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(54) **Block manifold for heat exchanger battery fan coils**

Verteilerblock für Wärmetauscher mit Rohrschlange und Lüfter

Bloc collecteur pour batterie d'échange de chaleur à serpentin et ventilateur

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EP-A- 0 758 734 **US-A- 4 948 177**

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Description

[0001] This invention concerns a block manifold for fitting to heat exchanger batteries and especially for fan coils.

[0002] In fan coils the heat exchanger batteries have fluid circulation pipes the ends of which are connected to manifolds through which the fluid flow and return pipes are connected. Usually the manifolds have a block body with a part fitting to fluid piping, two, three or more branches for connection to the battery pipes and a distribution chamber between the fitting and the said branches. Generally, this cylinder is cylindrical and its geometric axis is oriented transversally to the axes of the fitting and the branches which are substantially parallel to each other.

[0003] By its presence and conformation, this chamber is already a cause of turbulence in the fluid and a loss of pressure in the system and contributes to pointlessly increasing the external dimensions of the manifold.

[0004] Moreover, due to shape and machining requirements inside the body, this intermediate cylindrical chamber is left open at one end and is only closed, with a plug, generally welded on, at the end of machining. This plug represents a critical part of the manifold.

[0005] At the same time, inserting and fixing this plug requires additional production work time and costs. Furthermore, if the welding is not homogenous it becomes a source of rejection because in this case the manifold cannot be used.

[0006] Block manifolds are known in the state of the art, as shown by documents EP-A-0758734, US 4,948,177, US 1,092,385, US 1,160,839, US 1,205,508, US 2,673,101, US 5,176,177, US 3,951,440, US 5,078,432, US 5,143,151, US 5,908,288, GB 10174, GB 897965, US 3,790,966, US 4,013,049, US 4,541,448, US 6,202,686 and US 6,237,408.

[0007] Starting from this introduction, the purpose of this invention is to create and supply a manifold for heat exchanger batteries which is new and original in conformation, capable of providing diverse advantages over manifolds of known technical merit in construction, economical and functional terms.

[0008] This aim has been reached by a manifold for the use cited above which includes a block body: here, the distribution chamber, located between the fitting and branch parts is coaxial to the fitting and on a parallel axis to the said branches.

[0009] In other words, all the parts of the manifold are oriented in parallel to each other in the same direction. This allows a reduction in the external dimensions of the body, while maintaining the technical characteristics required for its use and a reduction in the raw materials used to make it. Furthermore, the internal machining of the body to provide communication between the fitting and the branches can be performed by passing axially from the fitting without the need for lateral openings. The

insertion and welding of a plug is thus eliminated and consequently also the risk of rejects and some production costs. Also, and not least, the intermediate chamber with its axis parallel to the fitting and the branches contributes to reducing if not completely eliminating, the turbulence in the fluid and the pressure losses in the supplied system.

[0010] The drawings enclosed illustrate an example of how the manifold is created, which is described in more detail as follows:

Fig. 1 shows a perspective view;

Fig. 2 shows a side view;

Fig. 3 shows an end view of the fitting side;

Fig. 4 shows a side view of the branches;

Fig. 5 shows a section according to the V-V arrows in Fig. 3; and

Fig. 6 shows a cross-section of a part of the body according to the VI-VI arrows in Fig. 3.

[0011] The manifold is comprised of a block body, usually made of brass. The resulting body is obtained with normal forming techniques and then machined for the finish required.

[0012] This body, when finished, has a fitting 12 with an internal thread on one end and two, three or more branches on the opposite end 13; inside there is a distribution chamber 14 which connects the fitting 12 and the branches 13.

[0013] The fitting 12 has a geometric axis X; the branches 13 are in parallel Y axes to the X axis of the union part.

[0014] As regards the internal chamber 14, this is circular and completely closed all round, coaxial with the fitting and with a radius broad enough to intersect the branches. All this to achieve the purpose and advantages described above.

[0015] In the body, on the sides of the fitting 12 seats for plug pins 15 have been made.

[0016] It is anyway evident that all the machining on the body and especially on the intermediate chamber can be performed on the same line or in parallel to the axis of the fitting, greatly simplifying the machining process.

