

Jan. 24, 1939.

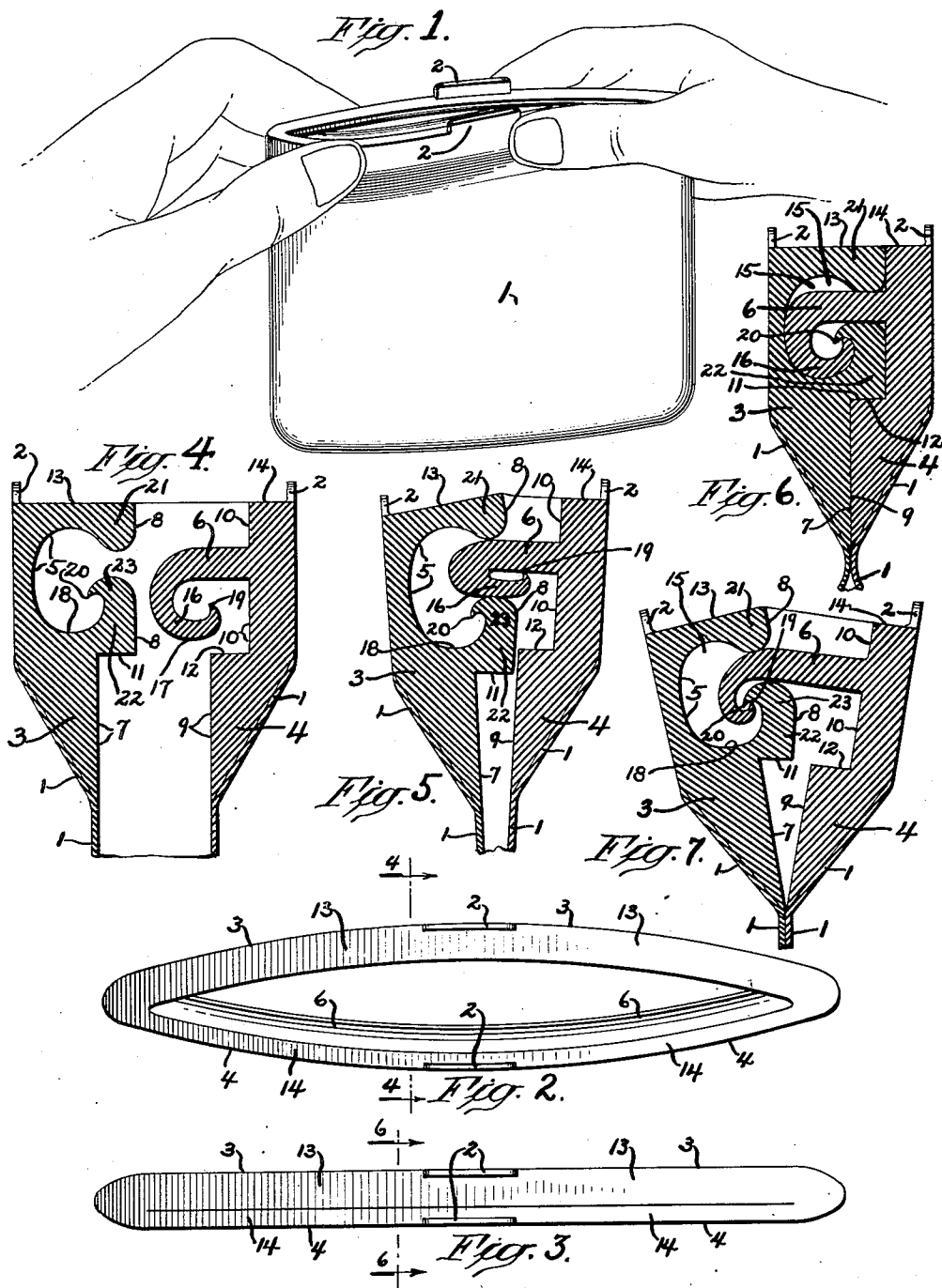
D. FREEDMAN

2,144,755

CLOSURE DEVICE

Filed Jan. 11, 1937

3 Sheets-Sheet 1



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Jan. 24, 1939.

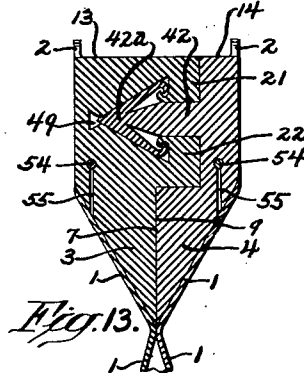
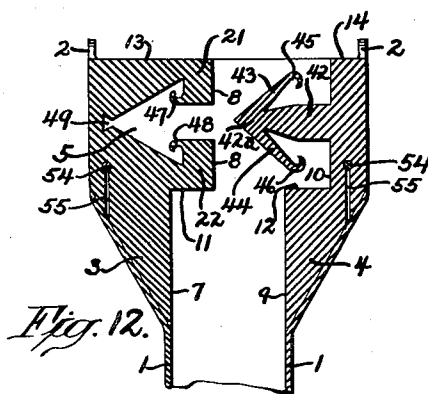
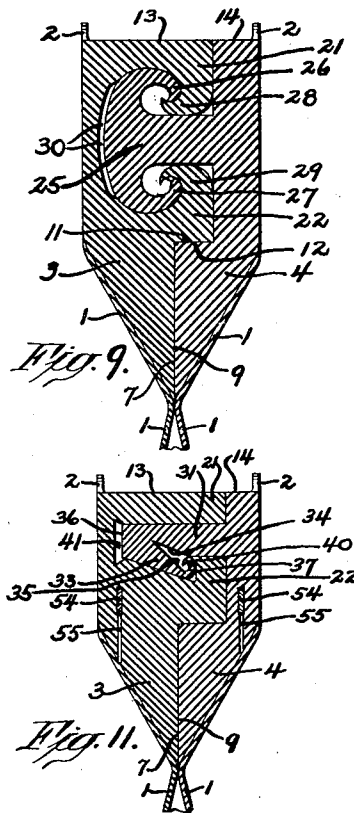
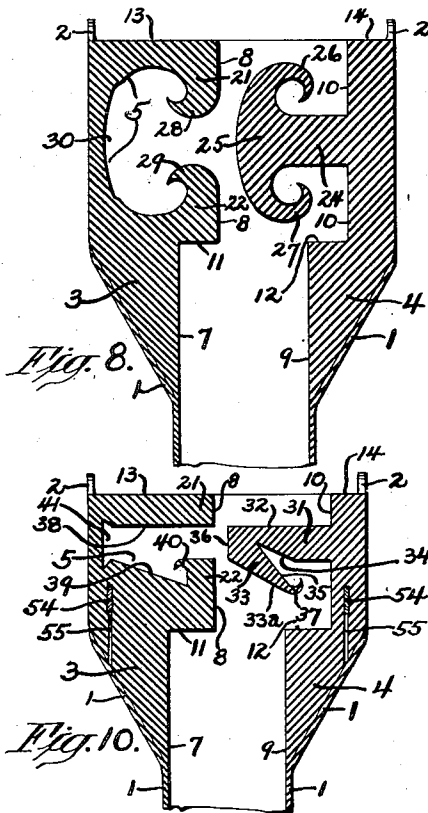
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CLOSURE DEVICE

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3 Sheets-Sheet 2



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CLOSURE DEVICE

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3 Sheets-Sheet 3

Fig. 14.

