(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number : **0 441 761 A2**

(12) EUROPEAN PATENT APPLICATION

(21) Application number : **91850027.3**

(51) Int. Cl.[5] : **F24D 19/10**, F24H 9/12

(22) Date of filing : **05.02.91**

(30) Priority : **08.02.90 SE 9000454**

(43) Date of publication of application :
14.08.91 Bulletin 91/33

(84) Designated Contracting States :
BE CH DE ES FR GB IT LI NL

(71) Applicant : **B E A S Industrikonsult AB**
Norra Kyrkogatan 15
S-736 00 Kungsör (SE)

(72) Inventor : **Sörberg, Bengt**
Norra Kyrkogatan 15
S-736 00 Kungsör (SE)

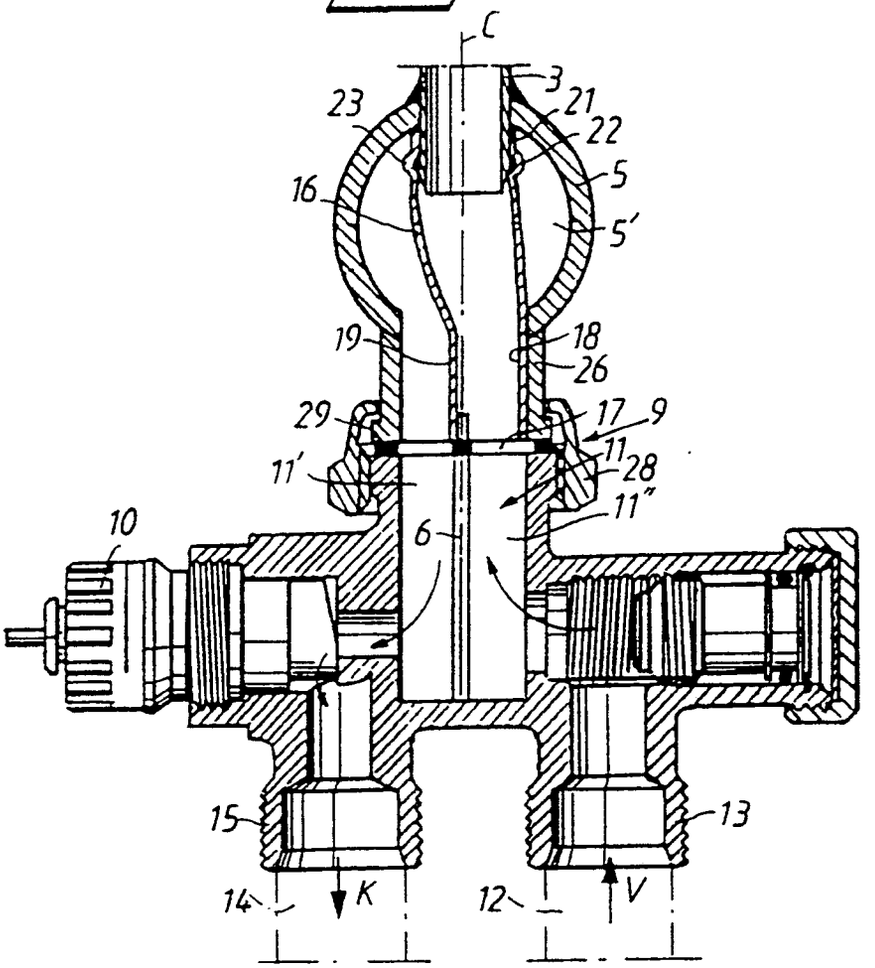
(74) Representative : **Nilsson, Karl et al**
STENHAGEN PATENTBYRA AB Box 17 709
S-118 93 Stockholm (SE)

(54) A radiator coupling.

