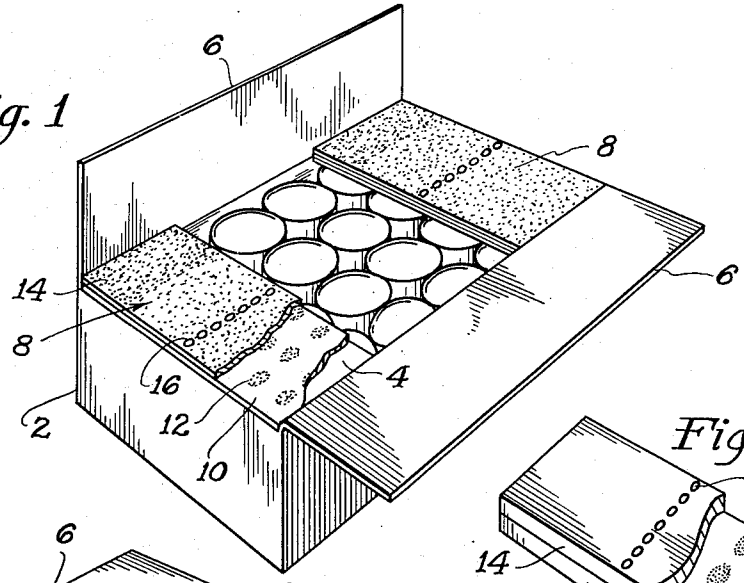
May 29, 1956 J. O. TILLY 2,747,788

SEALING INSERT FOR CONTAINERS

Filed July 18, 1951

Fig. 1



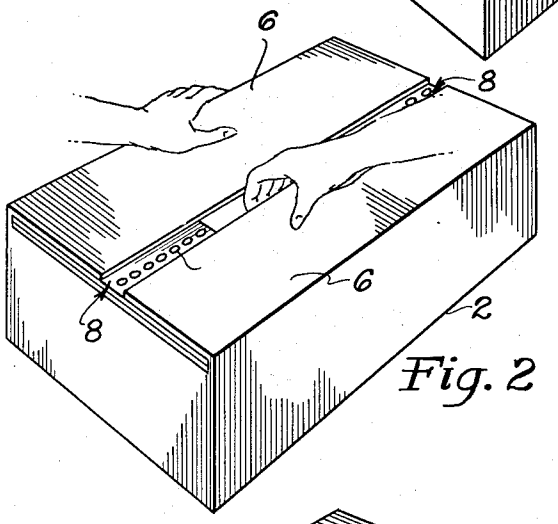


Fig. 2

Fig. 4

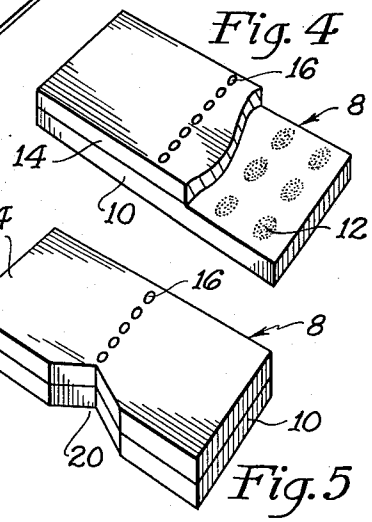


Fig. 5

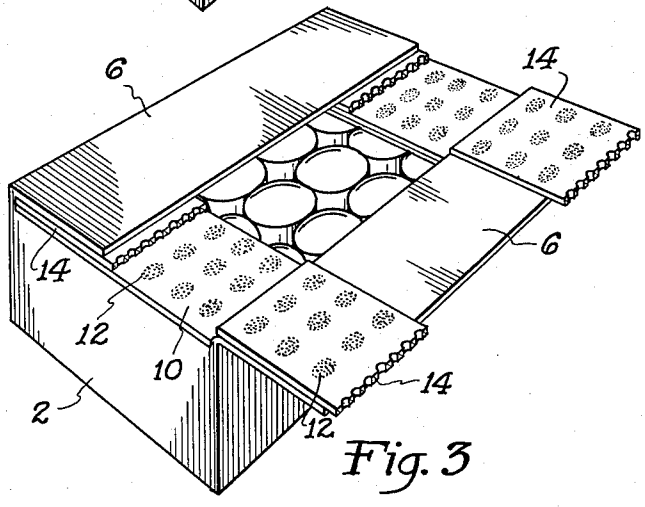


Fig. 3

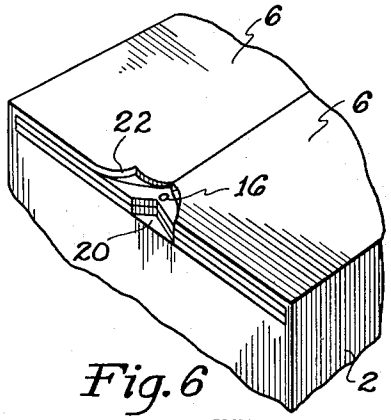


Fig. 6

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SEALING INSERT FOR CONTAINERS

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8 Claims. (Cl. 229—45)

This invention relates to a sealing insert for containers, and is a continuation-in-part of my application S. N. 200,914, filed December 15, 1950, for "Sealing Insert for Containers," and now abandoned. In particular the invention is directed to the use of a sealing insert for container covers so that the containers can be opened without destruction of the container cover flaps, and thus preserve the container for reuse.

In shipping containers such as corrugated boxes, the cover flaps are glued together after the box has been filled. When the box is opened, it is most often ruined for further use by reason of the tearing of the flaps as the glued surfaces are stronger than the flap material. Great economical savings can be made if the flaps can be separated without being destroyed, as the boxes can then be reused. Various methods have been suggested for constructing a box which can be opened without destroying the flaps, including the use of special adhesives, and even the use of a sealing insert such as shown in the U. S. Patent to Harrison No. 2,063,999. None of the prior art attempts have been commercially acceptable inasmuch as they either necessitate the use of special and expensive glues, or require a redesign of the box closing apparatus, both of which are more expensive than the savings realized by the salvage of containers.

The objects of this invention are to produce a container which can be opened without destruction of the closing flaps; to produce a container which can be sealed by inexpensive glues; to produce a container that can be used with the box filling and closing machinery currently used in the factories; to produce a sealing insert for use with ordinary containers in accomplishing these objects; and to produce an adequately sealed container which is easier to open than are conventional containers.