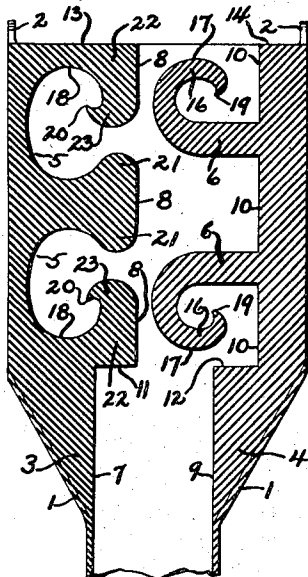


Fig. 15.

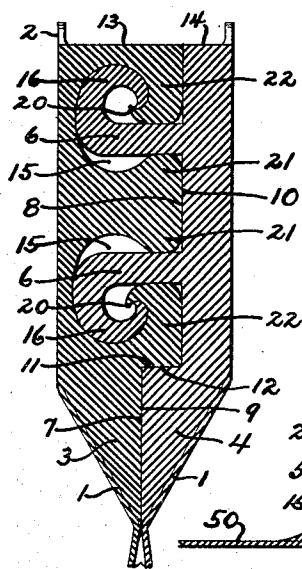


Fig. 19.

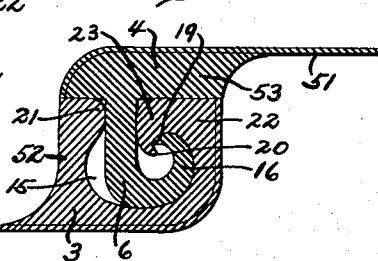


Fig. 16.

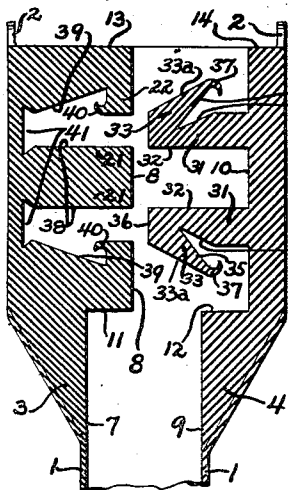


Fig. 17.

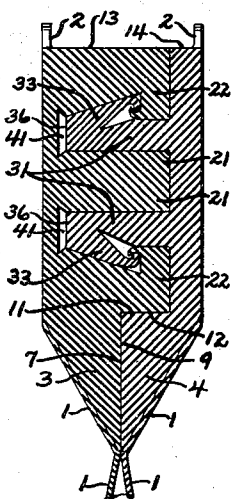
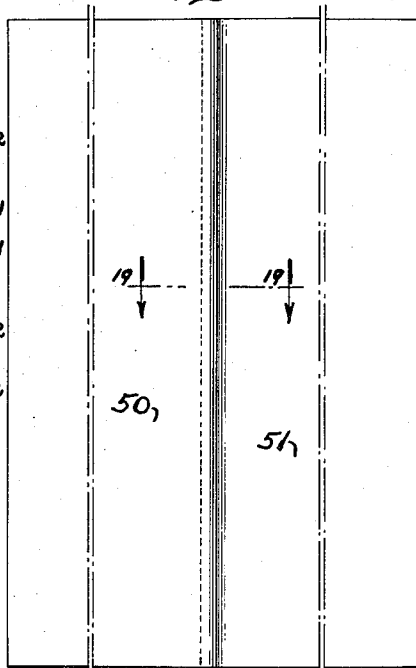


Fig. 18.



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UNITED STATES PATENT OFFICE

2,144,755

CLOSURE DEVICE

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Application January 11, 1937, Serial No. 120,011

11 Claims. (Cl. 24—201)

This invention relates broadly to new constructions of closure devices.

One of the objects of this invention is the creation of a construction of closure device which when actuated into closed condition provides an air-tight hermetical seal for the container on and upon which it is disposed, and used.

Another object of this invention is the creation of a construction of closure device which when actuated into closed condition tends to remain in such condition and is locked in such condition, subject to the application of proper and sufficient force to effect an unlocking effect thereupon.

Another object of this invention is the creation of a construction of closure device adapted to ready application and use upon any container, bag, or like article which it is desired be afforded an air-tight hermetical seal thereby.

Another object of this invention is the creation of a construction of closure device which may be manually actuated from open into closed condition and when so actuated will lock in closed condition.

Another object of this invention is the creation of a construction of closure device employing essentially resilient parts which are readily deformable so that such parts may be joined into locked condition by slight manual pressure.

A still further object of this invention is the creation of a construction of closure device which is adaptable to universal application to any article or articles in or upon which a simplified, ready and easily operable closure device is desired.

A still further object of this invention is the creation of a plurality of variant possible embodiments of closure device construction employing the principles of my invention.

A still further object of this invention is the creation of closure device constructions fabricated of such materials and so constructed that the same may be utilized without the employment of auxiliary mechanisms such as slides, fastening devices separate from the closure device construction, or the like.

A still further object of this invention is the creation of closure device constructions having the parts thereof which are to be joined and disconnected at the user's election fabricated of material which has been formed, molded and/or extruded into desired suitable finished shape.

A still further object of this invention is the creation of suitable reinforcing means adaptable to use in conjunction with closure device con-

structions of the type herein described, which reinforcing means are adapted to provide a pre-chosen configuration to the closure device constructions, if the employment of such means be desired.

A still further object of this invention is to provide closure device constructions of the type herein described, the component parts of which are strip-like in form and so arranged that one of said parts is adapted to be held in a channel formed in the other over its length.

Various other objects and advantages of the invention than those hereinabove mentioned will appear more fully hereinafter. It is to be understood, that the specific forms shown are merely illustrative and hence the detailed description thereof is not to be taken as limiting the invention itself.

