CHAPTER XV.

MAKING DAMPERS FOR LARGE DUCTS

Dampers for Large Ducts

When dampers are required in large size ducts, where they cannot be made in one piece, they are then made in the form of louvres as shown in Fig. 198, and are constructed as follows: First a wrought iron frame is made, whose outside measurements will

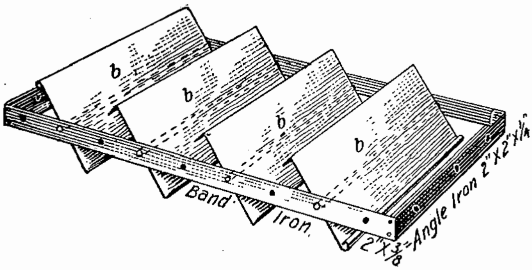

Fig. 198—Louvre Dampers for Large Size Ducts

fit the inside of the duct, two sides being of angle iron and two of flat iron of the thickness given in the illustration. This wrought iron frame has holes punched as indicated on all sides, through which it is riveted to the inside of the duct. Galvanized sheet iron louvres made of No. 20 gauge metal are then formed up as indicated by **b** through the center of which pivots are fastened, as previously illustrated, the ends of the pivots passing into holes punched through the band iron.

Operation of Louvre Dampers

The louvre dampers are operated as shown in Fig. 199. Malleable iron brackets **b**, which can be purchased from dealers in gearing supplies are riveted to the louvres and pivoted to a flat piece of band iron **e, e** as shown. Suitable sized pulleys X and X are fastened by bolting or riveting through to the

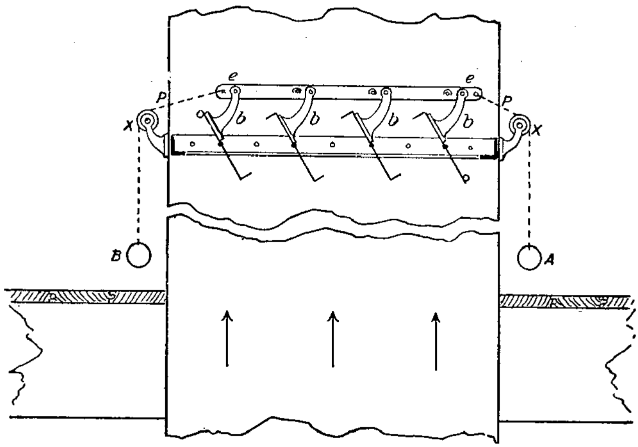

Fig. 199—Operation of Louvre Dampers

angle iron frame as shown. Brass chains pass over the pulleys through a slot cut into the sides of the duct at P. By pulling the ring at A or B the damper can be opened or closed.

Fusible Damper Construction

What are known as fusible dampers are usually employed in the fresh air and exhaust ducts. These are, as their name implies, dampers normally held open with a fusible link, which is melted when the temperature reaches 155°. They are placed in the duct at each floor as shown in Fig. 200, so that in case of fire on any floor the link holding the damper on the floor above melts and allows the damper to close, thus checking the circulation of air.

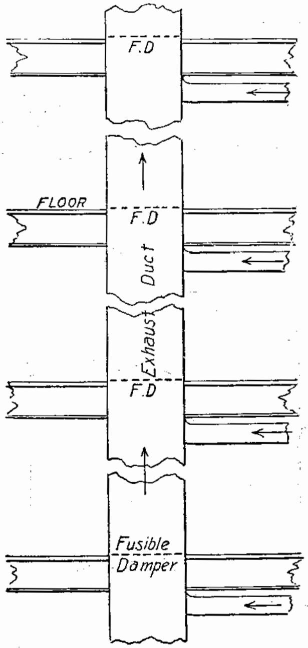

Fig. 200—Location of Fusible Dampers

These fusible dampers are constructed as shown in Fig. 201, in which A represents the duct, B, C an angle iron frame riveted to the inside of the duct, and D the damper, which is made of ⅛-inch thick metal and has a band iron frame riveted around same as indicated by **b b.** A pivot is placed at either end and a weight is bolted to the upper edge of the damper. The fusible link shown consists of two pieces

