April 29, 1941. L. H. MORIN ET AL 2,240,048

SEMIAUTOMATIC LOCK SLIDER

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Fig. 2.

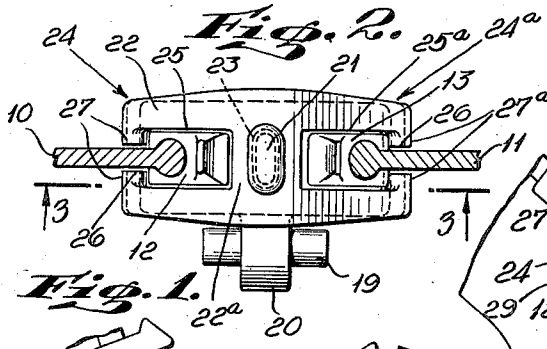

Fig. 1.

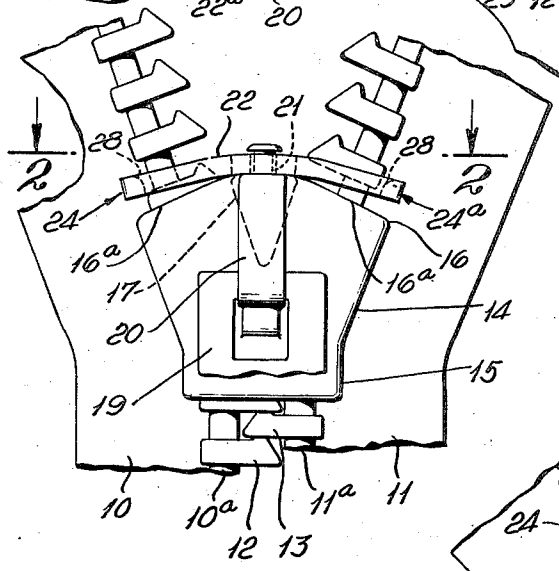

Fig. 3.

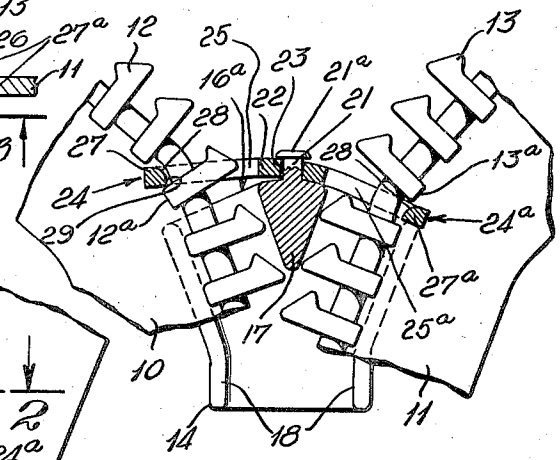

Fig. 4.

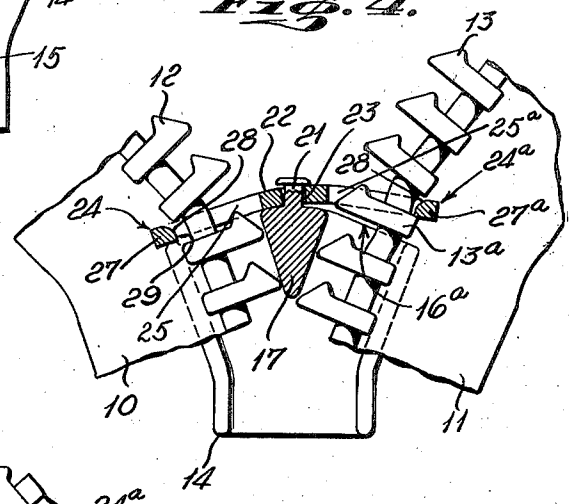

Fig. 5.

