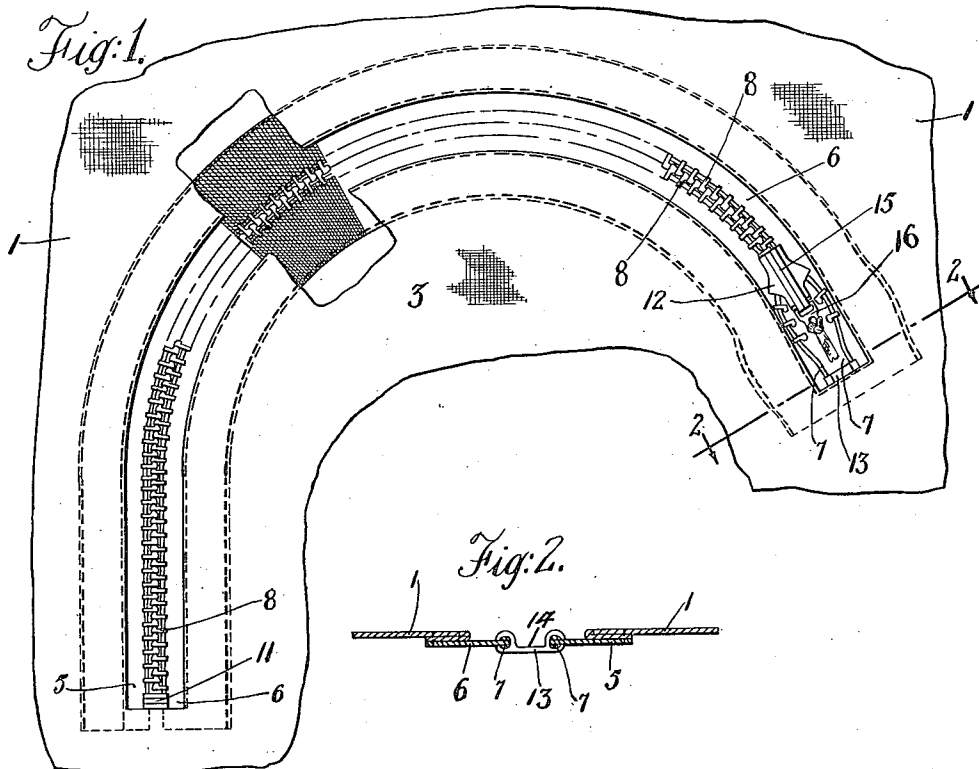
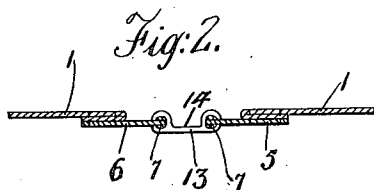
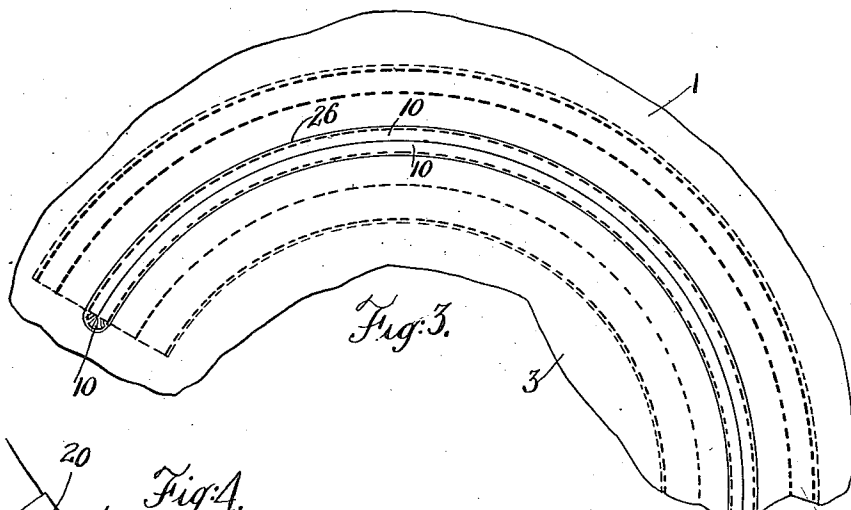
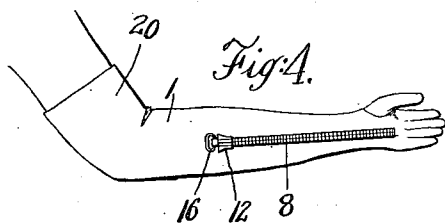


