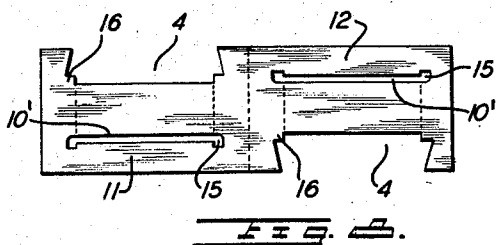
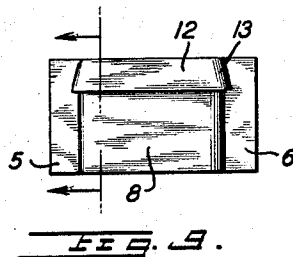
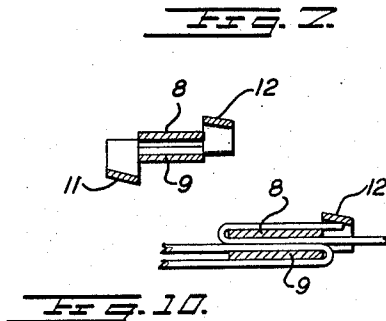
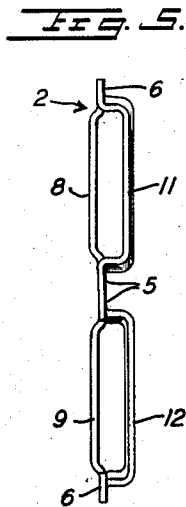
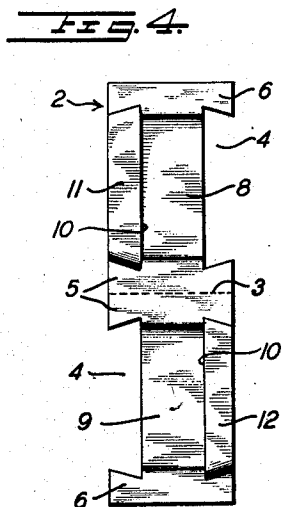
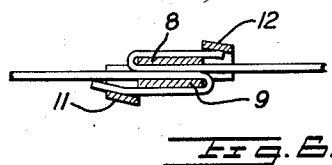
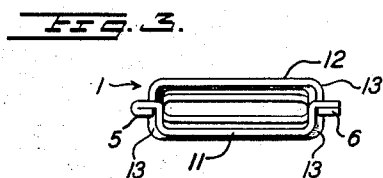
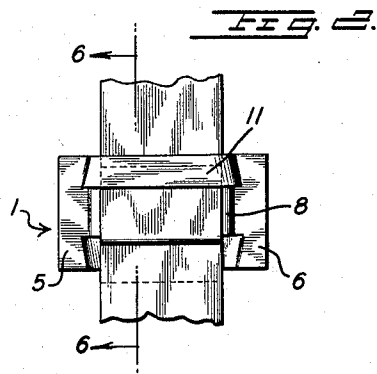
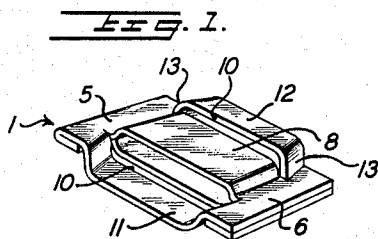


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E. D. CRAMMOND
METAL STRAP FASTENING MEANS
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INVENTOR.
EARLE D. CRAMMOND
BY *Harold T. Stowell*
Harold L. Stowell
ATTORNEY

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2,914,827

METAL STRAP FASTENING MEANS

Earle D. Crammond, Washington, D. C., assignor to
Lewis M. Schott, Plandome, N.Y.

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4 Claims. (Cl. 24—23)

This invention relates to improvements in metal strap fastening means and, more particularly, to a metal strap buckle for use with strapping tools and machines for fastening the ends of metal strapping in binding, supporting or tying bundles, packages or other objects or assemblies.

The invention has for one of its objects an improved buckle of the type which engages metal strap end portions passing in opposite directions through the buckle and bent around opposite sides of the buckle so as to hold and bind metal strapping transversely from edge to edge of the strapping without impairing the strap strength.

A further object of the invention is the provision of a buckle, of the strap fold over and tuck in type, which is economical to manufacture, and in which folded portions of the buckle serve to reinforce each other against strain and accidental opening.

