steam through pressure-reducing valves at locations far from the boilers. The returns may be delivered back to the boiler, if desired, by condensation return pumps which are vented to the atmosphere. The return lines in such systems are simply gravity waste lines in which the condensation flows entirely by gravity and is not aided by any pressure difference.

Atmospheric systems contemplate maintaining a practically constant pressure in the steam pipe and atmospheric pressure in the return pipe. When graduated steam valves are provided, they enable the occupant of a room to vary the flow area to the radiator so as to obtain a greater or lesser heating effect.

The steam side may be run as that for either up-feed or down-feed two-pipe vapor systems, as the conditions require, and the radiator connections are the same as for vapor systems in that they have graduated

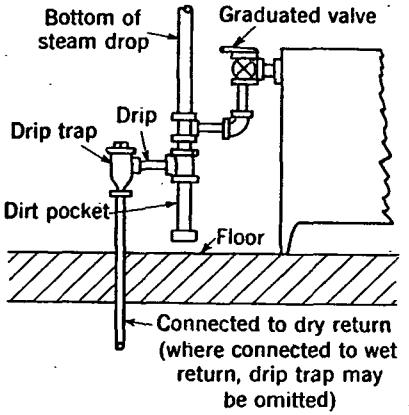

Fig. 12. Detail of Drip Connections at Bottom of Down-Feed Steam Drop

valves on the radiator supply ends and thermostatic traps on the radiator return ends. All drips from the supply main and the steam side of the system must pass through thermostatic drip traps before entering the return system where only atmospheric pressure exists. Fig. 13 illustrates a typical scheme of piping used on atmospheric systems.

VACUUM SYSTEM

In the vacuum system, a vacuum is maintained in the return line practically at all times but no vacuum is carried on the steam side, and the usual accessories include graduated valves on the radiator supply and thermostatic traps on the radiator return. The air is expelled from the system by a vacuum pump and all drips must pass through thermostatic traps before connecting to the return side of the system.

These systems are often fed from high pressure steam mains through pressure-reducing valves but they may be fed direct from a low-pressure steam heating boiler as shown in Fig. 14, in which a typical up-feed

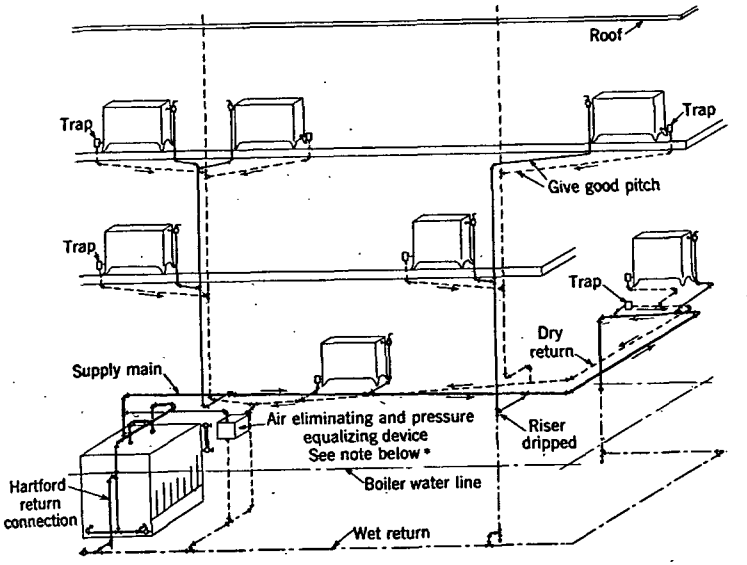

Fig. 13. Typical Atmospheric System with Automatic Return Trap[a]

*Proper piping connections are essential with special appliances for pressure equalizing and air elimination

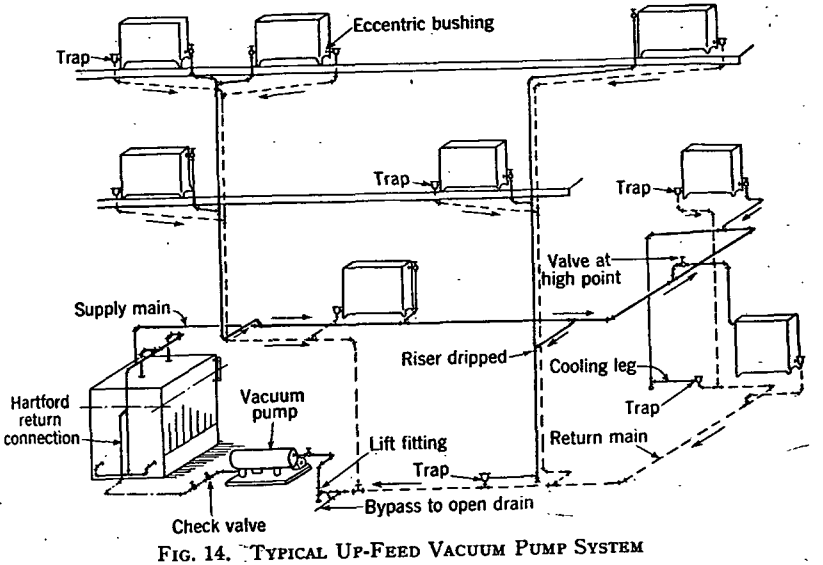

Fig. 14. Typical Up-Feed Vacuum Pump System