June 30, 1936. C. G. NEWTON 2,045,669

PIPE FITTING

Filed Sept. 14, 1935

Fig. 1

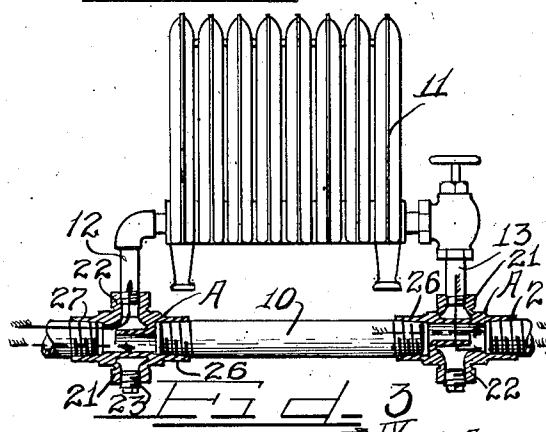


Fig. 2

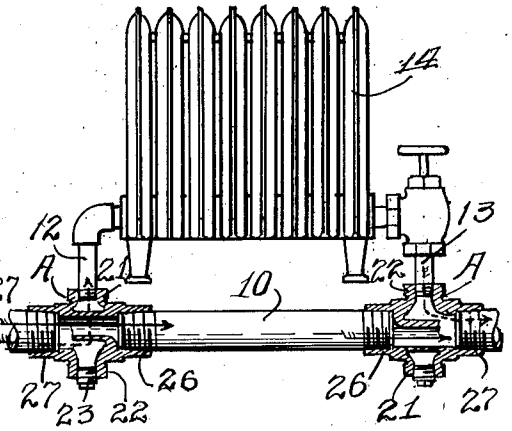


Fig. 3

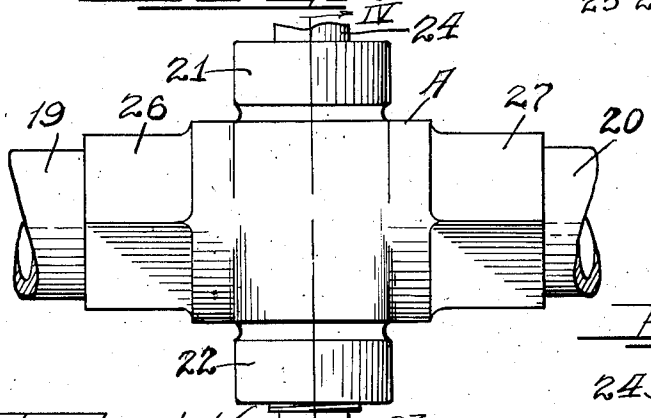


Fig. 4

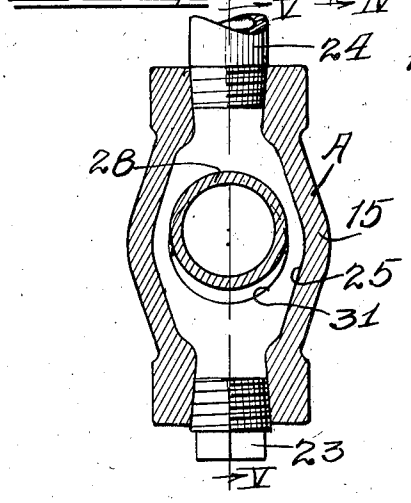
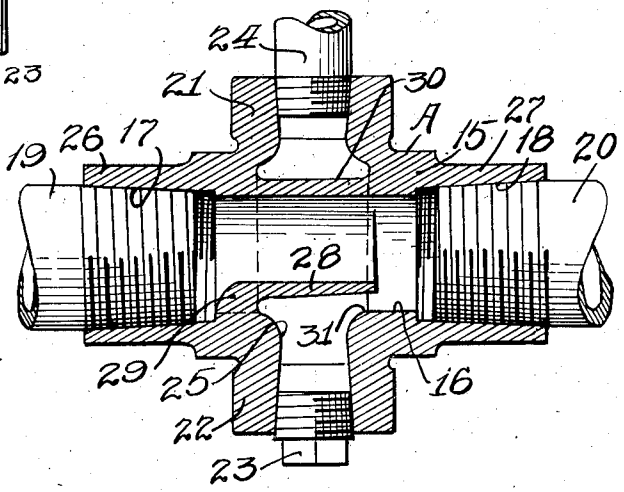


Fig. 5



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2,045,669

PIPE FITTING

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6 Claims. (Cl. 138—37)

The invention described herein relates to a pipe fitting and is more particularly concerned with a novel construction in a fitting to permit its use in a fluid heat transfer system, either heating or cooling, for the purpose of effecting stratified flow of the system fluid.

