CHAPTER II.

Sheet Metal Work in Heating and Ventilating Systems

Those systems of heating which require the use of sheet metal work are termed the warm air furnace, the indirect steam or hot water, the direct indirect steam or hot water and the forced blast systems.

In the warm air furnace system, galvanized sheet iron casings are placed around the furnaces, and the cold air ducts, as well as those for warm air, are all made of sheet metal. Sometimes furnaces for burning wood are used, as shown in Fig. 27, the entire casings

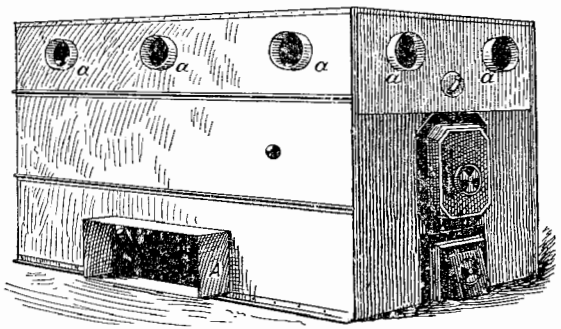

Fig. 27—Furnace for Burning Wood

being double and made portable. The cold air inlet is shown at A and the warm air outlets are indicated by a a, etc. The construction of these cold and warm air pipes and casings will be taken up in a later part of this treatise.

Sheet metal work is employed in the indirect steam or hot water heating system in the construction of a special form of heater which is placed below the ceiling and encased with No. 22 galvanized sheet iron, as shown by AA, etc., in Fig. 28. A cold air box or flue

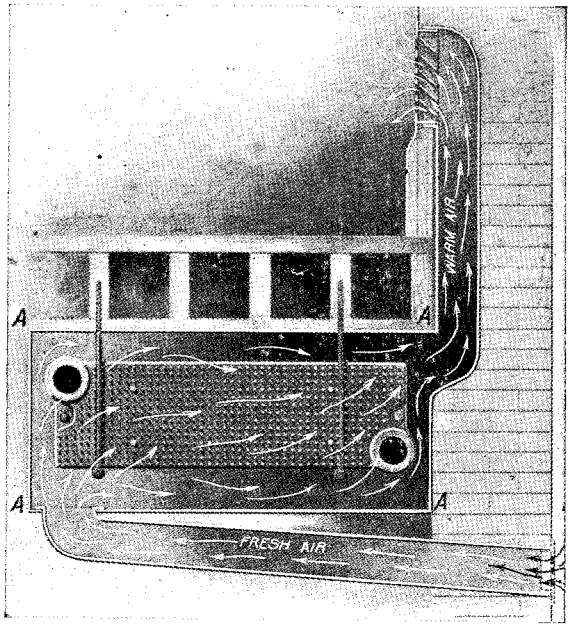

Fig. 28—Galvanized Iron Casing in an Indirect System of Heating

is connected to the bottom of the heater, as shown, and the warm air pipes at the top are connected to the registers placed in the walls or floors.

In the direct indirect heating system, the fresh air is admitted through an opening in the outside wall, as shown at A in Fig. 29, passes through the

fresh air duct B, and is heated in passing up the flues between the radiator. By raising the treadle C, the fresh air duct is closed, while the damper at the foot

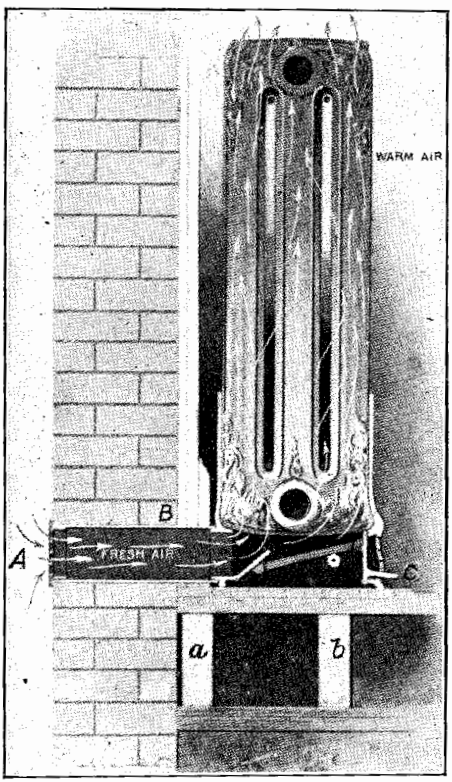

Fig. 29—Metal Duct in Direct Indirect System of Heating

of the radiator opens, thus allowing the cold air on the floor to pass up and become heated. The fresh air duct through the wall can be made of heavy sheet copper to prevent corrosion, and sometimes the space

