May 27, 1969 F. G. RINECKER 3,446,420

FLEXIBLE MOUTH CONTAINER

Filed Feb. 8, 1968

Sheet 1 of 4

FIG. 1

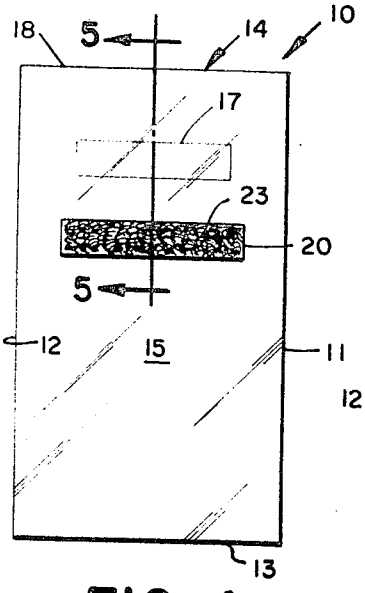


FIG. 2

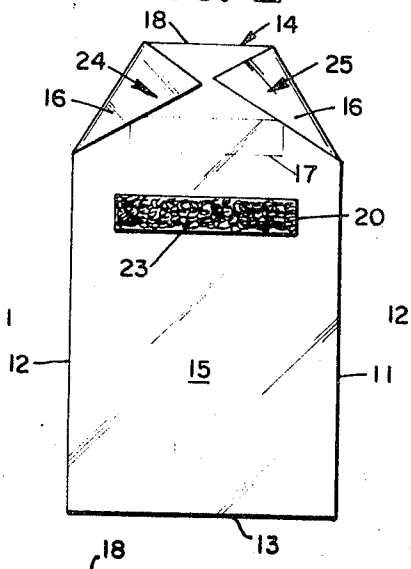


FIG. 3

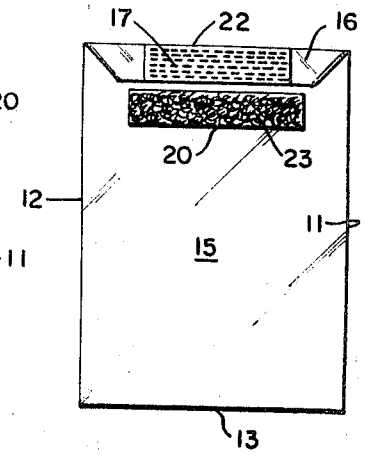


FIG. 4

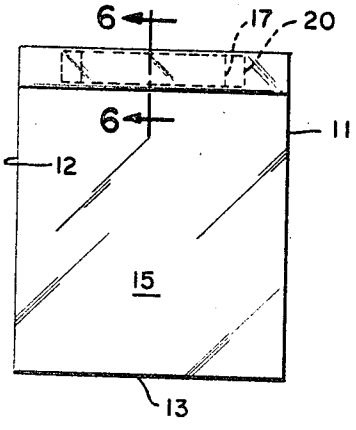


FIG. 5

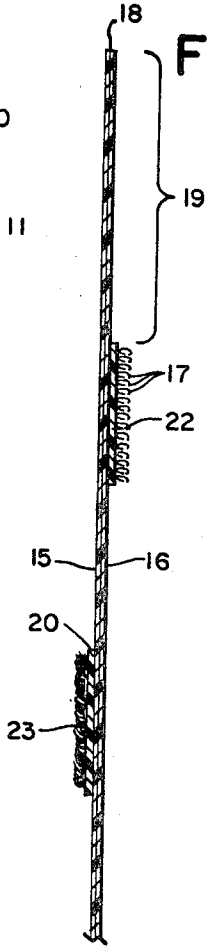
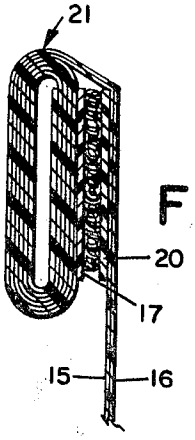


