TABLE 6. COMPARATIVE CAPACITY OF STEAM LINES AT VARIOUS PITCHES[a]

Pitch of Pipe in Inches per 10 Ft.

PITCH OF PIPE—¼ IN.			½ IN.		1 IN.		1¼ IN.		2 IN.		3 IN.		4 IN.		5 IN.	
Pipe Size Inches	Sq. Ft. Rad. Based on 240 B.t.u.	Max. Vel.	Sq. Ft. Rad. Based on 240 B.t.u.	Max. Vel.	Sq. Ft. Rad. Based on 240 B.t.u.	Max. Vel.	Sq. Ft. Rad. Based on 240 B.t.u.	Max. Vel.	Sq. Ft. Rad. Based on 240 B.t.u.	Max. Vel.	Sq. Ft. Rad. Based on 240 B.t.u.	Max. Vel.	Sq. Ft. Rad. Based on 240 B.t.u.	Max. Vel.	Sq. Ft. Rad. Based on 240 B.t.u.	Max. Vel.
¾	25.0	12	30.3	14	37.3	18	40.4	19	42.5	20	46.1	21	47.5	22	49.3	23
1	45.8	12	52.6	15	63.0	17	70.0	20	75.2	22	83.0	23	87.9	25	90.2	26
1¼	104.9	18	117.2	20	133.0	23	144.5	25	154.0	27	165.0	28	172.6	29	178.2	31
1½	142.6	18	159.0	21	181.0	23	196.5	25	209.3	27	224.0	28	234.8	30	242.6	31
2	236.0	19	263.5	20	299.5	23	325.5	25	346.5	27	371.5	28	388.4	29	401.1	30

TABLE 7. EFFECT OF REAMING ENTRANCE TO ONE-INCH ONE-PIPE RISERS[a]

	MAXIMUM CAPACITY OF RISER	PER CENT DECREASE
Reamed entrances	24.7 lb. per hour	0.0
Rounded entrances	23.9 lb. per hour	3.2
Squared entrances	22.2 lb. per hour	10.1
Three wheel cutter	19.2 lb. per hour	22.2
Single wheel cutter	17.6 lb. per hour	28.7

TABLE 8. PER CENT DIFFERENCE IN CAPACITY DUE TO VARIATION OF PIPE SIZE AND SMOOTHNESS[a]

	MAXIMUM CONDENSATION, LB. PER HR.			
Size of Pipe	¾"	1"	1¼"	1½"
Minimum	14.00	24.89	45.42	70.50
Maximum	15.20	30.08	52.08	82.00
Per Cent Variation	8.6	20.8	14.7	16.3

[a]Data from AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS Research Laboratory.

steam must be kept below the point where it will seriously interfere with the returning water. The maximum allowable velocity of steam for satisfactory operation has been determined by the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS Research Laboratory. Table 5 gives the maximum allowable capacity and velocities of flow for up-feed one-pipe risers while Table 6 gives the maximum capacity and velocity for horizontal pipes with various pitch.

Since the maximum velocity must not be exceeded in any part of the system, if silent and satisfactory operation are desired, care should be exercised to eliminate obstructions due to poor pipe, lack of or faulty reaming and improper use of pipe *dope*.

Tables 7 and 8 give the variation in capacity of pipe due to reaming and variation in size and smoothness of pipe as determined by experiments at the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS Research Laboratory. There are certain variations in manufacture which apparently cannot be avoided, which actually caused a 20 per cent variation in the capacity of a 1 in. pipe, as indicated by Table 8. A factor

of safety has been allowed in all of the capacity tables in this chapter so that Table 8, while interesting, need not be used to discount the other tables.

Table 9 is to be used in designing one-pipe systems up to 200 ft. equivalent length of run. For designing larger one-pipe systems where uniform distribution of steam to all parts of the building is difficult to obtain, Table 10 shall be used.

Air-Vent One-Pipe Down-feed System

The air-vent one-pipe down-feed system illustrated in Fig. 2 is a modification of the one-pipe up-feed system and the same tables apply

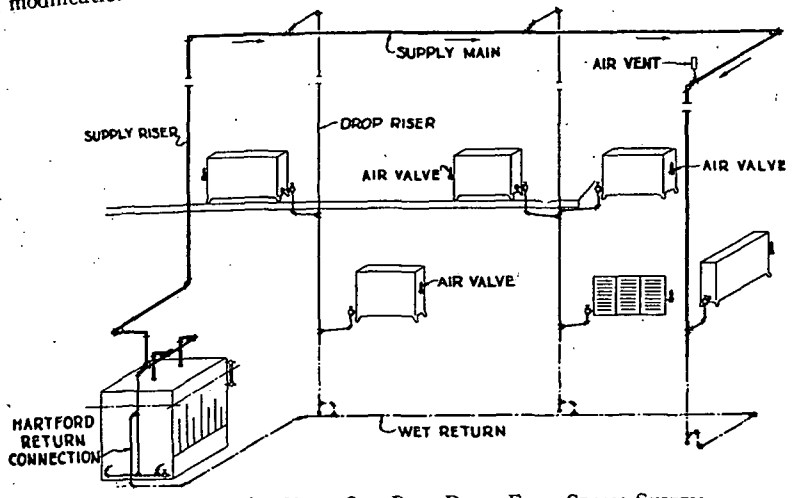

FIG. 2. TYPICAL AIR-VENT ONE-PIPE DOWN-FEED STEAM SYSTEM

to it as for the up-feed system. The branches may leave the overhead main from the top, in which case the condensation drains at the end, or the branches may leave the overhead main from the bottom, in which case each branch drains the condensation, and in which case the installation of eccentric fittings in the overhead main may be avoided. The illustration indicates no drain at the base of the main supply riser. When this riser is more than very few feet from the boiler a connection from the bottom of the riser into the wet return should be made.

Air-Vent Two-Pipe System

Two-pipe systems, Fig. 3, require separate supply and return mains and a separate supply and return connection for each heating unit. Like one-pipe systems, they require air valves on heating units and mains. The connection may be either at the top or the bottom of the unit, but the outlet is always at the bottom so that all condensation will drain through this to the return mains instead of back through the inlet connection to the supply mains, as with the one-pipe system. Both radiator connections should be valved.