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Pustelnik et al.(10) **Pub. No.: US 2009/0159249 A1**(43) **Pub. Date: Jun. 25, 2009**(54) **HEAT EXCHANGER**(30) **Foreign Application Priority Data**(76) Inventors: **Philipp Pustelnik**, Wien (AT);
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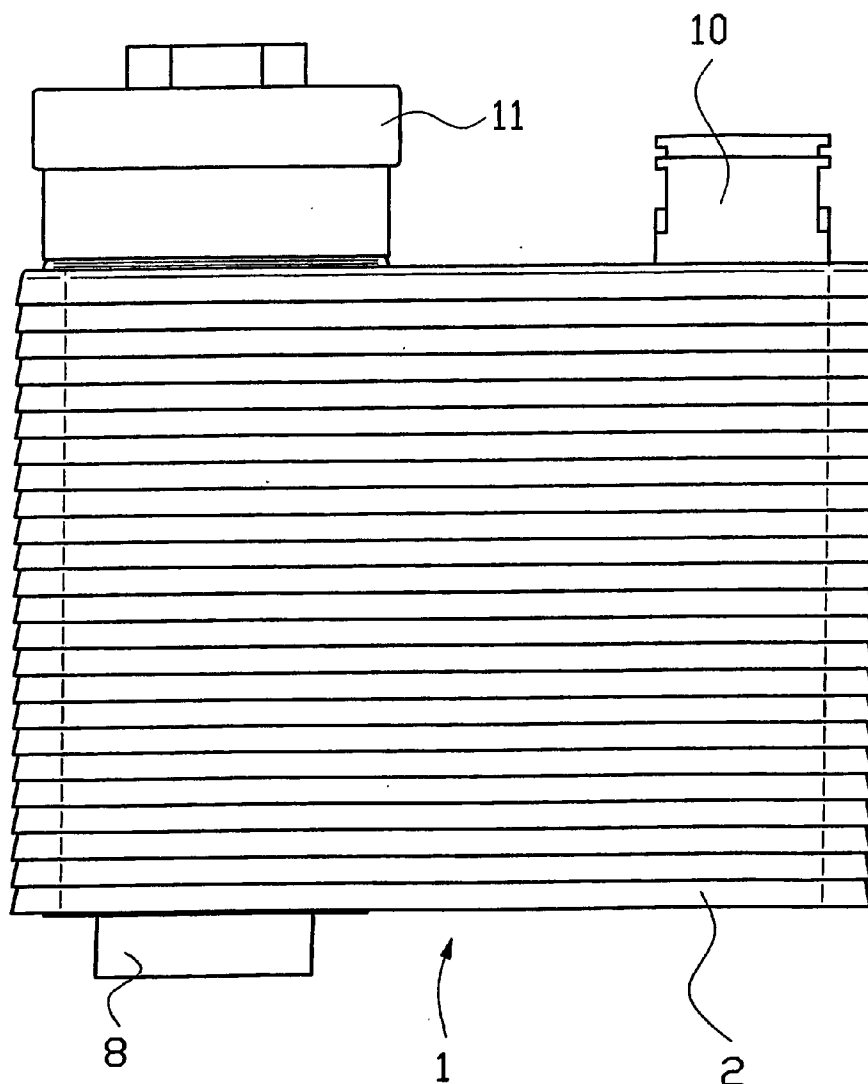
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NEW YORK, NY 10176 (US)(51) **Int. Cl.**
F28D 7/00 (2006.01)(52) **U.S. Cl.** **165/157**(57) **ABSTRACT**

Disclosed is a heat exchanger for fluids, particularly hydraulic oil, comprising a housing (1) in which fluid ducts (4) and coolant ducts (5) alternate and which is equipped with an inlet (8) for hot fluid, an outlet for cooled fluid as well as an inlet and an outlet (10) for the coolant. An internal cylinder chamber (7) that is lined by a fluid filter (13) on the circumference thereof is provided inside the housing. The delivered hot fluid or the discharged cooled fluid is fed into or discharged from the fluid ducts via said fluid filter (13).

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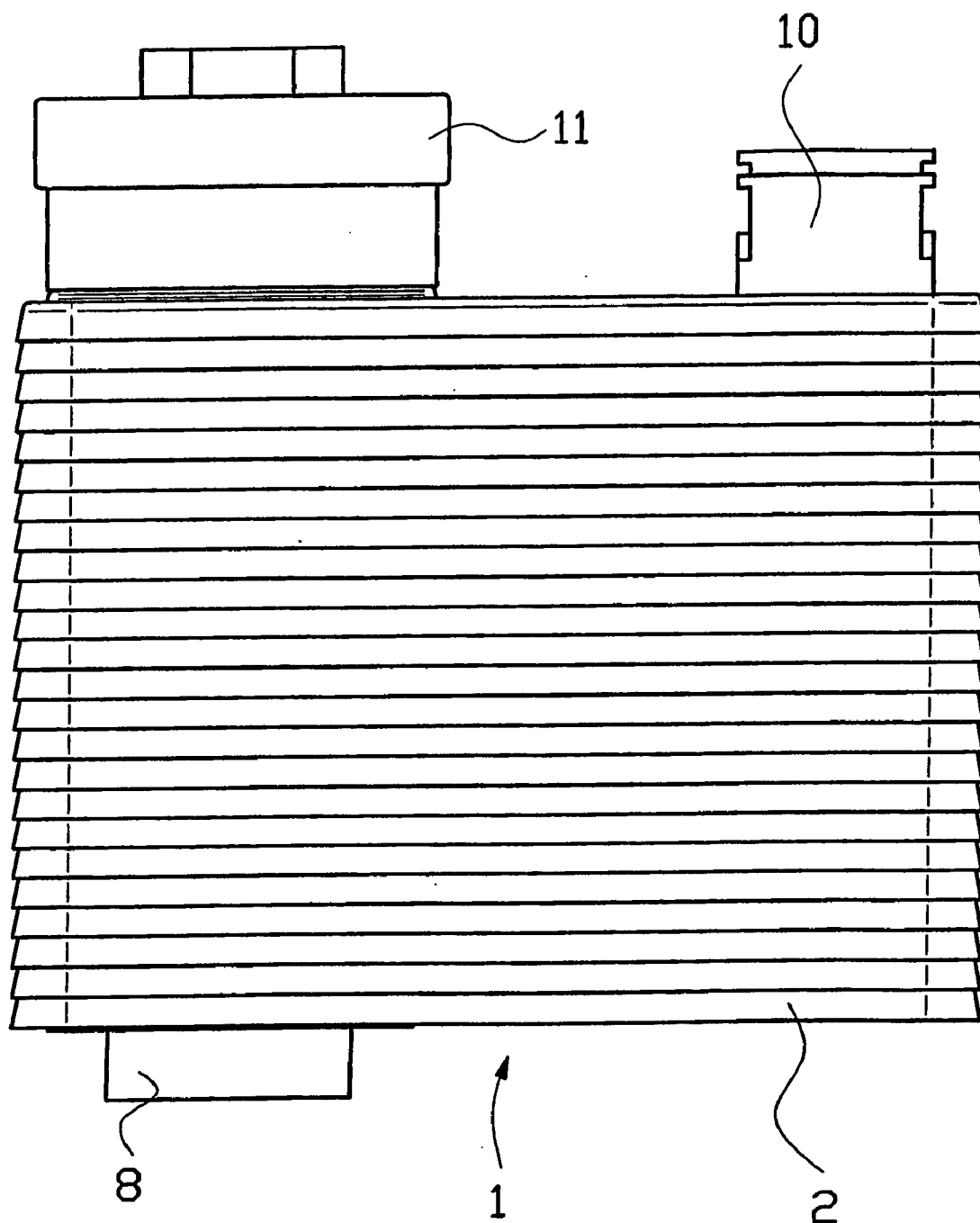


