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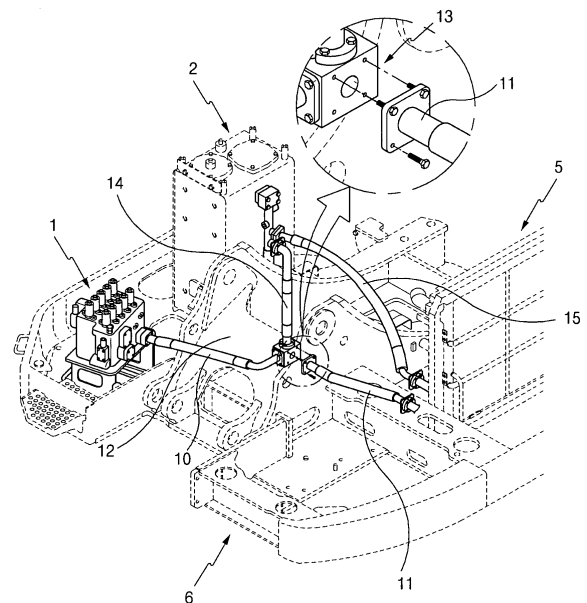
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(54) **Apparatus for fixing hydraulic pipes for construction equipment**

(57) An apparatus for fixing hydraulic pipes for construction equipment is provided, which can facilitate joint connection of return pipes having a large size to a hydraulic tank (2), in an environment where a working space of an upper frame (6) is narrow such as in a small swing radius construction equipment, by a return pipe block (13) for returning hydraulic fluid of a main control valve (1) to the hydraulic tank (2) without being interfered with a swing motor (4) and so on. The apparatus for fixing hydraulic pipes includes a first return joint pipe (10) having an inlet port joint-connected to a main control valve (1), a second return joint pipe (11) having an outlet port joint-connected to an oil cooler (5), a return pipe block (13) mounted on an upper frame (6) between a frame to which a working device is fixed and a swing motor (4), and joint-connected to an outlet port of the first return joint pipe (10) and an inlet port of the second return joint pipe (11), respectively, and a third return joint pipe (14) having an inlet port joint-connected to the return pipe block (13) and an outlet port joint-connected to the hydraulic tank (2). The return pipe block (13) is mounted on the upper frame (6) to joint-connect the first and second return joint pipes (10,11), and the third return joint pipe (14) is joint-connected to the return pipe block (13) and the hydraulic tank (2), respectively, after the swing motor (4) is mounted on the upper frame (6).

Fig. 3



Description

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is based on and claims priority from Korean Patent Application No. 10-2008-0020030, filed on March 4, 2008 in the Korean Intellectual Property Office, the disclosure of which is incorporated herein in its entirety by reference.

BACKGROUND OF THE INVENTION

Field of the invention

[0002] The present invention relates to an apparatus for fixing hydraulic pipes for construction equipment, which can facilitate joint connection of return pipes for returning hydraulic fluid of a main control valve (MCV), which controls the flow of hydraulic fluid being supplied to a working device and so on, to a hydraulic tank even in a narrow working space of an upper frame.

[0003] More particularly, the present invention relates to an apparatus for fixing hydraulic pipes for construction equipment, which can facilitate joint connection of return pipes having a large size to a hydraulic tank, in an environment where a working space of an upper frame is narrow such as in a small swing radius construction equipment, by a return pipe block for returning hydraulic fluid of a main control valve to the hydraulic tank without being interfered with a swing motor and so on.

Description of the Prior Art

[0004] Generally, a swing excavator is classified into a standard swing excavator and a small swing radius excavator.

