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(54) HOISTING JACK WITH ROTATING AND SWIVELLING SUPPORTING FORK

(57) Hoisting jack with a rotating and swivelling supporting fork, of the type permitting the handling of parts of engines, preferably marine engines which incorporate outside of the hull of the boat some driving means for the rotation of the propeller, which are inclined in respect to the vertical, whereby the hoisting jack (10), assembled on a frame (11), comprises four degrees of freedom for holding an engine or a part of the same by means of a supporting fork (27) having a regulatable base (27a). It permits the rotation of the engine or a part of the same by means of the rotation of the supporting fork (27) holding the same by means of the clamps (28) located in the arms (27b) and (27c), the swivelling forward and backward of said supporting fork (27) in respect to the frame (11), the raising and descent of the supporting fork (27) in respect to said frame and the movement of translation and rotation of the frame (11) and consequently of the supporting fork (27),

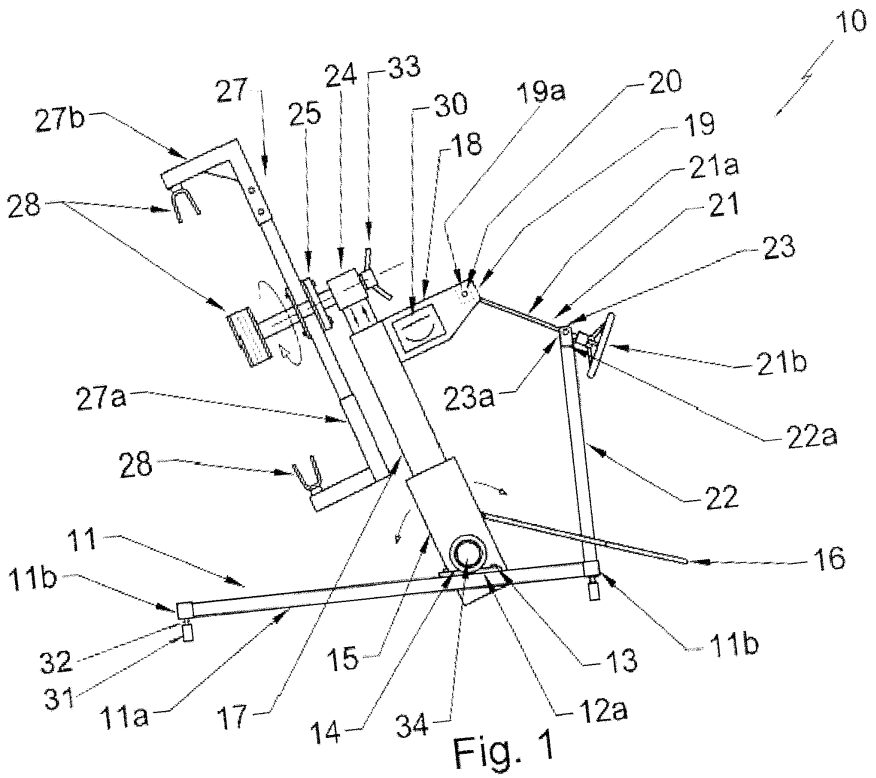

Fig. 1

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Description

Object of the invention

[0001] This invention refers to an hydraulic and/or pneumatic hoisting jack located on a frame having capacity to move on the plane of the ground and having a supporting fork with capacity to rotate 360° in respect to the frame, while at the same time the column supporting said fork has capacity to swivel within an angle comprised between -30 and +30 degrees approximately.

[0002] Another object of the invention consists in the structure of the frame of the hydraulic and/or pneumatic hoisting jack, permitting a plurality of movements of the above mentioned supporting fork, in a precise form.

State of the Art

[0003] There are in the market and therefore can be considered a part of the state of the art, different types of hydraulic or pneumatic hoisting jacks, which purpose is the elevation of weights from a plane below the jack, which weight can not be raised by means of the effort of one person, taking into account as well that said weight and the configuration of the same exceeds the possibility of handling between two different points in a safe and efficient manner.

[0004] With the same function as above frame structures with clamps are known, in which end the corresponding pulleys are located for raising the weight by means of the suitable chains, finding its application mainly, although not exclusively, in handling engines of all types, mainly engines for automobiles, boats and others.

[0005] Hydraulic and/or pneumatic hoisting jacks exist already in the market, having the corresponding forks, which height can be regulated with the purpose to locate the supporting fork in the correct position to hoist the corresponding weight. However said forks are always located in the same plane.