In the past, in the type of heating system employing a single loop main, wherein each radiator is connected to the main by supply and return risers, it has been the practice to provide a fitting at the respective connections of the risers to the main, which function to automatically shunt a portion of the fluid in the main through the radiators.

These fittings were so arranged that the fluid entering the supply riser of the radiator was taken from the upper part of the main where the fluid in the main would be relatively hotter than the fluid in the bottom of the main. At the return riser the fluid which continued to flow past the supply riser connection would be hotter than that returning from the radiator to the main. The fitting at the return riser was therefore arranged to direct the main fluid at this point to the top of the main and permit the cooler fluid from the radiator to follow its natural tendency to descend to the bottom of the main with less than normal resistance.

While this fitting worked satisfactorily at the supply riser, the construction of the fitting was such that, at the return riser, the fluid returning from the radiator depended upon its natural tendency to descend to the bottom of the main and the returning fluid was not actually forced to the bottom of the main. Consequently, in the prior art arrangements, there was a tendency of the fluid as it returned from the radiator to commingle with the fluid in the main, with the result that there was not an actual stratification of fluid in the main at this point. In view of this manner of operation, the prior art fitting was not adapted for successful operation in connection with cooling systems as well as heating systems.

In the present invention it is the primary object to provide a fitting of such construction that it is adapted without the necessity of mechanical changes for use either in a heating system or cooling system as desired, and when so used will result in a forced stratification of the heating or cooling fluid, as the case may be.

Other objects and features of the invention will more readily appear from the following detailed description taken in connection with the accompanying drawing, which illustrates a single embodiment thereof, and in which:

Figure 1 is a view having portions in section to illustrate the use of fittings embodying the features of the herein described invention in connection with a heating system;

Figure 2 is a similar view showing the use of the fitting in connection with a cooling system;

Figure 3 is an enlarged fragmentary view in elevation of the fitting embodying the features of the present invention;

Figure 4 is an enlarged transverse sectional view through the fitting showing details of its construction; taken substantially on line IV—IV of Figure 3; and

Figure 5 is a longitudinal section through the fitting, taken substantially on line V—V of Figure 4.

As shown on the drawing:

Referring to Figure 1, fittings generally indicated at A and embodying the principles of the present invention are shown as being utilized in a heating system of the type embodying a single loop main, a portion of which is indicated at 10, to which a heat dissipating device such as a radiator 11 is connected by means of a supply riser 12 and a return riser 13.

In Figure 2 the fittings A are disclosed as being incorporated into a cooling system having a similar arrangement for the single loop main and riser connections which in this case would be connected to a device 14 for cooling the surrounding medium rather than heating the surrounding medium as in the case of the radiator 11. Of course, in the portion of the system shown in Figure 1, a heated fluid would be circulated through the main and radiator, whereas in the case of the disclosure in Figure 2, it is contemplated that a cooling fluid would be circulated through the main and cooling device 14. The details of operation of the heating and cooling systems utilizing the fitting A and the operation of the fitting under the two conditions of operation will subsequently be described in more detail.

The fitting A, irrespective of whether it is for use in a heating system or a cooling system, is of the same construction, the only difference being that the connections are made to the fitting in a different manner. From the following description of the fitting, it will be apparent that the fitting of the present invention is so constructed that it may be utilized without mechanical changes in either a heating system or a cooling system, as desired.

Referring to Figures 4 and 5, it will be seen that the fitting A of the present invention embodies a body or shell-like structure 15 which may be of

brass or other suitable metal. The body is cast or otherwise formed to define a main longitudinally disposed passageway 16 which is terminated at its ends to form main openings 17 and 18 which are threaded for connection to pipes 19 and 20.

