July 8, 1941. R. I. HUTT 2,248,874

LOCK STRIP FOR CONNECTING SHEET METAL PARTS

Filed Jan. 19, 1937

FIG. 1.

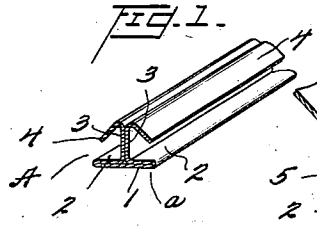


FIG. 2.

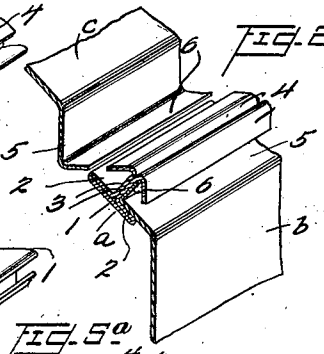


FIG. 3.

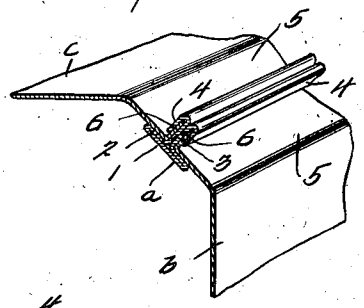


FIG. 5.

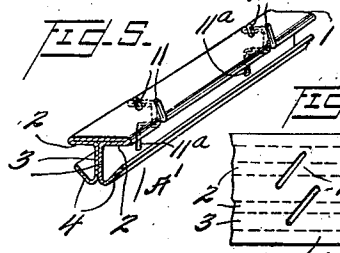


FIG. 5a.

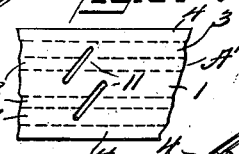


FIG. 6.

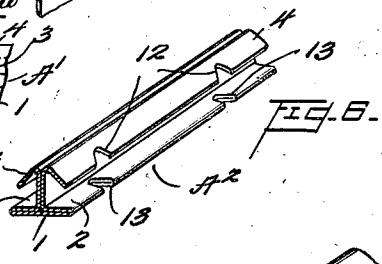


FIG. 4.

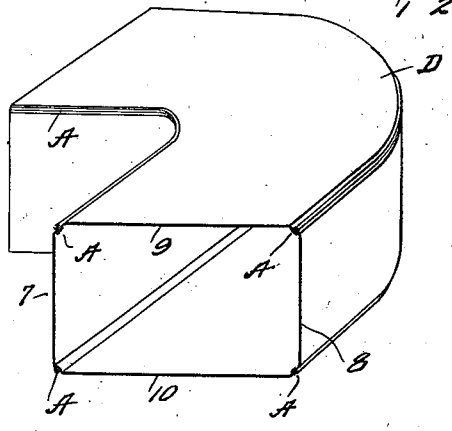


FIG. 7.

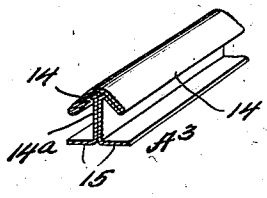


FIG. 8.

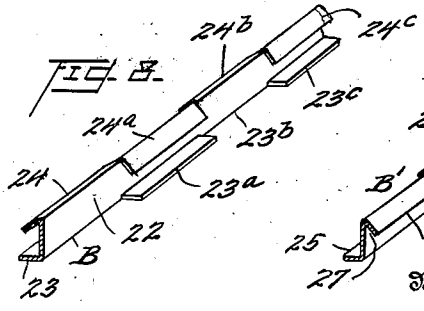
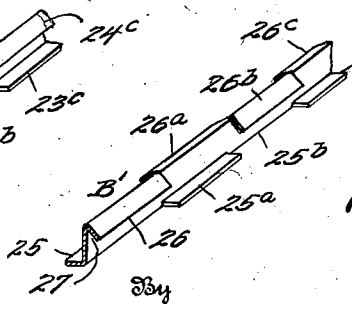


FIG. 9.



