March 19, 1940. L. H. MORIN 2,193,834

SLIDER

Filed July 16, 1938

Fig. 1.

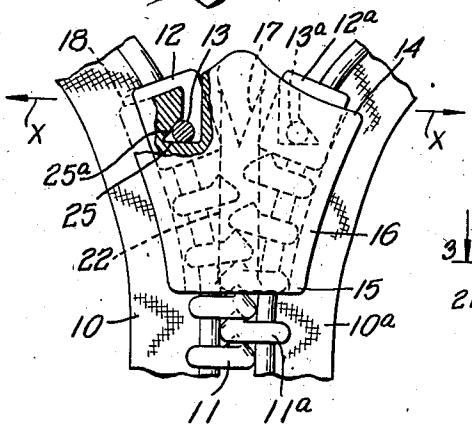


Fig. 2.

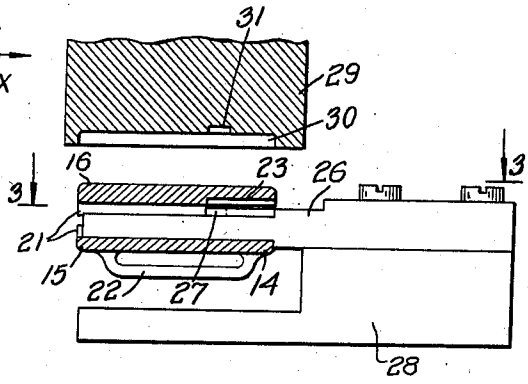


Fig. 3.

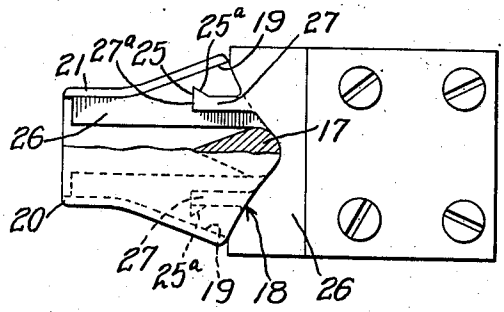


Fig. 5.

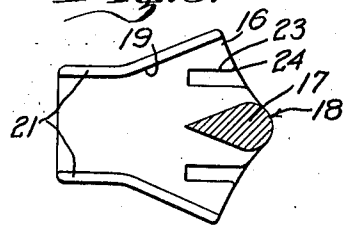


Fig. 4.

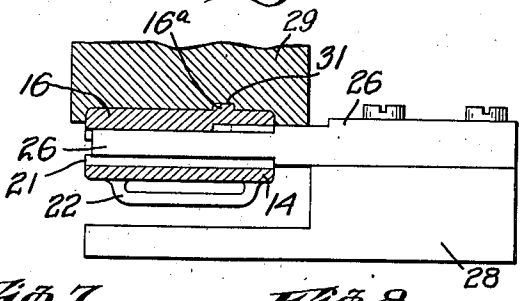


Fig. 6.

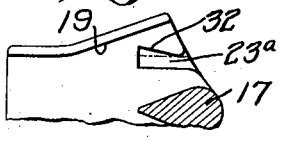


Fig. 7.

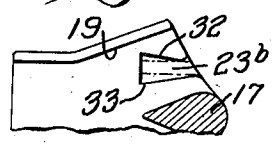
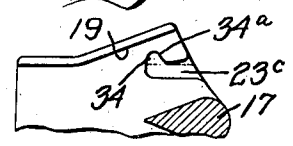


Fig. 8.



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Patented Mar. 19, 1940 2,193,834

UNITED STATES PATENT OFFICE

2,193,834

SLIDER

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Application July 16, 1938, Serial No. 219,536

2 Claims. (Cl. 24—205)

This invention relates to separable fasteners and other members or elements and particularly as an example to the production of sliders for separable fasteners, and further to a novel method of constructing devices of this kind having means engaging end stops for retaining the slider against movement longitudinally of the stringers when a pull is applied to the stringer ends tending to separate the same. More particularly the invention relates to devices, members or elements of the general type described which are constructed from thermoplastic material and which are formed in accordance with the method more fully hereinafter described and claimed. The novel features of the invention will be best understood from the following description and annexed drawing in which certain embodiments of the invention are disclosed, the separate parts being designated by suitable reference characters in each of the views, and in which:

Fig. 1 is a bottom plan and sectional view of one form of slider made according to the invention indicating its arrangement upon a portion of fastener stringers.

