TABLE 12. PIPE SIZES FOR TWO-PIPE VAPOR[b] SYSTEMS, WHERE EQUIVALENT LENGTH OF RUN FROM BOILER OR SOURCE OF SUPPLY TO FARTHEST RADIATOR DOES NOT EXCEED 200 FT.

Capacity in Sq. Ft. of Equivalent Radiation

Based on Total Pressure Drop of 1 oz. per 100 ft.

PIPE SIZE INCHES	SUPPLY MAIN DRIPPED AND BRANCHES TO RISERS DRIPPED Steam and Condensate flowing in same direction.	SUPPLY RISERS Up-Feed	BRANCHES TO SUPPLY RISERS AND RADIATORS NOT DRIPPED	RETURN RISERS	WET RETURN MAIN	DRY RETURN MAIN
A	*B*	*C*	*D*[a]	*E*	*F*	*G*
¾	---	30	---	190	-----	-----
1	56	56	26	450	700	320
1¼	122	122	58	990	1200	670
1½	190	190	95	1500	1900	1058
2	386	386	195	3000	4000	2300
2½	635	635	395	.....	6700	3800
3	1163	1129	700	.....	10,700	7000
3½	1737	1548	1150	.....	-----	10,000
4	2457	2042	1700	.....	-----	-----
5	4546	.....	3150	.....	-----	-----
6	7462	**Different makes of supply and return valves, steam traps and other specialties vary as to capacity, therefore use size as recommended for any particular make. Vertical connections to be of same size as valve and trap used. Return horizontal runout to be not less than ¼ in.**				

INSTRUCTIONS FOR USING TABLE 12

[a]1. Radiator branches more than 8 ft. in length should be one size larger than shown in Column *D*.

[b]2. This table is for systems which are open to atmosphere or operate under slight pressure or partial vacuum without use of vacuum pumps.

3. These tables apply where pipes are properly reamed. No allowances for defective material or workmanship have been made. (Also see Tables 7 and 8).

4. Capacities based on ¼ lb. condensation per square foot per hour equivalent radiation and actual diameter of standard pipe.

5. Extra length to be added to straight run of pipe for various fittings and valves to determine equivalent length. (See Table 4).

6. Where it is necessary to drip a supply main, supply riser or branch to a supply riser, same should be dripped separately into a wet return. The drip for a vapor or vacuum system may be taken into a dry return through a steam trap.

7. Pitch of mains should be not less than ¼ in. in 10 ft.; on horizontal branches to radiators and risers at least ½ in. in 10 ft.

8. In general it is desirable not to have a supply main smaller than 2 in. in diameter. When the supply main is larger than 2½ in. at the beginning, it is desirable that it shall not be smaller than 2½ in. at the end.

or spaces where overheating is likely to occur, or where the same temperatures are not desired in all the rooms or spaces of the building.

Orifice Control[1]

In using the last method, the rate of flow of steam into a radiator can be controlled by means of (1) a restriction of variable area such as is obtained by throttling the radiator valve, or (2) a fixed restriction, such as a fixed orifice, a variable flow being obtained by varying the pressures on the two sides of the orifice.

The use of a fixed orifice makes it possible to reduce the heat output of a radiator to any desired extent. The radiator may be kept full of steam when the maximum heat output is needed, by adjusting the pressure on the inlet side of the orifice so that it is sufficiently above that in the radiator. In mild weather the flow of steam into the radiator may be reduced to such an extent by reducing the difference in pressure between the two sides of the orifice that only a small part of the radiator is heated.

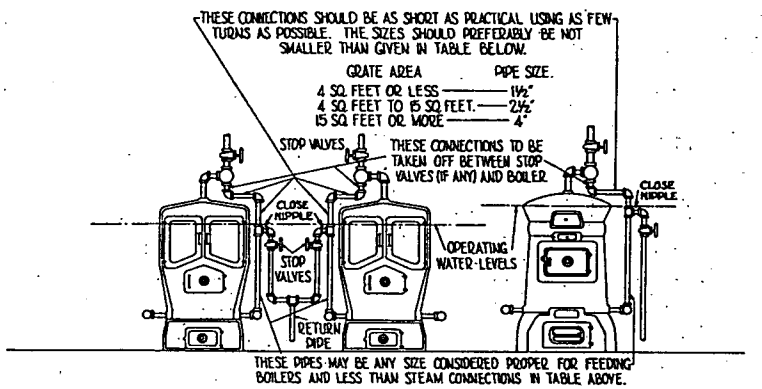

FIG. 7. USING THE HARTFORD RETURN CONNECTION

Between these extremes, the pressure differential may be adjusted to give the flow of steam required for weather conditions encountered at any time during the heating season.

Radiator orifices can be inexpensively made and installed. When an orifice system is properly operated, it is possible to obtain highly satisfactory control of building temperature, resulting in economy in the use of steam for heating.

For additional information on temperature control, refer to Chapter 23.

PIPING CONNECTIONS

Hartford Return Connections

The Hartford return connection illustrated in Fig. 7 and in other piping layouts in this chapter is recognized as safer and preferable to

[1]For additional information on this subject, refer to Flow of Steam through Orifices into Radiators, by S. S. Sanford and C. B. Sprenger [*Heating, Piping and Air Conditioning*, June, 1931].