[0005] In the standard swing excavator, if an upper frame has a posture directed to a forward/backward direction against a lower driving structure (i.e. if a working device has a posture directed to the traveling direction of the lower driving structure), a rear end part of the upper frame projects to an outside so as to be longer than a front/rear part of the lower driving structure (i.e. an end part in a traveling direction). If the upper frame has a posture directed to a horizontal direction against the lower driving structure (i.e. if the working device has a posture directed to a direction perpendicular to the traveling direction of the lower driving structure), the rear end part of the upper frame projects to an outside so as to be longer than a left/right part of the lower driving structure (i.e. an end part in a direction perpendicular to the traveling direction).

[0006] Accordingly, since a distance from the rear end part of the upper frame to the swing center thereof is long and the rotational moment of the rear part of the upper frame becomes high, it is difficult that the rotational moment of the front part of the upper frame that is generated by the excavation force of the working device causes the

overturning of the excavator. Accordingly, the excavator can provide a large excavation force, and thus the workability is improved.

[0007] As illustrated in FIG. 1, a conventional apparatus for fixing hydraulic pipes for construction equipment includes a return pipe 3 for returning hydraulic fluid from a main control valve 1 that controls a flow of the hydraulic fluid being supplied to a working device and so on to a hydraulic tank 2 via an oil cooler (not illustrated), or returning the hydraulic fluid from the main control valve 1 to the hydraulic tank 2 without passing through the oil cooler if back pressure over a specified pressure is formed in a feedback line of the hydraulic tank 2.

[0008] In this case, the return pipe 3 is joint-connected to keep away from a swing motor 4 due to a narrow working space of an upper frame.

[0009] As illustrated in FIG. 2, according to the conventional apparatus for fixing hydraulic pipes for construction equipment (e.g. small swing radius equipment), the return pipe 3 is installed to keep away from the swing motor 4 since the working space of the upper frame 6 is not sufficient due to the characteristic of the small swing radius equipment. Accordingly, the return pipe 3 is connected by using a one-piece hose, or is joint-connected to a side surface of the hydraulic tank 2 by utilizing a front space of the hydraulic tank 2.

[0010] In this case, since the return pipe 3 connected to the oil cooler 5 is arranged to be in close contact with an outer surface of the swing motor 4, the return pipe 3 is joint-connected after the swing motor 4 is first mounted on the upper frame 6. Accordingly, when the return pipe 3 is joint-connected, it is interfered with hydraulic pipes joint-connected to the swing motor 4 to lower the working efficiency.

[0011] On the other hand, as the utility of the small swing radius equipment is increased, the frequency in replacement of option devices, such as hammer, shear, quick fit, and the like, is also increased. Also, as the size of the return pipe 3 is increased, the working space of the upper frame 6 becomes narrower to lower the space utility. Accordingly, the return pipe 3 is installed to be arranged in front of the swing motor 4.

[0012] That is, due to the insufficient working space between the swing motor 4 and the fixing part of the working device, the work time for joint-connecting the return pipe 3 is increased to lower the working efficiency, and the safety of the worker who works in a narrow working space is lowered.

SUMMARY OF THE INVENTION

[0013] Accordingly, the present invention has been made to solve the above-mentioned problems occurring in the prior art, and an object of the present invention is to provide an apparatus for fixing hydraulic pipes for construction equipment, which can facilitate joint connection of return pipes having a large size to a hydraulic tank, in an environment where a working space of an upper frame

is narrow, by a return pipe block for returning hydraulic fluid of a main control valve to the hydraulic tank without being interfered with a swing motor and so on, so that the working time can be shortened and the working space can be secured.

[0014] In order to accomplish the above and other objects, there is provided an apparatus for fixing hydraulic pipes for construction equipment having return pipes for returning hydraulic fluid from a main control valve to a hydraulic tank or an oil cooler, according to an embodiment of the present invention, which includes a first return joint pipe having an inlet port joint-connected to the main control valve; a second return joint pipe having an outlet port joint-connected to the oil cooler; a return pipe block mounted on an upper frame between a frame to which a working device is fixed and a swing motor, and joint-connected to an outlet port of the first return joint pipe and an inlet port of the second return joint pipe, respectively; and a third return joint pipe having an inlet port joint-connected to the return pipe block and an outlet port joint-connected to the hydraulic tank; wherein the return pipe block is mounted on the upper frame to joint-connect the first and second return joint pipes, and the third return joint pipe is joint-connected to the return pipe block and the hydraulic tank, respectively, after the swing motor is mounted on the upper frame.

