

There are many types of conduits, some of which are manufactured products and some of which are built in the field. Some of the more common forms are illustrated in Fig. 1.

The conduit (A) is of a wood casing construction which has been widely used in the past. The wood casing is segmented, lined with tin, and bound with wire. The outside of the conduit is coated with asphaltum. It is not suitable for high temperatures or poorly drained soils.

In Fig. 1 (B), (C), (D), (H) and (I) are patented forms of conduits. The insulation is sometimes a loose filler packed into the conduit. Con-

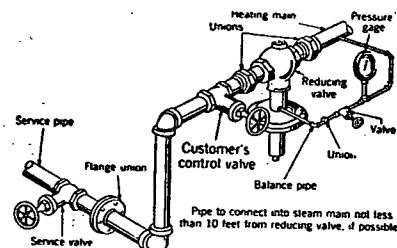


FIG. 2. CONNECTIONS FOR REDUCING VALVE WITHOUT BY-PASS

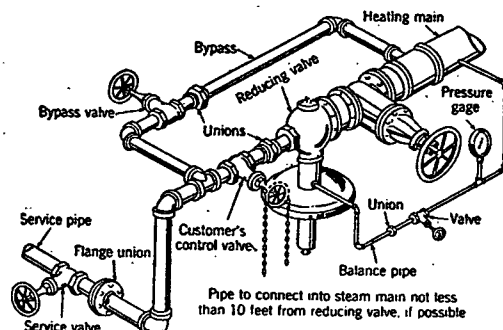


FIG. 3. CONNECTIONS FOR REDUCING VALVE WITH BY-PASS

duits (H) and (I) are prefabricated. Both of these conduits are enclosed in metal jackets.

At (C) and (E) are shown two tile conduits using sectional insulation. In these particular designs the space surrounding the pipe is filled partially or wholly with a loose insulating material. The addition of this loose insulating material to the sectional insulation is, of course, optional and is justified only where high pressure steam is used.

(E) and (F) are conduits used by two district heating companies, and have the advantage of being constructed of common materials.

Conduit (G) is of cast-iron construction, assembled with lead joints and is water-tight, if properly laid. It is obviously expensive and is justified only in exceptional cases.

There are, in addition to those mentioned, several conduits which use an insulating concrete as a pipe insulation. The insulating effect of the concrete is obtained by admixture of an insulating material with cement.

## PIPE TUNNELS

Where steam heating lines are installed in tunnels large enough to provide walking space, the pipes are supported by means of hangers or roller frames on brackets or frame racks at the side or sides of the tunnel. The pipes are insulated with sectional pipe insulation over which is placed a sewed-on, painted canvas jacket or a jacket of asphalt-saturated asbestos water-proofing felt. The tunnel itself is usually built of concrete or brick, and water-proofed on the outside with membrane water-proofing.

Because of their relatively high first cost as compared with smaller conduits, walking tunnels are sometimes omitted along heating lines, unless they are required to accommodate miscellaneous other services, or provide underground passage between buildings.

## OVERHEAD DISTRIBUTION

In some industrial and institutional applications, the distribution piping may be installed, entirely or in part, above ground. This method of con-

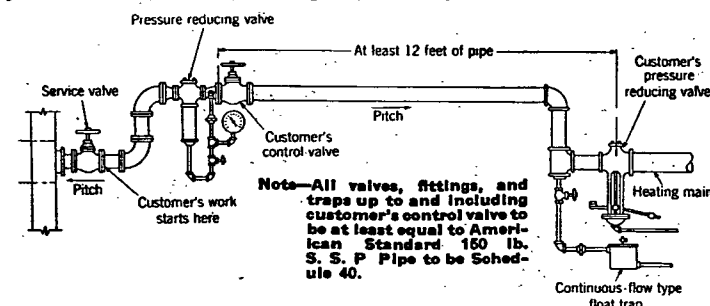


FIG. 4. STEAM SUPPLY CONNECTION WHEN USING TWO REDUCING VALVES

struction has the advantage of requiring no excavation and being easily maintained.

## INSIDE PIPING

Figs. 2 and 3 show typical service connections used for low pressure steam service. Fig. 2 shows installation of a reducing valve without a by-pass, which is usually omitted in the case of smaller size valves.

Fig. 3 illustrates the use of a reducing valve, with a by-pass which is generally provided for larger installations. This latter construction permits the operation of the line in case of failure in the reducing valve. In the smaller sizes, the reducing valve can be removed, a filler installed, and the house valve used to throttle the flow of steam until repairs are made.

Fig. 4 shows a typical installation used for high pressure steam service.<sup>1</sup> The first reducing valve effects the initial pressure reduction. The second reducing valve reduces the steam pressure to that required.

In a heating system the pipes carrying condensate are more subject to corrosion than other parts of the system. Care must be taken to give proper pitch to the pipes and provide proper venting of non-condensable gases. (See Chapter 43, Corrosion.)

Most district heating companies enforce certain regulations regarding the consumer's installation, partly to safeguard their own interests, but

<sup>1</sup> Code for Pressure Piping, B31-1, 1942, American Standards Association, Paragraph 408, p. 114