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(54) Improvements in or relating to radiators

(57) Junction fittings (18) are provided for connecting the inlet and outlet ports (12) of a water-filled space heating radiator (10) to the usual radiator control valves (16). Each junction fitting incorporates a stop valve (38) which may be manually adjusted between open and closed positions. When it is required to remove a radiator, the two stop valves (38) in the junction fittings (18) are closed, in addition to the main radiator control valves (16). The junction fittings may then be disconnected from the control valves, allowing removal of the radiator, without drainage of water from the radiator.

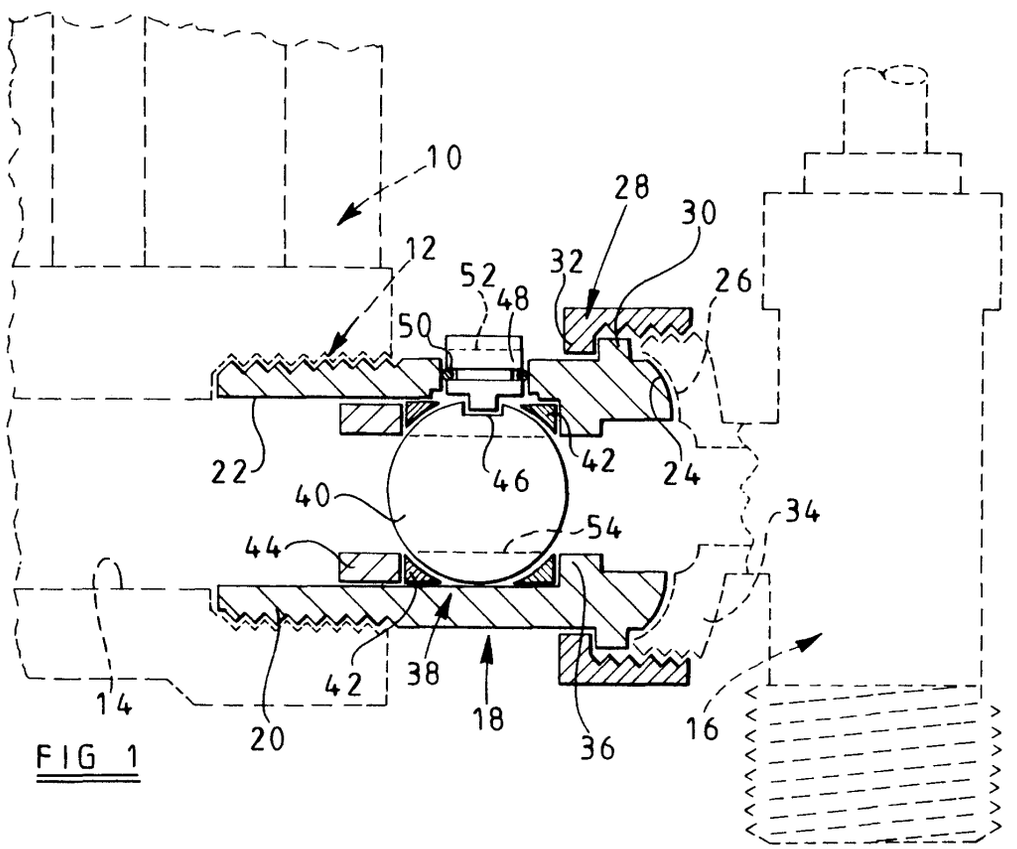

FIG 1

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Description

[0001] The invention relates to radiators for use in water-filled radiator space-heating systems.

[0002] As is well known, in such space-heating systems hot water is circulated through a series of radiators which are interconnected by appropriate pipework. Each radiator comprises a main body, usually of metal, which is formed with internal chambers through which the hot water flows in use, an inlet port and an outlet port in the main body communicating with the internal chambers. The pipework includes two control valves adjacent the inlet and outlet port respectively, and junction fittings are provided to connect each ofthe ports to the adjacent control valve. The control valve connected to the inlet port usually comprise a manually and/or automatically operated valve, for adjusting the flow of hot water through the radiator, as required, to control the temperature of the radiator. The control valve connected to the outlet port is usually preset, when the radiator is installed, to permit a certain flow through the radiator.

