

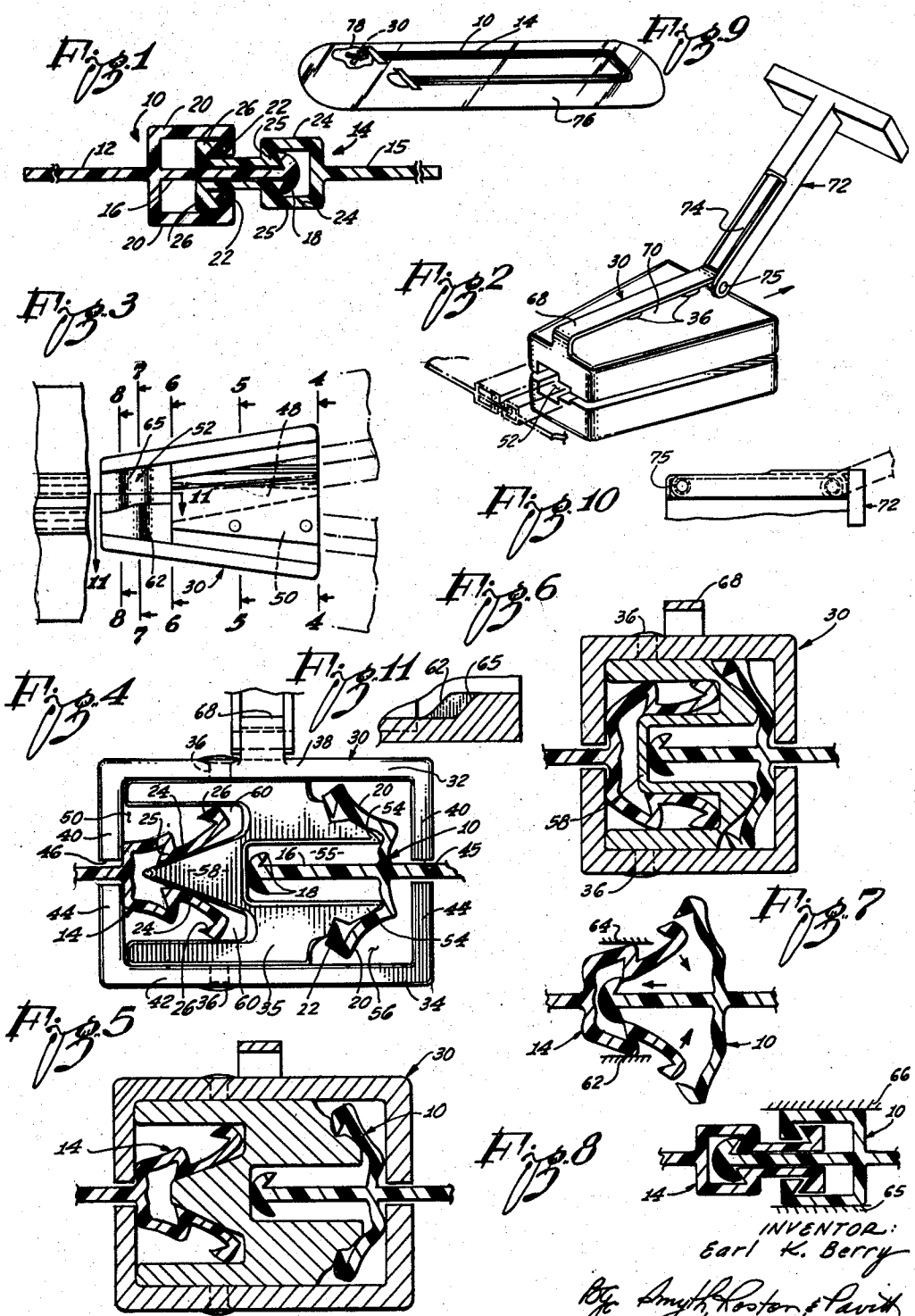
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SLIDE FASTENER

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SLIDE FASTENER

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This invention relates to a slide fastener assembly in which a slide member is slideable in opposite directions along two complementary plastic fastener strips to close the two fastener strips into mutual engagement with each other or to disengage and separate the two fastening strips.

