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(54) **Hydraulic connection device particularly for water-tube radiators**

Hydraulische Verbindungsvorrichtung insbesondere für Wasserrohrheizkörper

Raccord hydraulique, en particulier pour radiateur à tuyaux d'eau

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DE-U- 29 804 738 **DE-U- 29 810 698**

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Description

[0001] The present invention relates to a hydraulic connection device particularly for water-tube radiators.

[0002] It is known that flat-panel water-tube radiators have an upper connection assembly and a lower connection assembly which are hydraulically connected to each other by means of a connecting pipe.

[0003] The upper connection assembly is usually provided with a valve for adjusting the flow of water inside the radiator, whereas the lower connection assembly is hydraulically associated, by means of a distribution assembly, to the main hydraulic system for heating the building.

[0004] In particular, in current flat-panel water-tube radiators, both the upper connection assembly and the lower connection assembly are produced by welding the various parts that compose them to each other or to a base for supporting them, in order to be able to obtain a low-cost product which can be modified at will according to requirements and to the various types of radiator available on the market.

[0005] Moreover, documents DE 298 10 698 and DE 298 04 738, disclose a device according to the pre-characterizing portion of claim 1.

[0006] However, it is easily understandable that the welding of the various parts that predominantly constitute the lower connection assembly can cause a high percentage of liquid leakage in the region affected by it.

[0007] Accordingly, all the welds performed on the lower connection assembly are subjected to strict testing, with consequent rejection of any part that has any seepage or leakage of liquid from one or more of the welds.

[0008] By way of approximation, it can be assumed that weld testing causes the rejection of approximately 2% of manufactured parts.

[0009] All this entails substantially two main problems which arise respectively from the rejects that are produced, causing an increase in production costs, and from the fact that validating the welds by testing them is certainly onerous, both because of the considerable time expenditure and because of the inherent difficulty of the operation in order to ensure the quality of the product that is marketed.

[0010] Another considerable drawback of these devices is that even a part that has passed the weld tightness testing step must then be associated hydraulically with the distribution assembly once it has been fitted to the radiator.

[0011] This subsequent operation, which is indispensable in order to install the radiator, entails that the installer must tighten the hydraulic connection and coupling nuts by means of suitable tools.

[0012] It is evident that the stress applied to the connection nuts is transferred entirely to the welded parts, and accordingly the previously tested welds are subjected to a torque which can damage them, making them

leak without the possibility of performing any further check.

[0013] In this case it is actually necessary to remove the radiator and replace it.

5 **[0014]** Moreover, the provision of such a large number of welds causes the formation of many residual welding particles which normally circulate in the ducts of the radiator and of the heating system, causing corrosion in the piping and damage to the vanes of the impeller of the pump of the system.

10 **[0015]** It is also known that the presence of many welding regions also causes significant problems during the coating of the radiator and of the upper and lower connection assemblies thereof.

15 **[0016]** Finally, it should be noted that during the welding of the various parts and mainly of the lower connection assembly it is necessary to orientate these parts according to requirements and to keep them orientated until welding is complete.

20 **[0017]** This fact entails, among other things, a significant complication in the welding operations and requires skill on the part of the operators during its execution.

25 **[0018]** The aim of the present invention is to eliminate the above-noted drawbacks of the prior art.

[0019] Within the scope of this aim, an important object of the present invention is to provide a hydraulic connection device particularly for water-tube radiators in which the upper connection assembly and the lower connection assembly have a very small number of welds and in particular have a single weld for the upper connection assembly and for the lower connection assembly.

30 **[0020]** Another object of the present invention is to provide a hydraulic connection device particularly for water-tube radiators in which it is substantially possible to eliminate the steps for testing the welds in order to check for any leakage thereof, achieving substantially zero rejects.

35 **[0021]** Another object of the present invention is to provide a hydraulic connection device particularly for water-tube radiators in which the parts that compose the upper and lower connection assembly, even if subjected to intense torques, do not discharge these stresses onto any weld, accordingly ensuring absolute tightness of the various connection assembly parts and eliminating any operations for replacing the defective radiator during its installation.

40 **[0022]** Another object of the present invention is to provide a hydraulic connection device particularly for water-tube radiators which allows to paint the radiator without any problem, since it has a single welding region for the upper connection assembly and for the lower connection assembly.

