

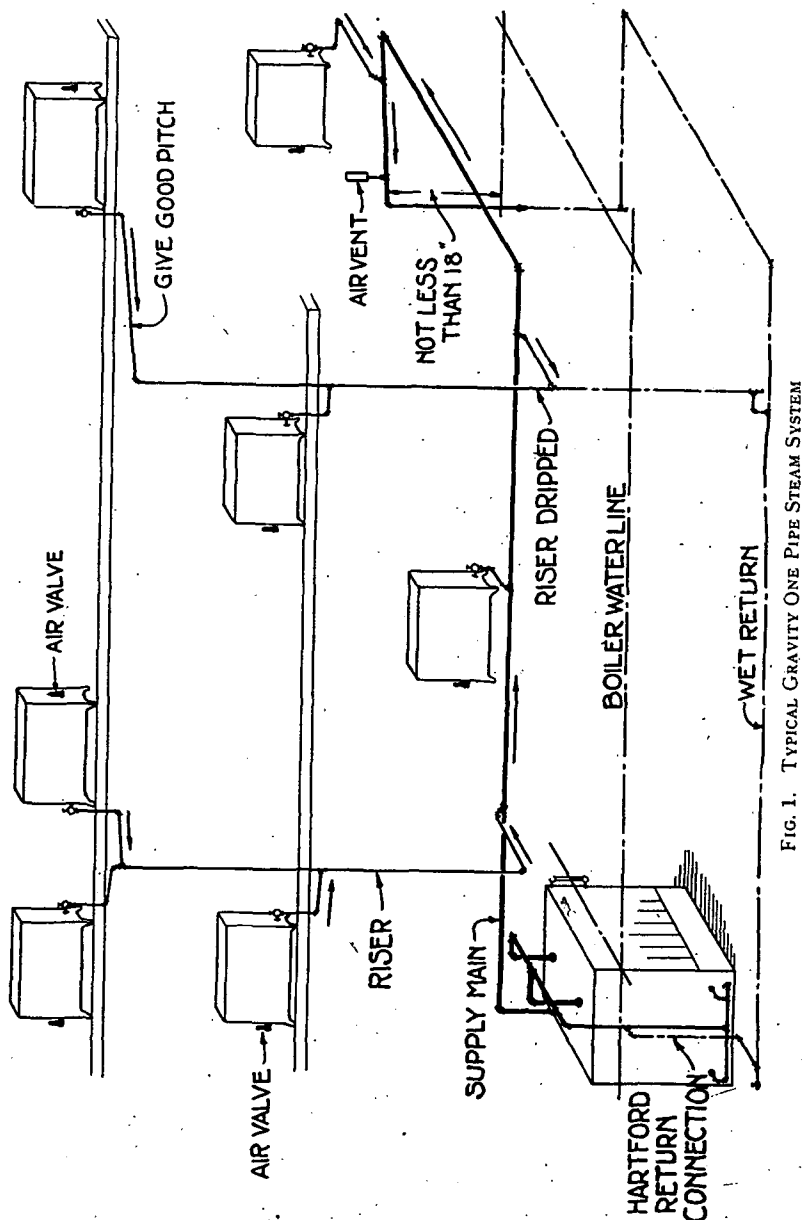


FIG. 1. TYPICAL GRAVITY ONE PIPE STEAM SYSTEM

CHAPTER III—STEAM HEATING SYSTEMS AND PIPING

The choice of gravity one-pipe, two-pipe, vapor or vacuum systems depends upon the requirements as to first cost, convenience, quality of service and local conditions. Theoretically, gravity one and two-pipe and vapor systems are substantially on a par as to heating efficiency, that is to say, the majority of the heat delivered is, or should be, dissipated by the radiators.

Gravity one-pipe or vapor systems operating under low pressure or partial vacuum and vacuum pump installations have practically the same thermal efficiency.

The greatest difference between these various types of installations lies in the ease of operation, flexibility, adaptability to local conditions and cost of operation. It is essential that any system circulate steam uniformly throughout the entire installation, as too often certain defective features of a system will require that heat be kept on longer or to a greater degree than would otherwise be required to uniformly and satisfactorily heat the building. This will result in waste and overheating. The one important thing to be remembered in connection with all systems is that they shall circulate steam freely and uniformly to the radiators and remove and return condensation noiselessly.

Gravity One-Pipe Steam System.—The one-pipe system is generally the least expensive to install. It requires one combined supply and return connection at the bottom of each radiator to allow the condensation to flow back to the boiler in opposition to the incoming steam. Air valves must be used on all radiators, also near the ends of mains before dropping below the water line. Fractional control by means of radiator valves is not possible with one-pipe systems. During operation the radiator supply valve must be either entirely open or entirely closed. This is necessary to prevent the retention of water and the noise due to intermittent inflow of steam and outflow of water (which occurs when the valve is partly open).

This system is adaptable to automatic temperature control and is entirely satisfactory when properly designed, installed and operated.

Gravity one-pipe systems operating under slight pressures sometimes called the vacuum type are the same in design as the gravity one-pipe system, the only point of difference being the venting valves on the radiators and return main. These valves vent air from the system but prevent its return. Where pressure is not maintained constantly and especially with oil or gas fired boilers the system just described should show some fuel economy over the ordinary gravity one-pipe system.

Two-pipe Gravity Systems.—Two-pipe systems require separate supply and return pipes and a supply and return connection for each radiator for steam and condensation. Like one-pipe systems, they require air valves on radiators and mains. The inlet supply connections may be either at the top or the bottom of the radiators, but the radiator 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.

The returns from radiators on several floors are usually connected into common risers and the various risers tie into the return system.