As will be disclosed in detail, the invention relates to a particular cooperating pair of plastic fastener strips of the prior art, each of which fastener strips is formed with two pairs of longitudinal hooking flanges for engagement with two corresponding pairs of hooking flanges of the other fastening strip. Since the cooperating pairs of hooking flanges engage each other in a fluid-tight manner, this slide fastener assembly has been used successfully to encase devices in plastic bags with confined inert gaseous fluid for storage and transportation of the devices.

Slide members have been produced to close such a pair of plastic fastener strips, but unfortunately no slide member has heretofore been developed that may be shifted in the opposite direction successfully for disengaging the pair of plastic fastener strips. Consequently it has heretofore been necessary to cut the bags open for release of the enveloped devices, the bags then being unsuited for reuse.

The present invention provides a slide member which is not only capable of closing the two fastener strips by sliding movement in one longitudinal direction but is also capable with equal facility of opening and separating the two fastener strips by sliding movement in the opposite longitudinal direction. Thus the invention makes it possible to reuse plastic bags and other similar storage containers which have heretofore been discarded after a single use.

To accomplish its purpose, the slide member has two longitudinal passages open on its opposite sides, which two passages converge to form a single passage in one end of the slide member. When the slide member is moved in its closing direction in sliding engagement with the two fastener strips, the two passages first cause pairs of the hooking flanges of the two fastening strips to spread apart as required to prepare for mutual engagement of the two strips. The two fastening strips are further caused to converge and overlap in the single end passage of the slide member with the various cooperating pairs of hooking flanges positioned for engagement with each other. The two overlapping fastening strips then encounter a first portion of the end passage which is narrowed in depth dimension to progressively constrict one longitudinal portion of the two overlapping strips to force a pair of hooking flanges of each of the strips into mutual engagement with a cooperating pair of hooking flanges of the other fastening strip. Then after this initial mutual engagement of cooperating hooking flanges of the two fastening strips is accomplished, the two fastening strips encounter a second portion of the end passage which is narrowed in depth to complete the coupling of the two fastening strips by forcing a second pair of hooking flanges of each strip into mutual engagement with a cooperating pair of hooking flanges of the other fastening strip.

On the opposite opening movement of the slide member the same operations occur in reverse sequence. The spreading effect of the slide member becomes apparent

as the two joined fastener strips progress through the end passage to the converging ends of the two longitudinal passages. First the flared expansion of the end passage in the above-mentioned second portion thereof permits a pair of hooking flanges on one fastening strip to disengage from the cooperating pair of hooking flanges on the other fastening strip. Then flared expansion of the end passage in the above-mentioned first portion thereof permits the rest of the hooking flanges to disengage for complete separation of the two fastening strips.

The features and advantages of the invention may be understood from the following detailed description and the accompanying drawing.

In the drawing, which is to be regarded as merely illustrative:

FIG. 1 is a transverse section on an enlarged scale of the two fastening strips in their closed or mutually engaging positions;

FIG. 2 is a perspective view of the slide member for engaging and disengaging the two fastening strips;

FIG. 3 is a plan view of the slide member with a top section removed to reveal concealed structure;

FIG. 4 is an end elevation of the slide member as seen along the line 4—4 of FIG. 3 with the two fastening strips engaged by the slide member, the two strips being shown in cross section;

FIG. 5 is a transverse section taken along the line 5—5 of FIG. 3 showing how the hooking flanges of the two strips are progressively spread apart;

FIG. 6 is a similar sectional view along the line 6—6 of FIG. 3 showing the maximum spread of the hooking flanges as they emerge from the two longitudinal passages into the single end passage;

