industrial installations. They differ in design and construction in proportion to the service for which they are intended.

They may be located in the various rooms or parts of a building for discharging warmed air into the room or building, and either entirely or partially recirculating the air, or else having a fresh-air connection for special ventilation purposes. These units, in the case of a school-room and sometimes in factories, are set on the floor but frequently in factories are suspended from the roof trusses so as to leave the floor spaces unobstructed.

Public Building Work

Unit heating and ventilating systems intended for public building work consist of a small rectangular steel cabinet, enclosing the following essential parts:—

1. A fresh air inlet.
2. An air filter.
3. A motor and fan assembly.
4. A radiator or heating element.
5. A cold air or by-pass chamber.
6. Mixing chamber.
7. Air discharge outlet.
8. Fresh air and recirculating control damper.
9. A by-pass or temperature control damper.

Note.—Both the recirculating control damper and the by-pass damper can be manually operated, or the recirculating control damper may be pneumatically controlled from some remote point. The by-pass or temperature control damper can be automatically operated on room temperature by means of thermostatic motor in connection with the use of any pneumatic automatic temperature control system. (See also Chapter XIII.)

When the fresh air inlet damper is open the fresh air is drawn immediately from out of doors, having the dust and dirt removed by means of the air filters. From this point the air is driven by means of the motor and fan assembly and forced up through the machine, using either polyphase, alternating current or direct current motor.

All of the air may be driven through the radiator to be heated and thence to the room, or all of the air may be driven through the cold air or by-pass chamber and thence to the room, or part of the air may be driven through the radiator and part through the cold air chamber in any desired proportion, depending upon the position of the by-pass damper.

The air is driven from the machine in a vertical direction at a velocity ranging from 800 to 1000 ft. per minute. This high velocity drives the air against the ceiling of the room, thereby diffusing it and spreading it in a downward movement to all parts of the room.

The closing of the fresh air damper simultaneously opens the recirculating grille at the floor line, so that there is a free path for the air to circulate by gravity through the radiator. Thus, when the motor is not operating and the fresh air damper is closed, the radiator of the unit becomes an enclosed direct radiator, functioning in the same manner, as any other enclosed direct radiator. By starting the motor during heating-up period in the morning, the air may be drawn from the room at the floor line, heated, discharged, recirculated, reheated and redischarged, this process continuing until the room has reached the desired temperature, thus effecting a tremendous saving in time and fuel in preparation of the room for occupancy.

With this system of ventilation, the air outlets for the room serve strictly in the capacity of vents to permit of displacement and they

should be small with as little exhausting effect as possible. Under such conditions their location is unimportant further than that they be placed at or very near the floor. In the typical layout they are usually placed in the wall opposite the ventilator. This is not necessary but it has been proven a very satisfactory location and where vent flues are used it is advisable to locate them on inside walls to prevent downdrafts.

In school work where it is desired to circulate air through adjoining wardrobes, room outlets should be in low panels of doors or near floor in partitions. Wardrobe outlets may be either at floor or ceiling. The latter arrangement is usually preferable from a purely ventilation standpoint but the former provides a better heating effect. By such a plan direct radiation may usually be omitted from such rooms. When half doors or no doors are used between class-rooms and wardrobes, outlets from latter must be at floor.

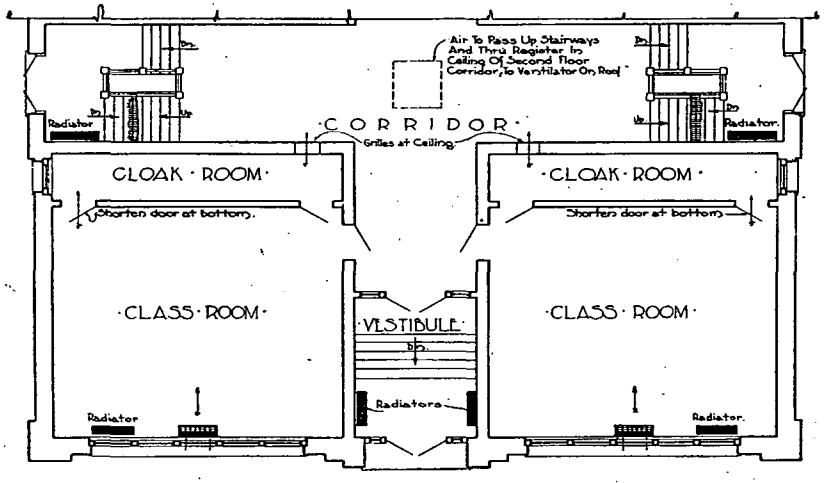

FIG. 76. SCHOOL ROOM PLAN SHOWING LOCATION OF UNITS

With the mechanical unit ventilation system exhaust fans or aspirating coils in vent flues are neither necessary nor desirable, it being the idea to force the air out of the rooms under back pressure. Where the outlets are properly proportioned this has an inflation effect that retards infiltration and assists in diffusion. One vent for each machine is sufficient and both the grille and flue should have a net free area of about 18 sq. in. for each 100 cu. ft. of air delivered per minute by the ventilator.

In cases where state laws have failed to anticipate this system of ventilation and demand larger vent flues, arrangements can usually be made to provide throttling dampers in same to secure the desired effect.

The so-called corridor system of venting is frequently employed with unit ventilators and is favored by many engineers with this system of ventilation. Vent flues are dispensed with and room outlets are directly into corridors, which serve for conducting the air to roof ventilators connected with grilles located in the ceiling of the top story corridor.