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(54) **Loader attachment having at least two parallel arms**

(57) In a loader attachment (1) for a working vehicle such as an agricultural tractor, there are arranged at least two arms (4), produced in the form of hollow bodies, which extend substantially in parallel, and at least one transverse hollow strut (6), for connecting the said arms (4). Electrical lines and/or fluid-carrying inlet lines (7) are run in at least one of the said arms (4). The transverse strut (6) and/or the arms (4) form an interconnected installation space in which is mounted at least one component (8) for controlling the loader attachment (1) or implements fastened to the front (3) thereof. The control components (8) are mounted on a carrier member 10 located in the transverse strut (6). The design avoids weakening the cross-sectional geometry of the arms or transverse strut and prevents the supply lines and control components from becoming fouled, without the need for additional protective components.

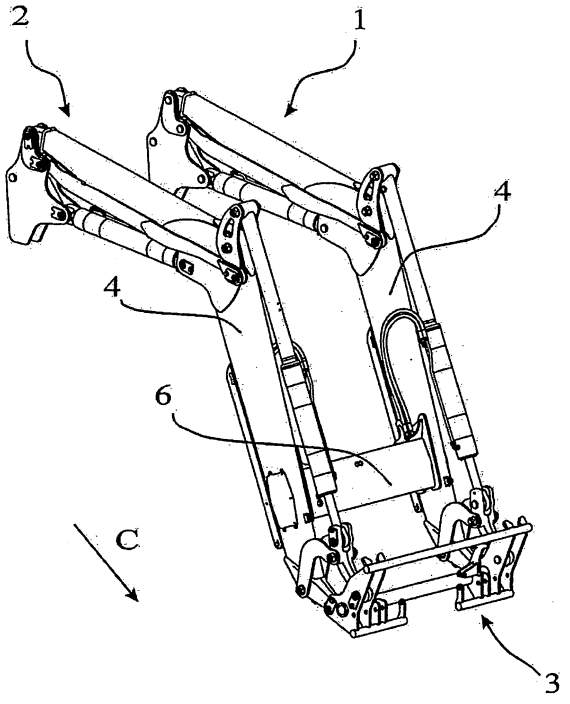

Fig. 1

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Description

[0001] The invention relates to a loader attachment for a working vehicle such as a tractor having at least two arms extending in parallel and at least one transverse strut for connecting the said arms and having feeds for electrical and/or fluid-carrying supply lines in at least one of the said arms.

[0002] Already known, from WO 2006/036014, is an attachment as defined in the preamble to claim 1 in which the supply lines emerge from the arm through openings at a point ahead of the transverse strut and are run to a valve housing mounted on the transverse strut. Also, to protect the supply lines and the valve housing there is, mounted on the transverse strut, a cover which is intended to protect the entire area of the transverse strut and hence the supply lines and the valve housing too. This design is disadvantageous because the opening of large area in the arm for the supply lines to be run out has an adverse effect on the cross-section of the arm and hence on its strength. To reduce this weakening, additional cost and effort has to be devoted to strengthening the region concerned. Also, the additional cover for protecting the supply lines and the valve housing on the transverse strut means additional expenditure on the parts which have to be used and on welding work.

[0003] It is an object of the invention to further provide an improved form of loader attachment which at least mitigates the above problems in such a way that both weakenings are avoided in the cross-sectional geometry in the arms and it is ensured that supply lines and valves are protected without the need for additional components.

[0004] This is achieved by providing a loader attachment for a working vehicle having at least two arms, produced in the form of hollow bodies, which extend substantially in parallel, and at least one transverse hollow strut, for connecting the said arms, at least one of the said hollow arms, containing fluid-carrying lines and/or electrical lines characterised in that the transverse strut and/or the arms form an interconnected installation space in which is mounted at least one component for controlling the attachment or implements fastened thereto.

[0005] Thus, for example, the control components (valves) may be mounted inside the cross-section of the transverse strut and the transition which the supply lines make from the arms to the transverse strut is effected inside the arm.

[0006] By virtue of this solution, it is now ensured that the control components are protected against mechanical damage without the use of further components and the supply lines are run in such a way that no further openings are required in the arms and the strength of the said arms is thus not reduced. Access to the control components is ensured by means of a carrier member, which can be withdrawn from the transverse strut together with the control components mounted thereon.

[0007] Other features of the invention are specified in the sub-claims.

[0008] An embodiment of the invention will be explained below by reference to the drawings. In the drawings:

Fig. 1 is a perspective view of a loader attachment in accordance with the invention;
Fig. 2 is a side view of the attachment, including a part shown in section;
Fig. 3 is a perspective view of part of the loader arm structure;
Fig. 4 is a perspective detail view of the loader arm in which the arm and transverse strut are shown ghosted;
Fig. 5 is a perspective view from below in the region of the transverse strut;
Fig. 6 is a section on line A-A in Fig. 2.
Fig. 7 is a section on line B-B in Fig. 6.

