

Figs. 8 to 15 show acceptable construction details for rectangular ducts, elbows, transformation pieces or connections, and air splitters. Other methods are also acceptable, such as the use of angle iron stiffeners for large ducts. Good construction is essential to the elimination of duct noises and for the prevention of a flimsy installation.

Fig. 8 is an isometric view of a duct showing the location of the stiffening seams on the top and side panels. The cross seams should not

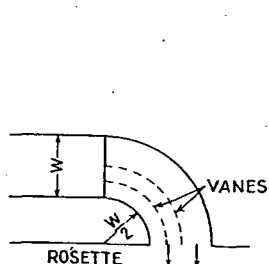


FIG. 13. AIR SPLITTERS
INSTALLED IN ELBOW

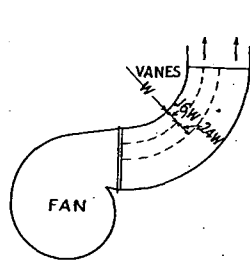


FIG. 14. AIR SPLITTERS IN-
STALLED IN ELBOW AT FAN
DISCHARGE

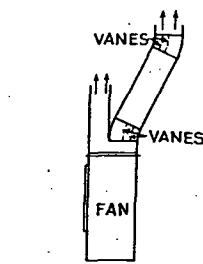


FIG. 15. AIR SPLITTERS
IN BRANCH DUCTS AND
ELBOWS

occur at the same place but should be staggered as indicated. Heating units should be installed as shown in Fig. 10 with the duct connections making an angle of not less than 45 deg, but preferably 60 deg. Fan discharge connections should have a maximum slope of 1 in 7, as indicated in Fig. 12. Whenever a pipe or other obstruction passes through a duct an easement should be placed around the pipe as indicated in Fig. 11. Air splitters should be installed in elbows as shown in Figs. 13 and 14. The recommended gages for rectangular sheet metal duct construction are given in Table 4.

TABLE 4. SHEET METAL GAGES FOR RECTANGULAR DUCT CONSTRUCTION^a

GAGE	WIDTH OF DUCT	SEAM	REINFORCED SEAM
26	Up to 12 in.		
24	13 in. to 30 in.	1	
22	31 in. to 48 in.	1	
22	49 in. to 60 in.	1½	¼ in. x 1¾ in.
20	61 in. to 90 in.	1½	¼ in. x 1¾ in.

^aIf panels are not cross-broken two gages heavier material should be used.

Chapter 20

AIR DISTRIBUTION

Warm Air Systems, Combined Systems, Split Systems, School Buildings, Theaters, Upward System, Downward System, Vanes

TO produce proper air distribution in a room to be ventilated, heated, or cooled by air, the design and location of the air supply inlets and exhaust outlets must be carefully considered. Systems fail though they handle the proper amount of air, because important design principles are ignored.

WARM AIR SYSTEMS

With gravity warm air systems, it has been the practice to place the supply registers in or near the floor of each room and to place the return grille in the floor of the first story. When there is mechanical air circulation, the supply ducts are extended to the outside walls and the air is discharged into the rooms near their cold exposures; on the return side a grille is placed in or near the floor at a central location, or individual return grilles are provided, usually at the side of the room opposite the supply register.

These arrangements are usually satisfactory for heating (Fig. 1) but not for cooling (Fig. 2). If cool air is introduced at one side of the room at the floor, and if the escape opening for the heated air to be displaced by the cool air is at the floor at the other side, the cool air will travel across the floor and will escape through the vent or return air opening, and thus not appreciably affect the over-heated air in the upper part of the room.

The air supply opening will serve satisfactorily if located high on an interior wall opposite the exposed wall, and this location answers well also for gravity indirect heating. The corresponding return air arrangements, however, apparently are not subject to exact rules, but must be adapted to circumstances. For example, where the building is compact, with a first story having rooms open to each other, a single, centrally-located return at the floor functions satisfactorily for heating, and if the second story bedrooms are also compactly arranged no individual return from each will be necessary. On the other hand, any room which is unusually exposed, which is especially remote with reference to the other rooms, or which is apt to be tightly closed most of the time, should have a controlled return grille and duct. With a mechanical warm air system, this return may be close to the floor below the supply grille, and with a gravity system may be close to the floor at the opposite side of the room from the supply grille.