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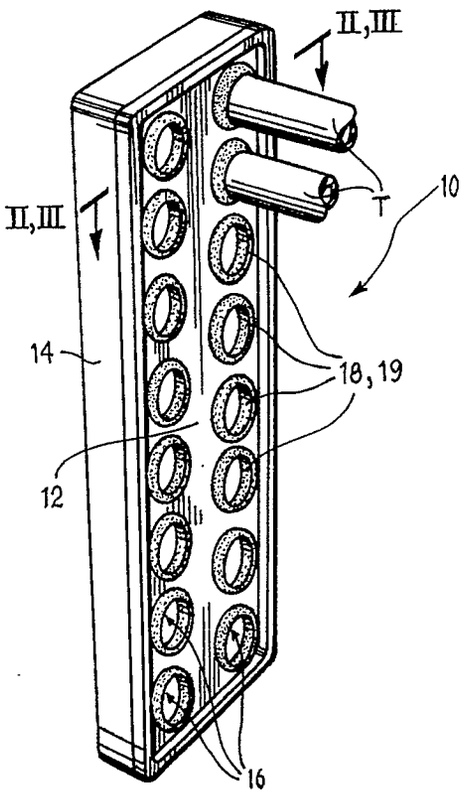
(54) A heat exchanger for motor-vehicle air-conditioning systems.

(57) A header (10) for a radiator for motor-vehicle air conditioning systems has a tube plate (12) of polymeric material provided with a plurality of sealing rings (18,19) co-moulded with the tube plate (12) and, arranged in correspondence with the holes (16) for sealingly connecting the tubes(T) of the exchanger to the header (10).

FIG. 1



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A HEAT EXCHANGER FOR MOTOR-VEHICLE AIR-CONDITIONING SYSTEMS

The present invention relates to a heat exchanger, particularly a liquid-gas, liquid-liquid or gas-gas heat exchanger for motor-vehicle air-conditioning or engine-cooling systems, of the type including at least one header with a tube plate of polymeric material.

The hydraulic seal between the tube matrix of the exchanger and the tube plates is normally achieved by the expansion of the tubes in the corresponding holes in the plate or by the interposition of a gasket of elastomeric material having a plurality of holes with raised edges complementary to the holes in the tube plate.

The first of these solutions requires levels of precision which are somewhat complex and expensive to achieve whilst, in the second, the use of the gasket is burdensome both in terms of costs and in terms of the time required for the assembly of the exchanger.

The object of the present invention is to provide a heat exchanger which overcomes the said problems.

According to the invention, this object is achieved by virtue of the fact that each hole in the tube plate has a sealing ring of elastomeric material which is integral with the tube plate and is adapted to ensure the hydraulic sealing of the header.

The sealing rings, which are formed by co-moulding with the tube plate, achieve a saving in the final cost of the product (less elastomeric material is used, the implementation cost is lower, and the heat exchanger is easier to assemble).

Preferably, each header has a cover of polymeric material which is welded to the tube plate, for example by ultrasonic mirror welding, or is fixed thereto either mechanically or by chemical welding.

Further advantages and characteristics of the heat exchanger according to the invention will become clear from the detailed description which follows, provided purely by way of non-limiting example, with reference to the appended drawings, in which

- Figure 1 is a perspective view of the header of an exchanger according to the invention,

Figures 2 and 3 are sections taken on the lines II-II and III-III of Figure 1 respectively, showing two variants.

With reference to the drawings, a header for a water-air heat exchanger for installation in the air-conditioning system of a motor vehicle is generally indicated 10. The header 10 has a tube plate 12 of polymeric material, to the periphery whereof a convex cover 14, also of polymeric material, is welded by ultrasonic or hot-blade welding.

The tube plate 12 has a plurality of holes 16 (which may be of various shapes, circular, eliptical, etc.) for the passage of tubes T of the exchanger. In the first version (Figure 2), a sheet 17 of elastomeric material is co-moulded on the face of the tube plate which faces the cover 14 and defines a plurality of sealing rings 18 in correspondence with the holes 16. In the second version (Figure 3), rings 19 of elastomeric material, adapted to act as sealing rings, are co-moulded with the tube plate in correspondence with the through-holes 16. Each sealing ring 18 or 19 has a respective annular portion 18a or 19a with an outside diameter substantially corresponding to the diameter of the corresponding hole 13 in the tube plate and an inside diameter approximately equal to the outside diameter of a metal tube T to be inserted sealingly in the hole 16.

