April 12, 1932. L. M HARVEY 1,853,810

TIE FOR METAL STRAPS

Original Filed May 26, 1930

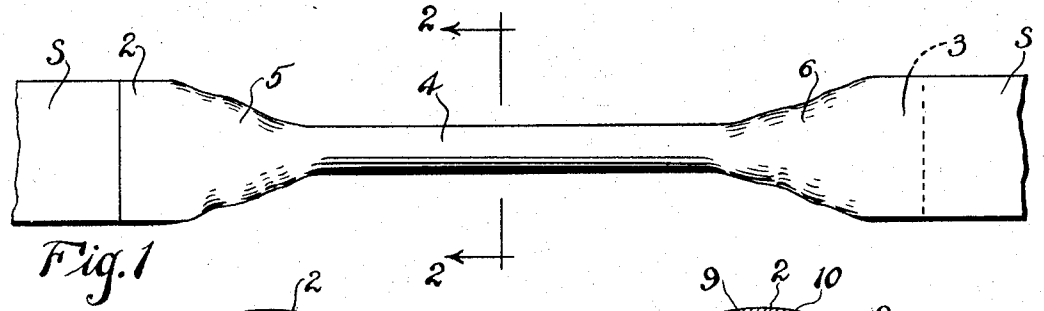

Fig. 1

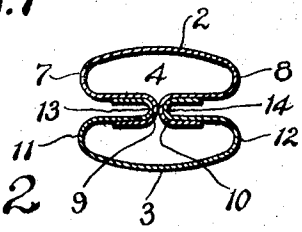

Fig. 2

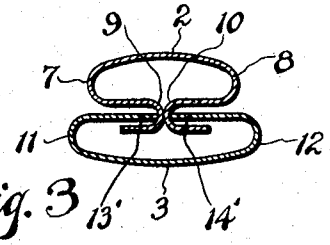

Fig. 3

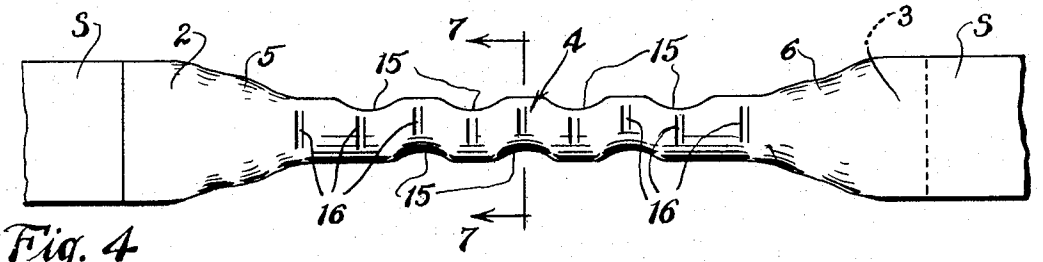

Fig. 4

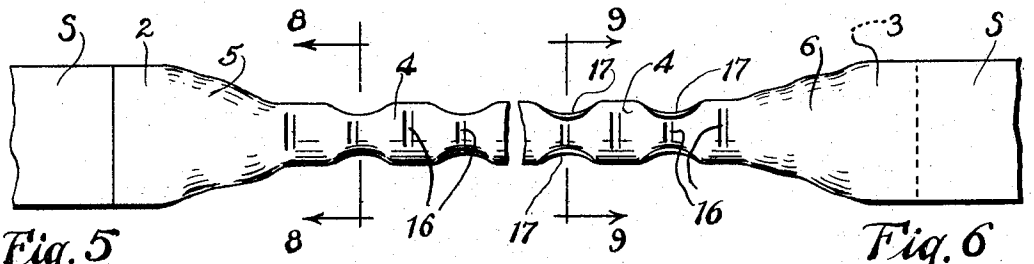

Fig. 5

Fig. 6

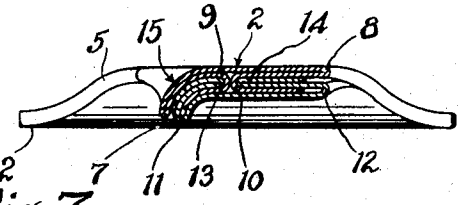

Fig. 7

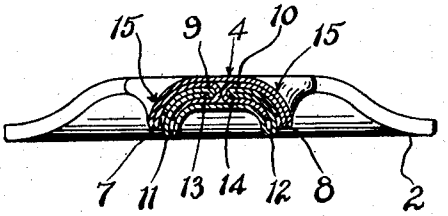

Fig. 8

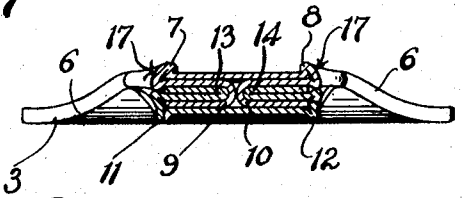

Fig. 9

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UNITED STATES PATENT OFFICE

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TIE FOR METAL STRAPS

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An object of this invention is to provide a tie for metal straps which are usually employed on boxes, bales, crates, and the like and the ends of which are overlapped and the overlapping portions bent or folded longitudinally and crimped or formed transversely so as to provide a plurality of inter-locking sections whereby the ends of the strap may not be pulled apart when tensioned around a box or the like.

My tie is formed by folding or bending the overlapping portions of a strap longitudinally in one or more folds or bends so as to inter-lock the folded portions longitudinally, and thereafter compressing the folds or bends into flat cross section and crimping, deforming, or upsetting the edges of the longitudinal folds at a plurality of opposite or staggered points transversely of the folds so as to prevent the overlapped ends of the strap from pulling apart when the strap is in tension.

Other objects will appear as the description progresses.

In the accompanying drawings I have shown a preferred form of invention, subject to modification within the scope of the appended claims without departing from the spirit thereof. In said drawings,

Fig. 1 is a plan view of a metal strap with the overlapping ends thereof partially formed for providing a tie in keeping with the aforenamed objects of invention.

Figs. 2 and 3 are respectively transverse sections of the tie on line 2—2 of Fig. 1, showing slightly different methods of inter-locking the overlapped portions of the tie before pressure is applied for compacting and crimping the tie.

Fig. 4 is a plan view of a tie subsequent to the application of pressure showing transverse crimps and bands for locking the overlapped portions of the strap together, and formed with the inter-locking portions in staggered relation.

