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Applicant: **Heard, Robert Arthur Henderson, Church Farm 63 Church Lane, Backwell Bristol, BS19 3JJ (GB)**

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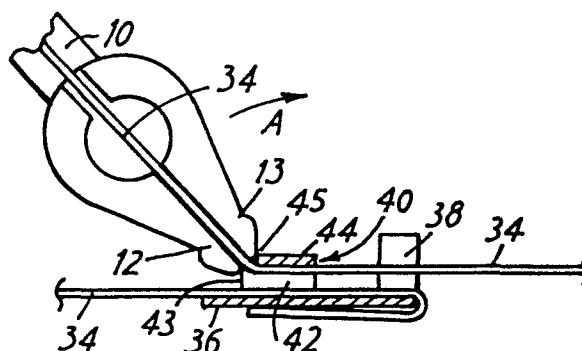
Inventor: **Heard, Robert Arthur Henderson, Church Farm 63 Church Lane, Backwell Bristol, BS19 3JJ (GB)**

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Representative: **Armitage, Ian Michael et al, MEWBURN ELLIS & CO. 2/3 Cursitor Street, London EC4A 1BQ (GB)**

Band-securing buckle.

A buckle for securing banding under tension around an article, comprises a sheet steel plate (36) with a bridge (40). One end of the band (34) is initially secured to the buckle and the free end passed around the article and threaded under the bridge, where it is then tensioned by a conventional banding tool. The free end is then secured by pivoting the tool so as to bend the band around the bridge. The top of the bridge has a recessed edge (45) so that only the lower jaw (12) engages the bridge, more specifically the edges (43) of the sides of the bridge, during tensioning and initial pivoting. The recess accommodates the thickness of the strap on bending and eliminates the need to slacken off the tension in the banding tool to avoid overtensioning or breakage.



BAND-SECURING BUCKLE

5 This invention relates to securing articles by means of high tensile bands, for example of stainless or other steel strip.

10 In a known banding system one end of a band is connected to a buckle; then the band is passed around the article being secured, and the other end of the band threaded through the buckle, tensioned and the projecting end bent back on itself to hold the band and prevent it from slackening. Thereafter lugs on the buckle are bent down onto the bent back end portion to hold it in place. The tensioning and bending of the band is generally performed with a tool which comprises a body having a pair of jaws which slidably receive the projecting end portion of the band at the point where it emerges from the buckle. A clamping member is adapted to grip the projecting end portion of the band and is mounted to the body of the tool so that it can be moved away from the jaws whereby, with the jaws in abutment with the buckle, the band is drawn through the buckle and tensioned. Then the whole tool is pivoted about the position of abutment of the jaws with the buckle to bend the end portion of the band back on itself. However, with existing tools it is usually necessary slightly to slacken the tension on the band before pivoting the tool, otherwise the pivoting, which takes place about the line of abutment with the buckle of the jaw on the inside of the pivot arc, tends to overtension the band and this can snap it or damage the article being secured. In existing tools the clamping member is moved by a screw device, and the usual instruction by the makers of the banding or tool is to turn the screw to reduce the tension so that the band does not fail owing to overloading. This is obviously a very imprecise instruction, and especially with relatively unskilled users the amount of slackening

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may be too little, resulting in overtensioning, or too much, resulting in an insufficiently tight band.

According to the present invention there is provided a buckle for use in securing a band passed around an article
5 by means of a banding tool of the kind hereinbefore described; the buckle comprising a plate to which one end of the band is secured or to be secured before application of the tool, and a bridge over the plate defining a passage between bridge and plate through which the other end of the
10 band can be passed and around which bridge the band can be bent after tensioning by pivoting of said tool; the bridge comprising side walls providing edges substantially at right-angles to the plate against which a jaw of the tool can abut during tensioning and subsequent pivoting of the
15 tool, and a transverse element joining the side walls and about an edge of which the band is bent during the pivoting of the tool, said edge of the transverse element being set back from said edges of the side walls to accommodate the thickness of the band during bending thereof.

20 The set-back of said edge of the transverse element relative to said edges of the side walls is preferably of the order of 1 mm (0.04 inches).