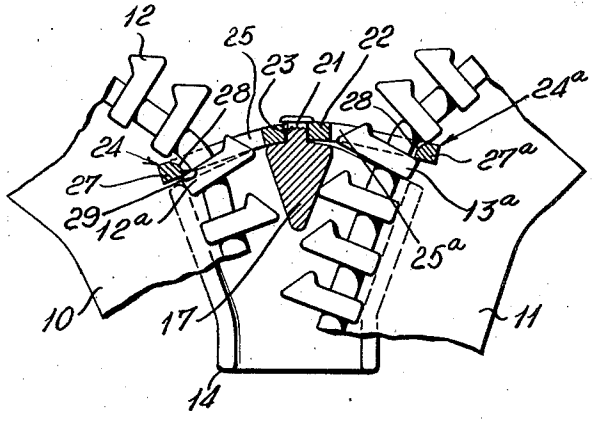

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Fig. 6.

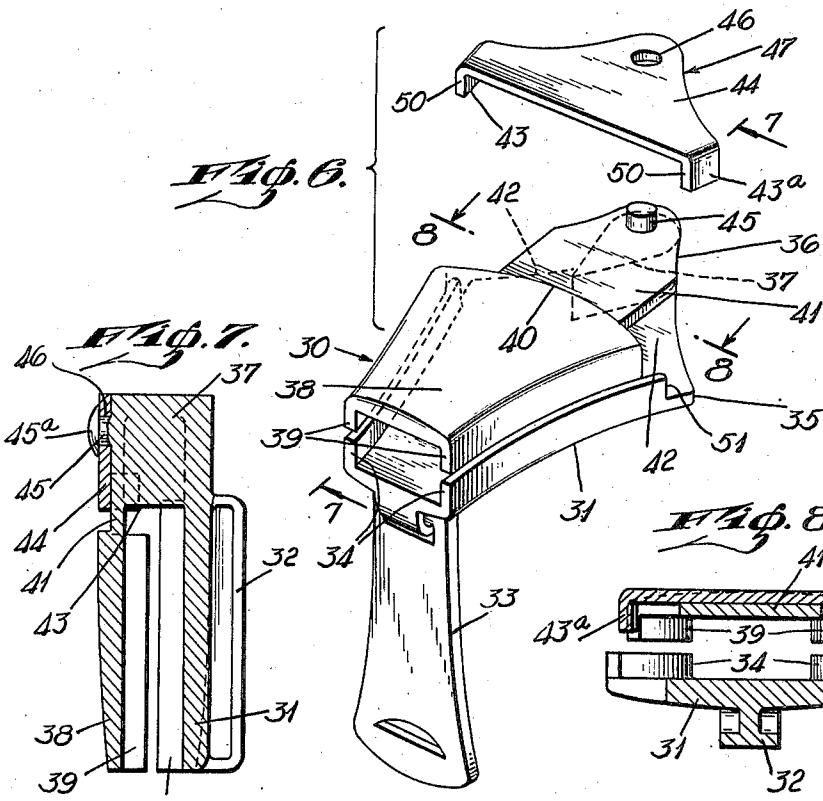


Fig. 7.

Fig. 8.

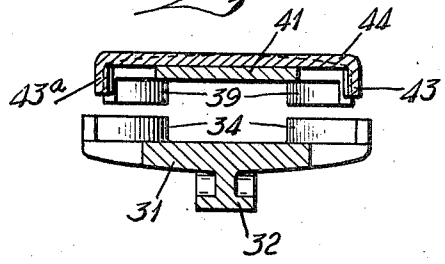
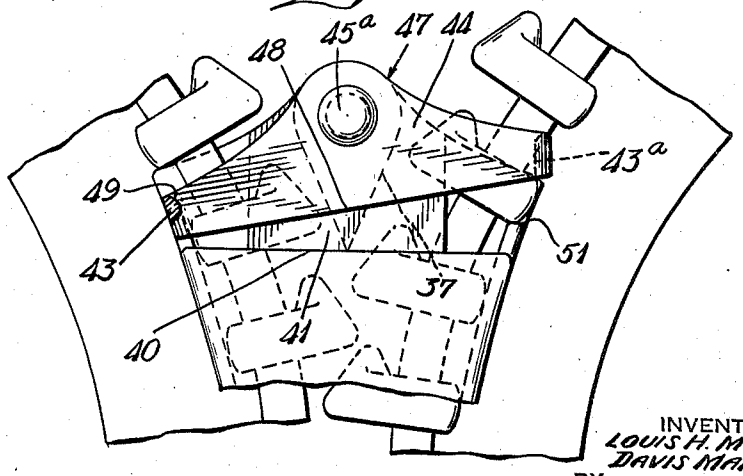


Fig. 9.