[0006] In some cases the hoisting jacks known in this field are not capable to raise certain weights or objects, particularly those mounted on the hull of boats. A part of said weights, above all those referring to the engines of the boats, are located inside of the hulls, while other parts of said engines, mainly the devices for driving the propeller or propellers and the assembly of levers for steering the boat, are located outside of the hull of the boat, being therefore difficult enough to hoist said weights without harming the surfaces of the hull in the vicinity of said parts of the engine, mainly in the engines of the IPS type, having two engines and two propellers with two rudders, in diverging directions.

Purpose of the invention

[0007] The object of the invention is the incorporation of a modified hoisting jack to a frame structure, permitting the associated supporting jack to rotate 360°, having as well the possibility to swivel said fork in respect to a vertical axis regulable between - 30 and +30 degrees approximately, and finally permitting the rotation of 360° and the translation of said frame and its structure on the plane of the ground and consequently the hoisting jack and the movable fork associated to said frame.

Description of the invention

[0008] According to an eventual embodiment, the invention comprises the following means:

- Translation and support means for the hoisting jack.
- Means to vertically move a supporting fork associated to the hoisting jack in combination with swivelling means for said supporting fork.
- Means for the adaptation of the supporting fork to the size of the mass to be suspended.

[0009] The translation and supporting means for the hoisting jack include a frame with a fixed column perpendicular to the frame, apart from the supporting structure of said frame with the corresponding wheels, permitting the movement of the hoisting jack and the frame across the plane of the ground.

[0010] The means for the vertical movement and swivelling of the supporting fork, both vertically and angularly, have a thread joining the column perpendicular to the frame to the swivelling column.

[0011] The means for swivelling the supporting fork comprise horizontal pins perpendicularly protruding from the pneumatic and/or hydraulic cylinder permitting the rotation of said cylinder and particularly of said fork.

[0012] The means for the adaptation of the supporting fork to the dimensions of the mass to be suspended, include multiple extensible tubular elements, forming some kind of a "U" structure with a vertical arm which is perpendicular to the base of said "U".

[0013] The present invention comprises a frame formed by longitudinal beams and cross beams with the corresponding wheels, on which the movable hoisting jack hydraulically or pneumatically driven is incorporated. A tubular element is welded to the frame, so that the hoisting jack and said tubular element can oscillate in respect to the structure of the frame and in this way also the supporting fork, associated to said tubular element. The assembly of commanding levers for the engines is secured by means of clamps located at the ends of the three arms forming the supporting base.

[0014] According to a feature of the invention, the structure of the hoisting jack in one of the embodiments eventually possible is practically cylindrical, having in its part welded to the same a tubular column inside of which a second tubular element is located, permitting the second element to slide within the first element, as well as the raising and descent of the supporting fork, on which upper end means are incorporated for pressing a fork or support with a "U" configuration, having at the ends of its

arms the corresponding clamps.

[0015] Said internal tubular column, according to another of the features of the invention, has some supporting plates perpendicular to the column and parallel to each other which hold a prismatic bar having an orifice for the passage of a worm gear driven by the corresponding hand lever, so that the movement of the worm gear implies according to a first degree of freedom, the oscillation in respect to the vertical axis of the supporting fork between +30 and -30 degrees approximately, according to a second degree of freedom, it implies the tubular element to slide up and down with the supporting fork by the action of the hydraulic and/or pneumatic hoisting jack, permitting a third degree of freedom the rotation of 360° of the supporting fork in respect of the rest of elements or parts integrating the invention, and finally a fourth degree of freedom permits to rotate and displace the assembly of the hoisting jack and its frame by means of the wheels of the frame sliding on the plane of the ground.

[0016] According to another of the characteristics of the invention, the supporting fork is formed by tubular sections integrating a "U" structure, which base has a variable width, permitting the adaptation to different configurations of the mass to be suspended with four degrees of freedom, securing the masses by means of corresponding clamps at the ends of the three arms. For its part the supporting fork is assembled on the internal tubular element which drives the hoisting jack by means of the corresponding circular flanges, permitting the rotation of 360° of the fork and the fixture to said tubular element by means of the corresponding handle.

[0017] Other details and features of the invention will be explained in the following description, which refers to the enclosed drawings, showing in an illustrative but non limitative form a graphic representation of the invention, which can be carried out in any type of dimensions and suitable materials.