between the beams a and b are lined with sheet metal, and the top of the fresh air duct is placed on a level

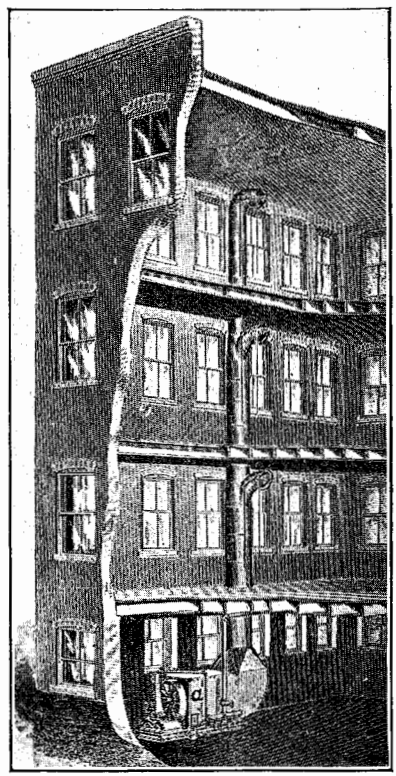

Fig. 30—Galvanized Iron Ducts in a Forced Blast System of Heating

with the bottom of the beam and connections made to the cold air box, thence through the floor to the radiator.

In the application of the forced blast for warming of factories, schools, theatres, etc., where good

fresh warm air is desired, the cold fresh air is forced through a heater of special design and discharged by a blower into ducts made of No. 22 galvanized iron, which lead to the rooms to be warmed, as shown in Fig. 30, which represents the interior of a factory. In schools, halls, etc., these ducts are placed in the walls or partitions, and discharge through registers.

Sheet Metal Ventilating Systems

Various systems of ventilation also require the use of sheet metal work in their construction. They are termed natural ventilation, heated flue or stack ventilation, heated drum ventilation and forced ventilation, consisting of the plenum and vacuum or exhaust systems.

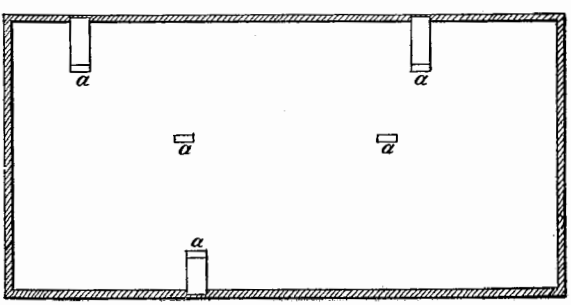

Fig. 31—Attic Plan, Showing Ventilating Pipes in Natural System

In the natural system of ventilation, the drafts in the flues or ducts are caused by the difference in density of the air in the flue or duct and that in the outer atmosphere. The higher the temperature of the air in the ducts, the greater will the draft be. The ducts are run to the attic floor, as shown by **a a,** etc., in Fig. 31, and the foul air is carried to the

outside by means of an ordinary ventilator. Stationary louvres may be placed instead in the gable at each end of the building if desired.