Fig. 2 is a sectional view through dies or forming parts employed in producing an undercut or offset recess in a groove formed in one wall of the slider.

Fig. 3 is a plan and sectional view substantially on the line 3—3 of Fig. 2.

Fig. 4 is a view similar to Fig. 2 showing parts in a different position.

Fig. 5 is a plan and sectional view showing a slider as produced prior to the forming operations herein specifically described, and

Figs. 6, 7 and 8 are sectional views of parts of sliders showing modified forms of grooves which may be employed.

The device forming the subject matter of this application constitutes an improvement on that disclosed in application, Serial No. 155,864 filed July 27, 1937 and is made in accordance with a method different from that employed in the formation of the device in said earlier application.

In Fig. 1 of the drawing one end portion of two stringers 10, 10*a*, is shown with the interengaging coupling links or scoops 11, 11*a*, arranged on adjacent beaded edges thereof, and the ends of the stringers beyond the end links are provided with end stops 12, 12*a*, each provided with downwardly, or downwardly and upwardly directed pins 13, 13*a* for latching engagement with a slider 14, as later described.

While the present invention is understood to be applicable to fasteners, or the sliders of fasteners, of any type, kind and construction, it is herein illustrated as applicable to thermoplastic sliders composed of such materials as cellulose acetate which may be readily die cast and then reformed in accordance with the method herein disclosed to produce what I term an undercut in establishing a locking or latching engagement of the slider with the pins 13, 13*a*. The slider consists of top and bottom walls 15, 16 joined by a connecting web 17 at the wide end 18 of the slider, forming at said end diverging channels 19 which converge into a single channel at the narrow end 20 of the slider. The side edges of the top and bottom walls include inturned flanges 21 as in the general construction of devices of this kind. It is also preferred that the top wall 15 be provided on the outer surface thereof with some means, such for example a strap 22 for supporting the usual finger piece or pull, not shown, in connection therewith.

For purposes of simplification, the slider in the following drawing is shown as a plain type or what might be termed non-locking type of slider; that is to say a slider which is not provided with means retaining the same against movement in different positions longitudinally of the stringers. It will be understood, however, that the invention is applicable to sliders of any type and kind. The present invention deals primarily with the provision of means for retaining the slider against accidental displacement when at the limit, or substantial limit, of its fully closed position, so that if the stringer tapes are subjected to stress or strain in the direction of the arrows *x*, Fig. 1, tending to open the stringers, the slider 14 will be retained automatically against opening movement, thus providing what might be termed an automatic lock. In accomplishing this result it is also desirable to provide a means of retaining the slider in this position which will, nevertheless, permit the automatic opening movement of the slider through the medium of the usual pull, as will be apparent.

In producing a slider of the type and kind illustrated in Figs. 1 to 5 inclusive, the slider is first formed in any desired manner, the slider in the structure being formed by die casting. This slider as formed will be provided on the inner surface of preferably the bottom wall 16, or in fact could be applied at the inner surface of both walls in accordance with the teachings in the earlier application herein identified, with grooves 23 opening through the large or wide end 18 of the slider and exposed to each channel 19 there-

in. These grooves extend longitudinally of the slider in a plane substantially parallel to the longitudinal center of the slider. The grooves preferably have a flared opening, as indicated at **24**, so as to permit free insertion of the pins **13**, **13***a*.