G. SUNDBACK.
FASTENER FOR SLIT AND OTHER CLOSURES.
APPLICATION FILED JULY 12, 1918.

Patented Nov. 25, 1919.
3 SHEETS—SHEET 1.

1,322,650.

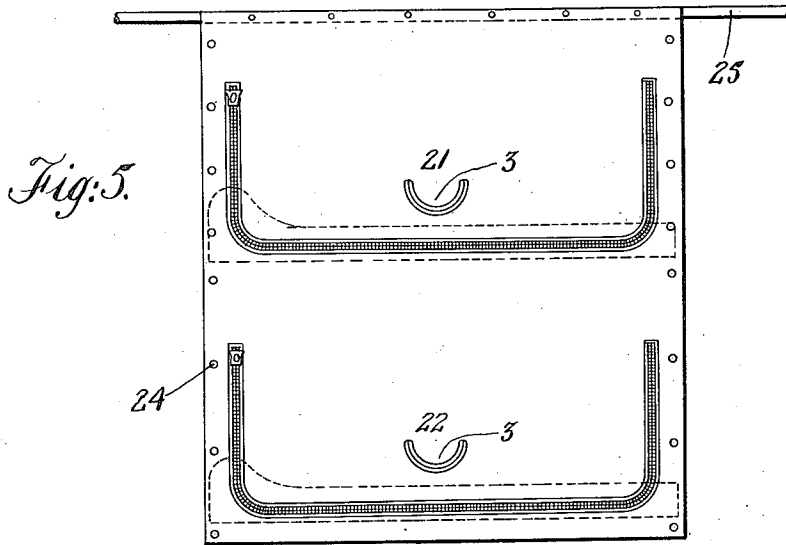
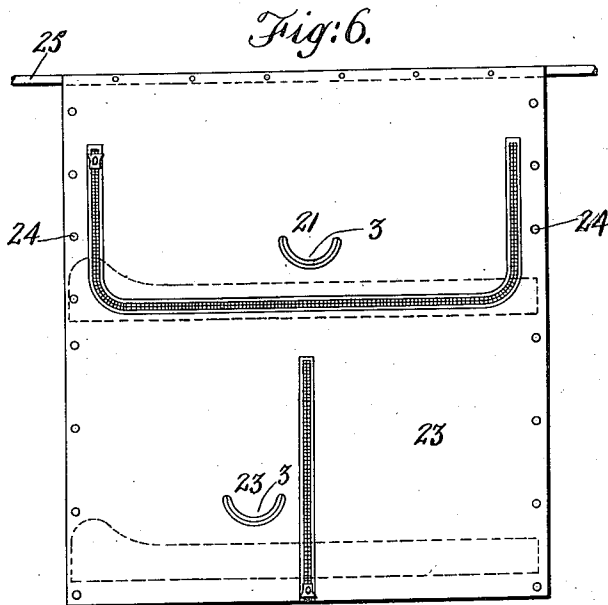
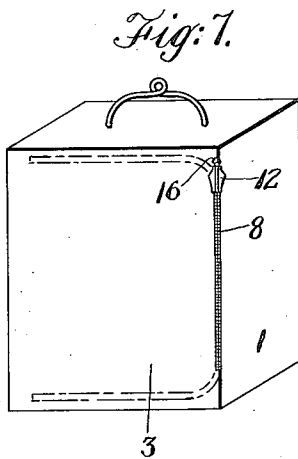


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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