[0015] The return pipe block may be mounted on the upper frame in front of the swing motor.

[0016] A hydraulic hose or pipe may be used as the third return joint pipe.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The above and other objects, features and advantages of the present invention will be more apparent from the following detailed description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a schematic view illustrating a conventional apparatus for fixing hydraulic pipes for construction equipment;

FIG. 2 is a view illustrating a modified example of a conventional apparatus for fixing hydraulic pipes for construction equipment;

FIG. 3 is a schematic view illustrating an apparatus for fixing hydraulic pipes for construction equipment before a swing motor is mounted on an upper frame according to an embodiment of the present invention;

FIG. 4 is a view illustrating the used state of an apparatus for fixing hydraulic pipes for construction equipment according to an embodiment of the present invention; and

FIG. 5 is a plan view of an apparatus for fixing hydraulic pipes for construction equipment according to an embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0018] Hereinafter, preferred embodiments of the present invention will be described with reference to the accompanying drawings. The matters defined in the description, such as the detailed construction and elements, are nothing but specific details provided to assist those of ordinary skill in the art in a comprehensive understanding of the invention, and thus the present invention is not limited thereto.

[0019] As shown in FIGS. 3 to 5, an apparatus for fixing hydraulic pipes for construction equipment having return pipes for returning hydraulic fluid from a main control valve, which controls the flow of hydraulic fluid being supplied to a working device and so on, to a hydraulic tank or an oil cooler, according to an embodiment of the present invention, includes a first return joint pipe 10 having an inlet port joint-connected to the main control valve 1; a second return joint pipe 11 having an outlet port joint-connected to the oil cooler 5; a return pipe block 13 mounted on an upper frame 6 between a frame 12, to which a working device such as a boom and so on is fixed, and a swing motor 4, and joint-connected to an outlet port of the first return joint pipe 10 and an inlet port of the second return joint pipe 11, respectively; and a third return joint pipe 14 having an inlet port joint-connected to the return pipe block 13 and an outlet port joint-connected to the hydraulic tank 2; wherein the return pipe block 13 is mounted on the upper frame 6 to joint-connect the first and second return joint pipes 10 and 11, and the third return joint pipe 14 is joint-connected to the return pipe block 13 and the hydraulic tank 2, respectively, after the swing motor 4 is mounted on the upper frame 6.

[0020] The return pipe block 13 is mounted on the upper frame 6 in front of the swing motor 4 so that the return pipe block 13 can be installed in an optimum position with respect to the main control valve 1, the swing motor 4, the hydraulic pump, and the like.

[0021] A hydraulic hose or pipe is used as the third return joint pipe 14 in accordance with the working capacity, model number, and the like, of the construction equipment.

[0022] Hereinafter, the operation of the apparatus for fixing hydraulic pipes for construction equipment according to an embodiment of the present invention will be described in detail with reference to the accompanying drawings.

[0023] As illustrated in FIG. 5, the return pipe block 13 is mounted on the upper frame 6 between the frame 12, to which a working device such as a boom and so on is rotatably fixed, and the swing motor 4. The first return joint pipe 10 and corresponding pipes for constructing a hydraulic circuit are joint-connected to the main control valve 1 and the return pipe block 13, respectively, in accordance with the designed hydraulic circuit.

[0024] The second return joint pipe 11 and corresponding components for constructing the hydraulic circuit are

joint-connected to the return pipe block 13 and the oil cooler 5, respectively, in accordance with the designed hydraulic circuit.