After producing a slider in the manner illustrated in Fig. 5, the next step in the process of forming the desired contour of the grooves to adapt them for the desired function, is to form what I term an undercut or offset in at least one side wall of the grooves, preferably adjacent the inner end thereof, for example, the offset **25** indicated in Figs. 1 and 3 of the drawing. These offsets extend outwardly and are substantially V-shaped or triangular in form to provide an angular wall **25***a* which is disposed in a position substantially transversely of the path of movement of the stringers with respect to the channels **19** or at approximately 45° to the longitudinal center line of the slider, so that the pins **13**, **13***a* when moved into the inner ends of the grooves, engage the angular surfaces **25***a* of the undercuts. thus retaining the slider against opening movement if a stress or strain is applied to the stringers in the direction of the arrow *x* as previously stated.

In forming the undercut **25** in the workpiece, as shown in Fig. 5 of the drawing, said workpiece is first placed upon an anvil **26** which is shaped to fit within the channels **19** of the slider in the manner illustrated in Fig. 3 of the drawing. The anvil has raised lugs or forming elements **27** of the contour of the resulting undercut grooves to be formed; that is to say, are provided with offset parts **27***a* which form the undercuts **25**. The anvil **26** is supported on a suitable block or bedplate **28** and the forked ends of the anvil, which are arranged within the slider **14**, are so formed as to engage the inner surface of the outer wall **15**, as indicated in Fig. 2 of the drawing in order to support the workpiece in proper alinement upon the anvil. After this, a punch or die **29** having a recess **30** in the undersurface thereof corresponding to the peripheral contour of the wall **16**, is moved into engagement with the slider or the outer surface of the wall **16** to force said wall downwardly in the direction of the anvil. In this operation the projections **27***a* on the lugs **27** will force the adjacent material of the wall **16** outwardly, which material will enter grooves **31** formed in the surface of the punch or the recess **30** therein. The result of this operation is illustrated in Fig. 4 of the drawing. It will be understood that the punch or die **29** is then raised and the workpiece removed from the anvil by first moving the same upwardly to disengage the lugs from the resulting undercut grooves formed in the workpiece, which are of the contour illustrated in Fig. 1 of the drawing.

When removed, the slider or resulting workpiece may now be trimmed and otherwise finished to remove the protruding portions **16***a* disposed on the outer surface of the wall **16** of the slider, especially if a neat and finished slider is desired. In some instances, however, these projecting portions need not be removed, as they will in no way interfere with the successful operation of the slider. The above operation of forming the undercuts or offset portions in the grooves of the slider when constructing the latter from thermoplastic materials, will be performed when the material is in a warm or heated condition, that is to say heated sufficiently to render the material thereof workable, and not when this material has become fully chilled or set. In other words, the operation referred to may be performed immediately after the casting of the slider when the same is still warm, or if desired, these devices may be reheated for performing this and any other operation desired thereon in the production of the finished slider. At this time it is well to call attention to the fact that any type or kind of undercut may be formed in a workpiece in accordance with the method herein disclosed, regardless of the structure of the workpiece or the intended use thereof. This is especially true in dealing with various kinds and classes of thermoplastic devices.

In Fig. 6 of the drawing another form of undercut is illustrated, and while only one-half of the slider is shown, it will be understood that both sides of the slider may be of the same construction. In this figure, the normal grooves formed in the slider are illustrated at **23***a*, and the undercut instead of being abrupt and located definitely at the inner end of the grooves, extends longitudinally of one wall of the grooves in a slider, tapered, as is indicated at **32**. This type of undercut will have an effective locking or latching surface of greater length longitudinally of the slider than with the structure shown in Figs. 1 and 3. On the other hand, the reduced angularity of the engaged wall will provide a freer detachment of the slider in the positive manual movement thereof longitudinally of the stringers from the closed to open positions.

In Fig. 7 of the drawing I have shown a slider which is provided with a double undercut, that is to say in addition to the undercut **32**, the opposed wall of the initial grooves **23***b* is provided with an inner undercut **33**. The latter provides a greater freedom of action of the pins **13**, **13***a* and will produce what might be termed a full dove-tailed groove, whereas the structures in Figs. 1 to 6 inclusive, might be said to be semi dove-tailed grooves.