FIG. 6



INVENTOR
FRANZ G. RINECKER

BY Bonnie, Edmonds, Moston, Taylor & Adams
ATTORNEYS

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FIG. 7

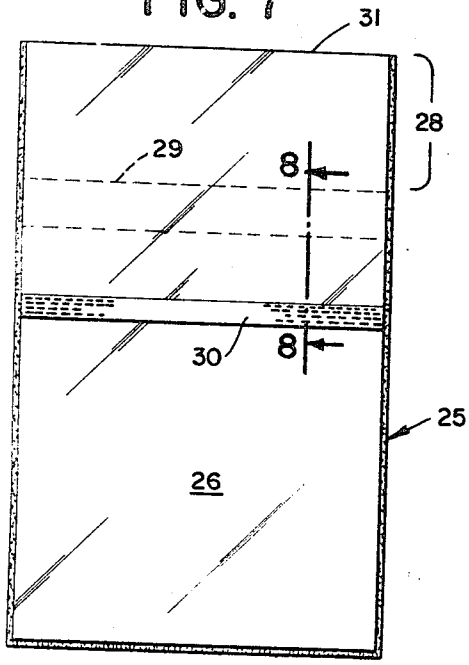


FIG. 8 FIG. 9

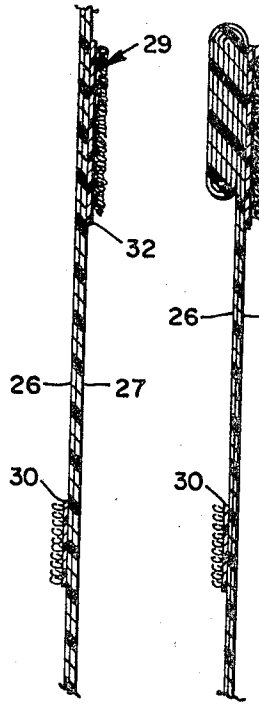


FIG. 10

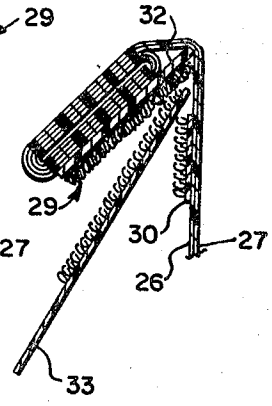
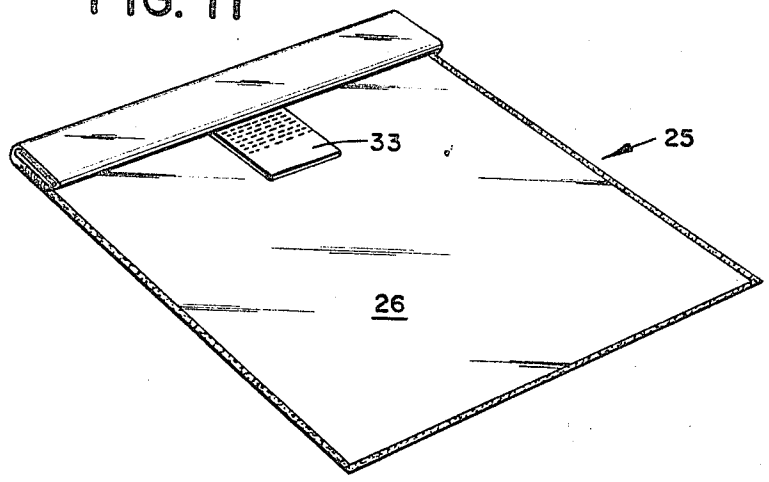


