

June 16, 1964

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3,137,047

METAL STRAP JOINT

Filed Aug. 18, 1961

3 Sheets-Sheet 1

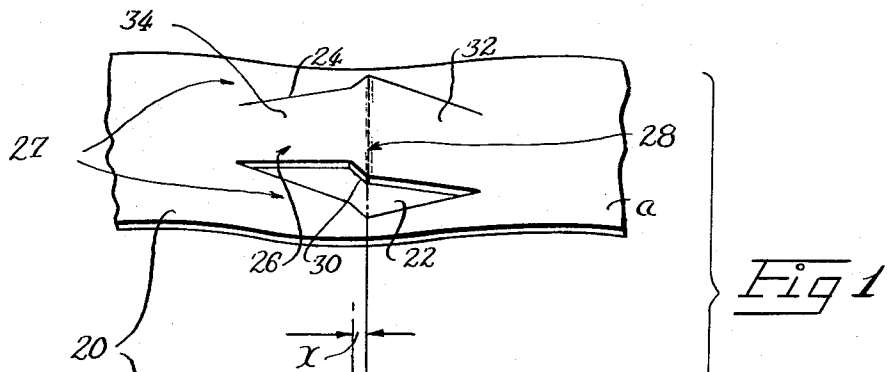


Fig 1

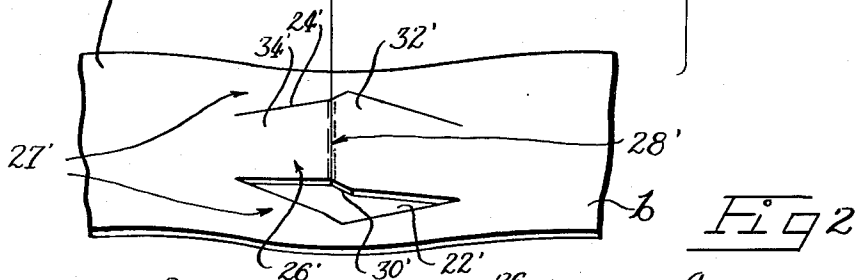


Fig 2

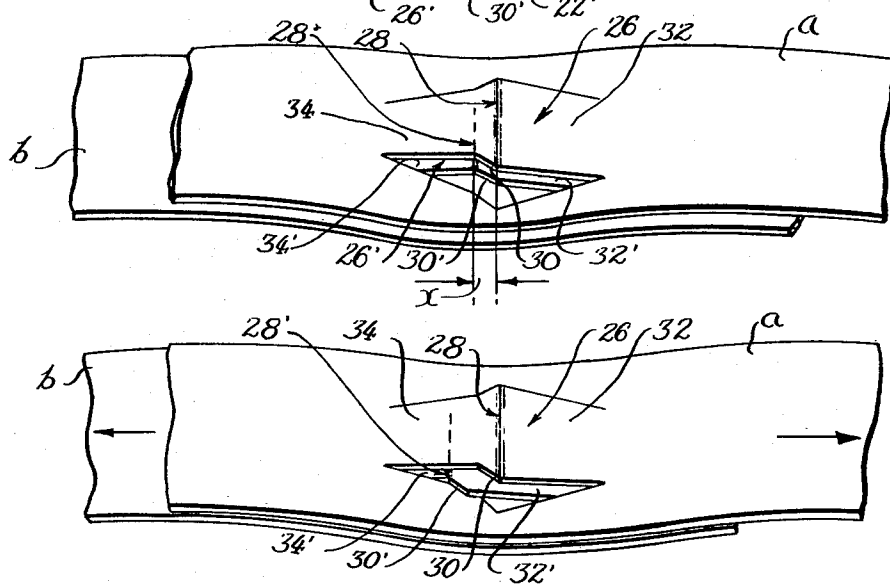


Fig 3

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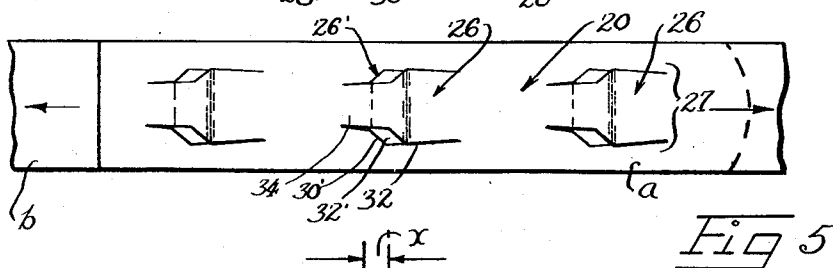
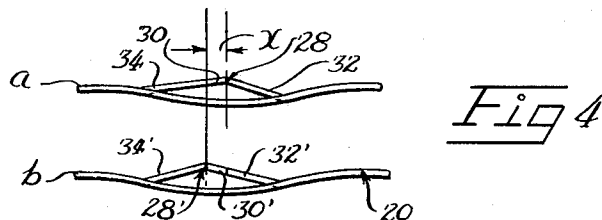


Fig 6

