

Jan. 5, 1965

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POLYSTYRENE MULTI-CLOSURE STRIP ADAPTED
FOR SEPARATION INTO INDIVIDUAL CLOSURES
Filed Nov. 22, 1963

3,164,250

Fig. 1.

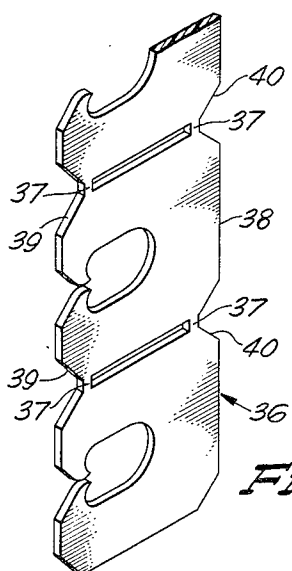
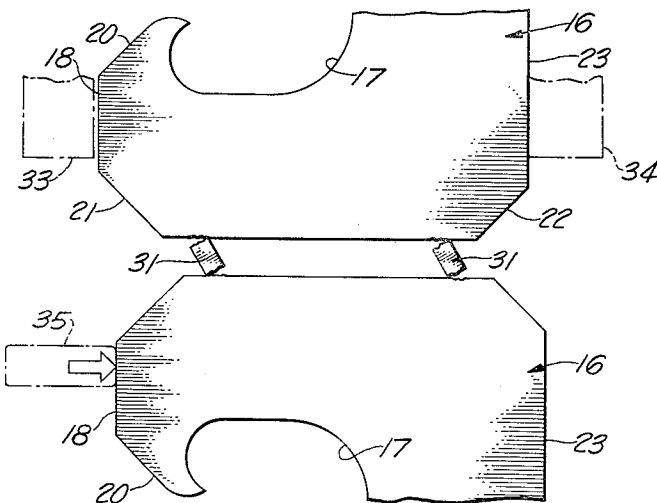
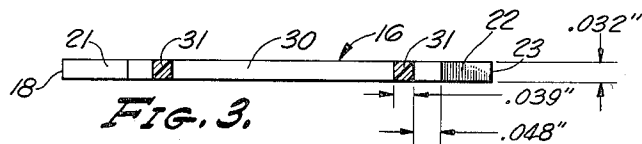
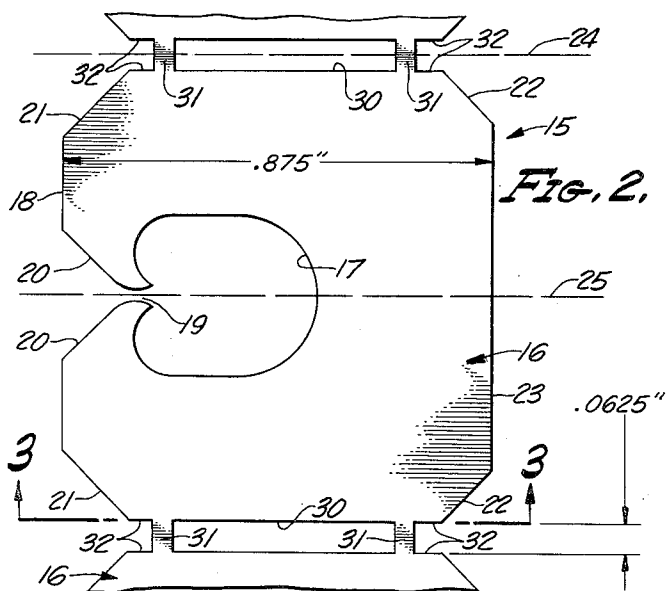
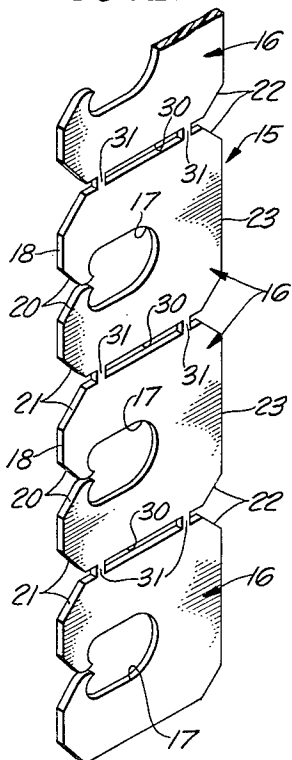


Fig. 4.

