Sept. 26, 1967 R. GOULD 3,343,233

SLIDE FASTENER

Filed March 11, 1966

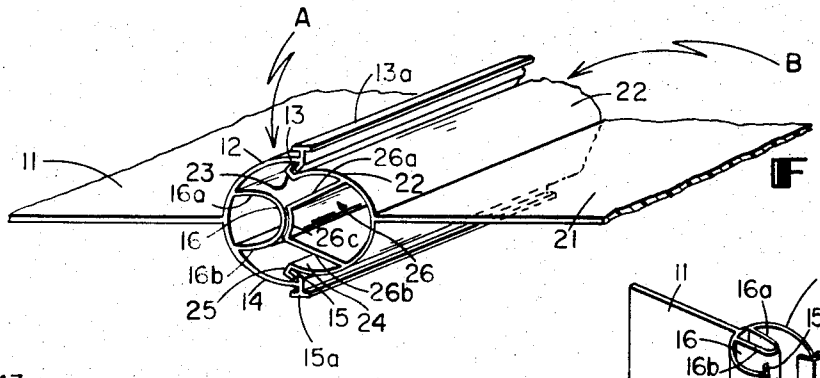


FIG. 1

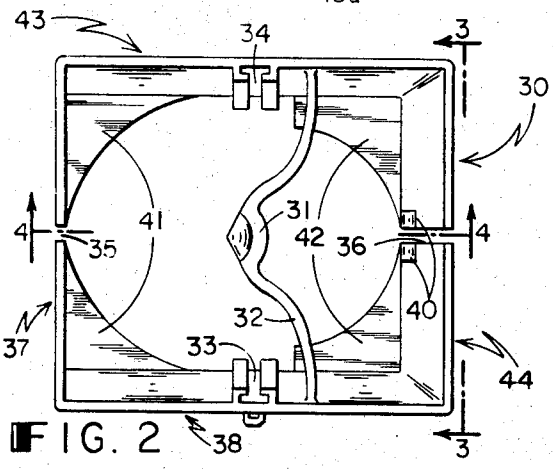


FIG. 2

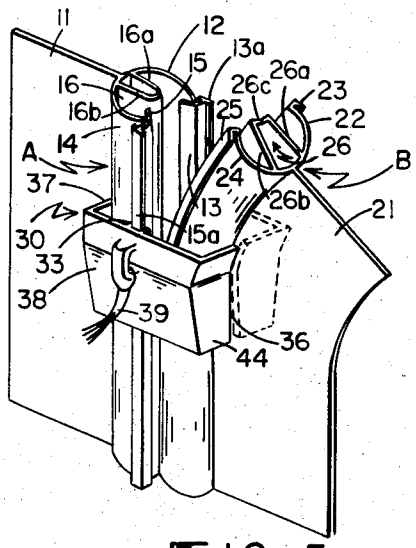


FIG. 5

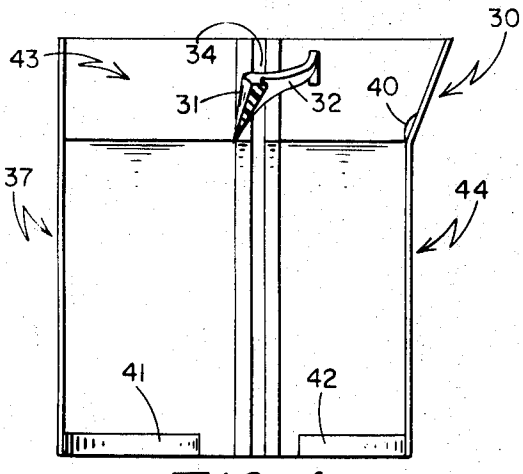


FIG. 4

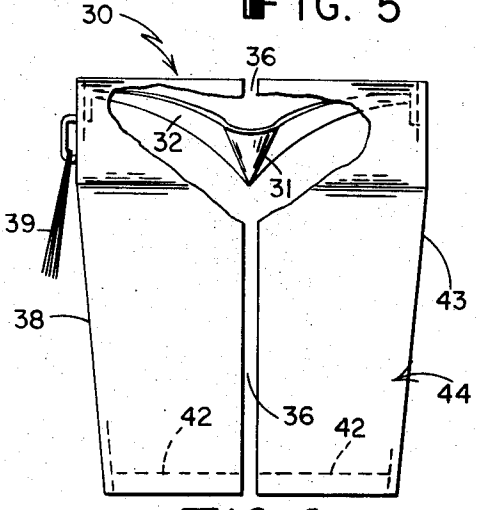


FIG. 3

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SLIDE FASTENER

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ABSTRACT OF THE DISCLOSURE

A toothless slide fastener is described. It is made of flexible resilient material and has a generally tubular, extrudable construction. Each of the interacting strips is transversely curved so that the concave sides face each other. On the edges there are interlocking flanges. In the interior are registering hollow protuberances formed from reversely curved strip material. The slide has a bridge which moves between the protuberances.

This invention relates to a slide fastener and in particular to a toothless slide fastener made of flexible resilient material and having a generally tubular, extrudable construction.

Conventional toothed slide fastener arrangements used in clothing and the like suffer from a number of disadvantages. They are normally subject to separations in isolated sections, lack water resistance, are expensive to manufacture and lack sufficient rigidity for many purposes. For these reasons, there have been several recent proposals to make slide fasteners in a toothless form using elongated flexible plastic strips having longitudinally cooperating tongues and grooves.

Thus Markoff-Moghadam, U.S. Patent 2,997,765 (Aug. 29, 1961), describes molded elastic continuous strips secured to the edges of the material to be joined and having longitudinal complimentary shaped surfaces adapted to engage tightly each other. The patentee pointed out the joint problems of obtaining sufficient transverse compression to interlock and yet permit the slider to move freely in its operation. The slider in this case was provided with spring backed plates in order to urge the tongue and groove into tight engagement. Balls in races were used to reduce the friction of the slider.

Ausnit, U.S. Patent 3,203,062 (Aug. 31, 1965) described a toothless slide fastener arrangement wherein a pair of plastic flexible closure strips with tightly interlockable elements were used. A hinge was provided between the marginal portion and the web portion. The slider had a separating finger with a concave surface described as being used to slidingly receive the rib and withdraw it from the groove. The concave surface faced the rib while the back side of the concave portion projected into the groove.