[0003] It is occasionally necessary to remove a radiator temporarily without disturbing the associated pipework. For example, it may be desired to replace the radiator, although more usually the reason for removing the radiator is to provide access to the wall behind it for repair or decoration. In order to remove the radiator without the necessity of draining down the whole system, the two control valves at the inlet and outlet ports are both closed so as to isolate the radiator from the rest of the system. The junction fittings are then detached from the control valves so that the radiator, with the fittings, may be removed.

[0004] In conventional systems, each junction fitting is normally a simple tubular adaptor having coupling parts at its two ends. Thus, it will normally have at one end an external screw thread which screws into an internal thread in the inlet or outlet port of the radiator. The opposite end of the fitting then has part of a suitable detachable coupling for connecting the fitting to the associated control valve. For example, the coupling may be a compression fitting of the kind where a nut retained on one part screws on to an external screw-thread on the other part so as to compress an annular olive between the two parts and provide a watertight seal.

[0005] The radiator to be removed will normally be full of water. Consequently, when the fittings of the radiator are detached from the control valves this water is free to drain out of the radiator and must be collected in a suitable receptacle if flooding is to be avoided. It is usually necessary to place collecting receptacles under both junction fittings. This can be a difficult and inconvenient operation since the lower edge of the radiator, where the junction fittings are located, will often be only a very short distance from the floor and the wall, making it difficult to insert receptacles beneath the fittings. Also, the draining water has to be caught at the same moment as the fittings are being detached from the control valves which can be difficult to do, particularly if the radiator is being removed by one person.

[0006] The present invention sets out to overcome these difficulties by enabling the radiator to be sealed, so that the water it contains is retained, before it is detached from the control valves.

[0007] According to the invention there is provided a radiator comprising a main body formed with internal chambers through which hot water flows in use, an inlet port and an outlet port in the main body communicating with said internal chambers, and two junction fittings for attachment to said ports in the main body, each of which junction fittings provides part of a coupling device for detachably connecting the radiator to a control valve which, in use, controls the flow of water through the radiator, characterised in that each of said junction fittings incorporates a manually operable normally-open stop valve which may be closed prior to detachment of the radiator from the control valves, when required, thereby to prevent escape of water from the radiator during such detachment.

[0008] Thus, when it is required to remove a radiator, the two stop valves in the junction fittings are first closed, the two control valves are then closed, as usual, and the junction fittings may then be disengaged from the control valves, allowing removal of the radiator, without drainage of water from the radiator. The only water escaping will be the tiny quantity of water which is located between each control valve and the associated stop valve. This may easily be caught in a small receptacle, such as a cup, as each fitting is detached.

[0009] Preferably, each port in the main body of the radiator is internally screw-threaded, and each junction fitting has an external screw-thread for engagement within the associated port.

[0010] At least one ofthe junction fittings may include a sealing surface for liquid-tight engagement with a mating sealing surface on the associated control valve, and a screw-threaded part for engagement with a cooperating screw-threaded part on the control valve to draw said sealing surfaces into liquid-tight mating engagement.

[0011] For example, the junction fitting may include an internally threaded rotatable nut surrounding the sealing surface on the junction fitting and threadedly engageable with a mating external screw-thread on the control valve. Alternatively, the nut may be rotatable on the control valve and engageable with a mating external screw-thread on the junction fitting.

[0012] In an alternative arrangement the junction fitting may be formed with an external smooth cylindrical surface which, in use, enters a mating cylindrical bore in the control valve, and is encircled by a compressible annular olive which may be compressed between the cylindrical surface and an annular surface on a compression nut which is in screw-threaded engagement with a part of the control valve.

[0013] In any of the above arrangements, each junction fitting may be formed with a through-bore across

which extends a valve element which is manually rotatable between a closed position where it blocks the through-bore and an open position where it permits the passage of water along the through-bore.