45 **[0023]** Another object of the present invention is to provide a hydraulic connection device particularly for water-tube radiators which has an extremely low production cost since testing operations are minimized and

production rejects are practically eliminated.

[0024] This aim, these objects and others which will become apparent hereinafter are achieved by a hydraulic connection device according to claim 1.

[0025] Further characteristics and advantages of the present invention will become apparent from the following detailed description of a preferred but not exclusive embodiment of the device according to the invention, illustrated by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a side elevation view of a flat-panel water-tube radiator according to the invention;
Figure 2 is a sectional side elevation view of the device according to the invention;
Figure 3 is a sectional plan view of the device of Figure 2 according to the invention; and
Figure 4 is a sectional plan view of a different embodiment of the manifold of the upper connection assembly according to the invention.

[0026] With particular reference to the above-described figures, the hydraulic connection device particularly for water-tube radiators, according to the invention, generally designated by the reference numeral 1, includes an upper connection assembly 2 and lower connection assembly 3 which are mutually hydraulically connected by means of a connecting pipe 4.

[0027] The upper connection assembly 2 and/or the lower connection assembly 3 include a manifold 5 which is formed monolithically with a threaded part which is suitable for engagement with a complementary thread of a different member to which it is connected hermetically.

[0028] In particular in the case of the manifold 5 of the upper connection assembly 2, the threaded part is a bush 7 with which a valve 50 is associated which is suitable for opening, closing or adjusting the circulation of water in the water-tube radiator.

[0029] In the case of the lower connection assembly 3, the threaded part that forms a single body with the manifold is formed by a return coupling 8 which is subsequently hydraulically connected to the distribution assembly 51, partially shown in the drawings, and through this assembly to the main hydraulic system for heating the building.

[0030] In particular, the manifold 5 formed monolithically with the return coupling 8 has, in a substantially central portion, at least one first seat 9 which is suitable to engage a first complementary seat 10 formed in a plate-like support 11.

[0031] In particular, the seat 9 has at least two side walls which are substantially as high as the plate-like support 11 is thick.

[0032] The walls 12 of the seat 9 are furthermore conveniently straight and are parallel to each other and to the axis of the manifold 5, so as to ensure interference during coupling between the seat 9 and the complemen-

tary seat 10 provided in the plate-like supporting base 11.

[0033] Conveniently, the base has, at the end of the complementary seat 10, optional protrusions 52 which can be caulked so as to ensure a valid and stable connection of the manifold 5 and of the return coupling 8 to the plate-like supporting base 11.

[0034] In this way, welding operations are eliminated completely and any torque applied to the return coupling 8 when it is connected to the distribution assembly is discharged entirely onto the plate-like support 11 without therefore creating any problem.

[0035] Moreover, the straight side walls 12 allow to insert the manifold in the complementary seat 10 so that the manifold is already orientated according to requirements.

[0036] The device further includes a delivery coupling 15 which is also formed monolithically with an upper enlarged portion 16.

[0037] A second seat 18 is furthermore formed between the delivery coupling 15 and the upper enlarged portion 16 and is suitable to engage a second complementary seat 19 formed in the plate-like support 11.

[0038] The second seat 18 and the corresponding second complementary seat 19 are respectively identical, in terms of both shape and structure, to the first seat 9 and the first complementary seat 10.

[0039] Also in this case, in addition to connecting the delivery coupling 15 to the plate-like support 11 by interference it is possible to perform optional caulking thereof.

[0040] In this manner it is possible to connect the delivery coupling and the return coupling at a preset distance of 50 mm as required by applicable statutory provisions on the subject without any particular positioning, since it is sufficient to insert them in the appropriately provided complementary seats 10 and 19 formed on the plate-like support 11.

[0041] A first end 20 of the connecting pipe 4 is bent and suitable to be welded outside the region affected by the flow of water coaxially and internally with respect to the enlarged portion 16 formed monolithically with the delivery coupling 15.

[0042] It is evident that the only weld in the entire lower connection assembly of the device is the weld of the end 20 of the delivery pipe 4 to the enlarged portion 16.