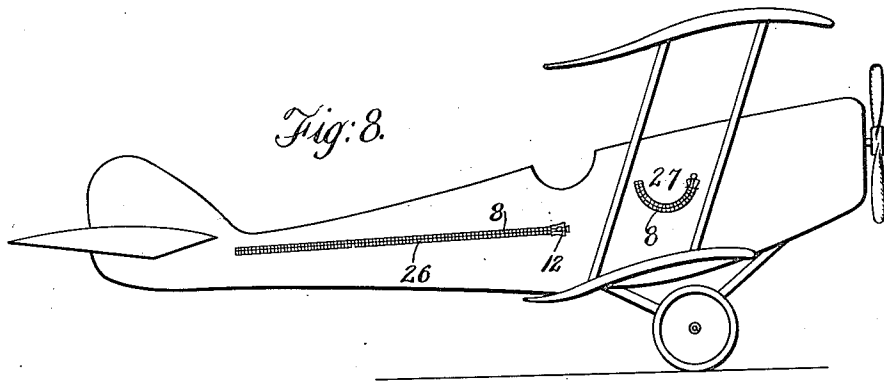
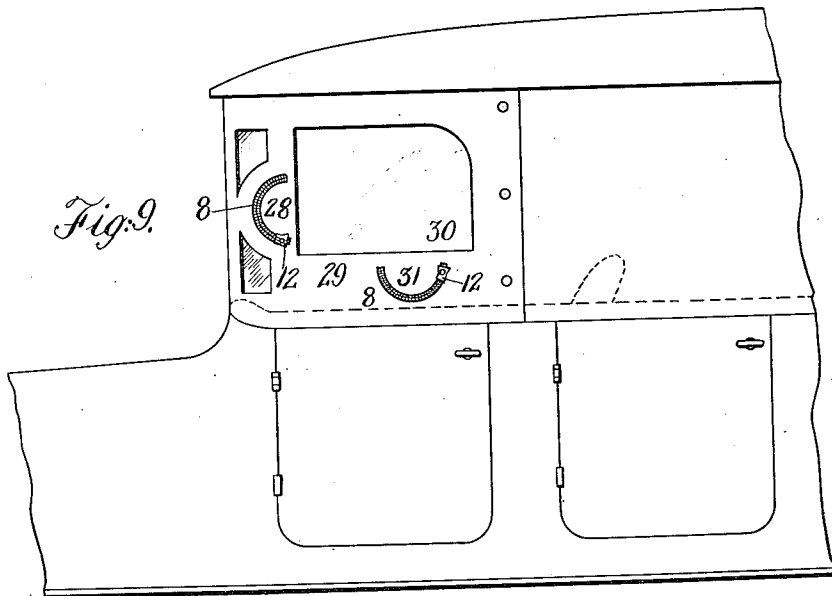
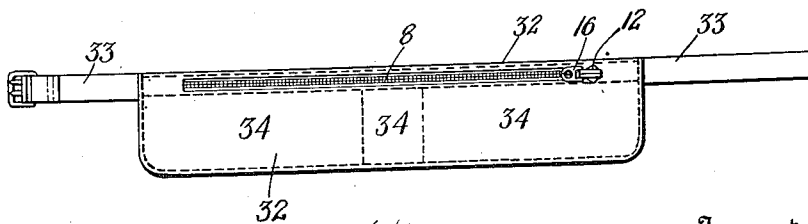


Fig. 10. Inventor
Gideon Sundback,
By his Attorney J. M. Foster.

UNITED STATES PATENT OFFICE.

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FASTENER FOR SLIT AND OTHER CLOSURES.

1,322,650.

Specification of Letters Patent.

Patented Nov. 25, 1919.

Application filed July 12, 1918. Serial No. 244,584.

To all whom it may concern:

Be it known that I, GIDEON SUNDBACK, a subject of the King of Sweden, and a resident of Meadville, in the county of Crawford and State of Pennsylvania, have invented certain new and useful Improvements in Fasteners for Slit and other Closures, of which the following is a specification.