[0014] Alternatively, the valve element may be displaceable laterally of the bore between a closed position where it blocks the through-bore and an open position where it permits the passage of water along the through-bore.

[0015] In the case where the valve element is rotatable, it may comprise a substantially spherical element which is rotatable about an axis extending transversely of the bore, and having passing through it a passage which in the closed position extends laterally of the bore and in the open position extends longitudinally of the bore. Resilient sealing rings are preferably disposed between the surface of the substantially spherical valve element and the internal surface of the bore, to prevent leakage of water past the valve element when in its closed position.

[0016] A manipulating member may extend laterally through the wall of the bore from the exterior of the junction fitting so as operatively to engage the valve member. The manipulating member may have a head portion exposed at the exterior of the junction fitting and having a formation, such as a transverse slot or other shaped recess, for engagement by a manipulating tool to rotate the manipulating member and hence the valve member.

[0017] The invention includes within its scope a junction fitting for use in a radiator of any ofthe kinds referred to above, the junction fitting having at one end a coupling part for attachment to the inlet or outlet port of a radiator, at the other end a coupling part for attachment to a control valve, and also having a through-bore across which extends a valve element which is manually adjustable between a closed position where it blocks the through-bore and an open position where it permits the passage of water along the through-bore.

[0018] The following is more detailed description of embodiments of the invention, by way of example, reference being made to the accompanying drawings in which:

> Figure 1 is a diagrammatic section through one form of junction fitting, according to the invention, connected between a radiator and a control valve, and Figure 2 is a similar view of an alternative form of junction fitting.

[0019] Referring to Figure 1: there is provided a radiator 10 (shown dotted) in the lower part of which is an internally threaded inlet port 12 leading to a passage 14 which communicates, in known manner, with internal chambers within the radiator. As is well known, radiators for hot water space-heating systems can take many forms. The precise structure of the radiator does not form a part of the present invention and will not therefore be described in detail.

[0020] A manually and/or automatically operated control valve 16 is coupled to the inlet port 12 of the radiator by a junction fitting indicated generally at 18. Again, the precise nature of the control valve 16 does not form a part of the present invention and it will not therefore be described in detail. As is well known, the control valve 16 may be a simple manual screw-down valve or may incorporate an automatic thermostatically controlled valve, for controlling the temperature of the radiator. Another junction fitting (not shown) connects the outlet of the radiator to a further control valve on the downstream side of the radiator. This control valve will normally be a simple valve which is pre-set when the radiator system is first installed and will not normally be used to control the temperature of the radiator by controlling the flow of hot water through it.

[0021] In conventional arrangements used hitherto, the junction fitting between each control valve and the radiator normally has an unrestricted through-bore so that the interior of the radiator is in permanent communication with the control valve. When it is required to detach the radiator from the control valves, both control valves are closed and the junction fittings on the radiator are then detached from them. As previously explained, this allows water in the radiator to drain out through the junction fittings. In accordance with the present invention each junction fitting incorporates a separate stop valve, for example as shown in Figure 1.

[0022] Referring to Figure 1, the junction fitting 18 has at one end an external screw-thread 20 which can be screwed into the screw-thread in the inlet port 12 of the radiator. The fitting has a through-bore 22 and at the opposite end to the screw-thread 20 is formed with a domed sealing surface 24 which mates with a similarly curved concave sealing surface 26 on the control valve 16. An internally threaded nut 28 is retained on the junction fitting 18, around the sealing surface 24, by interengaging flanges 30 and 32 on the main body ofthe junction fitting and on the nut 28 respectively. The internal screw-thread on the nut threadedly engages an external screw-thread on the part 34 of the control valve surrounding the sealing surface 26. Thus, by screwing the nut 28 tightly on to the part 34, the sealing surfaces 24, 26 are urged firmly into sealing engagement.