Claims

1. A block manifold for fan coil battery heat exchangers, including
 - a one piece body defining an intermediate distribution chamber (14) perfectly closed around outside, with a portion having a circular cross section, said circular cross section having a chamber axis (X-X),
 - said body having first and second ends on opposite axial ends of said chamber, said block

- body comprising
- a fitting (12) with fluid piping for connection to the heat exchanger battery, coaxial with the intermediate chamber (14), formed at said first end of the block body and in communication with the intermediate chamber; 5
 - three or more branches (13) formed at said second end of the block body, said branches being directly in communication with said intermediate chamber; 10
 - each of said branch having a straight branch axis (Y-Y), each of said branch axes (Y-Y) being parallel to said chamber axis (X-X);
 - seats (15) for plug pins (16). 15
2. A block according to claim 1, in which said fitting comprises an hexagonal wrench interface for mechanically engaging a tool.
 3. A block according to claim 1 or 2, in which said fitting comprising an internally thread portion. 20
 4. A block according to claim 2 and 3, in which said thread portion is the internal portion of the hexagonal wrench interface. 25
 5. A block according to any one of the preceding claims, in which said body is made of brass.
 6. A block according to any one of the preceding claims, in which said branches have a constant inner diameter. 30
 7. A block according to any one of the preceding claims, in which said seats (15) are in communication with said intermediate chamber (14). 35
 8. A block according to any one of the preceding claims, in which said seats have a straight axis. 40
 9. A block according to claim 8, in which said straight axis is parallel to said chamber axis (X-X).
 10. A block according to any one of the preceding claims, in which said seats are formed at said first end of the block body. 45
 11. A block according to claim 10, in which said seats are formed at diametrically opposed positions with respect said circular portion of said intermediate chamber. 50
- Patentansprüche**
1. Blockverteiler für Wärmetauscherbatterien für Gebläsespulen umfassend 55
 - einen einteiligen Körper, der eine Zwischenverteilerkammer (14) bildet, die hermetisch nach außen abgeschlossen ist und einen Abschnitt be-sitzt, der einen kreisrunden Querschnitt aufweist, wobei der kreisrunde Querschnitt eine Kammerachse (X-X) aufweist,
 - wobei der Körper ein erstes und ein zweites Ende an entgegengesetzten axialen Enden der Zwischenverteilerkammer aufweist, und der Blockkörper
 - ein Anschlussteil (12) mit Flüssigkeitsleitung zum Verbinden mit der Wärmetauscherbatterie umfasst, das coaxial zu der Zwischenverteilerkammer (14) angeordnet und an dem ersten Ende des Blockkörpers ausgebildet ist und mit der Zwischenverteilerkammer in Verbindung steht,
 - drei oder mehr Abzweigungen (13) umfasst, die an dem zweiten Ende des Blockkörpers ausgebildet sind und mit der Zwischenverteilerkammer unmittelbar in Verbindung stehen,
 - wobei jede Abzweigung eine gerade Abzweigungsachse (Y-Y) aufweist und jede Abzweigungsachse (Y-Y) parallel zu der Kammerachse (X-X) angeordnet ist,
 - Sitze (15) für Stopfen (16) umfasst.
 2. Blockverteiler gemäß Anspruch 1, wobei das Anschlussteil eine Sechskantschlüsselangriffsfläche für den mechanischen Angriff eines Werkzeugs umfasst.
 3. Blockverteiler gemäß Anspruch 1 oder 2, wobei das Anschlussteil einen Innengewindeabschnitt umfasst.
 4. Blockverteiler gemäß Anspruch 2 und 3, wobei der Gewindeabschnitt den Innengewindeabschnitt der Sechskantschlüsselangriffsfläche darstellt.
 5. Blockverteiler gemäß einem der vorangehenden Ansprüche, wobei der Körper aus einem Messingwerkstoff hergestellt ist.
 6. Blockverteiler gemäß einem der vorangehenden Ansprüche, wobei die Abzweigungen einen konstanten Innendurchmesser aufweisen.
 7. Blockverteiler gemäß einem der vorangehenden Ansprüche, wobei die Sitze (15) mit der Zwischenkammer (14) in Verbindung stehen.
 8. Blockverteiler gemäß einem der vorangehenden

Ansprüche, wobei die Sitze eine gerade Achse aufweisen.

9. Blockverteiler gemäß Anspruch 8, wobei die gerade Achse parallel zu der Kammerachse (X-X) angeordnet ist. 5
10. Blockverteiler gemäß einem der vorangehenden Ansprüche, wobei die Sitze an dem ersten Ende des Blockkörpers ausgebildet sind. 10
11. Blockverteiler gemäß Anspruch 10, wobei die Sitze an diametral gegenüberliegenden Positionen bezüglich des kreisrunden Abschnitts der Zwischenverteilerkammer ausgebildet sind. 15