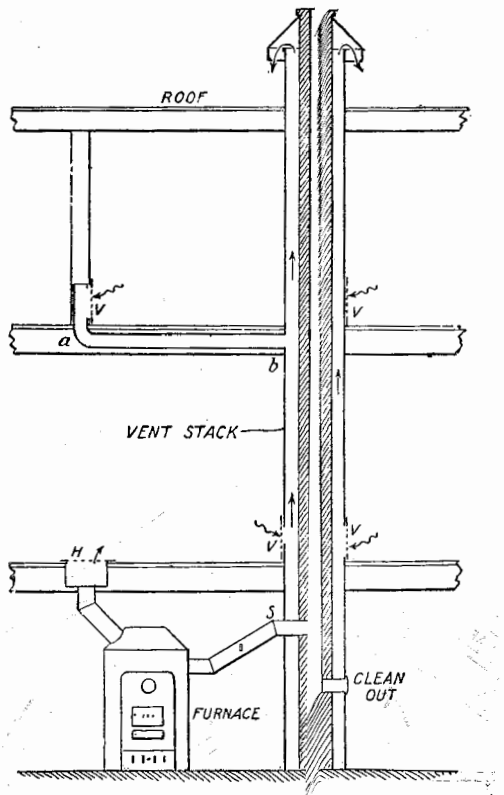

Fig. 32—Heated Flue or Stack Ventilation System

In the heated flue or stack ventilation system the smoke pipe of the furnace is connected to the smoke flue, around which a sheet metal stack is placed as shown in Fig. 32. This stack runs above the roof and is capped by a hood to keep out the rain. Ventilating

registers are connected to the stack and the heat in the flue raises the temperature of the air in the stack, which, rising, creates a suction, thus drawing out the foul air through the registers V. If desired, the registers when placed away from the stack can be connected by means of a flue or duct placed between the beams, as indicated by a b.

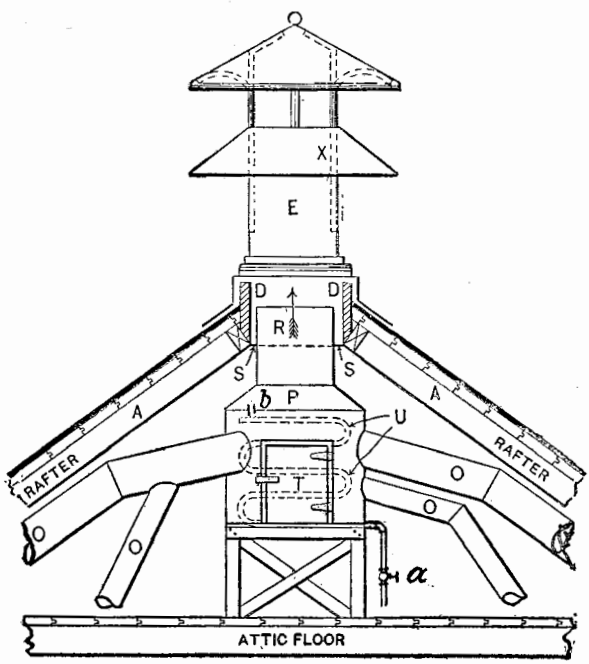

Fig. 33—Heated Drum System of Ventilation

A diagram of a heated drum ventilation system is shown in Fig. 33, in which A A show the rafters and D D the curb over which the ventilator E is secured by the braces X. A sheet metal drum made of No.

22 galvanized iron is set upon a wooden platform, the drum being connected to the ventilator at R and made air tight at S S. A clean out door is placed at T. After the ventilation pipes O O, etc., are connected to the drum, a steam coil is placed inside of the drum with a valve at **a** and an air valve at **b** on the inside of the drum. When the steam is turned on the heated air in the drum rises and passes out of the ventilator, which creates a vacuum or suction, thus drawing out the air in the ventilation pipes O O.

There are two classes of forced ventilation: (1) The plenum system, in which the air pressure in the building is slightly greater than that of the outer atmosphere, the air being blown into the building by means of a blower placed at the inlet, as shown at **a** in Fig. 30. As the space in the building is filled with air under a slight pressure, the leakage is outward, thus preventing the drawing of foul air into the rooms from any outside source. (2) The vacuum or exhaust system consists of drawing the foul air from the rooms by placing an exhaust fan at the outlet to the vent ducts, which is usually run by electricity. Using this exhaust method, a partial vacuum is created within the building, and all currents and leaks are inward, because the air pressure in the building is slightly lower than that of the outer atmosphere. The plenum system is the more preferable.