[0025] In this case, the construction in which the first return joint pipe 10 is joint-connected to the main control valve 1 and the return pipe block 13 and the construction in which the second return joint pipe 11 is joint-connected to the return pipe block 13 and the oil cooler 5 are well known and used in the corresponding technical field, and thus the detailed description thereof will be omitted.

[0026] After the swing motor 4 is mounted on the upper frame 6, the third return joint pipe 14 is joint-connected to the return pipe block 13 and the hydraulic tank 2, respectively, in accordance with the designed hydraulic circuit.

[0027] In this case, the construction in which the third return joint pipe 14 is joint-connected to the return pipe block 13 and the hydraulic tank 2, respectively, is well known and used in the corresponding technical field, and thus the detailed description thereof will be omitted.

[0028] On the other hand, the hydraulic fluid from the main control valve 1, which controls the flow of the hydraulic fluid being supplied to the working device, is returned to the hydraulic tank 2 after passing through a return line composed of the first return joint pipe 10, the return pipe block 13, the second return joint pipe 11, the oil cooler 5, and a drain pipe path 15.

[0029] If back pressure over a specified pressure is formed in a feedback line of the hydraulic tank 2, the hydraulic fluid from the main control valve 1 is returned to the hydraulic tank 2 through a return line composed of the first return joint pipe 10, the return pipe block 13, and the third return joint pipe 14.

[0030] As described above, according to the present invention, the fixing of the hydraulic pipes is performed through two work processes in order: a first work process of joint-connecting the first and second return joint pipes 10 and 11 to the main control valve 1 and the oil cooler 5, respectively, by using the return pipe block 13 mounted on the upper frame before the swing motor 4 is mounted on the upper frame 6; and a second work process of joint-connecting the third return joint pipe 14 to the return pipe block 13 and the hydraulic tank 2, respectively, after the swing motor 4 is mounted on the upper frame 6.

[0031] Accordingly, even in the case of joint-connecting the return pipes to the hydraulic tank in the small swing radius equipment, the working space can be secured, and thus the return pipes having a large size can be easily joint-connected.

[0032] As described above, the apparatus for fixing hydraulic pipes for construction equipment according to the embodiment of the present invention has the following advantages.

[0033] In the case of joint-connecting the return pipes having a large size to the hydraulic tank in an environment where the working space of the upper frame is narrow, since the work process of assembling the swing motor is simplified by the return pipe block for returning the hy-

draulic fluid of the main control valve to the hydraulic tank, the working time is shortened and the working space is secured to improve the working efficiency.

[0034] Although preferred embodiments of the present invention have been described for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

Claims

1. An apparatus for fixing hydraulic pipes for construction equipment including return pipes for returning hydraulic fluid from a main control valve to a hydraulic tank or an oil cooler, the apparatus comprising:

a first return joint pipe having an inlet port joint-connected to the main control valve;
a second return joint pipe having an outlet port joint-connected to the oil cooler;
a return pipe block mounted on an upper frame between a frame to which a working device is fixed and a swing motor, and joint-connected to an outlet port of the first return joint pipe and an inlet port of the second return joint pipe, respectively; and
a third return joint pipe having an inlet port joint-connected to the return pipe block and an outlet port joint-connected to the hydraulic tank;

wherein the return pipe block is mounted on the upper frame to joint-connect the first and second return joint pipes, and the third return joint pipe is joint-connected to the return pipe block and the hydraulic tank, respectively, after the swing motor is mounted on the upper frame.

2. The apparatus of claim 1, wherein the return pipe block is mounted on the upper frame in front of the swing motor.
3. The apparatus of claim 1, wherein a hydraulic hose or pipe is used as the third return joint pipe.

