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(54) **FLANGE FOR ATTACHING A VALVE FOR TANK OIL RETURN, OPERATION AND USES THEREOF**

(57) The present disclosure relates to a flange for attaching a valve for tank oil return comprising a first connection for receiving the directional control valve or an oil return line; a second connection for re-

ceiving a second oil return line; wherein the first connection and the second connection are positioned above the flange so that the oil returns directly to the tank through the directional control valve or through the oil return lines.

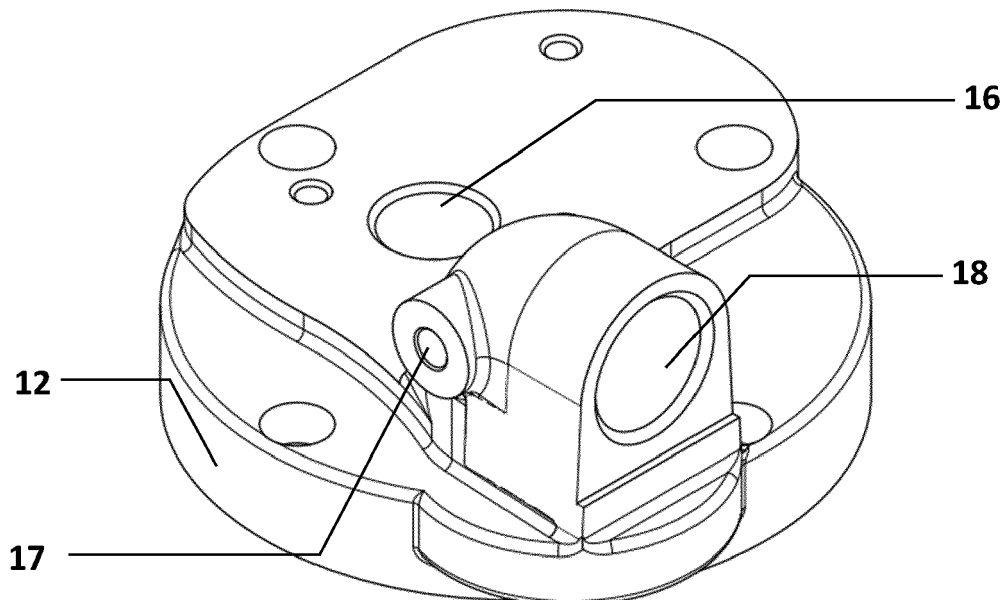


Fig. 1

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Description

TECHNICAL FIELD

[0001] The present description relates to a flange for attaching a valve for tank oil return wherein said flange comprises a second oil return connection. The flange for use in truck hydraulic circuit oil tanks allows a directional control valve (i.e. flow directing valve) to be coupled on its top, above the return filter, thus allowing oil to return to the tank directly through the valve without the use of hoses or hydraulic fittings between valve and tank.

BACKGROUND

[0002] BRPI1100623A2 presents a coupling system for diesel oil return piping. Designed by a flexible piping coupling system in a rigid terminal, which has been designed to be applied in the connection of the diesel oil return hose to the respective fuel tank, with a fuel return hose coupling system to the rigid tubular terminal of the diesel oil tank of cargo haulage vehicles or similar, which uses a quick coupler connector at the end of the fuel return hose and a rigid tubular terminal with a flange attached to the vehicle fuel tank.

[0003] CN203835824 describes a hydraulic oil tank for small engineering machines. The tank comprises an oil container body, a one-way valve, an oil return flange for oil return, an oil return filter, an oil suction flange, an oil suction filter, a main oil return hole, an oil leakage hole, a breather and two baffles, wherein the two baffles are arranged in the oil tank body and form a closed cavity body together with the inner side of a top plate of the oil tank body and the inner sidewall of the oil tank body. The oil return filter is fixed to the bottom of the cavity body and in communication with the cavity body, the main oil return hole and the one-way oil return valve are attached to the outside of the top plate of the oil tank body through the oil return flange and in communication with the body cavity, the oil suction filter is transversely arranged at the bottom of the oil tank body, and one end of the oil suction filter is connected with the oil suction flange. However, it does not describe the possibility of coupling a directional control valve.

