Feb. 6, 1940. G. H. C. CORNER 2,189,727

SEPARABLE INTERLOCKING FASTENER

Filed Nov. 16, 1938

Fig. 1.

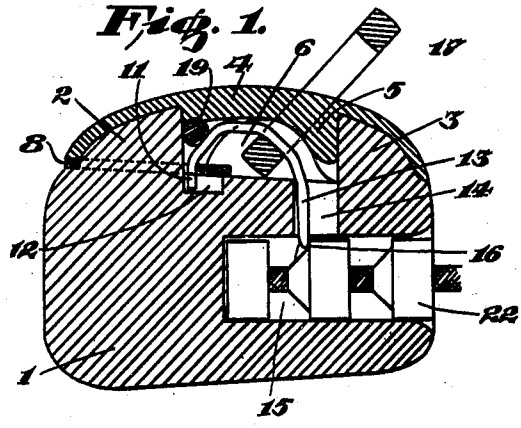
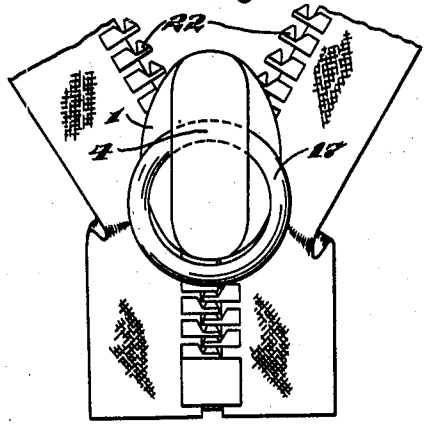



Fig. 2.



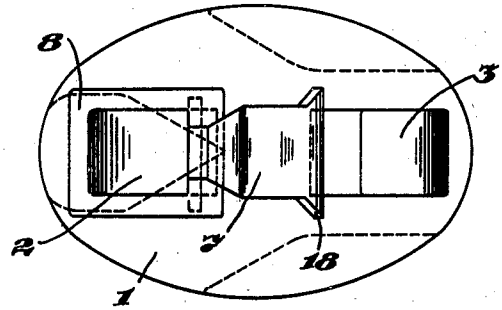




Fig. 3.

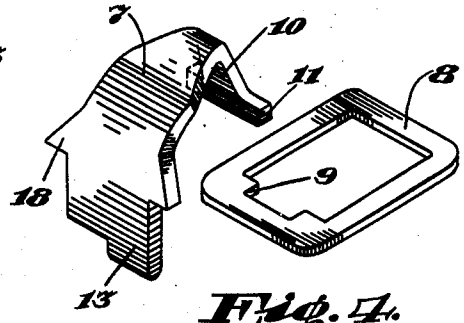
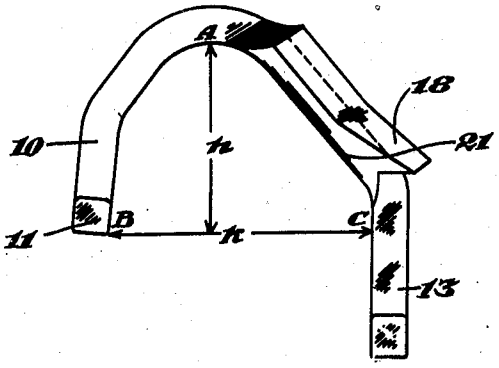



Fig. 4.

Fig. 5.



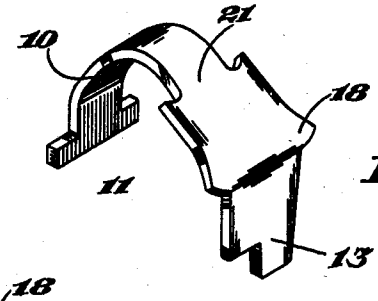




Fig. 6.

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## SEPARABLE INTERLOCKING FASTENER

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7 Claims. (Cl. 24—205)

This invention relates to separable interlocking fasteners of the well known slider operated type and particularly to sliders for operating fasteners made with non-metallic fastener members.

In such non-metallic sliders the constructional materials are considerably weaker than metal and consequently factors come into consideration which prevent the use of designs known for automatic locking metal sliders.

In non-metallic locking sliders, moreover, difficulty may arise in the provision of a hinged locking prong since if the bearing surfaces are metal on plastic excessive wear may take place and consequently it is desirable that the bearing surfaces should be metal on metal. Moreover, if it is desired to form the pull tab or other operating member of plastic material or other relatively weak material, this member must be considerably thicker than has hitherto been the practice with metal operating members.

The present invention has for an object the provision of a non-metallic slider with automatic locking means of simple and robust construction and yet without any substantial increase in the dimensions of the slider over and above those customary in the art.