Generally these objects are obtained by producing a sealing insert which is composed of two layers of material glued together by lines or spots of glue on an area considerably less than the surface of the insert. The inserts may have a perforated tear line. An insert is glued over its entire outer surface area to each of the inner closing flaps of the box. After the boxes are filled, they are sent through the ordinary closing machinery, in which the other outer surface of the insert is wiped with glue and the top cover flaps folded down and sealed against the insert. When the box is opened by pulling on one of the outer cover flaps, the insert layers will separate at the glue spots. The two layers of the insert will separate because the adhesive surface between the layers is of less area and thus weaker than the fully glued outer surfaces of the insert. When the box is emptied and returned for further use, a second insert is simply glued over the remains of the first insert, and the box filled and sealed again. This can be repeated until the box as a whole becomes so worn as to be discardable. Because the glue spots form a predetermined glue area, which can be the minimum necessary for a safe seal, the container can be opened more

easily than can conventional containers which are sealed over a considerably larger glue area.

It has been discovered that the material forming the insert should be as thin as possible, and yet be of such character as to prevent the adhesive forming the glue spots between the insert layers from penetrating too deeply into, or bleeding through the material. A sized, or a machine glazed paper has been found satisfactory, the glue spots being placed on the sized or glazed surfaces facing each other in the insert. As low as 10% of the area of the facing surfaces can be glued to form an insert which will seal a container adequately.

The means by which these and other objects of the invention are obtained is more fully described with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a partly closed box with the sealing inserts shown in place;

Figure 2 is a perspective view of a closed and sealed box ready to be opened;

Figure 3 is a perspective view showing the box with the sealing inserts torn as the box is opened;

Figure 4 is a perspective view of a sealing insert;

Figure 5 is a perspective view of a modified form of an insert; and

Figure 6 is a partial perspective view of a box using the sealing insert of Figure 5.