Fig. 5.

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POLYSTYRENE MULTI-CLOSURE STRIP ADAPTED FOR SEPARATION INTO IN- DIVIDUAL CLOSURES

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Filed Nov. 22, 1963, Ser. No. 325,665

5 Claims. (Cl. 206—56)

This application is a continuation in part of my copending application Serial No. 190,207, filed April 24, 1962, for a Multiple Closure Strip, said copending application having been abandoned since the filing of the instant application.

This invention relates to closures formed of flat material such as extruded polystyrene and particularly to a multi-closure strip of such material.

Heretofore it has been common practice to form tickets, price tags, and the like in strip form with a line of perforations provided at adjoining edges of adjacent tickets in the strip so that one or more tickets can be readily separated by tearing these from the strip along one of these lines of perforation. In some cases, cardboard tags united by webs have been provided in strip form for use in code-marking machines having means for die-cutting said webs to separate any desired number of tags from the strip.

For many years the use of sheet polystyrene closures for closing the necks of polyethylene bags in which food and other products are packaged, has been growing. The need has long existed for a better way of feeding these closures to a bag closing station. Attempts to do this by joining the closures integrally in a multi-closure strip have been defeated by the fact that the peculiar characteristics of polystyrene in the thickness (.032 inch) required for these closures, have rendered impractical the tearing or severing of the strips to separate the latter into individual closures. In the first place, insufficient room is available in machines provided for applying the closures to bags to accommodate a die-cutting operation. In the second place, attempts to pull the endmost closure from the strip by pulling apart the webs connecting adjacent closures resulted in each closure so separated having one or more of said webs still integrally united therewith. In other words the tendency was for each of the webs to be pulled free from only one of the adjacent closures it connected. These webs had sharp ends which scratched the hands of a person removing the closure from a bag as well as giving the closure a ragged appearance.

It is a primary object of the present invention to provide a multi-closure strip of the type above mentioned which does not require a die-cutting operation in separating individual closures from the strip in order to obtain relatively complete separation of each web from the closures connected thereby.

Another object of the invention is to provide such a multi-closure strip, the individual closures of which may be relatively completely separated from the strip by the mere application of a lateral pressure locally against opposite edges of the strip.

The manner of accomplishing the foregoing objects as well as further objects and advantages will be made manifest in the following description taken in connection with the accompanying drawings in which

FIG. 1 is a perspective view of a preferred embodiment of the multi-closure strip of the present invention.

FIG. 2 is an enlarged detail view of the structure and the optimum dimensions of one of the closures of said strip and the frangible means by which it is integrally united with adjacent closures in opposite directions therefrom in said strip.

FIG. 3 is a transverse sectional view taken on the line 3—3 of FIG. 2.

FIG. 4 is an enlarged diagrammatic elevational view illustrating adjacent portions of a consecutive pair of closures in said closure strip and showing how the application of two co-planar forces applied in opposite directions in the plane of said strip to opposite side edges of said two closures simultaneously fractures the closure connecting webs at their opposite ends within the areas in which said webs had been united with said closures, thereby completely separating said closures from each other and from said webs.

FIG. 5 is a view similar to FIG. 1 illustrating in perspective a modified form of the multi-closure strip of the invention.

