

control is installed whether this be of pneumatic, electric, or the self-contained radiator valve type. By operating the different zones to parallel outside temperature requirements, a large part of the load is taken off the thermostatic controls, they make fewer operations and the radiator follows a more even temperature instead of fluctuating from extreme hot to extreme cold.

CONDENSATION RETURN PUMPS

Condensation return pumps are generally required when the elevation of the boiler with respect to the heating units is such that the condensate will not return by gravity, or when the boiler pressure is greater than that

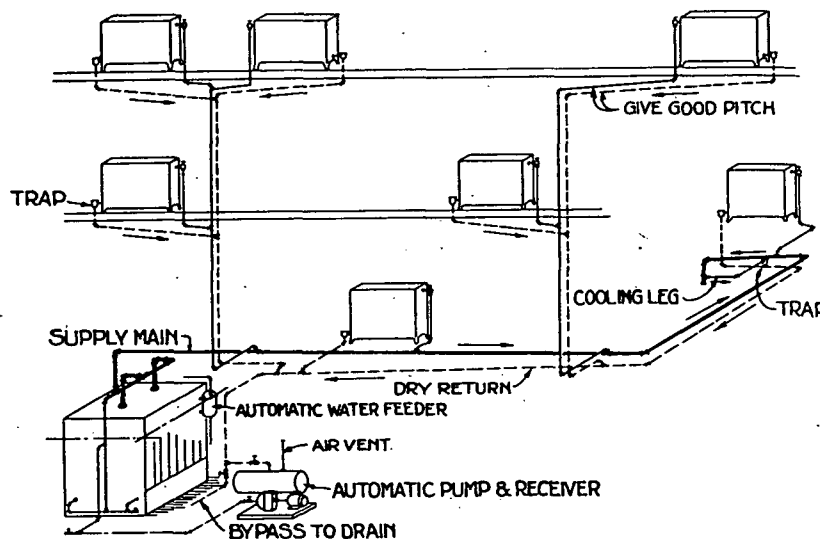


FIG. 19. TYPICAL INSTALLATION USING CONDENSATION PUMP

supplied the heating units, as in a high-pressure boiler installation supplying steam through a reducing valve to the heating units. The condensate is commonly returned by gravity to a receiver, vented to the atmosphere, from which it flows to the pump.

Condensation return pumps are assembled with tank or receiver and arranged for either continuous operation or for automatic starting and stopping by float control. Any style of water pump may be employed for this service, the power available determining whether the mode of drive shall be steam or electric. The motor-driven, automatic, centrifugal pump and receiver has found wide acceptance in practice for low pressure heating systems.

Fig. 19 shows a typical installation using an automatic condensation return pump and vented receiver. A float control operates the pump whenever sufficient water accumulates. Condensation return pumps are

suitable for use on systems in which the returns are under atmospheric pressure. These include atmospheric systems, orifice systems with open returns, and certain types of vapor systems which operate within a few ounces of atmospheric pressure, but ordinarily do not carry any sub-atmospheric pressure. They may also be used on one-pipe and two-pipe gravity steam systems with a proper arrangement for venting the receiver. In discharging to waste, there is no object in using a condensation pump unless the discharge must be elevated.

VACUUM PUMPS

A vacuum heating pump is employed to create a vacuum on the return end of a system to remove air and water and to return the condensate to the boiler or to some other intercepting device that may be employed in plants having mixed systems of heating and other services. Pumps of this classification may be driven by steam or electricity; they may be continuous in operation, or automatic with float or vacuum control in one or more combinations.

Return line vacuum pumps are classified as follows:

- a. Those which perform the function of air separation under atmospheric pressure.
- b. Those which perform the function of air separation under a partial vacuum.

Pumps coming under the first classification will handle vacuum steam system condensation coming back by gravity at any temperature up to 205 F without either the sealing or the hurling water flashing into steam. These pumps, to operate under a combined water level and vacuum control, must be equipped with a float-control receiver between the vacuum pump and the system, but where they are intended for continuous operation, they do not require a receiver. Such pumps employ a single vacuum producer which removes the condensate and air from the system and delivers it into a separating chamber under atmospheric pressure from which the condensate is delivered to the boiler or feed water heater. They are constructed on one of the following evacuating and discharge principles:

1. Hydraulic vacuum producer with one pump impeller.
2. Hydraulic vacuum producer with two pump impellers.
3. Water displacement vacuum producer with two pump impellers.
4. Piston displacement vacuum producer with one pump piston.

The second classification of pumps will handle vacuum steam system condensation coming back by gravity at any temperature not exceeding 190 F without the flashing into steam of either the sealing or the hurling water. In order to operate under a combined water-level and vacuum control, these pumps must be equipped with a float-control receiver between the vacuum pump and the system; where intended for continuous operation they do not require a receiver. Such pumps employ a vacuum producing impeller which removes air from the receiver or heating system under a partial vacuum and delivers it through an air separator against atmospheric pressure. The condensate is removed from the receiver under a partial vacuum by a separate impeller and is delivered to the boiler or feed water heater. For evacuating and dis-