

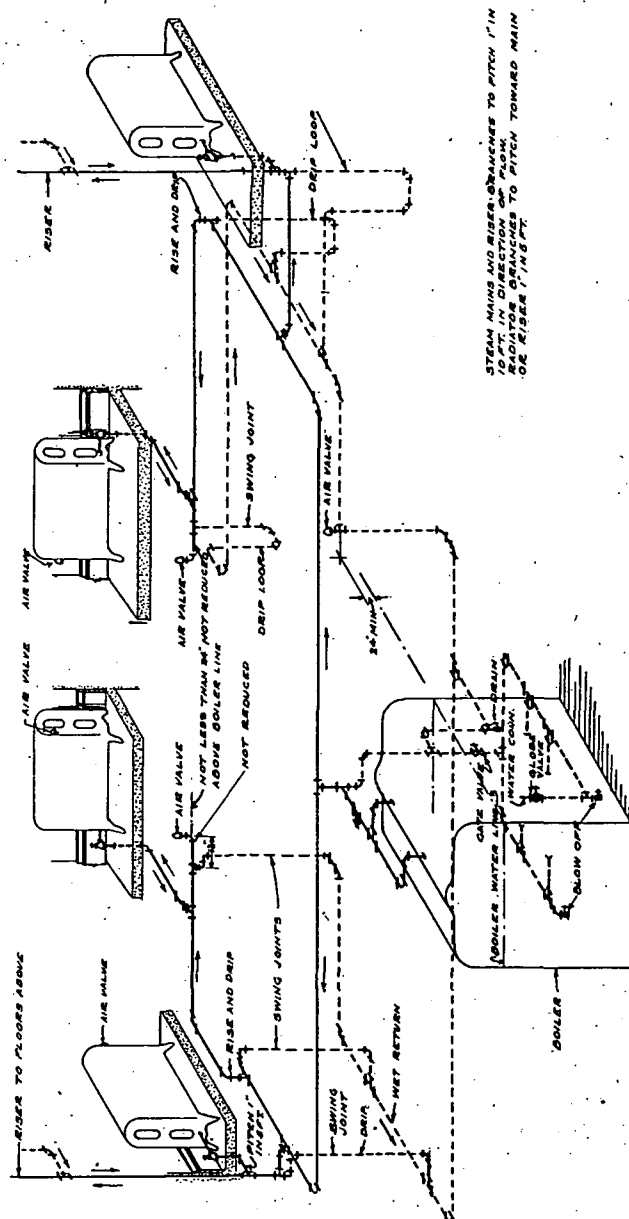


FIG. 16. ONE-PIPE RELIEF GRAVITY RETURN SYSTEM

the radiation is below the water line of the boiler, where the distance between the boiler and the radiation is very great or where high pressure boilers are used. All four systems may employ mechanical circulation, but it is infrequently used in a one-pipe plant. Pumps for producing mechanical circulation are discussed in Chapter VIII.

There are two broad divisions that may be very definitely made in the subject of steam main sizes as proposed by James A. Donnelly in Code of Minimum Requirements for the Heating and Ventilation of Buildings. The first covers the distribution of the steam, and the second its use. The conveyance of steam for any considerable distance is a problem by itself, needing separate analysis and altogether different handling from any of the problems concerning the use of the steam after it has arrived at the building to be heated. Steam flow tables should be used for distribution, and tables giving the capacities of steam mains and branches, radiator connections, etc., under standard and average conditions of use should be applied for sizing the pipes within the buildings.

For this reason, data may be divided into two classes or groups: (1) *transmission mains*; (2) *service piping*.

Transmission mains are those that have to do with the conveying of steam for a distance of considerable extent, through or between buildings and for collecting and returning the water of condensation from the several sections or buildings.

Service piping is that part of the apparatus by which the radiating units are connected to the transmission mains.

The velocities of flow used in the distribution of steam are only limited by the available or allowable drop in pressure, while the velocities within the buildings where the steam is used are limited by the critical velocities or the velocities which will allow of sufficient separation of the condensation so that defective circulation or water hammer will not occur.

#### STEAM HEATING PIPE SIZES

In using tables for steam heating pipe sizes, it is frequently hard to determine the length of run upon which they are based. Usually some allowance is made for one or more such items as: condensation in the pipe, equivalent length of fittings, and valves, etc., but it is generally hard to determine what factors have been allowed for, and what percentage of allowance has been made. In compiling the tables and other data for THE GUIDE, 1925-26 every attempt has been made to eliminate such indefinite and conflicting factors.

The three principal factors upon which the determination of pipe sizes for steam heating depends are:

1. The equivalent length of the run from the boiler, or source of steam supply, to the farthest radiator.
2. The total pressure drop, which may be allowed, between the source of supply and the end of the return system.
3. The peculiar conditions surrounding the particular plant in question.