[0009] Shown in Fig. 1 is a loader attachment 1 which is connected, by its end 2 which is at the rear in the direction of travel C, to a working vehicle (not shown) such as an agricultural or construction tractor and whose front end has mounted an implement such as an attachment frame 3 for a bucket for bulk material.

[0010] The attachment 1 comprises, in essence, two arms 4, which are produced in the form of substantially enclosed, welded frame-like structures in the embodiment, which structures are connected together in the front region by a transverse strut 6. Because the embodiment is symmetrical in construction on the two sides, it will be only the part of the embodiment which is situated on the right, looking in the direction of travel, that will be described in what follows.

[0011] As can be seen from Fig. 2, the bottom region of the arm 4 comprises an arm bottom portion 5 of enclosed construction having an inner side-wall 5a, an outer side-wall 5b, an upper wall 5c and a lower wall 5d. In the enclosed cross-section of the arm 4 and the arm bottom portion 5 are mounted hydraulic inlet lines 7 to the control components 8 for controlling the attachment I or implements fastened to the attachment frame 3. These inlet lines extend from the portion 2 of the arm 4 which is at the rear in the direction of travel to the transverse strut 6.

[0012] In Fig. 3, the transverse strut 6 is produced in the form of an enclosed, welded hexagonal profile whose edges are radiused in the embodiment and which comprises a front side-wall 6a, a rear side-wall 6b, a radiused-edged lower wall 6c in the bottom region of the profile and a radiused-edged upper wall 6d in the top region of the profile. At its end-faces, the transverse strut 6 has open ends.

[0013] To receive the transverse strut 6, the arm bottom portion 5 is provided with a perforation 5e through the side-walls 5a, 5b which extends perpendicularly to the side-walls 5a, 5b. The perforation 5e is of the same shape as the external outline of the transverse strut 6

and is spaced away from the external outline of the transverse strut 6, in parallel thereto, at a distance of 0.5 to 1 mm, thus enabling the perforation 5e to receive the transverse strut 6. To allow it to be connected to the arm bottom portion 5, the transverse strut 6 is passed through the perforation 5e so that the open end 6e of the transverse strut 6 projects beyond the outer side-wall 5b of the arm bottom portion 5, and it is non-releasably connected to the arm bottom portion 5, by means of the two side-walls 5a, 5b, by a surrounding weld. To tie the transverse strut 6 to the arm bottom portion 5 to an additional degree, the two parts are non-releasably connected to a stiffener 9.

[0014] To allow the inlet lines 7 to be run out of the arm bottom portion 5 and into the transverse strut 6, the transverse strut is provided with a perforation 6f which extends through the rear side-wall 6b and parts of the upper and lower walls 6c, 6d and through which the inlet lines 7 are run into the cross-section 6g of the transverse strut 6.

[0015] In the installation space 6h in the transverse strut 6, there is provided, as shown in Fig. 4, a carrier member 10 on which all the control components 8 (e.g. solenoid operated fluid flow control valves) for controlling the attachment 1 or implements fastened to the attachment frame 3 are mounted. Welded to the carrier member is at least one support 10a for fastening components, such as the control components 8, in position on the carrier member 10. The carrier member 10 is provided on both sides with a fold 10b whose plane is parallel to the lower wall 6c of the transverse strut 6, which folds 10b rest, in the fitted state, on the inside faces of the bottom wall 6d of the transverse strut 6 to provide centering and positioning. The folds are each provided with three holes 10c and welded captive nuts 10d by which, as shown in Fig. 5, the carrier member 10 is releasably connected to the transverse strut 6 by six fastening screws 11.

[0016] As shown in Fig. 6, the control components 8 and the connecting block 12 for the outlet lines 13 are screwed to the carrier member 10 by means of the supports 10a. Between the control components 8 and the connecting block 12, and between the control components 8 and the inlet lines 7, are provided intermediate connections 14 which, via clamps 15, are connected to the supports 10a on the carrier member 10 by screwed connections and whose positions are thus fixed. Standard commercial ring-nut connections are provided for connecting the inlet lines 7, outlet lines 13, intermediate connections 14 and control components 8 to one another. The open lateral ends 6e of the transverse strut 6 are provided with a cover 16 which stops dirt from entering the installation space 6h in the transverse strut 6 and thus stops the control components from becoming fouled or being damaged. Because the air inside the transverse strut is heated by the heat introduced by way of the fluid-carrying components 7, 8, 13, 14, the cover 16 is provided with spacers (not shown) which create a surrounding air gap between the cover 16 and the outer side-wall 5b through which temperature is equalised with the ambient air and any overheating of the components situated within the cross-section is thus counter-acted. To allow the cover 16 to be fastened in place, there are provided in the arm bottom portion 5, in the outer side-wall 5b, two tapped holes 5f to which the cover 15 is releasably fastened by two securing screws 17.

[0017] The view in section in Fig. 7 shows the connection of the outlet lines 13 to the connecting block 12. Provided in the rear side-wall 6b of the transverse strut 6 are holes 6i which, when the connecting holes 12a in the connecting block are in their installed position, are concentric to the said connecting holes 12a and through which the screw-in fittings 18 are screwed into the connecting block 12 by means of their exterior hexagonal flats 18a. The outlet lines 13 are connected to these screw-in fittings 18, once again by ring-nut connections.

