TABLE 7. TABULATION OF RESULTS (EXAMPLE 6)

Section	Air Volume	Equivalent Length	Velocity	Rectangular Duct	Diam.	Friction Per 100 ft	Net Pressure Loss
	cfm	ft	fpm	in.	in.	in. H_2O	in. H_2O
A	8000	40	1500	48 x 16	29.2	0.13	.05
B	6000	25	1500	36 x 16	—	—	.03
C	4500	15	1300	31 x 16	—	—	0
D	3000	26[a]	1040	26 x 16	—	—	0
E	1500	15	860	16 x 16	—	—	0
F	2000	22.5	1200	15 x 16	17.	0.13	.03
G	1000	15	900	10 x 16	—	—	0

[a] Includes additional equivalent length of elbow between outlets 2 and 3, which is assumed as 5.5 W, or 11 ft equivalent length of duct. *(Based on 3000 cfm at estimated velocity of 1100 fpm).*

5. Total pressure loss of the system is the loss in Section A, plus the loss in Section F (or B), plus the loss in the outlet as follows:

$$\text{Loss in Section A} = 0.13 \text{ in.} \times \frac{40}{100} = 0.05$$

Loss in Section F (or B) = 0.03
Outlet Loss = 0.12
Total Pressure Loss = 0.20 in.

DUCT CONSTRUCTION DETAILS

Straight sections of round duct are usually formed from sheets, rolled to the proper radius with a longitudinal grooved seam. Each section is swedged 1.5 in. from each end and assembled with the larger end of the adjoining section butting against the swedge. The sections are held in place by rivets, sheet metal screws, or by soldering.

Rectangular ducts are generally constructed by breaking the corners and grooving the longitudinal seam, although some fabricators still use the standing seam. Elbows and transformation sections are generally formed with Pittsburgh corner seams because this seam is easier to lock in place than the double seam, but complicated fittings such as double compounded elbows are usually constructed with double seam corners. The construction of these various seams, as well as the types of girth connections, are shown in Fig. 15. The application of the various slips and connections is outlined in Table 8. The end slip may be used wherever *S* slips are recommended. Where drive slips are used, the end slip may be applied on the narrow side of the duct, and the drive slips on only the maximum side. Ducts 25 to 30 in. in size should be reinforced between the joints, but not necessarily at the joint. Ducts 31 in. and up should be reinforced at the joint and between the joints; if drive slips are used the angles are usually rivited to the duct about 2 in. from the slips. It is good practice to cross-break or kink all flat surfaces to prevent vibration or buckling due to the air flow and accompanying variations in internal pressure

The construction of elbows and changes of shape cannot be definitely outlined, because of the varied conditions encountered in the field, but in general, long radius elbows and gradual changes in shape tend to maintain uniform velocities accompanied by decreased turbulence, lower resistance and a minimum of noise.

Heavy canvas connections (asbestos cloth if there is a fire hazard) are recommended on both the inlet and outlet to all fans. Self-vulcanizing

adhesive tapes are available for this purpose and for sealing joints in duct work. The fan discharge connections shown in Fig. 15 are marked *good*, *fair*, and *poor* in the order of the amount of turbulence produced. An inspection of the heater connections shown in Fig. 15 will readily show that uniform velocity through the heater cannot be expected in the diagram

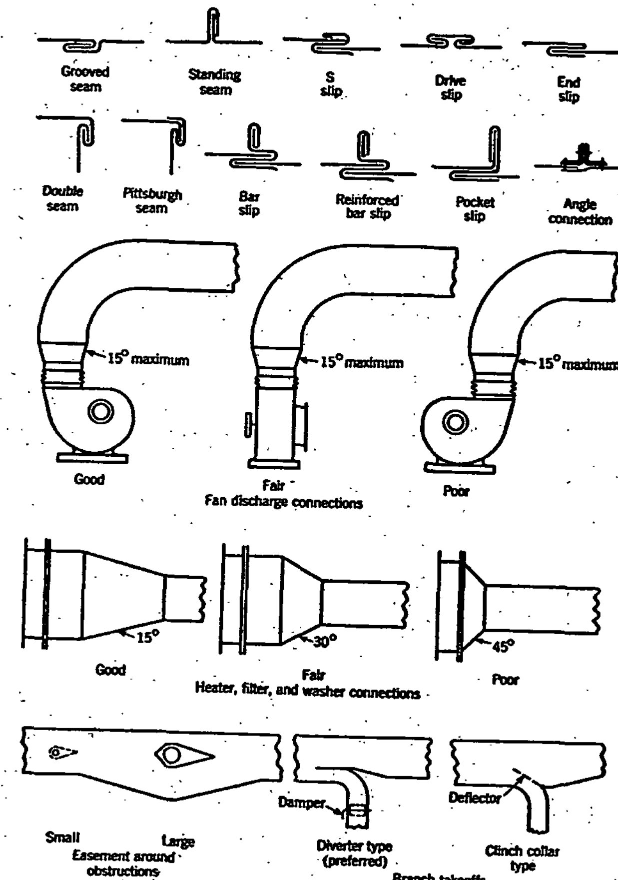

FIG. 15. SHEET METAL DUCT AND ARRANGEMENT DETAILS

noted *poor*. When obstructions cannot be avoided, the duct area should never be decreased more than 10 percent, and then a *streamlined* collar should be used. Larger obstructions require an increase in the duct size in order to maintain as nearly uniform velocity as possible. Branch takeoffs should always be arranged to cut or slice into the air stream in order to reduce as far as possible the losses in velocity head.

Wherever ducts pass through fire walls or connect two fire areas of a building, automatic fire dampers should be provided. For design of such