FIG. 11



INVENTOR
FRANZ G. RINECKER

BY Pennie, Edmonds, Morton, Taylor & Adams
ATTORNEYS

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FIG. 12

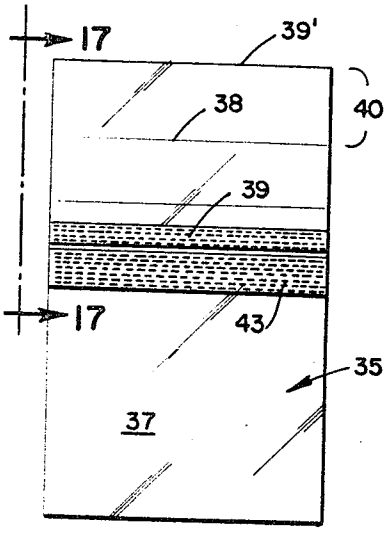


FIG. 13

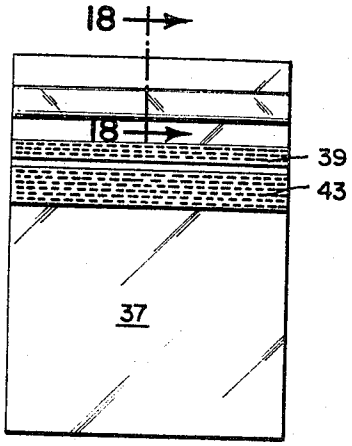


FIG. 14

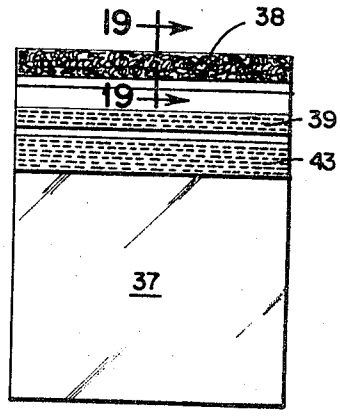


FIG. 15

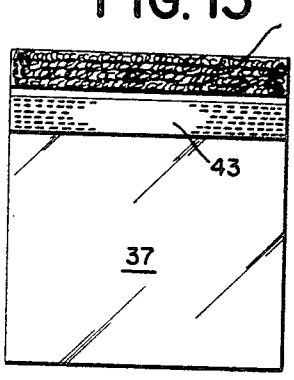


FIG. 16

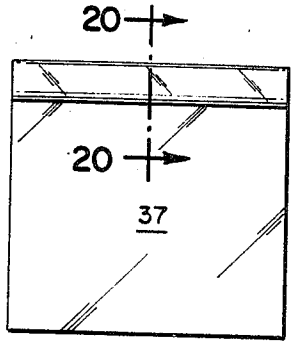


FIG. 17

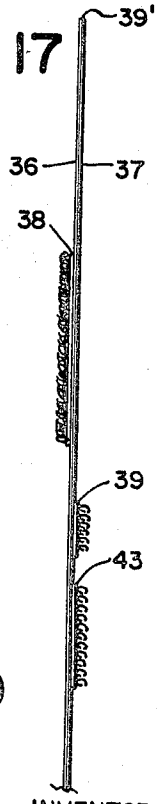


FIG. 18

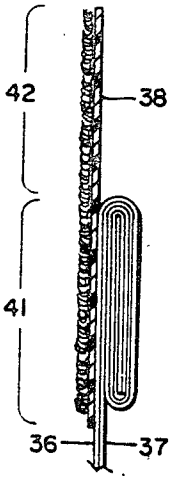
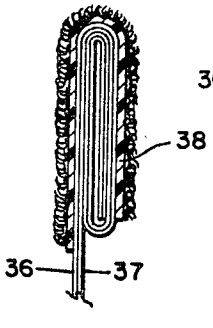