FIG. 7 is a transverse section taken along the line 7—7 of FIG. 3 showing how the narrowing in depth dimension of the first portion of the end passage contracts the one pair of hooking flanges of one fastening strip into engagement with a cooperating pair of hooking flanges of other fastening strip;

FIG. 8 is a transverse section along the line 8—8 of FIG. 3 showing how the second portion of the end passage narrows in depth to contract another pair of hooking flanges of the one fastening strip into engagement with a cooperating pair of hooking flanges of the other fastening strip to complete the coupling of the two strips;

FIG. 9 is a perspective view of a plastic bag incorporating the invention and employed to confine a device for storage;

FIG. 10 is a fragmentary side elevational view showing how a handle for the slide member may be folded compactly against the slide member; and

FIG. 11 is a fragmentary section along the line 11—11 of FIG. 3.

FIG. 1 shows in cross section the two fastening strips comprising a first fastening strip generally designated 10 which is shown integral with a margin of a sheet 12 and a second fastening strip, generally designated 14, which is shown integral with a second sheet 15. The sheets 12 and 15 may be, for example, the two portions of a plastic bag that lie along the two margins of a longitudinal slit of the bag which is opened and closed by the two fastening strips.

The first fastening strip 10 has a central web 16, the outer end of which is formed with a first pair of outwardly turned hooking flanges 18 and the first fastening strip also has a pair of flanking webs 20 on the opposite sides of the central web which are shorter than the central web and which are formed with a second pair of inwardly turned hooking flanges 22, respectively. The

second fastening strip 14 has a pair of laterally spaced longitudinal webs 24 which are formed with a third pair of inwardly turned hooking flanges 25 for engagement with the first pair of hooking flanges 18 and are further formed with a fourth pair of outwardly turned hooking flanges 26 for engagement with the second pair of hooking flanges 22.

A slide member, generally designated 30, for cooperation with the two fastening strips, may be made in three sections comprising a first upper casing section 32, a second lower casing section 34 and an intermediate section or structure in the form of a casting 35. In the construction shown, the three sections of the slide member are held together by means of rivet members 36 that are integral with the casting 35, the rivet members extending through corresponding bores in the two casing sections and being peened for permanent engagement with the casing sections. The upper casing section 32 has a top wall 38 and two side walls 40 and, in like manner, the lower casing section 34 has a bottom wall 42 and two side walls 44.

The casting 35 holds the two casing sections 32 and 34 apart whereby the side walls 40 and 44 of the casing sections form a longitudinal slot 45 along one side of the slide member and a second similar longitudinal slot 46 along the other side of the slide member. The interior of the slide member forms a first longitudinal passage 48 to receive the first fastening strip 10 and a second longitudinal passage 50 to receive the second fastening strip 14 and these two longitudinal passages converge into a single end passage 52. The first longitudinal passage 48 and the end passage 52 are open to the exterior on one longitudinal side of the slide member through the slot 45 and the second longitudinal passage 50 together with the end passage are open to the exterior on one longitudinal side of the slide member through the second longitudinal slot 46.

The first longitudinal passage 48 spreads the first fastening strip 10 and for this purpose is formed with two laterally spaced longitudinal wedge elements 54 to spread apart the flanking webs 20 and the inwardly turned second pair of hooking flanges 22 thereof, the two wedge elements increasing in thickness progressively towards the end passage 52. The two longitudinal wedge elements 54 form a central longitudinal guide groove 55 to receive the central web 16 of the first fastening strip 10 and the first pair of hooking flanges 18 thereon. It is also apparent that the two longitudinal wedge elements 54 together with the corresponding casing sections 32 and 34 form a laterally spaced pair of longitudinal guide grooves 56 for the two flanking webs 20 and the second pair of hooking flanges 22 thereon.