Referring specifically to the drawings and particularly to FIGS. 1, 2, 3 and 4 the preferred embodiment of the invention disclosed therein comprises a multi-closure strip 15 which is preferably formed from a thin flat strip of polystyrene or the like which is about .032 inch in thickness and $\frac{7}{8}$ of an inch in width and is die-formed to produce in said strip a consecutive series of closures 16 each of which has a heart shaped bag-neck-confining mouth 17 which is connected to one of the edges 18 of the closure by a narrow opening 19 having widely flaring lips 20. To complete the manufacture of the multi-closure strip 15, the die-cutting operation cuts a notch 21 in strip side edge 18 and a notch 22 from the opposite side edge 23 of said strip said notches being arranged symmetrically relative to transverse axes 24 which are equally spaced from the transverse axes 25 of the bag-neck-confining mouths 17 and openings 19. Simultaneously with the formation of notches 21 and 22, a transverse slot 30 is formed symmetrical with axis 24, this slot constituting a rectangle having a dimension lengthwise of the strip of .0625 inch and having its ends closed by two webs 31, the length of which is equal to the width of said slot, the transverse dimension of which webs being .039 inch. The webs 31 are preferably uniform in width throughout their length and inner portions of notches 21 and 22 preferably have parallel walls 32 which are spaced apart the same distance as the width of slot 30 and are in alignment with the transverse walls of said slot. It is thus to be noted that all four angles with which each of the webs 31 meets the consecutive pair of closures 16 which are integrally joined by said webs are right angles. The significance of this will be pointed out hereinafter.

The polystyrene from which the multi-closure strip 15 is made is particularly suitable because of the stiffness combined with flexibility which it gives to the closures 16 thus adapting them to be applied and removed from a bag many times without injuring the closure. I have discovered that it is highly desirable to make the webs 31 longer than they are wide and at the same time to make them relatively narrow. This has a twofold result of increasing the flexibility of these webs to permit them to resist crystallization under the flexing of the multi-closure strip when coiling this for transportation and uncoiling it for use, and has also offered a solution to the problem of separating the closures from each other in the very narrow space afforded for this in the closure applying machine while at the same time assuring that none of the webs 31 remain integrally united with a separated closure.

This solution arises from the fact that the endmost closure 16 of closure strip 15 above described may be readily separated from the strip by the operation illustrated in FIG. 4. Here I see the strip 15 provided with side edge guide plates 33 and 34 and with a shiftable finger 35 for applying pressure to the left edge of the lowermost closure 16 when it comes time to separate this from the balance of the strip. The right guide plate 34 supports the next closure thereabove to prevent that closure being

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moved laterally in response to the pressure finger 35 so that shifting of this finger as shown in FIG. 4 in a horizontal direction against the left edge of the lower closure 16 tends to rotate the webs 31 about axes normal respectively to their centers and to the plane of the closure strip thereby fracturing opposite ends of the webs 31 in the planes in which they previously were integrally connected to these two closures. These four fractures occur simultaneously and practically completely separate the webs from the closures although slightly rough spots are formed on the edges of the closures where these were formerly united with said webs.

I have also discovered that by providing the parallel walls 32 at the inner ends of notches 21 and 22 just outside of and adjacent to the webs 31 substantially improves the smoothness of the separation of the webs 31 from the closure 16 in the operation illustrated in FIG. 4.

Before developing closure strip 15, a closure strip 36 shown in FIG. 5 was developed by me in which webs 37 are provided which are located outwardly adjacent to widely diverging edges 38 of notches 39 and 40 formed in the left and right edges respectively of closure strip 36. When performing the operation shown in FIG. 4 on closure strip 36, simultaneous fractures at opposite ends of both of the webs 37 occur although there is a tendency to form a sharp corner between the fracture areas at the ends of webs 37 and an adjacent edge 38 of one of the notches 39 and 40. It is preferable therefore to place the webs connecting consecutive closures inwardly from the flaring edges of notches 21 and 22, as in multi-closure strip 15, so as to eliminate this sharpness.