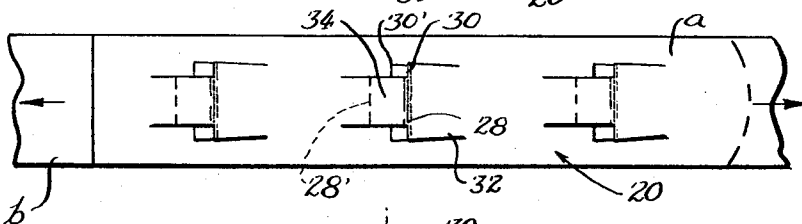
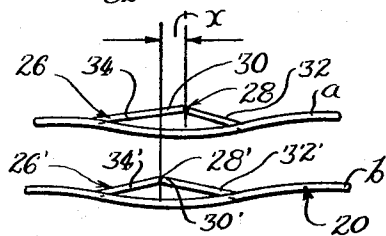


Fig 7

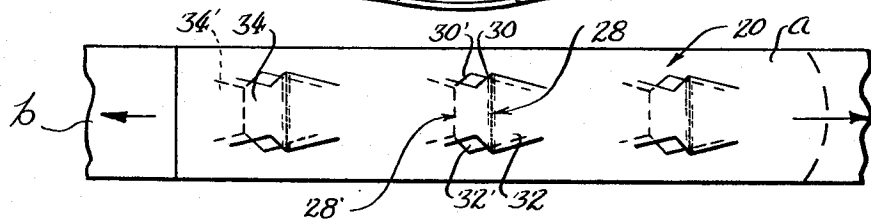
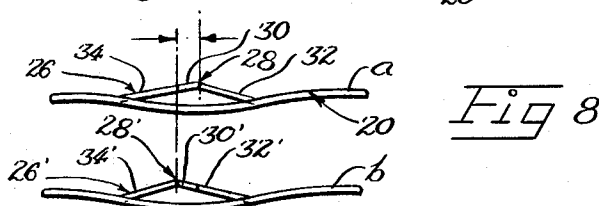


Fig 9

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Fig 10

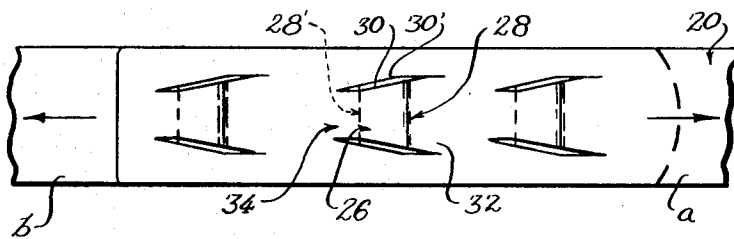
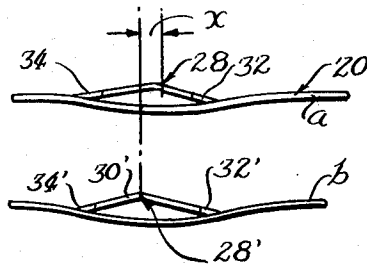


Fig 11

Fig 12

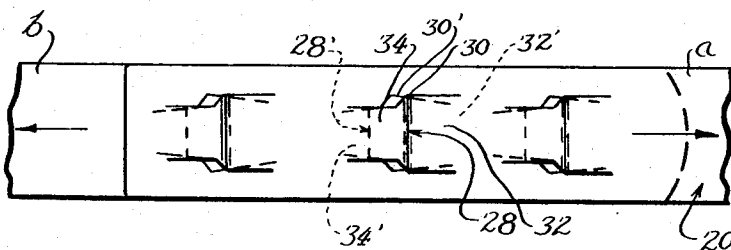
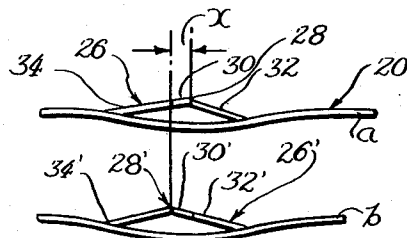