Whereas said edge of the transverse element of the bridge in a conventional buckle is normally serrated
25 supposedly to provide positive gripping of the band, this has not been found necessary, and in the present invention the edge is preferably not serrated.

In order that the invention may be more clearly understood, one embodiment will now be described with
30 reference to the accompanying drawings, wherein:

Fig. 1 shows a plan view of a banding tool,

Fig. 2 shows a side view of the tool,

Fig. 3 shows a perspective view of a buckle of the present invention,

35 Fig. 4 shows a side view of the buckle,

-3-

Fig. 5 shows a detailed perspective view of the buckle during tensioning,

Fig. 6 shows a detailed cross-sectional view of the buckle during pivoting of the tool,

5 Fig. 7 is a plan view of a buckle blank,

Fig. 8 is a side view of the buckle of Fig. 7 in use,

Fig. 9 is a plan view of a modified buckle blank, and

10 Fig. 10 is a side view of the buckle of Fig. 9 in use.

Referring to Figs. 1 and 2 of the drawings, the banding tool comprises a generally C-shaped body 10, one limb of which terminates in a pair of jaws 12,13 whose lips
15 are directed away from the other limb 15 which has a passage to freely slidably receive a screw spindle 16. The end of the spindle nearest the jaws carries a clamping block 18 which is slotted to receive the band and has a clamping lever 20 pivotally mounted at 22 so that, by cam action of
20 a nose on the lever, movement of the lever in one direction or the other clamps or releases the band. A handle 24 has a boss 26 with a threaded passage by which it is engaged on the outer end portion of the spindle 16 remote from the jaws 12,13. A thrust race bearing 28 is located between the
25 handle and the limb 15. A lever 30 is pivotally mounted at 32 to the jaws and moves a cutter blade within the jaws for severing the band after securing.

The buckle as shown in Figs. 3 and 4 is pressed from stainless steel sheet, and comprises a plate 36 from an
30 inner portion of which a bridge 40 is cut and pressed upwards leaving an opening 41 in the plate below the bridge. The bridge comprises side walls 42 and a transverse element 44 joining the side walls. A pair of ears 38 project upwards at one end of the plate. The side walls 42 of the
35 bridge present edges 43, remote from the ears 38, which in side view (see Fig. 4) are at right-angles to the general plane of the plate. The transverse element 44 presents an

-4-

edge 45, remote from the ears 38, which is set back from the edges 43 of the side walls by about 1 mm.

In use, a band 34 is passed around the article being secured, one end of the band having been connected to the 5 buckle. The free end of the band is threaded through the buckle, between the bridge and the plate and the projecting end portion is inserted into the jaws and clamping block of the banding tool. The tool is moved so that the jaws are 10 adjacent the buckle, and the lever 20 is moved to clamp the band in the block 18. Then the handle 24 is rotated until it bears through the thrust race 28 on the limb 15 of the tool body. Continued rotation of the handle 24, draws the spindle through the passage in the limb 15, and thereby 15 draws the band through the jaws and, by abutment of the jaw 12 with the edges 43 of the side walls of the bridge of the buckle, draws the band through the buckle and tensions it. The band is fully tensioned when there is no further appreciable movement of the band through the buckle when the 20 handle is rotated. Then the tool is pivoted as shown by arrow A in Figs. 5 and 6. The band bends about the edge 45 of the transverse element of the bridge. Since the edge 45 is set back from the abutment edges 43 of the side walls by about the thickness of the band, the pivoting action does 25 not appreciably add to the tension and there is no need to slacken off the handle 24 prior to pivoting. After pivoting, in which the end portion of the band is bent back on itself over the bridge and therefore holds the band in tension, the excess length of the band is severed by 30 operation of the cutting lever 30. The end of the band is then secured by bending down lugs 38 in known manner.

