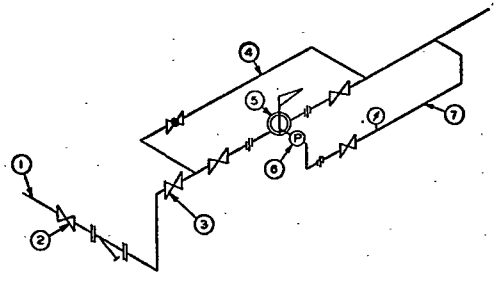
and Fig. 3 for high-pressure service. The district-heating industry refers to valves according to their functional use. The pressure-reducing valve reduces pressure to a safe point, and the pressure-regulating valve regulates pressures to that required by equipment served. Fig. 2 illustrates the use of a pressure-regulating valve with a bypass such as generally provided for larger installations. This bypass permits the operation of the system in case of failure in the pressure-regulating valve. In the smaller sizes, the bypass is usually omitted. When servicing is required, the pressure-regulating valve can be removed, a filler installed, and the gate valves used for manual regulation of the pressure until repairs are made. In Assembly A, Fig. 4, the single-stage pressure-reducing valve is also the pressure-regulating valve.

Fig. 3 shows a typical installation where the pressure in the district-steam main exceeds 50 psig, which pressure is usually higher than can



1. Service Pipe From District Steam Main
2. Service Valve
3. Operating Valve
4. By-pass, One Size Smaller Than Pressure-Regulating Valve.
5. Pressure-Regulating Valve
6. Pilot
7. Balance Line to Connect Into Steam Main Not Less Than 10 ft From Pressure Regulating Valve

FIG. 2. PRESSURE-REGULATING VALVE WITH BYPASS FOR LOW PRESSURE SERVICE

safely be applied to building heating systems, because much heating equipment is not intended to withstand more than 15 psig. The first or pressure-reducing valve effects the initial pressure reduction. The pressure-regulating valve controls the steam at the desired pressure.

When the steam pressure from a district steam system is greater than the safe working pressures of the steam-using equipment, a safety relief valve or valves on the low-pressure side of a reducing valve or valves should be installed. They should be of sufficient capacity and should be set to relieve the entire output of the reducing valves in the event pressure on the equipment exceeds the low-pressure setting by 10 per cent or more. The outlet from relief valves should be piped to a location where the discharge to atmosphere cannot jeopardize persons or property.[17] (See Figs. 3 and 4.)

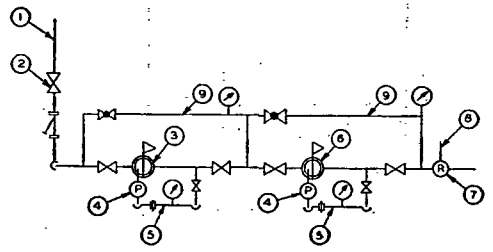
It is often advisable to install a separate pressure-regulating valve for each steam use in the building such as for water heating, building heating, and cooking, so that each system may operate at the optimum pressure.

Pressure-reducing valves are more fully described in Chapter 20. For use with district heating, *dead-end* type valves of the pilot-operated type are generally preferred where applicable. Pressure-regulating valves should be sized to supply adequately the maximum steam requirements of the heating system or equipment. This is especially important with

temperature control systems using intermittent flow of steam to heat the building. Pressure-regulating valve capacities recommended for use with various types of temperature control are shown in Table 4. However, in questionable cases, manufacturer's recommendations should be followed for the particular installation.

Certain types of pilot-operated pressure-regulating valves can be used as a temperature control valve in some temperature control applications, by actuating the pilot through operation of an electric damper motor or small motorized valve.[18]

Zoning. Where the hours of occupancy or heating loads differ in various sections of the building, it is good practice to install separate supply lines



1. Service Pipe From District Steam Main
2. Service Valve
3. Pressure-Reducing Valve
4. Pilot
5. Balance Line
6. Pressure-Regulating Valve
7. Safety Relief Valve
8. Relief Valve Discharge to Outside
9. By-pass, One Size Smaller Than Pressure-Reducing Valve

Note: All fittings should be American Standard Class 250 cast iron and/or 300 lb steel.

FIG. 3. TWO-STAGE PRESSURE-REDUCING AND PRESSURE-REGULATING EQUIPMENT (*Used Where High-Pressure Steam is Supplied for Low-Pressure Requirements*).

to the different sections. For example, in an office building with first floor stores or restaurants open in the evening, a separate main supplying the first floor will permit the steam to be shut off from the remainder of the building in the late afternoon. The division of the building into zones, each with a separately-controlled heat supply, is sometimes desirable, as it permits the heat to be adjusted according to variations in sunshine and wind. It is desirable, also, to provide separate lines for water heating and for various cooking or process appliances. In order that zones may operate at the optimum pressure, it is often advisable to install a separate pressure-regulating valve for each.

Fig. 4 shows a typical service installation with a separate line to the various heating zones and process equipment. If the initial pressure is below 50 psig the first stage pressure-reducing valve may be omitted.

The heat supply should be graduated according to variations in the outside temperature. Because of the continuous availability and constant pressure of district steam, the most economical operation and satisfactory heating can only be obtained by the use of automatic temperature control which, except in unusual cases, is well justified. The application of control equipment in various types of buildings is fully discussed in the book, *Principles of Economical Heating*[19]. Various types of control equipment are discussed in Chapter 38.

Rapid draining and venting of the heating system should be obtained by