(57) A radiator coupling for bottom-connected control valves (9) for radiators (1) comprises an upper connecting head having an outlet for hot water (V) which is connected to the upper part of the radiator, and a lower connecting head (5) which is connected to a first inlet for cooled water (K) on the lower part of the radiator. A riser pipe (3) communicates with a second inlet (17) in the lower connecting head and the outlet in the upper connecting head. The control valve has two through-flow channels (11', 11") of which the one channel receives cooled water and the other transfers hot water to the second inlet (17). The invention is characterised by a transfer sleeve (16) which has an end part rotatably connected to the end of the riser pipe (3) which projects into the lower connecting head and which sleeve has an opposite end part (18, 19) which when the sleeve is rotated is brought into communication with one or the other of the through-flow channels.

EP 0 441 761 A2

Fig. 3



A RADIATOR COUPLING

The present invention relates to a radiator coupling intended for bottom-connected control valves of radiators for water-carried heat in accordance with the preamble of Claim 1.

Control valves are known, for instance, from SE-A-75 11022-1 and GB-A-1 221 026 and are constructed for so-called single-pipe systems and dual-pipe or two-pipe systems. Hitherto, the control valves have been connected to the radiators either to a connection welded on the lower edge of the radiator or via pipes and pipe-parts to two screw-threaded connecting stubs on the radiators. According to a more common method nowadays, the inlet and outlet parts of the radiator valve are connected to a riser pipe and welded on the rear side of the radiator with the connecting pipe-stubs of the radiator valve welded in pairs to the rear side of the radiator on the right or the left side thereof. In the first case, the arrangement is such that the hot water flowing into the radiator and the cooled water leaving the radiator pass through one and the same divided radiator coupling. In the other case, the connecting stubs are located in pairs on the right or the left side of the radiator in a manner such that hot water is supplied to the radiator through the upper connecting stub whereas the cooled water leaves the radiator through the lower connecting stub. Both of these types of coupling are encumbered with serious drawbacks. In the case of the first type of coupling in which both the hot and the cooled water respectively enter and leave the radiator at the same location on the undersurface thereof a "short circuit" occurs, i.e. the hot and cooled water mix together, since the hot water flows into the radiator in the immediate vicinity of where the cooled water leaves the radiator. This greatly impairs the thermal effect or thermal efficiency of the radiator, and at times this reduction in thermal effect may reach to about 15%. This reduction is particularly manifest in so-called dual-pipe or two-pipe systems, which operate with much smaller flows than single pipe systems.

One drawback with the aforesaid second type of coupling, in which there are used pairs of connecting devices positioned one above the other on the right or left side of the radiator, is that when installing a heating system it is necessary to have available two types of radiator, namely a radiator for right-hand installation and a radiator for left-hand installation, and it is also necessary to take into account the flow direction of the water entering and leaving the radiator respectively in relation to the control valve. This problem is particularly serious in the case of single pipe systems.

The main object of the present invention is to provide a radiator coupling in which these drawbacks are totally eliminated. This object is realized in full with the invention defined in the following Claims.

The invention will now be described in more detail with reference to the accompanying drawings, in which

Figure 1 illustrates an inventive radiator coupling fitted on the rear side of a radiator ;

Figure 2 is a central section through the radiator coupling of Figure 1, the section plane lying perpendicular to the rear side of the radiator ;

Figure 3 is a sectional view of the lower part of the coupling, taken on the line III-III in Figures 2 and 4, said section lying in a plane parallel with the rear side of the radiator or radiators, and wherein this lower part is connected to the control valve, preferably a thermostat valve ;

Figure 4 is a central section through a radiator coupling intended for dual installation purposes ;

Figure 5 is a sectional view taken on the line V-V in Figure 4 ; and

Figure 6 illustrates the coupling of Figure 4 fitted between two radiators.

Figure 1 illustrates very schematically the use of a radiator coupling illustrated in the drawings.

As illustrated in Figure 1, a coupling, generally referenced 2, is fitted on one side edge of a radiator 1. The illustrated coupling comprises a riser pipe 3 which extends between an upper connecting head 4 and a lower connecting head 5. As will best be seen from Figure 2, the two connecting heads 4, 5 each comprise a housing which includes respectively an inner chamber 4′ and 5′, and an outlet 7 through which heated water V is delivered to the upper part of the radiator 1, and an inlet 8 which receives cooled return water from the lower part of the radiator. The two openings 7 and 8 lie in a plane which coincides with the rear wall of the radiator 1 and communicate with corresponding openings provided in said rear wall. The heads 4, 5 are preferably soldered or welded to the radiator wall, suitably by means of so-called press welding or resistance welding techniques, so as to obtain a liquid-tight seal between the heads and the steel-plate wall of the conventional radiator 1.

