use of a trap at the junction of the hood and branch pipe is permissible, provided it is not allowed to fill up completely.

The passing of pipes through fire-walls should be avoided wherever possible, and sweep-up connections should be so arranged that foreign material cannot be easily introduced into them.

Where considerable quantities of explosive dust or inflammable materials pass through the exhaust fan, the blast wheel should be constructed of brass composition, copper or other soft metal and in all cases ample clearance should be provided between blast wheels and housings.

MAINTENANCE OF SYSTEM

Because of its simplicity the exhaust system usually receives but little attention once it is installed; however, to obtain the best results, it should be inspected at suitable intervals and necessary adjustments made.

The exhaust fan should be given proper attention the same as any other high-speed machine. It should be kept in proper alignment and tightly bolted to its foundation.

Suction hoods, which have been removed to adjust the machines, should be replaced as soon as the adjustments are completed.

Never start a machine with the blast gate closed, as the slight air leakage past the blast gate may draw material into the pipe and clog it.

Disconnect furnace feeders from the furnaces when not in operation, and do not overload the system by ill-advised additions.

CHAPTER XXII

VENTILATORS AND NATURAL VENTILATION

OF the two methods of ventilating available, namely by mechanical means, and by the so-called natural forces, the later is often favored, because it is not dependent upon fans, blowers and motive power apparatus, any of which may get out of order; it requires no supervision, and it costs nothing for power to operate. It is dependent upon the operation of natural laws and is not subject to the requirements of control possible with mechanical ventilation.

Natural ventilation utilizes two separate agencies, (1) the buoyancy of the air caused by temperature difference between inside and outside of the building, and (2) the energy of the wind. The former is the same action that produces draft in a chimney. The two forces are entirely distinct and separate, and may either co-operate or oppose each other, depending upon the design of the ventilator.

A ventilator is an opening in the roof, properly protected against rain, snow and down draft; and surrounded by a hood or cowl intended to utilize the force of even the slightest breeze from any direction what-soever, in such a manner as to assist and increase ventilation. Occassionally a damper is required to prevent over-ventilation in cold, stormy weather. In any event, openings near the floor of the building which is to be ventilated are necessary to allow the ventilators to act.

Ventilators may be classified in general as, stationary and rotary, and each of these may be divided into siphoning and non-siphoning. The rotary ventilators being one which always presents the same face to the wind, and the siphoning ventilator being one which is so constructed as to use the force of the wind to siphon the air out of the ventilator, usually allowing some of the external air to pass through the head.

Engineers, architects and contractors who must make a selection should be guided by the following four general points, (1) quality of material, (2) design, (3) construction and (4) capacity (conditions should be stated otherwise a fair comparision of this item is impossible.)

What is generally desired more specificially is, the greatest amount of reliable ventilation for a given cost of equipment. The following facts affect ventilation and ventilator capacity:

1. Temperature difference between inside and outside of building.
2. Height of ventilator above air inlet openings.
3. Wind velocity.
4. Shape and design of ventilator.

Material for this section furnished especially for THE GUIDE by Frank Kelley, C. T. Palmer and Thornton Lewis.