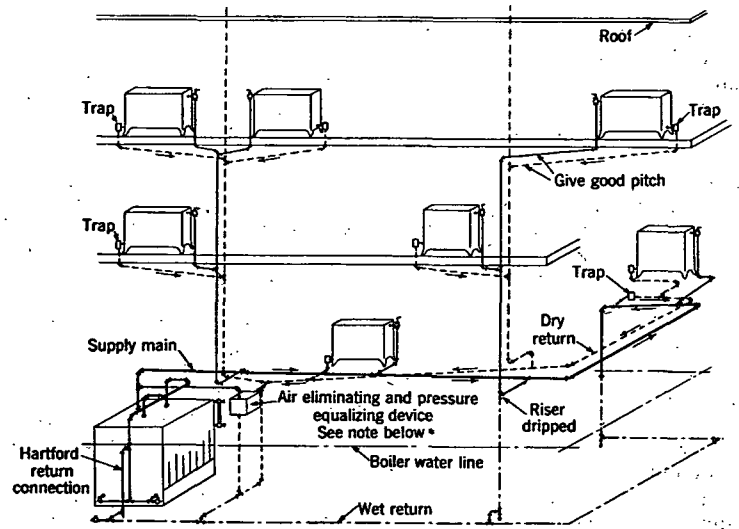

FIG. 13. TYPICAL ATMOSPHERIC SYSTEM WITH AUTOMATIC RETURN TRAP[a]

[a] Proper piping connections are essential with special appliances for pressure equalizing and air elimination

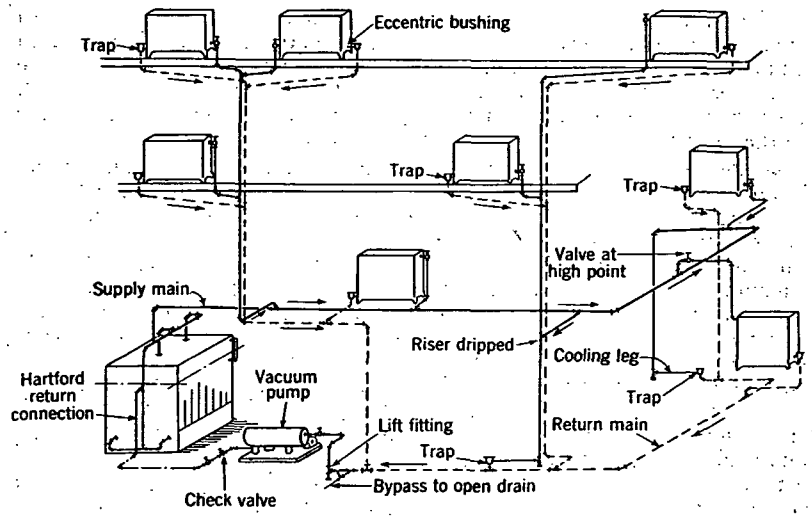

FIG. 14. TYPICAL UP-FEED VACUUM PUMP SYSTEM

the system is shut down for a considerable length of time. Lifts for draining condensate from ends of or rises in steam mains should be avoided to secure the greatest economy of operation and noiselessness.

Down-Feed Vacuum System

The piping arrangement for the down-feed vacuum system is similar on the supply side to the down-feed vapor system in that it has similar runouts, radiator valves, drips on the bottom of the steam drops, and enlargement of the drops for the lower radiator connections. The return side of the system is exactly the same as the up-feed system except that

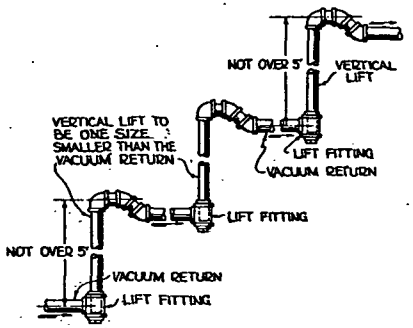

FIG. 15. METHOD OF MAKING LIFTS ON VACUUM SYSTEMS WHEN DISTANCE IS OVER 5 FT

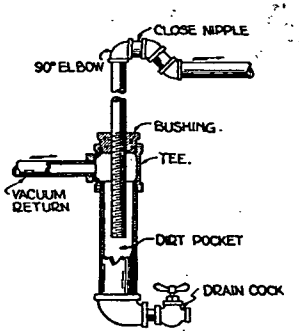

FIG. 16. DETAIL OF MAIN RETURN LIFT AT VACUUM PUMP

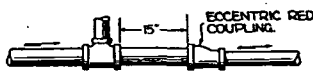

FIG. 17. METHOD OF CHANGING SIZE OF STEAM MAIN WHEN RUNOUTS ARE TAKEN FROM TOP

the steam riser drips at the bottom are connected into the return line through thermostatic traps. It is preferable to take the runouts for the risers from the bottom or at a 45-deg angle down from the steam main (Fig. 6) so that they may serve as steam main drips. When this is done it is practical to run the steam main level if a runout is located at every change in pipe size, or if eccentric fittings are used (Fig. 17). A slight pitch in the steam main, however, should be used when possible. An overhead vacuum down-feed system is shown diagrammatically in Fig. 18.

SUB-ATMOSPHERIC SYSTEMS

Sub-atmospheric systems are similar to vacuum systems, but in contrast provide temperature control by variation of the heat output from the radiators both by varying the pressure at which steam is circulated in the radiation and the amount of steam. The steam supply is continuous at varying rates. A vacuum pump capable of operating at high partial