

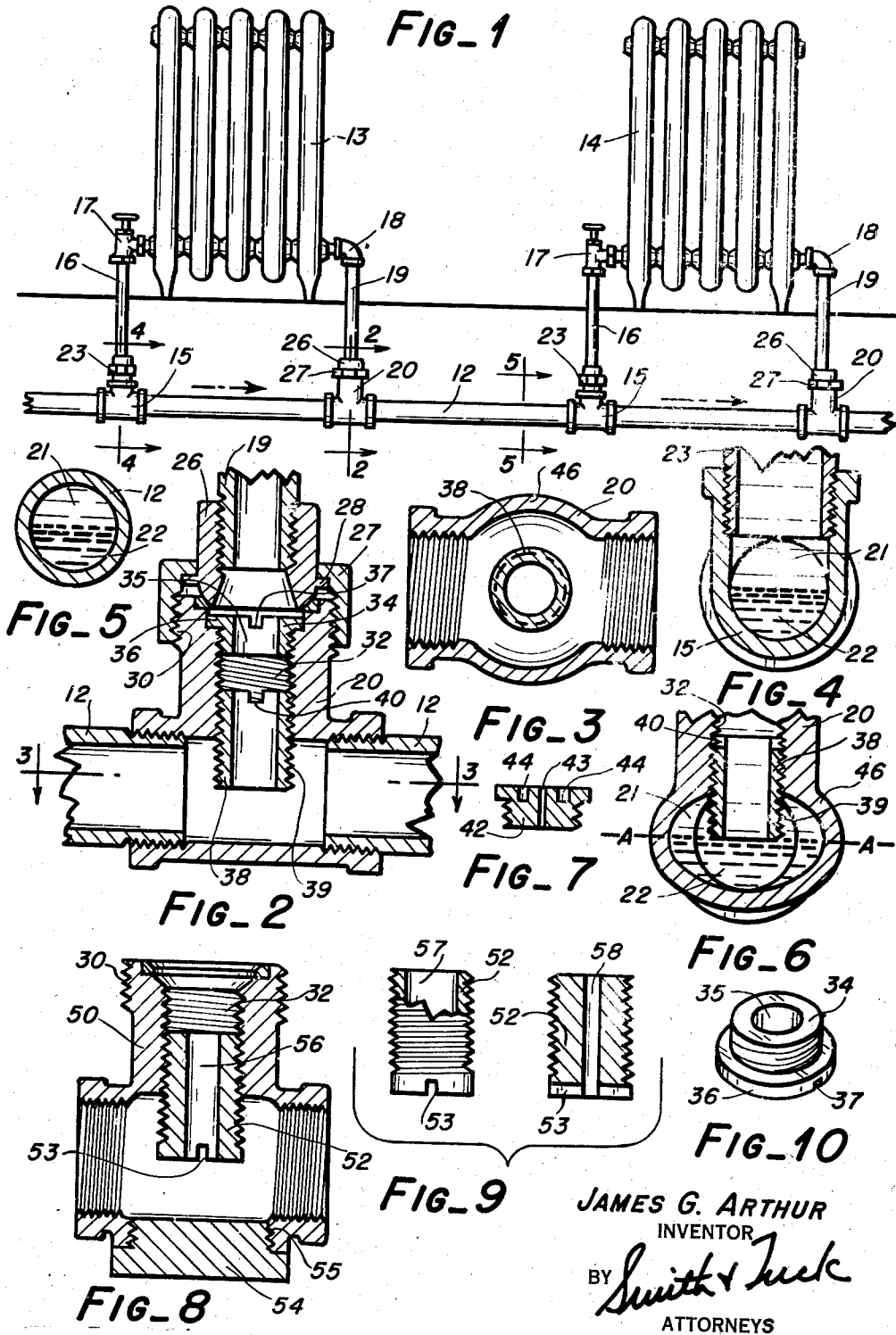
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MEANS FOR CONTROLLING RADIATOR SYSTEMS

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MEANS FOR CONTROLLING RADIATOR SYSTEMS

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This invention relates to means for controlling radiator systems and is more particularly useful in liquid radiation systems of the type employing a single pipe for simultaneously conducting heated water and carrying away the cooled liquid.

It often occurs in such single pipe systems that, because of the peculiarities of the piping arrangement, a lack of care in installation, or altered conditions from the original layout, certain radiators will heat above the normal requirements placed upon them, and certain other radiators in the system will be difficult to heat even to the proximity of the requirements for which they were placed. Often this is due to "short circuiting" of heated liquid through that portion of the system which more easily circulates, with a consequence that the harder heating portion of the circuit does not receive adequate fluid and the radiators therein remain below normal heat.

There has been a long-felt want for a simple and efficient means for balancing the system after the piping installation has been made so that the flow of heated fluid into the more accessible radiators can be restricted, or so that the flow of the heated fluid into the less accessible radiators can be enhanced to the end that a balance throughout the system is attained and the fullest efficiency is derived therefrom.

