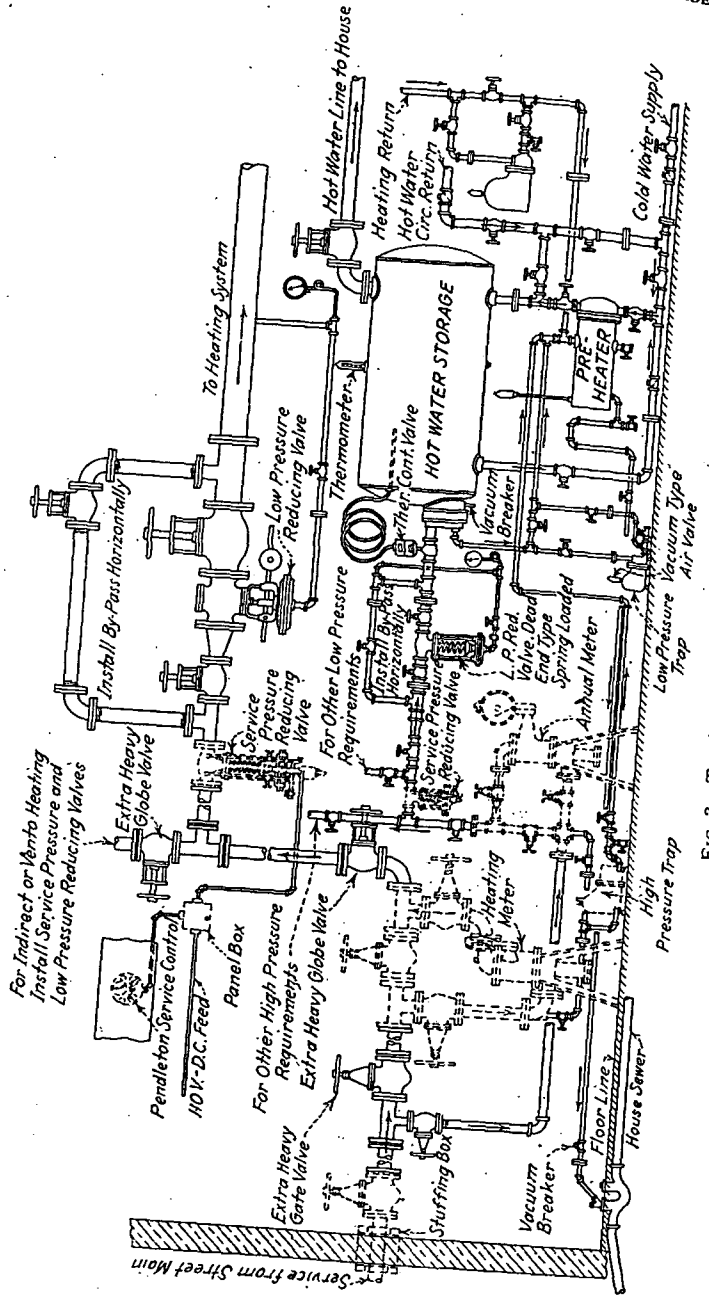

FIG. 3. TYPICAL SERVICE INSTALLATION

in expansion at minimum and maximum temperatures and dividing by 100 to arrive at the expansion per foot, then multiplying by the number of feet of pipe for which expansion is to be figured.

In the installation of transmission lines it is frequently the practice to figure on an installation temperature of 70 deg. fahr. and to compensate for about 40 per cent of the total expansion by means of a cold strain put in the line at the time of installation. This allows for only 60 per cent of all expansion to be taken care of by expansion joints, offsets or bends.

Table 2 gives the length of pipe that should be made up to provide for the expansion. In general the arms should be made up with pipe bends which can be welded into one continuous length.

The offset lengths which are required for expansion in the case of wrought iron pipe may also be used for brass pipes, using in each case the actual amount of expansion in the piping.

CAPACITY OF RETURNS WITH VARIOUS GRADES

In general return lines when installed follow the contour of the land, and Table 3 gives sizes of return pipes for various grades. It is evident that at points where the grade is great, smaller pipes can be installed.

Table 4 gives the number of pounds of steam condensed to water for various steam pressures which can be used in determining the size of steam main or return line.

CAPACITY OF SUPPLY MAINS

Table 5 gives the capacity of various sizes of pipes under various steam pressures, based on a velocity of 10,000 ft. per minute. The pipe loss will not vary under other velocities. For other velocities, at the same pressure drop, the capacity may be determined by dividing by 10,000 and multiplying by the actual velocity.

Present practice in the design of underground lines is towards higher velocities, and 10,000 ft. per minute may be considered as a minimum.

TABLE 3. CAPACITY OF RETURNS FOR UNDERGROUND DISTRIBUTION SYSTEMS IN POUNDS OF CONDENSATE PER HOUR

Size of Pipe In.	Pitch of Pipe per 100 Ft.						
	6″	1′	2′	3′	5′	10′	20′
1	448	998	1890	2240	3490	5490	7490
1¼	1740	2490	3990	4880	6480	9480	13500
1½	2700	4190	5740	7480	9480	14500	20900
2	4980	7380	10700	13900	16900	24900	36900
3	13900	22500	30900	37400	50400	74800	105000
4	30900	44800	64800	79700	105000	154000	229000
5	54800	79800	120000	144800	195000	294000	418000
6	90000	138000	187000	237000	312000	449000	.....
8	190000	277000	404000	508000	660000	938000	.....
10	344000	498000	724000	900000	1190000	.....	.....
12	555000	798000	1148000	1499000	1990000	.....	.....

*Size of pipe should be increased if same carries any steam.