Dec. 29, 1936. R. C. BOLSINGER 2,065,789 WATER CIRCULATING MEANS Original Filed May 23, 1934

FIG. I.

FIG. II.

FIG. III.

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11 Claims. (Cl. 237—59)

This is a continuation of my application Serial No. 727,078 filed May 23, 1934, for Letters Patent of the United States.

This invention relates to systems for circulating hot water to heat radiators, particularly of the one-piece type, to wit, wherein water is delivered to and returned from the radiators through a single main.

It is ordinary practice to allow a space of four feet of the extent of such a single main between the fitting through which the water is delivered to a radiator and the fitting through which the water is returned from that radiator to said main; such spacing being considered essential to secure the required circulation of the water through the radiators.

It is the purpose and effect of my invention to provide a single fitting for each radiator through which the water is supplied to the radiator and returned from the radiator to the single main aforesaid. The advantage of my improved construction and arrangement is two-fold, viz., first, it permits installation of such systems where systems requiring the four feet spacing aforesaid could not be installed; second, it reduces the cost of fittings to the minimum per radiator.

As hereinafter described, the essential feature of my invention is a pipe fitting which is a single casting including a cylindrical body with four openings, each having an internal screw thread of pipe taper, as shown in Figs. II and III. Said body is connected at its opposite ends in coaxial relation with adjoining sections of the main of the system and having a T branch intermediate of its length with a baffle flange extending inwardly therefrom obliquely with respect to the axis of said body and toward the inlet end thereof so as to divert a portion of the water supplied to said fitting outwardly through said T branch to supply a radiator. Said body has in a plane at right angles to the axis of said T branch a V-branch to which the return pipe from said radiator is connected. The axis of that V-branch is inclined with respect to the axis of said body so that the axis of that branch converges toward the axis of the body in the direction of the travel of the water through the body from the main to supply other radiators in the system and with a Venturi effect upon the water from the radiator supplied from the same fitting. That is to say, the flow of the water from the main through said cylindrical body in the direction of the axis of the latter creates a partial vacuum at the junction of the V-branch with said body to induce the flow of return water from said radiator back through said V-branch back into said body and main. A further advantage of the return inlet 7 of the fitting being offset in a plane transverse to the fitting axis, as shown in Fig. II, and being tangential to the outlet 3, as shown in Fig. III, is that it compels the cooler water returning from the radiator to enter the fitting at the bottom thereof, so that it does not interfere with the upward flow of the hot water from the top of the fitting and causes the return water to flow into the main at such an angle to the axis of the fitting as to merge with the stream of water passing through said main 1, not only without causing an eddy, which it would if the inlet 7 were at right angles to the axis of the fitting, but also with a suction effect at said inlet, induced by the flow of the water through said fitting, below said flange 4.

My invention includes the various novel features of construction and arrangement hereinafter more definitely specified.

In said drawing, Fig. I shows a one-piece hot water system embodying my invention in connection with a single radiator.

Fig. II is a side elevation, partly in section, and on a larger scale, showing the fitting indicated in Fig. I.

Fig. III is a diametrical sectional view of said fitting taken on the line b—b.
Y-branch 1 is inclined with respect to the axis of said body 2 so as to converge toward the axis of the body in the direction of the travel of the water through said body to supply other radiators in the system, and a Venturi effect upon the water returning from the radiator through said pipe 3 is thus facilitated. The flow of the return water back through said Y-branch 1 into said body 2 and main I.

Although I have found it convenient to dispose the T branch 3 and Y-branch 1 with their junction planes at right angles to each other; they may be otherwise disposed as may be found convenient.

Moreover, pipe fittings embodying the essential features of my invention as above described may be used in any system of piping in which it is desired to shunt water away from and back to the main in which the cylindrical portion of the body is included. That is to say, I do not desire to restrict the application of my invention to the purpose of directing water to and from a radiator.

Therefore, I do not desire to limit myself to the precise details of construction, arrangement, or method of operation herein set forth, as it is obvious that various modifications may be made therein without departing from the essential features of my invention, as defined in the appended claims.

I claim:

1. In a one-pipe water heating system, the combination with a single main; of a fitting formed of a single casting having a tubular body portion, with axially aligned internal screw threads at respectively opposite ends thereof connected between successive sections of said main and having a laterally projecting outlet branch with an internal screw thread and a baffle member extending inwardly obliquely with respect to the axis of said body portion and toward the inlet end thereof for diverting a portion of the water supplied to said fitting outwardly through said branch; a radiator connected with said branch, by a pipe in direct engagement with the internal screw thread of said branch; another laterally extending branch on said body with its axis tangential to the axis of said first branch and offset with respect to the axis of said body, in a direction away from said outlet branch, and having an internal screw thread and forming an inlet to which said radiator is connected, by a service elbow in direct engagement with the internal screw thread of said inlet, and a straight pipe extending with its axis parallel with said main and horizontally spaced from said main; whereby the return conduit from said radiator may be assembled in a minimum amount of vertical space; the axis of said inlet branch being inclined with respect to the axis of said body so that said axes converge in the direction of the travel of the water through the body; whereby a Venturi effect is had upon the water returning through said inlet to induce the flow of return water from said radiator into said body and main.