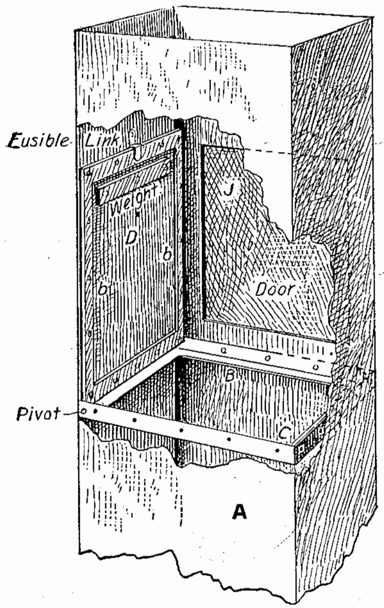

Fig. 201—Construction of Fusible Dampers

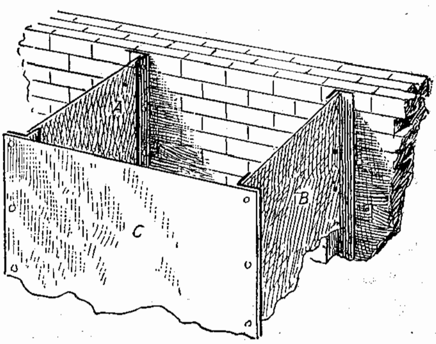

Fig. 202—Construction of Duct for Outside Vent

of metal soldered together with an alloy which will melt and release the damper at 155°. In order that the dampers can be inspected and adjusted when necessary, doors are provided at each floor as at J, which can be opened from each floor and closed tightly.

Fusible Alloy and Links

An alloy for a solder melting at 155° is composed of 12 parts of tin, 25 of lead, 50 of bismuth and 13

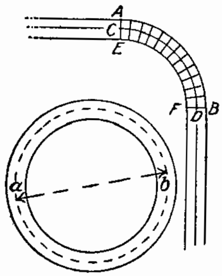

Fig. 203—Riveting Vertical Joints in Heavy Stacks

of cadmium. Fusible links for the purpose can be purchased.

Duct for Outside Vent

When the vent or exhaust duct is placed on the outside of the building the duct is constructed by means of angle iron uprights, to which heavy galvanized iron sheets are riveted as shown in Fig. 202, in which the angle iron uprights against the wall are fastened by expansion bolts. The outer uprights are held in position by means of cross-angle pieces, secured to the uprights against the wall. Holes are punched in the angle irons to receive the rivets before the uprights are set in position and when riveting the galvanized iron sheets in place the sides A and B are riveted in position first. This leaves the front open and avoids climbing in and out of the

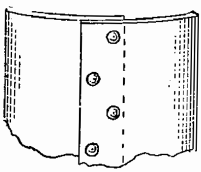

Fig. 204—Riveting Joints for Stacks

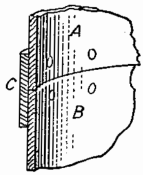

Fig. 205—Cross Joints

duct. After the sides are in place, the front C can be riveted in position from the outside by placing the angle uprights in the position shown.

Joints for Stacks

The usual metals employed for round stacks are black and galvanized sheet iron in thickness from No. 24 to 16 gauge; the joints being usually riveted as shown in Fig. 203.

When black sheet iron is used for the stack, the varnish used to protect the metal from rusting is made up from good asphaltum dissolved in oil of turpentine, and the inside of the stack is varnished or painted by means of a 4-inch wide painter's brush to which a long handle is attached. Several excellent brands of sheet metal are to be had for this special class of work.