Fig 13

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METAL STRAP JOINT

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5 Claims. (Cl. 24-20)

This invention relates to the well-known "seal-less" type of joint for interconnecting the overlapping portions of a metal binding strap after it has been looped about a package or the like. For this purpose, pairs of zig-zag incisions are made in each of said strap portions to form between these incisions an "endless tongue," and the mid section of this tongue is displaced perpendicularly to the plane of the strap and relatively to the laterally adjacent parts outside of said incisions. The displaced mid section thus forms an outwardly shouldered crown and leaves beneath the tongue a correspondingly inwardly shouldered opening. When the strap portions are overlapped, the crown of the tongue of the underlying strap portion will project through the opening of the overlying strap portion, and when the two strap portions are subsequently moved relatively in the longitudinal direction, as for example, by tension in the strap, the outwardly directed shoulders of the tongue of the lower strap portion will interengage with the oppositely directed shoulder portions defining the opening in the upper strap portion.

Interlocking joint formations are commonly made by means of dies operating on the strap portions while the portions are superimposed leaving the portions free to interengage automatically in situ when the dies move apart. It is also known to make the formations suitable for hooking together manually, as for example, after looping a strap of required length with the formations near its ends around a compressed bale; the bale upon being permitted to expand thereby produces the required tension in the strap for interengagement of the formations.

The joint formations provided by the present invention are especially suitable and intended for such manual hooked engagement; and since the formations differ, they can most conveniently be made when the strap parts are not in overlapping relationship.

In accordance with the invention, the joint formations are characterized in that the crown of the tongue of one formation (hereinafter called "the first tongue") is located in a broader portion of said tongue than in the tongue of the other formation (hereinafter called "the second tongue"); and in that when the formations are disposed one above the other, i.e., so that the shouldered portion of the upper formation lies directly over the shouldered portion of the lower formation, said crowns are relatively offset longitudinally of the run (i.e., axis) of the strap. This in effect provides a "lead" which facilitates the insertion of the shoulder of the one formation through the opening of the other, when the formations are superposed prior to their aforementioned relative longitudinal hooking movement.

Even when the formations are very close fitting, if the crowns are offset and of differing widths in accordance with this invention, it is possible to snap superimposed formations through one another by mere finger pressure, relying on the tongue of the one formation being enabled by the offsetting of the crowns to initially penetrate the opening of the other formation elsewhere than at the closely fitting shoulder. This initial insertion of the relatively narrow crown of the lower strap portion tongue into the upper strap portion opening provides a lead which permits the subsequent insertion of the shoulder of the tongue through the shouldered section of the opening.

The tongues may taper from the shoulders at one or

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both ends or alternatively may be of uniform width between the shoulders and one or both ends. The tapering may be inwardly toward one or both said ends, or the tongues may taper inwardly in this way at the broad end only, i.e., the end extending from the maximum width of the shoulder; and outwardly at the narrow end, i.e., the end extending from the minimum width of the shoulder. The last mentioned arrangement has the advantage of making it possible in spite of the tapering to bring both ends of the incisions within the width of the shoulders and thereby limiting the overall transverse weakening of the strap to the width of its shouldered portion.

The shoulders too may be mitred, i.e., tapered inwardly toward the narrow ends of the tongues, either bluntly or acutely. The mitre or taper may in some cases be so acute that the shouldered portions extend over most of the length of the tongues. Alternatively, the shoulders may be square, i.e., they may be at right angles to the run of the strap.

Instead of the formations being identical in plan, it is further possible for them to differ in this respect while the maximum of their shouldered portions remain substantially the same. Thus, one or both ends of the tongue of one formation may be of uniform width, and the tongue of the other may taper inwardly toward one or both ends, or both tongues may be thus tapered, one more acutely than the other. With formations identical in plan, it may be possible in use to superimpose either on the other, but where they differ in plan as just described, the uniform width end portions or those having the more acute taper, must be in the formation which is uppermost.