Description of the drawings

[0018] In the following a relation of the different parts of the invention will be given, with the assistance of numerals to identify the parts in the corresponding figures; (10) hydraulic hoisting jack, (11) frame, (11a) longitudinal beams, (11b) cross beams, (12) clamps, (12a) horizontal extensions, (13) screws, (14) bar, (15) hydraulic and/or pneumatic cylinder, (16) lever, (17) column, (18) supporting plate, (19) bar, (19a) orifice, (20) screw nuts, (21) adjustment element, (21a) threaded rod, (21b) hand control wheel, (22) column, (22a) fins, (23) bar, (23a) orifice, (24) tubular element, (25) pressing element, (25a-25b) circular flanges, (26) screws, (26a) screw nuts, (27) rotating supporting fork, (27a-27b-27c) sections of the supporting fork (27), (28) clamps, (29) arm, (30) inclination measuring gage, (31) wheels, (32) pins, (33) lever, (34) shafts, (35) handle.

Figure No. 1 is a side view of the hoisting jack (10) and, the frame (11) which is movable by means of the wheels (31) which rotate in respect to said frame (11) thanks to the pins (32) perpendicular to the frame (11).

Figure No. 2 is a plant view of the supporting fork (27) having a "U" form with a base (27a) and arms (29) perpendicular to the base (27a), the ends of the arms (29) incorporating the clamps (28) to secure the supporting fork (27) to the swivelling column (17).

Figure No. 3 shows a detail corresponding to "1" in Figure 2 corresponding to the arm (27a) of the fork (27) from which originates the arm (29).

Description of an embodiment of the invention

[0019] In one preferred embodiment of the invention as shown in Figure 1, the hoisting jack (10) has on the frame (11) a pneumatic and/or hydraulic cylinder (15), a tubular column (17) which has internally another tubular element (24), in which upper end some means for pressing the supporting fork (27) are located.

[0020] The frame (11) of the hoisting jack (10) has a supporting structure serving as movable support to the hoisting jack (10), having longitudinal beams (11a) secured by cross beams (11b) permitting the movement of said hoisting jack (10) by means of the wheels (31) located in the lower part of the cross beams (11b), permitting the movement of the hoisting jack as a whole.

[0021] On the frame (11) another column (22) is secured, being perpendicularly arranged to the cross beams (11b) and having its an upper end (22) a bar (23) which is capable to rotate in respect to the fins (22a) which are crossed by a half axis going through said bar (23) and fins (22a).

[0022] On the beams (11a) is assembled, as is to be seen in Figure No. 1, an hydraulic or pneumatic cylinder (15), which by means of a lever (16) in the case of being an hydraulic cylinder, displaces upside down and vice versa the supporting fork (27) fixing the tubular element (24) which is the base of (27) by means of the pressing elements (25) which have the form of corresponding circular flanges (25a-25b).

[0023] The cylinder (15) and the arm (17) can move oscillating forwards and rearwards, by means of clamps (12), which secure the shafts (34) welded to the body of said cylinder (15), the horizontal extensions (12a) of the clamps (12) being screwed to the longitudinal beams (11a).

[0024] For its part the column (17) oscillating in collaboration with the fixed column (22), the supporting plates (18) and the adjustment element (21) having a threaded rod (21a) and the hand control wheel (21b) regulate the oscillation of the column (17) in respect to the frame (11), having the capacity to determine the degree of oscillation with the assistance of an angle measuring gage secured to the supporting plates (18).

[0025] The tubular element (24) having the capacity to slide up and down within the internal part of the column

(17), receives the force from the hoisting jack (10), provoking the raising and descent of the supporting fork (27) in whatever position, existing one degree of freedom for rotation in 360° thanks to said pressing elements and the lever (33), which when rotating in the counterclockwise sense releases the pressure on the supporting fork (27), permitting to locate the same in the suitable position, while when rotating clockwise the lever (33) secures the fork in the selected position.

[0026] The forward and backward rotation of column (17) and subsequently of the supporting fork (27) is due additionally to the action of the adjustment element (21) which rotates the threaded rod (21a) nearing or putting farther away the column (17), when said threaded rod (21a) engages the bar (19) articulated on the supporting plates (18).

[0027] The supporting plates (18) are welded to the column (17) and its purpose is to support said bar (19) between its internal surfaces, in which orifice (19a) engages the threaded rod (21a) driven by the hand control wheel (21b).

