May 11, 1954 L. F. BORCHARDT ET AL 2,678,154

BAG CLOSURE

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FIG. 1

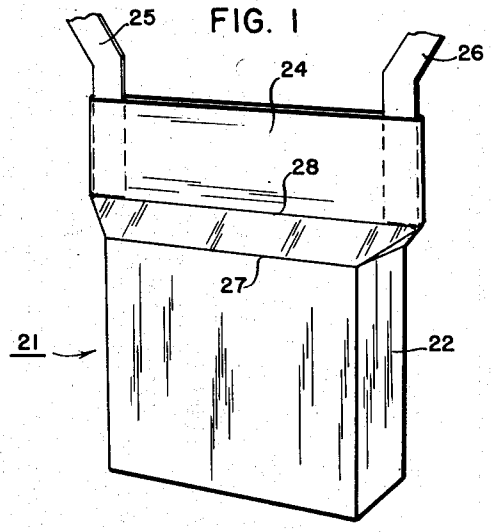


FIG. 3

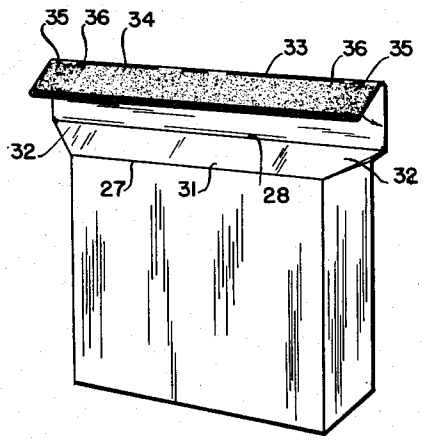


FIG. 4

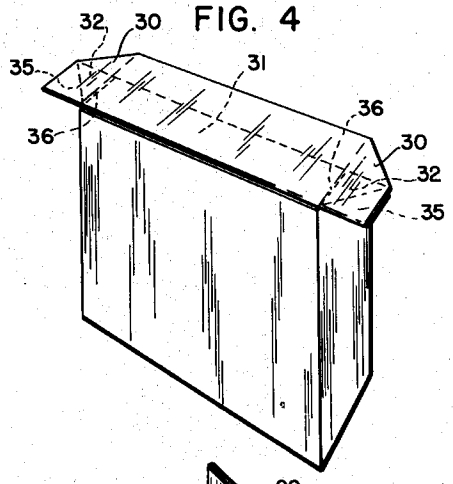


FIG. 5

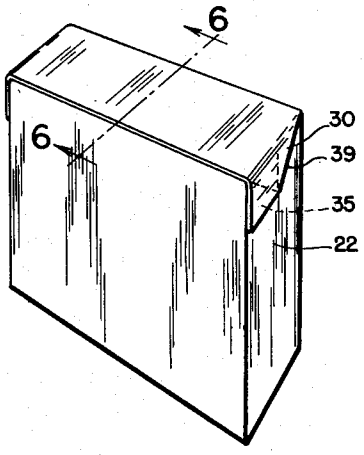


FIG. 2

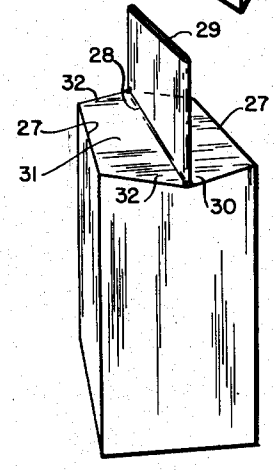
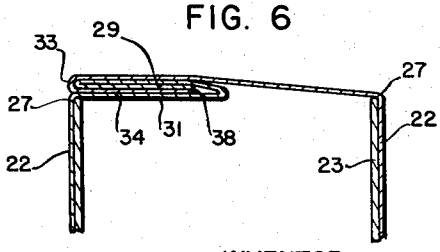


