5. Air admission below the ventilator, (resistance to flow of air *into* building).
6. Resistance to air flow *through* the building.
7. Resistance to air flow in the ventilators themselves.
8. Location of the ventilator with respect to surrounding objects.

Of the factors mentioned, only items 4 and 7 depend upon the ventilator itself; the other items depend upon circumstances wholly outside of ventilator size and design.

While ventilators may be divided into certain classes or groups and the average efficiency of one class will be higher or lower than the average efficiency of another class, this does not in any way determine the 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 basic principles which should be adhered to are as follows:

1. A reasonably large head, as it gives a larger low pressure area and a better exhaust.
2. A sufficiently large area for the air leaving the ventilator head preferably larger than the cross sectional area of pipe.
3. A storm band on stationary non-siphoning ventilators sufficiently wide and so placed as to prevent the entrance of external air into the ventilator head.
4. 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.
5. Provided a smooth, easy passage of sufficient area for the exit of exhaust air avoiding sharp turns and obstructions.
6. A flaring outlet from a rotary ventilator will give a better exhaust than a straight oultet.

The simplest form of ventilator, shown in Fig. 74, consists of an outlet pipe with a conical hood above it. The addition of a storm band, as shown in Figs. 75, 76 and 77, 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 utilizing the wind velocity to produce suction.

A further development of the later principle is the siphon ventilator, as illustrated in Fig. 78, in which siphons or ducts are introduced for the particular purpose of producing suction.

In the swiveling or rotary ventilators, typified by Figs. 79 and 80, 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). For producing suction, it depends upon the viscous drag of the wind passing along the outside of the cowl.

In the induction or ejector type of ventilator, which is also of the swiveling or rotary type Fig. 81, the kinetic energy of the wind is used to a large extent by creating suction, due to the viscous drag both inside and outside the cowl. This device is effective for ventilation even with very low wind velocities. In some stationary ventilators of the siphon type, or of the swiveling cowl type, low wind velocities have the effect of reducing

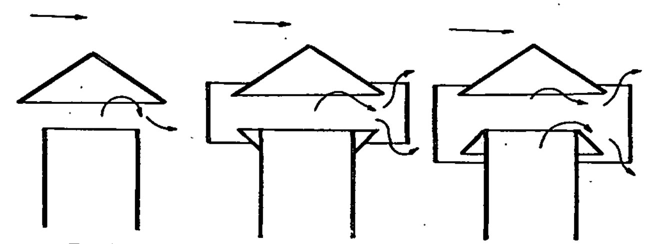

FIG. 74 FIG. 75 FIG. 76

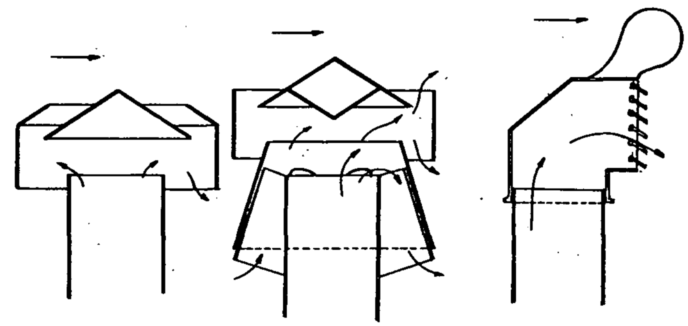

FIG. 77 FIG. 78 FIG. 79

VARIOUS STYLES OF ROOF VENTILATORS

the air discharge produced by the temperature difference, apparently because the laws of fluid flow are not the same at high and low velocities, which is an established fact. In the ejector ventilator, the funnel shape ejector tube converts the pressure of a slow wind into a higher velocity at the throat thereby maintaining suction.

All comparisons of capacity must be referred to a given dimension, namely the throat area, corresponding to the nominal size of the ventilator.

Resistance to flow of air is caused by; (1) restricted outlet openings, or (2) many turns or changes of the direction of the air flow. As regards the first item, this depends entirely upon the proportions, and not upon