Fig. 7 shows the sheet metal blank of a buckle prior to pressing the bridge 40 and ears 38 out of the plane of the plate 36. It is somewhat modified compared 35 with the buckle of Figs. 3 and 4, in that the plate has a

transverse slot 50 near the end remote from the ears, through which slot one end of the band 34 can be passed, instead of taking it under the bridge and around the plate as shown in Fig. 6. As shown in Fig. 8, that end of the band can be cranked, as at 52 and spot-welded to the underside of the plate, for which purpose the plate may be formed with a pair of blips 54. As shown in Fig. 7 the cuts forming the edges 43 of the bridge lie on a line 56 at right-angles to the longitudinal direction of plate (i.e. the direction taken by the band), so that when the bridge is pressed out of the plane of the plate the edges 43 will lie on a line 58 at right-angles to the plane of the plate, as shown in Fig. 8.

Fig. 9 shows a slight, but potentially important modification of the design of Fig. 7, in that the edges 43 lie on lines 57 at an angle α to the line 56, so that, as shown in Fig. 10, when the bridge is pressed out of the plane of the plate, the edges 43 will be raked forwardly (i.e. in the direction away from the ears 38) along a line 59 at the angle α to the line 58.

It is important that during the tightening of the band and initial pivoting of the banding tool, as shown in Figs. 5 and 6, the lower jaw 12 of the tool remains in abutment with the edges 43 and does not slip upwards towards the recessed edge 45 and thereby defeat the object of having the recess. The edges 43 should therefore be at least at right-angles to the plane of the plate as in Figs. 7 and 8, and preferably raked forwardly as in Figs. 9 and 10, to minimise this risk.