[0004] These facts are described in order to illustrate the technical problem solved by the embodiments of the present document.

GENERAL DESCRIPTION

[0005] The present disclosure relates to a flange for attaching a valve for tank oil return wherein said flange comprises a second oil return connection.

[0006] One of the aspects of the present embodiment relates to a flange for attaching a valve for tank oil return comprising:

a first connection for receiving the directional control

valve or a first oil return line (or channel);
a second connection for receiving a second oil return line;
wherein the first connection and the second connection are positioned above the flange so that the oil returns directly to the tank through the directional control valve or through the oil return lines.

[0007] In a preferred embodiment, it relates to a flange for attaching a valve for tank oil return comprising:

a first connection for receiving the directional control valve or an oil return line (or channel);
a second connection for receiving a second oil return line;
wherein the first connection and the second connection are positioned above the flange so that the oil returns directly to the tank through the directional control valve or through the oil return lines (or channels).

[0008] In a preferred embodiment, the first connection and the second connection are positioned above the return filter flange so that the oil returns directly to the tank through the directional control valve or through oil return lines.

[0009] In a preferred embodiment, the second connection is perpendicular to the first connection in said flange.

[0010] In a preferred embodiment, the flange for attaching a valve for tank oil return with a return filter comprises: a first connection for receiving the directional control valve or an oil return line (or channel); a second connection for receiving a second oil return line; wherein the second connection is perpendicular to the first connection in said flange; wherein the first connection and the second connection are positioned above the return filter so that oil returns directly to the tank through the directional control valve or through the oil return line (or channel).

[0011] It should be noted that it is possible to mount a valve on top of a tank, above the return filter, thus allowing oil to return to the tank through the valve directly, without the use of hoses or hydraulic fittings, between the valve and the tank. A preferred embodiment also allows all oil returning to the tank through the valve to be filtered.

[0012] Some advantages of the present disclosure are the following:

- fewer components compared to current market applications;
- less productive complexity of oil tanks, as they have less welding and components, thus reducing the risk of cracking and failure thereof in use;
- mounting capacity of standard return filters and filter elements.

[0013] The present disclosure comprises great versatility, as it is possible to mount on its upper face a valve

with different types of attachment and a second oil return line, of a hydraulic circuit independent of the hydraulic circuit of the directional control valve. On the other hand, as it allows coupling of a return filter, oil returning to the tank through this flange, either through the valve or through a second connection for receiving a second oil return line, is filtered, thus ensuring that hydraulic system oil is within recommended contamination levels.

[0014] Furthermore, the monitoring of the oil return pressure through the use of a pressure gauge makes it possible to understand when the filter element of the filter is saturated, thus indicating the need to timely change thereof.

[0015] In a preferred embodiment and in case the directional control valve is not mounted near the tank, the two oil return connections can be used as they are both threaded and allow the connection of hydraulic fittings, causing the oil inside to pass through the return filter and be filtered on return to the tank.

[0016] In a preferred embodiment, a flange is described for attaching a valve for tank oil return with a return filter comprising: a first connection for receiving the directional control valve or an oil return line (or channel); a second connection for receiving a second oil return line; wherein the second connection is perpendicular to the first connection in said flange; wherein the first connection and the second connection are positioned above the return filter so that oil returns directly to the tank through the directional control valve or through the oil return lines (channels).

[0017] In one embodiment, the oil returning to the tank through the directional control valve or oil return line (or channel) positioned on the first connection is filtered.

[0018] In one embodiment, the oil returning to the tank through the oil return line (or channel) positioned on the second connection is filtered.

[0019] In one embodiment, the first connection and the second connection are threaded connections.

[0020] In one embodiment, the second oil return line (channel) is of a hydraulic circuit independent of the hydraulic circuit of the directional control valve or oil return line connected to the first connection.

