2a, 2b) of said main transit platform (2);
- a first slot (14) made in the outer surface (15a) of a thickening washer (15) which is externally fixed to at least one of said side edges (2a, 2b) of said main transit platform (2) and received in said through hole (12) of said contrast plate (13);
- a second slot (16) made in the outer wall (8a) of said movable sleeve (8) and at a first end (8b) of said movable sleeve (8), arranged adjacent and facing said thickening washer (15) in such a manner that said second slot (16) is aligned, in a direction parallel to said transverse axis (X), and communicates with said first slot (14) when said front rod (4) takes said operating position,

said strike tooth (10) firmly snap engaging into said first slot (14) and into said second slot (15) for positioning said front rod (4) in said operating position.

9. Structure (1) according to claim 8), **characterized in that** said movable sleeve (8) is placed externally to a fixed peg (17) which supports it and protrudes from said thickening washer (15) according to said transverse rotation axis (X).

10. Structure (1) according to any of the claims 5) to 9), **characterized in that** said rotation means (7) comprise angular end-of-stroke means (18) suitable for stopping the rotation of said front rod (4) immediately before said front rod (4) takes said operating position or said rest position and immediately before that said locking and safety means (6) respectively take said working position or said release position.

11. Structure (1) according to claim 10) when depending on claim 9), **characterized in that** said angular end-of-stroke means (18) comprise:

- a first flat wall (19) and a second flat wall (20) defined by an arcuate notch (21) made in said first end (8b) of said movable sleeve (8) and which extends for the whole thickness of said movable sleeve (8) and for a length along said transverse axis (X) equal to the depth of said second slot (16);
- a first fixed pin (22) projecting from said thickening washer (15) parallelly to said fixed peg (17), with respect to which it is spaced apart, and from the outer face (13a) of said contrast plate (13) in such a way as to be opposite to said strike tooth (10),

said first flat wall (19) contrasting with said first fixed pin (22) in order to stop rotation of said front rod (4) before it takes said first operating position and said second flat wall (20) contrasting with said first fixed pin (22) in order to stop rotation of said front rod (4) before it takes said rest position.

12. Structure (1) according to claim 8), **characterized in that** said through hole (12) of said contrast plate (13) has a profile of substantially elliptical shape in such a way as to allow the relative sliding of said contrast plate (13) with respect to said thickening washer (15) and said movable sleeve (8) contained into said through hole (11) for at least one annular portion having a linear length along said transverse axis (X) equal to the depth of said second slot (16).

13. Structure (1) according to claim 8), **characterized in that** said contrast plate (13) is placed in proximity of the free end (2e) of at least one of said side edges (2a, 2b) of said main platform transit (2) so that said through hole (12) is closer to said access end (2c) of said main transit platform (2) than a reinforcement shank (23) of said contrast plate (13), monolithic to said annular body (11) from which projects parallelly to said longitudinal axis (Z) of said main transit platform (2).

14. Structure (1) according to claim 13), **characterized in that** said reinforcement shank (23) presents in the inner surface (23a) facing at least one of said side edges (2a, 2b) of said main transit platform (2) an elongated seat (24) which is separated from said through hole (12) by means of an intermediate flap (25) of said annular body (11) and which receives in a decentralized position a second fixed pin (26) projecting from the outer wall (2d) of said main transit platform (2) parallelly to said first fixed pin (22).

15. Structure (1) according to any of the claims 8), 12), 13) or 14), **characterized in that** said contrast plate (13) comprises elastic return and thrust means (27) suitable to be loaded when said front rod (4) passes from said rest position to said operating position and vice versa, respectively for:

- pulling said contrast plate (13) back towards the intermediate area (2f) of at least one of said side edges (2a, 2b) of said main transit platform (2) causing snap engagement of said strike tooth (10) into said first slot (14) and into said second slot (16) for positioning said front rod (4) in said operating position;
- pushing said contrast plate (13) towards said access zone (2c) of said main transit platform (2) causing disengagement of said strike tooth (10) from said first slot (14) and from said second slot (16) for positioning said front rod (4) in said rest position.

16. Structure (1) according to claim 15) when dependent

on claim 14), **characterized in that** said elastic means (27) comprise at least one torsion spring (28) contained into said elongated seat (24) of said reinforcement shank (23), placed along a third linear direction (Z") parallel to said longitudinal axis (Z) of said main transit platform (2) and provided with a first end (28a) cooperating in abutment with said second fixed pin (26).