Fig. 1

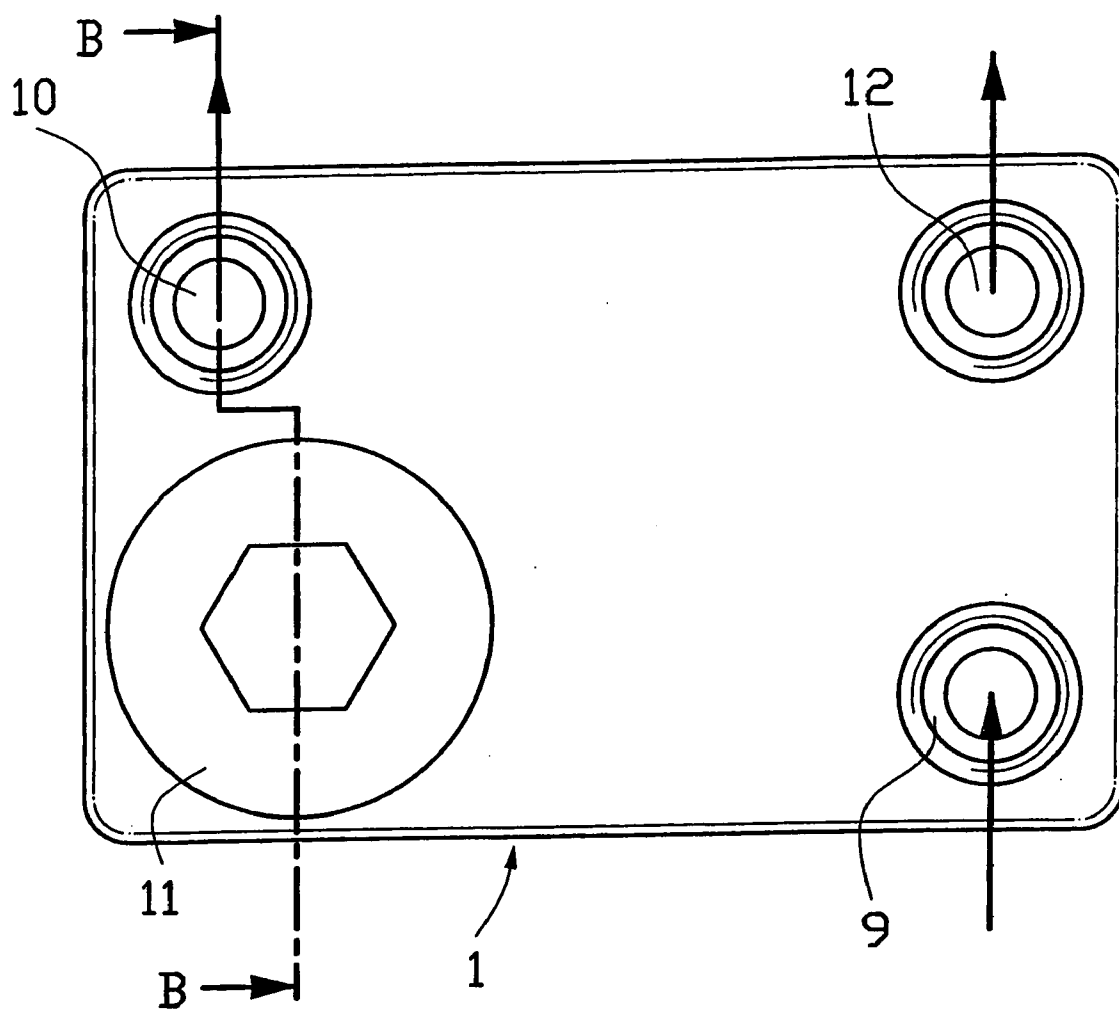
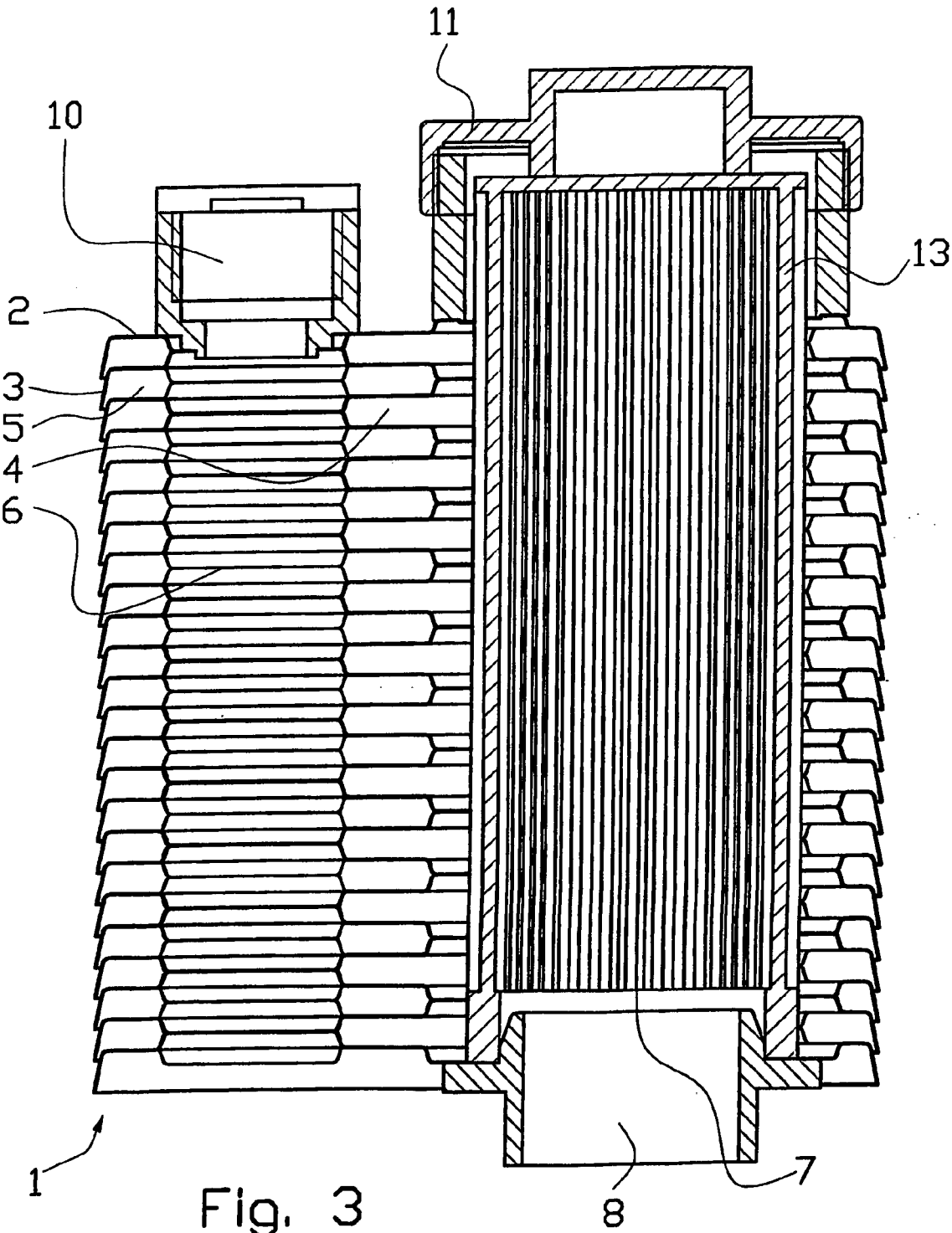