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SEMIAUTOMATIC LOCK SLIDER

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Application April 8, 1939, Serial No. 266,725

9 Claims. (Cl. 24—205.5)

This invention relates to slide fasteners comprising stringers adapted to be coupled and uncoupled in the movement of a slider longitudinally of the stringers, and particularly to the provision of what is termed a semiautomatic locking slider having a freely rocking or swinging lock element at the wide or diverging end portion of the slider adapted to engage links of opposed stringers when the latter are subjected to lateral stress or strain, tending to separate the stringers so as to retain the slider against opening movement longitudinally of the stringers, while at the same time providing free movement of the slider longitudinally of the stringers in both directions when operated through the medium of the usual finger piece or pull. The novel features of the invention will be best understood from the following description taken together with the accompanying drawings in which certain embodiments of the invention are disclosed and in which the separate parts are designated by suitable reference characters in each of the views, and in which:

Fig. 1 is a face view of a part of a fastener stringer showing a slider thereon made according to the invention.

Fig. 2 is a view looking in the direction of the arrows 2—2 of Fig. 1.

Fig. 3 is a horizontal sectional view through the slider substantially on the line 3—3 of Fig. 2 illustrating the lock element of the slider in a different position from that shown in Fig. 1.

Figs. 4 and 5 are views similar to Fig. 3 showing the lock element in different positions.

Fig. 6 is an exploded view showing another form of slider with the lock part of the slider in a position ready for assemblage.

Fig. 7 is a section on the line 7—7 of Fig. 6 showing the parts fully assembled and omitting part of the construction.

Fig. 8 is a section on the line 8—8 of Fig. 6 showing the parts assembled as in Fig. 7, and

Fig. 9 is a bottom plan view or part of a slider arranged upon a portion of two stringers illustrating one of the locked positions of the slider.

In the several views shown in Figs. 1 to 5, parts of the stringers of a separable fastener are illustrated at 10 and 11. Two adjacent edge portions of each stringer, which edge portions may be beaded as seen at 10a, 11a, are secured in any desired manner, and links 12, 13 to be coupled and uncoupled in attaching and detaching the stringers by a slider 14 movable longitudinally of the stringers.

The links, 12, 13 may be formed in any desired manner and of any suitable materials, and may include die cast materials of the metallic or thermoplastic types. It will also be apparent that the contour of the links is simply diagrammatically illustrated and the same may be of any desired shape or form.

The slider 14 may be of any desired contour and construction of different materials and in accordance with different methods of construction. For illustrative purposes, the slider in the accompanying drawings, is shown as comprising a die cast body having a contracted end portion 15 and a wide or flared end portion 16. The top and bottom plates of the slider are joined by a connecting web 17 centrally of the wide end 16, said top and bottom walls having inturned flanges as indicated at 18 to engage the links in guiding the same into and out of the channels at the wide end 16 of the slider and to couple the links of opposed stringers together in passing through the narrow or contracted end 15 thereof as in the usual construction of devices of this kind. In Figs. 1 and 2 of the drawings, 19 represents a part of a finger piece or pull pivoted to a suitable support 20 on the slider. Here again the particular construction of the support 20 and the pull 19 may be varied to suit different uses of the fastener.