FIG. 19



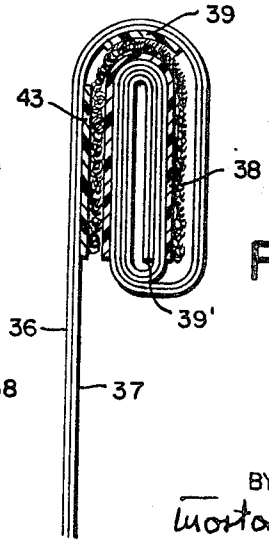


FIG. 20

INVENTOR
FRANZ G. RINECKER

BY Pennie, Edmonds, Morton, Taylor & Adams
ATTORNEYS

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FIG. 21

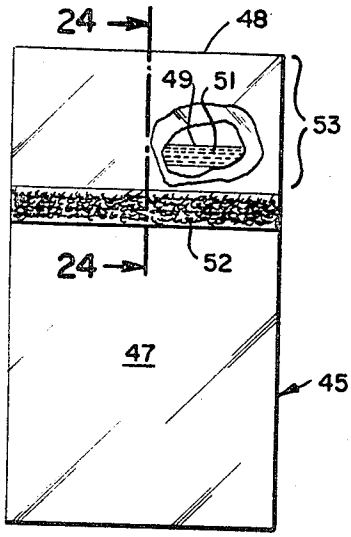


FIG. 22

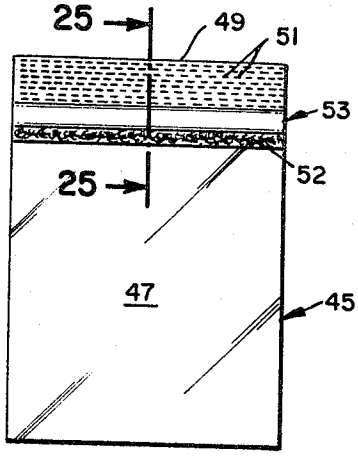


FIG. 23

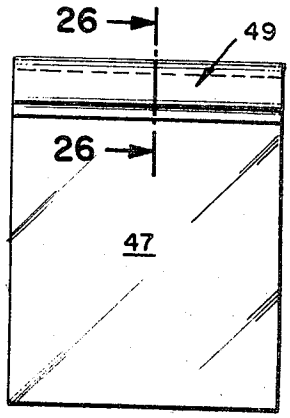


FIG. 24

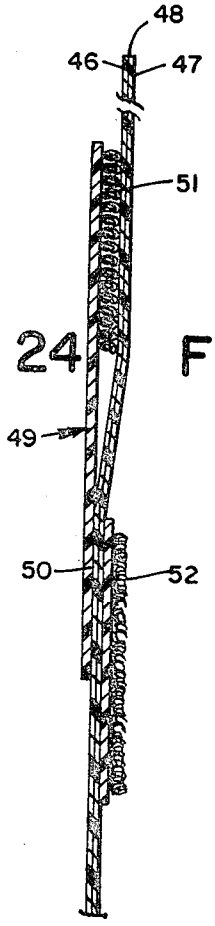


FIG. 25

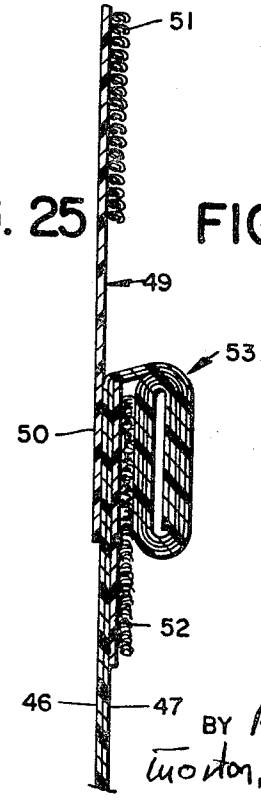
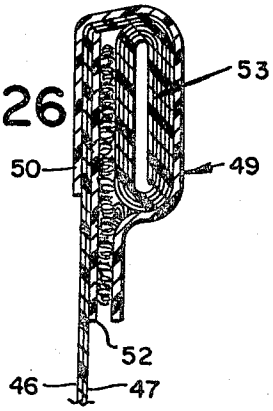


FIG. 26



INVENTOR
FRANZ G. RINECKER

BY Pennie, Edmonds, Morton, Taylor & Adams
ATTORNEYS

United States Patent Office 3,446,420
Patented May 27, 1969

3,446,420

FLEXIBLE MOUTH CONTAINER

Franz G. Rinecker, Wayne, N.J., assignor to American Velcro, Inc., a corporation of New Hampshire

Filed Feb. 8, 1968, Ser. No. 703,926
Int. Cl. B65d 33/16, 27/14
U.S. Cl. 229—62
6 Claims

ABSTRACT OF THE DISCLOSURE

A container of the type having a mouth defined by a flexible sheet which can be opened wide and closed by flattening it into two sheet portions and convoluting its marginal end portions. Included in the flexible sheets are fastening strips having outer surfaces characterized by hooking elements of the hook and loop type which are positioned so that in folding one strip to bring it in registry with the other, the convoluted marginal end portion of the flexible sheet will be confined within the fold to seal the opening.

