CHAPTER XIV.

The Construction of Mixing Dampers

Mixing Damper in Indirect Heating

The use of the mixing damper in a galvanized iron casing in indirect heating is shown in connection with Fig. 186, in which A is the heater. The heavy lines show the sectional view of the casing connecting to

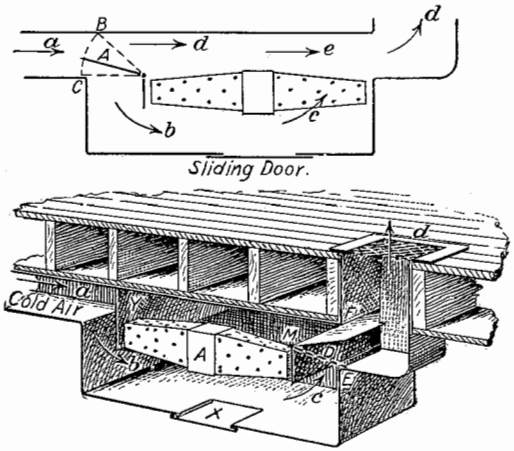

Fig. 186—Galvanized Iron Casing with Mixing Damper Below the Register

the floor register. The cold air duct **a** is carried along the basement ceiling from an inlet window and connects to the cold air chamber below the heater A.

The mixing damper in this case has been placed below the register as shown at D, and can be raised to

F, or lowered to E. By means of the metal partition Y, the cold air entering at **a** is brought below the heater at **b** and if the mixing damper D is lowered to E, then all of the cold air must pass over the heater A and become warmed before entering the room above through the register **d**. If the damper D, however, is set in the position shown, part of the cold air will pass over the heater A and part will pass without going through the heater, and this mixture entering the register will be at a lower temperature than before. By regulating the damper at the pivot M, the warm and cold air delivered to the room can be mixed as desired. The only objection to placing the mixing damper below the register is, that on a cold, windy day, if the damper is set in the position shown, the air enters the room too quickly, before it can be thoroughly mixed —that is, a stream of warm air passing through the heater will pass through one-half of the register and a stream of cold air **c** will pass through the other half.

As the distance between the cold air chamber and register is short, the clean out door being placed at X, will be sufficiently near to permit reaching the duct connecting to the register, for cleaning purposes.

The mixing damper if desired can be placed at the opposite side as indicated by A in the diagram above the same figure. In this case if the damper be raised to B, all of the cold air entering at **a** must pass over the heater as indicated by the arrows **b** and **c** and become heated before passing through the register at **d**. If, however, the damper is set in the position shown by A, the lower stream of cold air will pass over the heater, as shown by **b c**, while the upper stream passes through as indicated by **d e**, and becomes slightly heated before passing through the register **d**. It is

therefore advisable in regulating the mixing damper to have the opening A B larger than the opening A C as shown, so as to obtain the desired temperature.

Damper for Quick Warming

When it is desirable to warm the rooms at times when no ventilation is desired, as at night, or for quick warming in the morning, or any other time, the construction having this advantage is shown in Fig. 187,

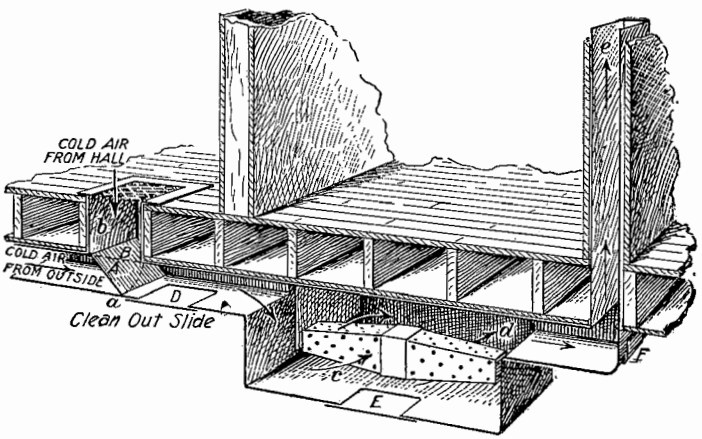

Fig. 187—Method of Construction When Cold Air Either from the Outside or from the Halls Is to be Used

in which the mixing damper is shown by A. If this damper is raised to B, the cold air from the outside will be heated. If, however, the damper A be dropped to **a** the cold air from the hall will pass through the register at **b**, enter the cold air chamber at **c**, pass over the heater at **d** and up the flue **e** to the room above. By keeping the damper A in the position shown the same air is heated over and over, but by raising the damper A, fresh cold air and ventilation is obtained.