In Figure 1, an ordinary corrugated paper box or carton **2** has the customary inner sealing flaps **4**, and the outer sealing flaps **6**. Secured to each of the inner flaps **4** is sealing insert **8**, as shown in Figures 1, 3 and 4. This insert is composed of two layers of materials **10** and **14**, which can be paper, regenerated cellulose, textiles, or other materials. These two layers are glued together by spaced dots of adhesive **12**. The surface area of the dots of adhesive **12** constitutes only a fraction of the entire inner surface of the layers **10** and **14**.

It is important that the material constituting the flaps be as thin as possible and yet not subject to bleed through by the glue spots. The theory is that the glue spots should adhere only to the surface of the material and not penetrate to any substantial extent into the material. On the other hand, the face of the insert which is glued to the cover flap can be porous and penetrable by the glue. Consequently, when the two halves of the insert are pulled apart, separation will occur by the breaking of the glue spots themselves, or by cleavage of the material covered by the glue spots. Experiments have shown that unless the material is so formed, a good clean separation of the insert halves will not occur.

For a specific example, a 30-pound machine glazed kraft paper produced an adequate sealing insert when the glazed surfaces of the insert halves were spotted with adhesive. Any adhesive can be used, including the inexpensive starch base and the water-glass glues.

An effectively sealed joint is obtained when the adhesive covered surface ranges from 10 to 50%, preferably about 22.4%, of the contacting surface areas of layers **10** and **14**. The two opposite outer surfaces of layers **10** and **14** are free of glue or adhesive until such time as the insert is placed in a box. Insert **8** may further be provided with a perforated tear line **16**, the perforations extending through both the layers **10** and **14**.

The outer surface of layer **10** corresponds in size approximately to the flap **4**. Glue is wiped over flap **4** covering a substantially greater area than that formed by the spots of glue **12**, and the insert then pasted on flap **4**; this being done prior to the filling of the box. After the box has been filled, flaps **4** carrying the inserts are folded inwardly as shown in Figure 1, and then the box sent through the usual closing machinery in which the surface of layer **14**, or the inner surface of flap **6** is wiped with glue, over an area substantially greater than

that provided by the glue dots 12, and the outer flaps 6 folded down and sealed to layer 14.

The glue area between insert 8 and flaps 4 and 6, respectively, amounts to from 60% to 100% of the outer surface of said insert, and thus is a substantially greater glue area than that provided by the spots 12. The connection between flaps 6 and flaps 4 is made through the glue dots 12, and it has been demonstrated that this adhesion is sufficient to seal the box for shipping purposes. When the box is to be opened, there often is sufficient space between the adjoined edges of flaps 6 to allow the insertion of fingers, or some kind of pulling tool, between the flaps as illustrated in Figure 2. A pull on one of the flaps 6 will cause the inserts to separate by fracture at the glue dots 12, and by tearing along the line indicated by perforations 16. Experiments have shown that while perforations 16 may be helpful, they are not absolutely necessary. Flap 6 is thus broken away from flap 4 without the destruction of either of the flaps. The other flaps 6 are similarly opened.

After the contents have been removed, the box or carton is returned to the filling plant where new inserts are glued over the remains of the original inserts, and the box then can be filled and closed. In the drawings the thickness of the material forming the inserts has been greatly exaggerated. In actual practice the inserts are so thin as to not constitute any objectionable thickness when a plurality of the remains of previous inserts are built up during the successive reuses of the box. Rather than being objectionable, the plurality of layers of insert parts built up on a reused container serve advantageously to reinforce the cover flaps and make them more serviceable for further use.

In some types of boxes the free edges of the outer closing flaps 6 are made so close together as to prevent the insertion of a tool, or the fingers, as shown in Figure 2. In such cases, the modified form of insert illustrated in Figures 5 and 6 is used. This insert is similar to the insert of Figure 4 in all respects except that notch 20 is cut in one edge thereof, the apex of this notch being in the line of the perforations 16. As shown in Figure 6 this notch is on the outer edge of the box when the insert is put into position on flap 4. The box is then opened by seizing the outer corner 22 of flap 6 and pulling it upwardly. This will pull the insert apart along line 16, and the box will be opened substantially as described for Figure 3.