This invention relates to fasteners of the separable type including a pair of stringers carrying locking members and a sliding operating device, and has reference to a fastener especially adapted for application to curved or straight closures wherein it is desired that the stringers have a degree of extensibility and contractibility independently of the corded edge which carries the connecting or interlocking members.

In my Patent #1,243,458 dated October 16, 1917, the corded edge stringer is composed of a woven tape in which the warp and filling run lengthwise and crosswise of the stringer, which does not provide much extensibility to the stringer from stretch in the material, nor does it provide much contractibility in the stringer, without cutting or goring the stringers. In certain situations, such as a curved closure herein illustrated, it is not only necessary to space the members on the outer stringer somewhat further apart than those on the inner stringer, in order to go around a corner, but it is also necessary to provide for corresponding extension and contraction of the outer and inner stringers respectively. If an ordinary woven tape stringer be used on a curved closure, the inner stringer has to be contracted while the outer stringer has to be lengthened. Contraction of the inner stringer can be effected either by goring, or by wetting and shrinking the tape, both of which methods are objectionable because of the time and trouble required, and also because it is difficult to make a gored or shrunk stringer lie flat either before or after sewing it to the article. The outer stringer must be correspondingly lengthened, which can only partly be accomplished by straining the woven tape, and additionally requires cutting of the tape to furnish the required amount of elongation of the outer or rear portion of the stringers. This is objectionable because the stringer is thereby weakened, and also because if woven

stringers become wet, they tend to contract and may ultimately prevent the fastener from properly functioning.

I have discovered that by having the threads of a stringer run bias or diagonally of the stringer, the body of the inner stringer tends to automatically contract in length and widen in width when being sewed to the article, while the body of a similarly constructed outer stringer will automatically tend to lengthen and contract in width while being sewed to the article, both variations being proportional to the curvature. These characteristics due to the bias of the threads of the stringer tape relatively to the practically inextensible corded edge thus obviate the goring, shrinking, stretching and cutting operations heretofore required to maintain the fastener flat and enable it to be properly attached by ordinary workers without special manipulations. I have found that a bias flat braid is especially advantageous in this connection, not only because it lends itself so readily to the requirements of these fasteners, but also because it automatically takes up the shrinking and stretching incident to wetting without throwing the interlocking members out of operative relation. Also, the bias woven stringer is of advantage in that the fasteners can be manufactured flat without having the rear or attaching edge longer than the corded edge as described in said Patent #1,243,458, and yet will sew flat as it goes under the sewing machine presser foot.

A further feature of the invention resides in the application of the type of fastener disclosed in the aforesaid patent to interior straight or curved slit closures in a fabric body, of which several advantageous forms are shown herein. Heretofore, fasteners of this type have only been employed in closures wherein the ends are freely separable, and where this separability of the ends has been employed for opening the fastener, as in a shoe or placket. This result has been obtained by the angle between the curved channels of the slider being such as to provide the camming opening force, the slider simply sliding down on the stringers and unlocking the members as the free ends of the stringers are pulled apart. In slit closures, according to this invention, the opening movement is required to be positive as

well as the closing movement, both because an interior slit opening does not permit pulling apart of the stringer ends to open the fastener, and also because it is desirable to provide a fastener which is not accidentally self-opening. To accomplish this result, the angle between the channels of the slider is made small and the channels straight sided, so that the slider does not slide even if the stringers are pulled apart, and the fastener is only opened when the slider is positively actuated in the proper direction, the fastener when closed being held against accidental opening under transverse strain by the slider friction.

So far as I am aware, it is entirely new to provide slit closures with fastenings operated by a sliding device, by which several advantages are obtained. One is that such closures can be closed against the tension of the material, as where it is stretched on a frame and it is desired to permit access to the interior, and also in cases where it is desired to have a larger opening than that provided by a straight slit, such as for hand holes in automobile curtains, aeroplane fuselages and the like where a flap is formed in the material and it becomes desirable to quickly open and close the flap. Heretofore, where flaps have been provided, they have either been fastened down by buttons or left without fastenings, and have usually required a separate piece of material, whereas by this invention extra material is not required and the edges of the slit are always brought exactly together, thus providing wind-proof, bug-proof and rain-proof closures.