It being essential to the proper operation of the present invention that each closure 16 when it becomes the lowermost closure in the strip resist buckling when the finger 35 is applied transversely to one edge of the closure in order to shift this closure laterally and thus separate it from the next closure thereabove, the use of polystyrene as the material from which the closure strip is made attains significance in that the characteristics of this material of stiffness and frangibility not only imparts to the closure a high resistance to buckling when subjected to such a transverse force but also renders the webs 31 when made with sufficiently small cross section, readily frangible simultaneously at their opposite ends as a result of the force applied by finger 35 transversely to the lowermost closure and accomplishes this before the pressure from finger 35 against the closure reaches a point which would cause a buckling of the closure which would interfere with the simultaneous rotation of the webs with resultant fracturing of these along the lines of their union with the two closures connected thereby.

When the multi-closure strip 15 is made with the dimensions shown on FIGS. 2 and 3 of the drawings, the simultaneous separation of the webs 31 from the two closures joined thereby as shown in FIG. 4 takes place in response to a pressure applied to the lowermost closure by the finger 35 of approximately 4 lbs. This pressure is only about two-thirds of the pressure which would have to be applied edgewise in the plane of the finger 35 to the lowermost closure and in opposite directions inwardly from opposite side edges thereof in order to buckle this closure and produce a vertical straight fracture leading from the bag confining mouth 17 to the upper edge 30 of said closure.

With this margin of strength built into the individual closure 16 as compared with the frangibility of the webs 31, the proper functioning of the multi-closure strip 15 of the present invention when fed into the bag closing head provided for using the same, is assured.

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While only one preferred form of the present invention and one modified form thereof have been disclosed herein, it is understood that various modifications and changes may be made in these without departing from the spirit of the invention or the scope of the appended claims.

The claims are:

1. In a multi-closure strip, wherein the closures each may have a bag confining mouth and a narrow opening located in a longitudinal side edge thereof and communicating with said mouth for admitting a bag neck into the latter; the structure comprising: a multiple of closures of transversely stiff, thin, sheet material comprising polystyrene or the like, arranged consecutively with their transverse edges in closely spaced relation; and web means integrally connecting with each consecutive pair of closures in frangible areas of union located between opposite ends of said web means and said closely spaced edges of said consecutive closures, said frangible areas being spaced far enough apart length-wise of said strip and being sufficiently restricted in the cross sectional dimension thereof measured transversely of said strip, that compressive forces applied in the plane of said strip from opposite directions respectively to said consecutive closures and through said closures to opposite ends of said web means without causing said closures to buckle, will cause the material of said strip to substantially simultaneously crack in said frangible areas of union at the opposite ends of said web means and thus separate said web means from said closures and said closures from each other.

2. In a multi-closure strip, the structure recited in claim 1, wherein the web means integrally connecting each consecutive pair of closures in said strip comprises a pair of transversely spaced webs.

3. In a multi-closure strip, the structure recited in claim 2 wherein portions of each transverse edge of a closure, lying immediately adjacent to and on opposite sides of the area of union between said edge and one of said webs, are transversely aligned and form right angles with said web.

4. In a multi-closure strip, the structure recited in claim 2, wherein the length of each of said webs, which is the distance measured lengthwise of said strip between said areas of union at the ends of said web, is substantially greater than the width of one of said areas of union which is the dimension thereof measured transversely of said strip.

5. In a multi-closure strip, the structure recited in claim 4, wherein said width of said area of union at each end of each web is approximately .039 inch, the length of said web is approximately .0625 inch and the thickness of said strip is approximately .032 inch.

References Cited by the Examiner

UNITED STATES PATENTS

2,705,100	3/55	Paxton et al.	53—138
2,855,647	10/58	Smith	24—30.5
2,884,123	4/59	Dann et al.	206—43
2,907,586	10/59	Paxton et al.	229—65
3,022,571	2/62	Niedecker	29—193.5
3,061,983	11/62	Trmin	53—138
3,072,770	1/63	Goodridge	29—413

FOREIGN PATENTS

232,093 1/61 Australia.

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