FIG. 6



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FIG. 8

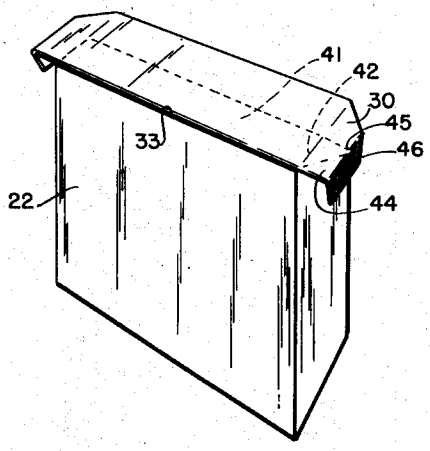


FIG. 9

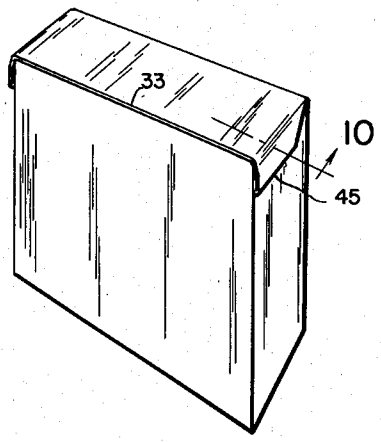


FIG. 7

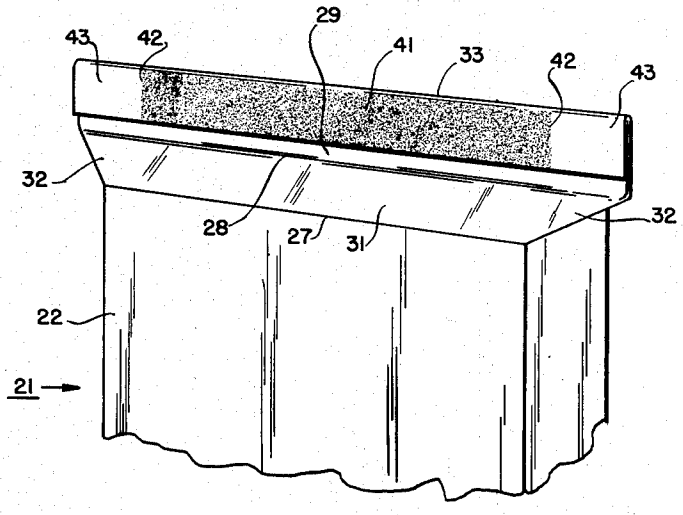


FIG. 10

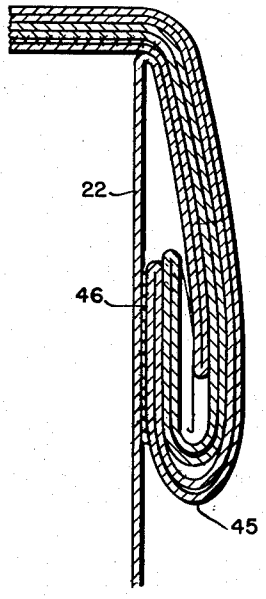
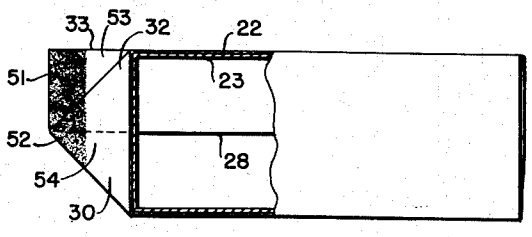


FIG. 11



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Patented May 11, 1954

2,678,154

UNITED STATES PATENT OFFICE

2,678,154

BAG CLOSURE

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Application September 29, 1948, Serial No. 51,688

1 Claim. (Cl. 229—62)

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This application relates to bags or containers and more particularly to an improved closure for such a container.