Another object is the provision of a buckle which allows full use of the strength of associated metal strapping without deformation thereof thus allowing use of lighter binding bands and a buckle which in use with metal bands is locked against opening.

Further objects and advantages of the invention will become apparent from the following detailed description of the invention having reference to the accompanying drawing in which:

Fig. 1 is a perspective view of a buckle embodying the invention;

Fig. 2 is a top plan view of the buckle of Fig. 1 showing metal strap ends connected thereby;

Fig. 3 is an end view of the buckle of Fig. 1;

Fig. 4 is a plan view of the struck out metal blank of the buckle before folding to the buckle form of Fig. 2;

Fig. 5 is an edgewise view in elevation of the blank of Fig. 4;

Fig. 6 is a cross section view of the buckle on line 6—6 of Fig. 2 showing the buckle and its cooperation with associated binding straps;

Fig. 7 is a cross section view corresponding to Fig. 6 with the strap ends omitted;

Fig. 8 is a plan view of a buckle metal blank productive of a buckle with additional self-locking characteristics;

Fig. 9 is a top plan view of a modified form of buckle, similar to the structure of Fig. 1, but with one arch, this form of the invention being utilized mainly when strapping round objects; and

Fig. 10 is a cross-section on line 10—10 of the buckle shown in Fig. 9.

Having reference to the drawings and to Figs. 1 to 7 in particular the numeral 1 indicates a finished embodiment of the invention and 2 indicates the cut and formed buckle blank before folding on the transverse median dotted line 3 into its finished form. The buckle may be formed from a single flat strip or in multiple rows from a sheet of flat metal preferably of low carbon deep drawing steel or other metal which permits easy drawing and forming by suitable dies, rolls and the like.

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In the method of making the buckles, strip metal or sheet metal is operated on by cutting and forming dies or rolls to provide the cut and formed elongated substantially rectangular buckle blank 2 of Figs. 4 and 5. On opposite sides of a transverse median fold line 3, each half of the buckle blank has identical but oppositely disposed formations. Each half portion of the blank has a marginal edge portion cut away to define a central marginal recess 4 and buckle side flanges 5 and 6. Intermediate said flange portions, in each half portion of the blank, the central part of the blank is depressed to form in each half portion of the blank transverse channel portions 8 and 9 offset to one side of the edgewise plane of the blank whereby a strap receiving passage is provided through the buckle when the half portions are folded on each other with flange portions 5 and 6 in abutment. Marginal portions of the blank opposite recesses 4 are provided in the course of forming the blank with slits 10 inwardly of and parallel with the edges of the blank, and the marginal metal portions between the slits 10 and the edge of the blank are struck up, or drawn outwardly of the plane of the blank in a deep draw sufficient to form combined strap and receiving arches and buckle locking members 11 and 12, which lie above the channel portions 8 and 9 when the blank is folded. These arches are struck up or drawn from the blank to a side of its edgewise plane opposite the channel portions to provide sloping and tapered side walls 13 and a top portion substantially parallel with the blank but sloping downwardly toward its marginal edge.

Slits 10 define the marginal boundaries of the depressed channel portions 8 and 9 and extend into the flange portions 5 and 6 a distance substantially equal to or slightly greater than the thickness of the blank material to define marginal rear edges of the arch portions when pressed out of the metal. Side walls of arches 11 and 12 start, at the rear edges thereof, in flange portions 5 and 6 outside the side boundaries of channels 8 and 9 but converge toward edges of the blank, terminating at the edge of the buckle in line with the respective side boundary portions of the channels. This provides outwardly converging guide walls tending to center strap ends with respect to the buckle when tucked under the arches in a strap fastening operation. The design is such that in the die forming action, due to the cut and draw or stretch of the metal in formation of the arches, rear edges of the arch side walls incline edgewise slightly from a perpendicular normal to the blank surface, particularly at the top portions of the arches.

The recesses 4 are dove-tail shaped, being wider at the rear, so as to provide converging edges of the blank adapted to receive therebetween the substantially conforming converging side walls of the arches when the blank is folded, and closely engage the arches adjacent flange portions of the buckle. The recesses are of depth such as to insure close frictional engagement of the blank edge of the counterpart folded over portion with rear edges of the arch side walls at their bottom portions adjacent the flanges. The frictional opposition to folding of the opposed counterpart portions of the blank, in order to provide a tight fit, is encountered only at the lower portions of the arches, the slight inclination of the rear edges of the side walls providing clearance at the top. Thus, in folded form, the arches are engaged snugly in the recesses contributing additional support and resistance to deformation of the buckle. When relatively heavy gauge metal is used in making the buckle the set of the metal and its tight engagement behind the arches is sufficient to maintain the buckle against opening.