Intermediate the main connection, the body is formed to define opposed lateral or branch connections 21 and 22 which are internally threaded for receiving either a plug as shown at 23 or a branch pipe connection as shown at 24. The branch connection communicates with an intermediate and transversely extending passageway 25.

The body end portions defining the main openings 17 and 18 are formed as shown at 26 and 27 to provide hexagonally disposed facets to facilitate the application of a wrench or other tool to the fitting.

Inside the fitting, is a tubular baffle 28 which is secured with its longitudinal center line offset relative to the longitudinal center line between the main openings 17 and 18, so that the tubular portion 28 is eccentric relative to the main passageway 16.

Tubular portion 28 is secured at one end throughout its entire periphery as shown at 29 so as to form an integral construction with the body of the fitting. The tubular portion 28 is also secured or is integrally formed with the fitting body along its uppermost peripheral portion as shown in Figure 5 so as to form a tubular baffle as shown at 30, which baffle extends across the branch connection 21.

It will also be noted that the tubular member 28 extends entirely across the transverse passageway 25 and that since the tubular member is eccentrically disposed, the unsecured portion of the right end of this tubular member, as viewed in Figure 5, will be spaced above the lower surface of the main passage to provide an arcuate opening 31 for communication between the transverse passageway and the main passageway.

In the use of the fittings in a heating system, the fittings are connected in the main and to the supply any return risers of the radiator as shown in Figure 1. At the supply riser 12, the riser is connected to the branch connection 22 and the plug 23 is in the branch connection 21. The end 27 of the fitting forms the inlet and the end 26 the outlet.

At the return riser, the return 13 is in this case connected to the branch connection 21 and the plug 23 is in the branch connection 22. The main inlet connection is made to the end 26 of the fitting and the main outlet connection to the end 27 of the fitting.

With the connections as just described, it will be apparent that the tubular portion 28 at the supply riser is disposed toward the bottom portion of the main, whereas in the case of the return riser 13 the tubular portion 28 is disposed toward the uppermost portion of the main.

Let it now be considered that a heated fluid is to flow through the single main loop of the heating system, the heated fluid will assume a natural position in the main so that the hottest portion of the fluid is in the top of the main and the coolest portion of the fluid is in the lowermost portion of the main. Consequently, it is desirable to take the hottest portion of the fluid in the main and supply it to the radiator 11. In this case the path of the hottest portion of the fluid is indicated by a solid arrow, and the coolest portion of the fluid is indicated by a dotted arrow. The coolest portion of the fluid will be passed through the tubular portion 28 of the fitting as indicated and by the radiator without going through the same. At the return riser, the fluid returning from the radiator will be cooler than that which is continuing through the main past the radiator, and consequently the cooler fluid from the radiator should be passed to the lowermost portion of the main. This is accomplished at this point by having the eccentrically disposed tubular portion in the uppermost portion of the main. It will therefore be seen that with the fitting just described and as used in a heating system, there will be a forced stratification of the heated fluid, and at the return riser, the fluid returning from the radiator will be returned to the main so that this fluid and the fluid in the main will have parallel flow paths and the flow will be streamlined rather than turbulent.

In the case of a cooling system it will of course be apparent that instead of taking the hottest portion of the fluid in the main, the coldest portion of the fluid should be forced through the cooling device 14. In order to provide for such operation, the fitting A at the supply riser 12, as shown in Figure 2, is connected so that the end 27 forms the inlet and the end 26 the main outlet of the fitting. The riser 12 is connected to branch connections 21 and the plug 23 is inserted in the connection 22.

At the return riser, the end 26 of the fitting forms the main inlet and the end 27 the main outlet. The return riser 13 is connected to the branch connection 22 and the plug 23 is inserted in the branch connection 21.