In both forms of the invention, the spots 12 can be replaced by spaced lines of adhesive, or by any other configuration, as long as the glue area of the insert is materially less than the glue areas, respectively, between the insert and the cover flaps. For example, in a carton used for beer cans, the insert may have about 11.2 square inches of glue area composed of the spots 12, whereas there will be about fifty square inches of glue area between insert 8 and flap 6, and a like glue area between insert 8 and flap 4. This exact proportion is not critical, it only being necessary that the glue areas between the insert and the flap is of such extent that the spots 12 will tear apart before the insert will pull away from either flap.

An advantage is gained by this invention in that the cheapest of glues, as for example water glass, can be used as the adhesive for forming both the dots 12 and the glue for sealing the outer surfaces of insert 8 both to the inner flaps 4 and the outer flaps 6. The elimination of the need for special adhesives constitutes a great savings, and the use of spots of glue 12 reduces the quantity of glue heretofore required. The insert is practical as a sealing means in that being preformed, the layers 10 and 14 are firmly united together by the glue dots 12, and adhesion between the layers is not dependent upon the degree of pressing support supplied flaps 4 by the contents of the box when the box is sent through the usual closing machinery. In other words, each glue spot 12 is one hundred percent effective, whereas the glue areas between the insert and the flaps may quite likely be less than perfect. Because of the relatively great surface area contact between the insert and flaps 4 and 6, sufficient sealing adhesion is achieved despite the lacking of supporting pressure by contents of the box. Furthermore, the use of the insert necessitates only one additional operation in the usual box filling machinery, namely, the pregluing of the inserts to the inner box flaps 4.

As previously stated, it is desirable to use as thin a material as possible for the insert, a 30-pound machine glazed kraft paper being preferred. The weight of the paper is not critical as far as sealing is concerned, but affects the thickness of the layers built up during successive reuses of the box. Although the use of the inserts is preferred, this invention also teaches that in at least the first sealing of the box, spots of glue could be used directly on the cover flaps, if the flaps were sized or glazed to prevent the glue from penetrating the flaps.

Tests of boxes sealed according to this invention indicate that the seal obtained with the glue spots is better than could be expected. It is theorized that the spotted glue areas permit slight yielding and adjustments of the flaps without tearing either the flaps or glue spots. Regardless of the reason, the advantages still obtain. Still another advantage lies in the ease with which a box can be opened. When the box flaps are pulled apart, as illustrated in Figures 2 and 3, the separation is accompanied by popping sounds as the individual glue spot lines are broken in succession. The force to tear apart the glue spots is much less than that required to tear apart overall glued surfaces. This means that as less tearing force is applied to the box, there is less likelihood of tearing the flaps themselves, thus preserving the box for further use.

Having now described the means by which the objects of the invention are obtained, I claim:

1. A sealing insert for containers comprising two sheets of material each of which has a surface resistant to penetration by an adhesive, said sheets being lapped with said surfaces facing each other, and spaced areas of adhesive between said surfaces and uniting said sheets.

2. A sealing insert as in claim 1, said sheets further comprising machine glazed kraft paper.

3. A sealing insert as in claim 2, further comprising said adhesive covering from 10 to 50% of said surfaces.

4. A sealing insert for containers comprising two lapped sheets of glazed paper, the contacting faces being glazed and resistant to penetration by adhesive, and spaced areas of adhesive uniting said sheets, said adhesive penetrating only slightly into said sheets.

5. In a container having closing flaps lapped upon one another, a sealing insert between two flaps and adhesively secured thereto, said insert comprising two sheets of machine glazed kraft paper having their glazed surfaces abutting, and spaced areas of adhesive uniting said sheets.

6. In a container as in claim 5, said adhesive areas comprising from 10 to 50% of the contacting surface area of said sheets, and said insert being adhesively secured to said flaps over from 60 to 100% of the outside area of said insert.

7. In a container having inner and outer closing flaps lapped upon one another, a sealing insert between two flaps, said insert comprising two sheets of machine glazed kraft paper each not less than thirty pounds basis weight having their glazed faces firmly glued together by numerous small spaced areas of adhesive equally distributed in a uniform pattern, said areas covering about twenty-two percent of the entire area of contact, said insert being firmly glued to said inner and outer flaps over substantially their entire area.

8. In a container as in claim 7, said spaced areas of adhesive covering not less than 22 percent and not more than 50 percent of said area of contact.

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