The invention resides substantially in the parts, as well as in the combination, construction, location and relative arrangement of parts, all as will be more fully pointed out hereinafter.

Referring to the drawings wherein like reference numerals refer to the same or similar parts throughout the several views, it will be found that:

Fig. 1 illustrates a manual closing of a bag provided with one of the embodiments of closure device construction of my invention;

Fig. 2 represents a top plan view of said bag in open condition;

Fig. 3 represents a top plan view of said bag in closed condition;

Fig. 4 represents a sectional view taken along the section line 4—4 in Fig. 2, looking in the direction of the arrows, and showing the cooperating elements of said embodiment of closure device construction in disengaged position;

Fig. 5 represents a similar sectional view, but showing the cooperating elements of said embodiment of closure device construction illustrated in a possible position they may assume when being brought together to effect engagement;

Fig. 6 represents a sectional view taken along the section line 6—6 in Fig. 3, looking in the direction of the arrows, and showing the cooperating elements of said embodiment of closure device construction in engaged position;

Fig. 7 represents a similar sectional view, but showing the cooperating elements of said embodiment of closure device construction illustrated in a possible position they may assume when being separated to effect disengagement;

Fig. 8 represents a sectional view similar to

that of Fig. 4, with particular reference to position of cooperating elements, but of a variant possible embodiment of closure device construction of my invention;

5 Fig. 9 represents a sectional view similar to that of Fig. 6, with particular reference to position of cooperating elements, but of the said variant possible embodiment of closure device construction shown in Fig. 8;

10 Fig. 10 represents a sectional view similar to that of Fig. 4, with particular reference to position of cooperating elements, but of a second variant possible embodiment of closure device construction of my invention;

15 Fig. 11 represents a sectional view similar to that of Fig. 6, with particular reference to position of cooperating elements, but of the said second variant possible embodiment of closure device construction shown in Fig. 10;

20 Fig. 12 represents a sectional view similar to that of Fig. 4, with particular reference to position of cooperating elements, but of a third variant possible embodiment of closure device construction of my invention;

25 Fig. 13 represents a sectional view similar to that of Fig. 6, with particular reference to position of cooperating elements, but of the said third variant possible embodiment of closure device construction shown in Fig. 12;

30 Fig. 14 represents a sectional view similar to that of Fig. 4, with particular reference to position of cooperating elements, but of a fourth variant possible embodiment of closure device construction of my invention;

35 Fig. 15 represents a sectional view similar to that of Fig. 6, with particular reference to position of cooperating elements, but of the said fourth variant possible embodiment of closure device construction shown in Fig. 14;

40 Fig. 16 represents a sectional view similar to that of Fig. 4, with particular reference to position of cooperating elements, but of a fifth variant possible embodiment of closure device construction of my invention;

45 Fig. 17 represents a sectional view similar to that of Fig. 6, with particular reference to position of cooperating elements, but of the said fifth variant possible embodiment of closure device construction shown in Fig. 16;

50 Fig. 18 is a front elevational view showing two elements of material joined together over a given length by one of my embodiments of closure device construction; and

55 Fig. 19 represents a sectional view taken along the section line 19—19 in Fig. 18, looking in the direction of the arrows and showing the cooperating elements of said embodiment of closure device construction in engaged condition.

60 It is the purpose of this invention to make more useful and improved closure device constructions. In the past different closure devices or separable fasteners of various types and constructions employing cooperating resilient or semi-resilient elements have been devised. However, as far
65 as I have found, such devices, with but few exceptions, have met with indifferent or little or no commercial adoption and success. The reasons for this, I believe have been that such devices as have been devised were either difficult to make and
70 to use or else did not provide an effective and secure closure or else necessitated the employment of extra and alien elements such as slides, coupling mechanisms or the like. Moreover such devices
75 were expensive to produce, usually complicated to

affix and use and often of very short effective life.

Accordingly, it has been my purpose to create closure device constructions free of the aforementioned disadvantages and which are simple,
5 cheap, rugged, and secure to make and use. Likewise to make those not employing a solid bead or penetrating element.

Turning now to the drawings, it will be observed that by way of illustration I have shown
10 in Fig. 1 a small bag 1 such, for example, as might be used as a tobacco bag or pouch, having secured along its upper edges one of the embodiments of closure device construction of my invention. It will be understood that securement
15 may be effected by any suitable means such, for example, as vulcanizing one of the cooperating elements of the closure device to the material of one side of the bag along the length thereof and adjacent the free upper edge of said side, and
20 the other of said elements to the material of the other side of said bag along the length thereof and adjacent the free upper edge of said other bag side, in the event that the material or materials employed in said elements and said bag sides
25 are such that securement can be effected by vulcanization; or in the event that the material or materials employed in the elements and the bag sides are such that vulcanization cannot be employed, then, and in that event, by other appropriate and suitable means for effecting securement such as cementing, gluing, etc.

At this point I desire to bring out that while in Fig. 1 I illustrate my closure device construction as applied to the material of a tobacco pouch
35 or bag 1 of rubber or the like, that it should be understood that the closure devices which I herein disclose are adaptable to wide and varied applications, thus the same may be employed in connection with bags and containers of all sorts
40 and nature, and in fact may be adapted to use whenever it is desired to create a ready means of joining two edges of material together over a given length as will be made more fully apparent hereinafter.

45 It should be understood that each closure device construction includes two cooperating elements of strip-like form of predetermined length sufficient to serve the desired purpose.

Turning to Fig. 4, it will be noted that I have there shown a sectional view through the two cooperating strip-like elements which go to make up one of the embodiments of my closure device. One of these elements 3, is provided with a channel, groove or slot 5 therein, running longitudinally
55 over the length thereof and the other of said elements 4 is provided with a joined hook-like protuberance 6, preferably integral therewith and which runs longitudinally over the length thereof. Each of strip-like elements 3
60 and 4 is provided at a convenient place along the body of the strip such, for example, as on the top surface of the respective strips with an extension, lug or finger-grip 2 which is securely joined thereto and preferably is integral with the particular element on which it is mounted. Elements 3 and 4 are preferably fabricated of resilient or semi-resilient material throughout,
65 such as rubber, compositions thereof, or the like, and it will be understood that elements 3 and 4 and all parts carried thereon are accordingly essentially deformable. The hook-like protuberance 6 over its length, it should be understood, is intended to be injected into and received and held in the channel, groove or slot 5 over the
75

length of the strip containing said channel, groove or slot 5.