The second longitudinal passage 50 is provided with a central longitudinal wedge element 58 which increases progressively in thickness towards the end passage 52. The wedge element 58 serves to spread apart the two longitudinal webs 24 of the second fastening strip 14 together with the third pair of hooking flanges 25 and the fourth pair of hooking flanges 26. It can be seen that the longitudinal wedge element 58 forms two longitudinal guide grooves 60 in the longitudinal passage 50 for receiving the pair of longitudinal webs 24 respectively.

FIG. 5 shows how the two plastic fastening strips 10 and 14 enter the two longitudinal passages 48 and 50 respectively with the two fastening strips separated and spaced from each other. FIG. 5 also shows how the two wedge elements 54 in the first longitudinal passage 48 initially spread apart the two flanking webs 20 of the first fastening strip 10 and shows how the longitudinal wedge element 48 in the second longitudinal passage 50 initially spreads apart the two longitudinal webs 24 of the second fastening strip 14.

FIG. 5 shows how the two fastening strips as they progress along the two converging longitudinal passages

48 and 50 are shifted progressively laterally towards each other and at the same time the two flanking webs 20 of the first fastening strip and the pair of longitudinal webs 24 of the second fastening strip are spread progressively apart.

FIG. 6 shows how at the point where the two longitudinal passages 48 and 50 converge to the beginning of the single end passage 52, the two flanking webs 20 of the first fastening strip 10 are spread apart to the maximum and the two longitudinal webs 24 of the second fastening strip 14 are likewise spread apart to the maximum. FIG. 6 further shows how the convergence of the two longitudinal passages 48 and 50 brings the two fastening strips 10 and 14 into overlapping relation, the two longitudinal webs 24 of the second fastening strip 14 being in positions that straddle the central web 16 of the first fastening strip 10. It is apparent in FIG. 6 that the longitudinal guide groove 55 of the first longitudinal passage 48 extends into the material of the longitudinal wedge element 58 of the second longitudinal passage to make this end of the wedge element of hollow thin-walled construction.

As the two fastening strips 10 and 14 enter the end passage 52 they are angled towards each other and continue to converge into greater overlap. Consequently the first pair of hooking flanges 18 of the first fastening strip 10 shifts into position for engagement with the third pair of hooking flanges 25 of the second fastening strip 14. The end passage 52 is shaped to close the third pair of hooking flanges of the second fastening strip 14 into engagement with the first pair of hooking flanges 18 of the first fastening strip 10 in the manner shown in FIG. 7 and then, as the two strips continue to travel away from the converging longitudinal passages 48 and 50, the end passage closes the second pair of hooking flanges 22 of the first fastening strip 10 into engagement with the fourth pair of hooking flanges 26 of the second fastening strip 14 in the manner shown in FIG. 8.

To carry out these functions the end passage 52 has a first portion that narrows in depth dimension for the closing action shown in FIG. 7 and a second portion that narrows in depth for the closing action shown in FIG. 8. In the first portion of the end passage 52 immediately adjacent the convergent ends of the two longitudinal passages 48 and 50, the bottom wall 42 of the lower casing section 34 is formed with an inclined cam surface 62 (FIGS. 3, 7 and 11) and the top wall 38 of the upper casing section 32 is formed with a similar inclined cam surface 64, the two cam surfaces cooperating to narrow the end passage in depth dimension. In like manner the second portion of the end passage 52 that is further removed from the two convergent passages 48 and 50 is narrowed in depth dimension by an inclined cam surface 65 of the bottom wall 42 and a cooperating inclined cam surface 66 of the top wall 38.

It is apparent from the foregoing that when the two fastening strips are threaded into the outer divergent ends of the two longitudinal passages 48 and 50 and the slide member is slid longitudinally in the same relative direction, the two fastening strips are effectively progressively coupled together. The spreading action of the described longitudinal wedge elements in the two diverging passages 48 and 50 is effective in the end passage 52 to make the mutual engagement of the pairs of hooking flanges possible and this spreading action is apparent for a short distance behind the traveling slide member, but the joint immediately thereafter contracts to its normal compact thickness.