Background of the invention

This invention relates to a container of the type having a mouth defined by a flexible sheet, and more particularly it relates to a container in which a convoluted marginal edge portion is confined in a fold between separable fastening means of the hook and loop type characterized by the properties that placing a surface containing hooks into face-to-face contact with a surface containing loops will result in a plurality of hooks engaging a plurality of loops which resist separation parallel to the interfacial plane of engagement but are readily separable by peeling forces, applied substantially normal to this plane.

In many instances, it is desirable to provide a container which is readily sealable and reusable and preferably one that is fluid tight. For example, in the storage of foodstuffs such as bread it is required that the container both protect the bread from drying out and be resealable after each use. In more rigorous applications, a container must both provide a seal of sufficient integrity either to prevent the entry of foreign fluids or to prevent leakage of contained fluids and be readily operable and resealable. Examples of the foregoing include containers for storage of gas masks and containers for shipment of fluids which are to be delivered by parachute drop. In the former instance, gas masks must be carried by soldiers in containers to protect them from water damage while the soldier is crossing a river or otherwise operating in muddy or swampy terrain. It is further required that the gas mask container be opened quickly and easily to give ready access to the gas mask. In the latter instance, it is common military practice to airdrop supplies to troops in isolated areas. The items so delivered include liquids such as smoke-free cooking fuel. It has been found that metal containers are not suitable for this purpose because they are too heavy and bulky and for a lightweight container to be suitable for this purpose it must have the capability of withstanding pressures which are encountered when the container hits the ground. Furthermore, such containers must provide easy access for cleaning before reuse. A lightweight container which is able to withstand both internal and external fluid pressure, which allows ready access to its contents, and which is easily resealable would be particularly suitable for the above purposes. However, no such container has heretofore been available.

Summary of the invention

The invention is in a container of the type having a mouth defined by a flexible sheet which can be opened wide and closed by flattening the sheet into two sheet portions and convoluting marginal end portions of the sheet together. The improvement includes a first fastening strip provided on an outside surface of one portion of the flattened flexible sheet to define therebetween a marginal edge portion of a flexible sheet of sufficient size to be convoluted into a plurality of convolutions to seal the opening. A second complementary fastening strip is provided on the outside surface of the other opposed portion of the flattened flexible sheet and is spaced a distance further from the endmost edge of the flexible sheet than the first fastening to permit the first fastening strip to be folded over the convoluted marginal edge portion and into registry with the second marginal strip to confine the convoluted marginal edge portion within the fold. The fastening strips have outer surfaces defined by hooking elements of the type characterized by the property of placing a surface containing hooks into face-to-face contact with a surface containing loops, a plurality of hooks engage a plurality of loops which resist separation parallel to the interfacial plane of engagement but are readily separable by peeling forces applied substantially normal to this plane. Such an arrangement will generally provide a fluid-tight container.

The present invention preferably utilizes the hook and loop fasteners such as those described in U.S. Patents Nos. 2,717,427 and 3,009,235 which includes separable members which comprise sheets of woven fabric having raised loop threads of synthetic material wherein the loops of one member are cut at their outer extremities to form hooks while the loops of the other member remain uncut. It is also contemplated that a given member may comprise both hooks and loops. When the two members of the fasteners are pressed together in face-to-face relationship there is a substantial engagement of hook threads with loop threads. A considerable effort must be applied to separate the members unless they are peeled apart. In that event, the members may be separated quite easily.

The present invention has a versatility and convenience of operation that is not approached in the prior art. Aside from providing a seal which both resists internal fluid pressure and external fluid pressure, the present container may be opened and closed repeatedly without any loss in the effectiveness of the seal. Furthermore, the present container is particularly useful in applications that require instant access to the container contents.