Arranged upon the outer surface of the connecting web 17, is a headed pin or stud 21 which may be cast integrally with the slider body when of a die casting, or may constitute a separate part attached to the slider, as will be apparent. At 22 is shown a locking element in the form of a strap or plate substantially conforming in contour to the contour of the wide end 16 of the slider for the purpose of producing a neat and finished appearance. This element or strap is provided centrally with an aperture 23 larger in size than the shank of the stud 21 to provide free swivel movement of the element 22 thereon. It will be noted upon a consideration of Fig. 3 of the drawings that the pin or stud 21 is preferably elongated or elliptical in cross-sectional form and the aperture 23 is correspondingly formed. The purpose of this construction is to maintain alinement of the element 22 on the slider, but any other means may be employed to accomplish this result.

The pin or stud 21 forms a pivotal coupling of the element 22 in connection with the slider, and the outer end is enlarged or headed as seen at 21a in Fig. 3 of the drawings to retain the element against displacement. Here again it will

be apparent that any means for accomplishing this result can be employed.

The element 22 has two similar end portions 24, 24a that are yoke-shaped in form. That is to say, each end portion is provided with an aperture 25, 25a of a contour conforming with the peripheral contour of the links 12, 13 and sufficiently large to provide free passage of the links therethrough. The large rectangular apertures 25, 25a open outwardly through the ends 24, 24a as seen at 26 forming inwardly directed top and bottom flanges or hook ends 27, 27a, adjacent surfaces of which are arranged in close proximity to the upper and lower surfaces of the tapes 10, 11 respectively inwardly of the beaded edges 10a, 11a thereof, allowing sufficient clearance for the free passage of the element 22 over the tapes in the normal operation of the slider.

The flanges or hook ends 27, 27a cooperate with the mounted end portions 12a, 13a of the links 12 and 13 in retaining the slider against accidental opening movement when a lateral separating strain is subjected to the stringers 10, 11, tending to open the stringers in the manner illustrated in Figs. 3, 4 and 5 which would otherwise cause the slider to move downwardly along the stringers producing a separation or uncoupling thereof.

The lock element 22 may be termed a semi-automatic lock in that it is effective in its operation under the conditions named, but does not lock the slider against normal upward and downward movement on the stringer through the medium of a pull of any type or kind. It will be understood of course that if other types of locking means are desirable for retaining the slider against movement in addition to the lock element 22, such other locking means may be employed.

The lock element 22, which is in the form of an elongated plate or strap having similar end portions 24, 24a, may be correctly termed a see-saw lock, in that due to its swivel mounting on the pin or stud 21, the separate end portions 24, 24a may be raised and lowered with respect to the beveled side surfaces 16a of the wide end 16 of the slider in the several manners illustrated in Figs. 1, 3, 4 and 5. Fig. 1 represents the normal or balanced position of the element 22 which is assumed when the slider is moved freely in both directions on the stringers in coupling and uncoupling the same. In Fig. 3 of the drawings, the end portion 24 is shown raised whereas the end portion 24a is lowered, and the flanges or hooks 27 are shown engaging one of the links 12 of the end portion 12a thereof in retaining the slider against opening movement, or in other words a downward movement as viewed in Fig. 3 of the drawings. In Fig. 4 of the drawings the reverse of the arrangement shown in Fig. 3 is illustrated. That is to say, the end portion 24a is raised and the end portion 24 is lowered. In this position the flanges or hooks 27a engage one of the links 13 or the end portion 13a thereof in retaining the slider against movement.

In Fig. 5 is illustrated another possible locking position of the element 22, which represents a position intermediate that shown in Figs. 1 and 4. It will be understood in this connection that a similar intermediate position may take place between the position shown in Figs. 1 and 3. In Fig. 5 the end portion 24a is higher than the end portion 24 and the members 27a engage the portion 13a of the link 13, whereas the members 27 engage the portion 12a of the link 12 to provide a double-check or lock of the slider on both stringers.