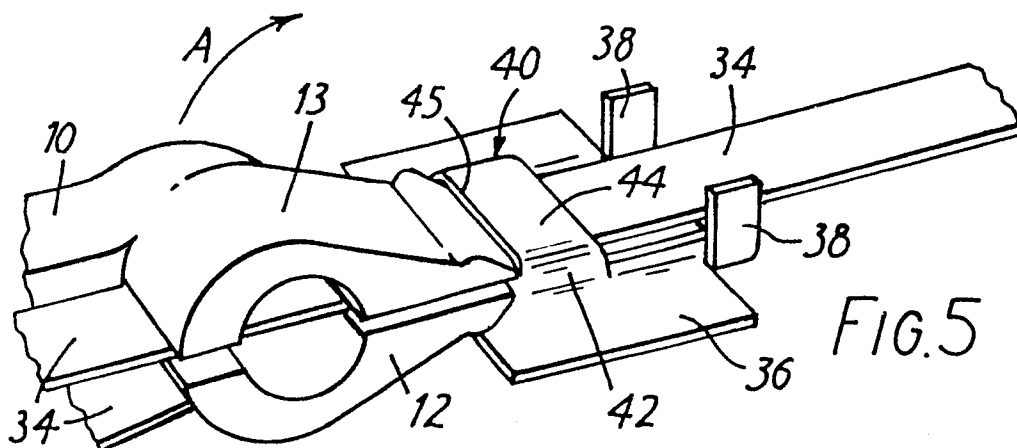
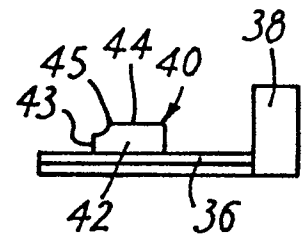
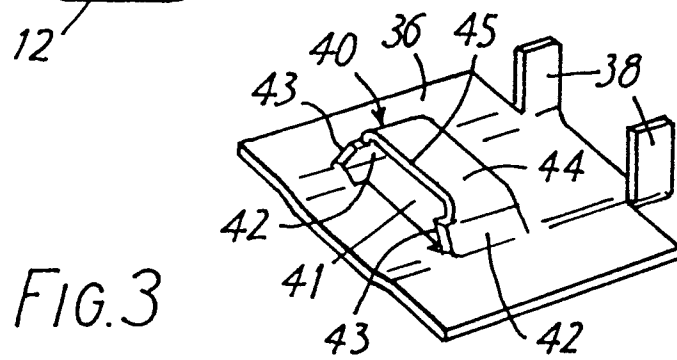
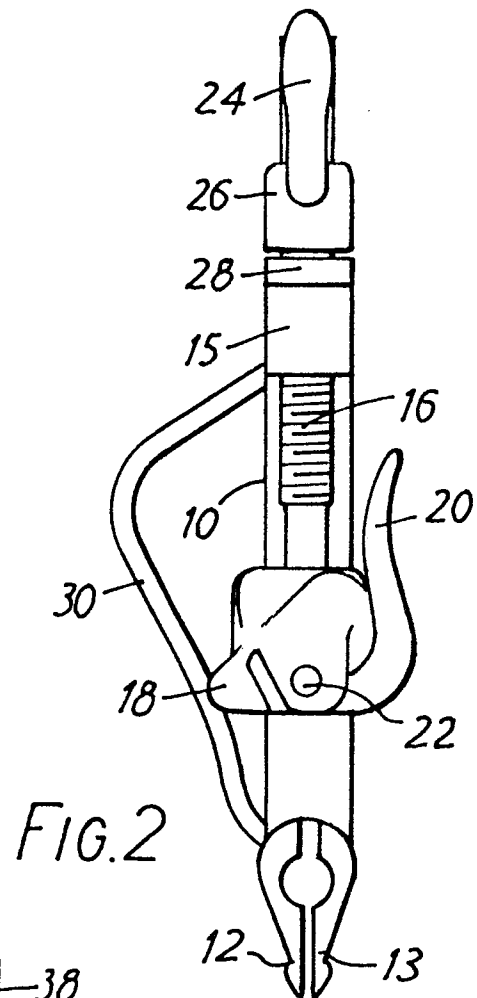
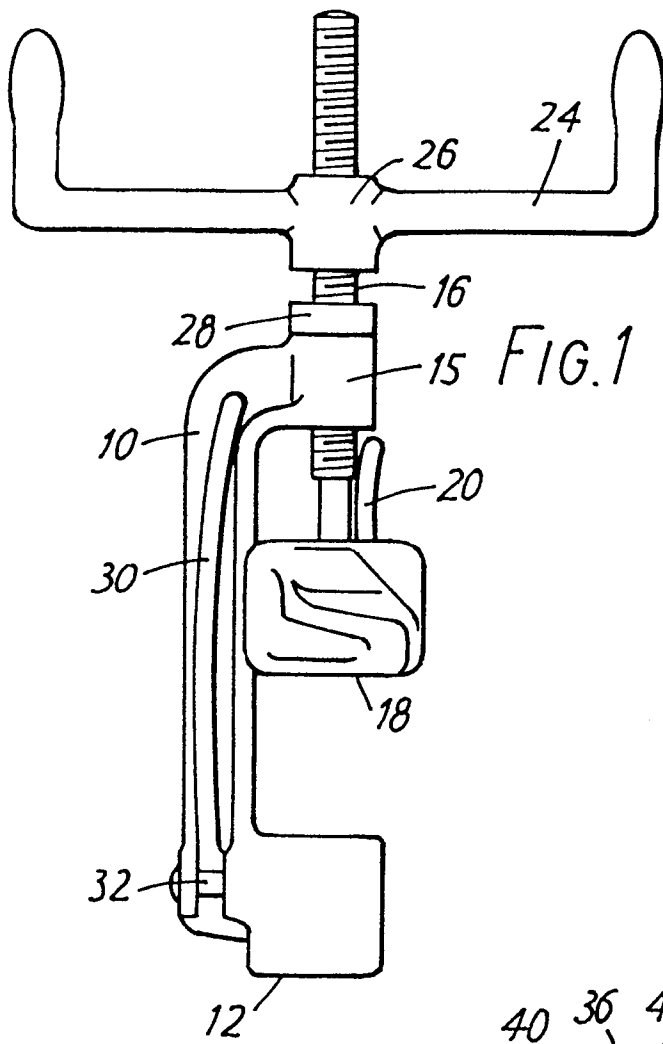
It should also be appreciated that this invention is concerned with the securing by a buckle of high tensile banding by the use of a banding tool adapted to apply a high tension to the band. The buckle is therefore of very robust construction adapted to withstand the forces involved, and the invention is not concerned