FIG.1

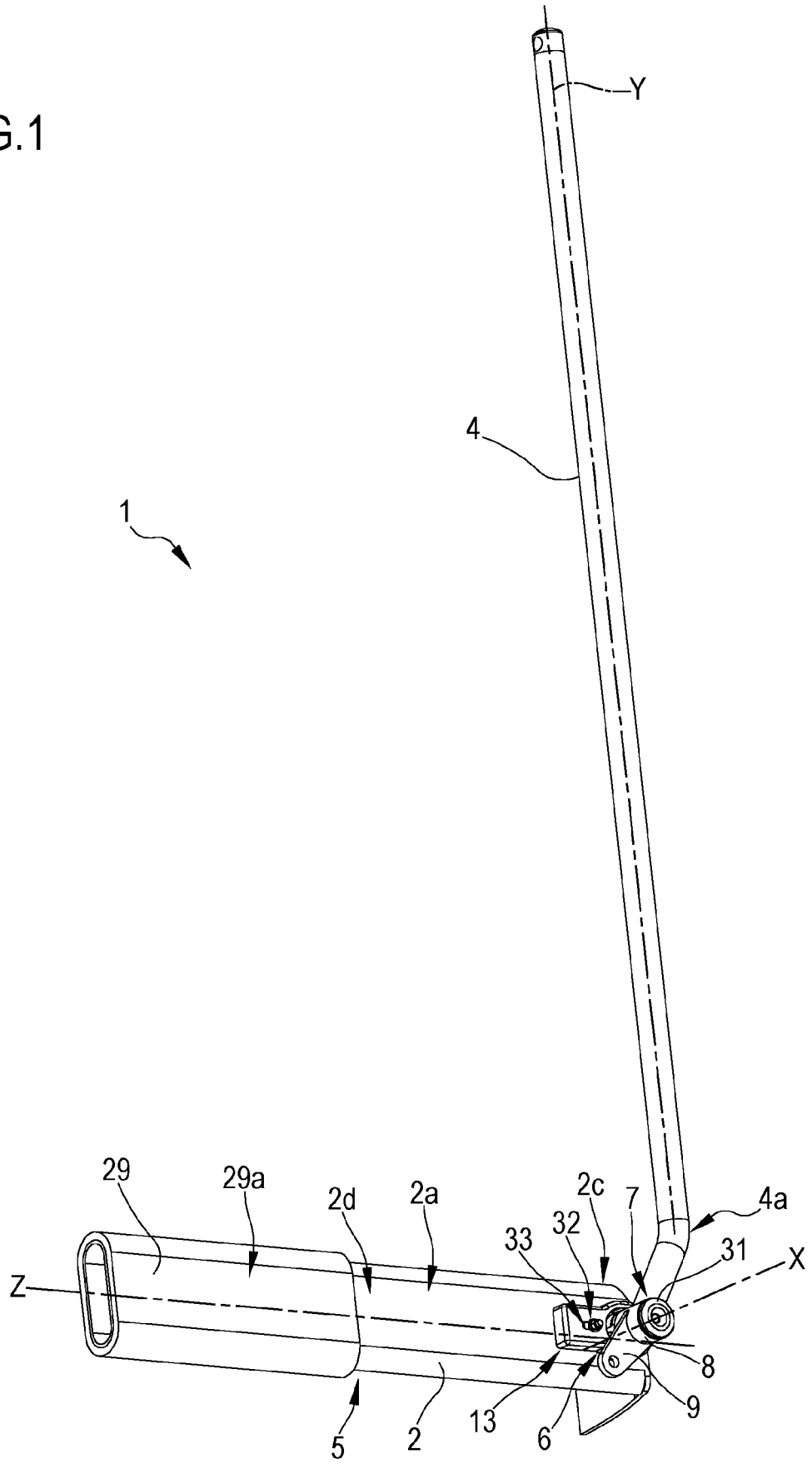


FIG.2

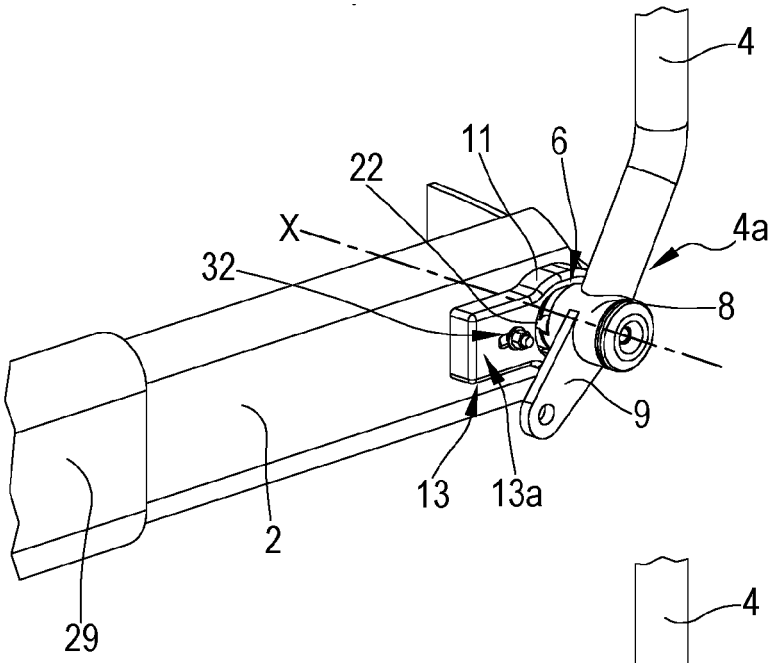


FIG.3

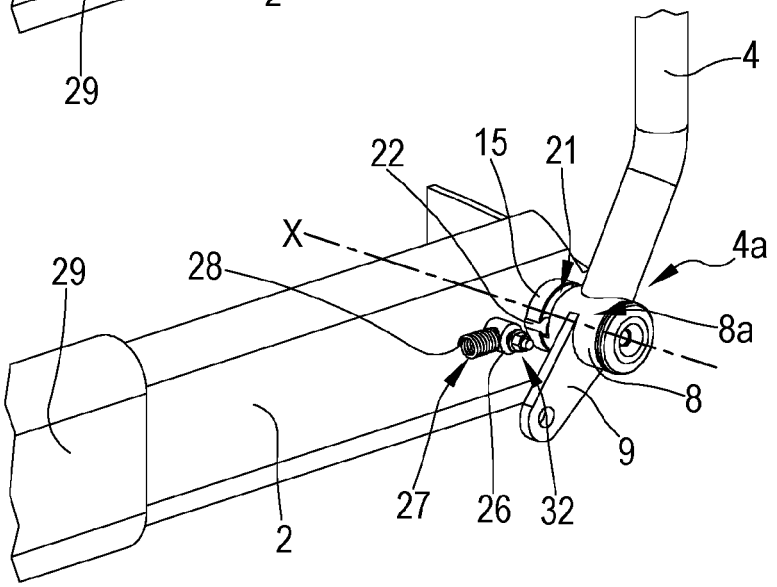
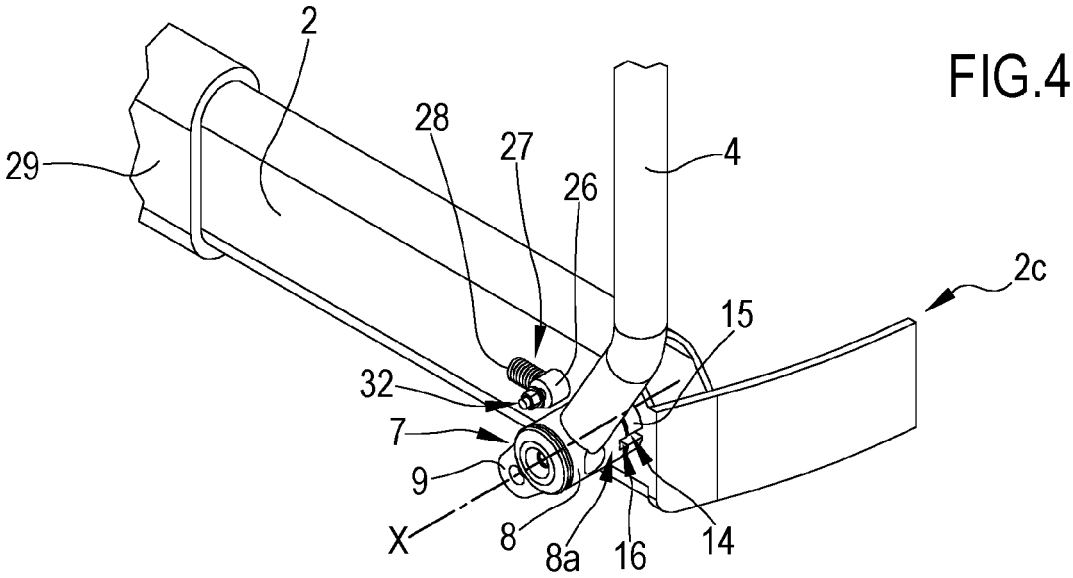