It will be understood that while the end portions 24, 24a have been shown as offset with respect to the central plate portion 22a of the lock element, that is to say leaning in the direction of the upper ends 16a of the slider, that these end portions may be extended in any manner and may be arranged in the same plane. It is also quite apparent that the duplication of the members 27, 27a is not essential. By this is meant, it is not essential that the members be arranged upon both the upper and lower surfaces of the stringer tapes 10 and 11. As a matter of fact, one-half of the entire end portions 24, 24a which extend beyond the central plate portion 22a, may be omitted, thus leaving the central plate portion 22a with one end 24 and the companion end 24a. This is especially true in using a device of the character defined in connection with supports which are subjected to light stress or strain. The duplication of the locking pins or flanges 27, 27a is only for a purpose of providing the added strength attained thereby.

It is also apparent that instead of omitting the upper or lower half of the element 22, either end portion of the element may be omitted; that is to say either the entire end 24 including the members 27, or the entire end portion 24a including the members 27a. In each case however, the plate portion 22a will remain as an integral part of and form the support for the element. With the latter arrangement, it will of course be understood that the lock element would cooperate with only one of the stringers depending upon which end portion was utilized.

Still further it will be apparent that any one of the so-called hook elements may be used at either side or upon either surface of the separate stringers. That is to say, the supporting or mounting plate portion 22a would be provided with one-half of either of the side extensions 24 or 24a including one of the associated pin-like elements 27, 27a.

The adaptations of the element 22 referred to above are not specifically illustrated in that their structure is quite apparent, especially when considering Fig. 2 of the drawings, applicants having elected to illustrate the complete or duplicated structure simply in that it represents the complete combination from which the more simplified forms of construction can be formed, and further in that it illustrates the stronger type of lock element.

It will be noted from a consideration of Figs. 3, 4 and 5 that the upper inner corner portions of each lock hook or flange 27, 27a are preferably rounded as seen at 28 so as to provide a free admission of the links 12, 13 through the element 22 when in the position shown in Fig. 1, even though the stringers are under a slight tension; in other words, in the operation of drawing two supports, to which the stringers are attached, together under a slight tension. The lower inner corners 29 of the members 27, 27a will be maintained rectangular for positive engagement with the links 12, 13 when the tapes 10 and 11 are subjected to a decided lateral pull tending to separate the stringers.

It will be apparent that the lock element is supported in a freely moving manner upon the wide or flared end portion 16 of the slider and may be arranged and supported in connection with this end portion of the slider in any desired

manner. The only essential feature is that the element employed will engage a stringer or stringers at said end portion of the slider where the stringers are subjected to and capable of lateral movement in the manners illustrated diagrammatically in Figs. 3, 4 and 5 of the drawings, and further in providing a lock element of this type and kind which when in a neutral position will permit free movement of the slider longitudinally of the stringers.

To show one further adaptation of the invention, we have illustrated in Figs. 6 to 9 inclusive, a slider 30 having a top wall 31 with means 32 extending longitudinally thereof forming a pivotal and slidable mounting for a pull 33, said wall having inturned side flanges 34. The wide end 35 of the wall 31 has a contracted or pointed extension 36 upon the inner surface of which is the usual connecting web 37 which divides the wide end of the slider into diverging channels. In the construction shown, the slider is made from a unitary body, but it will be understood that any desired construction can be employed.

At 38 is shown the bottom wall of the slider which includes inturned side flange 39. In this construction, the bottom wall terminates short of the top wall in an edge 40, but beyond the edge 40 the top wall extends in a relatively thin plate 41 in joining the connecting web 37. This plate is narrower in width than the width of the wall 38 at the end 40 thereof, as clearly seen in Figs. 6 and 9 of the drawings, forming recesses or spaces 42 at each side of the slider in which the hook ends 43, 43*a* of a lock element 44 are adapted to operate. At the contracted end of the plate 42 is a protruding coupling or pivot pin 45 which may be formed integrally with the slider body or may constitute an independent pin secured thereto. This pin is adapted to enter an aperture 46 in the lock element 44 and to be riveted or headed as seen at 45*a*, note Fig. 7, to retain the lock element 44 against displacement while permitting free swinging or oscillatory movement of the lock element upon the surface 41.