Fig. 2



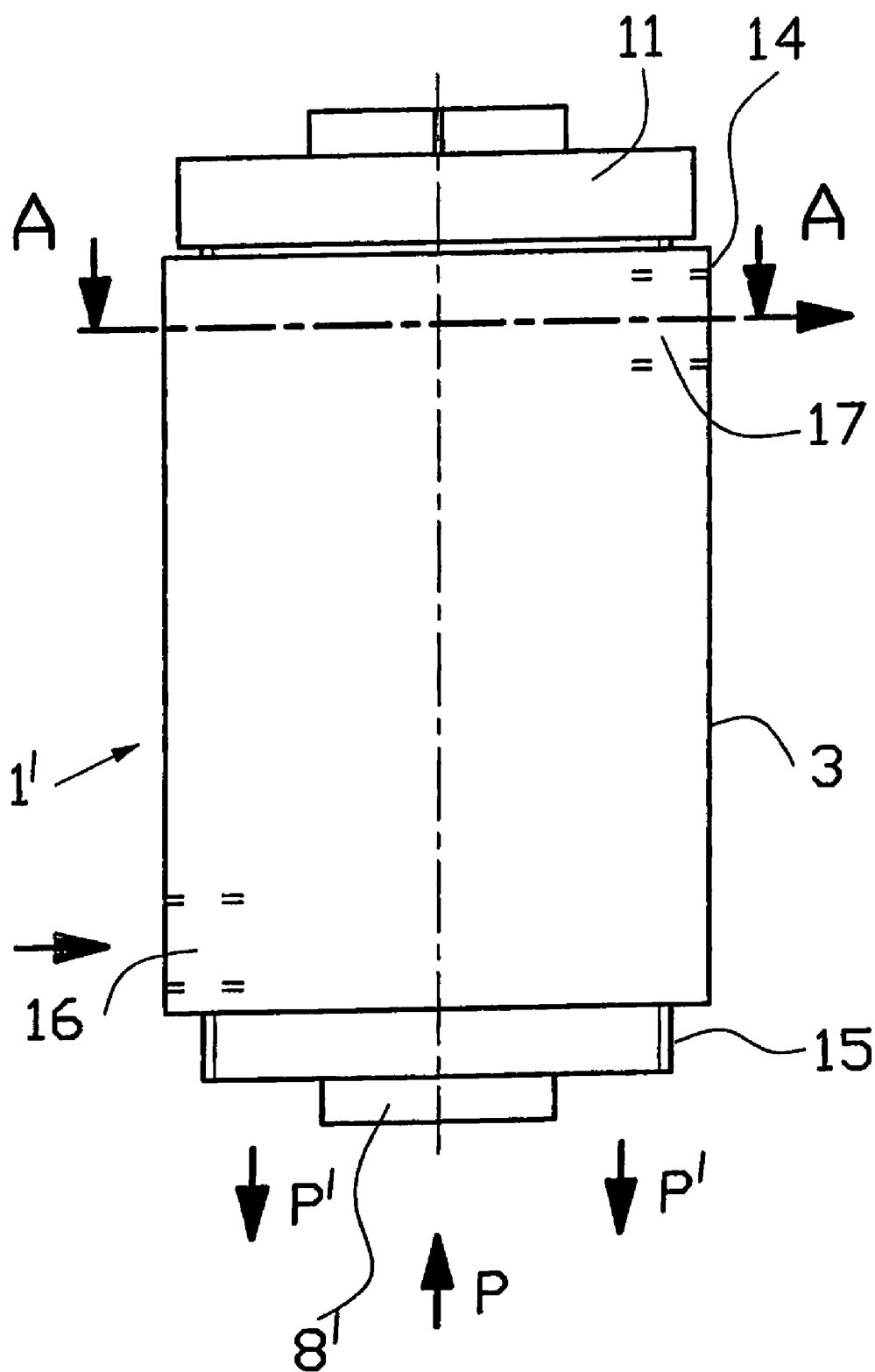
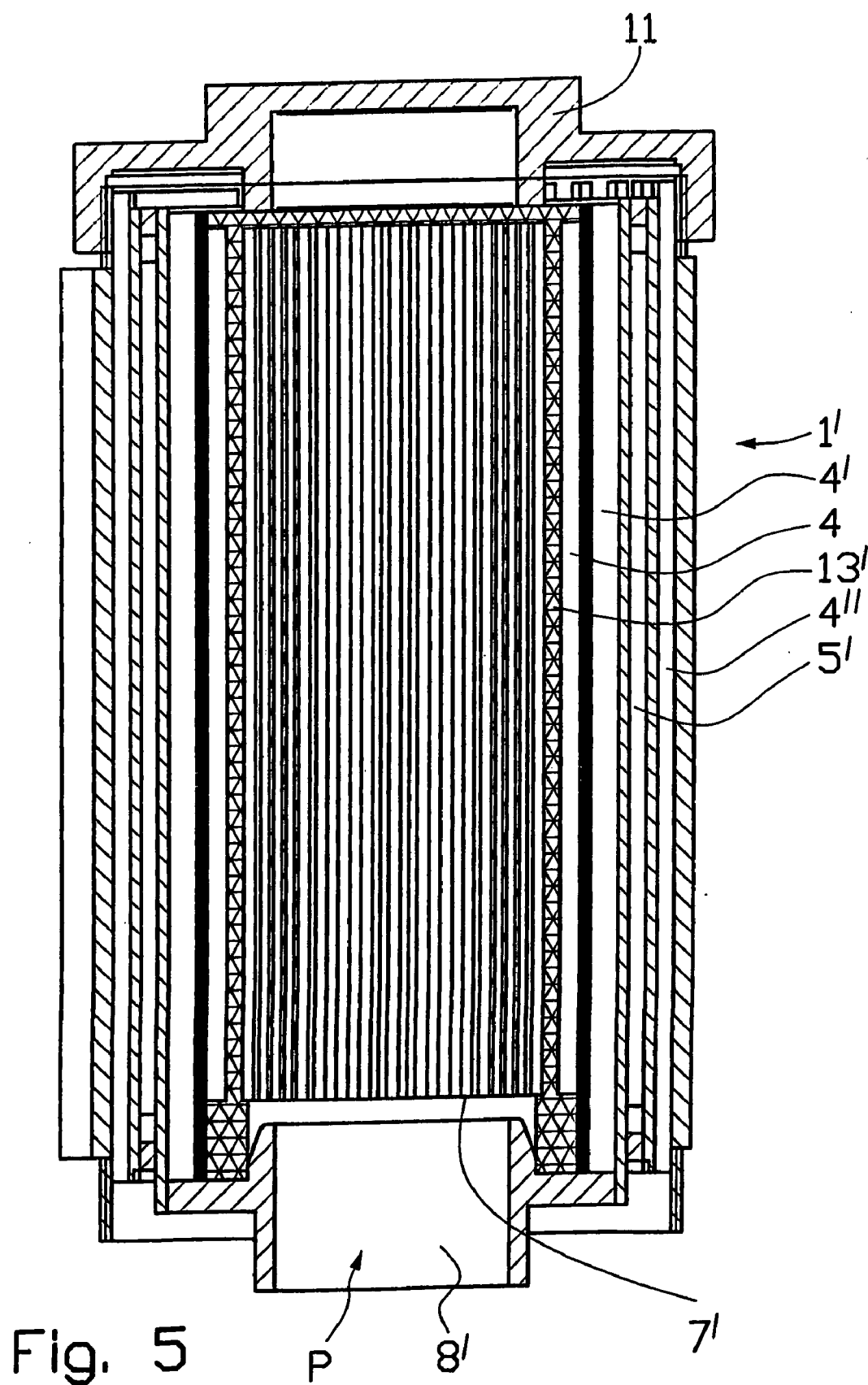