Indicated in Figure 1 is a control valve 9 which may be a conventional throttle valve or thermostat valve provided with an adjusting knob or wheel 10. The radiator 1 is fitted with the inventive coupling 2 during manufacture and when the radiator is fitted onto a wall the whole of the radiator coupling will thus lie hidden behind the radiator 1 and all that can be seen is the bottom control valve 9 with the adjusting knob or wheel 10 turned to face in the desired direction. Hot water is delivered to the control valve 9 of the Figure 1 embodiment from a pipe 12 and flows into the through-flow chamber 11 of the valve 9 (Figure 3) via a connecting stub 13 on the control valve. Subsequent to the hot water delivered to the radiator 1

through the riser pipe 3 having given off heat to the surroundings, the water sinks down in the radiator and exits as cooled return water K to the lower head 5 and to the return pipe 14, via the connecting stub 15, without mixing with the hot water V, i.e. in the absence of any short-circuiting effect. This short-circuiting effect has been eliminated by the fact that the riser pipe 3 communicates with a sleeve 16 which is arranged in the lower connecting head 5 and which can be selectively connected to one of the two through-flow channels 11′ and 11″ of the control valve, these channels being formed by a wall 6 provided in the chamber 11 and dividing said chamber into two mutually separate channels or passageways having the semi-circular area illustrated in the exemplifying embodiment. As will be seen from Figure 3, the pipe 12 is connected with the through-flow channel 11″ and the return-water pipe 14 is connected with the through-flow channel 11′. The sleeve 16 has an inlet 17 which is defined by a semi-cylindrical wall 18 and a flat wall 19. It should be noted that even though Figure 5 is actually related solely to Figure 4, the sleeve 16 is the same in both instances. The flat wall 19 of the sleeve 16 coincides with the partition wall 6, as shown in Figure 3, and the inlet 18 of the sleeve will thus coincide with the upper opening of the channel 11″, as illustrated in Figure 3, i.e. the water flowing into the channel 11″ is totally isolated from the water flowing in the channel 11′. The upper end of the sleeve 16 embraces the lower end of the riser pipe 3 and an internal groove 22 provided in said sleeve end 21 acommodates an O-ring 23 which seals against the mantle surface of the riser pipe 3 (Figure 3). Since the necessary, conventional control valve 9 must be turned so that the knob or wheel 10 will be located in the most readily accessible position when installing the radiator, it is quite possible that the hot water will be delivered to the connecting stub 15 (Figure 3) and consequently the channel 11′ must be connected to the sleeve 16 and the riser pipe 3. In accordance with the invention, the sleeve 16 can therefore be rotated through 180° and its inlet 17 is displaceable relative to the inlet of the riser pipe 3, so that when the sleeve 16 is rotated through 180°, the inlet 17, which in the Figure 3 illustration lies within the opening of the channel 11″, will be moved so as to coincide with the upper opening of the channel 11′, therewith enabling the arrangement to be readily adjusted in accordance with the position of the control or regulating valve 9. In order to ensure that the sleeve 16 will be held in its adjusted position, the end of the sleeve facing towards the control valve 9 is suitably provided with, for instance, two diametrically opposed projections or locking shoulders 24, 25 which engage in corresponding recesses provided in the inner wall of the lower connecting head 5, and more specifically in the wall of a neck 26 which, as will best be seen from Figure 3, is connected to the control valve 9 by means of a collar nut 28 and an intermediate seal 29.