The lock element 44 may be said to constitute an extension of the bottom wall 38 of the slider. The contracted outer edge 47 of said element conforms with the contour of the contracted end 36 of the slider as will appear upon a consideration of Figs. 6 and 9 of the drawings. It will also be noted that the flanges 43, 43*a* at the sides of the element 44 actually constitute continuations of the flanges 39 of the bottom wall. However, when the lock element is in a neutral position, these flanges will be spaced from the flanges 39 in that the edge 48 of the lock element is in spaced relation to the edge 40 of the bottom wall.

It will appear from a consideration of Figs. 1 to 5 inclusive, that the lock element 22 constitutes a continuation of the wall structure of the slider and that the hook ends 27, 27*a* are continuations of the side flanges of the slider, the same as with the construction shown in Figs. 6 to 9 inclusive.

It will also appear at the left of Fig. 9 of the drawings, that the outer ends of the flanges 43, 43*a* are rounded as is seen at 49 to provide free movement of the slider along the stringers in coupling and uncoupling the stringers, whereas the inner corners 50 of said flanges, note Fig. 6, are maintained square so as to engage the links when the stringers are subjected to lateral stress or strain to lock the slider against movement. One of the locked positions of the element 44 is shown in Fig. 9 of the drawings. It will be understood that this position is similar to the one shown in Fig. 4, and that the element 44 may also assume a position similar to that shown in Figs. 3 and 5.

By arranging the element 44 in the bottom wall structure of the slider, this element will be substantially invisible in normal uses of the fastener. It will also be apparent that by terminating the flanges 34 short of the wide end 35 of the wall 31 as seen at 51, a greater lateral movement of the stringers is made possible when subjected to stress or strain, which will produce a more positive locking engagement with the several links of the stringers, whereas when the element 44 maintains its neutral position in the normal use of the device, the flanges 43, 43*a* will serve to provide a smooth guiding of the slider along the stringers, and especially in guiding the links into the diverging channels at the wide end of the slider.

It will be apparent that in both forms of construction shown, the lock element may be said to be extensions of one or both walls of the slider, and the lock parts or inturned flanges of the elements, extensions of the flanges of said slider walls. These supplemental wall and flange parts which constitute the lock elements are movable with respect to the remainder of the slider so that either one of the flanges of the lock elements may be moved into and form an obstruction in the channel of the slider to engage a link of one of the stringers when the stringers are stressed or strained laterally as hereinbefore set forth.

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

1. A slider of the class described comprising top and bottom walls joined at one wide end by a connecting web, each of said walls having inturned side flanges, the flange portion of one wall of the slider being shorter and narrower than that of the other wall, an independent wall part pivoted to the web of the slider and forming a continuation of said shorter wall, said part having inturned side flanges arranged in substantial alinement with the flanges of said short wall and being movable relatively thereto in the swinging movement of said part so as to form of the flanges of said swinging wall part, lock elements for said slider, and means retaining said movable wall part against displacement from the slider.

2. A slider of the class described comprising top and bottom walls joined at one wide end by a connecting web, each of said walls having inturned side flanges, the flange portion of one wall of the slider being shorter and narrower than that of the other wall, an independent wall part pivoted to the web of the slider and forming a continuation of said shorter wall, said part having inturned side flanges arranged in substantial alinement with the flanges of said short wall and being movable relatively thereto in the swinging movement of said part so as to form of the flanges of said swinging wall part, lock elements for said slider, means retaining said movable wall part against displacement from the slider, and the flanges of the other wall part terminating short of the widest portion of said part.

3. In a slider having top and bottom walls joined at one wide end by a connecting web with inturned side flanges on said walls forming a channeled body with diverging channels at the wide end thereof, a lock element forming a continuation of one of the walls of said slider, means pivotally coupling the lock element to the web portion of said slider to provide free oscillatory

movement of the lock element relatively to said wall of the slider, and said element having inturned flanges at the ends thereof substantially in alinement with the flanges of said wall and movable relatively thereto to form locking parts obstructing at least one of the channels of the slider in locking said slider against movement.