Each of elements 3 and 4 are respectively so proportioned, and provided with such corresponding internal facings as will permit said elements to be brought together and closely fit and seat against each other when the hook-like protuberance 6, over the length thereof has been completely disposed within the channel, groove or slot 5, and the elements 3 and 4 are in closed position as shown in Fig. 6. Thus, element 3 is provided with internal vertical walls 7 and 8 and element 4 is provided with internal vertical walls 9 and 10. Further, element 3 is provided with an internal horizontal wall 11 and element 4 is provided with an internal horizontal wall 12. Element 3 is provided with an external top wall 13 and element 4 is provided with an external top wall 14. An inspection of Fig. 4 will make it clear that these walls are so arranged that when elements 3 and 4 are brought into the positions shown in Fig. 6, wall 7 will lie against wall 9; wall 11 will lie against and on top of wall 12; wall 8 will lie against wall 10; and top walls 13 and 14 will fall in alignment in one plane to make a smooth close internal fit of elements 3 and 4 and present a smooth continuous top surface. In this connection, it should be understood that walls 7 and 11 provide a shoulder against which the portion of element 4 defined by walls 9 and 12 ultimately abuts when the parts are in the position shown in Fig. 6.

It next should be noted that according to my construction the opening into the channel, groove or slot 5 is from and substantially at right angles to the vertical wall 8 and that such opening is effective to divide the element 3 along its length into an upper rib-like or lip-like portion 21 and a lower rib-like or lip-like portion 22, which rib-like or lip-like portions of course, are joined to and are integral parts of the element 3. It should be further noted that the protuberance 6 which is preferably integral with element 4 arises from wall 10 at substantially right angles with respect thereto.

I preferably form my channel, groove or slot 5 of such shape that when the hook-like protuberance 6 is completely disposed therewithin, the said channel, groove or slot is not completely filled thereby, but rather to the contrary is of such internal configuration as to leave an empty space 15 particularly shown in Fig. 6 between the upper surface of the hook-like protuberance 6 and the surface of the upper portion of the channel, groove or slot 5 lying thereabove, which space I conveniently term a "by-pass", since I have found that the same is helpful in permitting the parts additional freedom of movement while engagement thereof is being effected. Further, I preferably so shape the hook-like protuberance 6, that, when not deformed, a lower portion thereof 16 has its lowest surface point 17 lying vertically somewhat below the lowest point 18 on the internal surface of channel, groove or slot 5 when the same also is not deformed and when the respective elements are in the open and disengaged position shown in Fig. 4.

I also arrange and shape the free end of edge of the hook-like protuberance 6 so that the same terminates in a relatively sharp edge 19 extending over the length of the protuberance on the strip-like element 4 and correspondingly I provide the rib-like or lip-like portion 22 of element 3 adjacent the opening into the channel, groove or slot

5 with a relatively sharp edge 20 extending over the length of strip-like element 3; and the portion 22 is formed with an internal hook portion 23.

Having thus described the construction of the embodiment shown in Figs. 4 to 7, inclusive, I will now briefly describe the manner of use and operation thereof.

When it is desired to effect a closure, that is to say, when it is desired to bring elements 3 and 4 from open position as shown in Fig. 4 into closed position as shown in Fig. 6, the strips may be grasped substantially as shown in Fig. 1 and strip-like element 4 carrying the hook-like protuberance 6 urged towards element 3 and said hook-like protuberance urged to spread apart the rib-like or lip-like portions 21 and 22 of element 3 and enter into the channel, groove or slot 5.

Since, as aforesaid, the parts are deformable, proper pressure directed transversely of a strip section can have the effect of deforming hook-like protuberance 6 so that lower portion 16 thereof is raised and made to assume a position close and parallel to what may be termed the "shank" portion of such protuberance, such, for example, as the position thereof shown in Fig. 5. The free end of said protuberance is thus rendered compressed and of decreased vertical height and said protuberance presents to the opening into the channel, groove or slot 5, a tongue having what is effectively tantamount to a solid free protruding end.

However, it should be understood that even when the free end, of the hook-like protuberance 6 is completely compressed back on itself and its vertical height decreased, still such height will be greater than the vertical height of the opening from the wall 8 into the channel, groove or slot 5, and that sustained pressure will have the effect of wedging and injecting the compressed free end of the protuberance into said opening to effect penetration. Since element 3 is deformable, the upper rib-like or lip-like portion 21 thereof deforms and tilts upwardly carrying therewith the top wall 13 and the upper portion of wall 8, while the lower rib-like or lip-like portion 22 and its hook portion 23 also deforms but tilts downwardly carrying therewith the lower portion of wall 8 and wall 11. Hook portion 23 being forced downwardly, the same is compressed and deformed. Further, the internal surface of the channel, groove or slot 5 is deformed and distorted into increased vertical height and decreased horizontal width, and the opening from wall 8 into said channel, groove or slot is increased in vertical height due to the rib-like or lip-like portions 21 and 22 of element 3 being pushed and spread apart under the wedging action of the compressed free end of protuberance 6.

Accordingly lower portion 16 of protuberance 6 passes over hook portion 23 of rib-like or lip-like portion 22, each, during the passage, continuing to be deformed and compressed and reciprocally exerting upon each other a pressure incident to the tendency of each to becoming non-compressed. Sustained pressure causes protuberance 6 to enter further into the channel, groove or slot 5, over the lengthwise portion of the strip-like elements 3 and 4 where pressure is applied, and penetration thereof to a point where the compressed free end of the protuberance clears the compressed hook portion 23. Once the protuberance has cleared at its free end the hook portion 23 all parts tend to return to the positions shown therein in Fig. 4, and the free end of said pro-

tubulance and hook portion 23 tend to reassume their normal non-compressed curved contour. However, since, as hereinbefore explained, the relative configuration of parts is such that the lowest surface point 17 on lower portion 16 of protuberance 6 lies, when in the position therefor shown in Fig. 4, somewhat below the lowest point 18 on the internal surface of the channel, groove or slot 5, the result is that portion 16 of protuberance 6 when once within said channel, groove or slot 5, cannot completely assume the same lowered position that it had when the parts were not engaged as shown in Fig. 4. In other words, the compressed free end of the hook-like protuberance 6 when within the channel, groove or slot 5 cannot become completely non-compressed because the portion 16 is limited in its downward travel by the lower internal surface of the channel, groove or slot 5.

At this point I desire to make clear that the operations I have described will rapidly take place when a strip section is grasped and squeezed against its complementary strip section between the fingers, and, that if pressure is successively applied over contiguous strip sections from one end of the strips to the other, a complete penetration and closure will be effected.