Fig. 5 is a fragmentary view of the tie shown in Fig. 4 with the inter-locking portions on opposite edges of the tie formed in opposition to each other.

Fig. 6 is a similar view of a tie with a modified form of inter-locking crimps.

Fig. 7 is a transverse section of the tie on line 7—7 of Fig. 4.

Fig. 8 is a transverse section of the same on line 8—8 of Fig. 5.

Fig. 9 is a transverse section of the same on line 9—9 of Fig. 6.

Referring first to Fig. 1, it will be observed that the end portions 2 and 3 of a metal strip S are substantially overlapped longitudinally of the strap and initially folded or bent into the cross sectional form shown in Fig. 2, Fig. 3, or otherwise, so that substantial lengths of the end portions 2 and 3 will be overlapped, inter-locked, and folded, as at 4. The tied portion 4 gradually tapers outwardly from the opposite extremities of said portion, as at 5 and 6, into the flat end portions 2 and 3 respectively. As shown in Fig. 2, the overlapped tied portion 4 is substantially enlarged and exaggerated so as to clearly show the different folds and bends of the overlapping portions 2 and 3. In this form of tie the portion 2 is bent inwardly at 7 and 8 and thence outwardly at 9 and 10 respectively, with open bends in each case, particularly those 9 and 10. The portion 3 of the tie is bent inwardly at 11 and 12, and thence outwardly at 13 and 14 respectively. Thus the bends 13 and 14 of the portion 3 are within the bends 9 and 10 respectively of the portion 2 so as to inter-lock the strap ends 2 and 3 for a substantial distance longitudinally of the tie.

When the tie is thus loosely formed, as shown in Fig. 2, suitable pressure is applied to the tie, as for instance, by the application of forming jaws thereto, whereby the tie 4 will be compacted and flattened, as shown in Fig. 7. Preferably the inner folds 9 and 10 of the portion 2 are in abutting relation so as to completely fill the interior of the tie.

When the tie 4 is formed as described, the edge portions thereof are bent upwardly or downwardly at a plurality of points 15, 15 etc., for the purpose of locking the several folds of the tie together against separation under ordinary tension of the strap S. The bends 15 on opposite sides of the tie 4 may be staggered relative to each other, as shown

in Figs. 4 and 7, or they may be opposite to each other, as shown in Figs. 5 and 8.