Fig. 1

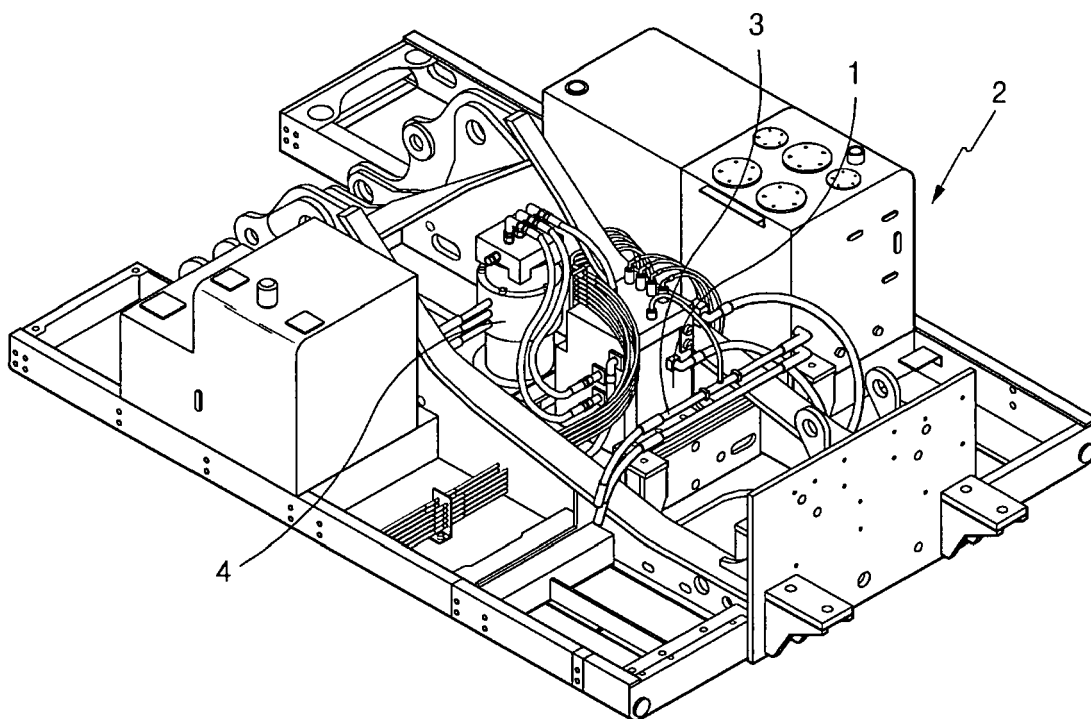


Fig. 2

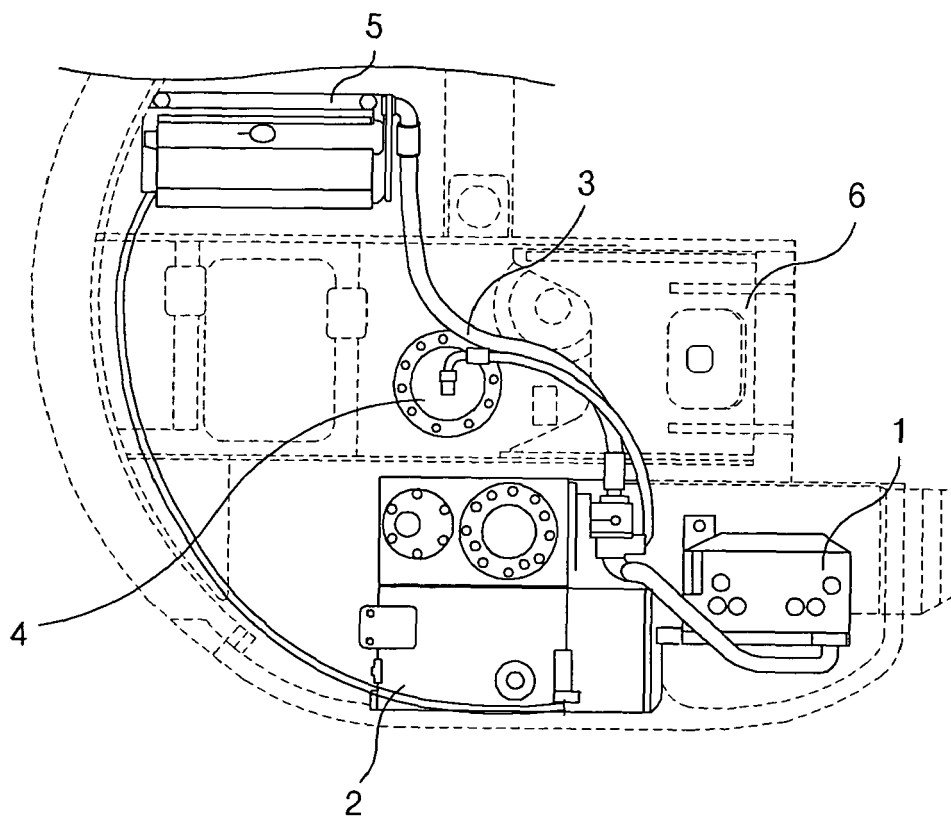