The presence of the space or "by-pass" 15 is helpful during penetration towards facilitating freedom of movement and ready deforming of parts; and, after penetration, in taking up to a degree the tendency of the free end of the hook-like protuberance 6 to return to non-compressed condition. Thus, since the parts are deformable, the "shank" like portion of the hook-like protuberance 6 may to a degree expand slightly into the "by-pass" 15. However, such expansion will not result in a complete return of the free end of the hook-like protuberance 6 to non-compressed condition, but rather to the contrary a pressure will remain between the lower surface of portion 16 of said protuberance and the lower portion of the internal surface of the channel, groove or slot 5, which pressure will more or less "lock" the parts and hold the same against relative free displacement or movement. Moreover, the upper rib-like or lip-like portion 21 upon returning from its upward tilt will, in an action like a leaf spring, tend to clamp down upon the hook-like protuberance 6 at the "root" of the "shank" thereof adjacent the joinder of such protuberance with element 4 at wall 10, thus providing a further locking action against free displacement or movement. The presence of the space or "by-pass" 15, as is clear, is additionally helpful in enhancing the aforementioned leaf spring action by permitting of the necessary play in the upper rib-like or lip-like portion 21. Still further it will be observed that once the parts are in the position therefor shown in Fig. 6 that the outer surface of the free end of protuberance 6 closely hugs the inner surface of the channel, groove or slot 5 and the edge 19 sits against such surface while wall 7 sits against wall 9, wall 8 sits against wall 10 and wall 11 sits upon wall 12, all effecting a perfect air-tight hermetical seal and closure.

Having thus described the manner in which locking or closure of the device is effected, I will now briefly describe the manner in which unlocking or disengagement can be attained.

When it is desired to effect disengagement of elements 3 and 4, or in other words to bring the parts from the position shown therefor in Fig. 6 to that shown in Fig. 4, one element 2 is grasped between the thumb and forefinger of one hand

while the other element 2 is grasped between the thumb and forefinger of the other hand and the user's hands are pulled apart thereby effecting a tension tending to separate the strips. It should of course be understood that in an embodiment not including any finger grips that the strips themselves may be grasped and that if the strips are of substantial length that the same will have to be opened at successive contiguous strip sections over the length thereof.

Irrespective however, whether a complete opening of the closure can be effected in one step or whether the same necessitates a repetition of the opening action at successive contiguous strip sections over the length thereof, the result of tension is to bring the parts into the position shown therefor in Fig. 7. Wall 9 is pulled away from wall 7, wall 12 is pulled from underneath wall 11 and wall 8 is laid bare of wall 10. The "shank" portion of protuberance 6 is pulled out of the opening from wall 8 into the channel, groove or slot 5 and is stretched by the hook-like free end of protuberance 6 and the hook portion 23 remaining engaged until overcome. In this regard it will be observed that edge 19 of the free end of protuberance 6 slides over the internal surface of the channel, groove or slot 5 towards the edge 20 and that the parts hold together right up until a point is reached where sufficient tension is employed to overcome the tendency of the edges to hold on to each other and one or both deform permitting of disengagement. When such point is reached the protuberance 6 may be withdrawn in toto.

From the foregoing it will be apparent that since the "shank" portion of protuberance 6 is resilient and may stretch and since the hook portions tend to hold together until a sufficient tension is applied to overcome the same, that a disengagement will not be effected unless the appropriate disengaging tension is applied and with the result that accidental slight tensions are ineffective to open and unlock the closure device. Thus under normal conditions the same will remain closed, when once closed, until it is intended that the same be opened and sufficient appropriate tension is applied for such purpose.

At this point it should also be observed that in the event that the closure be employed to effect a seal upon some container containing an internal pressure such as might be presented were the container to hold a gas, vapor or the like, that the effect of such internal pressure would be to tend to separate elements 3 and 4 from the bottom instead of from the top and thus the same would tend to bring the upper portions of such elements close together rather than apart, and thus to lock the closure more securely rather than to open same. Accordingly it will be understood that the embodiments of closure device constructions herein disclosed are of particularly good effect when employed on containers having an internal pressure since the effect of such pressure on the closure is to more securely lock the same rather than unlock it.

An inspection of the drawings generally will disclose that it is my intention that the final product such as the bag shown in Fig. 1 be the result of proper engagement of the bag or other container sides to the proper respective strips 3 and 4, by vulcanizing or by like process or by any suitable method of securement. It should also be understood that if vulcanizing processes are followed that the strips 3 and 4 can be joined to-

gether at their free ends to present a continuous closure as shown in Figs. 2 and 3.

Turning now to Figs. 8 and 9, it will be observed that in place of the hook-like protuberance 6, I employ in this embodiment a protuberance 24 jutting out from the strip 4 over its length, which protuberance, when viewed in section is of such configuration, that it may be termed "mushroom-like". This protuberance has a head 25 out of which develops an upper hook-like portion 26 and a lower hook-like portion 27. The channel, groove or slot 5 in this embodiment is of such configuration that the strip 3 is provided with a complementary upper hook-like portion 28 and a complementary lower hook-like portion 29. Said channel, groove or slot 5 also is so shaped as to provide a space or "by-pass" 30 between the outermost surface of the protuberance's head 25 and the wall of the channel, groove or slot. This space or "by-pass" will act to take up in part the tendency of the elements to become non-compressed, will insure close-fitting of elements and likewise will aid in providing sufficient play particularly in a horizontal direction so that upon penetration of the protuberance into the channel, groove or slot 5, the hook-like portions 26 and 27 can proceed sufficiently far into the channel, groove or slot 5 as to clear the hook-like portions 28 and 29. While, of course, the parts are resilient and may be sufficiently so as to deform to the necessary degree by themselves and permit of the attainment of this result, still it is clear that the positive provision of such a space or "by-pass" will materially aid in the accomplishment of the result. While, of course, such a space or "by-pass" can be, and in some instances I believe probably will be dispensed with, I nevertheless believe that its inclusion will be found desirable in most commercial constructions.

It will be understood that the embodiment shown in Figs. 8 and 9 is such that the hook-like portion 26 of protuberance 24 is contemplated to engage with hook-like portion 28 of element 3, while, hook-like portion 27 is contemplated to engage with hook-like portion 29 of element 3. To effect closure, hook-like portion 26 will be compressed down against the "shank" portion of protuberance 24 and hook-like portion 27 will be compressed up against such "shank" portion and hook-like portions 28 and 29, will each be compressed back. Upon disengagement, the upper hook-like portion 26 will tend to hold to hook-like portion 28 and likewise the lower hook-like portion 27 will tend to hold to the hook-like portion 29. It will thus be observed that in a single protuberance the configuration of the protuberance may be such as to provide an upper and lower locking action. It will be further understood that the manner of construction, use and operation of parts in this embodiment aside from the differences hereinabove just noted are substantially the same as that of the corresponding parts of the embodiment shown in Figs. 4 to 7 inclusive.