[0028] On the frame (11) is perpendicularly assembled the column (22) which blocks the rotation means of the threaded rod (21a) which rotates by means of the hand control wheel (21b) according to another of, the features of the invention. The structure of the frame (11) and the elements which are assembled on the same, permit to locate the supporting fork (27) under or aside of the weight to be handled, in order to raise or lower said weight by the action of the lever (16) on the pneumatic cylinder (10).

[0029] The better adapt the supporting fork (27) to the shape of the weight to be suspended it has a base (27a) with extensible arms (27b) which slide by the action of the lever (33) putting closer or farther away the arms (27b) and the clamps (28) welded to the ends of said arms (27b) and perpendicularly to the base (27a) of a third arm (17c).

[0030] The mass to be suspend comprises one or more rudders with the driving means for the propellers, located outside the hull of the boat, which elements by means of the supporting fork (27) and its three clamps (28) can be disassembled from the engine or engines located inside of the hull to be eventually repaired being afterwards assembled again.

[0031] The rudders of the IPS engines form a certain angle in respect to the vertical and when they should be repaired are separated from the engines assembled inside of the hull, changing gaskets and any other internal parts of the driving means including the propellers, for its subsequent re-assembly with the assistance of a movable hoisting jack having a supporting fork with three arms in which ends clamps are located to be adapted to the specific shape of said rudders.

[0032] After having sufficiently described the present invention corresponding to the enclosed figures it has to be understood that multiple modifications can be carried out in the same whenever the essentials of the invention are not altered as defined in the following claims.

Claims

1. Hoisting jack with a rotating and swivelling supporting fork, of the type permitting the handling of parts of engines, preferably marine engines which incorporate outside of the hull of the boat some driving means for the rotation of the propeller, which a inclined in respect to the vertical, **characterized in that** the hoisting jack (10) assembled on a frame (11) comprises four degrees of freedom for holding an engine or a part of the same by means of a supporting fork (27) having a regulatable base (27a) and permitting:

   - The rotation of the engine or a part of the same, by means of the rotation of the supporting fork (27) holding the same by means of the clamps (28) located in the arms (27b) and (27c),
   - The swivelling forward and backward of said supporting fork (27) in respect to the frame (11),
   - The raising and descent of the supporting fork (27) in respect to said frame,
   - The movement of translation and rotation of the frame (11) and consequently of the supporting fork (27);

   all of it by means of the combination of the following means:

   - Translation and holding means of the hoisting jack (10),
   - Means to displace vertically the supporting fork (27),
   - Means for the adaptation of the supporting fork (27) to the dimension of the weight to be suspended, the base (27a) and the arms (27b) and (27c),
   - Swivelling means for said supporting fork (27) in respect to the frame (11).

2. Hoisting jack with a rotating and swivelling supporting fork, according to claim 1, **characterized in that** the means for the translation and rotation of the hoisting jack (10) comprise wheels (31) assembled on pins (32) in the frame (11), formed by longitudinal beams (11a) and cross beams (11b).

3. Hoisting jack with a rotating and swivelling supporting fork, according to claim 1, **characterized in that** the holding means for the hoisting jack (10) and the hydraulic cylinder (15) include shafts (34) perpendicular to the cylinder (15) and diametrically opposed, secured to the longitudinal beams (11a) by means of the semi circular flanges (12), which have horizontal extensions (12a) secured by screws (13)

and nuts corresponding to the longitudinal beams (11a).

4. Hoisting jack with a rotating and swivelling supporting fork, according to claim 1, **characterized in that** the means for the movement of the supporting fork (27) comprise tubular elements, the first of which forms the column (17) which has inside the tubular element (24) with capacity of ascent and descent of said supporting fork (27) by the action of the lever (16) on the hydraulic or pneumatic cylinder (15).

5. Hoisting jack with a rotating and swivelling supporting fork, according to claim 1, **characterized in that** the frame (11) is secured to another column (22), perpendicularly to the cross beam (11b) and, at the upper end of the column (22) a bar (23) is located with capacity to rotate in respect to the fins (22a) crossed by an axis which passes through said bar (23) and the fins (22a).

