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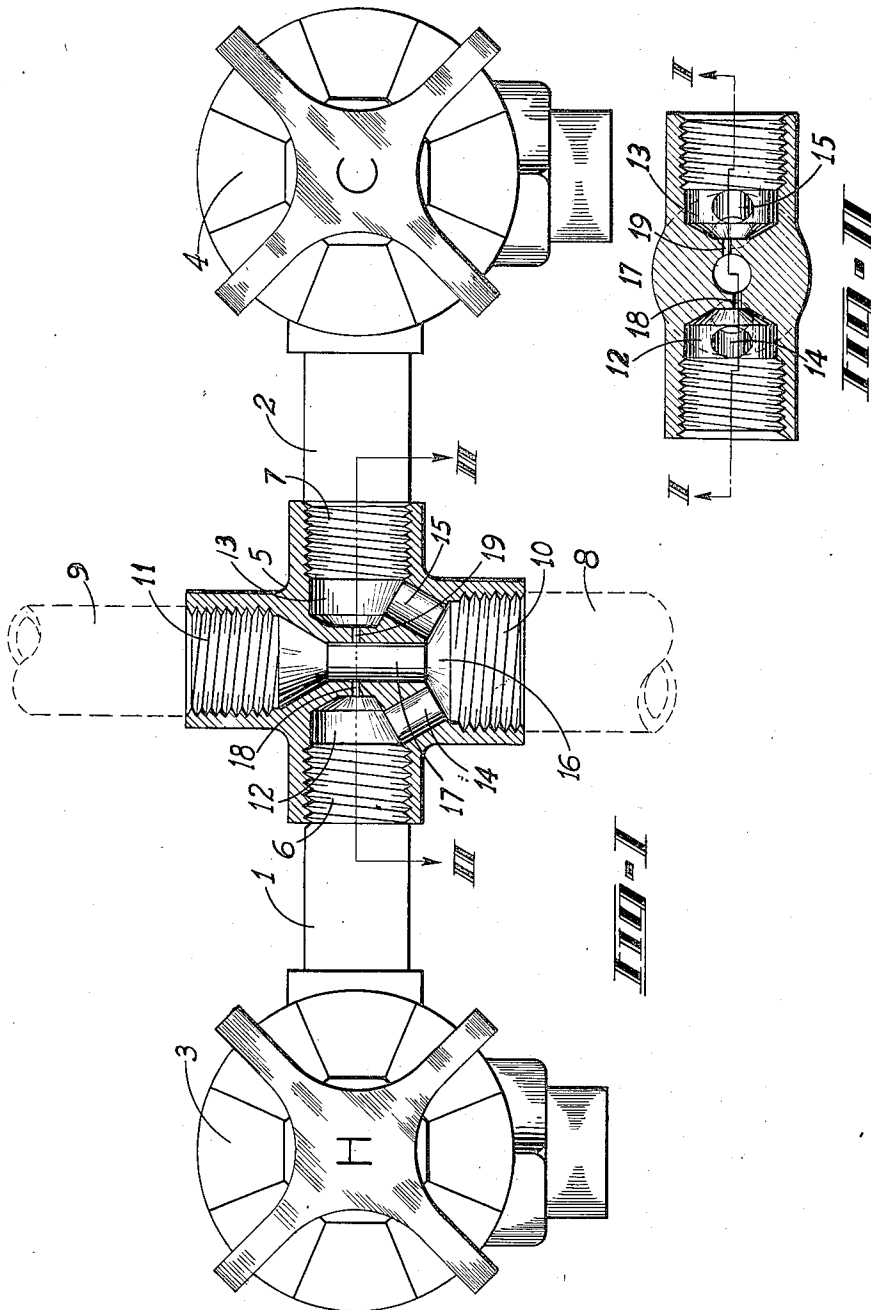
F. G. BROTZ