FIG.4



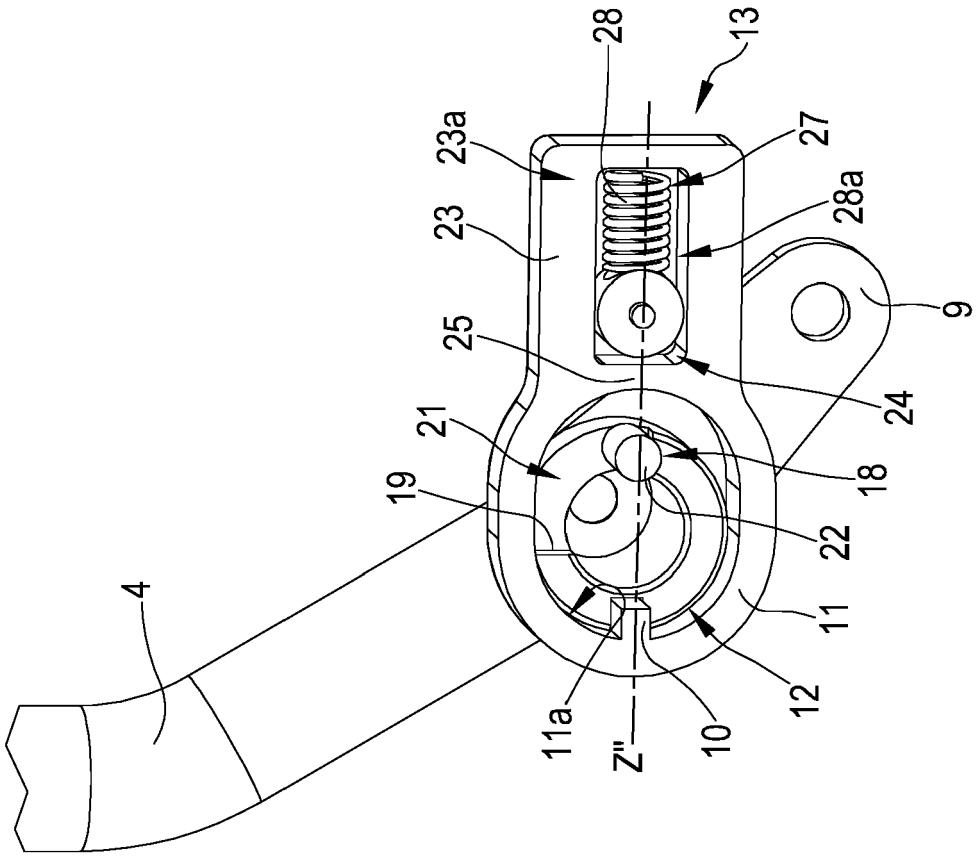

28
13
23a
27
23
28a
9
25
24
21
18
19
22
4
11
12
11a
Z"
10

FIG.6

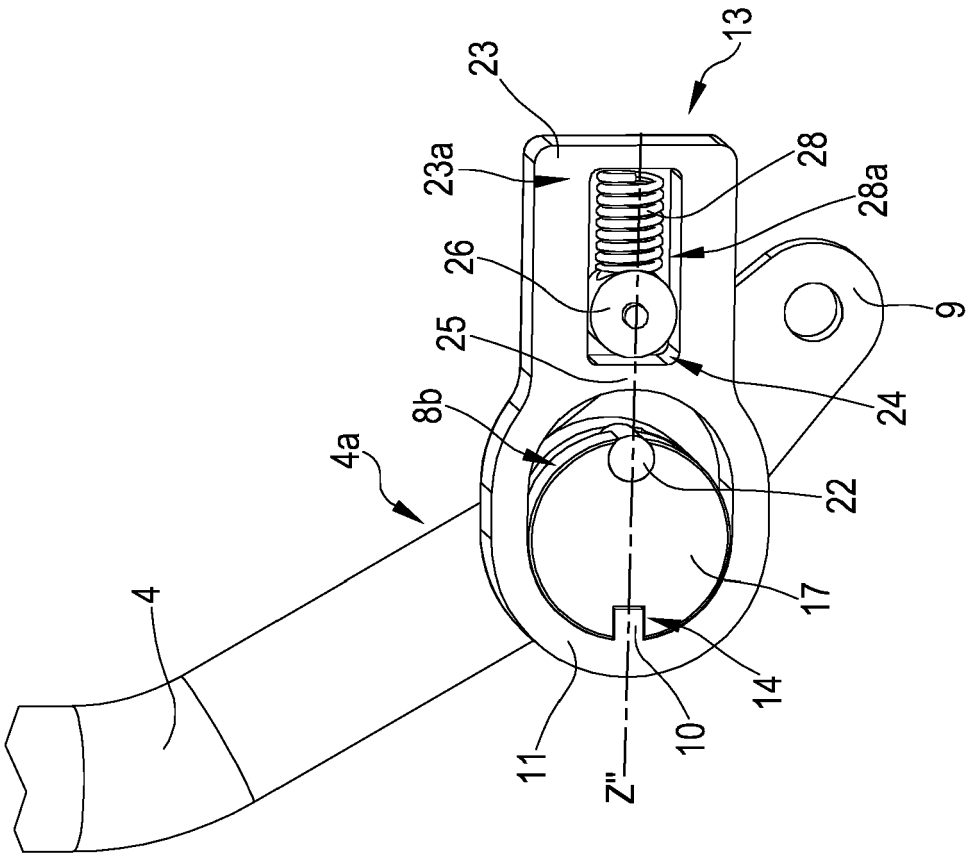

23
13
23a
28
28a
26
9
25
24
8b
4a
22
17
4
14
11
10
Z"