[0021] In one embodiment, the first connection and the second connection are suitable for receiving the oil return line in each of said connections.

[0022] In one embodiment, the first connection and the second connection may be suitable for receiving hydraulic fittings, in particular hoses, tubes, cylinders, clamps, or combinations thereof.

[0023] In one embodiment, the first connection is suitable for receiving a directional control valve with different types of attachments.

[0024] In one embodiment, between the valve for oil return and the return filter tank there is only said flange.

[0025] In one embodiment, the flange comprises a third connection for receiving a pressure gauge for monitoring the oil return pressure.

[0026] In one embodiment, an assembly for tank oil

return filtration is also described in the present disclosure comprising: an oil tank with a return filter; a directional control valve or a first oil return line; a second oil return line; a flange wherein said flange comprises a first connection for receiving the directional control valve or an oil return line (or channel); a second connection for receiving a second oil return line; optionally wherein the second connection is perpendicular to the first connection in said flange; optionally wherein the first connection and the second connection are positioned above the return filter so that oil returns directly to the tank through the directional control valve or through the oil return lines (or channels).

[0027] In one embodiment, the flange comprises a third connection to receive a pressure gauge.

[0028] In one embodiment, the assembly is made with the flange between the directional control valve and the return filter tank.

[0029] An oil tank comprising said flange and oil return valve or connection described above is further described.

[0030] In a preferred embodiment, the method of operation comprises a flange which, when coupled to the oil tank of a hydraulic circuit, eliminates some of the current problems existing on the market, as when valves (6) are attached against the truck chassis, they cause failures (sealing) since being applied/mounted on non-flat or poorly finished faces. Due to the complexity that some hydraulic systems present, a single return line (or channel) to the tank is often insufficient, so a second direct return line (or channel) normally welded to the side of the tank is added to the structure thereof, has been widely used. This solution requires tanks with this type of connection, thus increasing the costs thereof, the risk of cracking due to the presence of more welded components inside the tank, and finally this connection does not guarantee the filtration of the oil provided through this connection. All these problems are countered by applying the present embodiment in hydraulic circuit oil tanks.

BRIEF DESCRIPTION OF THE FIGURES

[0031] For an easier understanding, figures are herein attached, which represent preferred embodiments which are not intended to limit the object of the present description.

Figure 1: Perspective view representation of the flange, wherein:

- (12) represents a flange for oil return of the present disclosure;
- (16) represents a first connection for directional control valve or for an oil return connection;
- (17) represents a third connection for a pressure gauge;
- (18) represents a second connection for receiving a second oil return line.

Figure 2: Perspective view representation of the flange and possible connections (option 1), wherein:

- (6) represents a directional control valve;
- (10) represents a return filter;
- (13) represents a second oil return line
- (15) represents a pressure gauge.

Figure 3: Perspective view representation of the flange and possible connections (option 2), wherein (14) represents an oil return line.

Figure 4: Cross-sectional view representation of the flange and possible connections, including the return filter (10).

Figure 5: Cross-sectional view representation of the flange and possible connections.

Figure 6: Representation of the flange with valve applied to top of the return filter tank and second return connection wherein (1) represents the tank, (2) represents the tank oil level; (3) represents the air filter; (5) represents a tank oil outlet; (6) represents the directional control valve; (12) represents a flange for oil return of the present disclosure; (13) represents a second oil return line.

Figure 7: Representation of flange with valve applied to tank top and second return connection.

DETAILED DESCRIPTION

[0032] The present disclosure relates to a flange for attaching a directional control valve (6) with a second connection for receiving a second oil return line (18). In one embodiment, the flange for attaching a valve for tank oil return with a return filter comprises: a first connection (16) for receiving the directional control valve (6) or an oil return line (14); a second connection (18) for receiving a second oil return line (13); wherein the second connection is perpendicular to the first connection in said flange; wherein the first connection and the second connection are positioned above the return filter (10) so that the oil returns directly to the tank through the directional control valve or through the oil return lines and a connection (17) for connecting to a pressure gauge (15).