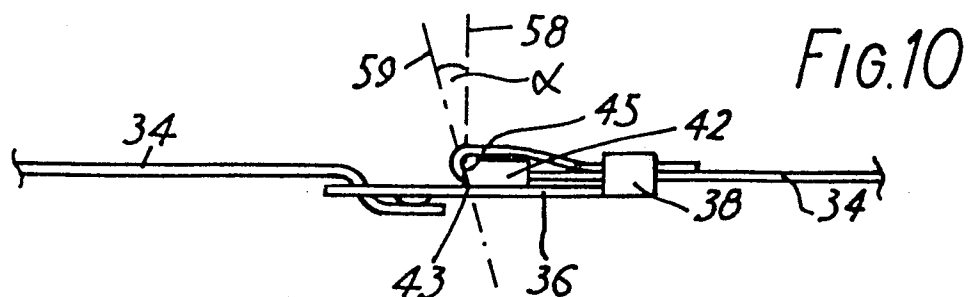
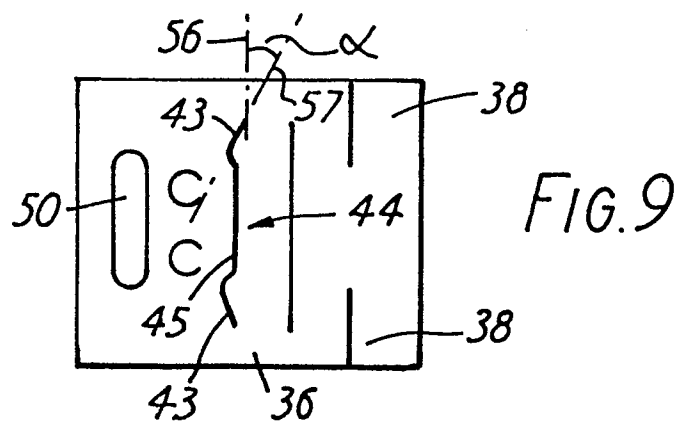
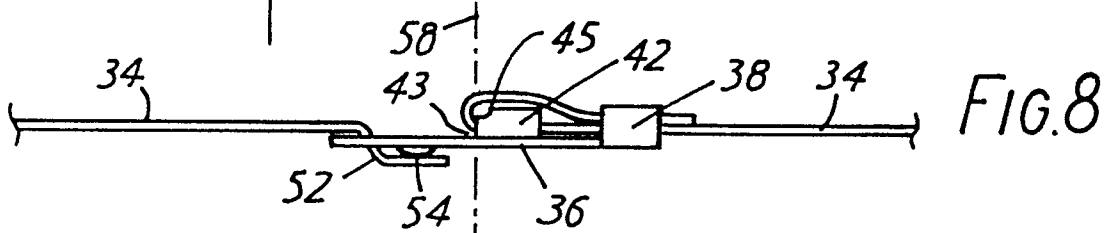
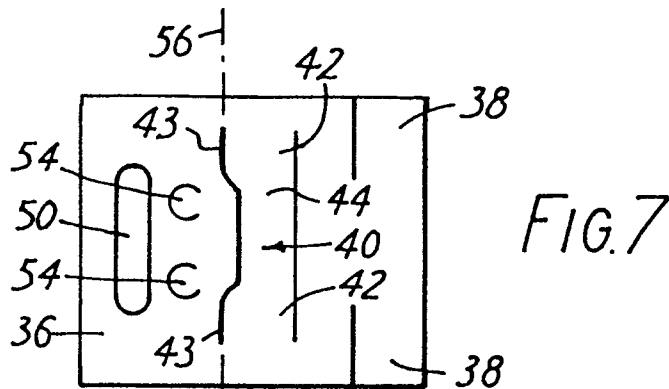
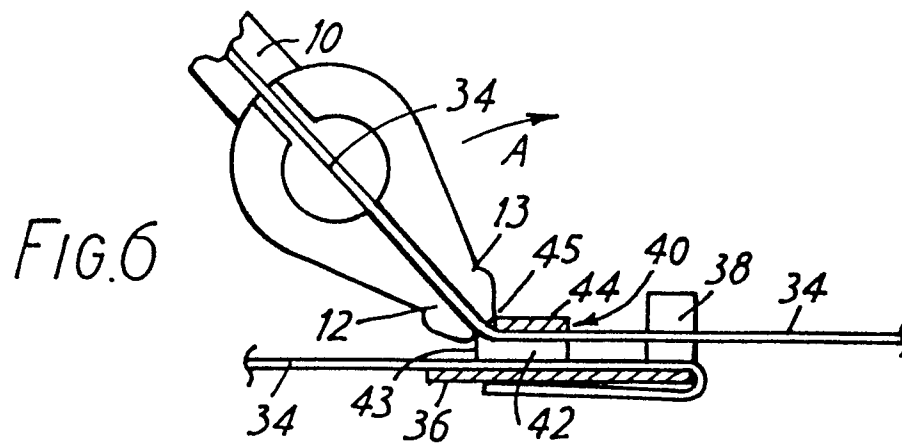
with lightweight buckles not intended to be used in such a fashion. In practical terms this means that the buckle is likely to be made from at least 1 mm thickness stainless steel sheet, or its equivalent in strength and rigidity, 5 preferably about 1.5 mm thickness. The banding is likely to be at least 0.5 mm thickness stainless steel, or its equivalent in tensile strength, preferably at least 0.62 mm thickness, and more preferably about 0.75 mm thickness.