[0043] From the above description, however, it is easily understandable that this weld will never be subjected to torque or to any other kind of stress, and since it is provided perimetrically at the end 20 of the connecting pipe 4, it ensures perfect hydraulic watertightness even without optional testing thereof.

[0044] The plate-like support 11 further has, in one of its regions, a protrusion 30 which is internally provided with a recess 31 which allows to receive the screw for connecting the side of the radiator directly to the plate-like support, accordingly eliminating any further work or parts for retaining the side on the body of the radiator.

[0045] As shown, the upper connection assembly 2 has a manifold 5 which is formed monolithically with the bush 7, with which the valve for adjusting the flow of water of the radiator is associated.

[0046] Advantageously, the manifold has, on the opposite side with respect to the bush 7, a cavity 34 which accommodates the second end 32 of the connecting pipe 4.

[0047] The seal of the valve 50 is preferably provided in this very region formed by the cavity 34 in two different manners.

[0048] In a first case, the seal of the valve is provided directly inside a flared region 33 formed on the second end of the pipe 32, as shown in Figure 2.

[0049] In a different embodiment, the seal of the valve is provided directly inside the cavity 34, which is machined and shaped specifically for this purpose.

[0050] Also in this case, as is easily understandable, the only weld that is present in the upper connection assembly is the weld provided on the perimeter of the connecting pipe 4, and as mentioned the weld is not subjected to any kind of stress and by way of its very structure it makes testing unnecessary.

[0051] It is also possible to provide, above the manifold 5 of the upper connection assembly 2, a vent valve 35 which is suitable to vent air if any air is present in the piping of the system.

[0052] It should also be noted that the thread 60 of the delivery and return coupling can be provided internally and therefore be of the 1/2-inch size rather than of the 3/4-inch size, as shown in the drawings, in order to ensure protection thereof during handling and storage of the parts.

[0053] In practice it has been observed that the device according to the present invention is particularly advantageous, in that welding of the various parts to the plate-like support has been eliminated and in that the manifolds are provided monolithically with the delivery coupling or the bush for receiving the valve.

[0054] In this manner, all testing operations and the operations for positioning/orientating the parts during their assembly are substantially eliminated.

[0055] In practice, the materials employed, as well as the dimensions, may be any according to requirements and the state of the art.

Claims

1. A hydraulic connection device (1) particularly for water-tube radiators, comprising an upper connection assembly (2) and a lower connection assembly (3) which are hydraulically connected to each other by means of a connecting pipe (4), wherein said upper connection assembly (2) and said lower connection assembly (3) comprise a manifold (5) which is formed monolithically with a threaded part which is suitable for hermetical engagement, said thread-

ed part being respectively the return coupling of said lower connection assembly (3) and a bush (7) with which a valve (50) is associated, said valve (50) being meant to open, close and adjust the water that circulates in the water-tube radiator, said valve (50) being arranged on said upper connection assembly (2), said device (1) comprising a delivery coupling (15) which is formed monolithically with an upper enlarged portion (16), and which is connected by said connecting pipe (4) to said manifold of said upper connection assembly **characterized in that** said manifold (5) formed monolithically with said return coupling (8) has, in one of its portions, at least one first seat (9) which is engaged to a first complementary seat (10) provided on a plate-like support (11), and the delivery coupling (15) comprising a second seat (18) which is engaged to a second complementary seat (19) provided on said plate-like support (11).

2. The device (1) according to claim 1, **characterized in that** said seat (9) has at least two side walls which are substantially as high as said plate-like support (11) is thick.
3. The device (1) according to claim 2, **characterized in that** said walls (12) are straight and parallel with respect to each other and to the axis of said manifold (5).
4. The device (1) according to one or more of the preceding claims, **characterized in that** said second seat (18) and said second complementary seat (19) are respectively identical to said first seat (9) and to said first complementary seat (10).
5. The device (1) according to one or more of the preceding claims, **characterized in that** said connecting pipe (4) has a first end (20) which is bent and suitable to be welded coaxially in said enlarged region (16) of said delivery coupling (15).
6. The device (1) according to one or more of the preceding claims, **characterized in that** said plate-like support (11) comprises at least one protrusion (30) on which one side of said radiator is connected.
7. The device (1) according to one or more of the preceding claims, **characterized in that** said manifold (5) formed monolithically with said bush (7) with which said valve is associated comprises, on the opposite side with respect to said bush (7), a cavity (34) for accommodating the second end (32) of said connecting pipe (4), the seal of said valve (50) being provided in the region formed by said cavity (34).
8. The device (1) according to one or more of the preceding claims, **characterized in that** said seal of

said valve (50) is provided directly inside a flared region (33) of said second end of said pipe (32).