[0033] In an embodiment, figure 1 shows an embodiment of the present disclosure showing a flange (12) comprising on its upperface a first connection (16) for a directional control valve (6) or an oil return line (14), and a second oil return connection (18) of a hydraulic circuit independent of the hydraulic circuit of the directional control valve (6) or oil return line (14).

[0034] In an embodiment, figures 2 and 3 show a flange (12) used in truck hydraulic circuit oil tanks which allows a directional control valve (6) or a return line (or channel) to be coupled to the top thereof for returning oil

(14), a second oil return line (or channel) (13), perpendicularly to the valve assembly, an oil return filter (10), at the bottom, and a pressure gauge connection (15).

[0035] In an embodiment, figure 4 shows a flange (12) mounted on its base in an oil return filter (10) and a directional control valve (6) and a second oil return line (or channel) (13) coupled to the flange (12).

[0036] In an embodiment, figure 5 shows a directional control valve (6) or a return line connected in the first connection and a second oil return line (13) connected to the second connection of the valve (12).

[0037] In an embodiment, figures 6 and 7 show a flange (12), with a second oil return connection (18) applied to the top of a hydraulic circuit oil tank (1), with a directional control valve (6) mounted on its top and the possibility of mounting on its base an oil return filter (10).

[0038] The embodiments described are combinable with each other. The present invention is of course in no way restricted to the embodiments described herein and a person of ordinary skill in the art can foresee many possibilities of modifying it and replacing technical features with equivalents, depending on the requirements of each situation, as defined in the appended claims. The following claims define additional embodiments of the present description.

Claims

1. Flange for attaching a valve for tank oil return comprising:
 - a first connection for receiving the directional control valve or a first oil return line;
 - a second connection for receiving a second oil return line;
 - wherein the first connection and the second connection are positioned above the flange so that the oil returns directly to the tank through the directional control valve or through the oil return lines.
2. Flange according to the previous claim, wherein the first connection and the second connection are positioned above the return filter so that the oil returns directly to the tank through the directional control valve or through the oil return lines.
3. Flange according to any of the previous claims, wherein the second connection is perpendicular to the first connection on said flange.
4. Flange according to any of the previous claims, wherein oil returning to the tank through the directional control valve or oil return line positioned on the first connection is filtered.
5. Flange according to any of the previous claims,

wherein oil returning to the tank through the second oil return line positioned on the second connection is filtered.

6. Flange according to any of the previous claims, wherein the first connection and the second connection are threaded connections. 5
7. Flange according to any of the previous claims, wherein the second oil return line is of a hydraulic circuit independent of the hydraulic circuit of the directional control valve or oil return line connected to the first connection. 10
8. Flange according to any of the previous claims, wherein the first connection and the second connection are suitable for receiving the oil return lines in each of said connections. 15
9. Flange according to any of the previous claims, wherein the first connection and the second connection are suitable for receiving hydraulic fittings, in particular hoses, tubes, cylinders, clamps, or combinations thereof which form part of the return line. 20
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10. Flange according to any of the previous claims, wherein the first connection is suitable for receiving a directional control valve with different types of attachments. 30
11. Flange according to any of the previous claims comprising a third connection for receiving a pressure gauge for monitoring the oil return pressure. 35
12. Assembly for tank oil return filtration according to any one of the previous claims, comprising
an oil tank with a return filter;
a directional control valve or a first oil return line;
a second oil return line;
a flange; 40
wherein said flange comprises a first connection for receiving the directional control valve or an oil return line; a second connection for receiving a second oil return line;
wherein the flange comprising the first connection and the second connection is positioned above the return filter so that oil returns directly to the tank through the directional control valve or through the oil return lines. 45
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13. Assembly according to the previous claim wherein the second connection is perpendicular to the first connection on said flange. 50
14. Assembly according to the previous claim wherein the flange comprises a third connection to receive a pressure gauge. 55
15. Assembly according to the previous claims, wherein between the valve and the return filter tank there is only said flange.

