



US 20040188075A1

(19) **United States**(12) **Patent Application Publication**

Pustelnik et al.

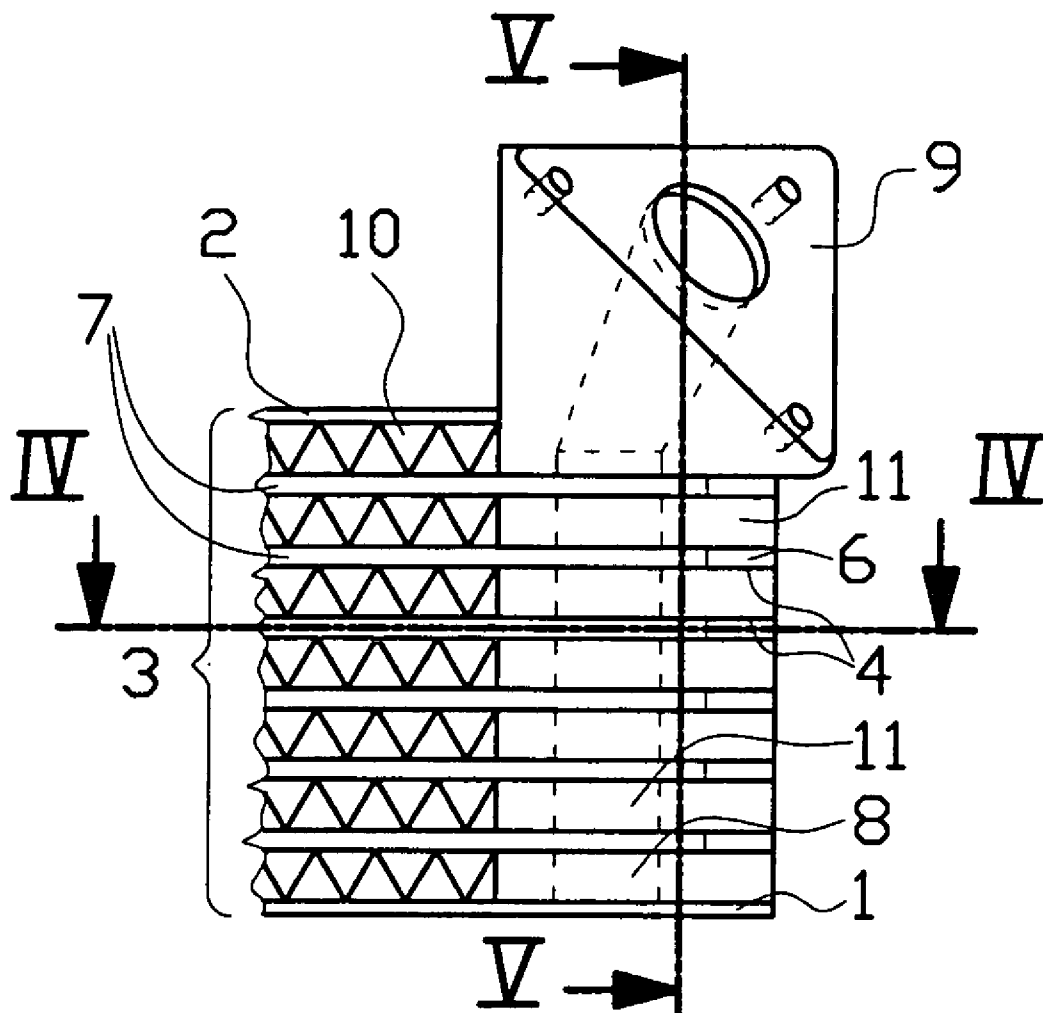
(10) **Pub. No.: US 2004/0188075 A1**(43) **Pub. Date: Sep. 30, 2004**(54) **COOLER****Publication Classification**(76) Inventors: **Werner Pustelnik**, Vienna (AT);
Philipp Pustelnik, Vienna (AT)(51) **Int. Cl.⁷** **F28F 3/08; F28D 7/02**(52) **U.S. Cl.** **165/167; 165/165**

