Vent Openings

The size and location of the vent outlet is important. In many cases the sizes for public buildings are regulated by law, but the location of the vents generally is left to the discretion of the engineer.

The best results have been obtained with a velocity through the vent openings nearly equal to that at which the air is introduced into the room, thus maintaining a slight pressure in the room. Calculated velocities at the vent openings of from 600 to 800 ft. per minute produce the best diffusion results from this system.

The cross-sectional area of the vent flue itself may be figured on the basis of 20 sq. in. of flue for each 100 cu. ft. per minute. Thus the vent flue area of a flue for a room equipped with one 1,200 c.f.m. unit ventilating machine would be 240 sq. in. The area of vent flue opening from the room may be figured on the basis of 25 sq. in. per 100 c.f.m.

The vent opening should not be placed directly opposite the unit, since the incoming air when introduced at lower than room temperature falls to the floor and moves directly toward this vent opening, causing possible floor drafts and in any event causing failure properly to cool the occupants of the room.

In buildings provided with wardrobes or cloakrooms the vents may be so located that the air shall pass through these spaces, heating and ventilating them with air which otherwise would be passed to the outside without being used to the best advantage. Many State codes for ventilation of public buildings make this arrangement mandatory.

In rooms without wardrobes or cloakrooms the vent flue may be located diagonally opposite the unit, and two such flues generally are desirable, one near each opposite interior corner of the room. This gives the air an opportunity to mix thoroughly with the room air before dropping to the vent opening.

Individual and Corridor Vent Flue Systems

The individual vent flue system and the corridor vent flue or central vent flue system are the methods generally used with unit ventilating machines.

The individual vent flue system, Fig. 5, provides for separate vent flues from each room.

The corridor vent or central vent outlet system, Fig. 6, provides for outlets centrally located to take care of a group of classrooms, the air passing from the classrooms, wardrobe or cloakroom to the corridor, and from the corridor to the central outlets. The grilles between the wardrobes and corridors may be near the ceiling, provided the air leaves the classroom to enter the wardrobes below the breathing line in the classrooms. A velocity of 800 to 900 ft. per minute may be used for the central outlet from the corridor.

Where the law and where the type of building construction will permit, the escaping spent air from the building may circulate throughout the attic on its way out.

CHAPTER 10

HEATING BY COAL

Composition, Kinds and Combustion of Coal; Hand Firing; Mechanical Stoker Firing; Storage Space.

COAL, because of its abundance and low price, has been used in preference to other fuels for heating purposes in most localities.

All coals are of vegetable origin, and are the remains of prehistoric forests. Destructive distillation, due to great pressures and temperatures, has resolved the organic matter into its exceedingly complex constituents; among which are carbon, hydrogen, oxygen, and other substances, in varying proportions. Time, depth of bed, disturbance of bed, and intrusion of extraneous mineral matter have produced the variations which are noted in the degree of evolution from vegetable fiber to hard coal. This variation is shown chiefly in the content of carbon, and Table 1 shows the steps of such variation.

COMPOSITION OF COAL

The uncombined carbon in coal is known as fixed carbon. Some of the carbon constitutent is combined with hydrogen, and this, together with other gaseous substances driven off by the application of heat, forms that portion of the coal known as the volatile matter. The fixed carbon and the volatile matter constitute the combustible.

The oxygen and nitrogen contained in the volatile matter are not combustible, but custom has applied this term to that portion of the coal which is dry and free from ash, thus including the oxygen and nitrogen in the combustible.

KINDS OF COAL

The kinds of solid fuel in general use are anthracite, semi-anthracite, semi-bituminous, bituminous, lignite and coke. They are classed according to their fixed carbon and volatile matter content. Analyses typical of each kind are shown in Table 2.

Anthracite Coal

Anthracite coal ignites slowly, but when in a state of incandescence its radiant heat is very great. Its flame is short and of a yellowish blue tinge and it can be burned with practically no smoke. This coal does not swell when burned although it contains from 3 to 7.5 per cent of volatile matter.

Semi-Anthracite Coal

Semi-anthracite coal kindles more readily, because of its higher content of volatile combustible, and burns more rapidly than anthracite. It has