The collected dust particles themselves aid in agglomerating and retaining others. Periodic shaking with the fans off or reversed, at intervals of a few hours, drops the excess dust into a lower header or hopper for removal.

Readily removed filters built in small sections in which filter mediums can be replaced are of distinct advantage where deterioration is rapid. Various styles of construction are available which combine quick interchangeability and large filtering area per square foot cross-sectional area. Use of several independent units in parallel is important for the reconditioning of each unit separately. Both continuous and intermittent shaking and sweeping devices remove excess dust and maintain a low resistance.

Such filters should be frequently inspected for leaks and the bags or screens should be in readily replaceable units. General practice in this field is to use a low flow per square foot of cloth and a high pressure drop, giving a relatively high efficiency as compared to general ventilation practice. However, because of the high dust loading, the discharged air may still carry excessive dust for ventilating purposes.

SMOKE STACKS

Gases discharged from smoke stacks may contain relatively large particles of cinders and carbon as well as the fine smoke which remains in relatively permanent suspension. Large particles settle quickly and are likely to constitute a serious nuisance in the immediate neighborhood. Smoke tends to spread over a large area, but in cities the large number of stacks may pollute the atmosphere over the entire city.

A variety of cinder catchers is available for catching the large cinders. Devices of the cyclone type remove much finer particles, but for anything approaching complete cleaning, electrostatic precipitators are usually required. For this purpose they usually consist of wires (at potential of 30,000 to 100,000 volts negative) suspended between vertical plates or hanging in the center of vertical cylinders. The dust collects on the plates or cylinders which are periodically vibrated or rapped to cause the dust to fall down into hoppers.

ODOR ADSORPTION

In recent years adsorption has been applied to ventilation for the removal of odors and also of gases or vapors which might be harmful or undesirable. A suitable adsorbing medium known for application to ventilation systems is cocoanut shell activated carbon. It is a hard granular very porous substance which has the property of selectively adsorbing gases. It adsorbs, in most cases, 60 per cent or more of its own weight and retains more than half of this amount. At ordinary temperatures none of the gases which are normal ingredients of the atmosphere are adsorbed. With very few exceptions, nearly all other gases are adsorbed. Two exceptions are carbon monoxide and ammonia. For water vapor, which is readily adsorbed, the carbon has no retentivity, and therefore the water is displaced by other gases when they are adsorbed. It may be used to remove such odors or gases as food odors, sweat and

body odors, putrefaction and sewage odors, animal odors, perfumes, alchohols, hydrocarbon, solvents, hydrogen sulphide and sulphur dioxide.

The apparatus consists in principle of relatively thin granular beds through which the air stream passes. Upon contact with the grains of carbon, the odors and other gases are adsorbed and held within the structure of the activated carbon. When saturated, the carbon may be revivified without loss. The period between revivification will vary with the concentration of adsorbable gases in the air stream, and have been found in ordinary odor conditions in ventilation practice to vary from four years down to four months.

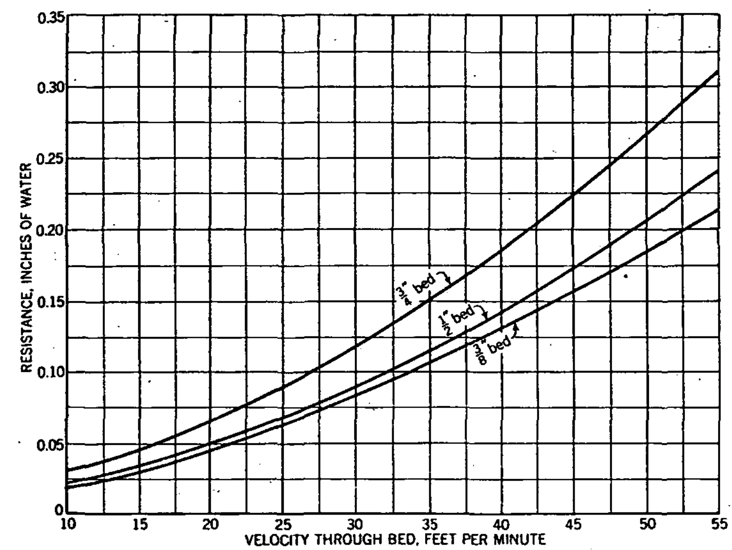

FIG. 5. RESISTANCE CURVES FOR 6-14 MESH ACTIVATED CARBON

The resistance curves shown in Fig. 5 are for 6-14 mesh activated carbon used in conventional equipment. Resistances given are overall for customary arranged equipment. The average practical velocity for such equipment is 40 fpm, although common velocities may range from 30 to 50 fpm.

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