Fig. 4



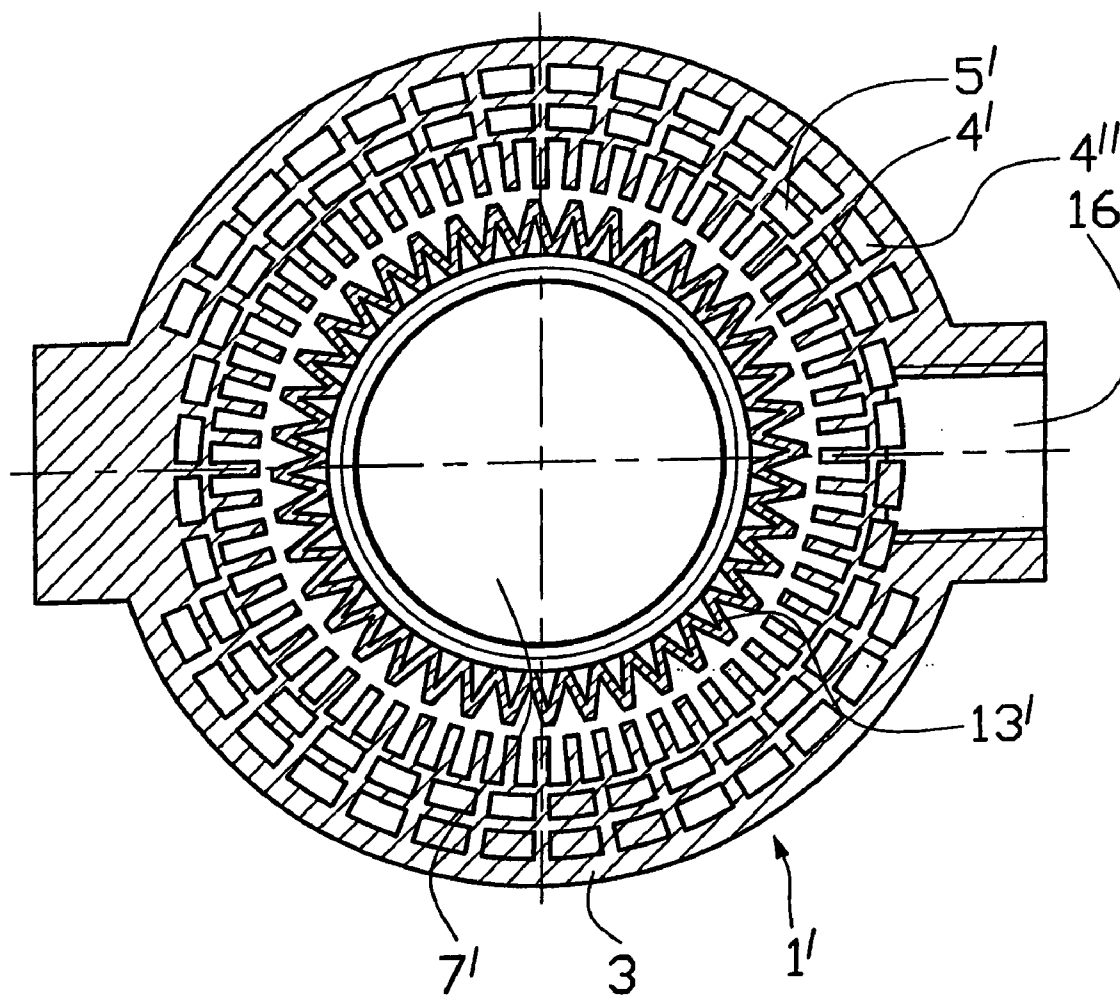


Fig. 6