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Law Offices of Karl Hormann**P.O. Box 381516****Cambridge, MA 02238-1516 (US)**(57) **ABSTRACT**(21) Appl. No.: **10/766,658**(22) Filed: **Jan. 28, 2004**(30) **Foreign Application Priority Data**

Jan. 29, 2003 (AT)..... GM 40/2003

A plate cooler for cooling a fluid made of a plurality of superposed pairs of spaced plates sealed at their margins by side and end plates to form fluid flow channels and connected by lateral plates. The spaced plates and lateral plates are provided with aligned fluid flow openings forming a fluid flow conduit connected to a fluid input and output. The cooler is preferably made of aluminum or an aluminum alloy and is assembled by vacuum welding.



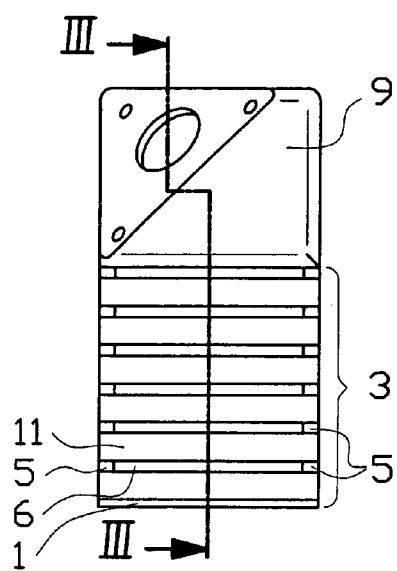


Fig. 1

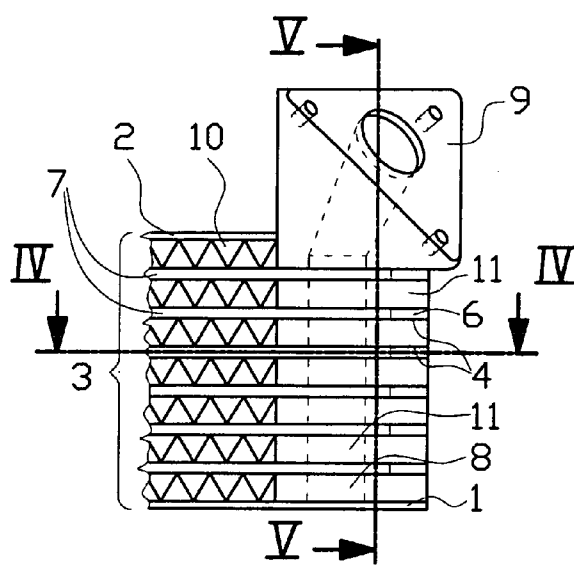


Fig. 2

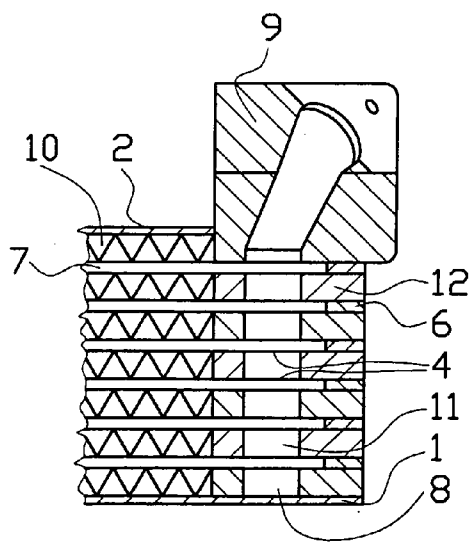


Fig. 3

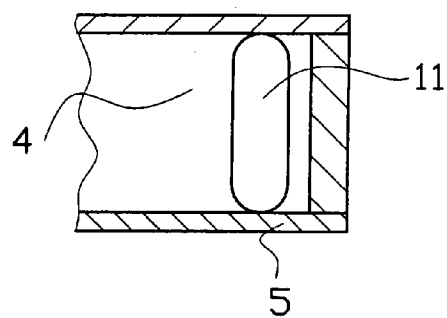


Fig. 4

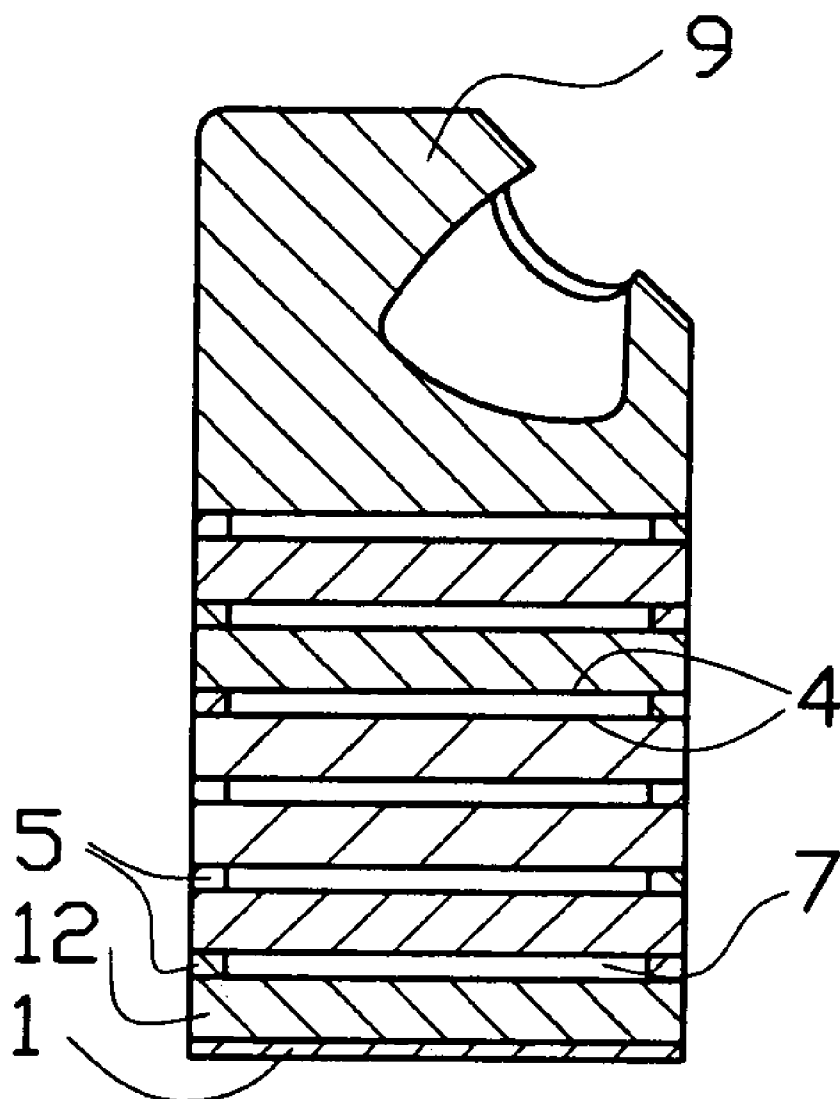


Fig. 5

COOLER

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to coolers in general and to a plate cooler for cooling hydraulic oil, in particular.

[0003] The cooler is preferably made of top and bottom plates which, between them, hold a substantially parallelepiped packet of spaced plates forming fluid channels with cooling fins being interposed between adjacent fluid channels, the ends of the fluid channels being connected to fluid distribution channels which in turn lead to fluid input and output conduits.

[0004] 2. The Prior Art

[0005] The fluid channels in conventional plate coolers of this general type are as a rule constructed of flat tubes which are closed at their ends by cuboid inserts. Such structures suffer from the drawback of the manufacture of the flat tubes and, indeed, of the entire cooler being complex and expensive.

OBJECT OF THE INVENTION

[0006] It is an object of the invention to avoid this drawback and to provide a plate cooler of the kind referred to supra which is not only of a simple structure, but which may also be easily connected.