Containers have been proposed in which an outer bag of paper or the like is reinforced by cardboard at its body portion. Various methods for closing the mouth of such a bag have been suggested. For example, it has been proposed that the extending end or mouth of the bag should be spread longitudinally of the longest dimension of the bag so that the edges of the mouth of the bag meet each other without any reentrant folds. Thus the folded mouth of such a bag has only two layers with the inner surfaces of the extending portions in contact. This flat extended portion may then be folded on itself and flattened on the top of the bag with the laterally projecting flaps at each side of the top of the bag folded down along the side walls of the container.

One object of the present invention is to provide an improved fastening means for such a container.

A further object is the provision of an improved container in which two different types of adhesives are employed to hold the container top in closed position.

Another object is to provide a container closure in which certain portions are bonded by an adhesive of low tensile strength and good shear strength, while other areas are united by an ordinary adhesive of high tensile strength.

Other objects and advantages of the invention will be apparent from the following specification and from the claim attached thereto.

Certain preferred embodiments of the invention are disclosed in the drawings which form a part of this specification and in which

Figure 1 is a perspective view of a container according to the present invention with the upper end or mouth of the container spread in a preliminary way for closing.

Fig. 2 is a perspective view showing the mouth of the bag in spread and initially folded position.

Figs. 3, 4, and 5 show successive steps in the further folding of the bag mouth.

Fig. 6 is a partial sectional view on the line 6—6 of Fig. 5, which shows details of the folded mouth of the bag.

Fig. 7 is a perspective view of an alternate embodiment of the invention showing a different method of applying adhesive to the partially folded bag mouth.

Fig. 8 is a perspective view showing the device of Fig. 7 in further folded position.

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Fig. 9 is a perspective view of the container of Fig. 7 in completely folded position.

Fig. 10 is a partial sectional view on the line 10 of Fig. 9, and

Fig. 11 is a partial sectional view from the bottom, showing details of an alternate arrangement of adhesive areas.

With reference to Figs. 1 through 6 inclusive, the bag, designated generally at 21, includes a body portion 22. A cardboard reinforcing liner 23 (Fig. 6) may be located inside the body portion 22 of the bag in order to maintain the body in rectangular or box-like condition and strengthen the side and end walls of the body. This liner 23 is limited to the body portion of the bag and does not extend along the end or mouth 24 of the bag which consists of the single layer of bag material.

To close the mouth of bag 21, the extending portion 24 at the top of the bag is spread by suitable mechanism such as the fingers 25 and 26 of Fig. 1. As the bag mouth is spread, it is also pushed downwardly against the top of the carton in order that clean cut folds 27 will be provided at the top edge of the body portion of the container. The use of the inner cardboard liner 23 already described will facilitate the folding of the bag top in this manner and will preserve a rectangular configuration of the side and top walls of the folded container. The fold lines 27 may be pre-scored in known manner to assist in squaring the top of the container.

The method of folding is such that an additional sharp fold 28 is provided at the junction between the spread upstanding portion 29 of the bag mouth and the portion 31 of the mouth which is flattened against the top of the container.

During this preliminary folding operation to the form shown in Fig. 2, flat triangular flaps or extensions 30 and 32 will be formed at each longitudinal end of the bag mouth as shown. Because these flaps or extensions 30 and 32 are permitted to extend beyond the edges of the bag, there will be no reentrant folds in the upstanding portion 29 of the bag mouth. Thus the two layers of this upstanding portion will be in smooth face-to-face contact. The absence of any reentrant folds will minimize the possibility of sifting of contents of the bag out through the bag mouth.

After the bag mouth has been folded to the position of Fig. 2, the upper section of the upstanding portion 29 is folded or doubled over along a line 33 as shown in Fig. 3. Adhesive is

applied to the folded-over portion of the bag mouth in a particular manner and may be applied either before or after this folding operation, or in separate steps as described below.