It is an important object of my invention to provide means for satisfactorily combating this problem and which means is simple and efficient in its operation in the practice of my method for controlling such radiation systems.

Another object of the invention is to provide a method of adjusting and pre-setting radiation systems for the maximum efficiency from the heated liquids that are circulated therethrough, and an associated object is to provide such a method for use in a single pipe radiation system.

A further object of the invention is to provide a method of regulating the flow of heated liquid in a radiation system which method can be easily installed and practiced, and when perfected will operate unattended thereafter.

Still another object of the invention relates to an improved method of inducing the flow of liquid in a single pipe radiation system to the end that heated liquids are conveyed to the radiators which, due to the peculiarities of the system and so forth, may unnaturally be by-passed and thus be operating inefficiently.

Another and further object of the invention is the provision of means that are simple, inexpensive and easily installed for adjusting and controlling single pipe radiation systems and

associated with this object is a further object namely that of providing a novel coupling that is simple to construct and useful in practicing said method objects.

Other objects and advantages of the invention will be more apparent during the course of the following description wherein I have shown and described a preferred and modified form of my invention. Throughout the drawing, like reference numerals refer to like parts, and it is to be observed at this time that it is my intention that changes and alterations may be made in materials, shapes and sizes of the various parts of my device, or changes may be made in the various steps of my method without departing from the principles defined by the sub-joined claims:

In the drawing:

Figure 1 is a schematic showing of a radiation system of the single pipe type;

Figure 2 is a vertical medial section, taken on line 2—2 of Figure 1, through a coupling which I have originated for use in a radiation system.

Figure 3 is a horizontal sectional view taken on line 3—3 of Figure 2;

Figure 4 is a vertical sectional view taken on line 4—4 of Figure 1;

Figure 5 is a typical vertical cross-sectional view through the pipe of a single pipe radiation system, on line 5—5 of Figure 1;

Figure 6 is a vertical sectional view similar to the showing of Figure 2, but taken in a plane at right angles thereto;

Figure 7 illustrates a perforate or ported regulator member employed in the coupling of Figure 2;

Figure 8 is a vertical medial sectional view similar to the showing of Figure 2, but illustrating a modified form of my invention;

Figure 9 is a bracketed view of a pair of regulator nipple nozzles employed in the device of Figure 8, and

Figure 10 is a perspective view of a regulator or ported member as employed in the coupling of Figure 2.

The numeral 12 designates the single pipe of a radiation system with which may be associated radiators 13 and 14 of the conventional type. As shown in Figure 1, the flow of liquid used for heating the radiators is from the left to the right and, customarily, flow is induced in the radiator 13 or 14 by cutting into the pipe 12 as at the T 15 and connecting a flow stub 16 thence through the valve 17 in to one side of the radiator. On the opposite end of the radiator the elbow 18 and return stub 19 join with the T coupling 20

and fluid being discharged from the radiator, is thus returned to the pipe 12.

As illustrated in Figures 4, 5, and 6, the flow of liquid through the pipe 12 and the T couplings is stratified. In the upper portion of the pipe the heated and lighter-weight liquid, as indicated by the numeral 21, flows above the axis AA and the heavier, cooler water being returned to the heating plant is indicated by the numeral 22 and flows in the lower portion or below the axis AA. As is well known, these liquids, having varying degrees of temperature, will flow along in the pipe in their separate strata and usually with limited co-mingling.

As shown in Figure 1, the T coupling 15 is of a conventional type and has associated therewith a union 23 useful in effecting joinder of the pipes in the system.

As the strata of liquid flows through the pipe 12 the warmer fluid being on top, rises through the stub 16 into the radiators 13 or 14 out through the drop stub 19 and is discharged into the pipe 12 through the coupling 20.

A flanged bushing 26 is threaded on the stub 19 and has the interiorly threaded female member 27 of a conventional union fitted thereto and cooperable with its flange 28, in the usual manner. Member 27 engages threads 30 on member 20 which may be described as the male portion of the union, and may be incorporated with the T coupling 20. Interiorly, member 20 has a threaded bore 32.

In the upper end of the threaded passage 32 I fit my port member 34 which has the interior port 35 through which fluid being conducted from the radiator by stub 19 may pass. In the lower terminus of the passage 32, the nozzle 38 is threadedly fitted. I have provided it with threads 39 so that it can be adjusted vertically in the passage 32 to vary the level of its lower discharge end with the conditions which are being met.

As shown in the figures, a kerf 40 is provided in member 38 in which an instrument such as a screw driver can be fitted for rotating the device. Of course, this means may be varied without altering the device.

The member 34 is shown as having a flange 36 which also has a kerf 37 to assist in its insertion and removal from the threaded passage 32. In the port member 34, shown in position in Figure 2, the opening 35 therethrough is of substantial size with relation to the member itself. In Figure 7 a slightly altered form of the port member is shown and is indicated by the numeral 42 as having a rather minute port 43 therethrough. In its upper surface shallow openings 44 are provided for engagement by a spanner for turning it into or out of the passage 32.