Inventor

R. I. Hutt

By Robert H. Watson

Attorney

Patented July 8, 1941

2,248,874

UNITED STATES PATENT OFFICE

2,248,874

LOCK STRIP FOR CONNECTING SHEET METAL PARTS

Reuben I. Hutt, Wilmington, Del.

Application January 19, 1937, Serial No. 121,368

1 Claim. (Cl. 189—36)

This invention relates to means for forming locked seams in sheet metal structures, such as pipes and conduits. In carrying out the invention, I provide a locking strip having a base, a web extending longitudinally of the strip at approximately a right angle to the base and midway between its sides, and flanges extending oppositely from the outer margin of the web, the flanges, web and base forming recesses at the opposite sides of the web. The sheets to be joined by the strip have their margins flanged outwardly from their adjacent body portions and these flanged portions of the sheets are fitted into the recesses in the strip and lie against the web, and the flanges on the web are then bent downwardly against the sides of the flanges on the sheets, compressing the latter against the web and forming a strong tight seam. The locking strip is preferably made of sheet metal, folded to form the base, web and flanges, but it may be otherwise formed.

The structural details and advantages of the locking strip will be clear from the following specification.

In the accompanying drawing,

Fig. 1 is a perspective view of the preferred form of locking strip;

Fig. 2 is a similar view of a strip illustrating the manner of applying it to the margins of two sheet metal plates which are to be joined together;

Fig. 3 is a similar view of the plates and strips showing the finished joint;

Fig. 4 is a similar view of a curved elbow of a sheet metal duct having the sheets which form the duct connected with locking strips as illustrated in Fig. 3;

Fig. 5 is an inverted view of a locking strip like that shown in Fig. 1, with the base of the strip slotted inwardly from its edges and part way through the web to facilitate bending the strip;

Fig. 5[a] is a plan view, on a reduced scale, of part of a sheet metal strip from which the locking strip shown in Fig. 5 is formed;

Fig. 6 is a perspective view of a strip having its base and flanges slotted to facilitate bending;

Fig. 7 is a similar view of a modified form of sheet metal locking strip;

Fig. 8 is a similar view of a locking strip in which the base and flanges are not continuous at either side of the web, and,

Fig. 9 is a similar view of a locking strip which is a modification of that shown in Fig. 8.

Referring to Fig. 1 of the drawing, the locking strip A there shown is formed from a strip of sheet metal folded along parallel lines at opposite sides of its longitudinal center, the folds 2 lying flat against the central portion 1 and extending to the center line thereof, forming a base *a* of double thickness, and from the base the parts 3 of the strip extend at a right angle thereto, forming a longitudinal web, and the marginal portions 4 of the strip are bent in opposite directions from the web and inclined toward the base, forming flanges.

The sheet metal plates to be connected by the strip, whether they are to lie in the same plane, or at an angle to one another as shown in Figs. 3 and 4, have their meeting edges flanged outwardly at substantially a right angle to their adjacent body portions, and these flanged portions are adapted to fit within the recesses in the strip formed by the base, the web and the flanges thereof. Thus, in Fig. 2, the marginal portions of the plates *b* and *c* are formed for connecting plates which are to extend at a right angle to one another, as shown in Fig. 3. Each plate has a part 5 near one edge which is inclined at an angle of 45° to the plane of the body of the plate, and a part 6 which is flanged outwardly at a right angle to the part 5. The locking strip is fitted over the flanged end of one of the plates, as the plate *b*, and the part 5 of the plate then rests against the base of the locking strip while the flange 6 rests against the web and extends practically to the downwardly turned flange 4 of the strip. The plate *c* is similarly applied in the recess at the opposite side of the web, and the flanges 4 of the strip are then closed tightly against the flanges on the plates by any suitable means, making a tight joint as illustrated in Fig. 3.

In Fig. 4 is shown an elbow D of a sheet metal duct of rectangular cross-section in which the side sheets 7 and 8 are connected at their edges to the upper and lower sheets 9 and 10 by locking strips A forming tight rigid joints as in Fig. 3. In this form of corner joint between sheets which lie at a right angle to one another, the seam does not project above the planes of the sheets and does not interfere with supports and stiffeners which may be applied to the duct.