[0023] The internal bore 22 of the fitting has an inwardly projecting flange 36 against which is disposed a manually operable valve assembly indicated generally at 38. The valve assembly comprises a spherical valve element 40 which is retained in the bore 22 by two resilient sealing rings 42 and an annular retaining ring 44.

[0024] The upper part ofthe spherical valve element 40 is formed with an elongate slot 46 which is engaged by a corresponding elongate projection on the lower end of a manipulating member 48. The manipulating member 48 passes through a circular aperture in the side wall of the fitting 18 where it is retained by a sealing ring 50. The upper surface of the manipulating member 48 is formed with a transverse slot 52 so that the member may

be rotated by a screwdriver, this causing corresponding rotation of the valve element 40.

[0025] The valve element 40 is formed with a central bore 54 which, in one rotational position of the valve, is in line with the bore 22 in the fitting 18 so that water can pass freely between the radiator and the control valve 16. However, by rotating the member 48 and valve element 40 through 90°, the bore 54 is brought to a position where it extends transversely across the bore 22 in the fitting 18, so as to close off the bore 22 and prevent the flow of water into or out of the radiator.

[0026] As previously described, therefore, when it is required to detach the radiator 10 from the control valve 16, the valve 38 of each junction fitting is first closed by simply rotating the manipulating member 48 through 90°. This ensures that the water in the radiator is retained there and does not drain out through the fittings. Thus when the radiator is detached from the two control valves (which have also been closed) the only water which comes out of the system is the tiny amount located in the space between each valve element 40 and the corresponding closure element of the control valve 16.

[0027] Any other suitable form of coupling arrangement may be provided for connecting each junction fitting to the radiator and/or control valve. Figure 2 shows an alternative arrangement where the end of the fitting 56 at the opposite end from the radiator has a smooth cylindrical surface 58 surrounded by a conventional form of compressible annular olive 60. An intemally threaded nut 62 encircles the surface 58 and has a shaped concave surface 64 which can bear on the olive 60. The cylindrical portion of the fitting 56 enters a cylindrical bore 66 in the control valve and the nut 62 threadedly engages an external thread 68 on the control valve. In known manner, tightening of the nut 62 on the thread 68 compresses the olive 60 and forces it into locking engagement with the surface 58 on the fitting and into sealing engagement with the abutting surfaces on the nut 62 and part 68 of the control valve. This secures the fitting 56 to the control valve and provides a watertight seal between them.

[0028] Figure 2 shows the spherical valve element 40 rotated to its closed position where the bore 54 extends transversely across the bore 22 in the fitting. Figure 2 also shows the shape of the slot 46 in the valve element and the interengaging projection on the manipulating member 48.

[0029] The particular forms of valve shown in the drawings, and the coupling arrangements for connecting the junction fittings to the radiator and control valve, are by way of example only and it will be appreciated that any other suitable form of manually operated valve may be used in the fitting, and any other suitable form of coupling may be used for connecting the fitting to the radiator and to the associated control valve.

Claims

1. A radiator comprising a main body (10) formed with internal chambers through which hot water flows in use, an inlet port (12) and an outlet port in the main body communicating with said internal chambers, and two junction fittings (18) for attachment to said ports in the main body, each of which junction fittings provides part (24, 28) of a coupling device (24, 26, 28, 34) for detachably connecting the radiator to a control valve (16) which, in use, controls the flow of water through the radiator, characterised in that each of said junction fittings (18) incorporates a manually operable normally-open stop valve (38) which may be closed prior to detachment of the radiator from the control valves, when required, thereby to prevent escape of water from the radiator during such detachment.

2. A radiator according to Claim 1, wherein at least one of the junction fittings includes a sealing surface (24) for liquid-tight engagement with a mating sealing surface (26) on the associated control valve (16), and a screw-threaded part (28) for engagement with a cooperating screw-threaded part (34) on the control valve to draw said sealing surfaces into liquid-tight mating engagement.

3. A radiator according to Claim 2, wherein the junction fitting (18) includes an internally threaded rotatable nut (28) surrounding the sealing surface (24) on the junction fitting and threadedly engageable with a mating external screw-thread on the control valve.