2,297,533

CROSS TEE CONNECTIONS

Filed July 11, 1940

2 Sheets-Sheet 1



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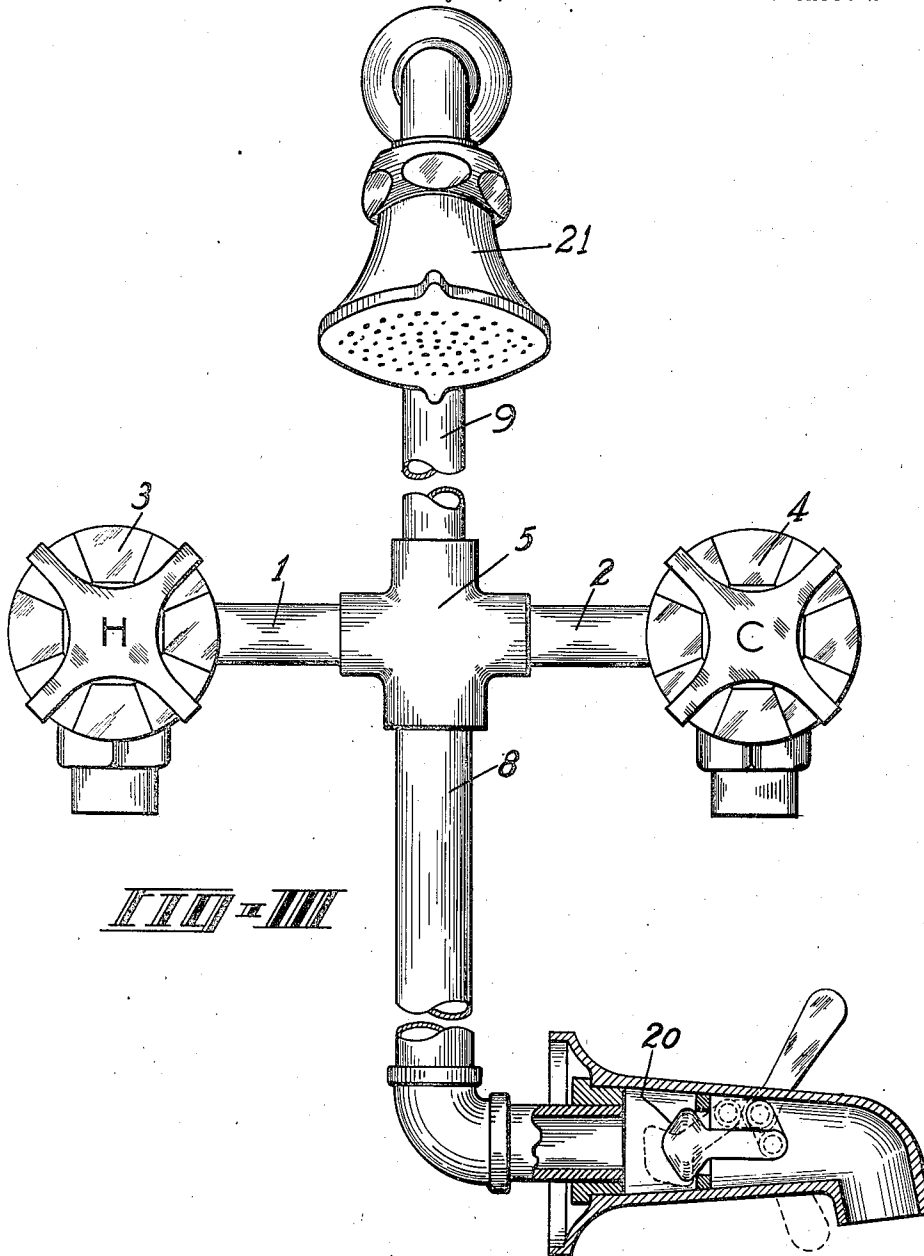
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CROSS T CONNECTION

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2 Claims. (Cl. 285—210)

My invention relates to improvements in cross T connections of the type comprising a pair of inlet connections and a pair of outlet connections, and it is the object of my invention to provide such a cross T connection wherein the fluid will normally be discharged wholly through one of said outlet connections but may be diverted to be discharged wholly through the other of said outlet connections.

With the foregoing and related objects in view, the invention consists in the construction illustrated in the accompanying drawings, in which Figure 1 is a side view, partly in section, showing the T connection in a typical installation; Figure 2, a sectional view thereof taken along the lines 2—2 of Figure 1; and Figure 3, a view showing the T installed in connection with a bath tub and shower.

The device is particularly adapted to use in connection with plumbing installations of a type adapted to supply water alternatively to a bath tub or to shower head, and will be described with particular reference to such use.

In the drawings, the numeral 1 indicates a fluid supply pipe, which may be the hot water supply pipe to an installation such as above described, and the numeral 2, a cold water supply pipe thereto. The flow of fluid through said pipes may be controlled, respectively, by valves 3 and 4.

The inlet pipe 1 has threaded connection at 6 to the T connection, indicated generally by the numeral 5, and the inlet pipe 2 is similarly connected at 7.

A pair of outlet or discharge pipes 8 and 9 are similarly connected at 10 and 11, oppositely disposed to each other and at substantially right angles to said inlet pipes, the whole forming a T or cruciform connection. In use the outlet pipe 8 may be connected to a spout discharging into a bath tub and the pipe 9 may be connected to a shower head, the pipe 8 or spout attached thereto being provided with some type of valve adapted to be regulated to obstruct the flow of fluid therethrough when desired and to cause it to flow through pipe 9. A suitable type of valve is that illustrated in Figure 3 and designated by the numeral 20.

