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H. R. SEGAL

2,407,618

COWL FASTENER

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Fig. 1.

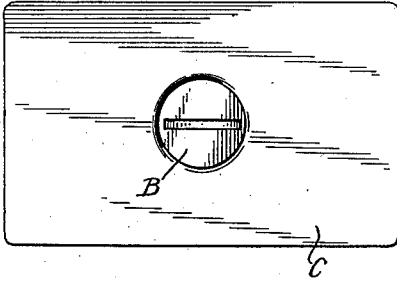


Fig. 2.

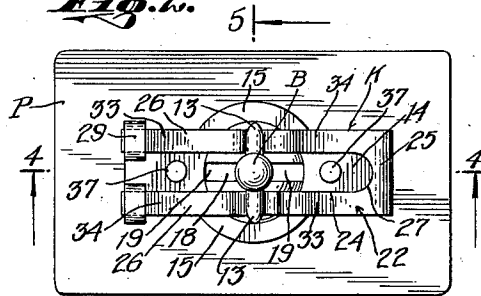


Fig. 3.

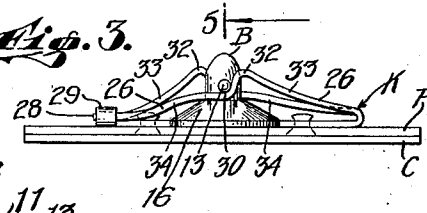


Fig. 4.

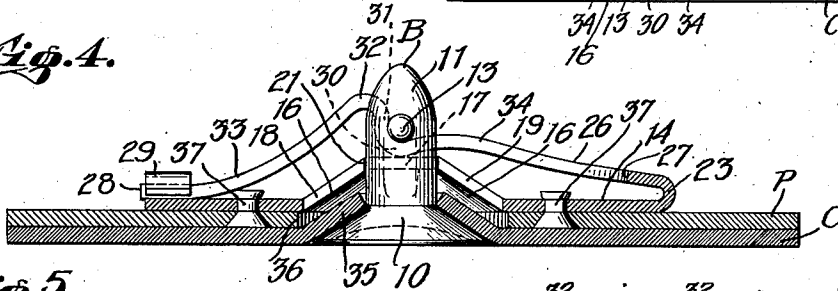


Fig. 5.

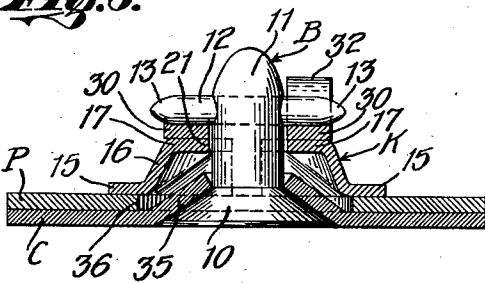


Fig. 6.

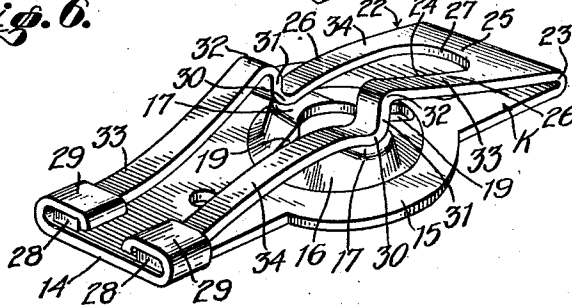
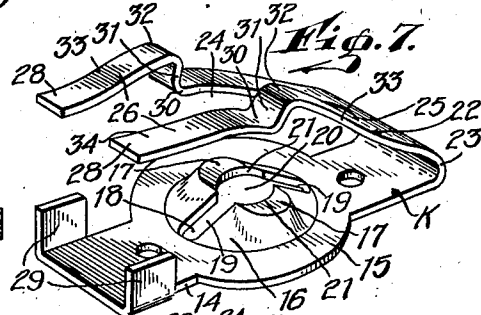


Fig. 7.