Ausnit, U.S. Patent 3,213,505 (Oct. 26, 1965) described a slider for use with interlocking tongue and groove flexible closure strips in which the slider was arranged to bend one strip laterally outward while permitting the other strip to extend in a substantially linear direction. The slider was characterized as having a bridge separator portion but was otherwise similar to the slider of conventional toothed slide fastener arrangements. This patent also provided for a slider having a spreader finger portion supported by a bridge.

The present invention differs from previously described toothless slide fasteners in several significant characteristics. The present invention comprises generally two elongated strips of generally uniform cross section and transverse curvature. The strips are positioned so that the convex surfaces face outwardly and the concave surfaces face one another. Each longitudinal edge of each strip is provided with longitudinally extending flange means adapted to engage corresponding flange means on the other strip.

Extending inwardly from the central interior portion of each strip is a longitudinally extending protuberance adapted to abut the opposite protuberance when the edge flanges are interlocked. One of the strips is provided with additional longitudinally extending flange means for providing a permanent track for the slide member. The slide member has longitudinal slots in each side through which the lateral or tape portions of the closure strip extend. These lateral portions may be formed sufficiently wide so as to provide means for attachment to the garment or other article, or they may be joined to other strips which are in turn attached to the garment. The slide member has a top transverse bridge preferably provided with an eccentric portion adapted for movement between the two protuberances so as to separate the strips. In assembled form, the closure is of generally tubular appearance. The slide member, apart from the eccentric portion of its bridge member, has a general resemblance to the conventional slide for tooth slide fasteners.

The present invention is characterized in that it is more flexible than previous toothless fasteners, can be readily extruded from inexpensive resilient materials, such as polypropylene, and has a positive opening and closing action. Further objects and advantages of this invention will be apparent from the specification and claims which follow and from the appended drawings wherein:

FIG. 1 is a fragmentary perspective view in section of a pair of closure strips of this invention in closed position.