To advantage, the material used for the manufacture of the cover 14 of the tube plate 12 is a thermoplastics technopolymer (for example polyamide, polypropylene, etc.), or an injectable thermosetting polymer, whilst a thermoplastics elastomer may, to advantage, be used for the sealing rings 18 and 19.

Claims

1. A heat-exchanger, particularly a liquid-gas, liquid-liquid or gas-gas heat exchanger for motor-vehicle air-conditioning or engine-cooling systems, of the type including at least one header (10) with a tube plate (12) of polymeric material, characterised in that each hole (16) in the tube plate (12) has a sealing ring (18, 19) of elastomeric material which is integral with the tube plate (12) and is adapted to ensure the hydraulic sealing of the header (10).

2. An exchanger according to Claim 1, characterised in that the sealing rings (18, 19) are produced by co-moulding with the tube plate (12).

3. An exchanger according to Claim 2, characterised in that the sealing rings (18) are defined by edges (18a) of holes in a sheet (17) of elastomeric material co-moulded on one face of the tube plate (12).

4. An exchanger according to Claim 2, characterised in that the sealing rings are constituted by rings (19) of elastomeric material co-moulded with the tube plate (12)

FIG. 1

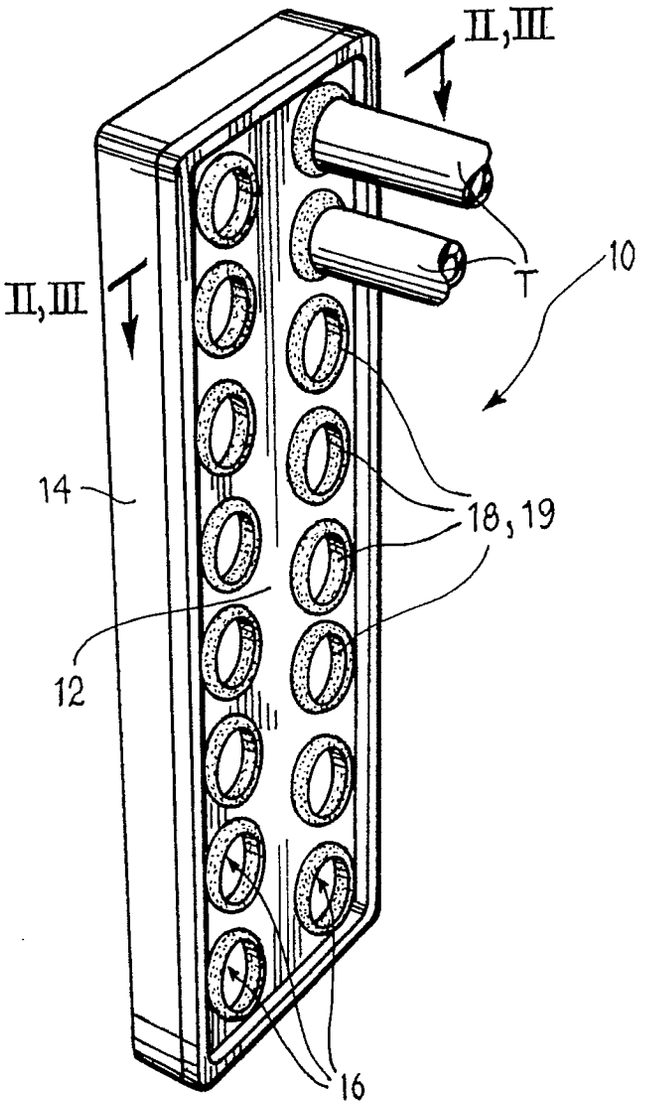

FIG. 2

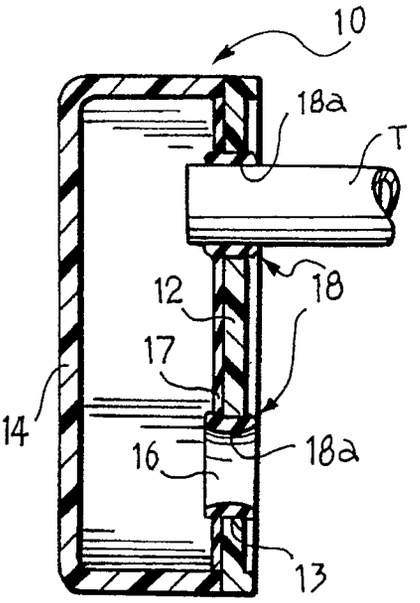

FIG. 3