When wishing to switch the direction of the flow, the control valve 9 is loosened on the lower head 5 of the coupling 2 and the sleeve 16 pulled slightly downwards and turned through 180°, wherewith when rotation of the sleeve is completed the lower edge surface of the flat wall 19 of the sleeve 16 will still lie in sealing abutment with the upper edge surface of the partition wall 6, which is diametrically disposed in the through-flow chamber 11, whereas the semi-cylindrical wall 18 of the sleeve 16 will lie against the left-hand part of the neck 26, as seen in Figure 3, and thus connect the channel 11′ with the riser pipe 3. Subsequent to setting the position of the sleeve 6, the sleeve is pushed upwards so as to bring the locking shoulders 24, 25 into locking engagement with the recesses in the neck 26.

As will best be seen from Figure 3, the flat wall 19 is located in a plane which coincides at least substantially with the centre axis C of the riser pipe 3 and the upper part of the sleeve 16 above the flat wall 19 is cylindrical with the cylinder axis coinciding with the centre axis C. As will be seen from the illustration, the O-ring 23 is accommodated in an internal groove 22 provided in the sleeve 16, although it is also conceivable to mount the O-ring on the end of the riser pipe 3, optionally in a groove formed in said end.

Figure 4 illustrates a coupling for dual-radiator installations and coincides completely with the aforedescribed coupling with the exception that each head 4, 5 has dual outlets 30, 31 for hot water and dual inlets 32, 33 for cooled water respectively. The coupling illustrated in Figure 5 is connected-up in the manner illustrated in Figure 6, which illustrates two radiators 1′ and 1″ with the coupling illustrated in Figure 4 located between and welded or soldered to the mutually parallel and mutually facing surfaces of said radiators. The coupling is preferably mounted centrally between the ends of the radiators and the hot water V is delivered to the upper parts of respective radiators through outlet stubs 30 and 31, while return water K returns through the inlet stubs 32 and 33.

This central fitting of the radiator coupling, indicated in broken lines in Figure 1, is only possible when using the inventive coupling, which enables the control valve to be fitted onto the underside of the radiator. Centre fitting affords the important advantage of needing to store only one type of radiator with a coupling welded thereto, as opposed to the earlier case in which it was necessary to store two types of radiator, i.e. radiators with a left-hand and a right-hand coupling respectively.

It has been assumed in the aforegoing that the through-flow chamber 11 is divided into two symmetrical, semi-cylindrical channels by means of a flat wall 6. It will be understood, however, that the channels 11′ and 11″ may have the form of cylindrical borings in the control valve, wherewith the lower end part 18, 19 of the sleeve 16 is at least configured with a cylin-

drical inlet adapted to the circular orifices of the two channels. It has also been assumed that the flows are adjusted by rotating the sleeve 16 through 180° around the centre axis C. It will be understood, however, that when the channels have the form of borings, said borings may, naturally, be located at another angular distance. It has also been assumed that the upper, cylindrical end part of the sleeve 16 embraces the end of the riser pipe 3. It will be understood, however, that the end of the riser pipe may embrace the end part of the sleeve.

Claims

1. A radiator coupling (2) for bottom-connected control valves (9) for radiators (1) intended for water-carried heat, comprising an upper connecting head (4) having an inner chamber (4') which includes an outlet (7) for hot water (V), said outlet (7) being connected to the upper part of at least one radiator (1 ; 1', 1"), and a lower connecting head (5) having an inner chamber (5') which is connected to the lower part of the radiator through a first inlet (8) for cooled water (K), and further comprising a riser pipe (3) which extends between the connecting heads (4, 5) and which is intended to conduct hot water (V) and which communicates with a second inlet (17) in the lower connecting head (5) and the outlet (7) in the upper connecting head (4), wherein the control valve (9) is provided with two through-flow channels (11', 11") of which the one channel (11') is intended to receive cooled water (K) from the first inlet (8) of the lower connecting head (5) and the second through-flow channel (11") is intended to transfer hot water (V) to the second inlet (17) of the lower connecting head (5), **characterized** by a transfer sleeve (16) having a cylindrical end part which is rotatably connected to the cylindrical end of the riser pipe (3) projecting into the inner chamber (5') of the second connecting head (5) and which transfer sleeve (16) has an opposite end part (18, 19) so configured that when the transfer sleeve (16) is rotated from a first position (Figure 3) in which said opposite end part communicates with said second through-flow channel (11") to a second position, said end part will communicate with said one through-flow channel (11').