6. Hoisting jack with a rotating and swivelling supporting fork, according to claim 1, **characterized in that** the swelling of the arm (17) and the supporting fork (27) is made possible by the rotation of the adjustment element (21) and the threaded rod (21a) putting closer or farther away the column (17) after said threaded rod (21a) engages the corresponding orifice in the movable bar (23).

7. Hoisting jack with a rotating and swivelling supporting fork, according to claims 1 and 6, **characterized in that** the bar (23) has capacity to rotate in respect to the column (22) by means of the fins (22a) welded to the upper part of the column (22) and a shaft which horizontally crosses said fins (22a) and the bar (23).

8. Hoisting jack with a rotating and swivelling supporting fork, according to claim 1, **characterized in that** the rotation and/or securement of the fork (27) is a result of the action of the adjustment element (21) which rotates the threaded rod (21a) putting closer or farther away the column (17) when said threaded rod (21a) engages the bar (19) articulated on the supporting plates (18).

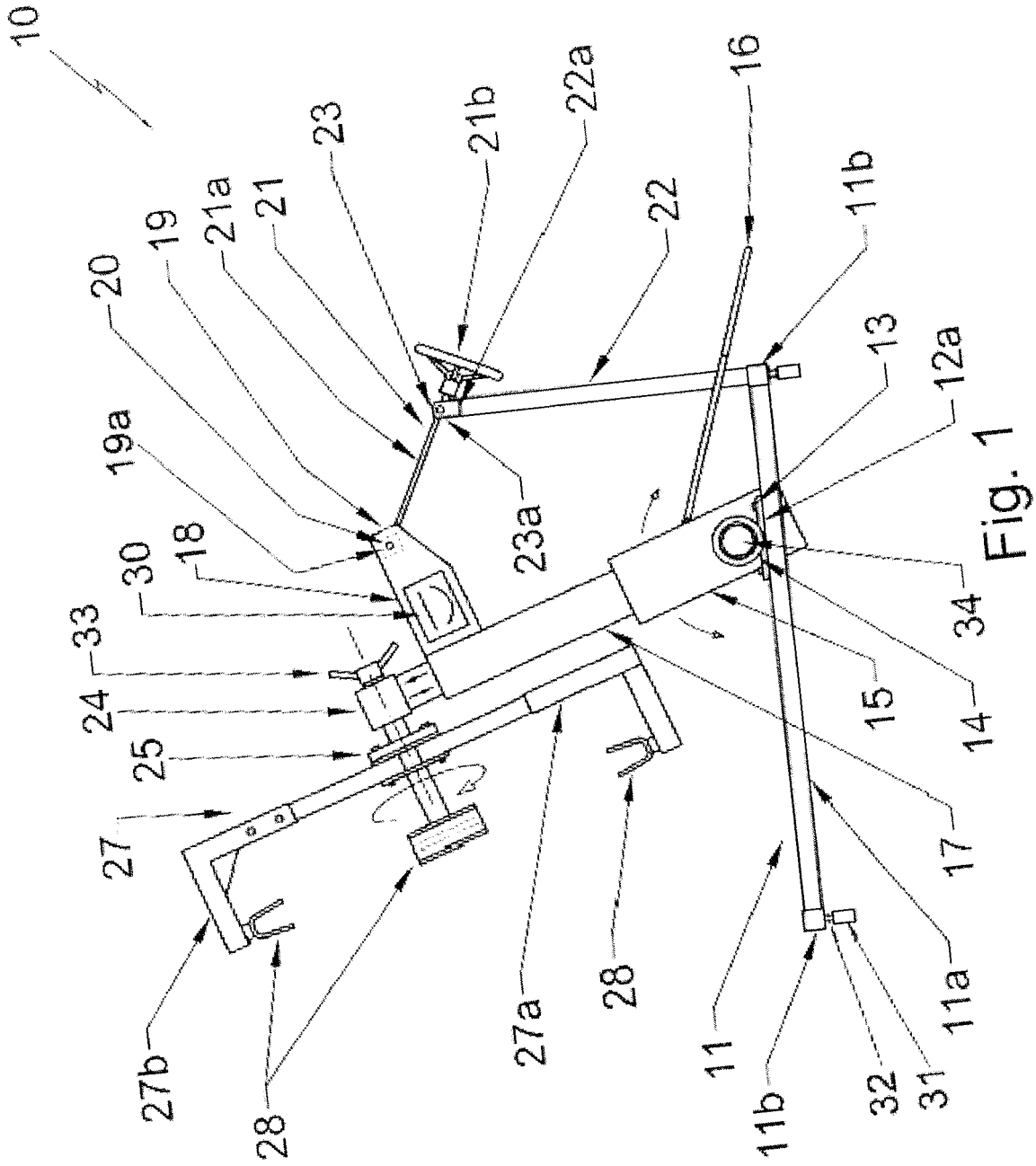
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Fig. 1