[0007] Other objects of the invention will in part be obvious and will in part appear hereinafter.

BRIEF SUMMARY OF THE INVENTION

[0008] In the accomplishment of these and other objects the invention provides for a plate cooler in which each of the fluid channels is formed by the two spaced plates as well as by side and end plates arranged therebetween. Cooling fins are arranged between two lateral plates arranged in the area of the distribution conduits and provided with a fluid flow-through opening, the lateral plates being of substantially the same height as the fins. The plates, the side plates, the end plates, the lateral plates, the bottom plate and the cover plate are assembled into a packet by vacuum welding. Preferably, at least the plates are made of aluminum or an aluminum alloy.

DESCRIPTION OF THE SEVERAL DRAWINGS

[0009] The novel features which are considered to be characteristic of the invention are set forth with particularity in the appended claims. The invention itself, however, in respect of its structure, construction and lay-out as well as manufacturing techniques, together with other objects and advantages thereof, will be best understood from the following description of preferred embodiments when read in connection with the appended drawings, in which:

[0010] **FIG. 1** is a schematic side view of the plate cooler in accordance with the invention;

[0011] **FIG. 2** is a schematic front view of part of the plate cooler;

[0012] **FIG. 3** is a sectional view of the plate cooler along line III-III of **FIG. 1**;

[0013] **FIG. 4** is a sectional view of the plate cooler along line IV-IV of **FIG. 2**; and

[0014] **FIG. 5** is a sectional view of the plate cooler along line V-V of **FIG. 2**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0015] As shown in **FIGS. 1 to 4**, the plate cooler for use with liquids, and more particularly with hydraulic oil, is preferably made of aluminum or an aluminum alloy and is provided with a parallelepiped packet **3** of spaced plates **4** disposed between a bottom plate **1** and a cover plate **2**. Fluid channels **7** are formed by pairs of spaced plates **4** and separate side plates **5** and end plates **6** arranged between the plates **4**. At their ends, the fluid channels **7** are connected to fluid distribution conduits **8** which lead to input and output channels structures as corner connectors **9**, for instance. Cooling fins **10** are interposed between neighboring fluid channels **7**. More particularly, the cooling fins **10** are positioned between two lateral plates **12** of substantially the same height as the cooling fins **10** and which are positioned in the area of the distribution conduits **8** and provided with a fluid flow-through opening **11**.

[0016] The bottom plate **1**, the cover plate **2**, the plates **4**, the side plates **5**, the end plates **6** and the lateral plates **12** are made of coated aluminum or of an aluminum alloy. They are assembled together as a packet **3** by vacuum welding which renders the cooler highly resistant to hydraulic stresses, permanent loads and vibrations.

[0017] Those skilled in the art will understand that within the frame of the general concept of the invention the described embodiment may be altered in several different ways.

What is claimed is:

1. A plate cooler for fluids, comprising:

a bottom plate;

a cover plate;

a plurality of pairs of spaced plates provided with superposed apertures;

side plates and end plates secured at marginal sections of the spaced paired plates to form fluid channels;

lateral plates of predetermined height positioned between adjacent pairs of spaced plates and provided with openings aligned with the apertures; and

cooling fins of a height substantially identical to the predetermined height disposed between adjacent pairs of spaced paired plates and laterally of the lateral plates.

2. The plate cooler of claim 1, wherein the spaced paired plates are positioned substantially parallel to each other.

3. The plate cooler of claim 2, wherein the pairs of spaced plates are positioned substantially parallel to each other.

4. The plate cooler of claim 3, wherein the cover plate, the bottom plate and the pairs of spaced plates are positioned in parallel to each other.

6. The plate cooler of claim 1, wherein the cover plate, the bottom plate, the pairs of spaced plates and the lateral plates are made of one of aluminum and an aluminum alloy.

7. The plate cooler of claim 6, wherein the cover plate, the bottom plate, the pairs of spaced plates and the lateral plates are vacuum welded together.