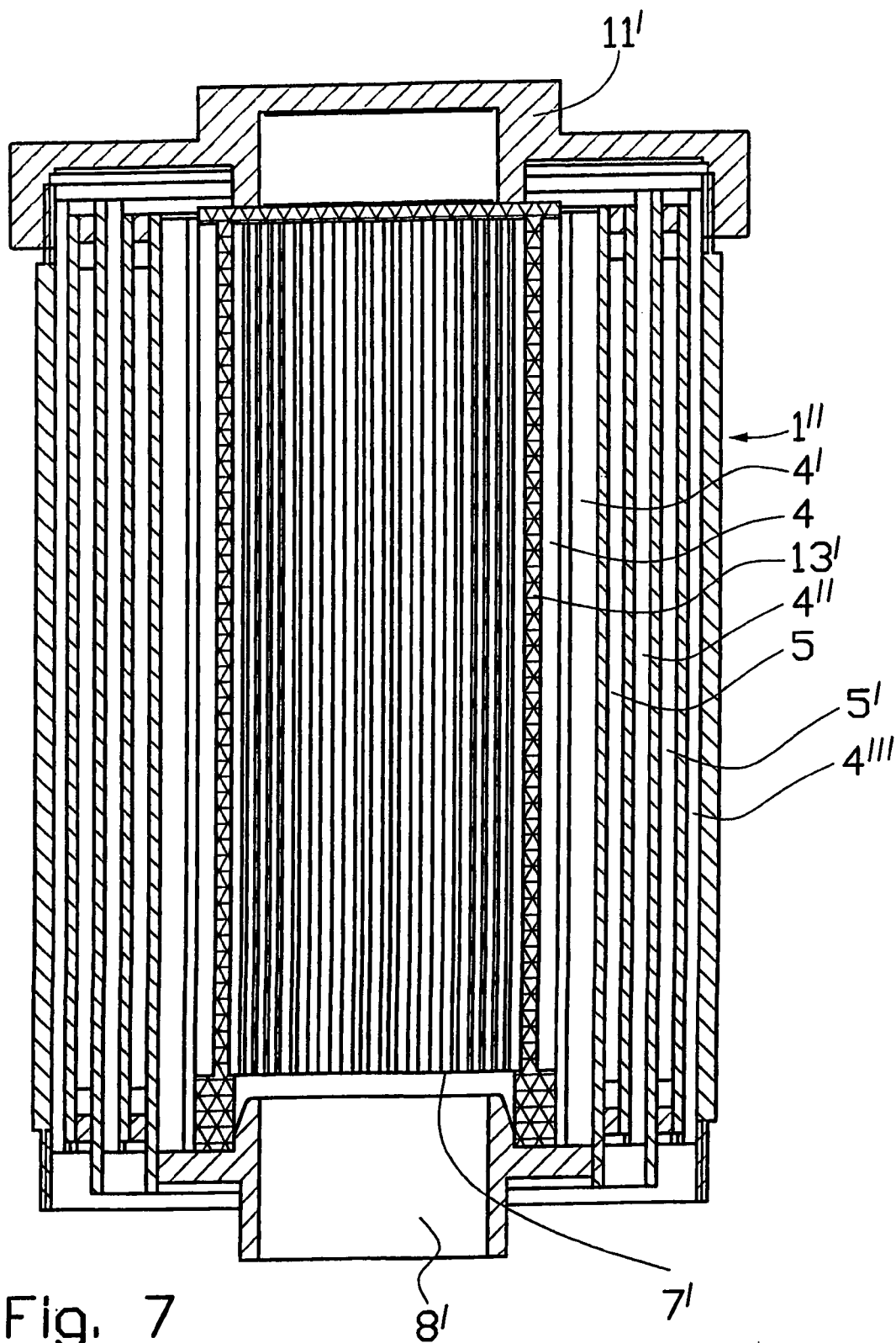


Fig. 7