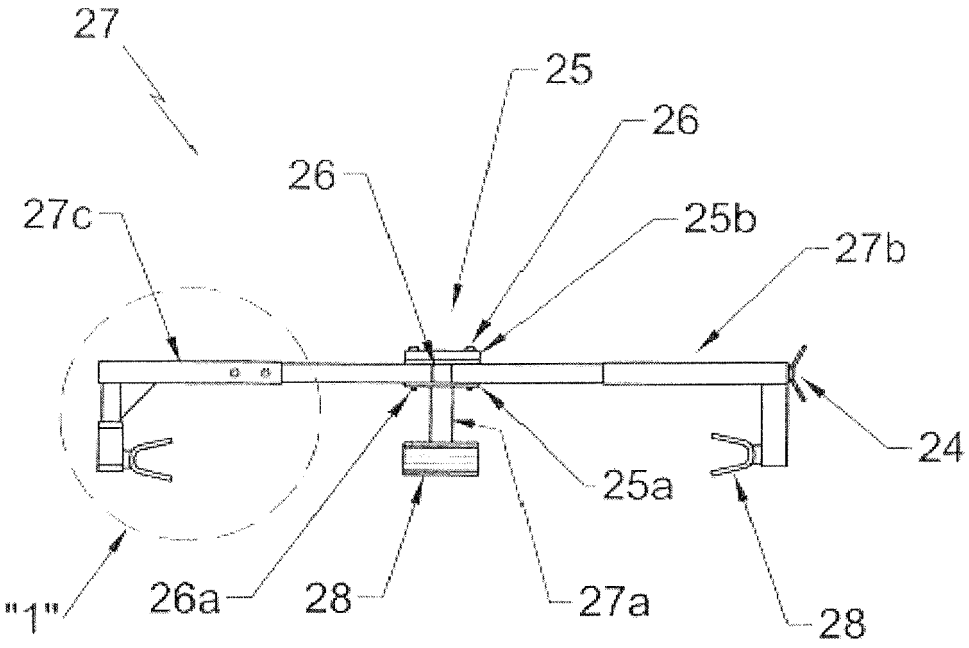

Fig. 2

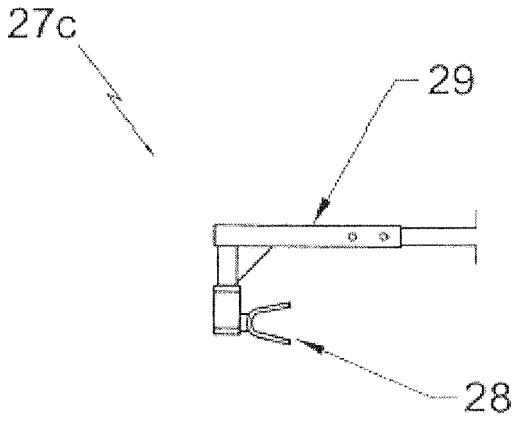

Fig. 3
Detail 1

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EUROPEAN SEARCH REPORT

Application Number
EP 16 16 3638

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 4 239 196 A (HANGER JAMES E [US]) 16 December 1980 (1980-12-16)	1-3,5-8	INV. B66F3/36 B66C23/48 B25H1/00
A	* the whole document *	4	
X	US 3 700 132 A (WATERS JAMES R) 24 October 1972 (1972-10-24)	1,2,4	
A	* the whole document *	3,5-8	
X	US 4 090 625 A (WALTERS JERRY) 23 May 1978 (1978-05-23)	1,2,4	
A	* column 2 - column 5; figures 1-10 *	3,5-8	
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A	* column 2 - column 4; figures 1-9 *	3-8	
A	US 6 491 293 B1 (BREWER MICHAEL L [US]) 10 December 2002 (2002-12-10) * abstract; figures 1-4 *	1-8	

TECHNICAL FIELDS SEARCHED (IPC)

B66F
B66C
B25H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	3 October 2016	Rupcic, Zoran

CATEGORY OF CITED DOCUMENTS

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03-10-2016

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