The invention is of especial application to closures for curtains, pockets, receptacles and the like which are subject to weather conditions or dampness, and also where the closure is taut when closed, because the stringer may withstand the strain without being weakened by cuts or gores and still hold the meeting edges together.

In the accompanying drawings,

Figure 1 shows a plan view of a closure embodying the invention, seen from the inside,

Fig. 2 is a sectional view on the line 2—2 of Fig. 1, showing the end stop member,

Fig. 3 is a perspective view of a modification, showing meeting edges in a curtain,

Fig. 4 shows the invention applied to a glove,

Figs. 5 and 6 show the invention applied to sleeping car curtains,

Fig. 7 shows the invention applied to a wardrobe,

Fig. 8 shows the invention applied to an aeroplane fuselage,

Fig. 9 shows the invention applied to an automobile curtain, and

Fig. 10 shows a novel money belt.

Referring to Fig. 1, 1 represents a fabric body having a slit partly curved and partly straight, forming a flexible flap 3 which will bend sufficiently when open to permit the passage of a hand or arm.

Referring to the fastener details, shown in Figs. 1, 2, and 3, the fastener consists of bias or braid stringers 5, 6, arranged parallel to each other on the edges of the slit 2 in the body 1, each stringer having cords 7 attached thereto by sewing on each side and adapted to receive the interlocking connecting members 8, as shown in said patent. Other forms of fasteners operated by a sliding device may be used instead, although for reasons of reliability in operation, strength, and tightness of closure, the patented structure is preferable.

Fig. 1 shows the slit widened by turning back the edges of the body, which furnishes a strong support for the fastener, especially on straight closures, or those where the curve is not too sharp, and where the bias of the fabric permits it to be kept flat. On heavy cloth having a curved slit closure, the edges of the body are bound, as by tapes 10 in Fig. 3, one of which may slightly overlap the other so as to shed water and also be practically wind tight. This form is especially good for vehicle curtains or where protection from weather is desired with quick opening and closing. The stringers are permanently connected by link members at each end, such as 11, but instead of the members 11 at the end where the slider 12 stops when closed, a special bridge stop member 13 may be used, as shown in Figs. 1 and 2, the depressed bridge 14 being long enough to receive the neck and bottom of the slider and frictionally hold it. The slider 12 is provided with a T-yoke 15 extending from end to end and carrying a sliding pull ring 16 for pulling the slider positively from each end according to the direction of movement. Instead of the link members 11, 13, for the permanent connection, the ends of the stringers may be permanently sewed or otherwise fastened to the body at the ends of the opening or slit. The slider 12 instead of being provided with widely curved channels to permit opening of the fastener by pulling the stringers apart as in the aforesaid patent, is provided with straight channels at such low angle to each other as to frictionally prevent movement of the slider by pulling apart of the stringers, the friction being so great that a positive pull is required on the slider itself in order to open the fastener. Thus the fastener is frictionally locked by the slider at the extreme closed position, as well as at any intermediate position. This feature is also of importance where the opening is closed under tension.

The stringers 5, 6 constructed of bias fab-

ric or braided tape are relatively inextensible at their front corded edges, which is necessary in order to maintain the spacing and coöperation of the interlocking members, which have to be guided into and out of engagement with each other by the slider. The members on the outer stringer of a curve are spaced farther apart than those on the inside stringer, but in order to make the stringers lie flat without goring or cutting, the stringer body varies in width with the radius. This is a property of a bias fabric which, as shown in Fig. 1, causes the outer flat stringer 5 to be narrower and longer as compared with the inner stringer 6 which has been shortened and widened, but still remaining flat. When a stringer of this character is once attached, it is strong enough to resist tension, while still remaining flat, and yet will not be objectionably affected by wetting and drying because it follows the lengthwise contraction and lengthening which takes in the material to which it is attached. If this material is waterproof, the braid does not stretch or contract to a material extent owing to the diagonal weave. The same applies to transverse contraction, which is so insignificant that it is disregarded in practical use.