4. A radiator according to Claim 2, wherein an internally threaded nut is rotatable on the control valve and engageable with a mating external screw-thread on the junction fitting.

5. A radiator according to Claim 1, wherein the junction fitting (56) is formed with an external smooth cylindrical surface (58) which, in use, enters a mating cylindrical bore (66) in the control valve, and is encircled by a compressible annular olive (60) which may be compressed between the cylindrical surface and an annular surface (64) on a compression nut (62) which is in screw-threaded engagement with a part of the control valve.

6. A radiator according to any of the preceding claims, wherein each junction fitting (18) is formed with a through-bore (22) across which extends a valve element (40) which is manually rotatable between a closed position where it blocks the through-bore and an open position where it permits the passage of water along the through-bore.

7. A radiator according to any of the preceding Claims 1 to 5, wherein each junction fitting is formed with a through-bore across which extends a valve element which is displaceable laterally of the bore between a closed position where it blocks the through-bore and an open position where it permits the passage of water along the through-bore.

8. A radiator according to Claim 6, wherein the valve element (40) comprises a substantially spherical element which is rotatable about an axis extending transversely of the bore, and having passing through it a passage (54) which in the closed position extends laterally of the bore and in the open position extends longitudinally of the bore.

9. A radiator according to Claim 7 or Claim 8, wherein a manipulating member (48) extends laterally through the wall of the bore from the exterior of the junction fitting so as operatively to engage the valve member (40), and wherein the manipulating member (48) has a head portion exposed at the exterior of the junction fitting and having a formation (52) for engagement by a manipulating tool to rotate the manipulating member.

10. A junction fitting for use in a radiator according to any of the preceding claims, the junction fitting having at one end a coupling part (20) for attachment to the inlet or outlet port of a radiator, at the other end a coupling part (24, 28) for attachment to a control valve, and also having a through-bore (22) across which extends a valve element (40) which is manually adjustable between a closed position where it blocks the through-bore and an open position where it permits the passage of water along the through-bore.

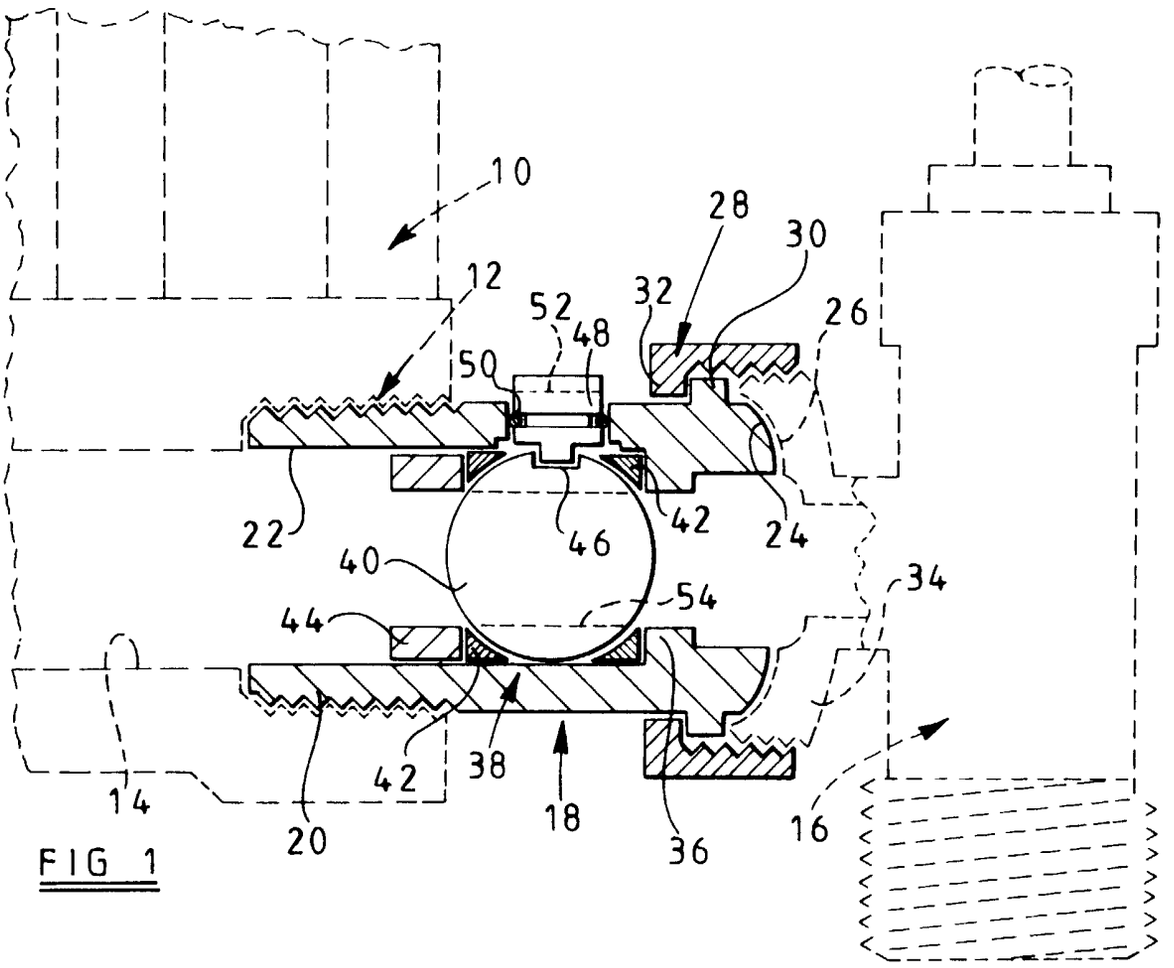
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FIG 1