[0018] In what follows, access to the control components 8 will now be described. The fastening screws 11 between the transverse strut 6 and the carrier member 10, which are accessible from outside, are unscrewed. Unscrewing the securing screws 17 between the cover 16 and the arm bottom portion 5 gives access to the ring-nut connections of the inlet lines 7, which connections are situated at the open end 6e of the installation space 6h in the transverse strut 6, to allow the inlet lines 7 to be disconnected from the intermediate connections 14 and to be slid into the arm bottom portion 5 in direction D. The screw-in fittings 18 which were screwed into the connecting block 12 through the holes 6i in the rear side-wall 6b of the transverse strut 6 are then unscrewed from the connecting block 12 and slid, together with the outlet lines 13, in direction E, so that the screw-in fittings 18 no longer project through the hole 6i.

[0019] The carrier member 10 is now moved out of the transverse strut 6 in direction F, whereby all the components which are mounted on the carrier member 10, such as the control components 8, the connecting block 12 and the intermediate connections 14, are freely accessible for maintenance tasks or replacement.

[0020] Refitting takes place in the reverse sequence.

[0021] As will be appreciated electrical lines for operating valves 8 or other component may also extend inside arms 4 and transverse strut 6 alongside fluid lines 7. These electrical lines may also enter or leave strut 6 through the walls of strut 6 alongside fluid lines 13.

Claims

1. A loader attachment (1) for a working vehicle having at least two arms (4), produced in the form of hollow bodies, which extend substantially in parallel, and at least one transverse hollow strut (6), for connecting the said arms (4), at least one of the said hollow arms (4), containing fluid-carrying lines (7) and/or electrical lines **characterised in that** the transverse strut (6) and/or the arms (4) form an interconnected installation space in which is mounted at least one component (8) for controlling the attachment (1) or

implements (3) fastened thereto.

2. An attachment according to claim 1, **characterised in that** the components (8) for controlling the attachment (1) or implements (3) fastened thereto are fastened to a carrier member (10) located in the transverse strut (6).

3. An attachment according to claims 1 and 2, **characterised in that** the components (8) for controlling the attachment (1) or implements (3) fastened thereto are hydraulic valves, pressure reservoirs and/or electrical components.

4. An attachment according to claim 2, **characterised in that** the carrier member (10) has fastening means (10d, 11) which can be released from outside the transverse strut.

5. An attachment according to claim 2, **characterised in that** the carrier member (10) is removable in the axial direction relative to the transverse strut (6).

6. An attachment according to claims 1 and 2, **characterised in that** the transverse strut (6) is open at at least one end.

7. An attachment according to claims 1, 2 and 6, **characterised in that** the transverse strut (6) has, at the or each open end (6e), a cover (16) for the installation space (6h).

8. An attachment according to claim 7, **characterised in that** the cover (16) for the or each open end (6e) of the transverse strut (6) is removable.

9. An attachment according to claim 7, **characterised in that** the cover (16) allows air to be exchanged between the installation space (6h) with in the transverse strut (6) and the ambient air.

10. An attachment according to claim 2, **characterised in that** releasable connections between the fluid-carrying lines (7, 13) and/or electrical lines and the components (8) for controlling the attachment or implements fastened thereto, which components are mounted on the carrier member (10), are situated in the immediate vicinity of the exterior of the transverse strut (6).

11. An attachment according to claim 1, **characterised in that** the transverse strut (6) has, in at least one region situated in the interior of the arm (4) to which is connected, a perforation (6f) through which the fluid-carrying lines (7) and/or electrical lines run out from the arm (4) into the transverse strut (6).

12. An attachment according to claims 2, **characterised in that** the connection (18) to the components (8) mounted on the carrier member (10) of at least some of the fluid-carrying lines (13) and/or electrical lines is run through at least one wall (6a, 6b, 6c, 6d) of the transverse strut (6).

13. An attachment according to claim 12, **characterised in that** the connection (18) to the components (8) mounted on the carrier member (10) whose fluid-carrying lines (13) and/or electrical lines pass transversely through the walls of strut (6) can be disconnected from outside the transverse strut (6).