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2,407,618

COWL FASTENER

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18 Claims. (Cl. 24-221)

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This invention is a fastener and more particularly is directed to an improved cowl fastener. The object of the invention among others resides in the provision of a serviceable cowl fastener having a one piece sheet metal keeper adapted for quick mounting onto a support and adapted to be automatically manufactured by progressive dies for relatively fast production on an economical basis.

The invention has as a further object the provision of an efficient and durable cowl fastener wherein the keeper is characterized by a base plate having a bifurcated spring plate integrally hinged thereto and defining compensatory reflexed and bowed straps adapted to be stressed and flexed by a cross pin of a rotatable bolt carried by a cover member to removably clamp the latter against a support to which the one piece keeper is secured.

The invention has as another object the provision of a novel cowl fastener wherein the keeper embodies a bossed base plate hingedly carrying spaced and reflexed straps having their terminals slidably guided in spaced sockets of the base plate and adapted to be linearly displaced relative to these sockets during rotation of the cross pin of the rotatable bolt when the latter is shifted from a non-locking position to a locking position.

Other important functional and structural aspects and advantages of the invention will appear from consideration of the following detailed description taken in the light of the accompanying drawing wherein:

Fig. 1 is an outside plan view of the cowl fastener according to my invention.

Fig. 2 is an inside view of Fig. 1.

Fig. 3 is a side view of Fig. 2.

Fig. 4 is an enlarged longitudinal and sectional view on the line 4-4 of Fig. 2.

Fig. 5 is a transverse sectional view on the line 5-5 of Fig. 2.

Fig. 6 is an enlarged perspective view of the keeper, and

Fig. 7 is an enlarged perspective view of the one piece keeper prior to securing of the compensatory longitudinally disposed locking straps or tines.

Illustrative of the embodiment disclosed the cowl fastener according to the invention comprises a keeper generally denoted K for disengageably interlocking with a bolt broadly denoted B.

The bolt consists of a beveled and slotted head 10 and a shank 11 fixedly carrying the cross pin

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12 provided with the tapering or cammed terminals 13.

The keeper is formed from relatively thin but durable sheet metal and comprises an elongated base or base plate 14 having the medially arranged circular portions or flanges 15 and provided with a frusto conical hollow boss 16 having the laterally extending struck out stop shoulders 17.

Interrupting the boss 16 and extending diametrically thereof and lengthwise of the keeper base plate 14 is the so-called butterfly slot 18 comprising the restricted openings 19 merging with the central enlarged or expanded opening 20 forming in part the opposed notches 21 in the opposed shoulders 17.

According to the invention and as previously set forth the keeper is a one piece member and readily punched out of suitable sheet metal stock for automatic or manual forming into its desired shape illustrated. Consequently during the process of forming, its bifurcated spring plate generally indicated 22 is disposed in spaced superimposed or juxtapositioned relation with the base 14 and this is accomplished by folding the bifurcated spring 22 over the base 14 along the curved portion or hinge 23.

Since the body of the keeper is of relatively thin but durable sheet metal the bifurcated spring 22 is amply resilient and upon application of suitable pressure thereon may be flexed in a direction towards the base 14. As shown the elongated slot 24 of the keeper spring is substantially coextensive with the length thereof and terminates just before the integral hinge 23 to provide a reinforcing bridge 25 from which the spaced flat tines or straps 26 extend, the latter being formed by the provision of the slot 24 although the latter has the closed and curved end 27.

The tines or arms 26 are in spaced relation to the base and are substantially coextensive with the length thereof terminating in the inclined and downwardly extending free terminals 28 which during assembly are brought flatwise against the base and thereafter slidably retained under the flanges 15 which are adequately turned upwardly and inwardly to form sockets with the base plate 14 to retain the terminals 28 in place and against opposite margins of the base plate, however permitting slidable displacement thereof when the resilient straps are stressed upon the application of suitable pressure thereon in a direction towards the base plate 14.