2. A coupling according to Claim 1, **characterized** in that the rotational angle between the first and the second positions is 180°.

3. A coupling according to Claim 1 and 2, in which the two channels (11', 11") of the control valve (9) are symmetrical and semi-cylindrical and separated by a partition wall (6), **characterized** in that the aforesaid opposite end part of the transfer sleeve (16) is configured semi-cylindrically with a flat wall (19) whose bottom edge coincides with the upper edge of the partition wall (6) of said control valve.

4. A coupling according to any one of Claims 1-3, **characterized** in that the cylindrical end part of the transfer sleeve (16) embraces the cylindrical end of the riser pipe (3).

5. A coupling according to any one of Claims 1-3, **characterized** in that the cylindrical end part of the transfer sleeve (16) projects into the cylindrical end of the riser pipe.

6. A coupling according to Claim 4 or Claim 5, **characterized** in that an O-ring (23) is fitted between the mutually overlapping surfaces of the sleeve (16) and the riser pipe.

7. A coupling according to any one of Claims 1-6, **characterized** in that said opposite end part of the transfer sleeve (16) is provided with locking devices (24, 25) which function to lock the sleeve (16) in an adjusted position.

8. A coupling according to any one of Claims 1-7, **characterized** in that the coupling is mounted centrally on the radiator.

