

boiler. The venting and condensing arrangements referred to above are also shown.

Fig. 8 shows a direct return trap and receiver properly connected for automatically feeding a boiler from a system of returns delivering the condensate to the receiver.

Oil traps are used for draining the oil and condensate from oil separators, muffler tanks, etc., and are usually of the float type.

Air traps are used for relieving the air from steam heating systems, hot water heating systems, domestic hot water systems, etc. For steam heating systems where air and water are to be passed and steam retained they are of the thermostatic type. Where air is to be passed and steam and water retained they are of the combination thermostatic and float type. For water systems where air is to be passed and water retained they are of the float type.

Alternating receiver type traps are used for returning the condensate to boilers or for lifting condensate from a lower to a higher level. They are generally of the two-valve type with one valve in the steam supply and one valve in the vent. The action of the float opens the vent and closes the steam supply while the trap is filling by gravity and closes the vent and opens the steam supply while the trap is discharging. The steam from the vent may be connected back into the return system to the trap to prevent the waste of heat. This type of trap requires a swinging check on each side to prevent the backing up of the discharge from the return system while the trap is discharging or into the trap while it is filling. The air is vented from the system, either through the vent of the trap to the atmosphere, or where this vent is connected back into the returns the air is vented separately from the trap vent through a thermostatic air trap.

CHAPTER 20

PIPING FOR STEAM HEATING SYSTEMS

Description of Systems; Allowance for Various Conditions; Pipe Size Tables; Details of Connections.

THE methods of selecting pipe sizes for steam heating systems presented in this chapter have been developed through the cooperative efforts of the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS and the *Heating and Piping Contractors National Association*. As a result of the extensive research investigations, engineers, architects and heating contractors may now design piping systems with a degree of accuracy that was heretofore impossible.

DEFINITIONS

Equivalent radiation means the equivalent capacity of heat-emitting units in terms of the standard capacity of cast iron radiation. (240 B.t.u. per square foot).

Piping systems for steam heating are broadly classified as one-pipe, two-pipe, vapor and vacuum systems. With any of them the condensation may be returned to the boiler by gravity or by mechanical devices.

A few of the terms used in describing these systems are defined as follows:

Gravity systems shall be defined as those in which the water of condensation is returned to the boiler by gravity.

Vacuum return line systems shall be defined as those which operate with the pressure at or above atmospheric in the steam lines and radiators, and with a vacuum in the return lines.

Differential vacuum systems shall be defined as those which operate with a fixed differential between the radiation and the return line, and with steam supplied to the radiation at pressures below or above atmosphere.

Vapor systems shall be defined as two-pipe systems which are controlled to operate below 2 lb. gage and which employ radiator supply valves and traps for steam regulation and a boiler protective device for water line control.

Supply mains shall be defined as the pipes through which the steam flows from the boiler or source of supply to the run-outs and risers leading to the heat-emitting units.

Return mains shall be defined as the pipes which carry condensate from the return risers and heat-emitting units to the boiler return header or to the mechanical device which delivers the condensate to the boiler.

Dry returns shall be defined as those returns which are above the water line in the boiler or above an elevation at which the pressure in the boiler