Turning next to Figs. 10 and 11, it will be observed that the protuberance in the embodiment there shown, is of such configuration that, when viewed in section, it may be termed "lance-like". Thus, this protuberance 31 has an upper flat surface 32 and a hook portion 33 secured thereto at a relatively acute angle. The protuberance is formed with a lower flat surface 34 at a relatively obtuse angle with the lower surface of the "shank" portion of the protuberance, against which sur-

face a flat surface 35 of the hook-like portion 33 may be made to rest during the closing operation. Surfaces 34 and 35 are at a relatively acute angle with respect to each other, said angle converging upwardly.

Protuberance 31 is further formed with a flat end 36, while the hook-like portion 33 has a downwardly sloping wall 33a which converges downwardly to the surface 35 at a relatively acute angle and walls 33a and 35 are arranged so that the portion 33 terminates in a rounded relatively sharp tip 37.

The channel, groove or slot 5 in this instance, instead of being of curvilinear internal configuration, is composed of a plurality of relatively straight complementary walls against which corresponding protuberance surfaces are adapted to rest, thus, such channel, is provided with an upper horizontal wall 38 against which top wall of protuberance 31 is designed to ultimately abut and such channel is also provided with a sloping wall 39 against which the wall 33a is designed to ultimately abut. Element 3 is provided with a hook-like portion 40 contemplated for engagement with the hook-like tip portion 37. It will be understood in this embodiment that again all parts are deformable and that upon insertion of the protuberance 31 into the channel, groove or slot 5, that the hook-like portion 33 will tend to be folded back upon the "shank" portion of such protuberance with the wall 35 being forced against the wall 34, and so disposed that the tip 37 may be passed over the hook-like portion 40 both of which as in previous embodiments are also adapted to becoming deformed and exerting upon each other reciprocal pressures incident to their respective tendencies to becoming non-compressed. If, as I intend, the walls 34 and 35 are at a relatively acute angle forming an indenture running into the body of the protuberance 31, the effect thereof will be to substantially decrease the effective height of the penetrating end of this protuberance for penetration. It will of course be understood that once penetration has been effected, that the hook-like portion 33 will swing out from the "shank" of the protuberance 31 to render the parts as non-compressed as possible.

It will be further understood that in this embodiment engagement is contemplated between the rounded relatively sharp tip portion 37 and the hook-like portion 40. In this embodiment a space or "by-pass" 41 for uses and purposes similar to those previously described for other spaces or "by-passes" is likewise provided. It will be understood that the "by-pass" in this instance will likewise be helpful in permitting play so that the tip 37 may clear the hook-like portion 40 upon penetration.

Turning next to Figs. 12 and 13, it will be found that the protuberance 42 here is of such configuration that when viewed in section it may be termed "arrow-like". Thus the "shank" of the protuberance 42 tapers into an "arrow-like" head 42a having an upper portion 43 and a lower portion 44, each adapted to being folded back upon the tapered-down "shank" portion of the protuberance 42. Each of elements 43 and 44 terminates in a relatively sharp hook-like portion designated 45 and 46 respectively. Element 3 is provided with a channel, groove or slot 5 of complementary configuration and said element 3 has an upper hook-like portion 47 and a lower hook-like portion 48. As it will be readily understood during penetration, elements 43 and 44 fold back

upon the tapered-down "shank" portion, and when hook-like portions 43 and 46 have cleared hook-like portions 47 and 48, the elements 43 and 44 in their tendency to becoming non-compressed spring apart until they rest against the internal complementary walls of the channel, groove or slot 5. As will be apparent, hook-like portion 45 is contemplated to engage with hook-like portion 47 and hook-like portion 46 is contemplated to engage with hook-like portion 48. This embodiment, likewise, is provided with a space or "by-pass" 49 for uses and purposes similar to those hereinbefore previously described for other similar spaces or "by-passes".

Turning next to Figs. 14 and 15, it will be observed that I there show a construction wherein the embodiment of closure device shown in Figs. 4 to 7, inclusive, has been twice employed. Thus, it will be understood that under certain instances, the employment of a single protuberance may not be found sufficient to insure a desired locking action, and it may be found desirable to provide two protuberances vertically spaced apart and so arranged for mutual cooperation to insure a possibly more complete and positive locking effect. Thus, in Fig. 14, either protuberance might become unlocked with the other remaining locked and one protuberance will tend to act as the "buffer" for the other against unlocking action.

Turning next to Figs. 16 and 17, it will be observed that I have there shown a double protuberance arrangement, each of which protuberances is of the type of embodiment shown in Figs. 10 and 11 and so arranged as to accomplish the advantages of a double protuberance arrangement.

It will be noted that in each of the double protuberance arrangements thus shown that the protuberances are shown as preferably facing in opposed directions and I believe that this will be found most desirable for attaining a secure locking effect, although at this point, I desire to call attention to the fact that such an opposed relationship need not be necessarily followed unless desired. Thus, as will be appreciated the upper and lower protuberances may be arranged if desired to both face in the same direction, whether upwardly or downwardly.

In connection with Figs. 14 to 17 inclusive, I also desire to emphasize that there will probably be occasions where a single protuberance having a single hook-portion facing in a single direction will suffice, other occasions where a single protuberance having both upper and lower hook portions will be found necessary, and still other occasions where one or more protuberances having single or double hook portions are required.

Thus, as it will be readily understood the number of arrangements and combination of arrangements that are possible and may be found necessary or desirable is exceedingly great. Embodiments may be made of one, two, three or a greater number of protuberances, and the protuberances may be of the same or of different embodiments and any and all of the protuberances which I have disclosed may be employed. For example, protuberances of the type of the embodiments shown in Figs. 8 and 9 or 12 and 13 in double arrangement might be found desirable or combinations thereof might be employed either alone or with other embodiments. Likewise, it will be readily conceived that embodiments of configurations and shapes of protuberances other than those I have disclosed, but employing the principles of my invention may be arrived at and

found productive of my desired results. I therefore desire it to be clear, that the embodiments and combinations thereof which I have disclosed are intended as illustrative rather than as limiting. Further, it will be understood that many different possible materials which can produce the desired necessary deformability may be employed and that I accordingly do not intend that this invention be limited to the employment of any particular conventional material, such as rubber, compositions thereof, or the like.