As indicated in Fig. 3, the central portion of the folded-over flap is coated with adhesive at 34 throughout an area corresponding to the width of the body of the bag 22. The extreme ends of this folded-over flap are coated with a different type of adhesive, indicated at 35, throughout the areas which extend laterally beyond the dimensions of the bag body.

The folded and adhesively coated flap is then bent down along the fold line 26 so that it is forced against the top of the container as shown in Fig. 4 which is against the supporting panel which lies between lines 27 and 28 in Figs. 1, 2 and 3. In this position the boundary lines 36 between the respective areas of different adhesive will lie just above the edges of the bag body as indicated. Thus the central portion of the folded over flap will be united to the flat top surface 31 of the bag by the adhesive 34. At the same time the outer portions of adhesive 35 will overlap partially the triangular portions or extensions 32 of the folded bag top. Thus the folded flap will be united to these triangular extensions 32 by a different type of adhesive, namely that which is utilized for the areas 35.

After the operation of Fig. 4 is complete, the extending ends of thickened ears of the folded-over bag mouth are then folded down against the lateral end walls of the container as indicated in Fig. 5. Inasmuch as the adhesively coated areas 35 extend beyond the triangular extensions 32 of the bag top, there will be a free area of this adhesively coated flap which will be united directly with the side of the body portion 22 of the bag.

The construction is therefore one in which the folded down ends of the bag mouth are united to the lateral end walls of the container by one type of adhesive as indicated in areas 35 while the central folded over portion of the bag mouth is united to the flat top portion or supporting panel 31 corresponding to the width of the bag by a different type of adhesive as indicated in the area 34. Also, as indicated in Fig. 6, the fact that the flattened bag mouth 29 is initially folded over at 33 provides a closure in which the free open end of the bag mouth is enclosed within the folded over portion of the completely sealed bag as indicated at 38. Also by proper choice of the length of the extending mouth 29 of the bag and by proper choice of the location of fold line 33, it is possible to make this fold line 33 coincide with the side wall of the bag body 22 as indicated in Fig. 6 after the mouth has been folded to closed position. Thus the appearance of the rectangular or box-like package may be improved. Also, the edge of the container offers better support during the sealing operation so that a more effective seal is obtained than would be the case if fold line 33 did not extend quite to the edge of the container.

The particular adhesive used for the coated area 34 of the bag mouth is one which has a low tensile strength and a relatively high shear strength. We have found that the tensile strength of this adhesive need not be particularly great, as long as the adhesive has good resistance to shearing stresses. The low tensile strength facilitates opening of the main intermediate portion of the bag mouth, after the bond between the side walls and folded down flaps in areas 35 has been broken.

The adhesive used in areas 35, on the other hand, should be an ordinary adhesive which will form a tearing bond between the folded over ends of the bag mouth and the side walls of the container in order to prevent the mouth of the bag from becoming unfolded. In other words, the bond formed by the adhesive areas 35 is so strong that the material of the bag mouth is likely to be torn before the adhesive bond itself gives way in the areas where the folded over flaps are fastened to the side walls. Because these folded flaps are held so firmly against the side walls, we have found that it is unnecessary for the adhesive in the area 34 to have such high tensile strength. It is only necessary for adhesive area 34 to have a high shear strength so that the corresponding portion of the bag mouth will not be loosened by the twisting or shearing stresses which are exerted on the cover of the container during ordinary handling.

Furthermore, when the user wishes to open the bag, it is necessary to exert reasonable force against the folded over end flaps to break the tearing bond formed by adhesive 35. This tearing open of the side flaps is facilitated, however, by reason of the absence of any adhesive along the region between the folded over triangular extension 30 and the side wall of the bag as indicated generally at 39 in Fig. 5. Thus the user can force a finger or knife between the folded flap 30 and the side wall of the container and can break the bond between the adhesively coated area 35 and the side wall of container 22 in spite of the stronger nature of this adhesive. Once the adhesive bond 35 is broken, the intermediate portion of the folded over bag mouth can be raised without particular difficulty because of the lower tensile strength of the adhesive bond throughout area 34.