According to this invention an automatic locking slider for separable fasteners of non-metallic material comprises a body and a bridge both of non-metallic material, a locking member accommodated beneath the bridge, relatively thick pull ring or other unitary operating member associated with the locking member, and a resilient member for normally holding the locking member in engagement with the fastener members, the said locking member having the form of a lever which is bent substantially in U-shaped fashion and is hinged at one end and formed at the other end as a substantially rigid locking prong. The bridge may be formed integrally with the body or may be made separately therefrom and stuck on or otherwise affixed to the upper surface of the body. It is preferably made as a trough-shaped member in which case it is preferred that the bridge should enclose between it and the body of the slider a tunnel-like space having a width (viewed from the side of the slider) which is short relative to the total length of the slider body.

The U-shaped locking member is preferably so formed that its vertical height is substantially greater than half and preferably equal to three quarters of its length as hereinafter defined. It will be understood that the arm of the U constituting the locking prong proper will be of a length greater than the other arm constituting the hinged arm. It is preferred, moreover, that the surface of the locking lever with which the pull ring comes in contact in operating the slider to open the fastener should be so formed that when viewed in longitudinal section it is a substantially straight line inclined at an angle of about 140° with the downwardly projecting locking prong which itself is substantially vertical. The section of the locking lever so contacting with the pull ring is preferably curved in order to conform with the configuration of the pull ring.

The resilient member may be in the form of a cylinder of rubber or similar resiliently compressible material which may be located in the desired position by means of suitable adhesive.

If desired the locking lever is so formed and arranged that it is not lifted completely free from the fastener members when the slider body is operated in the direction tending to close the fastener, and in this event the resilient member should be relatively weak in order that the locking prong may ride over the surface of the members without causing any damage thereto.

According to a particular modification of the invention, the locking lever is hinged in position by means of a metallic frame-like anchor plate held between the body of the slider and the bridge, e.g. passing over the rearmost lug, and is connected in position, between the bridge and the said lug.

It should be understood herein that the expression "vertical height of the lever" means the projected vertical height from the hinged end of the lever to the highest point thereof, and that "the length of the lever" refers to the projected horizontal distance between the two arms at their ends, the several distances being in all cases relative to the inner faces of the lever as seen in profile.

By the expression "relatively thick ring" as used herein, is meant a ring of such dimensions that it may readily be grasped between the fingers to operate the slider, and such pull ring may advantageously be formed of non-metallic material.

The invention is illustrated, by way of example only, in the accompanying drawing in which:

Fig. 1 is a sectional elevation of an automatic locking slider according to the invention;

Fig. 2 is a plan view of the slider on a fastener;

Fig. 3 is a plan view of the slider body with the bridge piece and pull ring removed;

Fig. 4 is a perspective view of the locking lever

and its anchor plate separated from each other;

Fig. 5 is a side elevation of a modified form of locking lever;

Fig. 6 is a perspective view of the locking lever shown in Fig. 5.

Referring to Figs. 1 to 4 of the drawing, a slider body 1 made of non-metallic material by a die-casting or molding operation, is provided with integral upstanding lugs 2 and 3. A trough-shaped bridge member 4 of the same or of different non-metallic material as the slider body is cemented to the lugs, preferably by applying a solvent to the contacting surfaces. The bridge member is thickened or otherwise reinforced at 5 to increase its strength at the unsupported part, i. e. between the lugs 2 and 3. The portion 5 of the bridge member is so shaped and the distance between the lugs 2 and 3 is such that the space 6 confined between the portion 5 of the bridge member and the slider body 1 has a length substantially less than that of the slider. This enables the contacting surfaces to be of an area sufficient to provide a strong union. The locking lever 7 of rigid material is located in the space 6 and is hingedly secured at one end by an anchor plate 8. The anchor plate 8 is of frame-like structure (Fig. 4) such as to fit snugly over the lug 2 and formed in one side is a cut-away portion 9. The end of the lever 7 to be secured is formed of T-shape (Fig. 4) the neck portion 10 being of slightly less width than the cut-away portion 9 and the end 11 having a width less than that of the aperture in the frame 8. Thus, on the T-shaped end portion 10, 11 of the lever 7 being passed through the anchor plate, the neck portion 10 can be located in the cut-away portion 9. The two parts 7 and 8 being thus assembled the anchor plate 8 is passed over the lug 2 so that the end 11 of the locking lever drops into a recess 12 formed in the body portion 1. When the bridge piece 4 is placed in position, the anchor 8 is securely held and the locking lever permitted to undergo only a hinge movement about the end of the anchor plate. The free end 13 of the locking lever passes through an aperture 14 in the upper wing of the slider to engage the fastener members (not shown). One face 15 of the end 13 may be slightly bevelled to permit the locking lever to slide over the fastener member in the direction of closing the fastener with a ratchet action, while the other face 16 may also be slightly bevelled to facilitate disengagement of the locking lever under the action of the pull ring 17. In order to prevent the free end 13 of the locking lever from penetrating too far into the recess 14, it is provided at a convenient height with outwardly extending lugs 18 which engage the upper surface adjacent the sides of the recess 14.

The method of hingedly securing the locking lever by means of an anchor plate is particularly advantageous. Not only does it permit of a satisfactory hinge movement of the locking lever, but also it effectively prevents undesirable movement of the lever body in any direction. Furthermore, an effective metal-to-metal contact is obtained which prevents wear on the non-metallic material of the slider.