Turning now to the position of the respective crowns, that of the first tongue may be at or near the maximum width of the shoulders when this is mitred, or it may be at the shoulder when it is square, or it may be in the broad end portion of the tongue. The crown of the second tongue may be at or near the minimum width of the shoulder when this is mitred, or it may be in the narrow end portion of the tongue. Alternatively, when the shoulders are so acutely mitred that the shouldered portions occupy most of the length of the tongue, the crowns of both tongues may be located in these portions at positions where because of the longitudinal offsetting of the crowns, the crown of one tongue is broader than that of the other.

The formations thus proposed can most conveniently be made by means of individual pairs of dies operating simultaneously on both ends of each strap while these ends are in abutment.

The invention will now be further described by way of example with reference to the accompanying drawings, wherein like parts are given like reference letters and numbers:

FIGURE 1 is a perspective view of end portions of a binding strap with the formations thereon made in accordance with this invention;

FIG. 2 is a perspective view of the two strap portions with the formations thereon in interfitting superposed relationship;

FIG. 3 is a perspective view of the two strap portions after they have been moved relatively in the longitudinal direction to effect full interengagement of their respective formations;

FIG. 4 is a side elevation view of the two strap portions just before they are placed in superposed interfitting relationship;

FIG. 5 is a top plan view of the strap portions having three interfitting formations in line and showing these formations after they have been fully interengaged;

FIG. 6 is a side elevation view of two strap portions having slightly modified formations;

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FIG. 7 is a top plan view of the two strap portions with the three modified formations of FIG. 6 in line and fully interengaged;

FIG. 8 is a side elevation view of two strap portions showing a further modification of the formations thereon;

FIG. 9 is a top plan view of the strap portions showing three of the modified formations of FIG. 8 in line after these formations have been fully interengaged;

FIGS. 10 is a side elevation view of the two strap portions showing still another modification of the formations;

FIG. 11 is a top plan view of the strap portions showing three of the modified formations of FIG. 10 in line after these formations have been fully interengaged;

FIG. 12 is a side elevation view of two strap portions showing an additional modification of the formations thereon; and

FIG. 13 is a top plan view of the strap portions showing three of the modified formations of FIG. 12 in line after these formations have been fully interengaged.

Throughout the drawings the strap portion denoted *a* is shown above the strap portion denoted *b*, and the corresponding parts and sections of portion *b* are identified by corresponding prime numerals.

In accordance with this invention, a joint is provided for interconnecting the overlapping portions *a* and *b* of a metal binding strap 20 after the strap has been looped about a package or the like. Each of the two strap portions *a* and *b* has a pair of spaced, substantially co-extensive incisions 22 and 24 therein which are oriented generally in the longitudinal direction with respect to the strap and form a longitudinal tongue 26 therebetween and leave laterally adjacent parts 27. The tongue of the strap portion *a* may herein be referred to as the "first" tongue, whereas the tongue of the strap portion *b* may be referred to as the "second" tongue.

Each tongue 26 has its mid section displaced from the plane of the remaining laterally adjacent parts 27 of the strap portion to form a crown 28. The incisions 22 and 24 extend toward each other over at least part of their length to form shoulders 30 and to produce relatively broad sections 32 and relatively narrow sections 34 of the tongue. The crown 28' of the tongue of the lower strap portion *b* is located in a relatively narrow section 34' thereof, and the crown 28 of the tongue of the upper strap portion *a* is located in a relatively broad section 32 thereof. Thus, when the strap portions *a* and *b* are superposed, the crowns 28 and 28' of the two tongues will be offset longitudinally by a distance *x*, and when the strap portions are moved relatively in the longitudinal direction, the tongue 26' of the lower strap portion will engage the laterally adjacent parts 27 of the upper strap portion.

In the first form of joint, shown in FIGS. 1 through 5, the tongues taper inwardly from the shoulders 30 toward the ends in both the broad end portion 32 and the narrow end portion 34, the shoulders themselves being mitred or angled bluntly toward the narrow ends 34, and the crown of the first or upper tongue being at or near the maximum width of the shoulder and that of the second or lower tongue at or near the minimum width thereof.