When the slide member is moved in the opposite longitudinal direction for disengaging and separating the two fastening strips, the same spreading effect of the longitudinal wedge elements is effective in the end passage 62 for the reverse order of operations. First the flanking webs 20 of the first fastening strip 10 spread apart to release the second pair of hooking flanges 22 from the fourth

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pair of hooking flanges 26 of the second fastening strip 14 and subsequently the third pair of hooking flanges 25 of the second fastening strip spread apart to release the first pair of hooking flanges 18 of the first fastening strip.

The slide member 30 may be provided with any suitable handle to facilitate its manipulation. In the construction shown the upper casing section 32 is formed with an outer longitudinal bridge 68 which cooperates with the top wall 38 to form a longitudinal slot 70. A T-shaped handle 72 has a shank with a longitudinal slot 74 to clear the bridge 68, the shank being provided with a cross pin 75 that slides in the longitudinal slot 74. Thus the handle 72 may be shifted to either end of the slot 74 to serve as means to pull the slide member longitudinally. When the handle 72 is out of service it may be folded compactly against the slide member in the manner shown in FIG. 10.

FIG. 9 shows how the two fastening strips 10 and 14 may be mounted along the slit opening of a plastic bag 76 to house a device together with an inert gaseous fluid. In a well known manner the two fastening strips extend free of the bag beyond one end of the slit to permit sealing the bag in a fluid-tight manner. For this purpose the free ends of the two fastening strips together with the slide member 30 thereon are encased in a small sack 78 in a fluid-tight manner.

My description in specific detail of the selected embodiment of the invention will suggest various changes, substitutions and other departures from my disclosure within the spirit and scope of the appended claims.

I claim:

1. In a slide fastener assembly, a slide member slideable in opposite directions for closing and opening a pair of mutually engageable plastic strips comprising a first strip and a second strip wherein said first strip has a central longitudinal web formed with a first pair of opposite outwardly turned longitudinal hooking flanges along its outer edge and has two shorter flanking longitudinal webs formed with a second pair of longitudinal hooking flanges thereon, respectively, turned inwards towards the central web and wherein said second strip has a pair of laterally spaced longitudinal webs shaped and dimensioned to straddle said central web of the first strip and to extend between the central web and said two flanking webs, respectively, of the first strip, said two laterally spaced longitudinal webs of the second strip being formed with a third pair of inwardly turned longitudinal hooking flanges, respectively, to engage said first pair of hooking flanges of the first strip, said two laterally spaced longitudinal webs being further formed with a fourth pair of outwardly turned longitudinal hooking flanges, respectively, to engage said second pair of hooking flanges of the first strip, said slide member having in combination:

- a first longitudinal passage open on one of the longitudinal sides of the slide member to slidably receive said first strip; and
- a second longitudinal passage open on the other longitudinal side of the slide member to slidably receive the second strip,

said two passages converging from one end of the slide member to form a single end passage at the other end of the slide member,

said first passage having a pair of longitudinal wedge elements increasing in thickness towards said end passage to spread said second pair of hooking flanges of the first strip,

said wedge elements being spaced apart laterally to form a longitudinal groove to receive said central web of the first strip and the first pair of hooking flanges thereon,

said second passage having a single longitudinal wedge element increasing in thickness towards said end passage to spread said pair of longitudinal webs of the second strip,

said longitudinal groove of the first passage converging into said single wedge element of the second passage

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to direct said first pair of hooking flanges of the first strip into position for engagement with said third pair of hooking flanges of the second strip,

said end passage narrowing in depth dimension in a first portion thereof adjacent the converging ends of said first and second passages in the region of the path of longitudinal sliding movement of the third pair of hooking flanges of the second strip to urge the third pair of hooking flanges into engagement with the first pair of hooking flanges of the first strip in response to the closing movement of the slide member,

said end passage narrowing in depth dimension in a second portion further removed from the converging ends of the first and second passages in the region of the path of longitudinal sliding movement of said second pair of hooking flanges of the first strip to urge the second pair of hooking flanges into engagement with the fourth pair of hooking flanges of the second strip in response to the closing movement of the slide member.