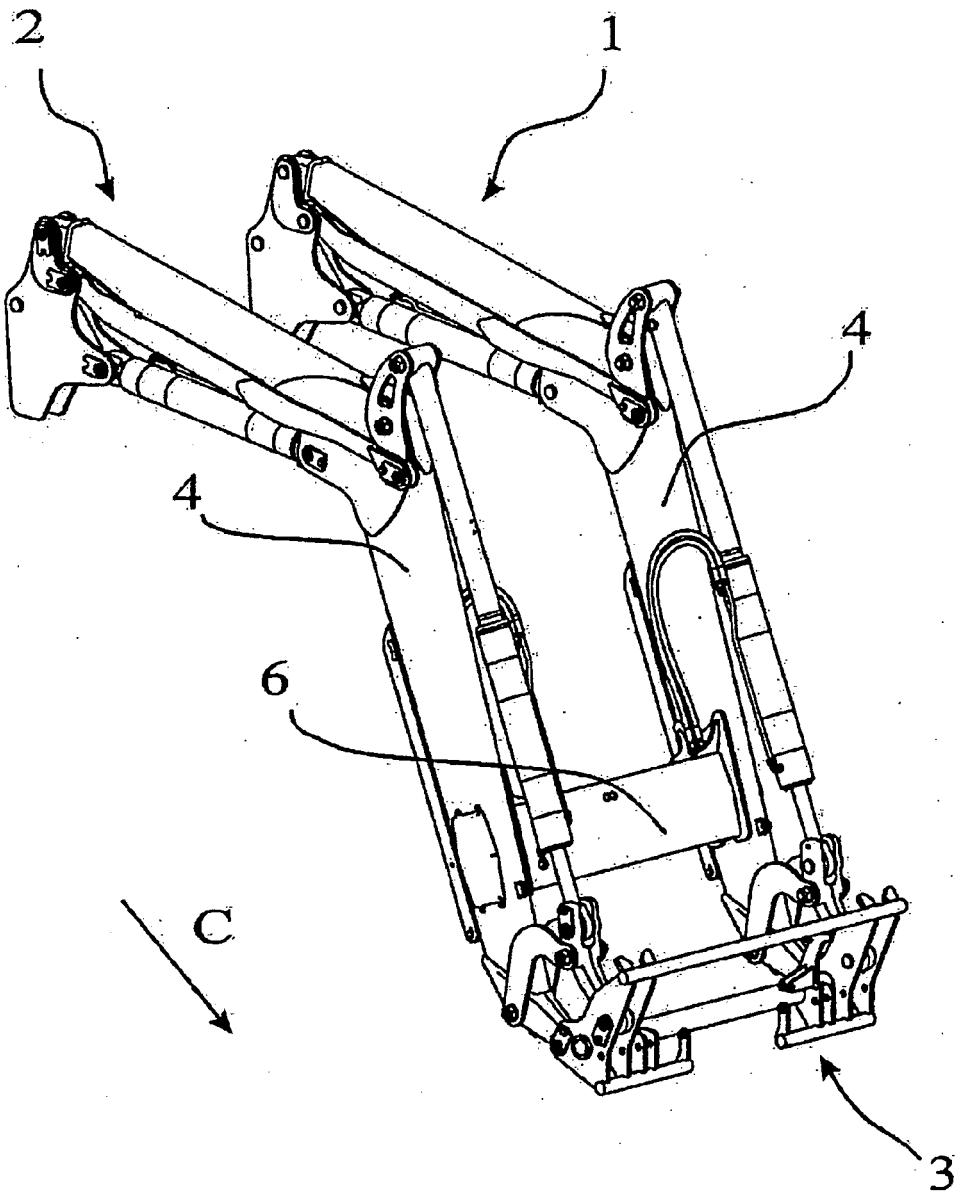

Fig. 1

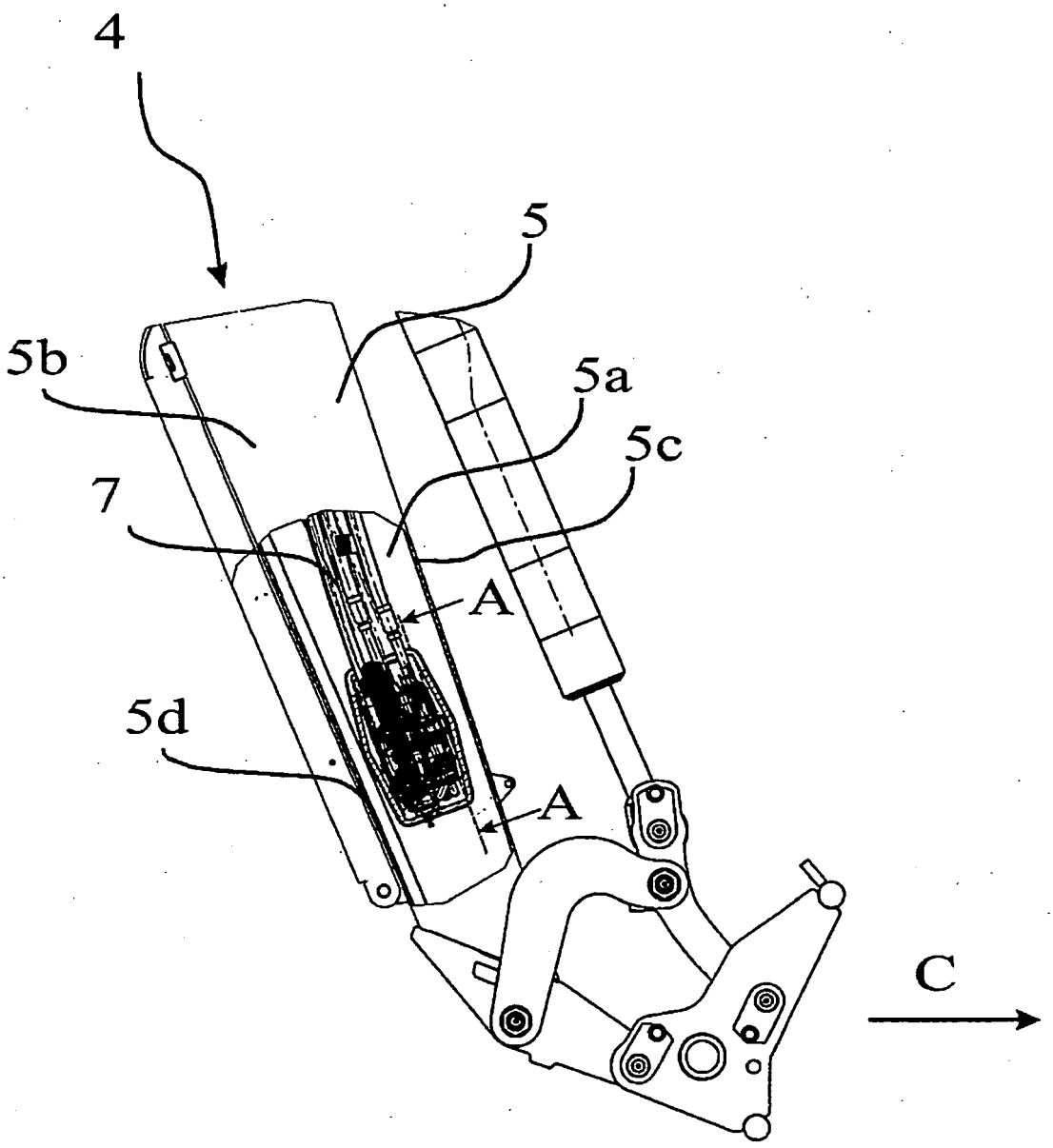