The glove 20 shown in Fig. 4 embodies the broad idea of a slit closure fastened in a novel manner, since gloves of this type prior to my invention have been laced or buttoned, and the fastener of my patent has not been satisfactory for such use owing to its tendency to open under strain unless locked by a separate hook and eye, and also not being positively actuated in each direction. Inasmuch as a glove is usually fastened under strain, and is subjected to varying strains in use, this invention solves the difficulty and furnishes a quickly operated and strong arrangement.

In Figs. 5 and 6, berth curtains are shown embodying the invention, Fig. 5 showing upper and lower curtains 21, 22, having flaps for permitting ingress and egress, while in Fig. 6, the lower curtain consists of two flaps 23. These curtains will be fastened at the sides in the usual manner, as by buttons 24, and hung on rods 25, or other suitable way. In both cases, the occupants have much greater privacy and security than with present arrangements with a tighter closure, while the lower berth is not exposed by opening of the upper curtain. These curtains may also have hand hole flaps 3 as shown to obviate complete opening of the curtain for collection of tickets, service, etc. The outside will preferably be finished as in Fig. 3, with the slider actuator on the inside so as to be under the control of the occupant. Owing to the flexibility of the fastener, the curtains when not in use roll up in very small space.

In Fig. 7, the invention is shown in connection with a portable knock-down wardrobe, which permits quick opening and closing, and also forms a dust and vermin proof closure. The dotted lines show permissible extensions where one side is to open wide.

In Fig. 8, the aeroplane fuselage has a straight slit closure 26, and a hand hole flap 27, embodying the invention, to permit quick access to the interior control mechanism, or to a receptacle, or both.

In Fig. 9, the invention is embodied in an automobile curtain having a flap 28 closing a hand hole located near the front of the curtain 29 in advance of the side window 30, for adjusting a spot light without unfastening the curtain. A second flap 31 adjacent the bottom of the curtain above the door provides means enabling the driver to extend his arm to signal for a turn without opening the curtain in stormy weather. These closures will preferably be finished outside as in Fig. 3, so as to give a smooth finished appearance to the curtain. This invention avoids the unsightly appearance of a slot covered by a flap, which has sometimes been used, and also gives a tight closure.

In Fig. 10, the invention is applied to a money belt 32, which consists of a strap 33 to go around the waist, carrying a double body having pockets 34. The slit is preferably finished as shown in Fig. 1 having both ends permanently closed, and positively opened and closed by actuating the slider 12 through pull 16 in the proper direction, it being observed that here, as in the other examples shown, the fastener remains closed unless positively actuated to open, and will stay partially open if desired. This makes a very light but secure money belt which is very much in demand by officers, soldiers and travelers.

The examples herein shown give an idea of the range of utility of the invention, but it is to be understood that some parts of the invention herein disclosed may be used without others according to the particular needs to be met, so that the invention is not to be limited except as required by the scope of the appended claims.

What is claimed is:

1. In a fastener, a stringer for carrying fastening members on one edge composed of fabric having its threads running bias to the edge whereby to permit the stringer to substantially stretch and contract both longitudinally and transversely.

2. In a fastener, a stringer comprising a bias tape capable of stretching and contracting both longitudinally and transversely, and having a substantially inextensible corded edge for carrying connecting members.

3. In a fastener, a stringer comprising a

bias tape capable of stretching and contracting both longitudinally and transversely, and having a substantially inextensible edge provided with a cord on each side for carrying connecting members.

4. In a fastener, a body having an interior slit, connecting members on the edges of said slit, and means movable on said edges between the ends of said slit and controlling said members to open and close said slit.

5. In a fastener, a body having an interior slit, interlocking members on the edges of said slit, and means movable on said edges between the ends of said slit to lock said members and close the slit when moved in one direction and unlocking said members to open the slit when moved in the other direction.

