

type of trap will blow steam out through the vent while filling, if the pressure on the inlet side is sufficient, and should not be used, therefore, with such pressures unless the vent is properly piped back into the return

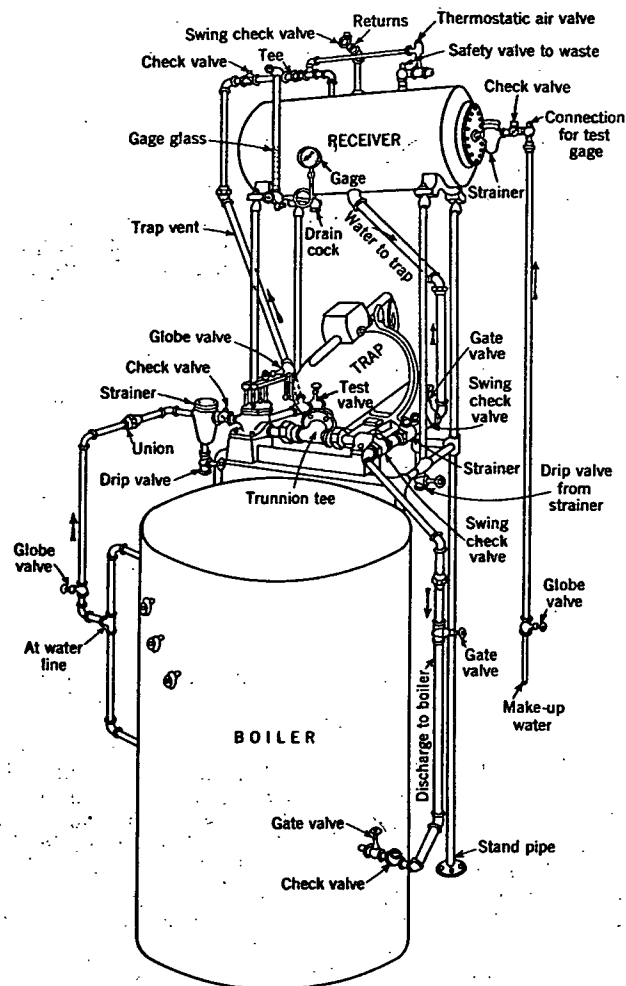


FIG. 22. RETURN TRAP AND RECEIVER FOR AUTOMATIC BOILER FEED

to a feed water heater, a condenser or a perforated pipe in the bottom of the receiver to which the trap discharges in such a way as to prevent the escape of the steam that comes in with the condensate and passes through the vent. In the three-valve traps of this type there is an extra

valve for closing the discharge while the trap is filling with condensate. High pressure traps should not discharge directly into a vacuum return because of the vapor formed by the re-evaporation of a part of the hot condensation. Fig. 21 shows a method which may be used for disposing of the greater part of the vapor of re-evaporation. An expansion chamber often is installed between the high- and low-pressure traps.

Automatic Return Traps

In the general heating plant, where thermostatic traps are installed on the heating units, it becomes necessary to provide a means for returning the water of condensation to the boiler, if a condensation or vacuum pump is not used. When the return main can be kept sufficiently high above the boiler water line for all operating conditions, the water of condensation will flow back by gravity, and no mechanical device is required. But actually this does not work out in practice. It follows, therefore, that a direct return trap is needed for the handling of the condensation even though it may not be called into action except under some operating condition where the pressure differential exceeds the static head provided. The installation of a direct return trap assures safety for such systems, and guarantees the operation of the plant under varying conditions.

Automatic return traps, sometimes called alternating receivers, may be of the counter-balanced, tilting type, or spring actuated. These consist of a small receiver with an internal float, and when the condensate will not flow into the boiler under pressure, it will feed into the receiver of the trap, and in so doing, raise or tilt the float or mechanism which actuates a steam valve automatically. This admits steam to the receiver, at boiler pressure, and the equalizing of the pressures which follows allows the water to flow into the boiler. Fig. 22 shows a direct return tilting trap and receiver properly connected for automatically feeding a boiler from a system of returns delivering the condensate to the receiver.

PROBLEMS IN PRACTICE

1 • What is meant by water line difference in a gravity steam heating system?

The water line difference is the distance between the level of the water in the dry or wet return and the boiler water line. This difference is equivalent to the pressure required to overcome the maximum drop in the system and the operating pressure of the boiler.

2 • How many types of common mechanical returns are there and what are they?

Three: (1) the mechanical return trap, (2) the condensation return pump, and (3) the vacuum pump.

3 • In the ordinary vacuum system of steam heating, where does the vacuum usually exist?

On the return side of the system only, between the radiator trap and the vacuum pump. If the radiator supply valve is closed off, the vacuum may extend back through the radiator as far as the supply valve; if an inadequate supply of steam is furnished to the system, some vacuum may be developed in the steam main, but neither of these can be termed *normal operation*.