Another factor in the construction which makes the ends or ears easy to separate from the bag walls is that the confronting surfaces between the doubled over flattened element are not bonded. These surfaces are easily separated at the ends of the ears and the ears also can be manually grasped to be separated from the bag walls.

The particular adhesives which have been found to be suitable for use according to this invention, are generally known as "low tensile strength adhesives." Such adhesives have been used in the past for locking stacks of shipping cartons to each other so that they would not become displaced during shipment. In such applications, a low tensile strength adhesive has been applied to a small area at the top of one carton to form a bond between this carton and the bottom of the carton above it. These bonds offered substantial resistance to shearing stresses and thus prevented the lateral shifting of the cartons with respect to each other. The tensile strength of the bond, however, is sufficiently low to permit separation of the cartons from each other in unloading without substantial tearing of the fibers of the carton material.

Since these adhesives are known and since their particular composition does not constitute a part of the present invention, a detailed list of the possible ingredients would serve no useful purpose in the present application. The following products, which are commercially available, are satisfactory for use in container closures as described herein: No. 1 and No. 133 Palletite adhesives, sold by H. B. Fuller Co.; Mikah Load Lok, and Load Lok No. 6, of the National Adhesive Co.; and Swift and Company's resin emulsion palletizing adhesive.

In general, the term "low tensile strength adhesives" as used in this specification and in the following claims, refers to an adhesive which forms a bond of good shear strength but which has a tensile strength low enough to permit breaking of the bond without substantial tearing of the fibers of the bonded material.

It will be understood that the above list of typical adhesives is merely illustrative and that any suitable adhesive having the characteristics described may be used in accordance with the invention.

An alternate embodiment of the invention is disclosed in Figs. 7 through 10, inclusive. The construction of the container disclosed in these figures is identical with that disclosed in Figs. 1 through 6, inclusive, and need not be described again.

As indicated in Fig. 7, the upstanding mouth 29 of this container is spread and folded in preliminary fashion as already described in connection with Fig. 2 of the previous embodiment. The flattened vertical mouth portion 29 is then folded over at 33 as in the previous case. In this example, however, only the central area 41 of the folded over flap is provided with a coating of adhesive of low tensile and high shear strength. This adhesive is applied within the central region designated by the boundaries 42 which correspond to the width of the carton. The outer portions of the folded over flap, indicated at 43, are not provided with any adhesive at all on their inner or under surface.

The mouth of the bag is folded over so that the fold line 33 comes to the edge of the body 22 of the container as indicated in Fig. 8. This figure indicates that the secondary adhesive bond of ordinary strength is applied to the upper side of the extended triangular flap portion 30 and the extended rectangular portion 44 opposite the uncoated area 43. The adhesive is applied only to the outer portion of these areas so that the extension may be folded over along the line indicated at 45 with the adhesive coating 46 only on the portions beyond fold line 45. The coated portion 46 is then folded inwardly and upwardly as indicated in Fig. 9 so that area 46 will be located against the side wall of the container body 22 as the flap extensions are pressed firmly into the position of Figs. 9 and 10. This alternate method of applying the adhesive and the alternate form of package which results therefrom have advantages similar to those in the embodiment described in Figs. 1 through 6. Thus the strong adhesive in the area 46 forms a tearing bond which maintains the mouth of the bag in closed position under all normal conditions. However, after the user has broken this tearing bond, as for example by tearing force exerted against the folded over edge 45, it is then a relatively easy matter to raise the rest of the bag mouth and break the adhesive bond throughout the area 41.

