Hartford Return Connection

In order to prevent the boiler from losing its water under any circumstances, the use of the Hartford Connection, or the Underwriters Loop, is recommended.

Fig. 5 shows this connection for a two-boiler installation. For a single boiler installation the connection is made as is indicated for one boiler. The essential features of construction of a Hartford Loop connection are: (1) A direct connection (made without valves) between the steam side of

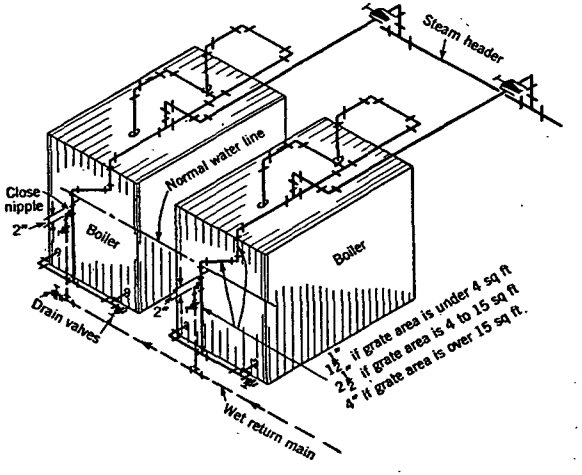

FIG. 5. THE HARTFORD RETURN CONNECTION

the boiler and the return side of the boiler, and (2) a close nipple connection about 2 in. below the normal boiler water line from the return main to the boiler steam and return balance connection.

Sizing Boiler Connections

Little authentic information is available on the sizing of boiler runouts and steam headers. Although many engineers prefer an enlarged steam header to serve as additional steam storage space, there ordinarily is no sudden demand for steam in a steam heating system except during the heating-up period, at which time a large steam header is a disadvantage rather than an advantage. The boiler header may be sized by first computing the maximum load that must be carried by any portion of the header under any conceivable method of operation, and then applying the same schedule of pipe sizing to the header as is used on the steam mains for the building. The horizontal runouts from the boiler, or boilers, may be sized by calculating the heaviest load that will be placed on the boiler at any time, and sizing the runout on the same basis as the building mains. The difference in size between the vertical uptakes from the

boiler and the horizontal main or runout is compensated for by the use of reducing ells (Figs. 3 and 4).

The following example illustrates the sizing of the boiler connections shown in Fig. 6.

Example 4. Determine the size of boiler steam header and connections (Fig. 6) if there are three boilers, two to carry 50 per cent of the load each, and the third to be used as a spare. The steam mains are based on ⅛-lb drop per 100 sq ft of equivalent direct radiation (EDR).

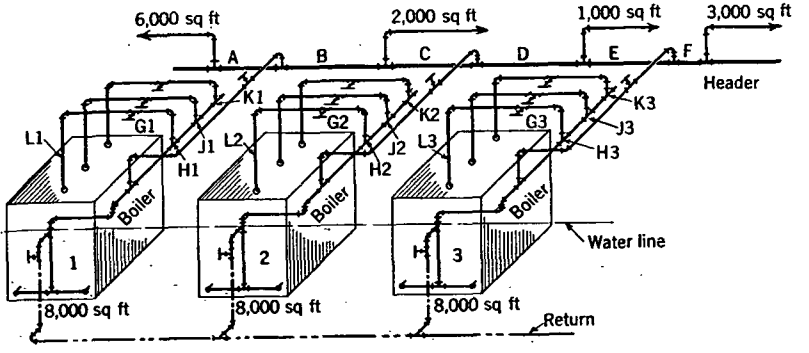

FIG. 6. BOILER STEAM HEADER AND CONNECTIONS

Solution:

Size of Boiler Header

When Operating on Boilers	Load on Various Portions of Header						Maximum Load
	A	*B*	*C*	*D*	*E*	*F*	
Nos. 1 and 2	6000	0	2000	4000	3000	3000	6000
Nos. 2 and 3	6000	6000	8000	2000	3000	3000	8000
Nos. 3 and 1	6000	0	2000	2000	3000	3000	6000
Max. Load	6000	6000	8000	4000	3000	3000	8000

8000 sq ft @ ⅛ lb per 100 ft = 6 in. main. (See Table 7.)

Size of Boiler Runouts

The three runouts

$$G_1,\ G_2,\ G_3 = \frac{8000}{3} = 2667 \text{ sq ft each @ } \tfrac{1}{8} \text{ lb per 100 ft} = 4 \text{ in. pipe.}$$

H_1, H_2, H_3 = 2667 sq ft each @ ⅛ lb per 100 ft = 4 in. pipe[4] (See Table 7).

J_1, J_2, J_3 = 5333 sq ft each @ ⅛ lb per 100 ft = 5 in. pipe[4] (See Table 7).

K_1, K_2, K_3 = 8000 sq ft each @ ⅛ lb per 100 ft = 6 in. pipe[4] (See Table 7).

The uptakes from the boiler probably would be 6 in. pipe with a 6 in. × 4 in. reducing ell at top.

[4] *Note.*—As K_1, K_2, K_3 all carry 8000 sq ft and are 6 in. pipe, the whole runout including J_1, J_2 and J_3 and H_1, H_2 and H_3 and the leads from the boiler headers to the main steam header would also be made 6 in. pipe.