Revendications

1. Collecteur de type bloc pour une batterie d'échangeurs de chaleur à serpentin et ventilateur, comprenant
 - un corps en une seule pièce définissant une chambre de distribution intermédiaire (14) parfaitement fermée autour à l'extérieur, une partie comportant une section transversale circulaire, ladite section transversale circulaire ayant un axe de chambre (X-X), 25
 - ledit corps comportant des première et seconde extrémités sur des extrémités axiales opposées de ladite chambre, ledit corps du type bloc comprenant 30
 - un raccord (12) avec une tuyauterie pour fluide en vue d'une connexion à la batterie d'échangeur de chaleur, coaxial avec la chambre intermédiaire (14), formé au niveau de ladite première extrémité dudit corps de type bloc en communication avec la chambre intermédiaire, 40
 - trois branches (13) ou plus formées au niveau de ladite seconde extrémité du corps de type bloc, lesdites branches étant directement en communication avec ladite chambre intermédiaire, 45
 - chacune desdites branches comportant un axe de branche (Y-Y), chacun desdits axes de branches (Y-Y) étant parallèle audit axe de chambre (X-X), 50
 - des sièges (15) pour des broches de fiches (16). 55
2. Bloc selon la revendication 1, dans lequel ledit raccord comprend une interface de clé hexagonale

destinée à venir en prise mécanique avec un outil.

3. Bloc selon la revendication 1 ou 2, dans lequel ledit raccord comprend une partie de filetage interne.
4. Bloc selon la revendication 2 et 3, dans lequel ladite partie de filetage est la partie interne de l'interface de clé hexagonale.
5. Bloc selon l'une quelconque des revendications précédentes, dans lequel ledit corps est constitué de laiton.
6. Bloc selon l'une quelconque des revendications précédentes, dans lequel lesdites branches présentent un diamètre intérieur constante.
7. Bloc selon l'une quelconque des revendications précédentes, dans lequel lesdits sièges (15) sont en communication avec ladite chambre intermédiaire (14).
8. Bloc selon l'une quelconque des revendications précédentes, dans lequel lesdits sièges présentent un axe droit.
9. Bloc selon la revendication 8, dans lequel ledit axe droit est parallèle audit axe de chambre (X-X).
10. Bloc selon l'une quelconque des revendications précédentes, dans lequel lesdits sièges sont formés au niveau de ladite première extrémité du corps de type bloc.
11. Bloc selon la revendication 10, dans lequel lesdits sièges sont formés à des positions diamétralement opposées par rapport à ladite partie circulaire de ladite chambre intermédiaire.