FIG.5

FIG.7

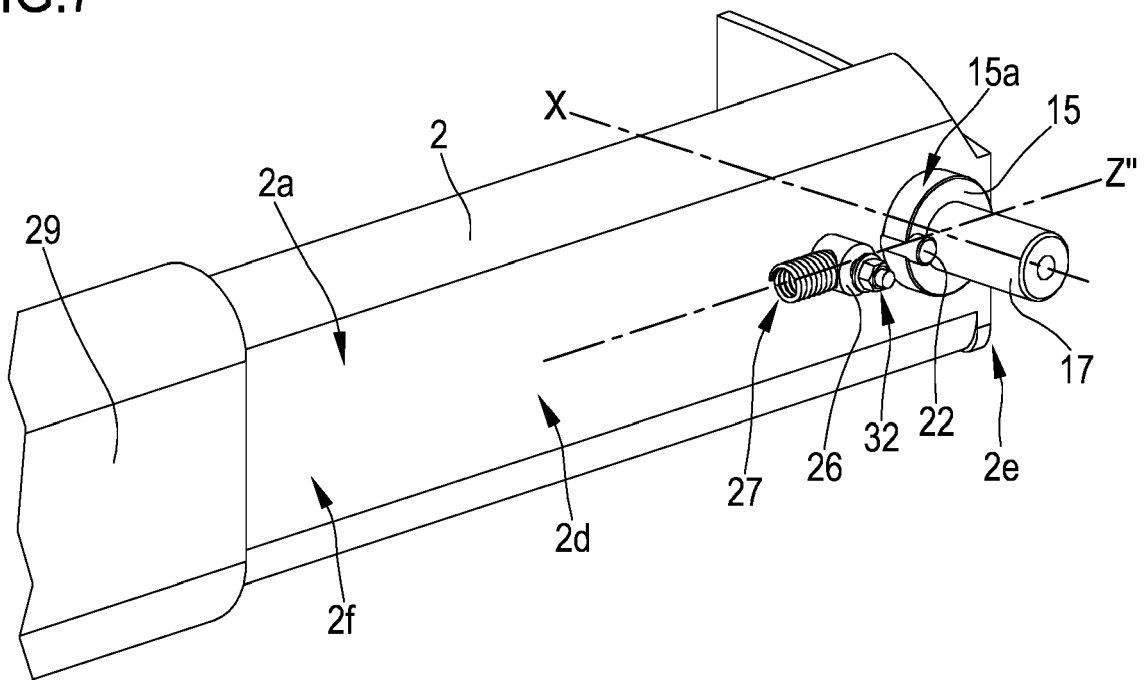

15a
15
X
Z"
2
2a
29
17
22
32
26
27
2e
2d
2f

FIG.8

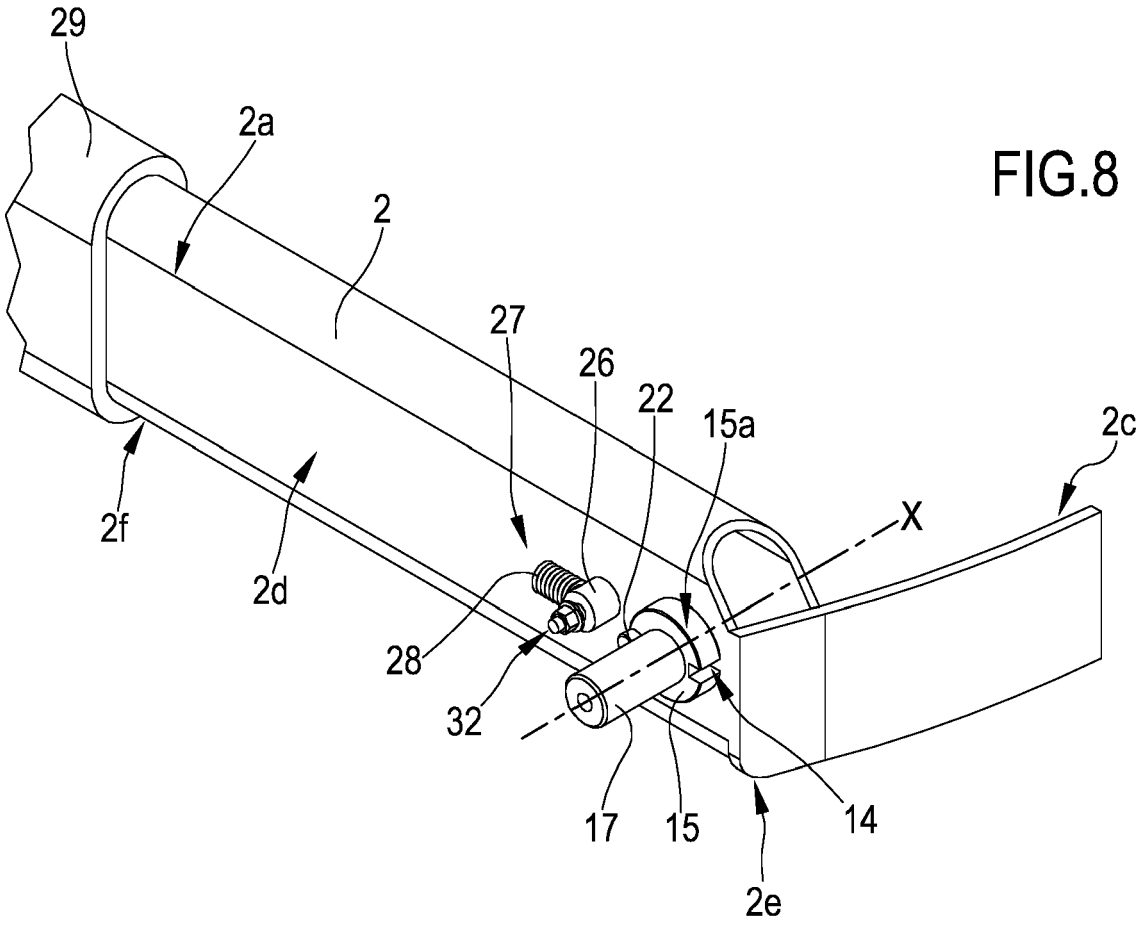
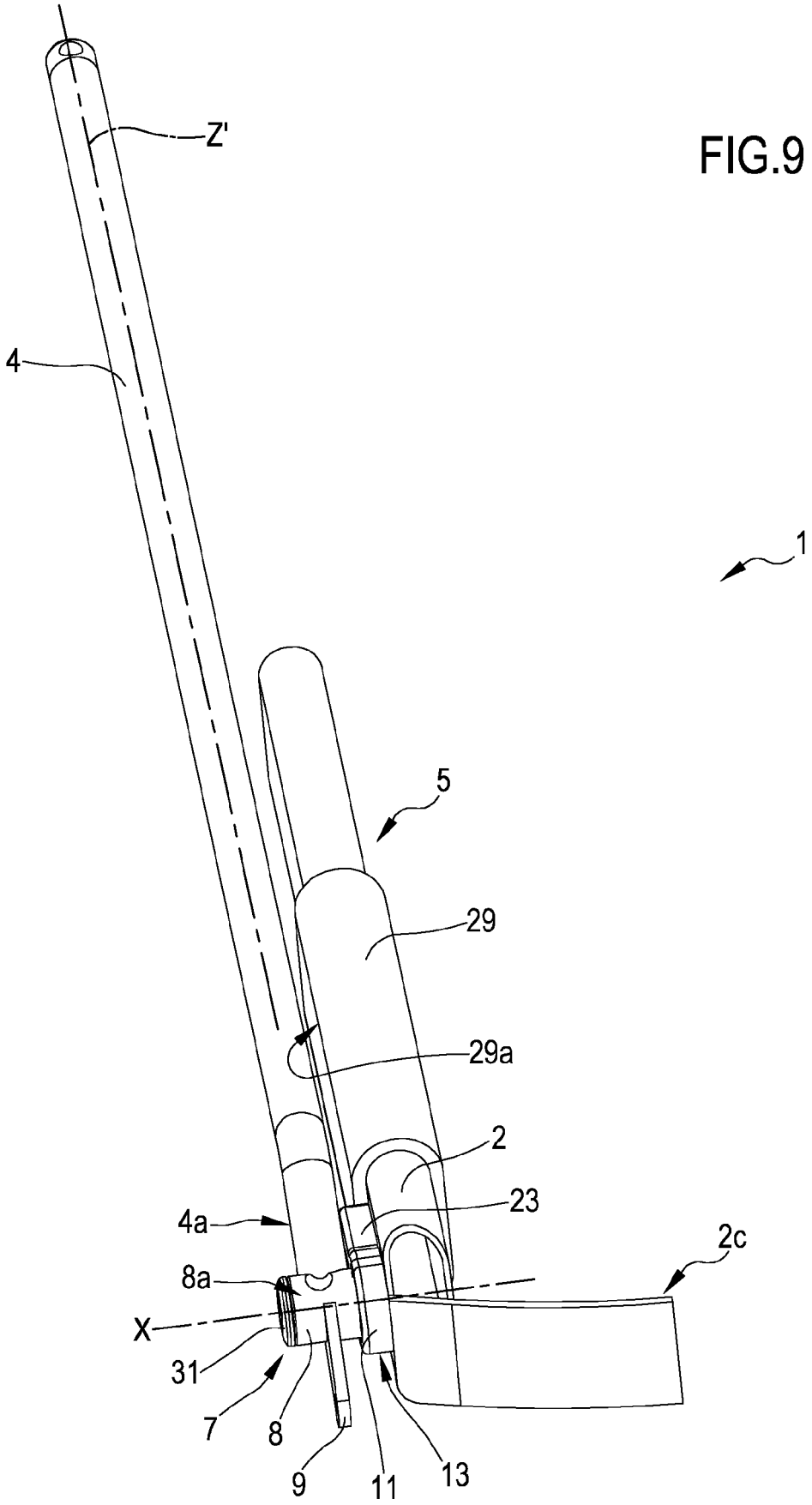