FIG. 2 is a plan view of the slide of this invention.

FIG. 3 is an end view of the slide member, partially broken away.

FIG. 4 is a section along line 4—4 of FIG. 2.

FIG. 5 is a perspective view showing the slide in position on the strips with partial closure of the strips.

Referring now to the drawings, integral, concave-convex longitudinal closure strip A has a laterally extending attachment portion **11** extending outwardly from the median of its exterior surface. On the back edge of the rearward portion **12** is an outwardly extending T-shaped portrusion **13***a* and an inwardly directed rib **13**. On the front edge of the forward portion **14** of strip A, is an outwardly extending T-shaped protrusion **15***a* and an inwardly extending rib **15**. Extending inwardly from the central inner surface of strip A is a longitudinally extending strip portion **16** bent back so as to form front and rear portions **16***a* and **16***b* joining strip A. This inner longitudinal strip portion **16** forms the convex longitudinal inner protuberance. The second longitudinal closure strip of the closure is generally designated as B and comprises a rear portion **22**, a front portion **24** and a lateral portion **21**. On the edge of the rear portion **22** is a double bent flange **23** which forms a channel adapted to engage rib **13**. On the edge of the front portion **24** is a similar double bent flange **25** which provides a channel cooperating with rib **15**. Extending inwardly from the inner surface of longitudinal closure strip B is a longitudinally extending curved strip portion **26** having front and rear portions **26***b* and **26***a* with its forward portion **26***c* shaped concavely to register with the convexity of protuberance **16**, but so arranged and constructed so that there is a slight separation between **16** and **26** when the closure strips A and B are engaged.

The slide member **30** has side slots **35** and **36** to accommodate the lateral portions **11** and **21** of the closure strips A and B. It also has front and rear T-shaped channels **33** and **34** which register with the T-shaped flanges **15***a* and **13***a* of closure strip A. The slide member generally tapers from the top to the bottom where bottom flanges **41** and **42** form guideway openings for the strips A and B. There is a bridge portion **32** provided with an eccentric or cam section **31**. The cam section is shaped so as to be easily inserted into the separation between the abutting surfaces of protuberance **16** and **26**. The left side of the slide is

generally designated as **37**, the right side is **44**, the front is **38**, the rear is **43** and the pull tab is **39**. A split lug **40** is provided to prevent binding of lateral portion **21**.

The strips that are illustrated show the interior abutting protuberances as being formed from material of approximately the same thickness as the thickness of the main body of the strip. However, this invention is not so limited. The protuberances may also be solid projections. Further, although it is preferred that the extremities of the protuberances be of registering shape, such is not essential to the function of this invention. To have what in effect is a reversed strip acting as the protuberance, as illustrated in the drawings, does, however, have the advantage of providing sufficient rigidity, although permitting appropriate flexing and resilience.

The construction of the slide member illustrated in the drawings shows a bridge with an eccentric portion for forcing the protuberances apart. It is obvious that the bridge itself or a downwardly directed portion could perform a similar function as the bridge moves down.

I claim:

1. A closure comprising two interacting integral elongated flexible resilient strips, each said strip having a pair of laterally extending longitudinal edge portions forming a transversely concave side on the edge of each strip with said concave sides facing each other; each said strip having a lateral portion; each said strip having longitudinally extending flange means on each edge portion adapted to separably fasten onto the corresponding flange means on the other strip and a longitudinally extending hollow protuberance comprising a transversely curved elongated second strip attached to the concave side of each strip; said protuberance being adapted to register with the other protuberance when the edge flange means of said strips are engaged with one another.

2. The closure of claim **1** wherein one of said strips is provided with additional longitudinally extending flange means adapted to engage a registering means on a slide.

3. The closure of claim **1** in combination with a slide member; said slide member having bridge means adapted to be positioned between said protuberances.

4. The combination of claim **3** wherein one of said strips has additional longitudinally extending flange means and said slide member has a channel engageable with said additional flange means.

5. The combination of claim **3** wherein the slide member has side slots to accommodate the lateral portions of the strips.

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