Fig. 2

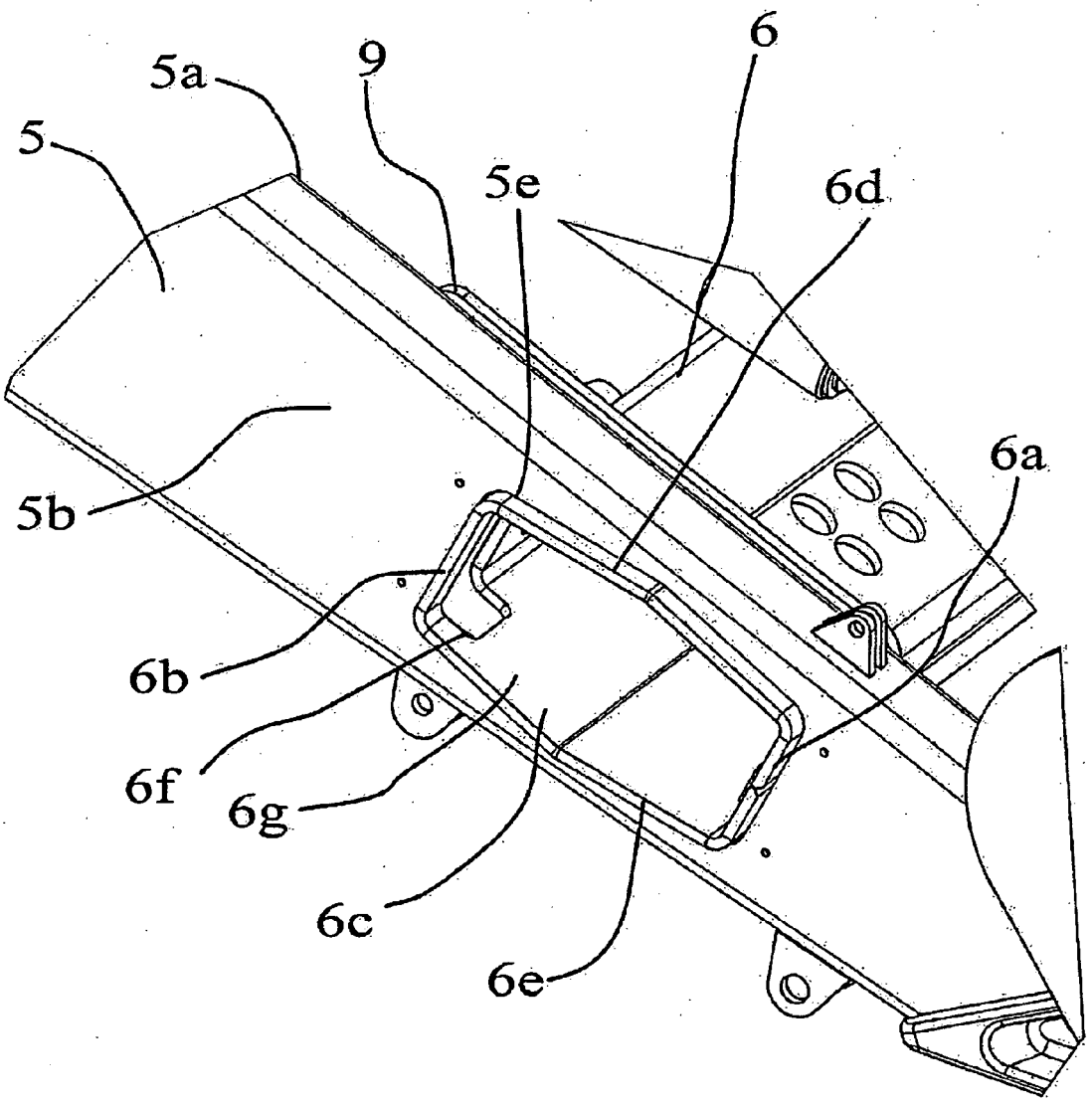

Fig. 3

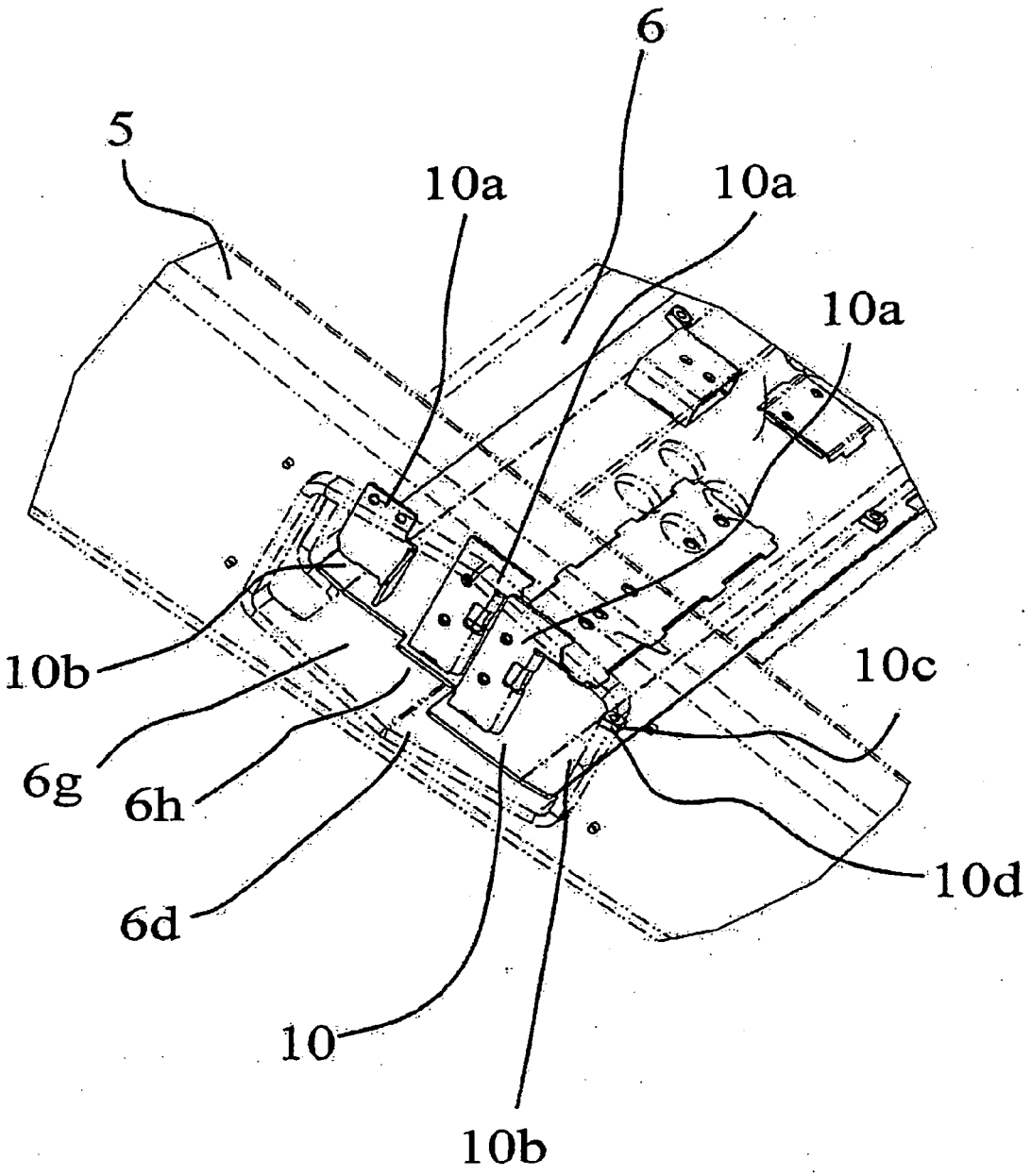