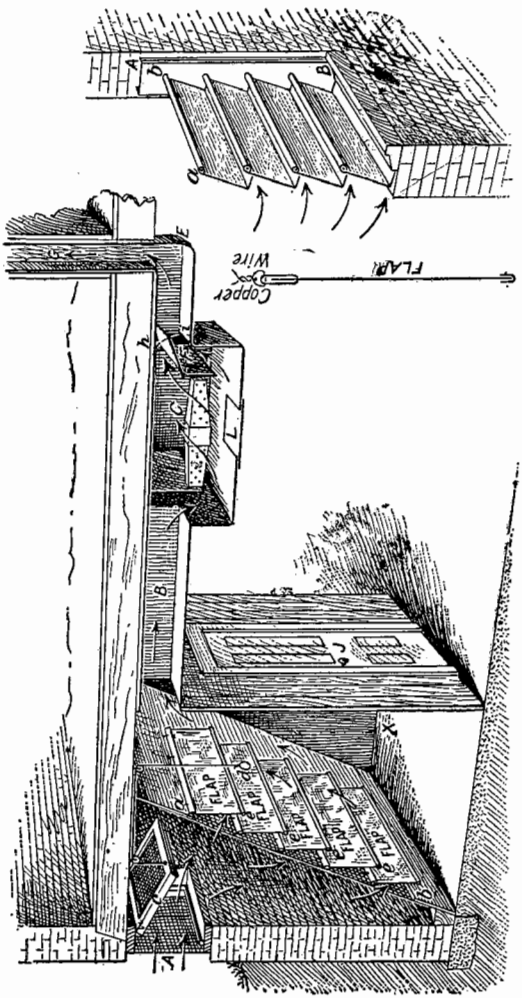

Fig. 188—Construction of Cold Air Room with Metal Edged Flaps Employed

Fig. 189—Reenforcing the Edges of the Flaps

Fig. 190—Placing Louvres in Cold Air Inlet

In a construction of this kind clean out doors should be placed as shown by D, E and F.

Check Valves in Cold Air Room

When a cold air room is in use, as for a large building, with ducts connecting with the heaters, check valves are arranged to prevent a back draft or outward flow of air, as shown in Fig. 188, in which X shows the cold air room, with a door J leading to same. A window at the ceiling line is provided at A with a heavy wire mesh on the outside as shown, or a frame can be hinged on the outside of the window, over which brass strainer cloth or cheese-cloth is stretched for cleansing the air. The window **c** is hinged on the inside and has a chain attached running over two brass pulleys as shown, so that it can be opened or closed as desired from **d**. The front of the cold air room has a partition sloping from the ceiling to the floor, with an opening in it as indicated from **a** to **b**, over which one-half inch wire mesh is drawn. To this wire mesh the check valves indicated by **e**, usually called flaps, are fastened. These flaps are usually made about six inches wide, overlap each other about one inch and hang in a perpendicular position as shown, thus allowing the air to enter the cold air room and pass thence through the duct B, over the heater C and up the flue G. In this case the mixing damper has been placed at F, and can be regulated by being moved to **h** or **i**. The objection previously noted about placing the mixing damper at this end of the heater is overcome when a vertical flue is used, because the cold and warm air will mix more rapidly in ascending the flue G. The flaps **e e**, etc., being made of gossamer cloth, swing easily, so that if there should be any tendency to a

back draught or outward flow of air, the flaps will close against each other and prevent the same. Clean outs are provided at L and E.

Construction of Flap

As shown in Fig. 189, a V-shaped metal hem is clamped at the lower edge of the flap, and a wider one at the upper part. At intervals of from 10 to 12 inches, holes are punched and through these holes, soft copper wire loops are placed and fastened to the wire mesh previously mentioned. In this manner the flaps are hung in position and can turn inward or outward according to the air pressure.

Louvre Construction in Cold Air Inlet

When the inlet to the cold air room is to have metal louvres the frame is constructed as shown in

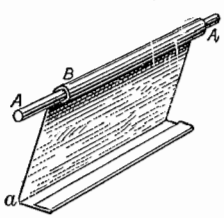

Fig. 191—Formation of Movable Louvre

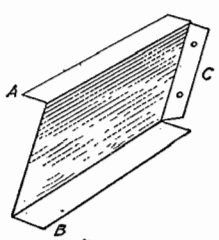

Fig. 192—Formation of Stationary Louvre

Fig. 190, which is a sectional view of movable metal louvres closed. Sometimes, however, stationary louvres are employed. In either case the part of the frame shown by A B is constructed of number 22 galvanized iron. When movable louvres are used they are pivoted on rods a, which enter holes previously punched in the frame at b.

They are formed as shown in Fig. 191, in which the sheet metal B is turned over the rod A A, which should not be less than ¼ inch in thickness, and acts as the pivot. To stiffen the lower edge, a hem edge can be formed at a.