2. In a one-pipe water heating system, the combination with a single main; of a fitting formed of a single casting having a tubular body portion, with axially aligned internal screw threads at respectively opposite ends thereof connected between successive sections of said main and having a laterally projecting outlet branch with an internal screw thread and a baffle member extending inwardly obliquely with respect to the axis of said body portion and toward the inlet end thereof for diverting a portion of the water supplied to said fitting outwardly through said branch; a radiator connected with said branch, by a pipe in direct engagement with the internal screw thread of said branch; another laterally extending branch on said body with its axis tangential to the axis of said first branch and offset with respect to the axis of said body, in a direction away from said outlet branch, and having an internal screw thread and forming an inlet to which said radiator is connected, by a service elbow in direct engagement with the internal screw thread of said inlet, and a straight pipe extending with its axis parallel with said main and horizontally spaced from said main; whereby the return conduit from said radiator may be assembled in a minimum amount of vertical space; the axis of said inlet branch being inclined with respect to the axis of said body so that said axes converge in the direction of the travel of the water through the body; whereby a Venturi effect is had upon the water returning through said inlet to induce the flow of return water from said radiator into said body and main.

3. In a one-pipe water heating system, the combination with a single main; of a fitting formed of a single casting having a tubular body portion, with axially aligned internal screw threads at respectively opposite ends thereof connected between successive sections of said main and having a laterally projecting outlet branch with an internal screw thread and a baffle member extending inwardly obliquely with respect to the axis of said body portion and toward the inlet end thereof for diverting a portion of the water supplied to said fitting outwardly through said branch; a radiator connected with said branch, by a pipe in direct engagement with the internal screw thread of said branch; another laterally extending branch on said body with its axis tangential to the axis of said first branch and offset with respect to the axis of said body, in a direction away from said outlet branch, and having an internal screw thread and forming an inlet to which said radiator is connected, by a service elbow in direct engagement with the internal screw thread of said inlet, and a straight pipe extending with its axis parallel with said main and horizontally spaced from said main; whereby the return conduit from said radiator may be assembled in a minimum amount of vertical space; the axis of said inlet branch being inclined with respect to the axis of said body so that said axes converge in the direction of the travel of the water through the body; whereby a Venturi effect is had upon the water returning through said inlet to induce the flow of return water from said radiator into said body and main.

4. In a water circulating system, the combination with a single main for the hot return water; of a fitting formed of a single casting having a tubular body portion with axially aligned internal screw threads at respectively opposite ends thereof connected between successive sections of said main and having a laterally projecting outlet branch with an internal screw thread and a baffle member extending inwardly obliquely with respect to the axis of said body portion and toward the inlet end thereof for diverting a portion of the water supplied to said fitting outwardly through said branch; another laterally extending branch on said body with its axis tangential to the axis of said first branch and offset with respect to the axis of said body, in a direction away from said outlet branch, and with an internal screw thread forming a water inlet; the axis of said inlet branch being inclined...
with respect to the axis of said body so that said axes converge in the direction of the travel of the water through the body; whereby a Venturi effect is had upon the water entering through said inlet to induce the flow thereof into said body and main.

5. In a water circulating system, the combination with a main for the hot and return water; of a fitting formed of a single casting having a tubular body portion with axially aligned internal screw threads at respectively opposite ends thereof connected in said main and having a laterally projecting outlet branch with an internal screw thread; another laterally extending branch on said body having an internal screw thread and forming an inlet; the axis of said inlet branch being tangential to the axis of said outlet branch and offset, in a direction away from said outlet branch, and converged toward the axis of said body at the discharge end of the latter; and a baffle member extending inwardly with respect to the axis of said body between said outlet and inlet and being converged toward the axis of said body at the opposite end of the latter; whereby the formation of an eddy current in the fitting by the return water entering said inlet is prevented and the effective area of the passageway through said body is restricted between said outlet and inlet, with a Venturi effect upon the water entering through said inlet to induce the flow thereof into said body and main.