Fig. 4

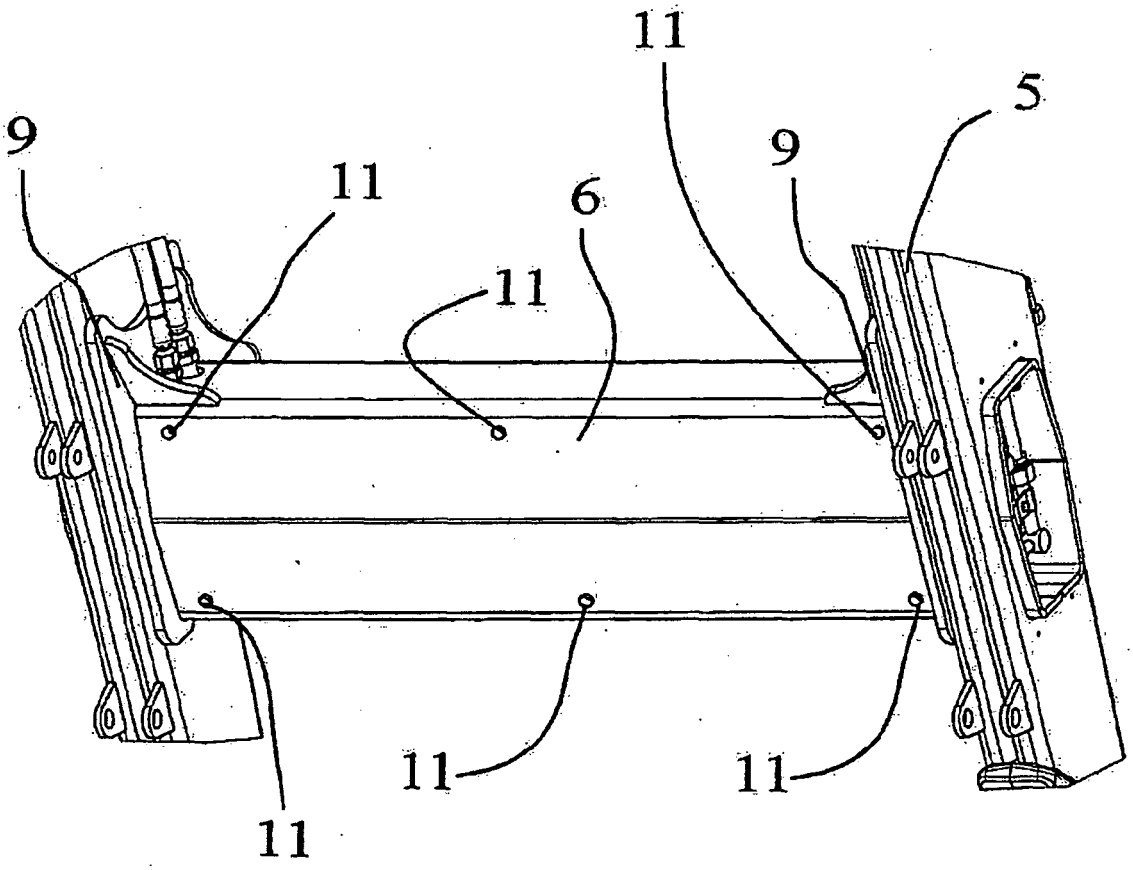

Fig. 5

