With a mechanical warm air system the inlet openings may be located in the floor or base board with satisfactory results but may also be located above the breathing line, which is equally satisfactory when proper inlet velocities are used. (See Chapter 23). Wall openings located above the breathing line permit higher inlet velocities with reduced sizes of the openings, resulting in improved air distribution satisfactory for both heated and cooled air. For the best location of the high inlet opening, the opening should be arranged so that the air will flow parallel and in close proximity to an exposed wall. If a low inlet opening is used for cooled air the temperature differential causes the cooled air to settle in the lower part of the occupied space, thereby causing too great a temperature differential between the floor and breathing level.

Exhaust openings for mechanical warm air systems located in or near the floor on either the exposed or interior wall function satisfactorily. The wall selected for the location of this opening does not appear to be

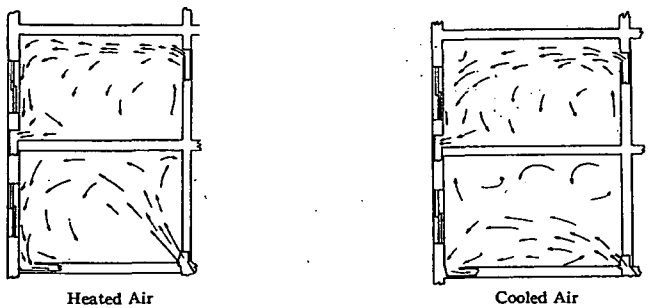

Fig. 4. Examples of Residence Air Distribution

important, except when the room has a multiple number of exposures, or excessive glass, because the movement of the air above the opening and the vertical room air movement usually exceeds the horizontal movement. Examples of both heated and cooled air residential distribution are given in Fig. 4.

STORES AND OFFICES

Air distribution for stores and offices is frequently a difficult problem because of the limitations in building design and construction. With a duct distribution system it is advisable to locate the inlet opening in the side wall as high as possible so that the location will be applicable for cooling as well as for heating.

When an inlet opening is located near the ceiling on one of the walls, the velocity through the opening should be as high as possible so as to project the air stream. The air stream may be expanded by deflection for short throws in offices and across the width of narrow stores. If the length of the throw required should exceed 40 ft as in the case of inlet openings installed at one or both ends of a store, a long throw opening (Fig. 1) should be used with a multiple number of openings proportionately spaced in either or both ends. Since every grille has a different charac-

teristic, it is advisable to use reliable grille engineering information for the proper selection. See *Catalog Data Section*. It is generally impossible to supply too many inlet or exhaust openings for any of these conditions.

One exhaust opening should be supplied for each office whenever possible, using a long narrow opening so that the air will be drawn from as large an area as possible, although the location can be either under or opposite the supply openings.

Suspended unit heaters and coolers are occasionally used in stores and offices and where a single unit is used, care should be exercised to insure that the air flow will diffuse properly. Where a multiple number of units are used it is advisable to locate the units so that the air streams all

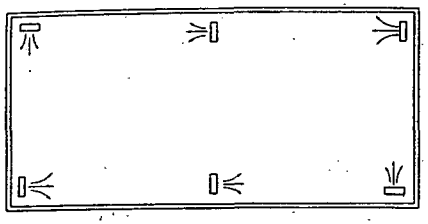

Fig. 5. Installation Arrangement of Multiple Suspended Unit Heaters

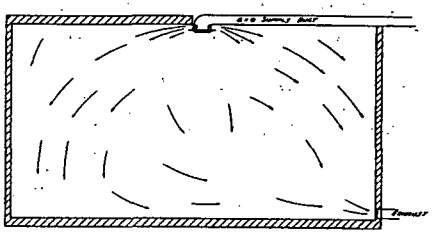

Fig. 6. Air Distribution with Ceiling Inlet Opening

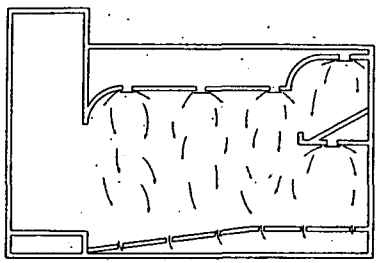

Fig. 7. Section Through Theatre Showing Air Distribution with Cooled Air

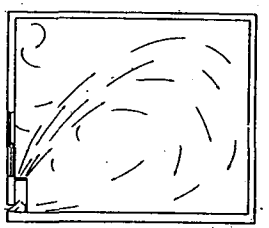

Fig. 8. Section Through Room Showing Air Distribution with Unit Ventilator

circulate in the same direction (Fig. 5) or in such a manner as to distribute the air uniformly throughout the space.

Another method of air introduction is a ceiling outlet (Fig. 6) with the air discharged downward on a deflector which spreads the air in all directions at right angles to the opening. With such an opening, a foot square and properly designed with a 4 in. opening completely around the outlet, the air may be discharged in an expanding circle with a low velocity for large and small volumes.

AUDITORIUMS

This type of building often presents the greatest problem in air distribution, mainly because winter conditions require air cooling, and for summer comfort air conditioning large volumes of air are required.