Brief description of drawings

FIG. 1 is an elevation of a first embodiment of the container of the present invention in an unsealed position;

FIG. 2 is an elevation of a first embodiment of the container of the present invention in a first partially sealed position;

FIG. 3 is an elevation of a first embodiment of the present invention in a second partially sealed position;

FIG. 4 is an elevation of a first embodiment of the container of the present invention in a sealed position;

FIG. 5 is a section taken susbtantially along line 5—5 of FIG. 1;

FIG. 6 is a section taken substantially along line 6—6 of FIG. 4;

FIG. 7 is an elevation of a second embodiment of the container of the present invention in an unsealed position;

FIG. 8 is a section taken substantially along line 8—8 of FIG. 7;

FIG. 9 is an end view of a second embodiment of the container of the present invention in a first partially sealed position;

FIG. 10 is an end view of a second embodiment of the container of the present invention in a second partially sealed position;

FIG. 11 is a perspective view of a second embodiment of the container of the present invention in a sealed position;

FIG. 12 is an elevation of a third embodiment of the container of the present invention in an unsealed position;

FIG. 13 is an elevation of a third embodiment of the container of the present invention in a first partially sealed position;

FIG. 14 is an elevation of a third embodiment of the container of the present invention in a second partially sealed position;

FIG. 15 is an elevation of a third embodiment of the container of the present invention in a third partially sealed position;

FIG. 16 is an elevation of a third embodiment of the container of the present invention in a sealed position;

FIG. 17 is a section taken substantially along line 17—17 of FIG. 12;

FIG. 18 is a section taken substantially along line 18—18 of FIG. 13;

FIG. 19 is a section taken substantially along line 19—19 of FIG. 14;

FIG. 20 is a section taken substantially along line 20—20 of FIG. 16;

FIG. 21 is an elevation in partial section of a fourth embodiment of the container of the present invention in an open position;

FIG. 22 is an elevation of a fourth embodiment of the container of the present invention in a first partially sealed position;

FIG. 23 is an elevation of a fourth embodiment of the container of the present invention in a sealed position;

FIG. 24 is a section taken substantially along line 24—24 of FIG. 21;

FIG. 25 is a section taken substantially along line 25—25 of FIG. 22; and

FIG. 26 is a section taken substantially along line 26—26 of FIG. 23.

Description of the preferred embodiment

Referring initially to FIGS. 1–6, a first embodiment of a container of the invention is shown. The container which will be shown in each embodiment to be described hereinbelow will basically comprise a flexible bag on which the improved means for sealing and releasably opening the container will be disclosed. It is to be understood, however, that while the improvements of the invention have application to flexible bag-type containers, the invention resides primarily in the arrangement which permits this ease of opening and sealing of a container having a mouth defined by a flexible sheet of the type which can be opened wide and closed by flattening the sheet into two sheet portions and convoluting the marginal end portions of the flexible sheet. Thus, the flexible mouth can be provided on a rigid container or in a flexible bag which is inserted into and sealed inside a rigid container.

The flexible bag-like container **10** is formed of two sheets which are sealed along their side edges **11** and **12** and at the bottom portion **13** but open at the top or mouth **14** of the container. Thus, at the mouth **14** of the container there are provided two sheet portions **15** and **16** (see FIG. 5) which can be flattened together and the marginal end portions convoluted to seal the opening in the container as shown in FIG. 6.

A first fastening strip **17** is adhesively sealed to the outside surface of one sheet portion **16** and is spaced from the endmost edge **18** of the flexible sheet and defining between the fastening strip and the endmost edge **18** a marginal edge portion **19** of sufficient size to be convoluted into a plurality of convolutions to seal the opening at the endmost edge **18**. A second complementary fastening strip **20** is provided on the outside surface of the other opposed sheet portion **15** and is spaced a distance further from the endmost edge **18** of the flexible sheet than the first fastening strip **17** to permit the first fastening strip to be folded over the convoluted marginal edge portion **19** and into registry with the second fastening strip **20** and to confine the convoluted marginal edge portion within the fold **21**, as shown in FIG. 6.