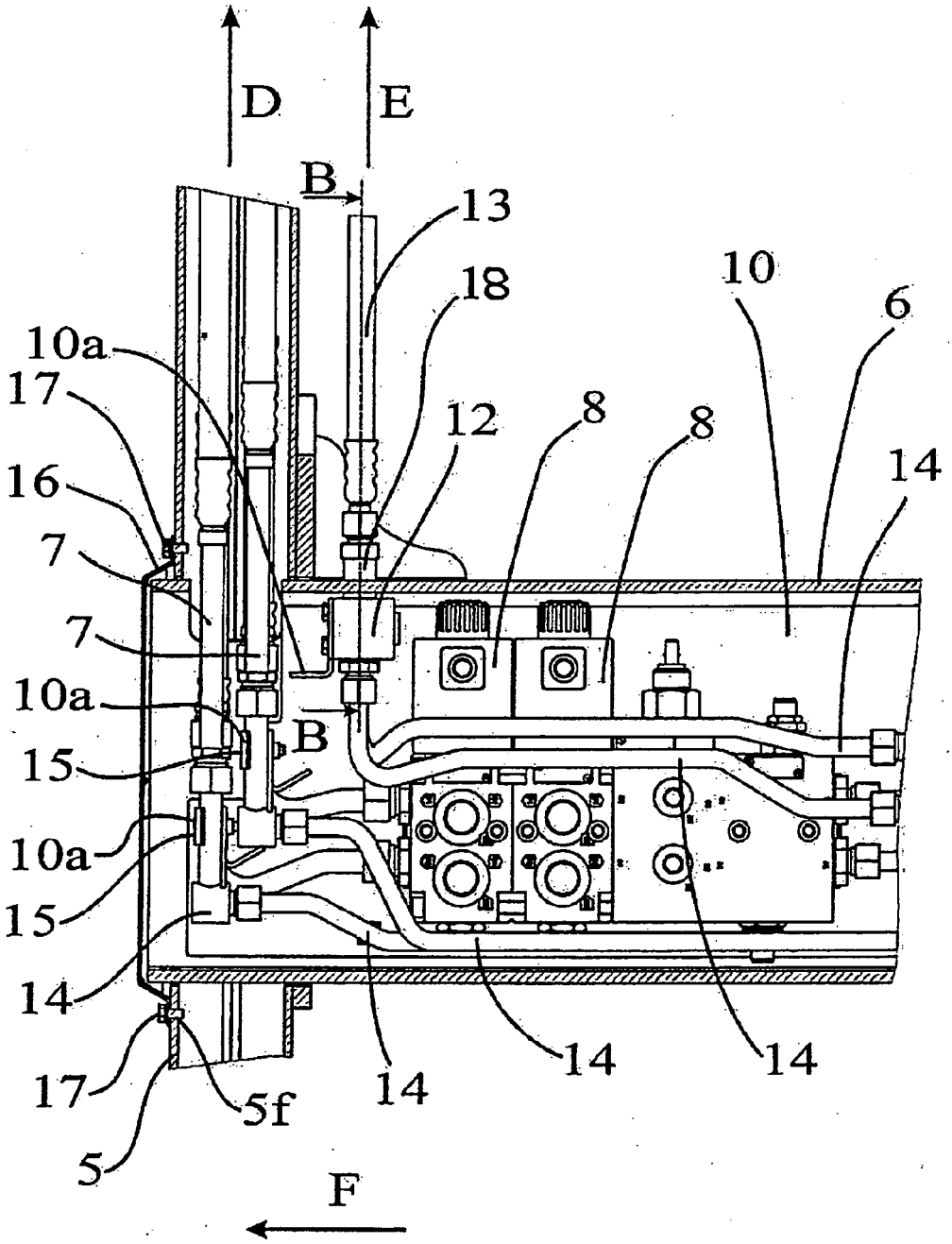
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Fig. 6