6. In a water circulating system, the combination with a main; of a fitting formed of a single casting having a tubular body portion with axially aligned internal screw threads at respectively opposite ends thereof connected in said main and having a laterally projecting outlet branch with an internal screw thread; another laterally extending branch on said body with an internal screw thread and forming an inlet; the axis of said inlet branch being tangential to the axis of said outlet branch, transverse to the axis of said outlet branch and obliquely transverse to the axis of the fitting, and offset with respect to the fitting axis in a direction away from said outlet branch; conduit means forming a shunt circuit from said outlet to said inlet, including a straight pipe extending parallel with said main; a baffle member extending inwardly with respect to the axis of said body portion between said outlet and inlet for diverting a portion of the water supplied to said fitting outwardly through said outlet and shunt circuit and back into said inlet, the axis of said body portion in the direction of the travel of the water through said body; whereby a Venturi effect is had upon the water entering through said inlet to induce the flow thereof into said body and main.

8. A pipe fitting formed of a single casting having a tubular body portion with internal screw threads at opposite ends thereof, in coaxial relation; a laterally projecting outlet branch on said body having an internal screw thread; another laterally extending branch on said body having an internal screw thread and forming an inlet; the axis of said inlet branch being tangential to the axis of said outlet branch and offset, in a direction away from said outlet branch, and converged toward the axis of said body at the discharge end of the latter; and a baffle member extending inwardly with respect to the axis of said body between said outlet and inlet and being converged toward the axis of said body at the opposite end of the latter; whereby the formation of an eddy current in the fitting by the return water entering said inlet is prevented and the effective area of the passageway through said body is restricted between said outlet and inlet, with a Venturi effect upon the water entering through said inlet to induce the flow thereof into said body.

9. A pipe fitting for installation of radiators in a single pipe system, by means of straight pipes; consisting of a single casting having a tubular body portion with four openings each having an internal screw thread for engagement with said pipes and other fittings; two of said openings and their threads being axially aligned at opposite ends of said body; the third opening and its thread being in a branch with its axis extending at right angles to the axis of said first two openings; the fourth opening and its thread having its axis at an angle of forty-five degrees to the axis of each of said first two openings, and offset in tangential relation to the axis of said third opening, in a plane transverse to the latter axis and in a direction away from said third opening; whereby the return water entering said fourth opening is directed below the hot water in the upper portion of said fitting and prevented from interfering therewith and the formation of an eddy current in the fitting is prevented.

10. A pipe fitting for installation of radiators in a single pipe system, by means of straight pipes; consisting of a single casting having a tubular body portion with four openings each having an internal screw thread for engagement with said pipes and other fittings; two of said openings and their threads being axially aligned at opposite ends of said body; the third opening and its thread being in a branch with its axis extending at right angles to the axis of said first two openings; the fourth opening and its thread having its axis at an angle of forty-five degrees to the axis of each of said first two openings and in a plane offset with respect to the axis of said first two openings toward the side of said fitting opposite to that of said third opening, and offset in tangential relation to the axis of said third opening, in a plane at right angles to the latter axis; whereby the return water entering said fourth opening is directed below the hot water in the upper portion of said fitting and prevented from interfering therewith and the formation of an eddy current in the fitting is prevented.

11. In water circulating means, the combina-
tion with a radiator having a hot water inlet at one end and a return water outlet at the other end, in coaxial relation; of a supply main extending beneath said radiator with its axis parallel with the common axis of said inlet and outlet; a pipe fitting in said main comprising a single casting having a tubular body portion with four openings each having an internal screw thread; two of said openings and their threads being in coaxial relation at opposite ends of said body; the third opening and its thread being in a branch with its axis extending at right angles to the axis of said first two openings; the fourth opening and its thread having its axis at an angle of forty-five degrees to the axis of each of said first two openings and in a plane offset with respect to the axis of said first two openings toward the side of said fitting opposite to that of said third opening and offset in tangential relation to the axis of said third opening, in a plane at an angle of 90° to the axis of the latter opening; said fitting having a baffle flange extending obliquely inward in said fitting body between said third and fourth openings for deflecting water from said main through said third opening and in a position where it would cooperate with the offset feature of said fourth opening in producing a Venturi effect at said fourth opening for induction of water into said fourth opening by the passage of water through said main; a straight pipe extending substantially vertically from said branch in communication with said radiator inlet; a service elbow connected with said fourth opening of said fitting and having the axis of its outer end extending parallel with said main; a straight pipe extending from said elbow parallel with said main and having an ordinary elbow at the end thereof; and a straight pipe extending from said ordinary elbow in communication with said radiator outlet; whereby hot water may be supplied from said main to said radiator and return water discharged from said radiator and be induced to flow back into said main through said single fitting, below the hot water in said fitting, and interference of the return water with the outflowing hot water and formation of any eddy current in the fitting prevented and the connections between said main and radiator may be assembled in a minimum amount of vertical space.

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