In Fig. 11 still another possible arrangement of the adhesive areas in the flour package closure is illustrated. In this case a package is utilized which is identical to that previously described in connection with the first two examples. Here again, just as in the example of Fig. 7, a low tensile strength adhesive is applied throughout the central or intermediate portion of the folded over bag mouth (as indicated at 41 in Fig. 7). In this case, however, the bag mouth is immediately folded from the position of Fig. 7 to a position corresponding to that of Fig. 4 in the first example, before any adhesive is applied to the outer portions of the bag mouth 29. After the mouth has been flattened in the manner shown in Fig. 4, a stripe of adhesive of normal tensile strength, sufficient to form a tearing bond, is applied to the under side of the folded over flap and of the triangular extensions 30 and 32. As shown in Fig. 11, this stripe of adhesive is applied only to the outer portion 51 of the folded over bag mouth and to the outer portion 52 of the triangular flap 30, 32. Thus there remains an intermediate uncoated portion 53 on the folded over flap of the bag mouth and a similar uncoated area 54 at the intermediate portions of the triangular flap 30, 32.

The closure is completed by folding the coated flaps down to a position corresponding to that of Fig. 5 in Example 1. The resulting package will be similar in external appearance to that shown in Fig. 5. However, the presence of the uncoated intermediate portions 53 and 54 will provide an unbonded area extending entirely across the side wall for insertion of the fingers or of a suitable implement, so that breaking of the tearing bond between adhesively coated portions 51 and 52 and the side wall of the container will be facilitated.

Other possible arrangements of the respective areas of low tensile strength adhesive and normal or high tensile strength adhesive will be apparent to workers in the packaging field in the light of the present teachings. Such arrangements offer definite advantages in ease of subsequent opening because only the outer portions or extremities of a particular closure need be sealed with a strong tearing bond. Once this bond is broken at the outer edges, the intermediate low tensile strength bond may be readily broken to complete the opening of the package. The fact that these intermediate portions are more readily opened will also tend to preserve the package in its original form and prevent tearing of the closure parts, so that the package may be reclosed for further use.

It should be noted that in these examples, the regular adhesive area is preferably located in the plane of the side walls of the container rather than in the plane of the top of the bag. Thus, any forces tending to open the top of the bag will not be transmitted directly to this adhesive area on the side wall, but will be incapable of breaking the side wall bond because such forces are exerted along a shearing line in the plane of the side wall rather than along a line perpendicular to the adhesive coated areas 46 and 36.

Various changes and modifications of the exact arrangement of adhesive areas as shown in the drawings will be readily apparent to persons skilled in this art in the light of applicants' teachings in the present specification. The present invention is therefore intended to include all such changes, modifications, and variations as fall within the spirit and scope of the attached claim.

Now, therefore, we claim:

A bag having lateral side and end walls with a continuous tubular end closure portion extending from said walls past the top edges of said walls, said closure portion being flattened and spread beyond the end walls forming a projecting element with supporting panels extending inwardly from the upper side wall edges, the flattened element being doubled over on itself and having unbonded and freely confronting surfaces, the doubled element being folded down upon one of said supporting panels, the ends of the doubled

and folded element constituting thickened ears extending laterally from and folded down upon the end walls, an adhesive covering the said one supporting panel and the downwardly facing surface of the doubled element detachably bonding the element to the panel and an adhesive detachably securing the under surface of the ears to the end walls, the unbonded and freely confronting surfaces between the doubled element being freely separable at the ends of the ears for manually separating the thickened ears from the end walls for opening the bag.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,063,999	Harrison	Dec. 15, 1936
2,214,172	Moore (A)	Sept. 10, 1940
2,218,509	Goodyear	Oct. 22, 1940
2,246,596	Moore (B)	June 24, 1941
2,281,304	Gillian	Apr. 28, 1942
2,294,848	Moore	Sept. 1, 1942
2,329,262	Ganz	Sept. 14, 1943
2,340,774	Snyder	Feb. 1, 1944
2,453,777	Bell	Nov. 16, 1948

FOREIGN PATENTS

Number	Country	Date
491,682	Great Britain	Sept. 7, 1938
559,274	Great Britain	Feb. 11, 1944