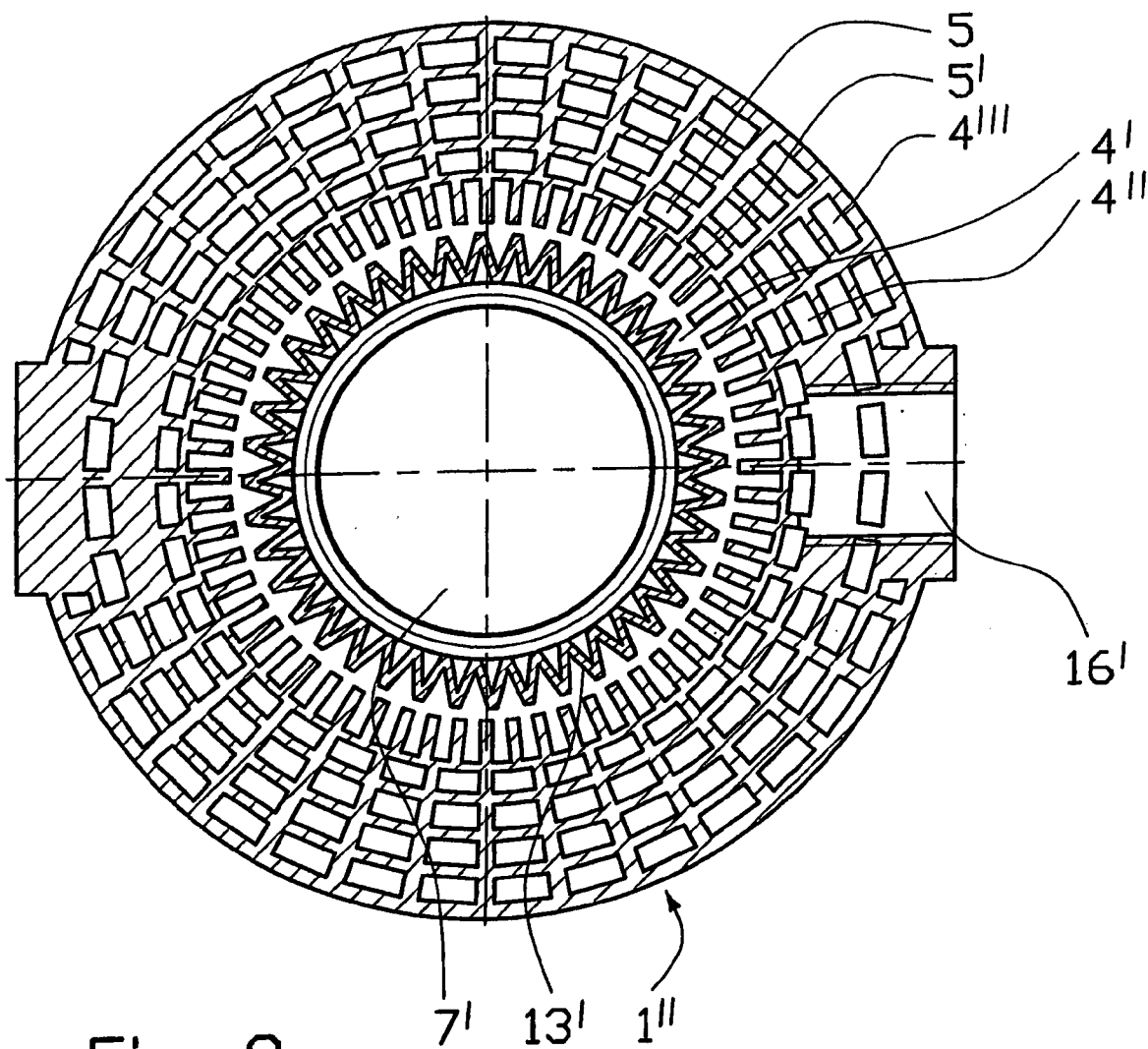
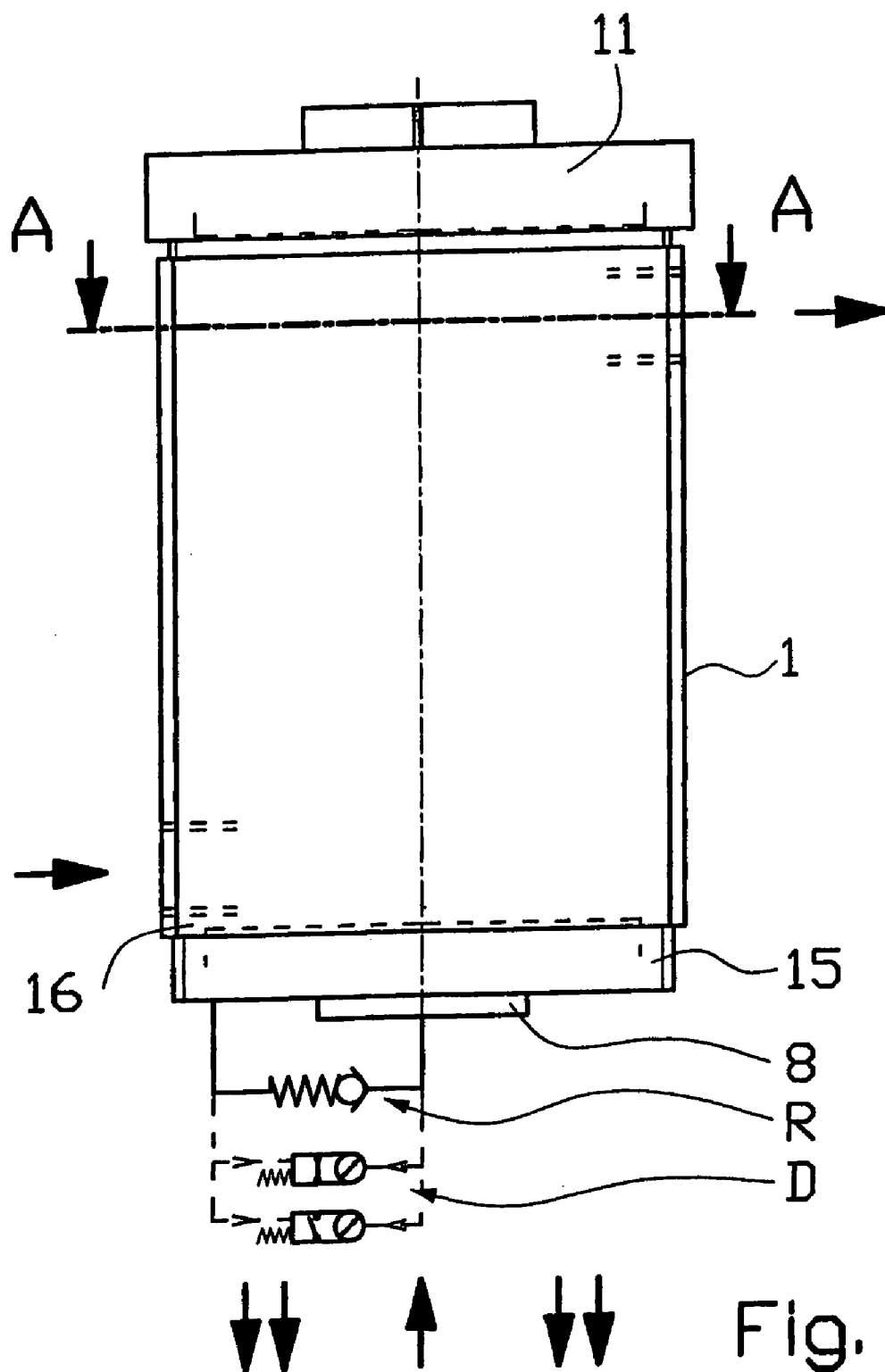