The locking lever 7 is normally held in engagement with the fastener members 22 by means of a resiliently compressible member 19, preferably of rubber, which is located in a recess in the bridge piece by means of adhesive.

The shape of the locking lever 7 is an important feature of the invention. As will be seen from Figs. 4 and 5 which show an alternative form of the locking lever differing in details only from that above described, the lever is formed substantially in U-shaped fashion with the arm 21, 13 longer than the arm 10, 11. The profile shape of the lever is such that (see Fig. 5) the vertical distance $h$ from the highest point A to a horizontal line $k$ drawn from the point B representing the end of the arm 10, 11 to a point C on the arm 21, 13 is about three-fourths of the distance BC, and furthermore, the leading face 21 of the slider presents with the line BC an angle of between 35° and 50° and, since the locking prong is substantially vertical, an angle of between 125° and 140° with the latter member.

The modified form of locking member shown in Figs. 4 and 5 differs from that of Figs. 1 to 3 principally in the form of the lugs 18. The lever is stamped out from a single blank of the desired shape, which is first bent to the profile indicated in Fig. 4, whereupon the sides of the leading face 21 are bent outwardly so that the lugs 18 project to some extent in front of the adjacent, unbent middle portion of the leading face 21. The locking lever now has the appearance (Fig. 6) of a bent strip of metal of a width substantially equal to that of the neck portion 10, having on the leading face lateral outwardly bent, extensions which at their lower ends form lugs or abutments for the locking prong.

It should be understood that the invention is not limited to the particular embodiment described and that modifications may be made without departing from the scope of the invention. For example, instead of forming the body portion of the slider with an upstanding lug for securing the anchor plate, the bridge piece may be recessed to accommodate that member; in this case the bridge portion is secured to a plane portion of the upper surface of the slider body.

Again the relatively compressible member may be formed by blanking out narrow strips from the two sides of the anchor plate that adjoin the locking lever pivot and bending these strips in such a manner as to form, between the said lug and the locking member, a leaf spring bearing resiliently against these two members. In this way material which would otherwise be wasted is utilized to form the resiliently compressible member.

Furthermore, when the slider body is provided with upstanding lugs, the anchor plate may take the form of an angle plate with one side held between the upper surface of the lug and the bridge piece. The locking lever is then formed as a composite member comprising a rigid portion, the locking lever proper, and a relatively weak spring portion which is secured to the downwardly extending side of the anchor plate.

The invention includes within its scope a locking lever suitable for use in a non-metallic slider and having the form of a substantially U-shaped metal strip preferably with one arm, the locking prong proper, of a length greater than that of the other or hinge end, the said strip being of such shape that its vertical height is substantially greater than half the length, preferably about three-fourths thereof, as herein defined, and the leading face of the strip being, for a substantial part of its length preferably inclined at an angle of between 125° and 150°, suitably about 140°, with the downwardly projecting locking prong which is substantially vertical.

I claim:

1. A slider for slide fasteners of the class described comprising a body member of non-metallic material having a fastener member receiving channel, a bridge secured to the upper surface of the body member and a locking member hinged at one end beneath the bridge, said locking member having the form of a substantially U-shaped lever with a hinge pivot at one end, and at the other end a substantially rigid locking prong adapted to extend into the channel of the slider in one position of the locking member, the vertical height of said locking member being substantially greater than half its length, the arm of the U having the locking prong being of a greater length than the other arm, and a pull having a portion extending under said bridge and locking member for operating the slider.

2. A slider for slide fasteners according to claim 1, and a resilient member positioned under the bridge and engaging the locking member for normally holding it in locking position.

3. A slider for slide fasteners of the class described comprising a body member having a fastener member receiving channel and a bridge secured to the upper surface of said body member, both body member and bridge consisting of non-metallic material, a metallic framelike anchor plate secured in position at one end of the bridge and having a portion extending into the space under the bridge, a metallic locking member having a hinge connection with said anchor plate, said metallic locking member being located under said bridge and having a locking prong adapted to extend into the channel of the slider in one position of the locking member and a pull tab operatively connected to said locking member.

4. A slider for slide fasteners of the class described comprising a non-metallic body with upstanding lugs and having a fastener member receiving channel, a bridge member secured in position over said lugs, said body and bridge member consisting of non-metallic material, and a metallic framelike anchor plate positioned over the rearmost lug and extending into the space under the bridge, a metallic locking member hinged to such extending portion of the anchor plate and having a portion extending into the channel of the slider body in one position of the locking member, and a pull tab operatively connected to the locking member.

5. A slider according to claim 1 wherein that surface of the locking lever with which the pull tab comes in contact in opening the fastener is substantially a straight line inclined at an angle of about 140° with a downwardly projecting locking prong.

6. A slider according to claim 1 wherein the portion of the locking lever with which the pull tab comes in contact in opening the fastener is curved transversely.

7. A slider for slide fasteners according to claim 1, and a resiliently compressible rubber member positioned under the bridge and engaging the locking member for normally holding it in locking position.

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