Fig. 3

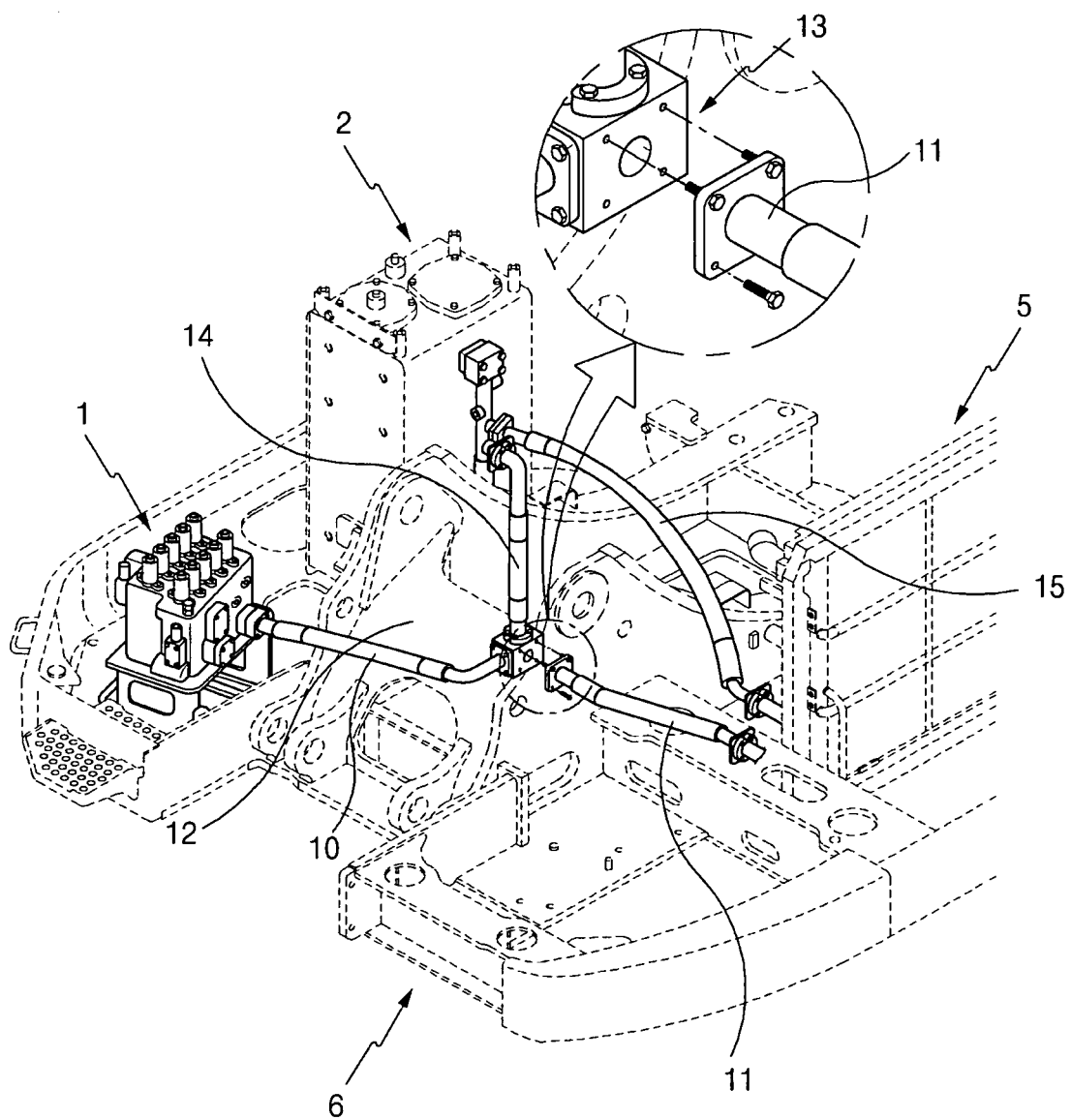


Fig. 4

