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(54) **A radiator coupling.**

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Description

The present invention relates to a bottom-connected control valve and radiator coupling 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 control valve and 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 control valve and 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 cylindrical 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 bottom-connected control valve having a radiator coupling which comprises 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 in which said opposite end part (18,19) communicates with said second through-flow channel (11") to a second position, said opposite end part (18,19) will communicate with said one through-flow channel (11').

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

3. A bottom-connected control valve and radiator 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 bottom-connected control valve and radiator 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 bottom-connected control valve and radiator 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 bottom-connected control valve and radiator 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 bottom-connected control valve and radiator 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 bottom-connected control valve and radiator coupling according to any one of Claims 1-7, **characterized** in that the coupling is mounted centrally on the radiator.

Patentansprüche

1. Bodenseitig angeschlossenes Regulierventil mit einem Heizkörperanschluß, der einen oberen Anschlußkopf (4) mit einem Innenraum (4'), der einen Auslaß (7) für heißes Wasser (V) aufweist, wobei der Auslaß (7) mit dem oberen Teil zumindest eines Heizkörpers (1;1', 1") verbunden ist, und einen unteren Anschluß-

kopf (5) mit einem Innenraum (5') umfaßt, der mit dem unteren Teil des Heizkörpers durch einen ersten Einlaß (8) für abgekühltes Wasser (K) verbunden ist, und ferner ein Steigrohr (3) umfassend, das sich zwischen den Anschlußköpfen (4,5) erstreckt, zur Führung heißen Wassers (V) bestimmt ist und mit einem zweiten Einlaß (17) im unteren Anschlußkopf (5) und dem Auslaß (7) im oberen Anschlußkopf (4) in Verbindung steht, wobei das Regulierventil (9) mit zwei Durchflußkanälen (11',11") versehen ist, von denen der eine Kanal (11') zur Aufnahme abgekühlten Wassers (K) aus dem ersten Einlaß (8) des unteren Anschlußkopfes (5) bestimmt ist und der zweite Durchflußkanal (11") zur Überführung heißen Wassers (V) zum zweiten Einlaß (17) des unteren Anschlußkopfes (5) bestimmt ist, gekennzeichnet durch eine Überführungshülse (16) mit einem zylindrischen Endteil, der drehbar mit dem zylindrischen Ende des in den Innenraum (5') des zweiten Anschlußkopfes (5) hineinragenden Steigrohres (3) verbunden ist, welche Überführungshülse (16) einen gegenüberliegenden Endteil (18,19) aufweist, der so gestaltet ist, daß, wenn die Überführungshülse (16) aus einer ersten Position, in der der gegenüberliegende Endteil (18,19) mit dem zweiten Durchflußkanal (11") in Verbindung steht, in eine zweite Position gedreht ist, der gegenüberliegende Endteil (18,19) mit dem einen Durchflußkanal (11') in Verbindung steht.

2. Bodenseitig angeschlossenes Regulierventil und Heizkörperanschluß nach Anspruch 1, dadurch gekennzeichnet, daß der Drehwinkel zwischen der ersten und der zweiten Position 180° beträgt.

3. Bodenseitig angeschlossenes Regulierventil und Heizkörperanschluß nach Anspruch 1 und 2, bei dem die beiden Kanäle (11', 11") des Regulierventils (9) symmetrisch und halbzylindrisch sind und durch eine Trennwand (6) getrennt sind, dadurch gekennzeichnet, daß der genannte gegenüberliegende Endteil der Überführungshülse (16) halbzylindrisch mit einer ebenen Wand (19) gestaltet ist, deren unterer Rand mit dem oberen Rand der Trennwand (6) des Regulierventils zusammenfällt.

4. Bodenseitig angeschlossenes Regulierventil und Heizkörperanschluß nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß der zylindrische Endteil der Überführungshülse (16) das zylindrische Ende des Steigrohres (3) umgreift.

5. Bodenseitig angeschlossenes Regulierventil und Heizkörperanschluß nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß der zylindrische Endteil der Überführungshülse (16) in das zylindrische Ende des Steigrohres hineinragt.

