

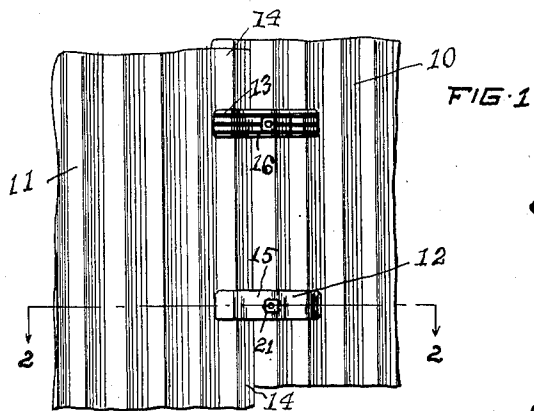
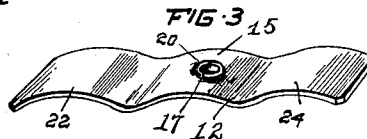
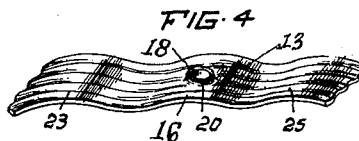
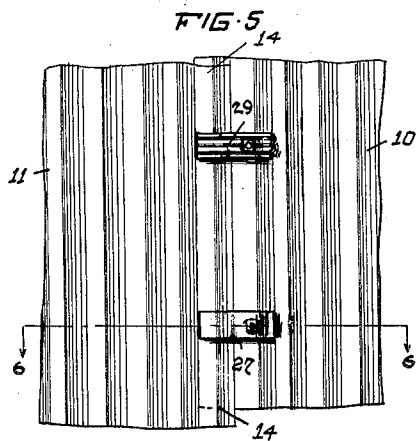
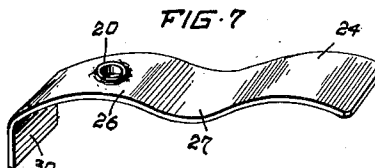
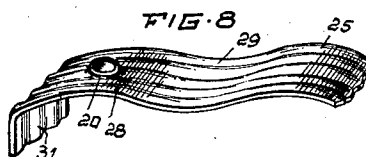
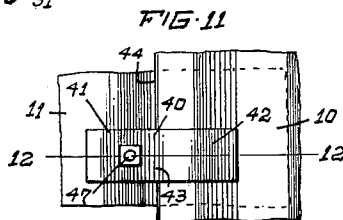
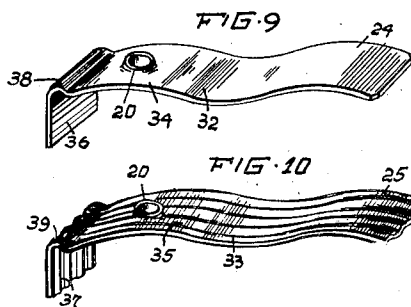
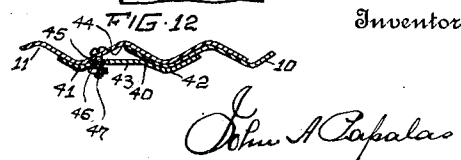
Sept. 16, 1930.

J. A. PAPALAS

1,775,778

LOCKING STRIP FOR CORRUGATED METAL SHEETS

Filed Nov. 15, 1927



Inventor

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UNITED STATES PATENT OFFICE

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LOCKING STRIP FOR CORRUGATED METAL SHEETS

Application filed November 15, 1927. Serial No. 233,504.

This invention relates to locking strips for corrugated metal sheets, and more especially to locking strips designed to be superposed upon corrugated sheets and formed of compound curves both to fit approximately the corrugations of the said sheets as well as have longitudinal grooves and spaced ridges crossing the curves of the corrugated sheets themselves.

It is a particular object of my invention to provide my locking strips with apertures to receive locking bolts therein for locking the strips to the said metal sheets. Since I contemplate superposing the nuts of these bolts external of the strips, I have discovered that the pressure to be exerted to these strips when the nuts are applied to the bolts, may be greatly increased by building up a flange or collar about the bolt opening in the strip so that the nut will be pressed down upon the outer ridge of the annular flange or collar as it is screwed tightly down upon the bolt, and thereby force the strip the more tightly against the metal sheets underneath.