It will be understood that throughout the various embodiments herein described, that apart from the differences in construction and configuration of parts noted in each instance that the other parts and the operation thereof is substantially the same as that of the embodiment of Figs. 4 to 7, inclusive, hereinbefore fully described and that, of course, all parts of all embodiments are similarly resilient and deformable.

It should be further noted that the essential portion of each closure device lies in each case in the given protuberance and channel, and that the employment thereof need not necessarily be in connection with any particular container or bag, but the same may be used in any instance where it may be desired to secure two elements of material, together over a given length. Thus, in Figs. 18 and 19, I show a length of material, such, for example, as a shower curtain, tent cover or tarpaulin 50 secured to another length of material such as another shower curtain, tent cover or tarpaulin 51 by a channel, groove or slot strip 52 and a protuberance strip 53, the particular embodiment of closure device shown employed being that of Figs. 4 to 7, inclusive.

Turning now for the moment, to Figs. 10 to 13, inclusive, it will be observed that in each of these figures I have shown the cross section of a spring-like element 54 which may be of rectangular sectional shape as shown in Figs. 10 and 11 or circular sectional shape as shown in Figs. 12 and 13. In this connection I desire to point out that at times it might be found to be desirable to reinforce the respective strip elements 3 and 4 with a round wire or band spring embedded therein over the length thereof. Thus, each of said strip-like elements may be provided with a slot 55 and the elements 54 forced into the body of the strip, down the slot 55 prior to a closing off of the open end of the slot by vulcanization alone or by the vulcanizing thereto of the sides 1. Likewise, embedding of a reinforcing element can be obtained in any other suitable manner such as the disposition of such element in the mold, prior to molding of the strip therein if the strip is produced by molding rather than extruding processes. If this is done the strip is thereupon molded with the reinforcing element contained therewithin. Such reinforcing element, it should be understood, may be of a cross sectional shape other than round or rectangular, if desired.

In the event that a reinforcing strip is employed, the effect thereof will be to lend a more or less strip rigidity to a given strip length, so that the strip may be closed and opened over a more substantial length thereof by a closing or opening operation at a given strip section. Likewise, an effect of such a strip may be to preserve an open shape such as that shown in Fig. 2, to a complete closure construction when in opened condition, to wit: that of having the strips stand apart from each other, each one being "beilled-out" from the other, instead of being so soft and

deformable as to assume an irregular shape in the user's hand. To this end, of course, it will be understood, that reinforcing elements 54 may be initially so shaped prior to its inclusion in the strips as to give the closure strips the desired "bellied-out" configuration or such other configuration and shape as the circumstances may make desirable. It will of course be still further understood, that as hereinbefore indicated, in connection with the embodiments shown in Figs. 4 to 7, inclusive, that initial slight tension upon the parts of my closure device embodiments, when in closed condition, will have the effect of initially bringing them into a more firm and close locked engagement, prior to sufficient tension being applied to overcome the same and effect positive disengagement. It will be understood therefore, that if a reinforcing element 54 is employed which tends to normally hold the strips in "bellied-out" relation in respect to each other because of the preformed shape of said element 54, that the effect thereof will be to continually supply such initial tension and the parts will be brought into much more firm and close locked condition. Accordingly, the employment of a reinforcing member may be found in some instances desirable for such purposes.

Besides the foregoing it should also be noted and understood that the "bellied-out" effect just discussed, if found desirable or necessary, may also be obtained without the employment of reinforcing or shaping members, and, of course, without the employment of slots for the introduction of such members into the strip bodies. Thus, by shaping the closure strips during the molding and/or other shaping process in an appropriately preformed mold or by any other appropriate means adapted to give the strip the desired shape and form, the desired result may be attained and a flexible closure appropriately shaped in "belly" form over its length may be secured without the employment of extrinsic means for stiffening and shaping the closure structure into the specific desired shape. In this connection, it should be understood that if for example the strip is made by molding processes and if a preformed "bellied" mold is employed for molding that the strips may be initially molded to a "belly" shape, or in fact to any other shape or form that may be desired and for which appropriate mold shape may be provided.

Since, as hereinbefore explained, the essential portion of each closure device lies in each case in the given protuberance and channel, it will likewise be understood that the elements for which it is desired to effect engagement may be optionally arranged in any position with respect to a given protuberance and channel as will result in the desired closure being effected. Thus, by way of example side elements 1 might be secured, if found necessary or desirable to any part of a given strip, such as in positions parallel to or at an angle to top walls 13 and 14, respectively, or in any other suitable place or position. At this point it will be realized that even if it be desired to have a number of sheets or other elements of material extending radially from a given axis; that is, to say, with each sheet or element emanating radially from said axis, that a strip of substantially cylindrical form might even be employed as a center "pole" or axis, which strip selectively may be provided either with a plurality of circumferentially spaced apart peripheral protuberances or else channels, grooves or slots, while the correspond-

ing sheets or other elements of material to be radially extended may be provided with either cooperating complementary channels, grooves or slots or else protuberances, respectively, as the case may be.

At this point I desire to emphasize the fact that materials and plastics of generally resilient nature of all types may be employed in the formation of the respective strips and that such strips could even possibly be built up into proper configurations out of proper laminations of material. It should accordingly be understood that this invention contemplates the employment of any and all processes of strip formation and manufacture as might be productive of the desired strips and accordingly that the manufacture of rubber or rubber composition strips by molding, extruding and vulcanization processes, as herein described should be considered as illustrative of possible desirable ways of manufacture.

Inasmuch as many changes may be made in the closure device constructions, as I have hereinabove from time to time pointed out and inasmuch as other changes might likewise be made therein without departing from the spirit and the scope of this invention and inasmuch as many apparently widely and different embodiments within the scope of the invention may be made and still further inasmuch as my invention may reasonably be used in many fashions, materials and for many purposes, it is intended that all matters hereinabove contained or shown in the accompanying drawings shall be interpreted as illustrative and not in any way as limiting the invention itself.

The following claims are intended to cover all generic and specific features of the invention described.

What I seek to secure by and claim for United States Letters Patent is:

1. In a closure device of the type described, a resilient strip having a channel therein and a restricted opening to such channel in an outer surface of such strip, which opening is of a width narrower than the greatest width of the channel, said opening being defined by normally spaced apart lip-like portions adjacent the mentioned outer surface of such strip, one of such lip-like portions having a part thereof inwardly directed into said channel and forming a hook, a second strip, a resilient protuberance carried by said second strip, said protuberance having a shank portion and a hook-like portion joined to such shank portion, said shank portion extending outwardly from said second strip and being of a thickness substantially equal to the width of the aforementioned restricted opening in the first mentioned strip and said hook-like portion, after its joinder to said shank portion, being reversely directed and standing normally spaced apart from said shank portion and being of a thickness less than that of the shank portion; said strips being adapted to cooperative interengagement.