9. The device (1) according to one or more of the preceding claims, **characterized in that** said seal of said valve (50) is provided directly inside said cavity (34).
10. The device (1) according to one or more of the preceding claims, **characterized in that** said manifold (5) of said upper connection assembly (2) comprises a vent valve (35).

Patentansprüche

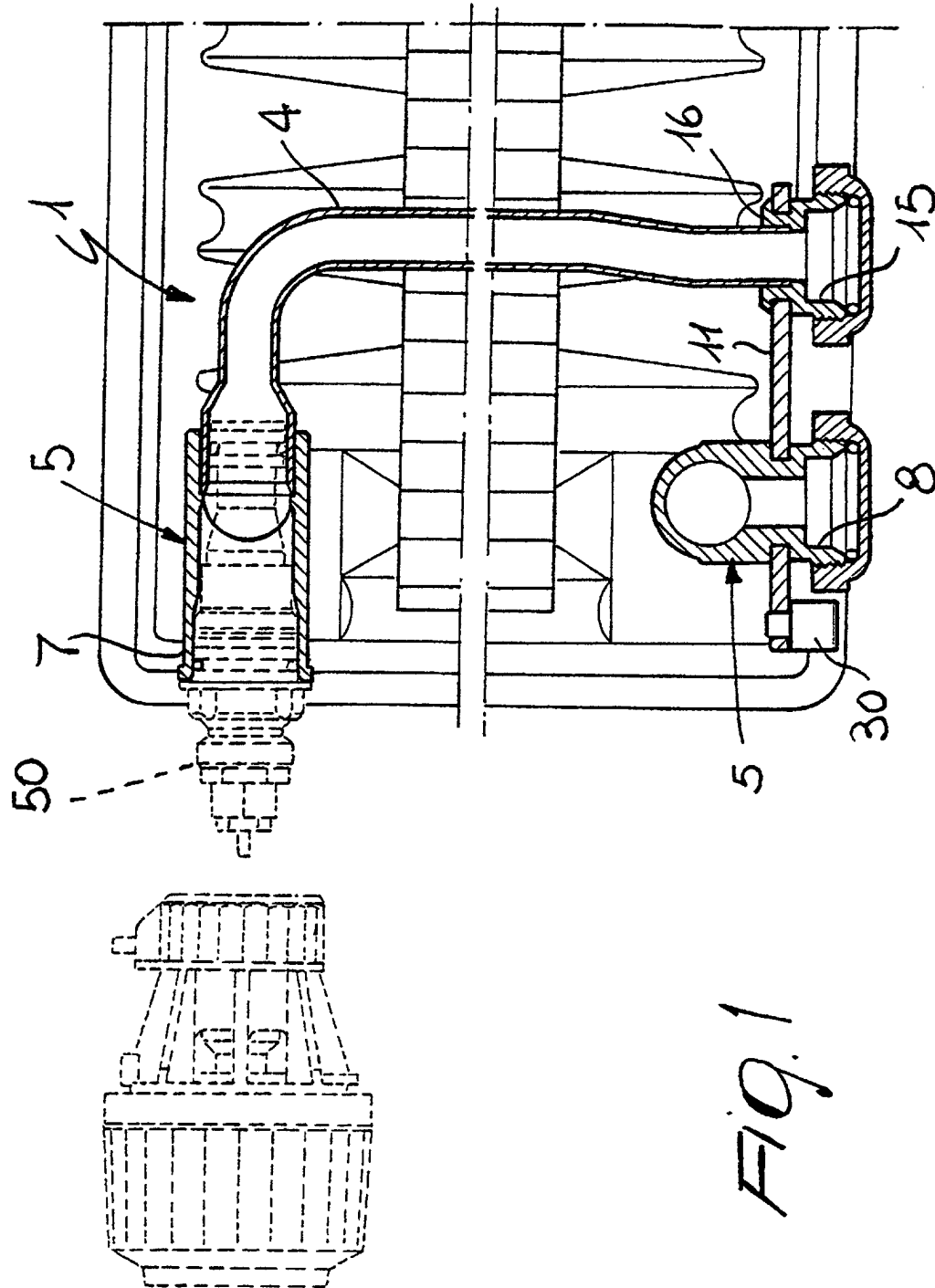
1. Eine hydraulische Verbindungseinrichtung (1) insbesondere für Wasserrohrradiatoren, bestehend aus einer oberen Verbindungsbaugruppe (2) und einer unteren Verbindungsbaugruppe (3), die durch ein Verbindungsrohr (4) miteinander hydraulisch verbunden sind, wobei besagte obere Verbindungsbaugruppe (2) und besagte untere Verbindungsbaugruppe (3) ein Leitungselement (5) enthalten, das monolithisch mit einem Gewindeteil ausgeführt ist, welches sich für ein hermetisches dichtes Einkuppeln eignet, wobei besagter Gewindeteil in dieser Reihenfolge die Rückkupplung von besagter unterer Verbindungsbaugruppe (3) und einer Buchse (7) ist, mit der ein Ventil (50) verbunden ist, das öffnen und schließen und die Wassermenge anpassen soll, welche im Wasserrohr radiator umläuft, wobei besagtes Ventil (50) auf besagter oberer Verbindungsbaugruppe (2) angeordnet ist. Besagte Einrichtung (1) umfasst eine Förderstromkupplung (15), die monolithisch mit einem oberen aufgeweiteten Abschnitt (16) ausgeführt ist, und die durch besagtes Verbindungsrohr (4) mit besagtem Leitungselement (5) von besagter oberer Verbindungsbaugruppe (2) verbunden ist, **dadurch gekennzeichnet, dass** besagtes Leitungselement (5), das mit besagter Rückkupplung (8) monolithisch ausgeführt ist, in einem seiner Abschnitte über mindestens einen ersten Sitz (9) verfügt, der zu einem ersten Gegensitz (10) einrastet, welcher auf einer blechartigen Auflage (11) vorgesehen ist, und die Förderstromkupplung (15) umfasst einen zweiten Sitz (18), der zu einem zweiten Gegensitz (19) einrastet, welcher auf besagter blechartiger Auflage (11) vorgesehen ist.
2. Die Einrichtung (1) nach Anspruch 1 **dadurch gekennzeichnet, dass** besagter Sitz (9) über mindestens zwei Seitenwände verfügt, die im Wesentlichen so hoch sind, wie besagte blechartige Auflage (11) dick ist.
3. Die Einrichtung (1) nach Anspruch 2 **dadurch ge-**