In order to compensate for the area in the T-member 20 that is occupied by the nozzle 38, the member may be bellied at 46 on either side as is shown in Figures 3 and 6.

In Figure 8 the T member 50 has the interiorly threaded passage 32 that is similar to the structure of Figure 2 and in which is threaded the ported nozzle member 52 for vertical movement therein. The nozzle 52 has a kerf 53 in one end that is useful for turning the member in its threaded engagement in member 50. A plug 54 closes the opening 55 below the nozzle, and when this plug is removed access is readily available to the interior of the coupling for adjustment of the ported nozzle. The member 52 in Figure 8 is shown as having what may be described as a

medium size port 56. In Figure 9 alternative sized ports 52 are shown and the one at the left in the drawing has the relatively large port 57, while the one shown at the right in Figure 9 has the small port 58.

The amount of liquid that may pass through the ported nozzle is governed by the size of the port in the nozzle, in this form of the invention; whereas in the invention as shown in Figure 2, the discharge of cooled liquid from the radiator is governed by the size of the port in the port member 34.

An important step in the practice of my method is the adjustment of the nozzle member in either form shown, so that its lower end coincides with the approximate line of demarcation, between the strata of heated and cooled fluids, passing through coupling 20 or the conductor pipe 12. In other words, if the lower end of the nozzle is above the line of demarcation, cooled liquid passing out of the nozzle is discharged into the strata of heated water tending to cool it by absorbing heat therefrom unnecessarily. Conversely, if the lower end of the nozzle is too low in the housing of the coupling as to be somewhat below the line of demarcation between the strata of fluids, the proper action is not obtained and the fullest efficiency of the device is lost. Consequently, the adjustment, vertically of the nozzle requires, it can be seen, the exercise of judgment and skill, and naturally an understanding of the circumstances and conditions to be met and remedied by my device and my method.

An additional factor governing the satisfactory balancing of the system is the regulation of the flow of liquid through a radiator. This regulation is accomplished by varying the size of the ports in the member 35 or the ports of the member 52. A radiator that is easily heated because it will readily receive and circulate the liquid in the system ordinarily would be provided with a small discharge port so that only a limited quantity of the heated fluid can flow therethrough. This of course will force the heated fluid to seek another source of radiation and it can be seen that it would flow easily into a radiator that is less accessible under other conditions. This flow can be enhanced, naturally, by increasing the size of the ports in the coupling associated with the latter radiator or by varying the particular size ported nozzle that is employed.

To adjust the vertical height of the nozzle 38, the joinder between member 27 and the thread 30 is disrupted and either the stub 19 is swung out of the way or else the T member 20 is swung slightly out of its normal axis and by inserting a screw driver into the kerf 37 the member 34 can be removed from its seat. This provides access to the interior of passage 32 and permits the insertion of a screw driver into the kerf 40 of member 38, whereupon then it may be turned. Thus this member will be raised or lowered to vary the height of its lower discharge end. The port member would of course be replaced and the coupling properly joined in a water tight manner into the circuit.

In adjusting the device of Figure 8 the plug 54 is removed and the tool for turning member 52 is inserted into the kerf as above described.

It can be seen that it is possible by the use of my invention to apportion the proper predetermined amount of water that is required by each unit in the distributing system of piping. Thus throughout the entire system a balance may be

obtained which will make it possible to heat the remote point in the system as evenly as it is to heat those more closely proximate to the source of the fluid.

My invention will obviously in a single pipe system make for efficiency and thorough operation. The consequence, therefore, is that a single pipe system becomes as desirable and as easy to install and operate as any of the other systems with the consequent saving of pipe and labor in the original installation.

As has been pointed out above the parts of the physical embodiment of my invention are interchangeable as well as adjustable so that changes and alterations may be made in the system to meet conditions that are presented simply and "on the job," without requiring a great amount of testing equipment or an undue amount of skill.

I claim:

1. In a single pipe radiation system wherein hot fluids are delivered to a radiator and cooler fluids are withdrawn from such radiator both through a single pipe, a coupler from the discharge side of such radiator to the single pipe, comprising: an inverted hollow T-shaped body having its leg upstanding, means at each end of the head of said body for connecting sections of

said single pipe thereto in alignment, means on said leg for connecting a pipe from the radiator, a nipple tubular throughout its length and mounted within said leg and having an end vertically movable into and out of the passage between the ends of the head of said body to thereby determine the level of discharge of fluid passing downward through said leg and said nipple.

2. A coupler for the discharge side of a liquid radiator for connecting the same into a single-pipe distribution and return system, comprising: an inverted hollow T-shaped body having its leg upstanding, means at each end of the cross-member of said body for connection thereto of sections of said single pipe system in alignment, means on said leg for connection thereto of a pipe from the radiator, a nipple tubular throughout its length and mounted within said leg and having an end vertically movable into and out of the passage between the ends of the head of said body to thereby determine the level of discharge of fluid passing downward through said leg and said nipple, said nipple including means operable from external said body for moving the same relative its mounting in said leg.

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