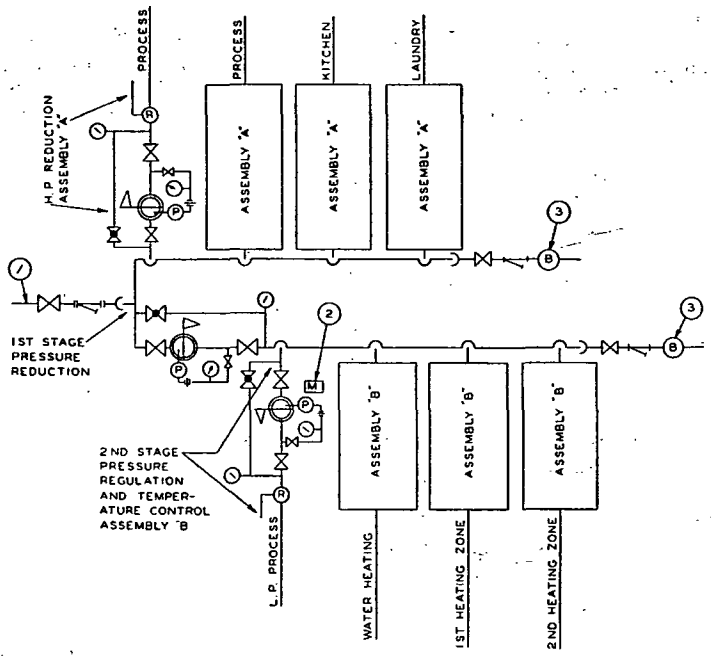
means of suitable traps and air vents in order to obtain rapid circulation and quick heating. This is particularly important with intermittent-type temperature-control equipment. The selection of traps is discussed in Chapter 20. Suggested trap capacities are given in Table 4 of this Chapter. To obtain efficient and economical operation of any system it is imperative that all traps be properly maintained. In a system supplied with district steam any leakage through traps may prevent air removal from the



1. Service Pipe from District Steam Main
2. Motorized Pilot on Pressure-Regulating Valve
3. Bucket Trap on Header Drip Line

NOTE: Where process equipment is individually controlled, temperature control on header may be omitted. All fittings should be American Standard Class 250 cast iron or 300 lb steel in both reduction and regulation assemblies.

FIG. 4. STEAM SUPPLY INSTALLATION WITH HEADER FOR PROCESS AND ZONE CONNECTIONS

system and otherwise impair its operation. Further more, such steam must be condensed and its condensate cooled before being discharged to sewer. This represents a direct waste of steam.

Provision should be made for conveniently shutting off the steam supply at night and at other times when heat is not needed. A considerable amount of heat can be saved by shutting off steam at night and other times when optimum building temperatures are not required.[20] Equipment is available which will automatically shut heat off at night for varying lengths of time, depending upon outside temperature.[21]

Residual heat in the condensate should be salvaged. This heat may be

TABLE 4. SUGGESTED CAPACITY OF PRESSURE-REGULATING VALVES AND TRAPS

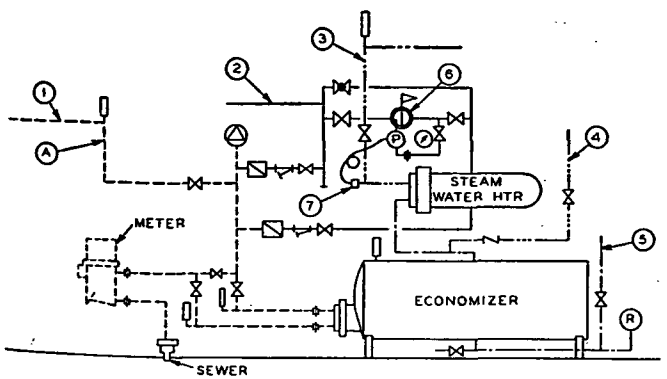
TYPE OF CONTROL	PRESSURE-REGULATING VALVE CAPACITY, LB/(HR) (SQ FT OF RADIATION[a])	TRAP CAPACITY, LB/(HR) (SQ FT OF PIPE AND RADIATION[a])
Continuous or modulating operation, intermittent with *on* periods over 3 hr in duration	⅛	⅛
Intermittent operation with *on* periods of ½ to 3 hr in duration	½	⅛
Intermittent operation with *on* periods of ½ hr or less	½[c]	½[b]

[a] Square Feet EDR.
[b] Except for drip traps on mains which should be 1 lb per sq ft EDR.
[c] Except for 1 pipe systems or 2 pipe systems not orificed which should be 1 lb per sq ft EDR.

salvaged by means of an air-cooling coil, or as is more frequently done, by a water-heating economizer, shown in Fig. 5, which preheats the hot water supply to the building.[22]

The condensate from the heating system, after leaving the traps, passes through the economizer. The water supply to the heater passes through the economizer, absorbing heat from the condensate. If the hot-water system in the building is of the recirculating type, the recirculating line should be connected *between* the economizer and the water heater proper, not at the economizer inlet, because the recirculated hot water is itself at a high temperature.

Since the heating-system load and the hot-water demand are not coincident a greater amount of heat can be extracted from the condensate if storage capacity is provided for the preheated water. Frequently, therefore, the economizer coils are submerged in a storage tank. Where condensate is pumped, the pump should discharge into a receiving tank



1. Main return line from gravity heating system with all returns properly trapped or pump discharge from vacuum system. With vacuum system a receiving tank with thermostatic vent should be provided at Point A.
2. Steam Supply to Water Heater
3. Hot Water Supply to Building
4. Recirculating Line
5. City Water Line
6. Pressure-Regulator Temperature Control Assembly With Bypass
7. Thermostat Bulb and Tubing

FIG. 5. METHOD OF INSTALLING A WATER HEATER AND ECONOMIZER IN A GRAVITY HEATING SYSTEM