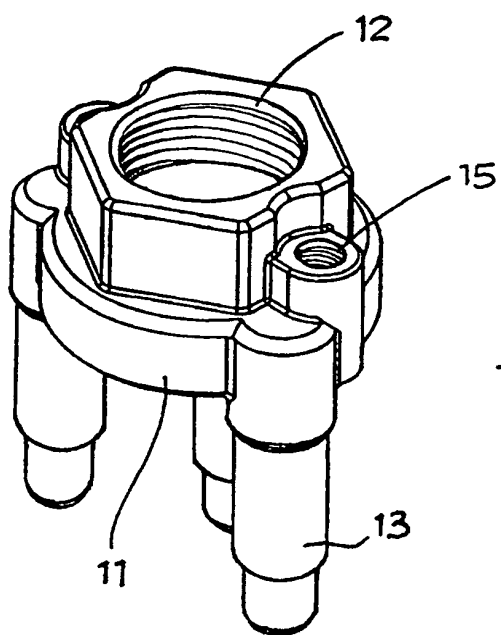


Fig. 1

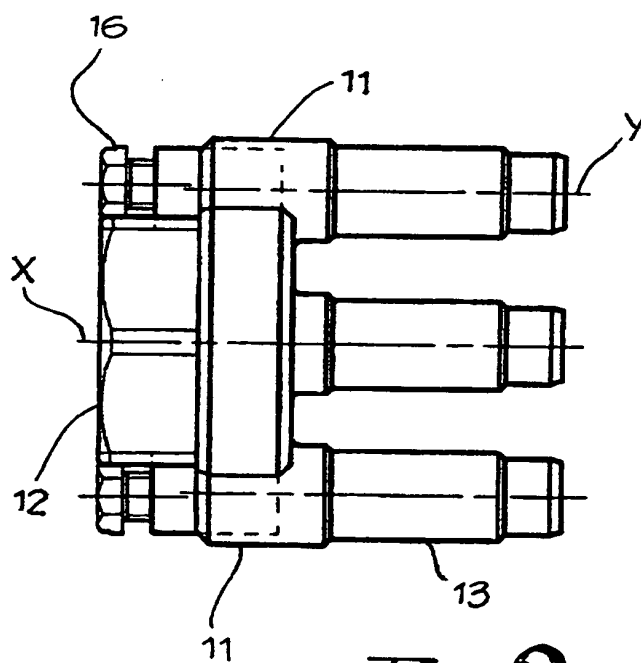


Fig. 2

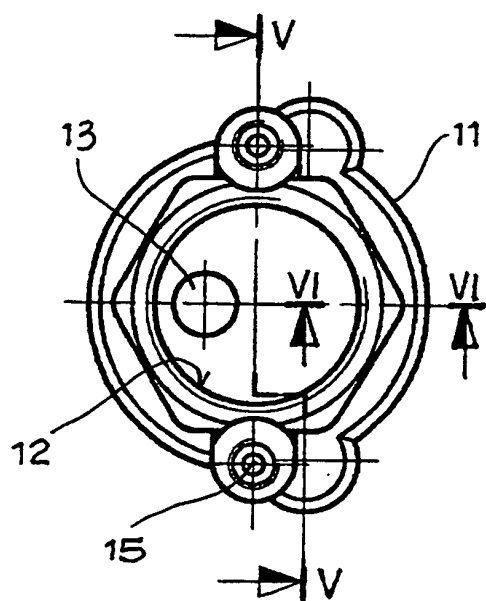


Fig. 3

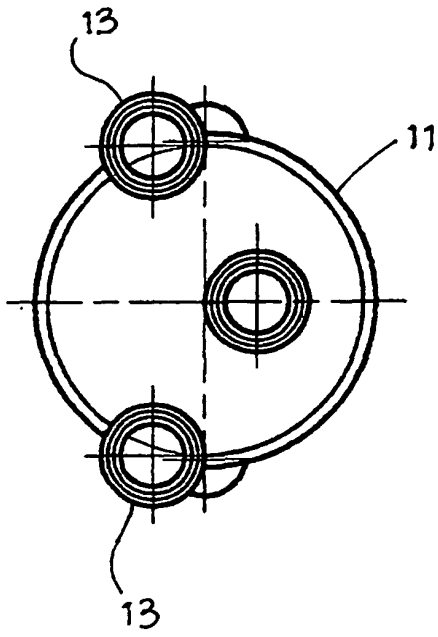


Fig. 4

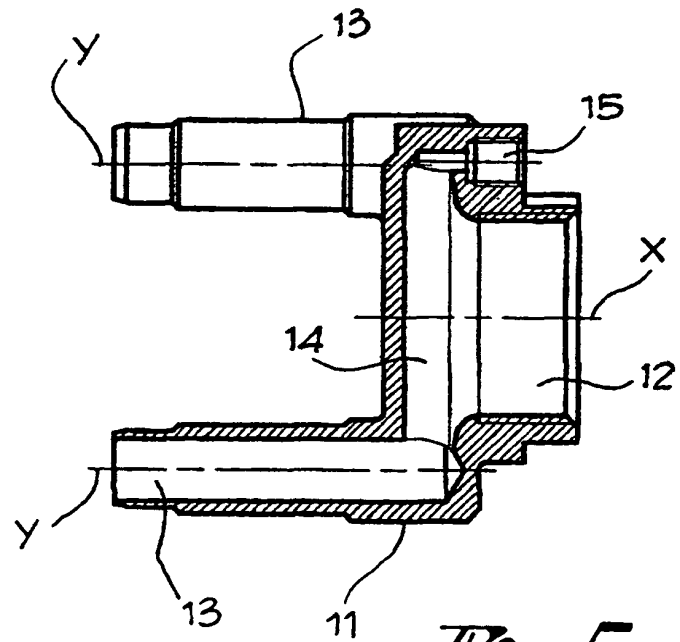


Fig. 5

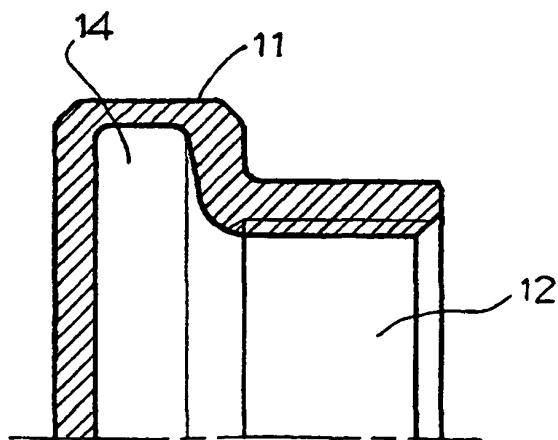


Fig. 6