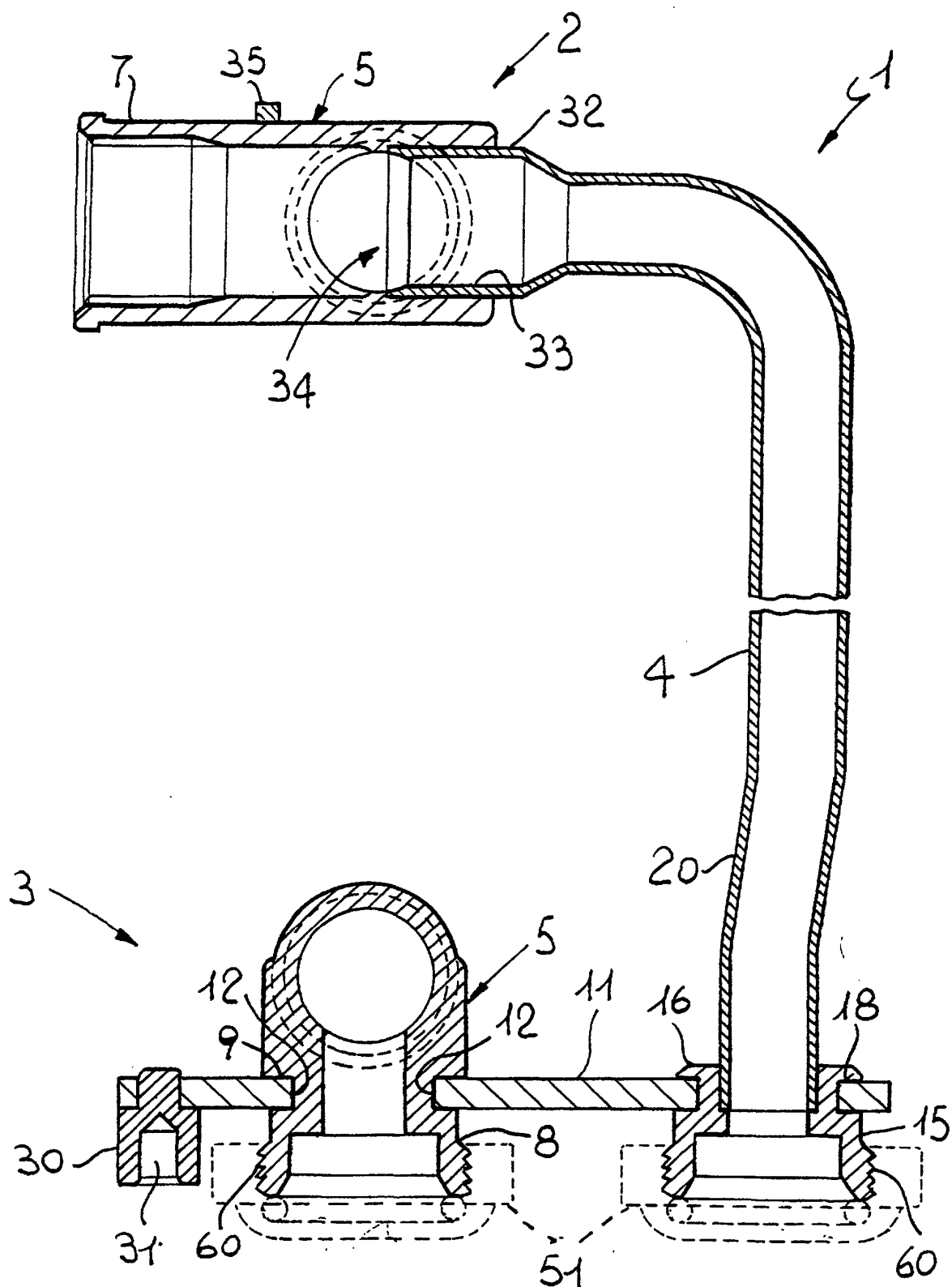
kennzeichnet, dass besagte Wände (12) zueinander und auf die Achse von besagtem Leitungsteil (5) bezogen gerade und parallel stehen.