Fig. 8



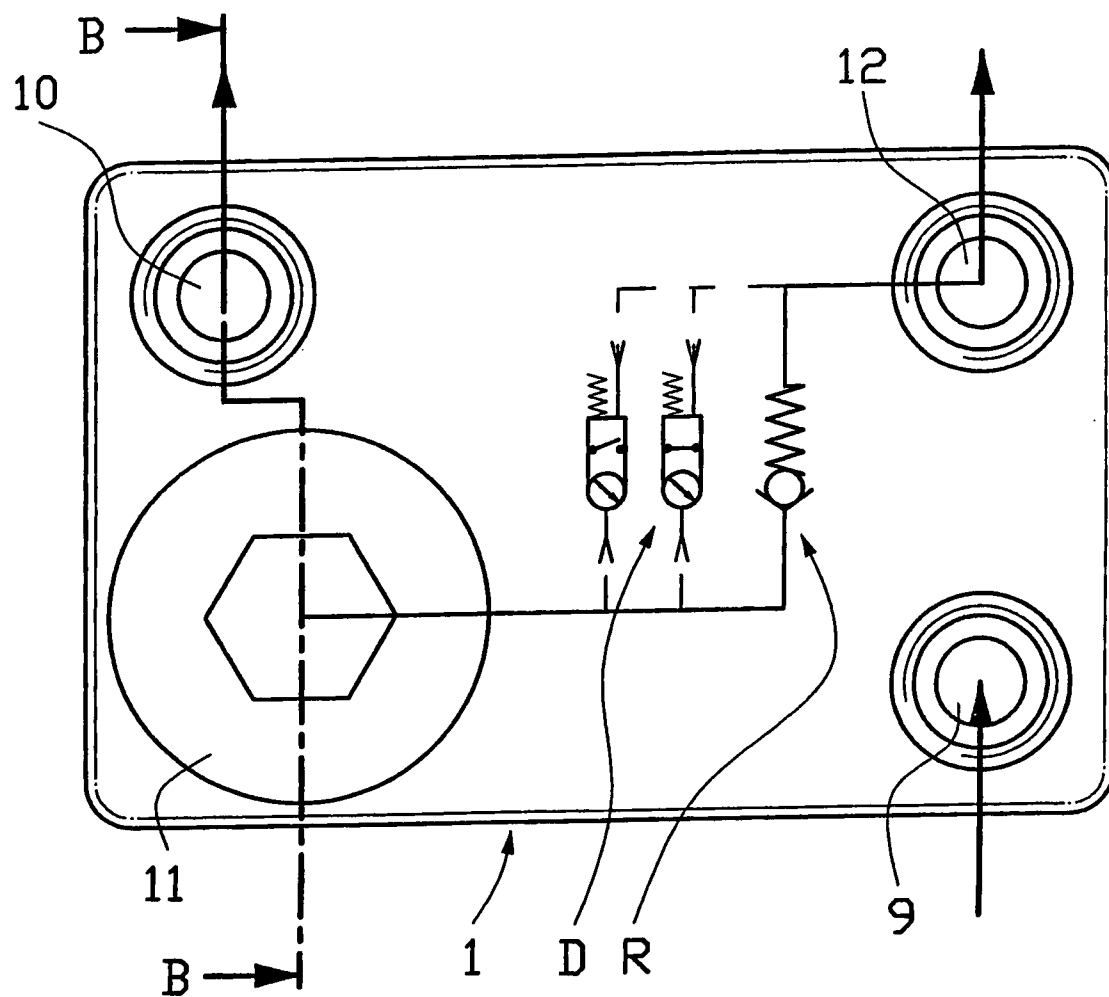


Fig. 10

HEAT EXCHANGER

[0001] The invention relates to a heat exchanger for fluids, in particular hydraulic oil, having a housing in which fluid conduits and coolant conduits alternate with one another, in which the housing has an inlet for hot fluid, an outlet for cooled fluid, and one inlet and one outlet for the coolant.

[0002] Such heat exchangers are versatile in use. The disadvantage of the known heat exchangers is that the hot fluid, such as hydraulic oil, before entering or after leaving the heat exchanger must be passed through a separate filter device, to remove foreign bodies from the fluid.