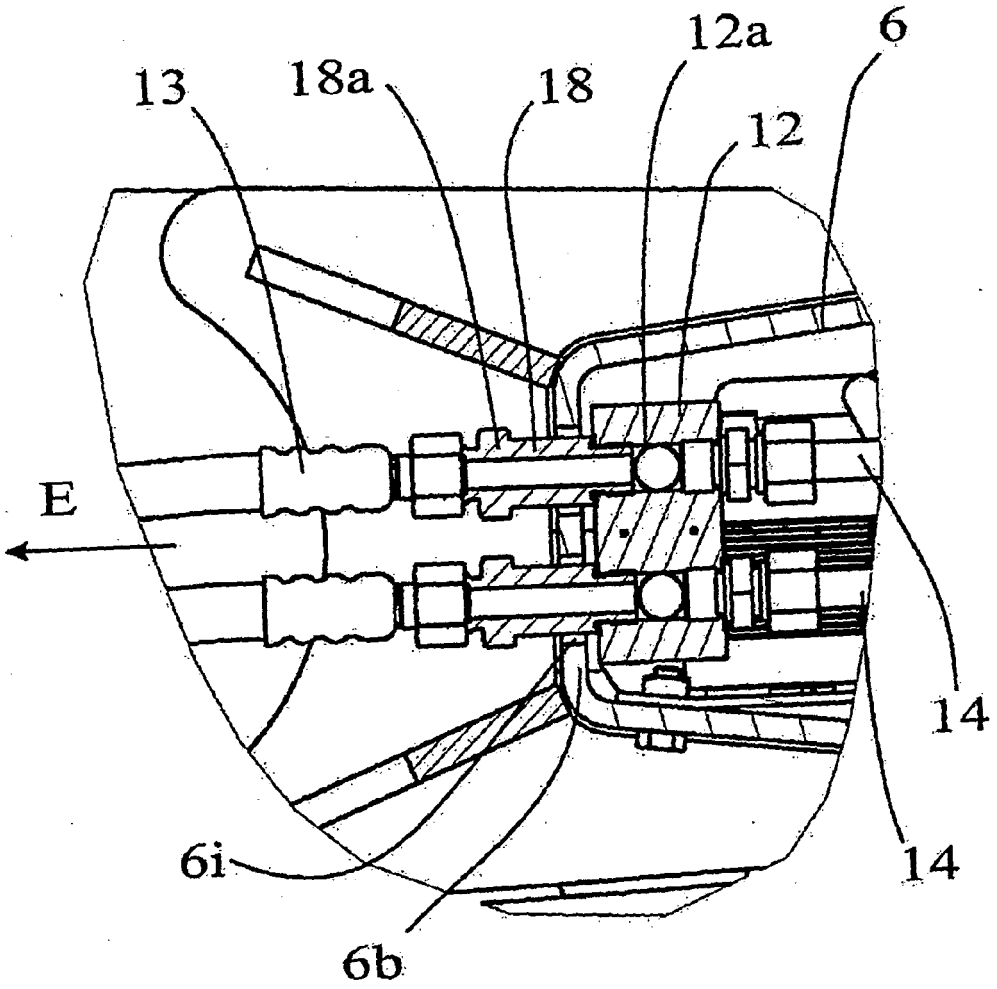

Fig. 7

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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