4. Die Einrichtung (1) nach einem oder mehreren der vorhergehenden Ansprüche **dadurch gekennzeichnet, dass** besagter zweiter Sitz (18) und besagter zweiter Gegensitz (19) in dieser Reihenfolge identisch mit besagten ersten Sitz (9) und besagtem ersten Gegensitz (10) sind.
5. Die Einrichtung (1) nach einem oder mehreren der vorhergehenden Ansprüche **dadurch gekennzeichnet, dass** besagtes Verbindungsrohr (4) über ein erstes Ende (20) verfügt, das gebogen ist und sich eignet, koaxial in besagten aufgeweiteten Bereich (16) besagter Förderstromkupplung (15) geschweißt zu werden.
6. Die Einrichtung (1) nach einem oder mehreren der vorhergehenden Ansprüche **dadurch gekennzeichnet, dass** besagte blechartige Auflage (11) zumindest einen überstehenden Teil (30) umfasst, mit dem eine Seite des besagten Radiators verbunden ist.
7. Die Einrichtung (1) nach einem oder mehreren der vorhergehenden Ansprüche **dadurch gekennzeichnet, dass** besagtes Leitungselement (5), das monolithisch mit besagter Buchse (7) ausgeführt ist, die mit besagtem Ventil verbunden ist, auf der Gegenseite in Bezug auf besagter Buchse (7) über einen Hohlraum (34) für die Aufnahme des zweiten Endes (8) des besagten Verbindungsrohrs (4) verfügt, wobei die Abdichtung des besagten Ventils (50) in dem Bereich vorgesehen ist, der durch besagten Hohlraum (34) geformt wird.
8. Die Einrichtung (1) nach einem oder mehreren der vorhergehenden Ansprüche **dadurch gekennzeichnet, dass** besagte Abdichtung von besagtem Ventil (50) direkt innerhalb eines aufgeweiteten Bereiches (33) von besagtem zweiten Ende des besagten Rohrs (32) vorgesehen ist.
9. Die Einrichtung (1) nach einem oder mehreren der vorhergehenden Ansprüche **dadurch gekennzeichnet, dass** besagte Abdichtung von besagtem Ventil (50) direkt innerhalb des besagten Hohlraumes (34) vorgesehen ist.
10. Die Einrichtung (1) nach einem oder mehreren der vorhergehenden Ansprüche **dadurch gekennzeichnet, dass** besagtes Leitungselement (5) von besagter oberer Verbindungsbaugruppe (2) ein Lüftungsventil (35) umfasst.