6. Bodenseitig angeschlossenes Regulierventil und Heizkörperanschluß nach Anspruch 4 oder Anspruch 5, dadurch gekennzeichnet, daß ein O-Ring (23) zwischen die einander übergreifenden Oberflächen der Hülse (16) und des Steigrohres montiert ist.

7. Bodenseitig angeschlossenes Regulierventil und Heizkörperanschluß nach einem der Ansprüche 1 bis 6, dadurch gekennzeichnet, daß der gegenüberliegende Endteil der Uberführungshülse (16) mit Verriegelungseinrichtungen (24, 25) mit der Funktion des Verriegelns der Hülse (16) in einer eingestellten Position versehen ist.

8. Bodenseitig angeschlossenes Regulierventil und Heizkörperanschluß nach einem der Ansprüche 1 bis 7, dadurch gekennzeichnet, daß der Anschluß mittig am Heizkörper angebracht ist.

Revendications

1. Un robinet de commande raccordé à la partie inférieure d'un radiateur et un raccord de radiateur qui comprend une tête de raccordement supérieure (4) ayant une chambre intérieure (4)' qui comporte une sortie (7) pour l'eau chaude (V), ladite sortie (7) étant branchée sur la partie supérieure d'au moins un radiateur (1; 1', 1"), et une tête de raccordement inférieure (5) ayant une chambre intérieure (5') mise en communication avec la partie inférieure du radiateur par l'intermédiaire d'une première entrée (8) pour l'eau refroidie (K), et qui comprend en outre une colonne ascendante (3) qui s'étend entre lesdites têtes de raccordement (4, 5) et dont la fonction est de conduire l'eau chaude (V) et qui communique avec une seconde entrée (17) logée dans la tête de raccordement inférieure (5) et avec la sortie (7) dans la tête de raccordement supérieure (4), dans lequels le robinet de commande (9) comporte aussi deux canaux de transfert (11', 11") qui ont pour fonction, en ce qui concerne ledit canal (11'), de recevoir l'eau refroidie (K) venant de la première entrée (8) de la tête inférieure de raccordement (5) et en ce qui concerne ledit canal de transfert (11"), de transférer l'eau chaude (V) vers la seconde entrée (17) de la tête de raccor-

dement inférieure (5), caractérisés par le fait qu'un manchon de transfert (16) ayant une extrémité cylindrique raccordée à l'extrémité cylindrique de la colonne ascendante (3) et pouvant tourner autour de ladite extrémité cylindrique qui se projette dans la chambre intérieure (5') de la seconde tête de raccordement (5) et lequel manchon de transfert (16) comporte une partie extrême opposée (18, 19) configurée de manière à ce que lorsque le manchon de transfert (16) effectue une rotation à partir d'une première position à laquelle ladite extrémité opposée (18, 19) communique avec ledit second canal de transfert (11") vers une seconde position, ladite extrémité opposée (18, 19) communique avec ledit canal de transfert (11').

2. Un robinet de commande qui se raccorde à la partie inférieure d'un radiateur et un raccord de radiateur selon la revendication 1, caractérisés par le fait que l'angle de rotation entre la première position et la seconde position est de 180°.

3. Un robinet de commande qui se raccorde à la partie inférieure d'un radiateur et un raccord de radiateur selon la revendication 1 et la revendication 2 , dans laquelle deux canaux de transfert (11', 11") du robinet de commande (9) sont placés symétriquement l'un par rapport à l'autre, sont de section semi-cylindrique et sont séparés par une cloison (6), caractérisés par le fait que ladite extrémité opposée du manchon de transfert (16) a une section de forme semi-cylindrique avec une paroi plate (19) dont le bord inférieur coïncide avec le rebord supérieur de la cloison (6) dudit robinet de commande (9).

4. Un robinet de commande qui se raccorde à la partie inférieure d'un radiateur et un raccord de radiateur selon n'importe laquelle des revendications 1 à 3, caractérisés par le fait que l'extrémité cylindrique du manchon de transfert (16) entoure l'extrémité cylindrique de la colonne ascendante (3).