The inlet pipe 1 discharges into a chamber 12 formed in the T connection opposite the extremity of said pipe and the inlet pipe 2 discharges into a similar chamber 13 oppositely disposed to the chamber 12. A jet or passageway 14 connects the chamber 12 with the chamber 16 in the outlet pipe 8 and chamber 13 is similarly connected with a jet 15. A passageway 17

provides communication between the chamber 15 and the pipe 9.

It will be noted that the jets 14 and 15 are disposed at an acute angle to the longitudinal axis of the chambers 12 and 13 and also to the pipe 8 and chamber 16, while passageway 17 is disposed substantially parallel thereto.

The passageways 14 and 15 may, if desired, be positioned to discharge parallel to the longitudinal axis of the pipe 8, it being necessary only that the angle of incidence of the discharge therefrom be less than a right angle with respect to such longitudinal axis and that the direction of the discharge be substantially opposed to the direction of discharge of passageway 17.

It will also be noted, particularly from Figure 2, that the cross-sectional area of the jets 14 and 15 is considerably less than the cross-sectional area of the corresponding chambers 12 and 13. Thus, when fluid enters the chambers a pressure is built up and the fluid is discharged under pressure through the jets. This results in fluid being discharged from the jets with considerable velocity and, the direction of the discharge being opposed to the direction of discharge of the passageway 17, the fluid tends to be discharged through pipe 8, its velocity and the pressure of the fluid behind it preventing a flow through passageway 17 and pipe 9.

It will thus be apparent that, by a correct proportioning of the cross-sectional areas of the jets to the area of the chambers, a condition may be obtained whereby all the fluid will be discharged through the chamber 16 and outlet pipe 8 and none will flow through or enter the pipe 9 so long as the outlet pipe 8 is unrestricted by the closing of valve 20.

It will also be apparent that in case the passageway through the outlet pipe 8 is closed, by means of valve 20, the pressure will then build up in that pipe and cause the fluid to flow through passageway 17 and outlet pipe 9.

It will thus be seen that fluid may be diverted at will to flow either through outlet pipe 8 or outlet pipe 9 merely by providing a suitable valve in outlet pipe 8. In the installation previously mentioned, where a shower head 21 is attached to a pipe 9 and a spout to pipe 8, no fluid will issue from the shower head so long as the spout and pipe 8 remain open, but the discharge may be entirely diverted to pass through pipe 9 and the shower head merely by preventing the discharge through pipe 8.

With the construction thus far described there is a tendency for air to become entrained in the

fluid passing downwardly, thus setting up an aspirating outlet pipe 9. This is not only wholly incidental to the action but actually interferes therewith as it not only results in turbulence and increased noise but, due to the fact that the discharge through the pipe 8 is mixed fluid and air, the efficiency of the discharge is impaired and the rate of discharge of the fluid is lessened.

This difficulty is obviated by drilling a small passageway between the chamber 12 and the passageway 17, substantially parallel to the longitudinal axis of the former and at substantially right angles to the longitudinal axis of the latter, and a similar passageway 19 between the chamber 13 and the passageway 17.

The passageways 18 and 19 are of a cross-sectional area substantially smaller than the jets 14 and 15 and are so proportioned thereto that the discharge of fluid therethrough is just sufficient to keep the passageway 17 filled with fluid, thus preventing an aspirating action and preventing air from entering the chamber 16 or the outlet pipe 8 and enabling a more rapid discharge of fluid therethrough. It is desirable that the passageways 18 and 19 be somewhat offset, as illustrated in Figure 2, so that the discharges therefrom do not meet and cause a turbulence but rather a whirling or vortical action is created.

It will be obvious that many changes may be made in the specific construction illustrated and described without the exercise of invention; therefore I do not limit myself to such details, but claim all constructions within the scope of the appended claims.

I claim:

1. A cross T comprising, in combination, a pair of oppositely disposed inlet pipes, a pair of oppositely disposed outlet pipes, discharge passageways connecting said inlet pipes and one of said outlet pipes and disposed to discharge into said outlet pipe at an angle less than a right angle with respect to the longitudinal axis of said outlet pipe, a valve adapted to control the flow through said outlet pipe, and a passageway providing communication between said outlet pipe and the other of said outlet pipes and disposed substantially parallel to the longitudinal axis of said outlet pipe.

2. A cross T comprising, in combination, a pair of inlet pipes, a pair of outlet pipes, discharge passageways of substantially smaller cross-sectional area than said inlet pipes connecting said inlet pipes and one of said outlet pipes and disposed to discharge into said outlet pipe at an angle less than a right angle with respect to the longitudinal axis thereof, a valve positioned in said outlet pipe and adapted to control the flow therethrough, a passageway providing communication between said outlet pipes and disposed to discharge in a direction substantially opposed to the direction of discharge of said connecting passageways and passageways of substantially smaller cross-sectional area than said connecting passageways extending between said connecting passageways and said communicating passageway.

FRANK G. BROTZ.