Revendications

1. Un dispositif de raccordement hydraulique (1) destiné notamment aux radiateurs munis de tubes bouilleurs, comprenant une unité de raccordement supérieure (2) et une unité de raccordement inférieure (3) qui sont réciproquement raccordées de façon hydraulique au moyen d'un tuyau de raccordement (4), où ladite unité de raccordement supérieure (2) et ladite unité de raccordement inférieure (3) comprennent un collecteur (5) qui est formé de façon monolithique avec une partie filetée laquelle résulte convenable pour tout engagement hermétique (1), ladite partie filetée étant respectivement l'accouplement de retour de ladite unité de raccordement inférieure (3) et une douille (7) à laquelle est associée une soupape (50), ladite soupape (50) étant chargée d'ouvrir, fermer et régler l'eau qui circule dans le radiateur muni d'un tube bouilleur, ladite soupape (50) étant disposée sur ladite unité de raccordement supérieure (2), ledit dispositif (1) comprenant un manchon de sortie (15) qui est formé de façon monolithique avec une portion supérieure élargie (16) et qui est raccordé par ledit tuyau de raccordement (4) audit manchon de ladite unité de raccordement supérieure, **caractérisé en ce que** ledit manchon (5) formé de façon monolithique avec ledit accouplement de retour (8) a, dans une de ses portions, au moins un premier siège (9) qui est engagé à un premier siège complémentaire (10) fixé à un soutien ressemblant à une petite plaque (11), et le manchon de sortie (15) comprenant un second siège (18) qui est engagé dans un second siège complémentaire (12) fixé audit soutien ressemblant à une petite plaque (11).
2. Le dispositif (1) selon la revendication 1, **caractérisé en ce que** ledit siège (9) a au moins deux flancs latéraux dont la hauteur correspond substantiellement à l'épaisseur dudit soutien ressemblant à une petite plaque (11).
3. Le dispositif (1) selon la revendication 2, **caractérisé en ce que** lesdits flancs (12) sont droits et parallèles l'un par rapport à l'autre ainsi que par rapport à l'axe dudit manchon (5).
4. Le dispositif (1) selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** ledit second siège (18) et ledit second siège complémentaire (19) sont respectivement identiques audit premier siège (9) et audit premier siège complémentaire (10).
5. Le dispositif (1) selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** ledit tuyau de raccordement (4) a une première extrémité (20) qui est repliée et idéale pour être soudée de façon coaxiale dans ladite région élargie (16) dudit manchon de sortie (15).
6. Le dispositif (1) selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** ledit soutien ressemblant à une petite plaque (11) comprend au moins une saillie (30) sur laquelle est raccordé un côté dudit radiateur.
7. Le dispositif (1) selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** ledit manchon (5) formé de façon monolithique avec ladite douille (7) à laquelle est associée ladite soupape comprend, du côté opposé par rapport à ladite douille (7), une cavité (34) pour loger la deuxième extrémité (32) dudit tuyau de raccordement (4), le plombage de ladite soupape (50) étant prédisposé dans la région formée par ladite cavité (34).
8. Le dispositif (1) selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** ledit plombage de ladite soupape (50) est prédisposé directement dans une région mandrinée (33) de ladite deuxième extrémité dudit tuyau (32).
9. Le dispositif (1) selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** ledit plombage de ladite soupape (50) est prédisposé directement dans ladite cavité (34).
10. Le dispositif (1) selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** ledit manchon (5) de ladite unité de raccordement supérieure (2) comprend une soupape à évent (35).