[0003] The object of the invention is to overcome this disadvantage and to attain cleaner cooled fluid in a structurally simple way. A heat exchanger of the type defined at the outset and embodied according to the invention is distinguished in that in the housing, a central cylindrical chamber is provided, which is lined on its circumference by a filter, by way of which the inflowing hot fluid or the outflowing cooled fluid enters or emerges from the fluid conduits.

[0004] In this way, it is attained that immediately before or after its is cooled, the hot fluid is filtered, so that a separate filter device upstream or downstream of the heat exchanger is unnecessary.

[0005] In a preferred embodiment of the invention, the housing is formed by an essentially block shaped packet comprising plates that define horizontal fluid conduits and coolant conduits, which plates are penetrated by the cylindrical chamber and by both a coolant conduit and a fluid outlet conduit. Alternatively, the housing is formed by a cylindrical body, in which the fluid conduits and the coolant conduits are embodied in the form of rings of axially extending conduits, and one or more outer rings of fluid conduits discharge at the face end of the housing toward the fluid inlet, and on the top of the cylindrical chamber, a deflection from the inner fluid outlet conduit to the outer fluid outlet conduit or outer fluid outlet conduits is provided.

[0006] Further characteristics of the invention will be described in further detail below in terms of exemplary embodiments, in conjunction with the drawings. Shown are:

[0007] FIG. 1, a schematic elevation view of a heat exchanger according to the invention;

[0008] FIG. 2, a top view on the heat exchanger of FIG. 1;

[0009] FIG. 3, an axial section through the heat exchanger of FIGS. 1 and 2;

[0010] FIG. 4, an elevation view of a second embodiment of the heat exchanger of the invention;

[0011] FIG. 5, an axial section through the second embodiment;

[0012] FIG. 6, a cross section taken along the line VI-VI in FIG. 4;

[0013] FIG. 7, an axial section through the third embodiment;

[0014] FIG. 8, a cross section taken along the line VIII-VIII in FIG. 7;

[0015] FIG. 9, a schematic view of a fourth embodiment of the heat exchanger; and

[0016] FIG. 10, a top view on the embodiment of FIG. 8.

[0017] In FIG. 1, the heat exchanger, produced for instance from special steel, for a fluid, in particular hydraulic oil, has a block shaped housing 1, which is formed of a packet of joined-together plates 2, 3 that between them define horizontal fluid conduits 4 and conduits 5 for a coolant, preferably

water. The packet is penetrated both by a coolant distribution conduit 6 and by a cylindrical chamber 7 for distributing the fluid, as well as by a collection conduit (not shown) for cooled fluid. On the underside of the housing, there is an inlet 8 to the cylindrical chamber 7, and on the top of the housing a coolant inlet 9 and a coolant outlet 10 as well as an outlet 12 for cooled fluid are provided. The cylindrical chamber 7 is closed on the top of the housing by a screw cap 11 and is lined both on its circumference and on its upper face end with a filter body 13, through which the fluid flowing in under pressure flows in the radial direction into the fluid conduits 4.

[0018] The flow direction of the fluid and of the coolant can also be reversed. In that case, the cooled fluid flows via the filter body 13 into the cylindrical fluid space 7 and from there out of the housing.

[0019] In the exemplary embodiment of FIGS. 4 through 6, a substantially cylindrical housing 3 is provided between a top part 14 and a base part 15. On the underside of the housing 1', there is an inlet 16 for coolant, in particular cooling water, and on the top of the housing there is a coolant outlet 17. The fluid to be cooled flows under pressure, via the lower face end of the housing, in the direction of the arrow P into the inlet 8' of the central cylindrical chamber 7', and the cooled fluid flows out of the lower face end of the housing, in the region of the housing circumference, as indicated by the arrows P' (FIG. 4).

[0020] As FIG. 6 shows, fluid conduits 4', 4'' and coolant conduits 5' disposed in rings in the radial direction alternate with one another. The central cylindrical chamber 7' is lined on its inside with a filter body 13', through which the hot fluid, flowing in under pressure, flows radially into the fluid conduits 4', which extend axially outside the filter body 13' and change over on the top of the housing into the radially outward-located fluid conduits 4'', which discharge via the lower face end of the housing. In the embodiment of FIGS. 5 and 6 as well, the flow direction of the fluid to be cooled and of the coolant can be reversed.

[0021] FIGS. 7 and 8 show a third embodiment with a greater number of fluid conduit rings and coolant conduit rings.

[0022] In FIG. 9, in the embodiment of FIGS. 4 through 6 on the one hand and in the embodiment of FIGS. 1 through 3 on the other, an additional arrangement can each be provided, which includes a check valve R and a pressure switch D, which if a defined threshold value is exceeded send a signal to a display and/or device, such as an emergency shutoff device, that affects the operation of the heat exchanger in the desired manner.

1. A heat exchanger for fluids, in particular hydraulic oil, having a housing (1) in which fluid conduits (4) and coolant conduits (5) alternate with one another, in which the housing has an inlet (8) for hot fluid, an outlet for cooled fluid, and one inlet and one outlet (10) for the coolant, characterized in that in the housing (1), an internal cylindrical chamber (7, 7') is provided, which is lined on its circumference by a fluid filter (13), by way of which the inflowing hot fluid or the outflowing cooled fluid enters or emerges from the fluid conduits (4, 4', 4'').

2. The heat exchanger as defined by claim 1, characterized in that the housing (1) is formed by an essentially block shaped packet comprising plates (2, 3) that define horizontal fluid conduits (4) and coolant conduits (5), which plates are penetrated by the cylindrical chamber (7) and by both a coolant conduit (6) and a fluid outlet conduit (12).

3. The heat exchanger as defined by claim 1, characterized in that the housing (1') is formed by a cylindrical body, in which the fluid conduits (4', 4'', 4''') and the coolant conduits (5, 5') are embodied in the form of rings of axially extending conduits, and one or more outer rings of fluid conduits (4'', 4''') discharge at the face end of the housing toward the fluid

inlet, and on the top of the cylindrical chamber (7'), a deflection from the inner fluid outlet conduit (4') to the outer fluid outlet conduit or outer fluid outlet conduits (4'', 4''') is provided.

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