In some instances, particularly when buckles are made of light gauge and more yieldable material, a more positive latch-like fastening may be provided in forming

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the blank prior to folding. The metal cuts at and defining end portions of slits 10 in flanges 5 and 6 may be enlarged or carried forward toward edges of the blank to provide a small undercut 15 (Fig. 8) at the rear base portions of the arch side walls so as to lie directly above the flange portions when the arches 11 and 12 are struck outwardly of the blank. Depth of this undercut need only be a few thousandths of an inch and lateral extent may be only that sufficiently greater than the thickness of the blank to provide clearance to allow edge portion movement and engagement therein of the other half of the blank when the counterpart portions are forced by the die to full folded position with the arches 11 and 12 extending through the recesses. Diagrammatic illustration of this cutout is to be noted in Fig. 8 showing a slightly modified blank, before the channels and arches are struck outwardly therefrom, wherein recesses are cut deeper into the blank to provide a widened slit 10' for larger strap entrance under the arches. Extent of the deepened portion of the dove-tailed recesses is only across the strap receiving channel portion thus leaving corner outwardly facing shoulders 16 for frictional edge engagement with the inner edge walls of the arches.

Figs. 9 and 10 show a modified form of buckle wherein the folded blank is provided with but one recess defining the edgewise converging blank edges and one strap receiving arch 12 along the single edge of the blank extending between side flanges 5 and 6. The single arch 12 is locked in the single recess in the folded position. This form finds its main use in strapping pipes and other round objects and in some instances where the buckle may be drawn into the bundle or material being strapped.

Buckles of the invention are designed for main use with strapping machines or tools of the strap fold over and tuck in type known in the art such as, for example, the strapping tool described in U.S. patent application Serial No. 722,486 filed March 19, 1956 by M. J. McAneny. In use with such machines the strap ends are caused to engage the buckle as illustrated in Figs. 1 and 6. Stresses from strap pull are opposite in the respective folded portions of the buckle. Tendency of these stresses toward movement of one fold portion of the blank with respect to the other is opposed by the locking features provided by engagement of the arches in the fitting recesses and by the edgewise plate reinforcement behind the arches.

From the foregoing, it is apparent that the invention provides a simplified buckle which results from formation and folding of a single blank into a self locking assembly, thus avoiding other fastening steps such as welding or the like. When engaged with strap ends the structure is further locked by the ends of the strap passing around sides of the buckle and anchored under the arches.

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The invention has been described in connection with preferred embodiments thereof but the words and terms employed are those of description and not of limitation as other forms of the invention may be contemplated within the purview of the appended claims without departing from the true scope and spirit of the invention.

I claim:

1. A strap fastening buckle comprising a formed and folded metal blank having counterpart half-portions provided with strap receiving channels therein struck outwardly of the said half-portions and defining a strap receiving passage through the buckle so that the said passage is parallel to the fold, one of said counterpart half-portions having a marginal dovetail-shaped recess therein at one end of the passage, and a marginal inwardly struck strap receiving arch on the other counterpart half-portion adjacent the end of the passage on the same side as the recess of the said one-half portion, the said arch having converging side walls engaged in said recess and extending through the other side of the buckle when the buckle is in the folded position.

2. The invention defined in claim 1 wherein said strap receiving arch is undercut at the rear base portions of the side walls thereof to receive therein the edge of the counterpart half-portion when the buckle is in the folded position.

3. A strap fastening buckle comprising a formed and folded metal blank having counterpart half-portions provided with strap receiving channels therein struck outwardly of the said half-portions and defining a strap receiving passage through the buckle so that the said passage is parallel to the fold, each of the counterpart half-portions having a marginal dovetail-shaped recess therein at opposite ends of the passage, and a marginal inwardly struck strap receiving arch at the other ends of the passage, the said arches having converging side walls engaged in the recess of its counterpart half-portion and extending through its counterpart half-portion when the buckle is in the folded position.

4. The invention defined in claim 3 wherein each of the strap receiving arches is undercut at the rear base portion of the side walls thereof to receive therein the edge of the counterpart half-portion when the buckle is in the folded position.

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