CLAIMS:

1. A buckle for use in securing under high tension a band passed around an article, comprising a rigid plate
5 (36) to which one end of the band (34) is secured before tensioning the band, and a bridge (40) over the plate defining a passage between the bridge and plate through which the other end of the band can be passed and tensioned by means of a tensioning means (18-28) on a
10 banding tool having jaws (12,13) between which the band is slidably received and which abut the bridge (40) during tensioning, and around which bridge the band can be bent after tensioning by pivoting of said tool about its abutment with the bridge; characterised in that the
15 bridge has side walls (42) providing edges (43) against which the jaw (12) of the banding tool nearest the plate abuts during tensioning and initial pivoting of the tool, and a transverse element (44) joining the side walls (42) and having an edge (45) set back from said edges (43) of
20 the side walls to accommodate the thickness of the band during bending thereof, so that the jaw (13) of the banding tool remote from the plate will not engage the bridge during tensioning or initial pivoting of the tool, said edges (43) of the side walls being at right-angles
25 to the plane of the plate or inclined so as to overhang the plate, so that the jaw (12) of the banding tool nearest the plate will be maintained in abutment therewith during tensioning and initial pivoting.
- 30 2. A buckle according to claim 1 made from sheet steel of at least 1 mm thickness.
3. A method of banding using a buckle according to claim 1 or claim 2 to which one end of a high tensile
35 band is secured leaving a free end of the band, the method comprising passing the band (34) around an object and threading the free end through the passage between

the bridge (40) and plate (36), inserting the free end of the band between jaws (12,13) of a banding tool and securing the free end to a component (18) of tensioning means on the banding tool, engaging the jaw (12) nearest
5 the plate (36) with said edges (43) of the side walls (42) of the bridge (40) of the buckle and operating the tensioning means so as to tension the band to a desired extent, then without slackening the tensioning means pivoting the banding tool about an axis provided by the
10 engagement of said jaw (12) with said side wall edges (43) so as to bend the band about said edge (45) of the transverse element (44) of the bridge (40) and thereby secure the formerly free end of the band under tension to the buckle.







DOCUMENTS CONSIDERED TO BE RELEVANT			EP 83302334.4
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
X	FR - A - 1 135 108 (MASCLET) * Fig. 4 * --	1,3	A 44 B 21/00 B 65 B 13/34
Y	GB - A - 429 883 (BOABANDS, LTD), * Totality * --	1,3	
Y	US - A - 2 882 934 (GERRARD) * Fig. 6 * --	1,3	
A	GB - A - 950 561 (BAND-IT COMPANY) * Fig. 6 * ----		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl. 3)
			A 44 B B 65 B B 25 B B 65 D
Place of search		Date of completion of the search	Examiner
VIENNA		06-07-1983	NETZER
CATEGORY OF CITED DOCUMENTS			
X particularly relevant if taken alone Y particularly relevant if combined with another document of the same category A technological background O non-written disclosure P intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	