29
2a
2
27
26
22
15a
2c
X
2f
2d
28
32
17
15
14
2e

FIG.9



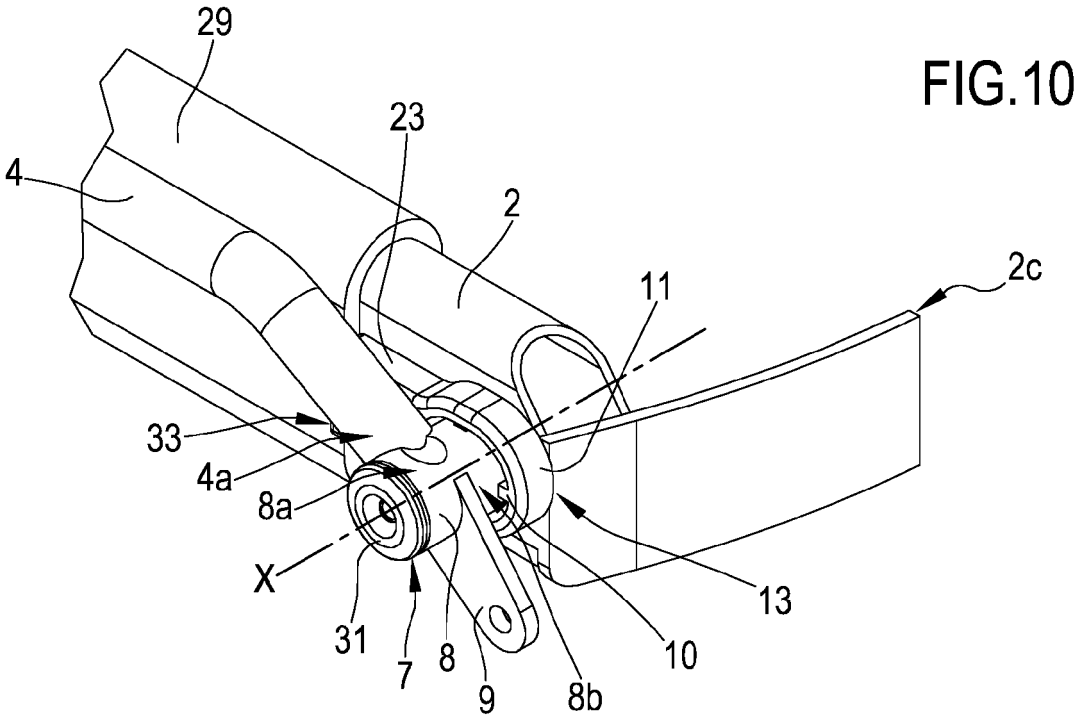
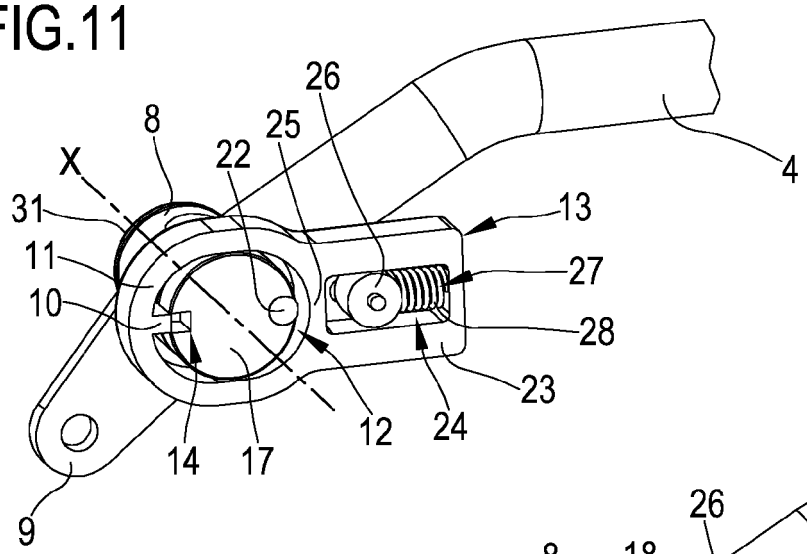