In Fig. 8 another form of construction is shown wherein the normal grooves **23***c* have an undercut **34** at the inner ends thereof which is semi-circular in form. The circular formation of the undercut **34** is sufficiently large to freely receive the pins **13**, **13***a*, but are not of such contour as to form a definite lock which would prevent manual movement of the slider into open position, but would effectively produce a latching or locking wall **34***a*.

This construction is substantially the same as the undercut disclosed in the application herein identified, but is formed without the necessity of drilling the holes through the wall of the slider as is taught in said earlier application. Furthermore with a structure of the type and kind herein disclosed, made in accordance with the method herein defined, it will be apparent that by the proper formation of the die lugs on the anvil, any desired degree of angularity and/or contour can be formed on the undercut, while at the same time the contour of the grooves as a whole, or at least the boundary walls thereof, may be changed. In fact it would also be possible, within the limits of movement of the anvil transversely with respect to the walls of the slider, to form other irregular contours in the bottom wall of the grooves, if desired.

At this time it is well to call atention to the fact that while it is preferred to preform a part of the desired grooves in the workpiece in accordance with the casting operations thereof in the manner which is permitted without complicating the dies employed in forming such die castings, it is also possible to form the workpiece with a plain or ungrooved surface and to form the en-

tire grooves therein by means of the die member or element on the anvil which forms one part of what may be termed two die members. Another objection to the latter procedure is in extending a large amount of material of the casting to the outer surface of the wall, in which the groove or grooves are formed, and the added work which would be required in removing these protruding bodies if removal is desired.

To more broadly express the invention herein disclosed, apart from the present disclosure which is illustrative of one method or mode of carrying the invention into effect, it may be said that the invention consists in first preforming a body or element by die casting the same, especially as applied to a die cast thermoplastic body or element, and then subjecting such body or element to what may be termed a die forming operation wherein a part of the material of said body or element is displaced from one wall or surfacc and extended through another or opposed wall, and especially in forming grooves, recesses or impresses in the body or element which are not capable of being formed in a simple economical manner by the initial casting dies or part thereof, thereby facilitating the production in die cast bodies, of structural contours which heretofore have been deemed impossible or which heretofore have necessitated the performance of drilling or other machine operations rather than die forming operations.

In forming grooves on the inner surfaces of both the top and bottom walls in the manner heretofore indicated and as specifically disclosed in the application herein cited, it will be understood that the workpiece is simply reversed upon the anvil and the operation performed in accordance with the teachings illustrated in Figs. 2 and 4 of the drawing, it being understood that the recess **30** of the die or tool **29** will be characterized or shaped to receive the strap element **22** on the outer surface of the wall **15** or any other element or part which may be arranged thereon, so long as the latter does not interfere with or register with the grooves **31** employed for receiving the displaced material.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A slider for separable fasteners employing stringers having end stops with projecting latch pins thereon for engaging the slider to retain the same against accidental displacement when substantially at the limit of its closed position, said slider comprising a channelled body having spaced top and bottom plates joined by a connecting web, at least one of said plates being provided entirely upon the inner surface thereof and at opposed sides of said web with undercut grooves opening through one end of the body, said grooves receiving the latch pins of said end stops, the undercut portions of said grooves engaging the pins to retain the slider against displacement on the stringers when the stringers are subjected to a force tending to separate the stringers, the undercut portions of said grooves forming the outer edges thereof with respect to the center line of the slider, and said outer edges being disposed at substantially 45° to the longitudinal center of the slider.

2. A slider of the class described comprising spaced wall members jointed at one wide end thereof in a connecting web, said members having flanges at opposed sides thereof forming in conjunction with said web, diverging channels at said wide end of the slider, the inner surface of one wall of the slider at the wide end thereof having parallel grooves opening through said wide end of the slider and extending into the channels thereof, the inner ends of said grooves being extended laterally and outwardly toward the flanged sides of the slider wall, the extended portions of said grooves comprising substantially V shaped offsets, and said slider wall having projections on the outer surface thereof in alinement with said offsets.

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