It should be observed that the spaced tines or

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straps are substantially transversely flat and each includes a concaved portion 30 defining a notch intermediate thereof. The notches are disposed in transverse alinement as shown. The concaved portions 30 in fact merge with inclined stops 31 merging with convex portions or humps 32.

Although the concaved portions 30 are in alinement, the reflexed or convex portions 32 are out of alinement and the latter merge with the alternate limbs 33 of the spaced straps 26, while the concaved portions 30 merge with the slightly convexed or bowed limbs 34 of the straps, the arrangement being such that alined convex portions 30 are above and normally in spaced relation to the alined stops or wings 17 of the struck out hollow boss 16, that is, at a time when the straps have not been stressed by the cross pin 12 of the rotatable bolt and at such time the formerly free terminals 28 are now completely within the spaced retaining sockets or guides 29 (Fig. 6).

Bolt B has its shank rotatably and linearly guided in the contracted portion of the hollow frusto conical dimple or nipple 35 struck out of the outer cover plate C. Pursuant to the positioning of the bolt into the nipple, the cross pin 12 is forced fitted into shank 11 and by reason of the pin being much longer than the contracted portion of the nipple, the shank is prevented from being accidentally withdrawn from the cover plate C.

With the keeper formed out of the single sheet of material and assembled as shown in Fig. 6, this keeper can be readily secured to the inside plate P and over an enlarged opening 36 therein by spaced rivets 37 thereby positioning the boss 16 over and in spaced relation to the nipple 35.

Having secured the keeper to the support or inside plate P and the rotatable bolt to the outside plate or cover C, the latter and the support P may be quickly clamped together. In this connection the bolt B is positioned in the boss 16 so that the cross pin passes through the butterfly slot 18, thus permitting nipple 35 to be received in the hollow boss 16. In this relation shank 11 of the bolt is rotatably confined between the notches 21 forming a part of the expanded opening 20 and the cross pin is between the resilient straps 26 awaiting to slip over the alternate bowed and convex limbs 34 when the bolt rotated is in a counter clockwise direction considering Fig. 2.

Upon such rotation of the bolt the cross pin is shifted so that its tapered or cam portions first slip over limbs 34, thus slightly flexing or stressing the latter. By such action the body of the pin progressively reaches over limbs 34 causing the latter to be further stressed or flexed downwardly towards the base 14 and ultimately the cross pin reaches the alined concavities or sub-keepers 30, disengageably interlocking with or snapping into the latter in which instance sub-keepers 30 reach the stops or abutments 17 resisting further rotation of the bolt in the same direction. Consequently it may be said that the straps of the keeper are stressed and placed under tension upon rotation of the bolt from a non-locking position to a locking position causing these straps to flex towards the base plate but such flexing is limited by the action of the opposed stops 17 (Fig. 5) although the tapered cams permit the initial clearing or start of the cross pin on the limbs 34 at the beginning of the rotation of the bolt.

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Normally terminals 28 are completely within the spaced sockets 29 (Fig. 6). During rotation of the bolt to securely clamp the cover plate C to the supporting plate P, the pressure transmitted to the alternate limbs 34 causes the tines or straps to be shifted downwardly, ultimately hinging downwardly whereupon terminals 28 are slidably displaced longitudinally of the keeper to be slightly projected beyond the sockets 29 (Fig. 4).

In the interlocked relation of the cross pin of the bolt and the reflexed concavities 30 of the straps of the keeper, the propelling pressure applied by these straps against the cross pin tends to urge the bolt in a direction towards the supporting or inner plate P, and by this action the cover plate is securely held clamped against the inner plate pin.

The cover plate may be quickly removed from the supporting plate upon disengaging the cross pin from the straps and this is accomplished upon rotating the bolt as viewed in Fig. 2 in a clockwise direction whereby the cross pin is initially removed from the concavities 30 thereafter shifted over the alternate limbs 34 to be received in slot 24 of the bifurcated keeper spring 22. Subsequently the cross pin is lined up with the butterfly slot 18 and may be quickly withdrawn from boss 16 after which the bolt can be quickly removed from the limits of the supporting plate by withdrawing the cover plate away from the supporting plate.