FIG.10

FIG.11



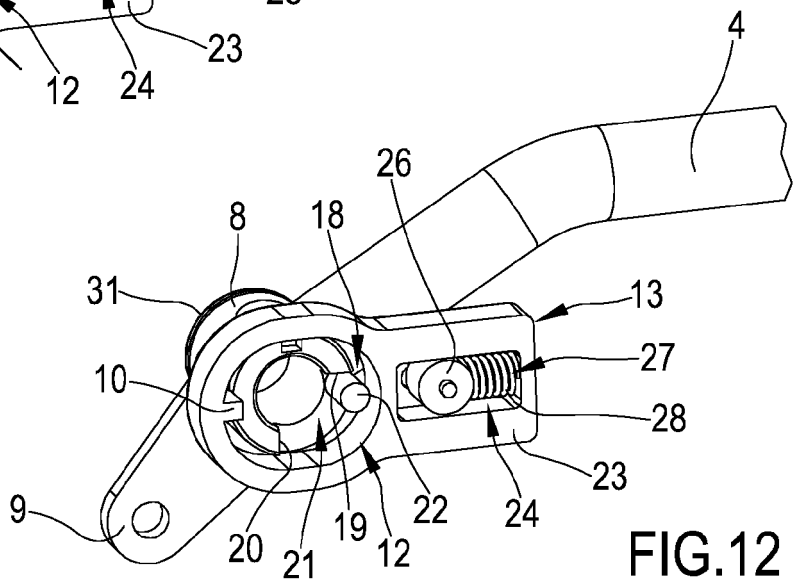


FIG.12

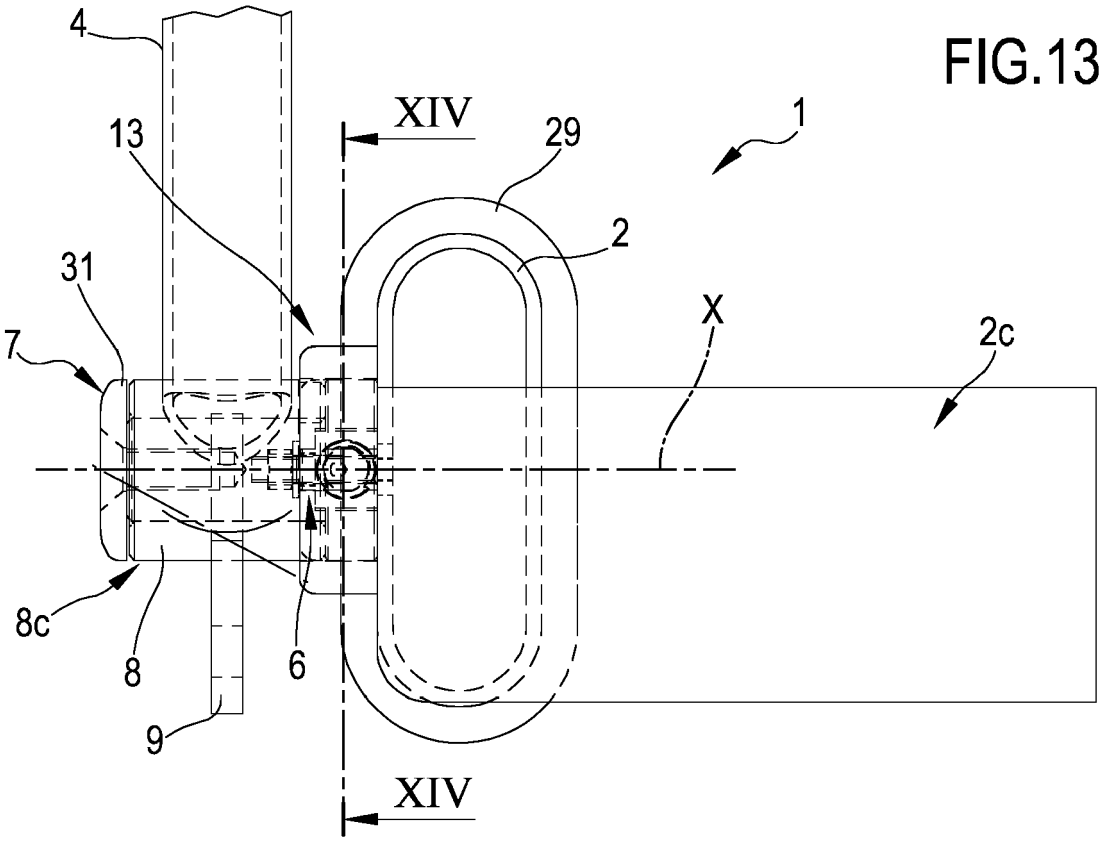

4
13
XIV
29
1
2
31
X
2c
7
8c
8
6
9
XIV

FIG.13

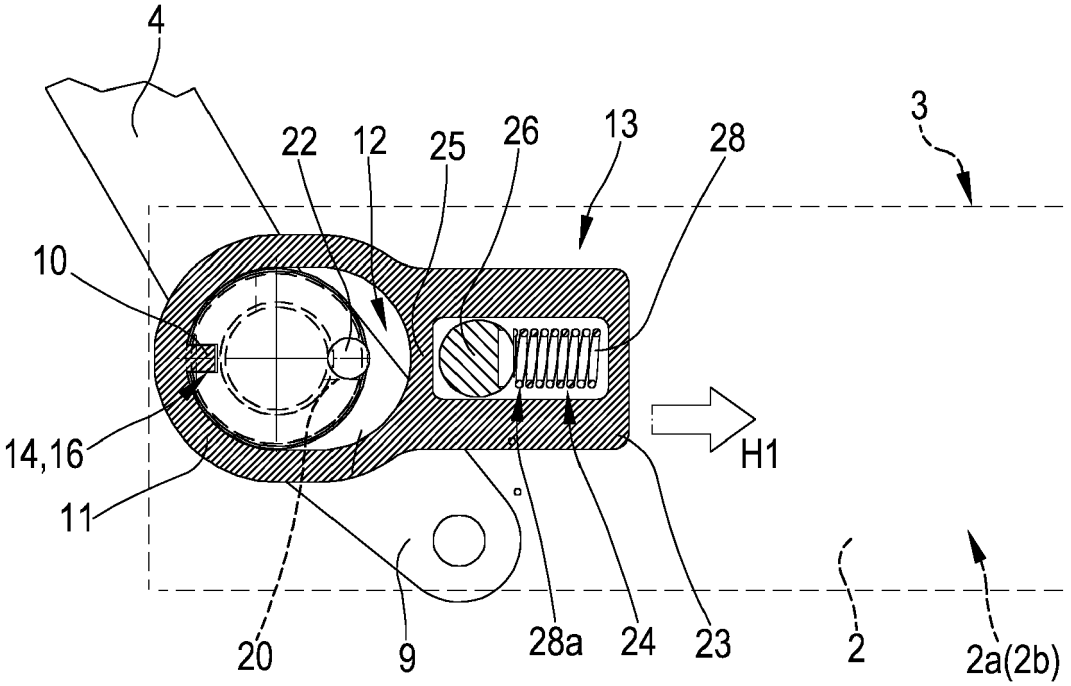
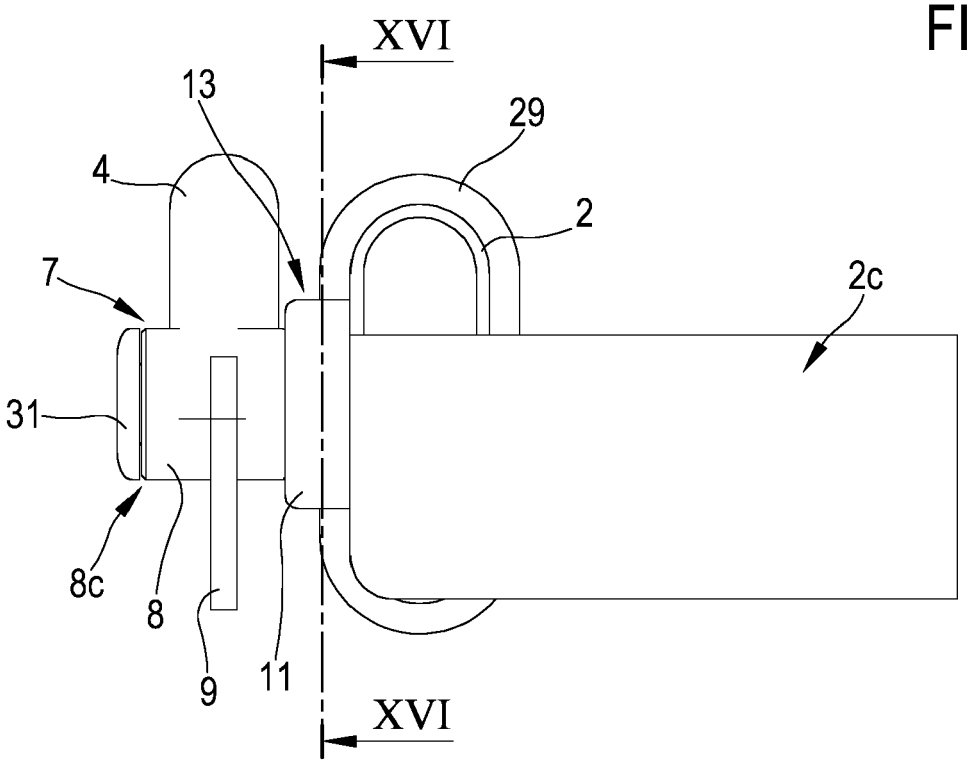

4