Fig. 1

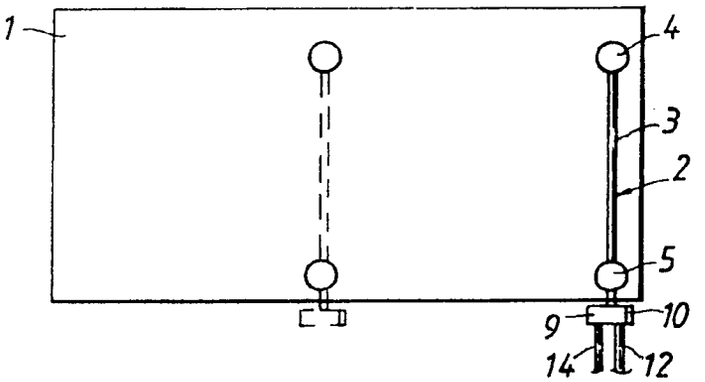


Fig. 2

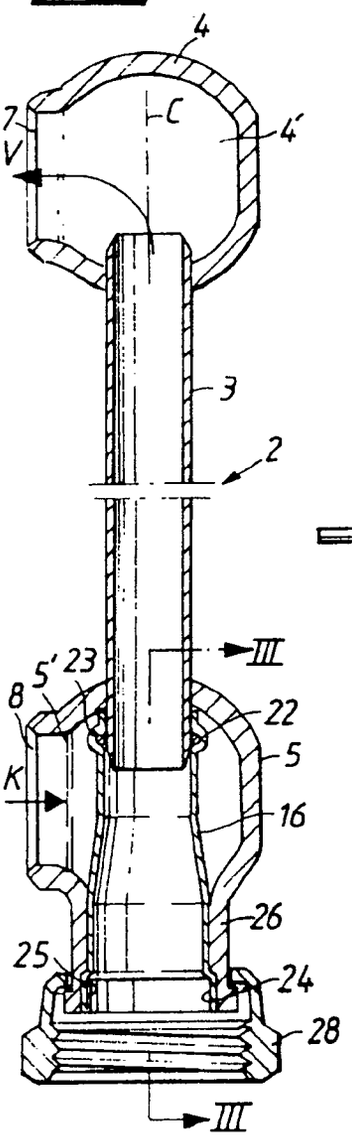


Fig. 3

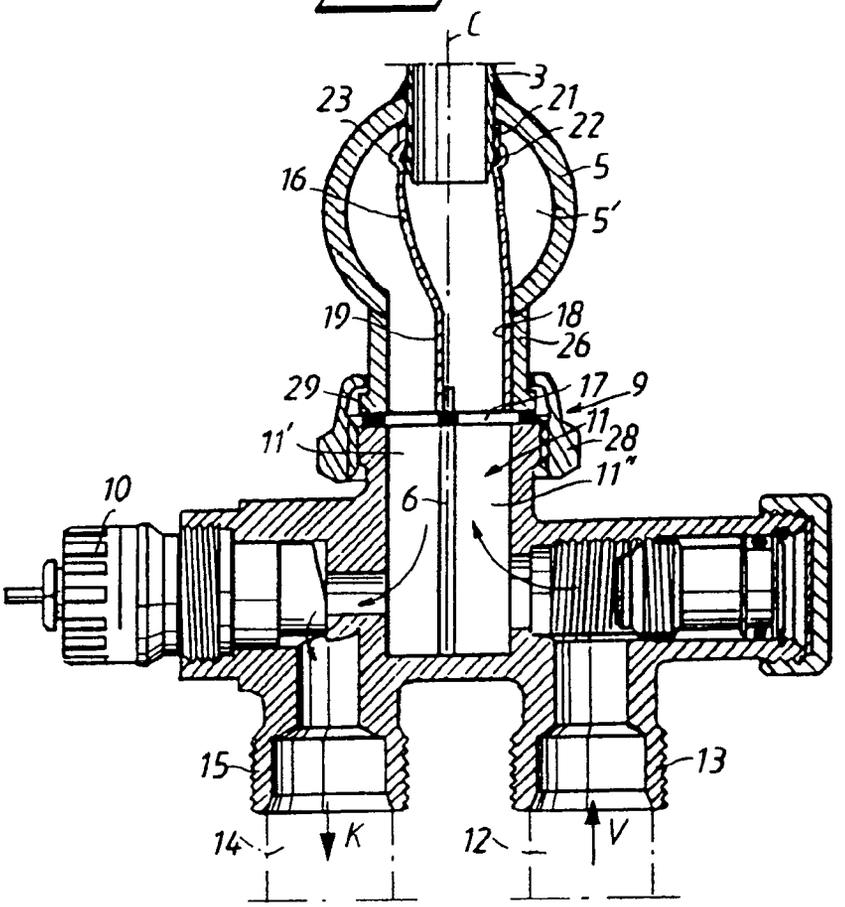


Fig. 4

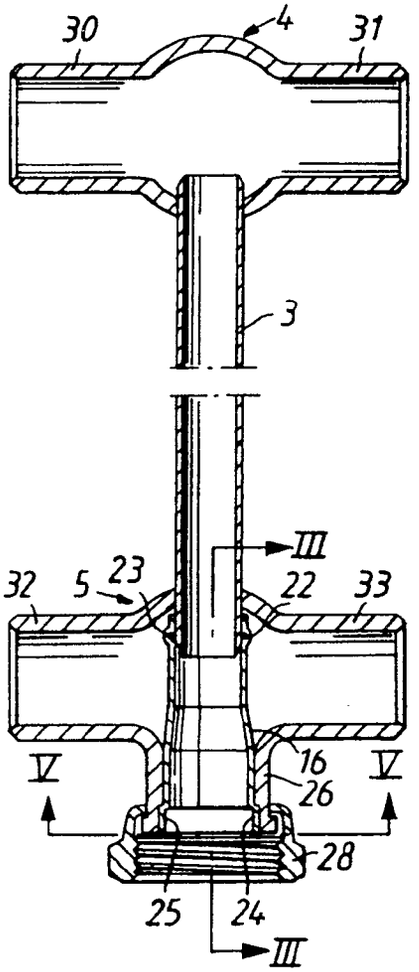


Fig. 5

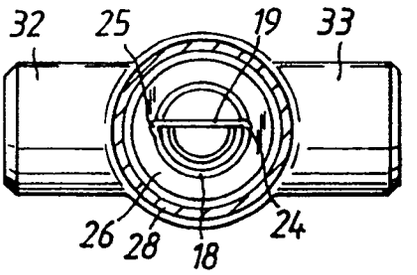


Fig. 6