Once the cross pin is free of the bowed straps they automatically retract to their normal positions, that is, due to their resiliency, they again assume their normal spaced relation with the opposed stops 17. Or stated in another way, the straps are displaced vertically away from these stops. They are also retracted longitudinally in that terminals 28 again move into sockets 29 due to the bifurcated spring plate 22 automatically hinging upwardly along the integral hinge 23.

The relatively broad upper surface of the straps 26 provide for added frictional engagement with the relatively elongated arms of the cross pin, thus once the latter is interlocked with the concavities, accidental dislodgement is resisted.

In fact the keeper may be considered loop shaped with the base plate 14 characterizing one arm or leg of the loop and the bifurcated spring plate constituting the other arm or leg of the loop with the curved hinge connection or loop portion 23 integrally merging with the base plate and the bifurcated spring plate. Normally the tension in the loop portion 23 urges the base plate and bifurcated plate apart. Thus when the bifurcated hinged plate is brought towards the base and slidably anchored as desired, the inherent tendency of the bifurcated spring plate is to spread away from the base plate but such action is prevented by the sockets 29. By such arrangement the straps are held under tension.

In actual practice the thicknesses of the cover C and supporting plate S vary and since the terminals 28 of the loop spring plate 22 are slidably guided to allow slidable creepage or relief of the bowed straps relative to the retaining sockets, such action compensates for irregularities in the thicknesses of the support and cover plates.

Various changes may be made in the details of construction and arrangement of parts without departing from the spirit of the invention or sacrificing any of the advantages thereof inherent therein.

I claim:

1. In a fastener for removably clamping a cover to a support, a keeper having a base plate adapted to be secured to said support, a hollow boss extending from said base plate and including an elongated opening having an expanded medial portion and communicating restricted portions, a spring plate characterizing spaced and resilient members including transversely alined subkeepers normally spaced from said boss and including terminal portions, resilient loop means integrally merged with said spring plate and base plate for normally hingedly spreading said spring plate away from said base plate, means for slidably guiding said terminal portions and to limit the spread of said spring plate away from said base plate, and a bolt adapted to be carried by said cover for insertion into and through said boss and having a cross pin for insertion into and through said restricted portions and adapted to be pressed onto and over said members upon rotation of said bolt relative to said cover and support for flexing said members towards said boss and to removably interlock with said subkeepers.

2. In a fastener for removably clamping a cover to a support, a keeper having a base plate adapted to be secured to said support, a hollow boss extending from said base plate and including an elongated opening having an expanded medial portion and communicating restricted portions, a spring plate characterizing spaced and resilient members including transversely alined subkeepers normally spaced from said boss and including terminal portions, resilient loop means integrally merged with said spring plate and base plate for normally hingedly spreading said spring plate away from said base plate, sockets for slidably guiding said terminal portions and to limit the spread of said spring plate away from said base plate, and a bolt adapted to be carried by said cover for insertion into and through said boss and having a cross pin for insertion into and through said restricted portions and adapted to be pressed onto and over said members upon rotation of said bolt relative to said cover and support for flexing said members towards said boss and to removably interlock with said subkeepers.

3. In a fastener for removably clamping a cover to a support, a one piece keeper having a base plate adapted to be secured to said support, a hollow boss extending from said base plate and including an elongated opening having an expanded medial portion and communicating restricted portions, a spring plate characterizing spaced and resilient bowed members including transversely alined subkeepers normally spaced from said boss and including terminal portions, resilient loop means integrally merged with said spring plate and base plate for normally hingedly spreading said spring plate away from said base plate, means for slidably guiding said terminal portions and to limit the spread of said spring plate away from said base plate, and a bolt adapted to be carried by said cover for insertion into and through said boss and having a cross pin for insertion into and through said restricted portions and adapted to be pressed onto and over said members upon rotation of said bolt relative to said cover and support for flexing said members towards said boss and to removably interlock with said subkeepers.