22
12
25
26
13
28
3
10
14,16
11
H1
20
9
28a
24
23
2
2a(2b)

FIG.14

FIG.15


XVI
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29
4
2
7
2c
31
8c
8
9
11
XVI

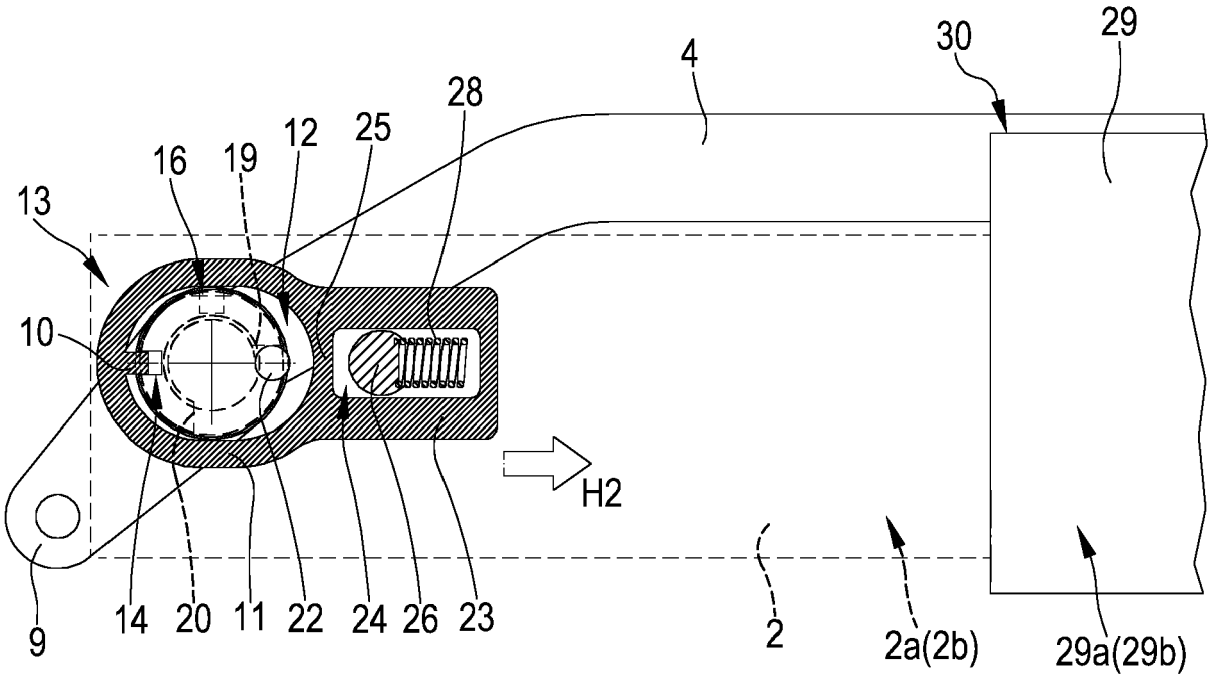
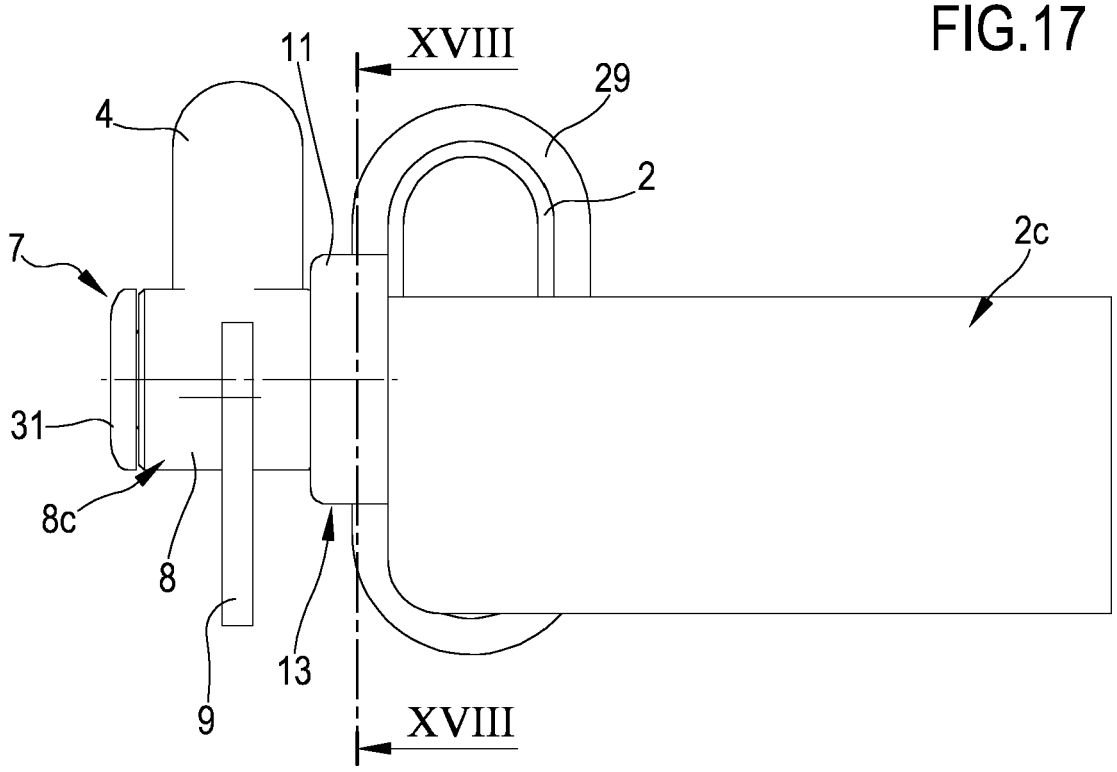