It is my purpose to apply such strips across the overlapping seams of corrugated plates, and provide each strip with three or more corrugations that fit the corrugations of the lapping plates, at least one of the strip corrugations fitting the overlapping corrugation of the plates. the object of the locking strips being both to press the edges of the seams of the plates together and to hold the said edges against relative movement one upon the other.

My new locking strips are illustrated in connection with the corrugated plates upon which they are to be applied, in the accompanying drawings in which—

Figure 1 is a plan view of a plurality of plates fastened together by locking strips at the seams;

Figure 2 is a transverse section taken on the plane indicated by the line 2—2 of Fig. 1;

Figure 3 is a perspective view of a locking strip;

Figure 4 is a perspective view of a modified form of locking strip;

Figure 5 is a plan view of a plurality of

corrugated plates or sheets united by locking strips of still another form;

Figure 6 is a transverse section of locked sheets shown in the plane indicated by the line 6—6 of Fig. 5;

Figures 7 and 8 show in perspective, two forms of locking strips suitable for application to the sheets in Fig. 5;

Figures 9 and 10 show in perspective, two other forms of locking strips that may be applied to overlapping sheets in the manner indicated in Figs. 1 and 5;

Figure 11 is a plan view of overlapped edges of corrugated sheets, with a cross clip bent to fit certain corrugations of the sheets, and to bridge the intervening groove, and

Figure 12 is a transverse section of the sheets and strip taken on the plane indicated by the line 12—12 of Fig. 11.

In Fig. 1 are shown overlapping sheets 10 and 11 both of which are corrugated, and transverse strips 12 and 13 more especially the subject of this invention, and which are formed with three cross corrugations. One end of these locking strips is intended to overlap the superposed common corrugation 14 of the sheets 10 and 11, while the intermediate corrugations 15 and 16 are apertured at 17 and 18, respectively, and will receive therethrough a suitable securing member, such as a bolt 19.

The apertures in the strips shown in Figs. 1 to 10 are provided with a strengthening bushing or collar 20 which is shown in especial detail in Fig. 2, but has the same function in the other views mentioned—that of enabling the nut 21 of the bolt more efficiently to bear against the lock strip and thereby press the strips against the corrugated sheets. This raised bushing 20 may be applied upon corrugated surfaces of lock strips, as in Figs. 1, 4, 5, 8 or 10, and with the same result of more effectively exerting force by the nut against the sheets underneath.

The locking strips 12 and 13 have their cross corrugations of substantially equal curvature all of which are equal to the curvature of the several corrugations 14, the ends 22 and 23 covering the common corrugation 14, while the end corrugations 24 and 25 over-

lap adjacent corrugations 14 of the sheet 10, and the bolts 19 pierce suitably positioned apertures in the peak of a corrugation adjacent the overlapped corrugation 14 in the sheets.

5 Strips 13 are similar to those designated 12, except that the latter have smooth outer surfaces while strips 13 have longitudinal corrugations of small radius which tend to
10 strengthen the strips without appreciably increasing their weight or size. The strips shown in Figs. 3 and 4 are on a larger scale than those in Figs. 1 and 2 but have the same general functions.

15 The locking strips shown in Figs. 5 to 8, are provided with the end corrugations 24 and 25, respectively, of the same nature as the ends bearing those numerals in the strips 12 and 13, but the intermediate corruga-
20 tion 26 of strip 27 and the corrugation 28 of strip 29, differs from the first-described forms 12 and 13, in that one end of these corrugations 26 and 28 merges into the abrupt and right-angled toe portions 30 and 31, re-
25 spectively, which latter serve effectively as a positive fulcrum wherever used, both to resist lateral relative movement of such strips over the surface of the sheet 10, as well as to make possible effective application of pres-
30 sure of the ends 24 or 25 upon the overlapped corrugation 14 of the sheets. Strips 29 are also made stronger than strips 27 by reason of the provision of the lengthwise corruga-
tions thereon.