4. In a fastener for removably clamping a cover to a support, a keeper having a base plate adapted to be secured to said support, a hollow

boss extending from said base plate and including an elongated opening having an expanded medial portion and communicating restricted portions, a bifurcated spring plate characterizing spaced and resilient members including transversely alined subkeepers normally spaced from said boss and including terminal portions, resilient loop means integrally merged with corresponding ends of said spring plate and base plate for normally hingedly spreading said spring plate away from said base plate, means carried by said base plate and disposed oppositely to said loop means for slidably guiding said terminal portions and to limit the spread of said spring plate away from said base plate, and a bolt adapted to be carried by said cover for insertion into and through said boss and having a cross pin for insertion into and through said restricted portions and adapted to be pressed onto and over said members upon rotation of said bolt relative to said cover and support for flexing said members towards said boss and to removably interlock with said subkeepers.

5. In a fastener for removably clamping a cover to a support, a keeper having a base plate adapted to be secured to said support, a hollow boss extending from said base plate and including an elongated opening having an expanded medial portion and communicating restricted portions, a bifurcated spring plate characterizing spaced and resilient straps including transversely alined subkeepers normally spaced from said boss, resilient loop means integrally merged with said spring plate and base plate for normally hingedly spreading said spring plate away from said base plate, means for slidably guiding and retaining said straps and to limit the spread of said spring plate away from said base plate, and a bolt adapted to be carried by said cover for insertion into and through said boss and having a cross pin for insertion into and through said restricted portions and adapted to be pressed onto and over said straps upon rotation of said bolt relative to said cover and support for flexing said straps towards said base and to removably interlock with said subkeepers.

6. In a fastener for removably clamping a cover to a support, a keeper having a base plate adapted to be secured to said support, a hollow boss extending from said base plate and including an elongated opening having an expanded medial portion and communicating restricted portions, an arched bifurcated spring plate characterizing spaced and resilient bowed straps disposed longitudinally of base plate and including transversely alined subkeepers normally spaced from said boss, resilient loop means integrally merged with said spring plate and base plate for normally hingedly spreading said spring plate away from said base plate, means for slidably guiding and retaining said straps and to limit the spread of said spring plate away from said base plate, a bolt adapted to be carried by said cover for insertion into and through said boss and having a cross pin for insertion into and through said restricted portions and adapted to be pressed onto and over said straps upon rotation of said bolt relative to said cover and support for flexing said straps towards said base and to removably interlock with said subkeepers, and stop means on said boss to limit the deflection of said straps in a direction towards said base.

7. In a fastener for removably clamping a cover to a support, a keeper having a base plate

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adapted to be secured to said support, a hollow boss extending from said base plate and including an elongated opening having an expanded medial portion and communicating restricted portions, a bifurcated spring plate characterizing spaced and resilient bowed straps including transversely aligned sub keepers normally spaced from said boss, resilient loop means integrally merged with said spring plate and base plate for normally hingedly spreading said spring plate away from said base plate, sockets on said base plate for slidably guiding and retaining said straps and to limit the spread of said spring plate away from said base plate, a bolt adapted to be carried by said cover for insertion into and through said boss and having a cross pin for insertion into and through said restricted portions and adapted to be pressed onto and over said straps upon rotation of said bolt relative to said cover and support for flexing said straps towards said base and to removably interlock with said sub keepers, means to limit the deflection of said strap towards said base.