The fastening strips **17** and **20** are hooking elements which also are raised woven members which have a plurality of upstanding hooking elements extending from their outermost surfaces. These "hooking elements," as they will be described throughout the description, are preferably of the type described in the patents referred to above and the hooking elements on fastening strip **17** can comprise raised loop threads of a synthetic material such as a superpolyamide which have been cut at their outer extremities to form hooks **22** or can be raised loop threads which are uncut to provide loop **23** such as shown in fastening strip **20**. These hooking elements of the hook and loop type are characterized by the property of placing a surface containing hooks into face-to-face contact with a surface containing loops will result in a plurality of hooks engaging a plurality of loops which resist separation parallel to the interfacial plane of engagement but are readily separable by peeling forces applied substantially normal to this plane. While hooks are shown on fastening strip **17** and loops on fastening strip **20**, the hooks and loops can be interchanged and it is also contemplated that the fastening strips can comprise both hooks and loops and still fall within the scope of this invention.

To close the container **10** in this first embodiment, lateral edge portions **24** and **25** at the mouth of the container are infolded so that the endmost edge **18** is confined within a lateral dimension which is less than the length of the fastening strips **17** and **20**. The marginal end portion **19** is then convoluted a plurality of times until the first fastening strip **17** is positioned in parallel spaced relationship with the second fastening strip **20** on the same side of the container as shown in FIG. 3. At this point the spaced relationship is such that one more fold of the flexible sheet will bring the hooking elements of the first fastening strip into face-to-face contact with the hooking elements of the second fastening strip **20**, as shown in FIGS. 4 and 6, and the convoluted marginal edge portion **19** is confined within the fold **21** so as to effect a fluidtight seal.

A second embodiment of the invention is shown in FIGS. 7–11. Here a similar type container **25** of flexible sheet material is provided and two sheet portions **26** and **27** are defined along a marginal end portion **28** which is to be convoluted together in the same manner described with respect to the first embodiment. There are a few differences in this second embodiment. A first fastening strip **29** having the hooking elements as described is provided in parallel spaced relationship with the second fastening strip **30** and both the first and second fastening strips **29** and **30** extend laterally substantially the same width of the flattened sheet portions **26** and **27** and endmost edge **31** of the container **25**, is therefore convoluted into a plurality of convolutions as shown in FIG. 9 without infolding the side edges of the sheet portion as was the case in the first embodiment. Also the first fastening strip **29** is backed by a semi-rigid plastic strip **32** so as to add some rigidity to the flexible sheet and preserve good surface to surface contact between the fastening strips **29** and **30** while in use. This semi-rigid strip can also be used with advantage with certain applications of the other embodiments. Further, as shown in FIGS. 10 and 11, a tab member **33**, formed with one surface of hooking elements complementary to the first fastening strip **29**, is inserted between the first fastening strip **29** and the second fastening strip **30** when they are placed in face-to-face sealing contact. This tabular member **33** can then be used as a means to open a closed container by merely grasping the tab **33** and snapping the first and second fastening

strips out of engagement. This tabular arrangement can also be used with advantage in the other embodiments.

In FIGS. 12–20 a third embodiment of the invention is shown. In this third embodiment a flexible container **35** comprised of two sheet portions **36** and **37** have a first fastening strip **38** attached to the outside surface of one of the sheet portions **36** and spaced from its endmost edge **39'** a distance sufficient to provide a marginal edge portion which can be convoluted into a plurality of convolutions. A second fastening strip **39** is provided spaced from the first fastening strip **38** a distance greater from the endmost edge **39'** than the first fastening strip to permit the first fastening strip **38** to be folded into face-to-face contact with the second fastening strip **39**. Shown in this embodiment the first fastening strip is adhesively secured along the lower longitudinal half **40** which is spaced furtherest from the endmost edge **39'** and is free along its upper half portion **42**, as shown in FIG. 18. Thus, after the marginal end portion **40** of the flexible sheet is convoluted a plurality of times, the upper longitudinal half **42** of the first fastening strip **38** is folded over convoluted marginal end portion **40**. This permits the convoluted end portion to be wound into tighter convolutions than the one-half thickness of the first fastening strip. The first fastening strip is then in the position shown in FIGS. 14 and 19 and the entire end portion is then folded so that the upper half portion **42** of the first fastening strip is brought into face-to-face contact with the second fastening strip **39**.