I may also provide transverse crimps 16, 16 etc. on the upper and lower sides of the tie, alternating with or opposite the bends 15, for the purpose of additionally locking the portions 2 and 3 together.

In lieu of the portions 15 at the edges of the tie 4, I may upset the edges of the tie at a plurality of points 17, as shown in Figs. 6 and 9, and in such case the folds 7, 8, 11 and 12 of the tie will be distorted and indented at the points 16 on the opposite sides of the tie, either in staggered or transversely opposite positions, as may be desired. In such case, the indented or upset portions 17 will serve the same purpose as the bends 15.

In the form of tie shown in Fig. 3, I may omit the bends 13 and 14 from the portion 3, and in lieu thereof extend the edge portions 13′ and 14′ into the folds 9 and 10 of the member 2 respectively.

When a tie of this form is completed it will serve substantially the same purpose as the form of tie shown in Fig. 2.

It will be apparent from the foregoing description of my improved tie that the overlapping portions 2 and 3 of a metal strap when folded a plurality of times and indented, bent, or upset at the margins of the folds, will serve to lock the tied ends of the strap together in such a manner that the longitudinal strain when the strap S is under tension will not under ordinary conditions suffice to pull the portions 2 and 3 apart.

What I claim is:

1. A tie for connecting the overlapping ends of a metal strap comprising longitudinal folds at the edges of the overlapped portions, and transverse crimps on portions of said folds, for the purpose described.

2. A tie for connecting the overlapping ends of a metal strap, comprising inter-locking longitudinal folds of the overlapping portions of the strap compressed into a compact cross section and transverse deformations, for the purpose described.

3. A tie for connecting the overlapping ends of a metal strap, comprising inter-locking longitudinal folds of said strap ends, and deformations at the edges of the tie.

4. A tie for connecting the overlapping ends of a metal strap, comprising inter-locking longitudinal folds of said strap ends, deformations at the edges of the tie, and transverse crimps on a surface of the tie.

5. A tie for connecting the overlapping ends of a metal strap comprising a plurality of longitudinal folds of said strap ends and including a plurality of thicknesses of metal, and marginal deformations for inter-locking said folds together against separation when the strap is longitudinally tensioned.

6. A tie for connecting the overlapping ends of a metal strap, comprising reversely folded inter-locking portions of said strap ends extending longitudinally of the tie, and lateral deformations in said folded portions.

7. The method of forming a tie for connecting the overlapping ends of a metal strap which consists in longitudinally folding and inter-locking the marginal portions of the strap ends, and compressing the folds into a compact cross section.

8. The method of forming a tie for connecting the overlapping ends of a metal strap which consists in longitudinally folding and inter-locking the marginal portions of the strap ends, and deforming the margins of the compressed tie for providing inter-locking portions therein.

9. The method of forming a tie for connecting the overlapping ends of a metal strap which consists in longitudinally folding and inter-locking the marginal portions of the strap ends, and transversely crimping the material on the sides and deforming the same at the edges for providing inter-locking portions.

10. The method of forming a tie for the overlapping ends of a metal strap which consists in folding one of said ends inwardly and thence outwardly near its edges, folding the other member inwardly into inter-locking relation with the first member, and compressing the folds into a suitable cross section.

11. The method of forming a tie for the overlapping ends of a metal strap which consists in folding one of said ends inwardly and thence outwardly near its edges, folding the other member inwardly into inter-locking relation with the first member, compressing the folds, and deforming the folded material at a plurality of points for providing inter-locking portions thereon.

12. The method of forming a tie for the overlapping ends of a metal strap which consists in inter-locking and folding the strap ends longitudinally, and deforming the folds transversely.

13. The method of forming a tie for the overlapping ends of a metal strap which consists in folding the ends longitudinally one over the other, and deforming the folds transversely.

14. The method of forming a tie in the overlapping ends of a metal strap which consists in folding the ends longitudinally one over the other, and compressing the folds into a compact cross section.

15. The method of forming a tie in the overlapping ends of a metal strap which consists in folding the ends longitudinally one over the other, compressing the folds into a compact cross section, and deforming the compacted folds transversely.

LEO M. HARVEY.