35 The modified form of strips 32 and 33 in Figs. 9 and 10, differ from each other in the provisions of the lengthwise corrugations in the latter, and from the strips 27 and 29, respectively, by the provision of the loops 38
40 and 39 in strips 32 and 33, respectively, between the intermediate corrugations 34 and 35 and the toe portions 36 and 37 respectively. Strip 33 is especially valuable on heavy work where exceedingly strong lock strips
45 are essential. In these forms, as in the others, the ends 24 and 25 are designed to overlap the seam portion 14 between the sheets 10 and 11.

50 In Figs. 11 and 12 of these drawings, I have shown a transverse locking strip or securing plate 40 having spaced corrugations 41 and 42 which are connected by an integral, flat portion 43 which bridges the trough 44 of the plates 10 and 11, and is perforated
55 at 45 at a point 46 nearer the crest of the corrugation 41 than that of 42. By perforating the plate 11 directly opposite the aperture 45, a bolt 47 will serve to bind the parts 41 and 42 very tightly against the crests of the corrugations 14.

60 The bolt 47 is positioned preferably between the points at the crest of a corrugation and the bottom of the trough of another corrugation. Usually nuts 21 are
65 applied at the outer ends of the bolts, as

shown in Fig. 12. These plates or strips 40 are found very effective in binding together the edges of sheets as of 10 and 11 at the seams 14 by the strong pressing force at 47.

This form of strip shown in Figs. 11 and 12 of this application, is an exact duplicate of the form shown in Figs. 5 and 6 of the drawings in the pending application, Ser. No. 188,594, filed May 3, 1927, by the present
70 applicant, for securing devices for corrugated plates, and the structure now shown in Figs. 11 and 12 is divided from the said earlier application.

75 While a plurality of forms of strips are shown in this application, it is not to be understood that the several forms are in any way unrelated. Indeed, all of them have a common and generic inventive idea though expressed by somewhat varied forms. It is also positively claimed by applicant that he is entitled to whatever combinations or sub-
80 combinations that may result from combinations of different features shown in unillustrated suggestions that are specified in this description, or that would ordinarily be under-
85 stood by one acquainted with the art to which it appertains. For example, the bushing 20 may be used on any one of the forms shown in the drawings, or any one of the locking strips shown in Figs. 5 to 9, may with
90 advantage be used without the use of the said bushing therein, and applicant claims the special use of the toe or abrupt locking portions 30, 31, 36 or 37 on any of the other forms in Figs. 1, 11 or 12, for the purpose of
95 locking in the grooves of corrugations of the sheets, wherever it may be desired.

Having thus described my invention, what I claim as new and desire to secure by Letters
100 Patent is—

1. A locking strip for securing corrugated metal plates in relative position with their edges connected by overlapping corrugations comprising, a metallic strip corrugated in
105 cross direction to fit the peaks of the overlapping corrugations of the plates at one end, and exert pressure upon the troughs of other corrugations thereof, at the other end, said locking strip having an intermediate corru-
110 gation apertured to receive therein a fastening bolt and provided with an outstanding annular bushing encircling the aperture.

2. A locking strip for securing corrugated metal plates in relative position with their edges connected by overlapping corrugations
115 comprising, a metallic strip having a plurality of cross corrugations to fit peaks of the plate corrugations, and having an end tip extending at an angle to the longitudinal axis of the strip for pressing into a trough of one
120 of the corrugated plates while the opposite cross corrugation is applied to the overlapping corrugation of the plates, the intermediate corrugation of the strip being aper-
125 tured to receive therein a fastening bolt; and

the strip being further provided with longitudinal corrugations of relatively narrow breadth.

3. A locking strip for securing corrugated
5 metal plates in relative position with their
edges connected by overlapping corrugations
comprising, a metallic strip having a plurality of cross corrugations to fit peaks of the
plate corrugations and a toepiece at one end
10 extending downward at an angle to the strip
to seat in a trough of a plate corrugation,
an intermediate corrugation of the strip having
an aperture and an annular bushing encircling
the aperture and directed oppositely
15 to said toepiece, the latter being integral with
said strip and connected therewith by a fold
or loop portion to resist bending of the toepiece.

In witness whereof I have hereunto set my
20 hand this 14th day of November, 1927.

JOHN A. PAPALAS.

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