When the louvres are to be stationary they are constructed as shown in Fig. 192, right angle bends being made at A and B, to which a hem edge can be added if desired. If the louvres are longer than two feet, they should be made from number 22 galvanized iron or from 16-oz. cold rolled copper. A flange must be allowed at each end, turned toward the inside as

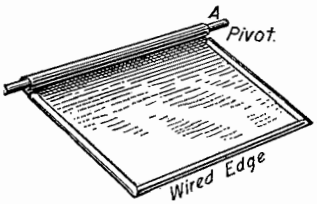

Fig. 193—Construction of Double Damper

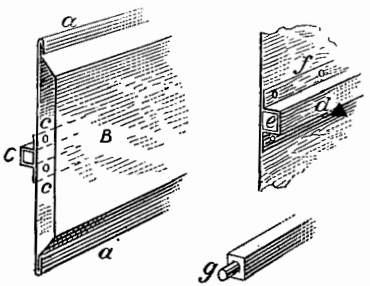

Fig. 194—Construction of Double Damper

shown by C, which is riveted to the frame before it is inserted in the wall opening.

Construction of Mixing Damper

The construction of the mixing damper is shown in Fig. 193; the top edge of the damper is turned over a rod not less than ¼ inch in thickness, which acts as a pivot when placed in the sides of the casing. The other three sides of the damper have hem or wire edges. Care must be taken that the mixing damper works easily and closes tightly against sheet rubber

or felt flanges, similar in construction to those already described. The dampers can be operated from the rooms above by means of brass chains passing over guide pulleys as previously shown, or a quadrant can be operated from the side of the casing in the basement.

Construction and Operation of Duct Dampers

When square or rectangular dampers are to be operated in heat or vent ducts, the method of con-

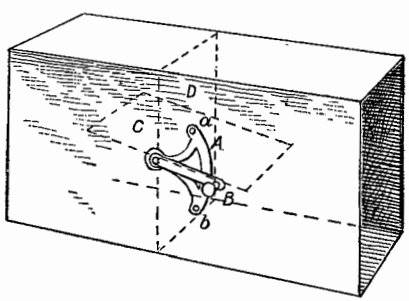

Fig 195—Using the Quadrant for Operating Center or Mixing Damper

struction required is that shown in Fig. 194, in which a double damper is shown. The top B, or one side,

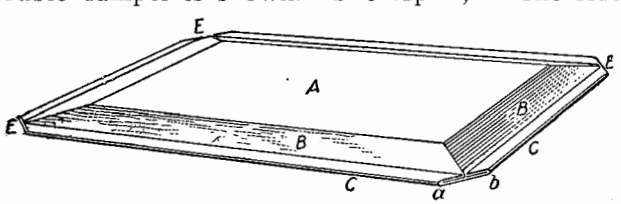

Fig. 196—Method of Notching Corner of Double Damper to Prevent Binding in Duct

is beveled as shown, while the other side is flat with locks, which close over the edges at a and a. On the flat side of the damper a pocket C is riveted as shown

by **c c** to receive the damper rod; this rod pocket C must be riveted to the flat side before the opposite side is locked in position. The diagram at the right shows the flat side of the damper, showing more clearly how the damper rod **e** is fitted into the pocked **d**, which in turn is riveted at **f**.

The ends of the damper rod are filed as at g below, so that they act as a pivot when in position in the sides of the duct.

In operating the dampers after they are placed in the duct, quadrants are used as shown at A in Fig. 195. These quadrants are riveted in position at **a** and

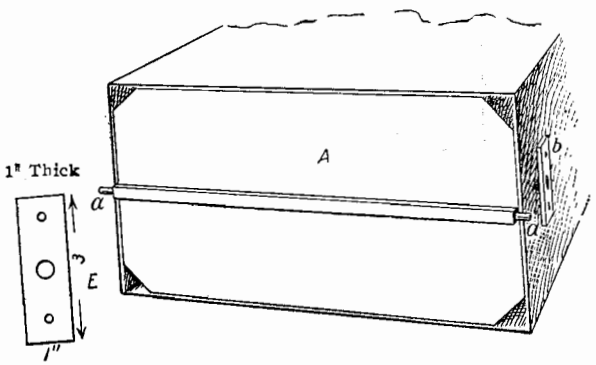

Fig. 197—The Damper in Position

b, and the end of the damper rod secured to the handle B; then by means of the handle the damper can be closed or opened as shown by the dotted lines. Care must be taken that the dampers close tightly against felt or rubber flanges as previously illustrated. When using sheet metal dampers they are formed so as to prevent them from binding in the duct as shown in Fig. 196. In this cut A B B represents the beveled side of the damper with single edges turned outward

as shown by **a b**. C C shows the lock to lock to the beveled side as shown. The corners are notched off at 45° as shown by E E E, which prevents binding in the duct. When this damper is in position in the duct a re-enforcement is required to the metal side of the duct to receive the damper rod as shown in Fig. 197. A shows the damper in position and **a a** the damper rod. Small eyelets are used through which the damper pivot passes, as shown by **b** and as shown in detail with measurements at E. The eyelet is riveted to the sides of the duct through the two holes near the ends and the rod pivot passes through the center hole.