The second form of joint, shown in FIGS. 6 and 7, differs from the first in that the narrow end portions 34 of the tongues are of uniform width and the shoulders 30 and 30' are square. The crown 28 of the first tongue 26 is located at the shoulders 30 or near thereto in the broad end portion 32 of the tongue, and the crown 28' of the second tongue 26' is located in the narrow end portion 34' thereof.

The third form of joint, shown in FIGS. 8 and 9, differs alternatively from the first in that the narrow end portions 34 and 34' of the tongues taper outwardly from the shoulders 30 and 30' so that the transverse weakening of the strap is limited to the width of the shoulders. In this case, also these portions 34 and 34' are shortened as shown, so that the incisions on either side thereof ter-

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minate sufficiently within the shoulder width to ensure longitudinal engagement of the shoulders of the tongue of the underlying strap portion *b* with the laterally adjacent parts of the overlying strap portion *a*.

The fourth form of joint, shown in FIGS. 10 and 11, is characterized in that the shoulders 30 and 30' of the tongues are mitred so acutely as to occupy most of their length leaving broad end portions 32 and 32' and narrow end portions 34 and 34' just sufficiently long to permit the required relative longitudinal movement of the formations for interengagement. The crowns 28 and 28' in this embodiment are both located in the shouldered portions 30 and 30', respectively, crown 28 of the first or lower tongue being in a relatively broad portion of that tongue and the crown 28' of the second or lower tongue being in a relatively narrow portion of that tongue.

In all the previously described embodiments of joint, the formations are identical in plan, but in the fifth embodiment illustrated in FIGS. 12 and 13, the formations differ. The first or underlying tongue 26' in this embodiment has both its broad end portion 32' and its narrow end portion 34' extending from the shoulder 30' at uniform widths, while both the broad end portion 32 and the narrow end portion 34 of the second tongue 26 taper inwardly from the shoulder 30 as in the first form of joint, both the crowns also being positioned in the respective tongues substantially as in that form.

It will be noted that the formation in the upper strap portion *a* is of uniform width. If the tongues of both strap portions were tapered, the portion with the most acute taper (with respect to the axis of the strap) would be above the other. Also, because of the non-identity in plan of the incisions, the superposed parts may be pre-hooked together prior to final longitudinal movement.

Although the invention has been described with a certain degree of particularity, it is understood that the present disclosure has been made only by way of example and that many modifications and changes in various details may be resorted to without departing from the spirit and scope of the invention, as hereinafter claimed.

What is claimed is:

1. A joint for interconnecting the overlapping portions of a metal binding strap after said strap has been looped about a package or the like, each strap portion having a pair of spaced, substantially coextensive incisions therein which are oriented generally in the longitudinal direction with respect to said strap and form a longitudinal tongue therebetween, each of said tongues having, intermediate its ends, a crown of maximum displacement with respect to the remaining laterally adjacent parts of the strap portion, said incisions extending toward each other over at least part of their length, whereby said tongue and the opening between said laterally adjacent parts have relatively broad and relatively narrow sections, the crown of the tongue of one of said strap portions being located in a relatively narrow section thereof, and the crown of the tongue of the other of said strap portions being located in a relatively broad section thereof, whereby when the strap portions are disposed with their tongues in superposed relationship, said crown will be offset longitudinally, and when said strap portions are moved relatively in the longitudinal direction, the relatively broad section of the tongue of said one strap portion will engage the laterally adjacent parts of said other strap portion defining the relatively narrow section of the opening therebetween.

2. The structure of claim 1 wherein said incisions in each strap portion extend laterally over an intermediate part of their length to form shoulders and also extend angularly with respect to one another between said shoulders and at least one end of said tongue, whereby the tongue is tapered at that end.

3. The structure of claim 1 wherein said incisions in each strap portion extend laterally over an intermediate part of their length to form shoulders and also ex-

tend substantially parallel with one another between said shoulders and at least one end of said tongue, whereby the tongue is of uniform width at that end.

4. The structure of claim 1 wherein said incisions in each strap portion extend laterally over an intermediate part of their length to form shoulders and the incisions of the respective strap portions differ while their tongues are of substantially the same maximum width at said shoulders.

5. The structure of claim 1 wherein said incisions in each strap portion extend laterally to form shoulders which are disposed obliquely with respect to the longitudinal axis of said strap portion and extend over most of the length of the tongue.

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