2. A slide member as set forth in claim 1 having two casing sections and an intermediate structure interconnecting the two casing sections and forming therewith said two longitudinal passages, said intermediate structure holding the two casing sections spaced apart to form longitudinal slots on the opposite sides of the slide member to receive said two strips respectively, said intermediate structure being formed with said wedge elements of the two longitudinal passages.

3. A slide member as set forth in claim 2 in which said intermediate structure is a metal casting.

4. A slide member for cooperation with a pair of mutually engageable plastic strips comprising a first strip and a second strip wherein said first strip has a central longitudinal web formed with a first pair of opposite outwardly turned longitudinal hooking flanges along its outer edge and has two shorter flanking longitudinal webs formed with a second pair of longitudinal hooking flanges thereon, respectively, turned inwards towards the central web and wherein said second strip has a pair of laterally spaced longitudinal webs shaped and dimensioned to straddle said central web of the first strip and to extend between the central web and said two flanking webs, respectively, of the first strip, said two laterally spaced longitudinal webs of the second strip being formed with a third pair of inwardly turned longitudinal hooking flanges, respectively, to engage said first pair of hooking flanges of the first strip, said two laterally spaced longitudinal webs being further formed with a fourth pair of outwardly turned longitudinal hooking flanges, respectively, to engage said second pair of hooking flanges of the first strip, said slide member having a first longitudinal passage open on one of the longitudinal sides of the slide member to slidably receive said first strip and a second longitudinal passage open on the other longitudinal side of the slide member to receive said second strip, said two passages converging from one end of the slide member to form a single end passage at the other end of the slide member, said first passage having a central longitudinal guide groove to receive said central web of the first fastening strip and the first pair of hooking flanges thereon and having two longitudinal guide slots diverging towards said end passage to receive and spread apart said flanking webs, respectively, of the first fastening strip, said second passage having two longitudinal guide grooves diverging towards said end passage to receive and spread apart said pair of longitudinal webs respectively of the second strip, said end passage narrowing in depth dimension in a first portion thereof adjacent the converging ends of said first and second passages in the region of the path of longitudinal sliding movement of the third pair of hooking flanges of the second strip to urge the third pair of hooking flanges into engagement with the first pair of hooking flanges of the first

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strip in response to the closing movement of the slide member,

said end passage narrowing in depth dimension in a second portion further removed from the converging ends of the first and second passages in the region of the path of longitudinal sliding movement of said second pair of hooking flanges of the first strip to urge the second pair of hooking flanges into engagement with the fourth pair of hooking flanges of the second strip in response to the closing movement of the slide member.

5. A slide member as set forth in claim 4 in which said two longitudinal guide grooves of the second passage overlap and straddle the central longitudinal guide groove of the first passage at the converging ends of the two passages with thin walls separating the three grooves adjacent said first portion of the end passage.

6. A slide member as set forth in claim 4 having two casing sections and an intermediate structure interconnect-

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ing the two casing sections and forming therewith said two passages, said intermediate structure holding the two casing sections spaced apart to form longitudinal slots in the opposite sides of the slide member to receive said two strips respectively, said intermediate structure being formed with said guide grooves of the two passages, said two casing sections being formed, respectively, with cam surfaces that narrow said first portion of the end passage in depth dimension and being further formed with adjacent cam surfaces, respectively, that narrow said second portion of the end passage in depth dimension.

References Cited in the file of this patent

UNITED STATES PATENTS

2,606,352 Wende ----- Aug. 12, 1952
2,823,720 Svec ----- Feb. 18, 1958

FOREIGN PATENTS

375,235 Italy ----- Sept. 28, 1939