For facilitating bending of the locking strips to join sheets in curved ducts, the base of the locking strip may be notched inwardly from its edges at short distances apart and these notches may be extended into the web, if desired. In Fig. 5 is shown a locking strip A[1] like that in Fig. 1, inverted, with notches 11 arranged in pairs,

spaced apart longitudinally of the strip, each notch extending from one edge of the base diagonally in opposite directions in the opposing folds of the base and being extended into the web as shown at 11a. Fig. 5a shows, on a reduced scale, a portion of a flat metal strip from which the slotted locking strip is formed, the crease lines between the folds being dotted. Thus, in Fig. 5a, the bottom fold of the base is indicated at 1, the upper folds of the base are indicated at 2, the web portions are indicated at 3 and the flange portions are indicated at 4. A pair of parallel diagonal slots 11 are punched through the strip. Starting at approximately the center line of the base fold 1, and extending in opposite directions, each slot extends entirely through an upper base fold 2 and part way through a web fold 3. When the flat strip is folded along the crease lines, the slots appear as in Fig. 5. The slots may be made in the base folds only, or extended partly into the web folds, as shown. These slots facilitate bending of the locking strip laterally or in the plane of the web.

The strip A^2, Fig. 6 is the same as that shown in Fig. 1, except that in Fig. 6 the flanges and base are notched as shown at 12 and 13, respectively, to facilitate bending the strip.

Fig. 7 is a modification A^3 in which the central portion of the blank is doubled upon itself to form the flanges 14, which are oppositely inclined from the web 14a toward the base, and the marginal portions 15 of the blank are turned outwardly at right angles to the web and form the base of the locking strip.

Each of the locking strips hereinbefore described has a base, a longitudinal web projecting from the base and oppositely inclined flanges arranged at an acute angle to the web, forming recesses in which the marginal flanges of the sheets to be connected fit, and within which they are gripped when the flanges on the locking strip are closed.

In Fig. 8, I have shown a locking strip B which has a continuous web 22, a base formed by bending short sections 23, 23a, etc., alternately at opposite sides of the web and at a right angle thereto, and the flanges are formed by bending correspondingly short sections 24, 24a, etc., outwardly and downwardly over the base portions. Recesses are thus formed between the base portions and the opposing flange portions to receive the right angled flanges of the metal sheets, and when the flanges of the strip are compressed against the flanges of the sheets, a secure seam is formed. To unite sheets for curved ducts, the webs of the locking strips may be bent on lines between the successive base and flange sections. In this form of strip the base and flange sections are in pairs, each flange section overlying a base section, and the pairs projecting alternately at opposite sides of the web. Thus the pairs 23—24 and 23^b—24^b project at one side of the web while the alternate pairs 23^a—24^a, 23^c—24^c, project at the opposite side of the web.

Fig. 9 shows a locking strip B^1, of the type shown in Fig. 8, in which each base section and the corresponding flange section project at opposite sides of the web instead of projecting at the same side as in Fig. 8. Thus, the base sections 25, 25a, etc., are bent alternately in opposite directions from the web 27 and the flange sections 26, 26a, etc., are also bent alternately in opposite directions from the web, but the flange sections are not in over-lapping relation to the base sections.

When the strip is used to connect the sheets of large ducts, as illustrated in Figs. 3 and 4, a considerable saving in metal is effected as compared with the usual methods of connecting such sheets by having them meet at a right angle to one another.

What I claim is:

The combination with two metal sheets each having a marginal portion inclined with respect to the plane of its main portion and having a flange extending substantially at a right angle to its inclined marginal portion, of a locking strip connecting said sheets, said strip comprising a flat and relatively long and narrow base, a longitudinal web projecting outwardly from the base, at substantially a right angle thereto and midway between its side edges, and flanges extending oppositely from the outer margin of the web, said marginal portions of the sheets resting on the base at opposite sides of the web, the flanges on the sheets lying against opposite sides of the web, and the flanges on the web being bent over the edges of and lying against the sides of the flanges on the sheets, locking the latter flanges against the web and base.

REUBEN I. HUTT.