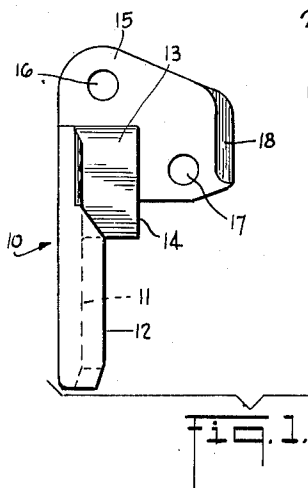
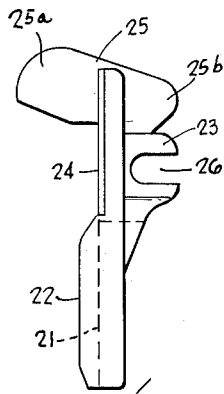
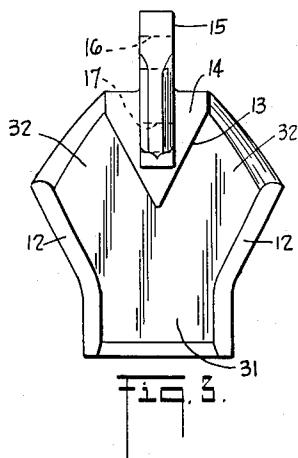
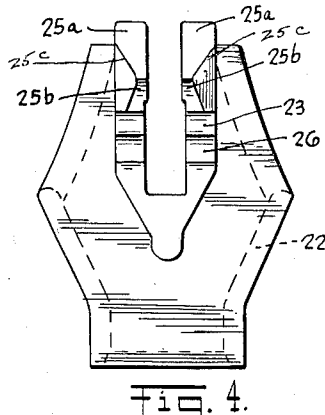
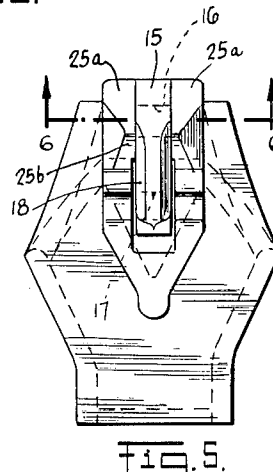
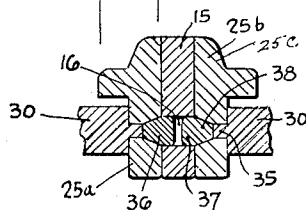
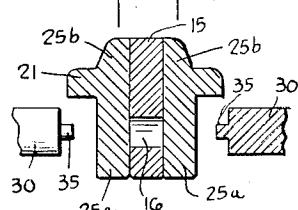
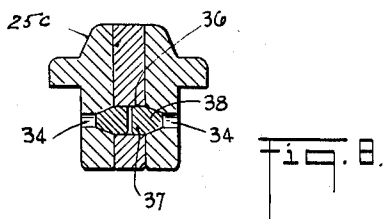


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METHOD OF FORMING PIVOTAL CONNECTIONS FOR
HINGED MEMBERS OF SLIDERS OR THE LIKE
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2,723,447

METHOD OF FORMING PIVOTAL CONNECTIONS FOR HINGED MEMBERS OF SLIDERS OR THE LIKE

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This invention relates to a novel method of forming a pivotal interconnection between hingedly related metal elements and, more particularly, to a novel method of assembling the parts of a slider for separable fasteners.

In the so-called "reversible" type of slider for separable fasteners, such as shown and described, for example, in U. S. Patent No. 2,495,176, the guide members or wings are interconnected at one end by a pivot so that they may be swung apart to completely disengage the slider hooks or elements and be reengaged therewith in a relatively reversed position. Normally, the guide members are held in substantially parallel relation by means cooperable with the pull tab of the slider, such means usually comprising aligned apertures in interengaged male and female ears on the two members receiving separable stub shafts or pins on the pull tab. When the pull tab is forced toward a given position, cooperating cam means spread the tab pins sufficiently to release the male ear so that the guide members may be swung apart.

The hinging connection between the guide members has been provided hitherto by forming a male ear projecting from one member and engageable between spaced female ears on the other member. The three ears are formed with holes which are aligned, when the members are properly assembled, to receive a fastening pin which may then be headed to prevent displacement. Due to the small dimensions involved, difficulty is experienced in aligning the holes and fitting the pin therein, thus unduly increasing the time and cost of the assembly operation.

In accordance with the present invention, these difficulties are avoided by forming the pivot of metal slugs partially displaced from the female ears into an aperture in the male ear, the displacement being effected in a novel manner whereby the two guide members are permanently hingedly interconnected.

For an understanding of the invention method, reference is made to the following description of a typical application thereof as illustrated in the accompanying drawing. In the drawing:

Fig. 1 is a side elevation view of the two guide members of a reversible slider before assembly;

Fig. 2 is a similar view of the members when fitted together but before formation of the hinge connection;

Figs. 3 and 4 are plan views of the male and female members, respectively;

Fig. 5 is a plan view of the two members as fitted together but before the hinge formation;

Fig. 6 is a transverse sectional view on the line 6—6 of Fig. 5, illustrating the parts just prior to the hinge formation;

Fig. 7 is a view on the line 6—6 of Fig. 5 at the completion of the hinge formation; and

Fig. 8 is a sectional view of the completed hinge.

For the purpose of providing a specific example of an application of the invention method, the invention will be described as applied to the hinging together of the guide members or wings of a reversible slider. However, it should be understood that the invention is of general

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applicability in hingedly interconnecting metal members, and is not limited to the assembly of such sliders.