5. Un robinet de commande qui se raccorde à la partie inférieure d'un radiateur et un raccord de radiateur selon n'importe laquelle des revendications 1 à 3, caractérisés par le fait que l'extrémité cylindrique du manchon de transfert (16) se projette dans l'extrémité cylindrique de la colonne ascendante.

6. Un robinet de commande qui se raccorde à la partie inférieure d'un radiateur et un raccord de radiateur selon la revendication 4 ou la revendication 5, caractérisés par le fait qu'un joint torique (23) est logé entre les surfaces du manchon de transfert (16) et de la colonne ascendante qui se recouvrent mutuellement.

7. Un robinet de commande qui se raccorde à la partie inférieure d'un radiateur et un raccord de radiateur selon l'une quelconque des revendications 1 à 6 , caractérisés par le fait que ladite extrémité opposée du manchon de transfert (16) est équipée de dispositifs de verrouillage (24, 25) dont la fonction est d'immobiliser le manchon (16) dans une position déterminée.

8. Un robinet de commande qui se raccorde à la partie inférieure d'un radiateur et un raccord de radiateur selon l'une quelconque des revendications 1 à 7, caractérisés par le raccord est monté de manière centrale sur le radiateur.

Fig. 1

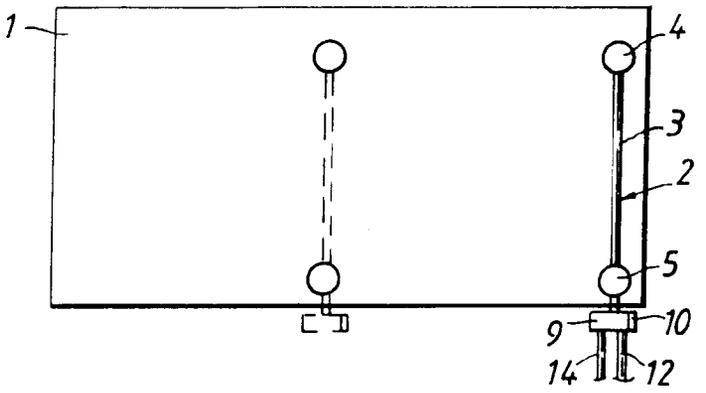

Fig. 2

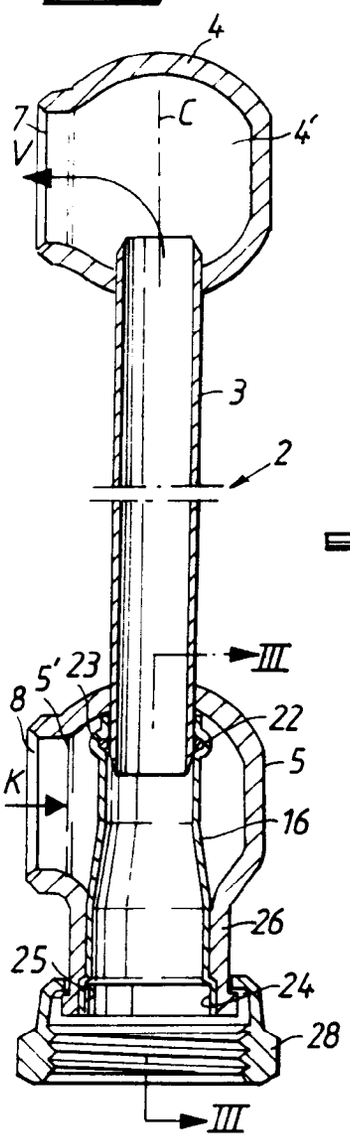

Fig. 3

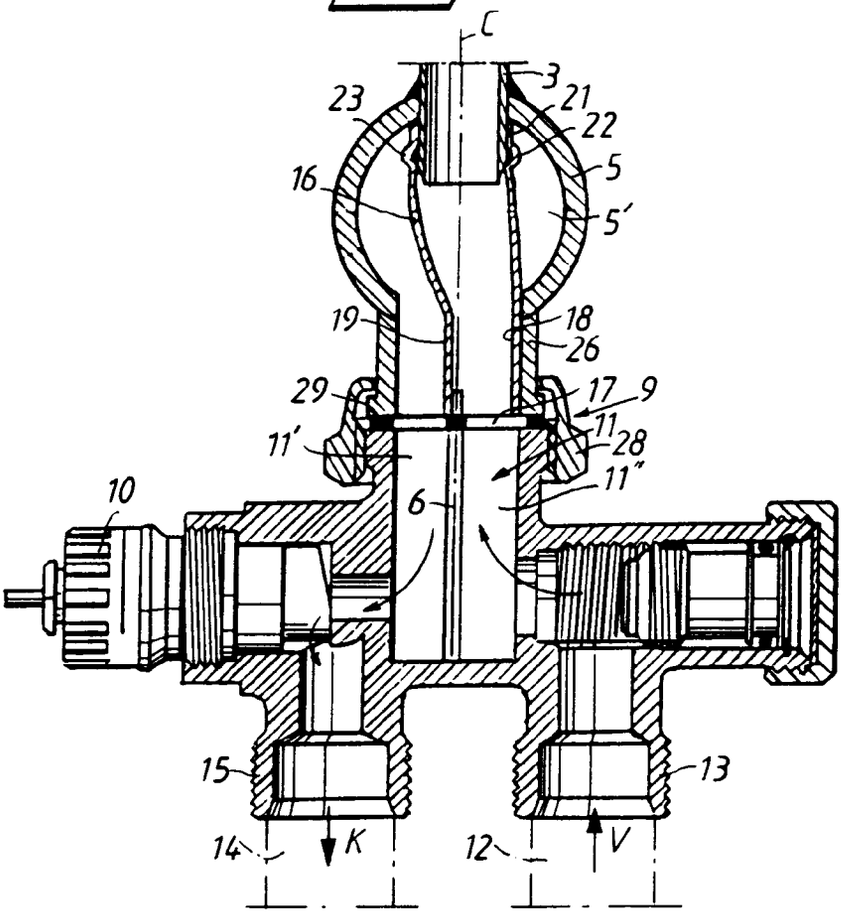

Fig. 4

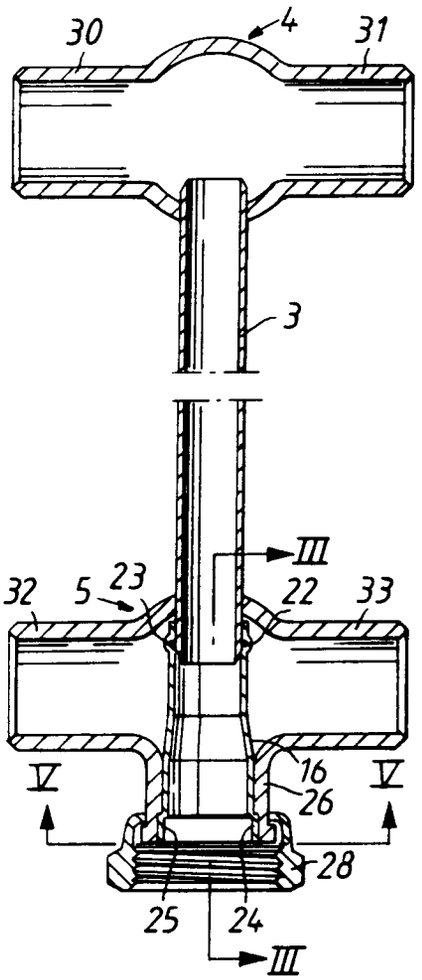

Fig. 5

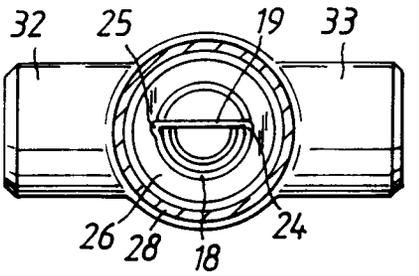

Fig. 6