In this embodiment a third fastening strip **43** is provided spaced from the second fastening strip **39** a distance greater from the endmost edge of the flexible mouth than is the second fastening strip but on the same outside surface of the flexible sheet as is the second fastening surface. Thus, in the final fold, the contacted first and second fastening strips **38** and **39** respectively with the convolution confined within the fold therebetween is folded one additional time to bring the second lower longitudinal end **41** of the first fastening strip into contact with the third fastening strip **43** thereby compressing the convoluted marginal edge portion within the folds as shown in FIG. 20 and insuring a better fluid-tight seal.

A fourth embodiment is shown in FIGS. 21–26. Here a flexible bag-type container **45** is provided similar to that described with respect to the earlier embodiments. Two flexible sheet portions **46** and **47** are flattened into opposed relationship and the flexible sheet defines a mouth opening at the endmost edge **48**. A first fastening strip **49** of a different type than the previous embodiments is provided. It comprises a longitudinal strip which is sealed at its lower longitudinal end portion **50** at the outside portion of one sheet portion **46** and has hooking elements **51** provided on the upper longitudinal portion of the strip **49** and extending from the same surface of the strip **49** and is adhesively sealed at portion **50**. A second fastening strip **52** is provided spaced from the endmost edge **48** a distance further than the first fastening strip **49**. A marginal end portion **53** of the flexible sheet portions **46** and **47** is convoluted a plurality of times and brought into contact with the second fastening strip **52**. The first fastening strip **51** is then folded around the convoluted marginal end portion **53** and its hooking elements **51** are brought into surface-to-surface contact with the hooking elements of the fastening strip **52** as shown in FIG. 26 to confine the convoluted marginal edge portion **52** within the fold and provide a fluid-tight seal.

I claim:

1. In a container having a mouth defined by a flexible sheet which can be opened wide and closed by flattening the sheet into two sheet portions and convoluting marginal end portions thereof, the improvement in combination herewith comprising a first fastening strip provided

on an outside surface of one portion of the flattened flexible sheet and spaced from the endmost edge of the flexible sheet to define therebetween a marginal edge portion of flexible sheet of sufficient size to be convoluted into a plurality of convolutions to seal the opening, and a second complementary fastening strip provided on the outside surface of the other opposed portion of the flattened flexible sheet, the second complementary fastening strip being spaced a distance further from the endmost edge of the flexible sheet than the first fastening strip and being disposed substantially parallel to the first fastening strip and to the convoluted marginal edge portion to permit the first fastening strip to be folded over the convoluted marginal edge portion and into registry with the second fastening strip and confine the convoluted marginal edge portion within the fold, said fastening strips having outer surfaces defined by hooking elements of the hook and loop type characterized by the property of placing a surface containing hooks into face-to-face contact with a surface containing loops, a plurality of hooks engage a plurality of loops which resist separation parallel to the interfacial plane of engagement but are readily separable by peeling forces applied substantially normal to this plane.

2. A container according to claim **1** wherein the convoluted marginal portion is so confined that it is fluid-tight.

3. A container according to claim **1** wherein at least one of said fastening strips is provided with a semi-rigid backing.

4. A container according to claim **1** wherein said first fastening strip is flexible and has one elongated marginal edge portion attached to the flexible sheet and a free edge portion with the surface containing the hooking elements facing toward the marginal edge of the sheet, said second fastening strip and the attached elongated marginal edge portion of the first fastening strip being in substantially opposed relationship on opposite flexible sheet portions with the free end portion of the first sheet extending toward the endmost edge of the unfolded marginal portions, the free end of said first fastening strip being folded over said folded marginal portion in registry with the second fastening strip and confining the folded marginal portion within the folded over first fastening strip.

5. A container according to claim **1** wherein a third fastening strip having hooking elements complementary to said first strip is provided spaced from said second strip in a direction away from the endmost edge and said first strip is provided with a sufficient width to fold over one additional turn into registry with the third fastening strip.

6. A container according to claim **1** wherein a tab is secured to the first fastening strip with a portion of the tab exposed when the first fastening strip is in face-to-face engagement with the second fastening strip so that separation of the strips can be effected by pulling the tab.

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DAVID M. BOCKENEK, *Primary Examiner.*

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