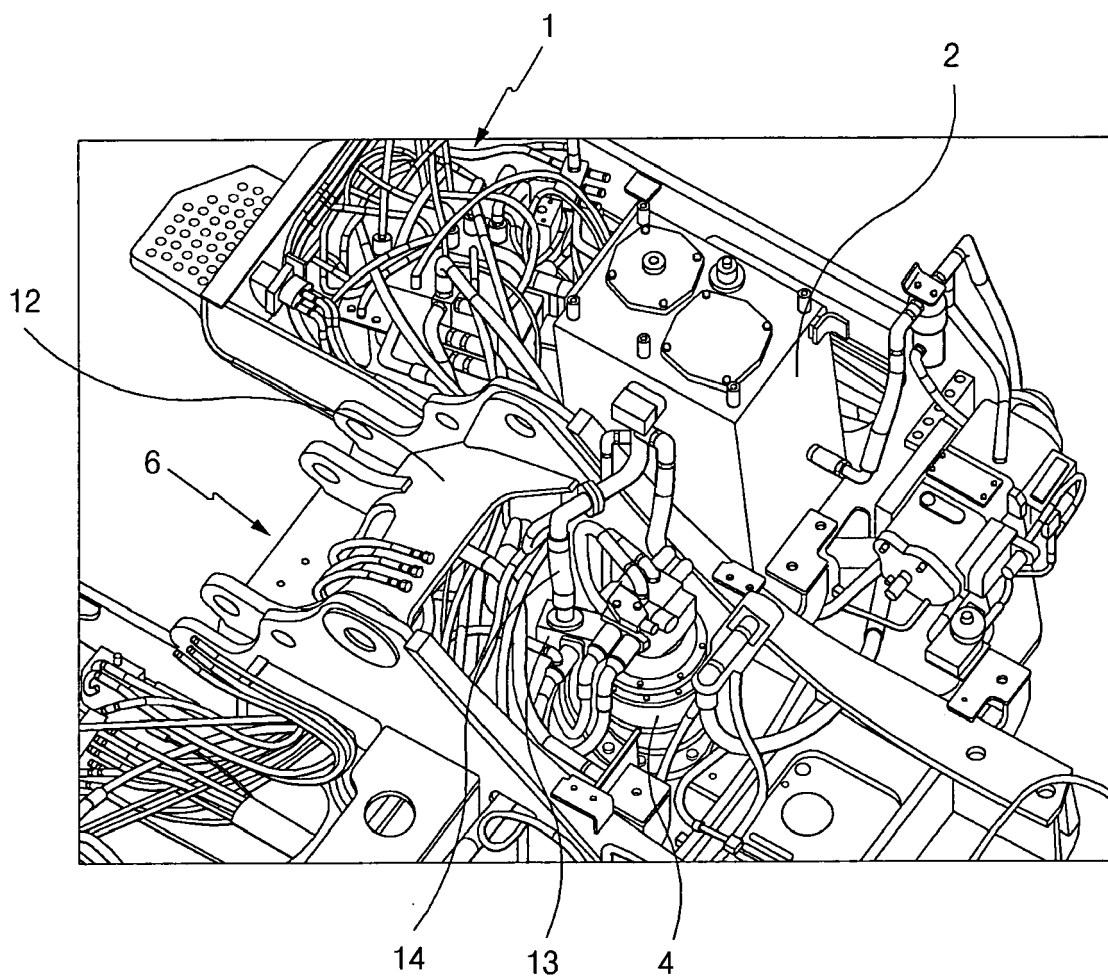
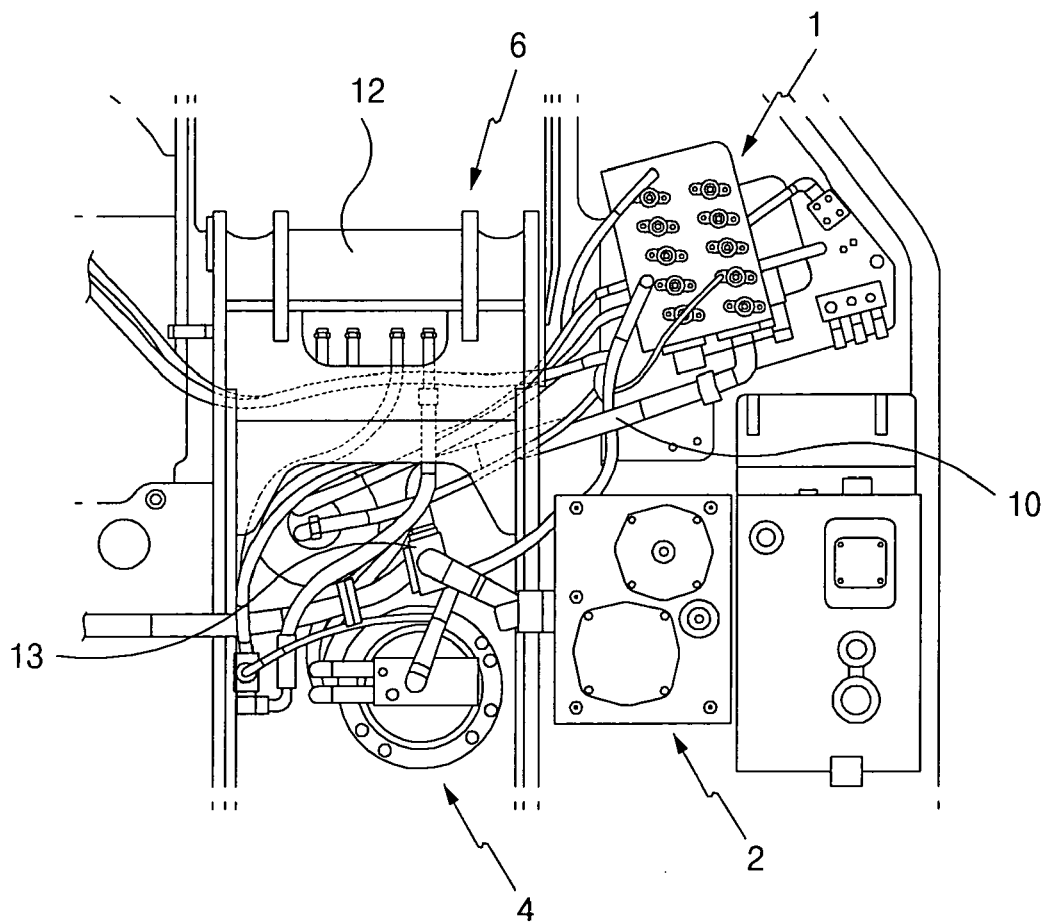


Fig. 5



REFERENCES CITED IN THE DESCRIPTION

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