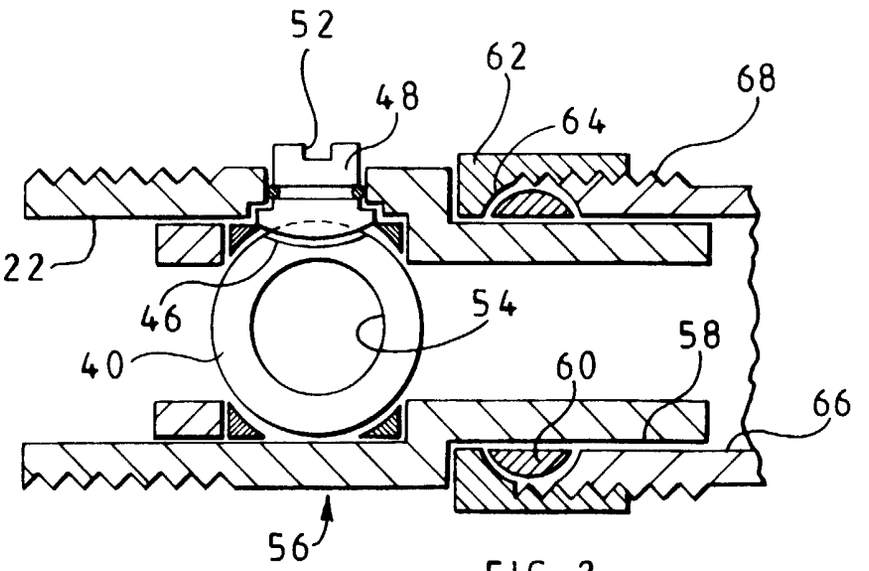
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FIG 2

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EUROPEAN SEARCH REPORT

Application Number
EP 98 30 5624

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	GB 2 229 521 A (TUNG HAO) 26 September 1990 * the whole document *	1,5,6, 8-10	F24H9/12
A	GB 2 302 147 A (FOX JEREMY PHILIP ;EVANS SHAUN DAVID (GB)) 8 January 1997 * abstract *	1,10	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

F24H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	24 November 1998	Van Gestel, H

CATEGORY OF CITED DOCUMENTS

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24-11-1998

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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