2. In a closure device of the type described, a strip having a channel therein and a restricted opening to such channel in an outer surface of such strip, which opening is of a width narrower than the greatest width of the channel, said opening being defined by spaced apart lip-like portions adjacent the mentioned outer surface of such strip, one of such lip-like portions having a part thereof inwardly directed into said channel and forming a hook, a second strip, a resilient protuberance carried by said second strip, said protuberance having a shank portion and a hook-

like portion joined to such shank portion, said shank portion extending outwardly from said second strip and being of a thickness substantially equal to the width of the aforementioned restricted opening in the first mentioned strip and said hook-like portion after its joinder to said shank portion, being reversely directed and standing normally spaced apart from said shank portion and being of a thickness less than that of the shank portion; said strips being adapted to cooperative interengagement.

3. In a closure device of the type described, a resilient strip having a channel therein and a restricted opening to such channel in an outer surface of such strip, which opening is of a width narrower than the greatest width of the channel, said opening being defined by normally spaced apart lip-like portions adjacent the mentioned outer surface of such strip, one of such lip-like portions having a part thereof inwardly directed into said channel and forming a hook, a second strip, a protuberance carried by said second strip, said protuberance having a shank portion and a hook-like portion joined to such shank portion, said shank portion extending outwardly from said second strip and being of a thickness substantially equal to the width of the aforementioned restricted opening in the first mentioned strip and said hook-like portion after its joined to said shank portion, being reversely directed and standing spaced apart from said shank portion, and being of a thickness less than that of the shank portion; said strips being adapted to cooperative interengagement.

4. In a closure device of the type described, a resilient strip having a channel therein and a restricted opening to such channel in an outer surface of such strip, which opening is of a width narrower than the greatest width of the channel, such opening being defined by normally spaced apart upper and lower lip-like portions adjacent the mentioned outer surface of such strip, the upper of such lip-like portions having a part thereof inwardly directed into said channel and forming an upwardly turned hook, and the lower of such lip-like portions having a part thereof inwardly directed into said channel and forming a downwardly turned hook, a second strip, a resilient protuberance carried by said second strip, said protuberance having a shank portion formed with upper and lower surfaces, an upper hook-like portion joined to such shank portion and a lower hook-like portion joined to such shank portion, said shank portion extending outwardly from said second strip and being of a thickness substantially equal to the width of the aforementioned restricted opening in the first mentioned strip, the upper of said hook-like portions, after its joinder to said shank portion, being reversely directed and standing normally spaced apart from the upper surface of said shank portion, and the lower of said hook-like portions after its joinder to said shank portion, being reversely directed and standing normally spaced apart from the lower surface of said shank portion, with each of said hook-like portions being of a thickness less than that of the shank portion; said strips being adapted to cooperative interengagement.

5. The structure recited in claim 1 characterized in that the outside surface of the hook-like portion of the protuberance is substantially complementary in shape and form to part of the inside surface of the channel in the first mentioned strip; and further in that the inside surface of

the channel is so configured at a part thereof, as to provide a clearance recess therein.

6. The structure recited in claim 4 characterized in that a substantial portion of the surface of the channel in the first mentioned strip consists in an upper plane surface and a lower plane surface, which plane surfaces converge in a direction inwardly from the outer surface of such strip; and further characterized in that, a substantial portion of each of the hook-like portions of the protuberance on the second mentioned strip, is defined by two plane surfaces which converge towards each other after the joinder of such hook-like portion to the shank portion.

7. The structure recited in claim 1 characterized in that a substantial portion of the surface of the channel in the first mentioned strip consists in an upper substantially horizontal plane surface and a lower inclined plane surface, which surfaces converge towards each other in a direction inwardly from the outer surface of such strip; and, further characterized in that the shank portion of the protuberance on the second mentioned strip has an upper substantially horizontal plane surface, and, in that, a substantial portion of the hook-like portion of such protuberance is defined by two plane surfaces which converge towards each other after the joinder of such hook-like portion to the shank portion.

8. The structure recited in claim 1 characterized in that the surface of the channel in section, is generally of curvilinear outline like a capital letter G; and, further characterized in that the protuberance in section, is generally of an outline like a capital letter J.

9. In a closure device of the type described, a resilient strip having an upper channel and a lower channel therein and an upper restricted opening to the upper channel and a lower restricted opening to the lower channel in an outer surface of such strip, each of said openings being of a width narrower than the greatest width of the channel to which it opens, and each of said openings being defined by normally spaced apart lip-like portions adjacent the outer surface of such strip, the upper of the lip-like portions defining the upper restricted opening having a part thereof inwardly directed into the upper channel towards the upper part of the surface thereof and forming a hook, and the lower of the lip-like portions defining the lower restricted opening having a part thereof inwardly directed into the lower channel towards the lower part of the surface thereof and forming a hook, a second strip, an upper resilient protuberance and a lower resilient protuberance carried by said second strip, each of said protuberances having a shank portion extending outwardly from said second strip and being of a thickness substantially equal to the width of the corresponding restricted opening in the first mentioned strip, an upper hook-like portion joined to the shank portion of the upper protuberance and after its joinder to said shank portion, being reversely directed and standing normally spaced apart from the upper surface thereof and being of a thickness less than that of such shank portion, and a lower hook-like portion joined to the shank portion of the lower protuberance and after its joinder to said shank portion, being reversely directed and standing normally spaced apart from the lower surface thereof and being of a thickness less than that of such shank portion; said strips being adapted to cooperative interengagement.

ment with the upper protuberance cooperating with the upper channel and the lower protuberance cooperating with the lower channel.

5 10. The structure recited in claim 1 characterized in that each of the mentioned strips is bowed longitudinally of its length and the strips are so disposed with respect to each other, that their respective bowed convexities face in opposite directions, whereby such strips are always urged
10 away from each other.

11. The structure recited in claim 1 characterized in that a preformed bowed flexible reinforcing element is embodied in each of the mentioned strips longitudinally of its length to bow the same into convex form with the elements being so bowed and the strips so disposed, with respect to each other that their respective bowed convexities face in opposite directions, whereby such strips are always urged away from each other.

DAVID FREEDMAN. 10

CERTIFICATE OF CORRECTION.

Patent No. 2,144,755.

January 24, 1939.

DAVID FREEDMAN.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 8, first column, line 30, for the word "joined" read joinder; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 4th day of April, A. D. 1939.

Henry Van Arsdale

(Seal)

Acting Commissioner of Patents.

24 - 201
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