4
30
29
28
25
12
16
19
13
10
H2
9
14
20
11
22
24
26
23
2
2a(2b)
29a(29b)

FIG.16

FIG.17


11
XVIII
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4
2
7
2c
31
8c
8
13
9
XVIII

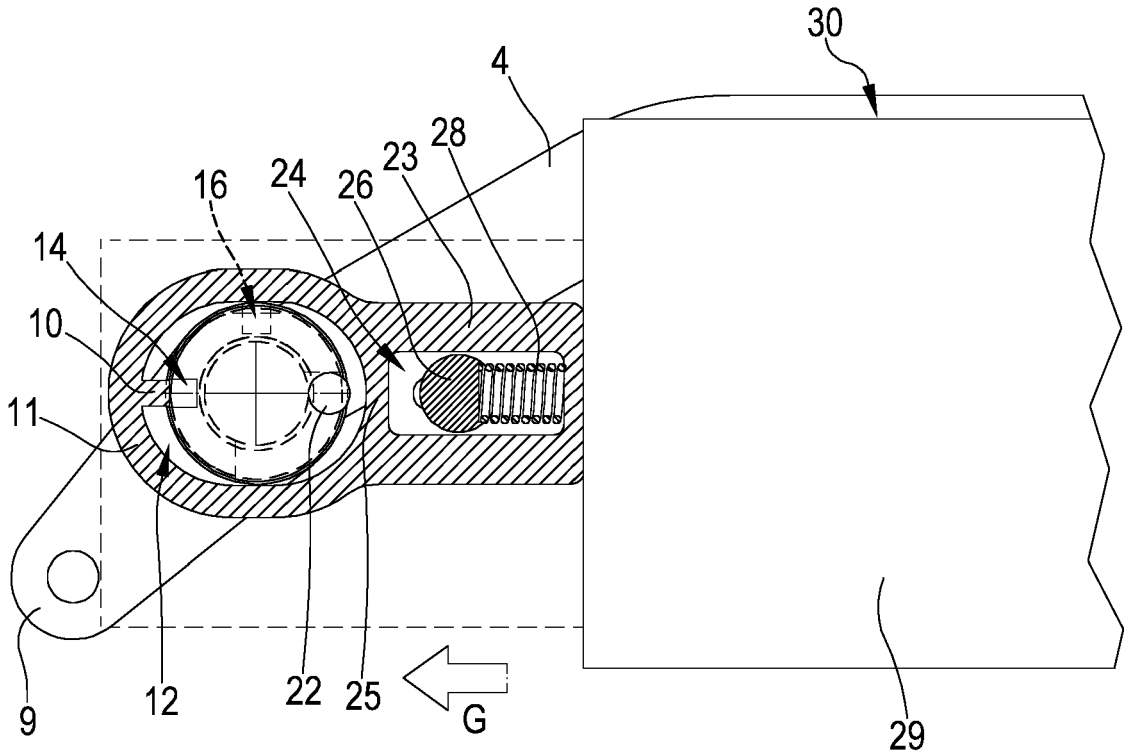
30
4
28
23
16
24
26
14
10
11
9
12
22
25
G
29

FIG.18

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EUROPEAN SEARCH REPORT

Application Number
EP 16 16 0587

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	WO 2013/042157 A1 (FINANCIAL S R L B [IT]) 28 March 2013 (2013-03-28) * page 5, line 1 - page 14, line 9; figures 1-8a *	1-16	INV. B63B27/14
A	US 4 161 795 A (QUEST ROLAND G [US]) 24 July 1979 (1979-07-24) * column 6, line 25 - line 44; figures 1-4,9 *	1-16	
A	DE 22 52 262 A1 (PIELERT JACK) 9 May 1974 (1974-05-09) * the whole document *	1-16	

TECHNICAL FIELDS SEARCHED (IPC)
B63B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	22 July 2016	Martínez, Felipe

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EPO FORM 1503 03.82 (P04C01)

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22-07-2016

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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- DE 3310460 A1 **[0009]**