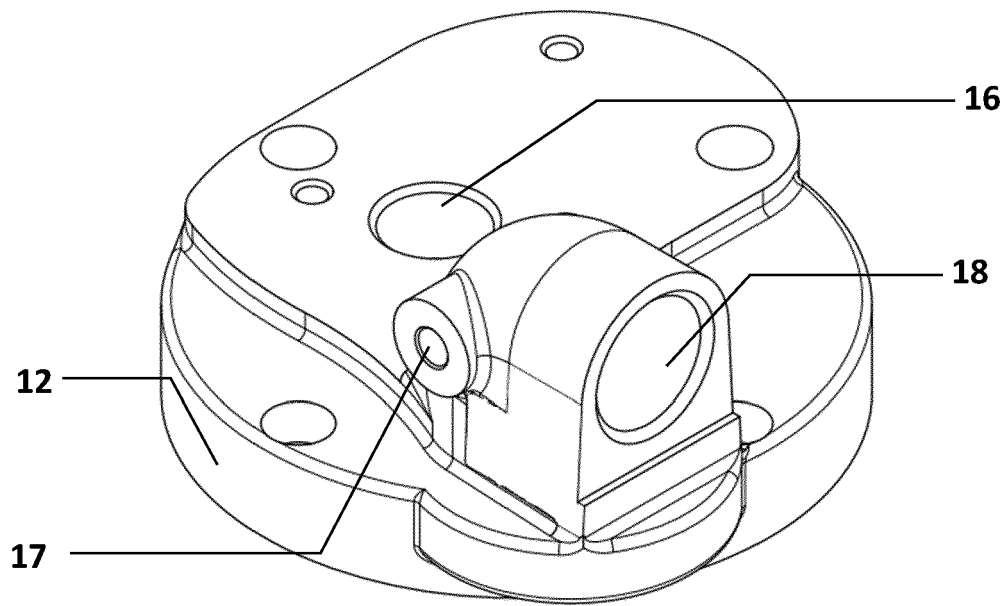


Fig. 1

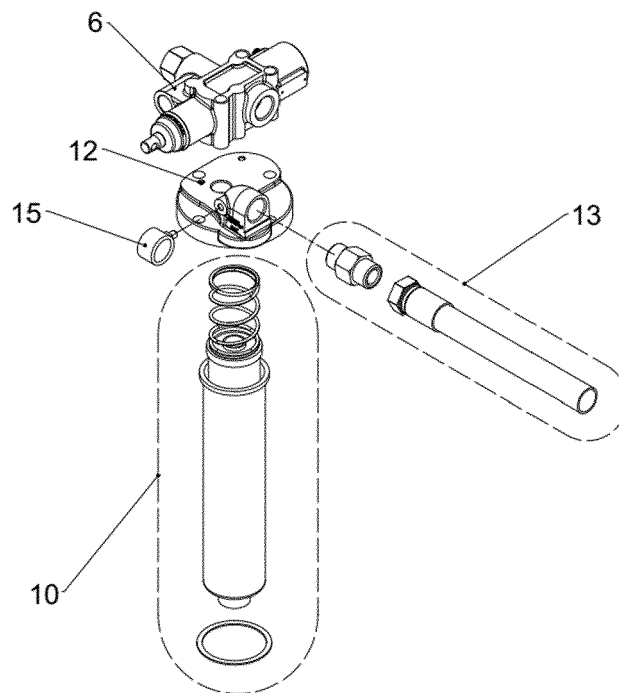


Fig. 2

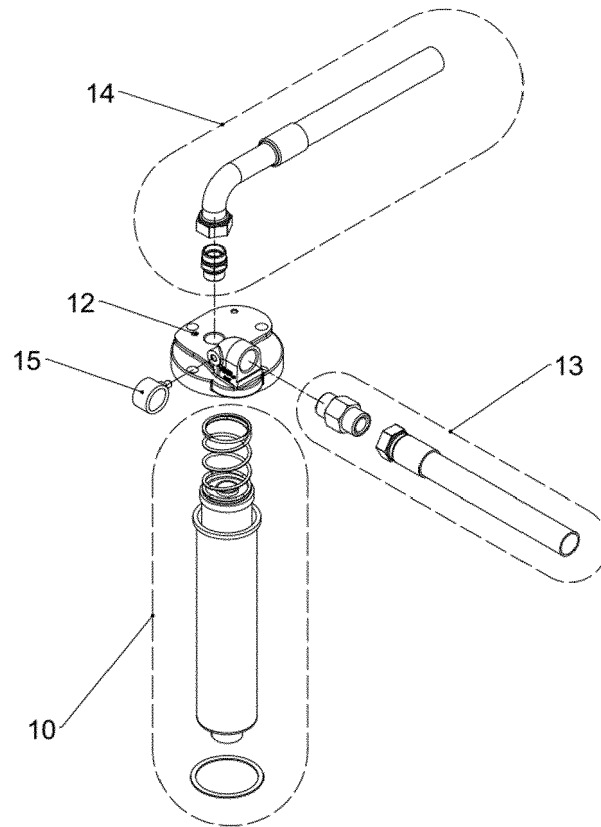


Fig. 3

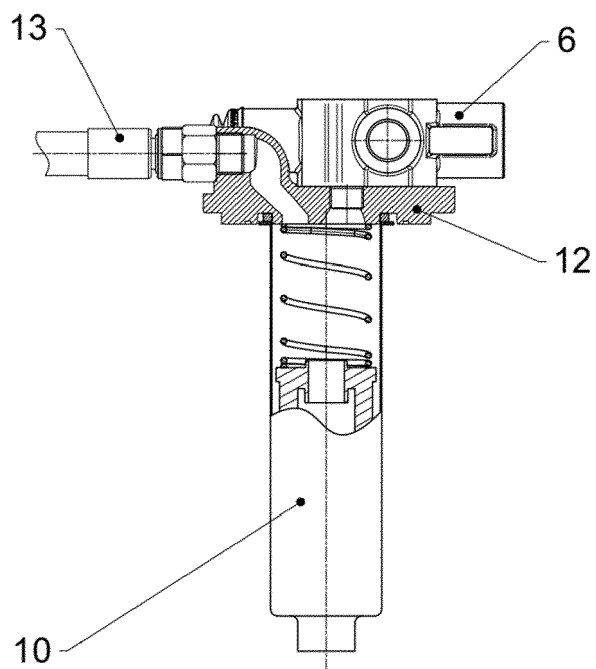


Fig. 4