Considering the cooling fluid to be flowing from left to right in the main, as shown in Figure 2, the coolest portion of the fluid will likewise be at the bottom of the main. With the fitting and the supply riser connected as described and shown in Figure 2, the eccentric tubular portion 28 is disposed in the upper portion of the main so that the coolest portion of the fluid as shown by the arrow in dotted lines will be passed through the cooling device 14. Since this fluid after passing through the cooling device will be warmer than the fluid which is passing on through the main, it is desirable to put this fluid back into the upper portion of the main rather than in the lower portion as in the case of the return from a radiator of a heating system.

At the return riser 13 of the cooling device 14, the fitting A is connected so that the tubular eccentrically disposed member is at the lowermost portion of the main, whereby the fluid shunting the cooling device will be passed on at the lower portion of the main and the return fluid from the cooling device will be forced into the upper portion of the main as shown by the arrow in dotted lines. It will therefore be seen that stratification of the relatively warmer and cooler fluids will be accomplished at the return riser 13 and that these fluids will have parallel flow paths, and that the flow will be streamlined instead of turbulent.

From the foregoing description, it will be apparent that this invention provides a novel construction of pipe fitting which may be utilized in connection with either a heating or cooling system, and which will provide stratification of the relatively warmer and cooler fluids, whereby the fluids will be forced into the main so that the warmer fluids are uppermost and the cooler fluids are lowermost in the main, and that these fluids will flow in parallel paths and that this flow will be streamlined and not turbulent. Moreover, this

fitting may be used in either a heating or cooling system without in any way having to change its mechanical construction.

Now, it is of course to be understood that although I have described in detail a single embodiment of my invention, the invention is not to be thus limited but only insofar as defined by the scope and spirit of the appended claims.

I claim as my invention:

1. A pipe fitting comprising a body structure defining opposed main openings each arranged for connection to a pipe, and an intermediate chamber having a branch connection communicating therewith, a tube eccentrically disposed relative to said main openings and communicating at one end with one of the main openings and extending thru the intermediate chamber towards the other main opening, the other end of said tube being secured along a portion of its periphery to the body adjacent the branch connection and free relative to the remainder of its periphery.

2. A pipe fitting including a body having a passage therethrough with an opening arranged for connection with a pipe at each end thereof, said body also having an angularly disposed branch connection therein communicating with said passage, and a tubular baffle disposed in the passage with its longitudinal center line parallel to the longitudinal center line of said passage, said baffle being secured entirely around one end to the body adjacent one of said openings and at its other end at a point adjacent the branch connection, the latter end being spaced from the interior surface of the passage at a point opposite its point of securement to provide communication between the other opening and the branch connection.

3. A pipe fitting including a body having a passage therethrough with an opening arranged for connection with a pipe at each end thereof, said body also having opposed intermediate branch connections at an angle to the passage, a tubular baffle disposed between the branch connections arranged to provide communication therethrough from one of the openings to the other of the openings, direct communication from one of the branch connections to the other of said openings and communication from the other branch connection around the baffle to the other of said openings.

4. A pipe fitting including a body having a passage therethough with an opening arranged for connection with a pipe at each end thereof, said body also having opposed branch connections disposed at an angle to the passage, and a baffle in the passage arranged to provide unobstructed communication between one of the openings and the other of the openings, and direct or indirect communication between a branch connection and the other of said openings, depending upon the branch connection selected.

5. A pipe fitting comprising a body structure defining opposed main openings each arranged for connection to a pipe and an interconnecting chamber having a branch connection opening thereinto, and a tube in said chamber of smaller diameter than said chamber, said tube having one end integrally formed with said body at one of said main openings and extending towards the other main opening past the entrance opening of the branch connection, the wall of the tube adjacent the entrance opening of the branch connection being coincident with the wall of said chamber.

6. A pipe fitting comprising a body structure defining a main passageway terminating in opposed openings each arranged for connection to a pipe, and an intermediate chamber having a branch connection communicating therewith, and a tube disposed in the passageway defining a baffle extending through the intermediate chamber, said tube being secured entirely around one end to the body adjacent one of said openings, the other end of the tube being smaller than the passageway and secured to the wall thereof at a point adjacent the branch opening, whereby communication is established between the intermediate chamber and the passageway on the side of the tube opposite the branch connection, the flow axis of said communication being substantially parallel to the flow axis of the passageway.

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