Referring to Figs. 1 through 5 of the drawings, a reversible slider is illustrated as including a male member or wing 10 and a female member or wing 20. Member 10 includes a flat wall 11 partially bounded by flanges 12 to form a Y-shaped channel for passage of the separable fastener elements through the slider. A substantially triangular abutment 13 projects from wall 11 adjacent the diverging end of the member, abutment 13 having a flat surface 14 for a purpose to be described. An ear 15 projects rearwardly and outwardly from abutment 13, having a rearwardly disposed aperture 16 and an outwardly disposed aperture 17. The outer edge of ear 15 is tapered, as at 18, for a purpose to be described.

Female member 20 is similar in outline to male member 10, having a flat wall 21 partially bounded by flanges 22 and a flat surface 24 arranged to engage surface 14 to maintain members 10 and 20 normally in parallelism with flanges 12 and 22 in substantially parallel spaced relation. A pair of laterally spaced ears 25 project vertically in opposing directions from wall 21, the respective opposing portions thereof being indicated at 25a and 25b, the inner walls of ears 25 being spaced sufficient to receive ear 15 therebetween. The ear portions 25a have parallel walls while ear portions 25b have inner walls in alignment with those of the ear portions 25a, while the outer walls thereof are inclined to form cam surfaces 25c for a purpose to be later described. Just forwardly of ear portions 25b, wall 21 has outwardly projecting laterally spaced ears 23 each having a U-shaped recess 26 therein alignable with aperture 17 when the members 10 and 20 are assembled.

When the two members are assembled in parallelism, with ear 15 engaged between the inner faces or walls of the ear portions 25a and 25b of ears 25, and with the surface 24 engaging surface 14, the flanges 12 and 22 are spaced to pass the stringers of a separable fastener. As will be understood by those skilled in the art, the teeth of a closed fastener are disengaged as they pass from trunk passage 31 into branch passages 32, 32 to either side of abutment 13, and are re-engaged by passing from branch passages 32 into trunk passage 31. The U-shaped slots 26 and aperture 27 receive the shafts or pins of a pull tab (not shown), which pins are separated sufficiently when the tab, which is formed of spring metal, is forced over tapered surface 18 to enter aperture 17, the tab having surfaces cooperating with cam surfaces 25c to cause a spread of the pins out of aperture 17, whereby to permit a pivotal movement and spread to angular relationship of members 10 and 20 in accordance with the showing of Letters Patent No. 2,495,176 above referred to.

The hinge connection according to the invention is formed as shown in Figs. 6 and 7. It will be noted that the ear portions 25a are blank, having no aperture alignable with aperture 16 of male ear 15. With the parts assembled as in Figs. 2 and 5, a pair of die punches 30 are arranged on each side of ear portions 25a in axial alignment with aperture 16. Each punch has a small projection 35 whose diameter is less than that of aperture 16 and whose length is less than the thickness of ear portions 25a.

As projections 35 are forced against ear portions 25a, the metal of the latter in alignment with the punches is displaced inwardly. This displaced metal tends to spread in all directions in a sort of mushrooming effect. As the aperture 16 offers the least resistance to movement, the mushrooming or spreading metal enters the aperture, spreading over the full sectional area of the latter.

With continued die movement and resultant pressure, the unit stress on the displaced metal becomes greater than the breaking stress. This forms slugs 36 severed from

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ear portions 25a and each constituting a cylinder 37 firmly set in aperture 16 and surmounted by a frusto-conical head 38 seated in a correspondingly shaped recess in the inner surface of each ear portion 25a. The punches 30 are then withdrawn, leaving apertures 34 of less diameter than aperture 16 and cylinders 37. Consequently, slugs 36 cannot move outwardly through apertures 34, and a permanent hinge interconnection of members 10 and 20 is effected.

While a specific embodiment of the invention has been shown and described in detail to illustrate the application of the invention principles thereof, it should be understood that the invention may be otherwise embodied without departing from such principles.

What is claimed is:

1. The method of forming a hinged interconnection between a pair of members formed of deformable metal comprising forming a projecting apertured male ear on one member; forming a pair of laterally spaced female ears on the other member arranged to receive and engage said male ear; inserting the male ear between the female ears; applying pressure to the outer surfaces of the female ears in alignment with such aperture and over an area less than the cross-sectional area of such aperture for displacing metal from said female ears into such aperture; and severing the displaced metal from the female ears by continuing the pressure application.

2. The method of forming a hinged interconnection between a pair of members formed of deformable metal comprising forming a projecting apertured male ear on one member; forming a pair of laterally spaced female ears on the other member arranged to receive and engage said male ear; inserting the male ear between the female ears; applying pressure to the outer surfaces of the female ears in alignment with such aperture and over an area less than the cross-sectional area of such aperture for displacing metal inwardly and laterally from said female ears into such aperture; and severing the displaced metal

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from the female ears by continuing the pressure application to form opposing plugs each with a cylindrical portion firmly set in each aperture, each plug having a frusto-conical head seated in a frusto-conical recess in the inner surface of each female ear.

3. The method of forming a hinged interconnection between a pair of guide wings of a separable fastener slider comprising forming one wing with a single male ear projecting from its wall and having an aperture; forming the other wing with a pair of laterally spaced female ears projecting from its wall, the spacing being substantially equal to the thickness of the male ear; assembling the wings with the male ear between the female ears; applying pressure to the outer surfaces of the female ears in alignment with such aperture and over an area less than the cross-sectional area of such aperture to displace metal inwardly and laterally from said female ears into such aperture and severing the displaced metal from the female ears by continuing the pressure application to form opposing plugs, each with a cylindrical portion firmly set in each aperture, each plug having a frusto-conical head seated in a frusto-conical recess in the inner surface of such female ear.

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