8. In a fastener for removably clamping a cover to a support, a one piece sheet metal keeper having a base plate adapted to be secured to said support, a hollow boss extending from said base plate and including an elongated opening having an expanded medial portion and communicating restricted portions, a bifurcated spring plate characterizing spaced and resilient bowed straps including transversely aligned sub keepers normally spaced from said boss, resilient loop means integrally merged with said spring plate and base plate for normally hingedly spreading said spring plate away from said base plate, means for slidably guiding and retaining said straps and to limit the spread of said spring plate away from said base plate, a bolt adapted to be carried by said cover for insertion into and through said boss and having a cross pin for insertion into and through said restricted portions and adapted to be pressed onto and over said straps upon rotation of said bolt relative to said cover and support for flexing said straps towards said base and to removably interlock with said sub keepers, stops on said boss to limit the deflection of said straps towards said base plate, and said straps having stop means to limit the rotation of said bolt.

9. In a fastener for removably clamping a cover to a support, a keeper having a base plate adapted to be secured to said support, a hollow boss extending from said base plate and including an elongated opening having an expanded medial portion and communicating restricted portions, a bifurcated spring plate characterizing spaced and resilient straps including transversely aligned sub keepers normally spaced from said boss, resilient loop means integrally merged with said spring plate and base plate for normally hingedly spreading said spring plate away from said base plate, means for slidably guiding and retaining said straps to limit the spread of said spring plate away from said base plate, and a bolt adapted to be carried by said cover for insertion into and through said boss and having a cross pin including laterally extending arms for insertion into and through said restricted portions and having tapered ends adapted initially to be pressed onto said straps to position said arms against said straps upon rotation of said bolt relative to said cover and support whereupon said arms flex said straps towards said boss and removably interlock with said sub keepers.

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10. In a fastener for removably clamping a cover to a support, a keeper having a base plate adapted to be secured to said support, a hollow boss extending from said base plate and including an elongated opening having an expanded medial portion and communicating restricted portions, a bifurcated spring plate characterizing transversely spaced and resilient and relatively transversely flat straps including transversely aligned sub keepers normally spaced from said boss, resilient loop means integrally merged with said spring plate and base plate for normally hingedly spreading said spring plate away from said base plate, means for slidably guiding and retaining said straps to limit the spread of said spring plate away from said base plate, and a bolt adapted to be carried by said cover for insertion into and through said boss and having a cross pin including laterally extending arms for insertion into and through said restricted portions and having tapered ends adapted initially to be pressed onto said straps to position said arms against said straps upon rotation of said bolt relative to said cover and support whereupon said arms flex said straps towards said boss and removably interlock with said sub keepers.

11. In a fastener for removably clamping a cover to a support, a keeper having a base plate adapted to be secured to said support, a hollow boss extending from said base plate and including an elongated opening having an expanded medial portion and communicating restricted portions, a slotted spring plate having transversely aligned sub keepers normally spaced from said boss and having terminal means, resilient loop means integrally merged with corresponding ends of said spring plate and base plate for normally hingedly spreading said spring plate away from said base plate, means for slidably guiding and retaining said terminal means and to limit the spread of said spring plate away from said base plate, and a bolt adapted to be carried by said cover for insertion into and through said boss and having a cross pin including laterally extending arms for insertion into and through said restricted portions and having tapered ends adapted initially to be pressed onto said spring plate to position said arms thereon upon rotation of said bolt relative to said cover and support whereupon said arms flex said spring plate towards said boss and removably interlock with said sub keepers.

12. In a fastener for removably clamping a cover to a support, a keeper having a base plate adapted to be secured to said support, a hollow boss extending from said base plate and including an elongated opening having an expanded medial portion and communicating restricted portions, a bifurcated and arched spring plate having sub keepers means normally spaced from said boss, resilient loop means internally merged with said spring plate and base plate for normally hingedly spreading said spring plate away from said base plate, means for slidably guiding and retaining said spring plate and to limit the spread of said spring plate away from said base plate, and a bolt adapted to be carried by said cover for insertion into and through said boss and having a cross pin including laterally extending arms for insertion into and through said restricted portions and having tapered ends adapted initially to be pressed onto said spring plate to position said arms thereon upon rotation of said bolt relative to said cover and support whereupon said arms flex said spring plate towards said boss and removably interlock with said sub keeper means,

and stop means to limit the deflection of said spring plate towards said base plate.

