capacity of individual ventilators, as ventilators of the same class and, which from a casual observation appear to be the same, will have entirely different characteristics, due to the fact that some of the fundamentals have been overlooked or changed in one or the other.

The principles which should be followed are:

A—Stationary Ventilators.

1. A head sufficiently large to produce a large low-pressure area on the side opposite the wind, and to give an area of outlet for the air leaving the head large enough to obviate undue resistance to flow. At the same time the head should not be so large as to be unwieldy in handling or to be structurally weak when erected.
2. A storm band on stationary non-siphoning ventilators should be sufficiently wide and so placed as to prevent the entrance of external air into the ventilator head.
3. If the ventilator is a siphoning type, additional outlet air space must be provided in the head in order not to restrict the air passage from the exhaust pipe.

B—Rotary Ventilators.

1. A flaring outlet from a rotary ventilator will give a better exhaust than a straight outlet.
2. Practically frictionless and noiseless turning of the ventilator head, when the wind direction changes. The head should turn at very low wind velocities.
3. Smallest possible change of direction of the air ascending from the building and least possible resistance to its egress by louvres or other obstructions at the outlet opening.

C—All Ventilators.

1. Freest possible outlet for the air from the building, with large areas and smallest possible change of direction of the air flow.
2. Freedom from down drafts and from entrance of rain or snow.
3. Freedom from being rendered inoperative by collection of snow or formation of ice on ventilator.

The simplest form of ventilator, shown in Fig. 2, consists of an outlet pipe with a conical hood above it. The addition of a storm band, as shown in Figs. 3, 4, and 5, gives an increased protection against the entrance of rain or snow. The storm band, if placed so close to the cones as to restrict the outflow of air, interferes with ventilation. On the other hand, if the openings are made large enough to permit free egress of the inside air, the storm band increases the ventilation by better utilizing the wind velocity to produce suction.

A further development of the latter principle is the siphon ventilator, as illustrated in Fig. 6, in which siphons or ducts are introduced for the particular purpose of producing suction.

In the swiveling or rotary ventilators, typified by Figs. 7 and 8, a freely rotating cowl is used. A wind vane is provided for keeping the opening facing away from the direction of the wind. This type allows

free egress of the inside air (unless the outlet is made unduly small). Its action depends chiefly upon the suction produced by the wind on the leeward side of the ventilator.

In the induction or ejector type of ventilator, which is also of the swiveling or rotary type, Fig. 9, the kinetic energy of the wind is intended to create a suction inside the cowl as well as outside.

Resistance to flow of air in the ventilator is caused by; (1) restricted outlet openings, or (2) many turns or changes of the direction of the air

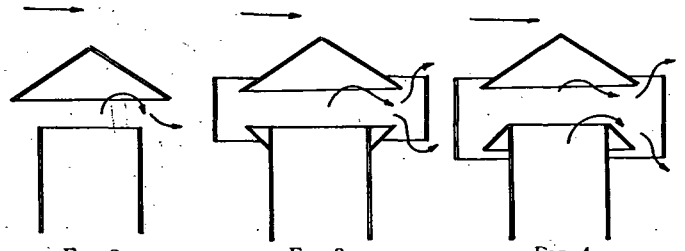

FIG. 2 FIG. 3 FIG. 4

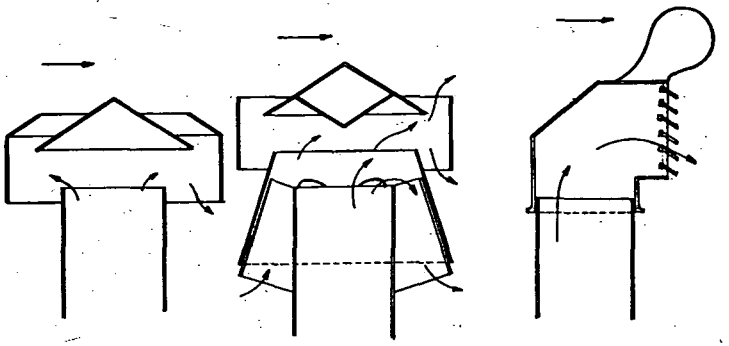

FIG. 5 FIG. 6 FIG. 7

VARIOUS STYLES OF ROOF VENTILATORS

flow. As regards the first item, this depends entirely upon the proportions, and not upon the type; some of the stationary ventilators have smaller, and others have larger outlet area than some cowl ventilators of the same nominal size. Regarding the second item, the swiveling cowl ventilators offer less resistance than the stationary type, in that the direction of air flow is changed as little as possible.

Unless swiveling ventilators move very freely, the opening, at times, faces towards the wind so that ventilation produced by temperature difference is much reduced, or wholly counteracted. In that case, snow and rain may blow in. The rumbling or creaking noise caused by a hard turning swivel ventilator is also very unpleasant. These troubles are,