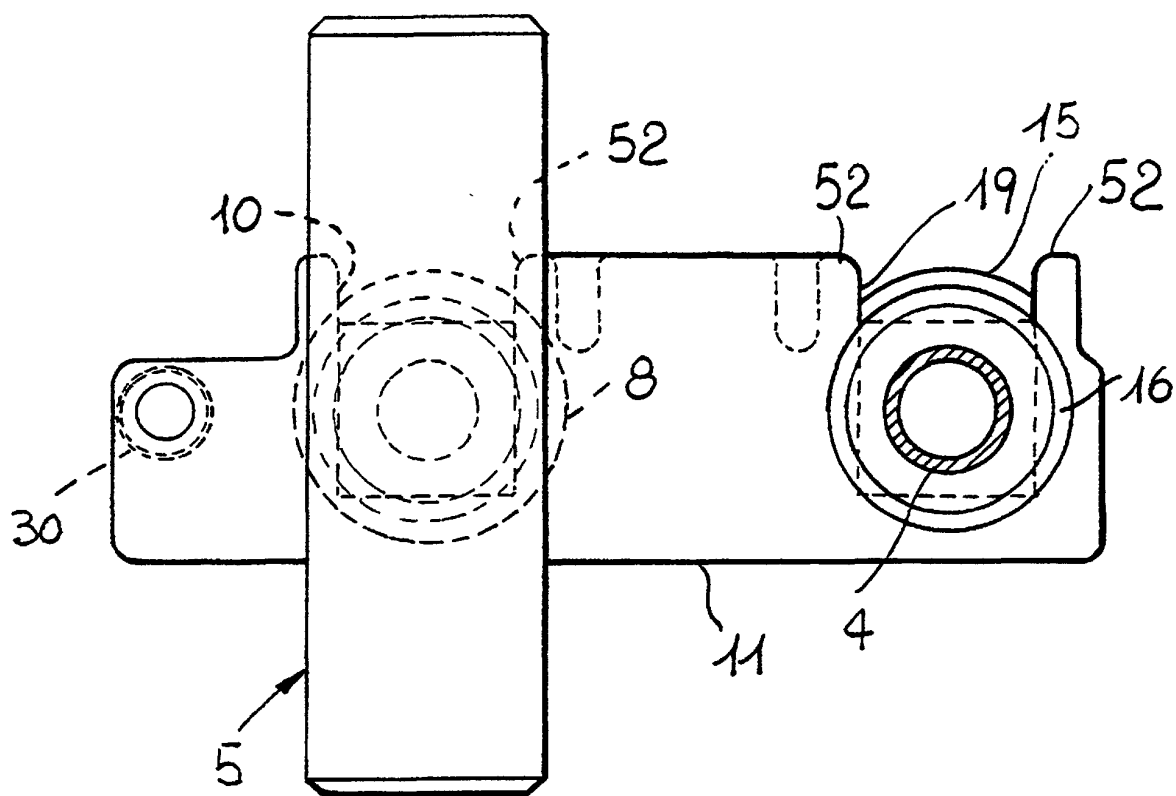


Fig. 3

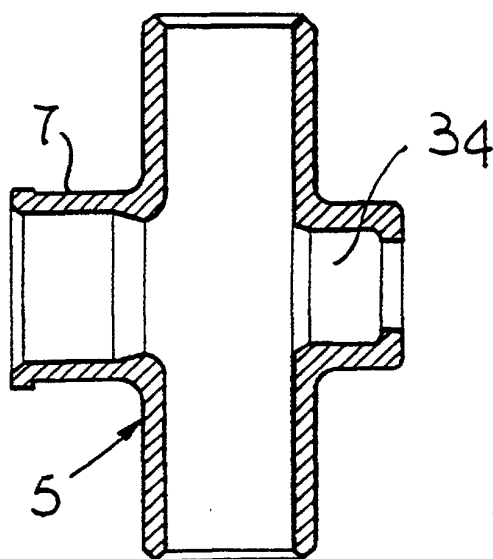


Fig. 4