Forming the Stack

When the metal is rolled, to form a stack or other cylindrical article the outer molecules expand along the outer curve A B of Fig. 204, while those along the inner curve E F contract as shown, the center of the thickness along C D remaining practically stationary. This then shows that if no allowance were added to the circumference for the thickness of the metal the inside diameter would be too small. It would thus be found that the desired diameter would measure from center to center of thickness as shown in diagram from **a** to **b**.

Vertical joints are riveted in heavy stack work by placing the rivet zig-zag fashion as shown in Fig. 204. The cross joints are made in heavy stack work as shown in Fig. 205. An outer collar or band C is riveted on the outside of the pipe as at B, then the following joint of pipe A slipped in position, and the band C riveted to A.

Punching Holes in Heavy Material.

As heavy metal necessitates that all holes be punched in the pipe and band while in the flat sheet, that is before rolling, their exact position can be de-

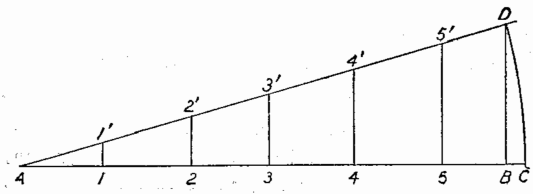

Fig. 206—Finding Position for Punching Holes, While Sheet Is in the Flat

termined by means of the diagram Fig. 206, whether they are equally or unequally spaced, in the following manner. Let A B represent the outside girth of a stack made from ¼-inch thick metal, and let the small figures 1 to 5 represent the unequally spaced holes. To find the location of the holes in the band on its true girth, add seven times the thickness of the metal or 7″ × ¼″ or 1¾″ as shown from B to C. From B erect a perpendicular, intersecting it at D by an arc struck from A as center and A C as radius. Draw a line from D to A, and erect perpendiculars from points 1 to 5 until they intersect A D at 1′ to 5′. Then A D with the various intersections on same is the layout of the holes for the band going around the outside of the stack.

Another form of cross joint can be made by placing the band on the inside of the stack as shown in Fig. 207.

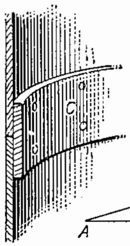

Fig. 207—Another Form of Cross Joint

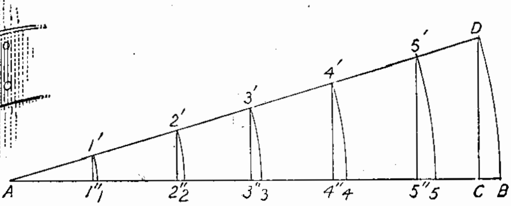

Fig. 208—Method of Finding Girth of Inside Band

For punching the holes in the flat band going on the inside of the stack the difference in girths is deducted from the circumference of the stack as shown in Fig. 208. Let A B represent the inside girth of the stack and points from 1 to 5 the location of the holes. As the band is to go on the inside of the stack, then we deduct 1¾ inch from B to C, and at C erect a perpendicular, intersecting it at D by an arc struck from A as center and A B as radius. Draw a line from D to A, and using A as center, with radii equal to the distances from A to the several points 1 to 5, draw arcs cutting the slant line D A as shown from 1′ to 5′ respectively. Now from the various intersections 1′ to 5′ draw lines at right angles to A B intersecting the same from 1″ to 5″. Then the line A C with the various intersections 1″ to 5″, will be the layout for the band going on the inside of the stack.

Re-enforced Angle Iron Cross Joints

The cross joints may be re-enforced with angle iron

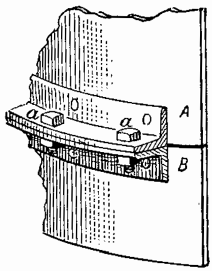

Fig. 209—Re-enforcing Cross Joints with Angle Iron Rings

rings as shown in Fig. 209. The angle iron rings are riveted to the ends of the pieces at A and B, then the joint assembled by bolting the pieces together at **a** and **a**.