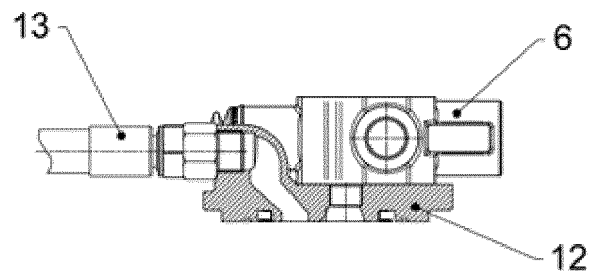


Fig. 5

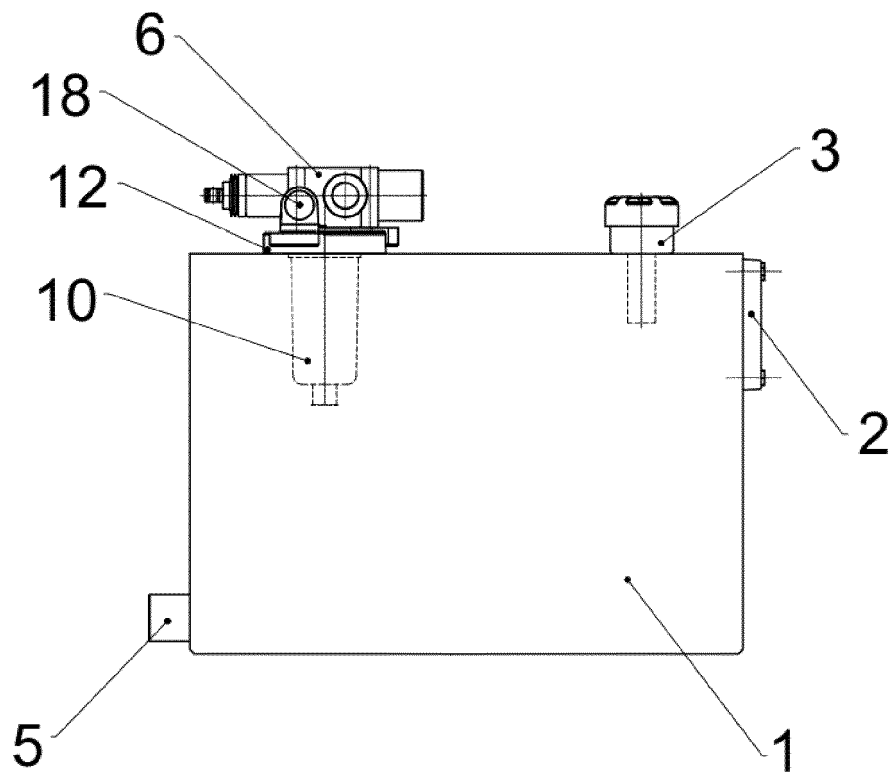


Fig. 6

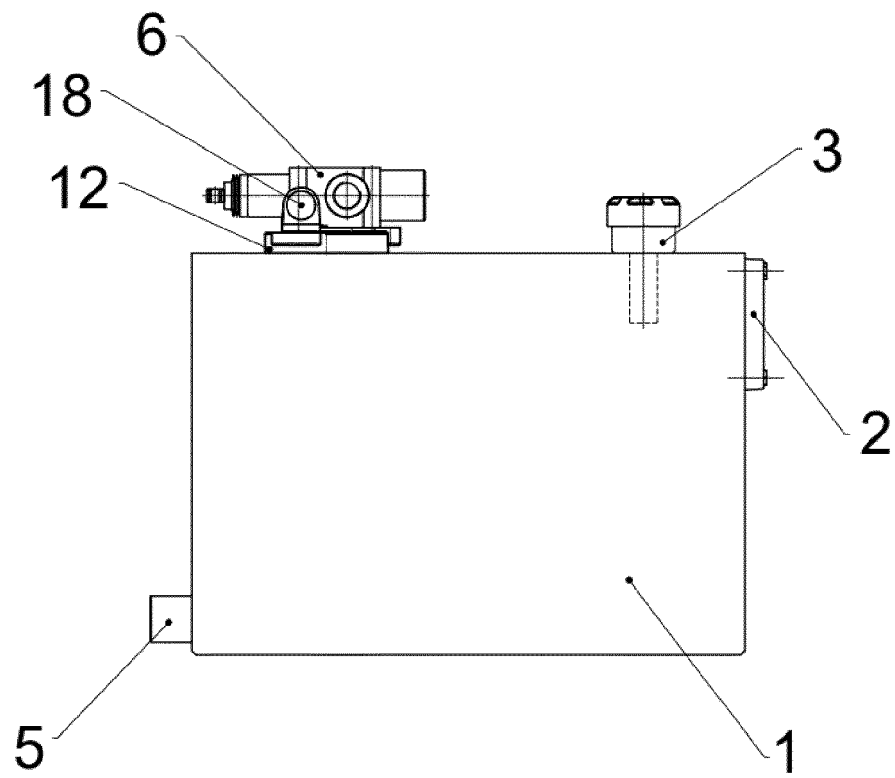


Fig. 7



EUROPEAN SEARCH REPORT

Application Number
EP 20 18 2744

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Place of search Munich		Date of completion of the search 6 November 2020	Examiner Díaz Antuña, Elena
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