4. In a lock slider for separable fasteners employing stringers having interengaging coupling links, a slider body comprising top and bottom walls joined at one wide end portion by a connecting web, said walls having inturned side flanges, a lock element pivoted to the web of the slider, the support for said element comprising pivot means centrally thereof providing pivotal movement of said element about an axis extending perpendicularly to said slider, end portions of said element being normally spaced from adjacent portions of said slider and operatively movable toward and from the same, one of said end portions having angularly extending means arranged substantially in alinement with one of the flanges of at least one wall of the slider and forming a lock part on said element, the other end portion of said element having corresponding angularly extending means forming another lock part thereon, said lock parts when equally spaced from said slider being arranged in alinement with corresponding flange portions of the slider thereby providing for the intended operation thereof, and said lock parts when unequally spaced from said slider being adapted to engage the links of at least one stringer thereby preventing uncoupling of said stringers.

5. In a lock slider for separable fasteners employing stringers having interengaging coupling links, a slider body comprising top and bottom walls joined at one wide end portion by a connecting web, said walls having inturned side flanges, a lock element pivoted to the web of the slider, the support for said element comprising pivot means centrally thereof providing pivotal movement of said element about an axis extending perpendicularly to said slider, end portions of said element being normally spaced from adjacent portions of said slider and operatively movable toward and from the same, one of said end portions having angularly extending means arranged substantially in alinement with one of the flanges of each wall of the slider and forming a yoke-shaped lock part on said element, the other end portion of said element having corresponding angularly extending means forming another yoke-shaped lock part thereon, said lock parts when equally spaced from said slider being arranged in alinement with corresponding flange portions of the slider thereby providing for the intended operation thereof, and said lock parts when unequally spaced from said slider being adapted to engage the links of at least one stringer thereby preventing uncoupling of said stringers.

6. In a slider of the class described having a wide end portion with diverging channels arranged between top and bottom flanged walls of the slider and separated by a central web joining said walls, a lock element pivoted to said web and extending to opposite sides of the wide end portion of said slider, said element having inturned end flanges arranged in substantial alinement with the flanges of at least one wall of the slider and having limited swinging movement on said pivot, and the flanges of said element being free to move into position to obstruct passage through either or both of said diverging channels.

7. In a slider of the class described having a wide end portion with diverging channels arranged between top and bottom flanged walls of the slider and separated by a central web joining said walls, a lock element pivoted to said web and extending to opposite sides of the wide end portion of said slider, said element having inturned end flanges arranged in substantial alinement with the flanges of at least one wall of the slider and having limited swinging movement on said pivot, the flanges of said element being free to move into position to obstruct passage through either or both of said diverging channels, and the lock element at each side of the pivot thereof being substantially yoke-shaped in form to provide openings in the lock element in alinement with the diverging channels at the wide end of the slider.

8. In a slider of the class described having a wide end portion with diverging channels arranged between top and bottom flanged walls of the slider and separated by a central web joining said walls, a lock element pivoted to said web and extending to opposite sides of the wide end portion of said slider, said element having inturned end flanges arranged in substantial alinement with the flanges of at least one wall of the slider and having limited swinging movement on said pivot, the flanges of said element being free to move into position to obstruct passage through either or both of said diverging channels, the lock element at each side of the pivot thereof being substantially yoke-shaped in form to provide openings in the lock element in alinement with the diverging channels at the wide end of the slider, and the pivotal coupling of the lock element with said slider comprising an elliptical pin arranged in a corresponding aperture in said element for keying the element in proper alinement on said slider.

9. In a slider of the class described having a wide end portion with diverging channels arranged between top and bottom flanged walls of the slider and separated by a central web joining said walls, a lock element pivoted to said web and extending to opposite sides of the wide end portion of said slider, said element comprising a plate forming a continuation of one wall of the slider, said plate having angularly extending flanges arranged substantially in alinement with the flanges of said slider wall, and said lock element having limited swinging movement on its pivot to bring at least one of the flanges thereof into position obstructing passage through one of the channels of said slider.

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