6. In a fastener, a body having an interior curved slit, connecting members on the edges of said slit, and means movable on said edges between the ends of said slit and controlling said members to open and close said slit.

7. In a fastener, a body having an interior curved slit forming parallel edges, interlocking members on said edges spaced apart according to the differing length of the edges, and means movable on said edges between the ends of said slit to lock said members and close the slit when moved in one direction and unlocking said members to open the slit when moved in the other direction.

8. In a fastener, a body having an opening, stringers composed of bias material having their rear edges secured to the body on opposite sides of said opening, connecting members carried by the adjoining front edges of said stringers, and an operating device sliding on both stringers.

9. In a fastener, a body having a curved interior slit forming a flap, stringers composed of bias material having their rear edges secured to the body on opposite sides of said opening, connecting members carried by the adjoining front edges of said stringers, and an operating device sliding on both stringers.

10. In a fastener, a body having an interior slit, stringers composed of bias material having their rear edges secured to the body on opposite sides of said opening, connecting members carried by the adjoining front edges of said stringers, and an operating device sliding on both stringers.

11. In a fastener, a body having an opening adapted to be closed under tension, stringers composed of bias material adapted to stretch and contract both longitudinally and transversely secured at their rear edges to the body on each side of the opening, said stringers having front, relatively inextensible corded edges carrying connecting

members, and an operating device sliding on both stringers.

12. In a fastener, a body having a curved opening adapted to be closed under tension, flat stringers composed of bias material secured at their rear edges to the body on each side of the opening, said stringers having front relatively inextensible corded edges carrying connecting members, the inner stringer body being shortened and widened relatively to the corded edge while the outer stringer body is stretched and narrowed relatively to the corded edge to cause the stringers to lie flat without goring or cutting, and an operating device sliding on both stringers.

13. In a fastener, a body having an interior slit, interlocking members on the edges of said slit, and a slider positively movable in each direction for locking and unlocking said members, said slider having its divergent cam channels at such a low angle to each other as to frictionally hold the slit locked until positively moved to unlock.

14. In a fastener, stringers carrying interlocking members and a sliding operating device, and permanently connected at each end by a link member.

15. In a fastener, stringers carrying interlocking members and a sliding operating device and connected at the closed end by a link member having a depressed bridge portion adapted to receive and stop said operating device in extreme locked position.

16. In a fastener, stringers carrying interlocking members and a sliding operating device, and permanently connected at each end.

17. In a fastener, a body having an interior slit, stringers of substantially the length of the slit attached to the body along their rear edges throughout their length so as to be held in permanent position by the body, connecting members on the adjoining front edges of said stringers, and an operating device sliding on both stringers.

18. In a fastener, a body having an interior slit with the edges turned in, a stringer secured on each side of the slit to cover the turned in edge, said stringers being held against lateral separation at each end, connecting members carried by said stringers, and a sliding device having means for actuating it from one end in one direction and from the other end in the other direction to positively open and close said slit.

19. In a fastener, a body having a curved interior slit, stringers of unequal length secured to the body on each side of the slit, interlocking members carried by the stringers, those on the outer stringer being more widely spaced than those on the inner stringer, and a sliding operating device mounted on the stringers and constructed to frictionally hold the members locked and

having an actuating pull movable to each end to enable said device to be positively operated both to open and close.

5 20. A curtain, glove, receptacle, money belt or the like comprising a fabric body having an interior slit, stringers permanently secured lengthwise and adjacent each end to said body, one being on each side of the slit, connecting members carried by said
10 stringers, and a sliding device mounted on said stringers and capable of being posi-

tively pulled in either direction to actuate said connecting members to open and close said slit substantially as herein described and illustrated.

Signed at Meadville, in the county of Crawford and State of Pennsylvania, this ninth day of July, A. D. 1918.

GIDEON SUNDBACK.

Witnesses:

ALGER F. RUSSELL,
CAL. CLANCY.