13. In a fastener wherein a keeper disengageably interlocks with a cross pin of a rotatable bolt, the keeper comprising a one piece sheet metal body having a base plate and means for receiving said pin and a spring plate superimposed spatially on said base plate, a hinged connection merged with said base plate and spring plate for normally spreading the spring plate away from the base plate, the spring plate having terminal means opposite to said hinged connection, means for slidably guiding said terminal means and to prevent spreading of said spring plate away from said base plate, the spring plate having sub keeper means for receiving said cross pin, said spring plate adapted to be flexed towards said base plate upon rotation of said bolt to permit said cross pin to disengageably interlock with said sub keeper means.

14. In a fastener wherein a keeper disengageably interlocks with a cross pin of a rotatable bolt, the keeper comprising a one piece sheet metal body having a base plate and means for receiving said pin and a spring plate superimposed spatially on said base plate, a hinged connection integrally merged with said base plate and spring plate for normally spreading the spring plate away from the base plate, the spring plate having spaced bowed straps including terminal means opposite to said hinged connection, means for slidably guiding said terminal means and to prevent spreading of said spring plate away from said base plate, the spring plate having sub keeper means for receiving said cross pin, the latter upon rotation of said bolt riding on said straps to flex the latter towards said base plate and ultimately disengageably interlocks with said sub keeper means.

15. In a fastener wherein a keeper disengageably interlocks with a cross pin of a rotatable bolt, the keeper comprising a one piece sheet metal body having a base plate and means for receiving said pin and a bifurcated spring plate superimposed spatially on said base plate, a hinged connection merged with said base plate and spring plate for normally spreading the spring plate away from the base plate, the spring plate having spaced bowed and resilient straps including terminal means opposite to said hinged connection, means for slidably guiding said terminal means and to prevent spreading of said spring plate away from said base plate, the spring plate having sub keeper means for receiving said cross pin, the latter upon rotation of said bolt

riding on said straps to flex the latter towards said base plate and ultimately disengageably interlock with said sub keeper means, said pin upon rotation towards said sub keeper means linearly shifting said terminal means relative to said base plate.

16. In a fastener wherein a keeper disengageably interlocks with a cross pin of a rotatable bolt, the keeper comprising a one piece sheet metal body having a base plate and means for receiving said pin and a spring bifurcated plate superimposed spatially on said base plate, a hinged connection merged with said base plate and spring plate for normally spreading the spring plate away from the base plate, the spring plate having spaced bowed and resilient straps including terminal means opposite to said hinged connection, fixed sockets for slidably guiding said terminal means and to prevent spreading of said spring plate away from said base plate, the spring plate having sub keeper means for receiving said cross pin, the latter upon rotation of said bolt riding on said straps to flex the latter towards said base plate and ultimately disengageably interlock with said sub keeper means, and means to limit deflection of said straps towards said base plate.

17. A keeper comprising a one piece loop shaped and resilient body having a base plate and a spring plate superimposed spatially on said base plate, a U shaped loop portion merged with corresponding ends of said base plate and spring plate, the latter having spaced longitudinally disposed resilient straps defining a relatively elongated opening, said straps having bowed limbs and sub keeper means spaced from said base plate and including terminal means, and fixed means linearly guiding the displacement of said terminal means relative to said plate.

18. A keeper comprising a one piece looped and resilient body having a base plate, a hollow boss projecting from said base plate and provided with an elongated slot, a spring plate superimposed spatially on said base plate, a U shaped loop portion integrally merged with corresponding ends of said base plate and spring plate, the latter having spaced longitudinally disposed resilient straps defining a relatively elongated opening, said straps having bowed alternate and resilient limbs and sub keeper means spaced from said base plate and including offset terminal means, fixed means linearly guiding the displacement of said terminal means relative to said plate, and stop means on said boss means.

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