June 28, 1927. 1,634,073

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REENFORCED AND LEAK TIGHT PAPER BOX

Filed March 13, 1924

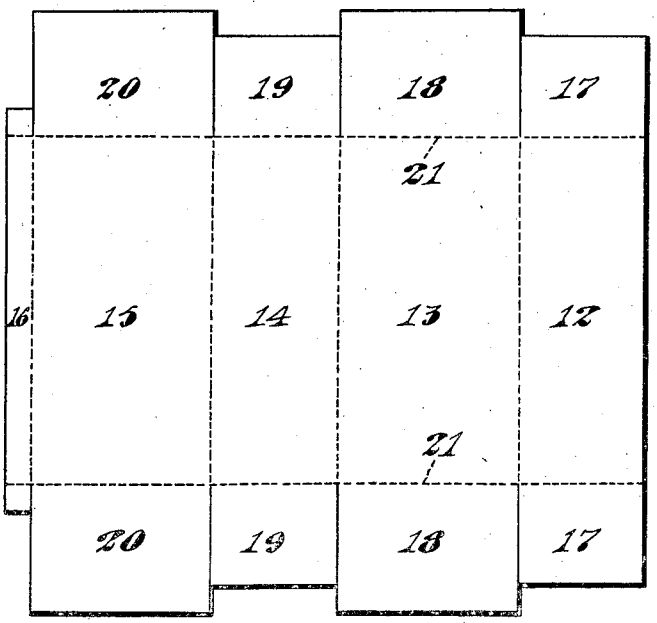


Fig. 1.

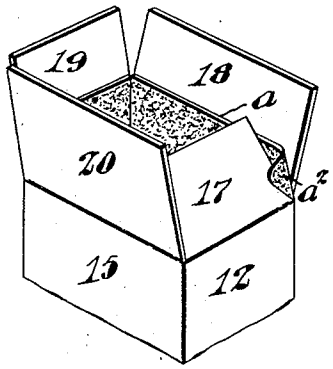


Fig. 4.

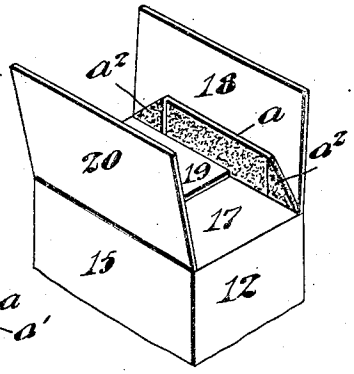


Fig. 5.

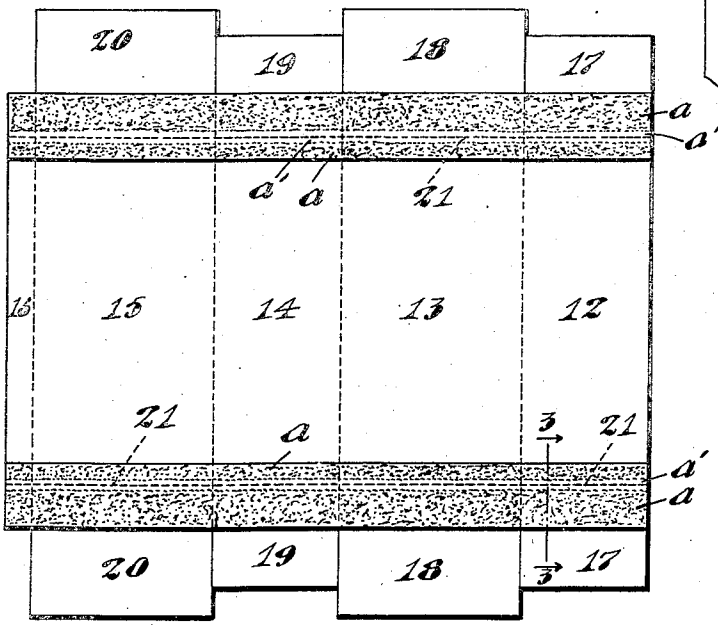


Fig. 2.

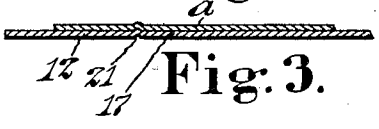


Fig. 3.

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UNITED STATES PATENT OFFICE.

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REENFORCED AND LEAK-TIGHT PAPER BOX.

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This invention relates to paper boxes and has particular reference to the production of boxes having no corner openings through which comminuted material can escape or through which the dampness of moist air, or insects or germs, can gain access to the contents of the boxes.

Paper boxes are now very largely used for containing, for sale to users, many kinds of more or less comminuted goods such as cereals, flour, ground coffee, salt, sugar, soap flakes, and cleansing powders. For the sake of economy in transportation and in storage space, as well as for cheapness and rapidity of production by automatic machinery, it is customary to employ the type of boxes known as folding boxes or cartons which can be shipped and stored flat and then opened or "set up" for filling. They usually include eight flaps (four for the bottom and four for the top) and the slits or cuts which define the edges of said flaps extend in to those portions which constitute the eight corners of the box. When such a box is set up, and filled, and the flaps folded in to close the box, there is a small hole, frequently referred to as a "pin hole," at the inner end of each slit. Consequently, unless something is provided to obstruct these holes at the corners of the box, moisture or germs or small insects can enter, and finely comminuted material is liable to escape. So far as I am aware, the only obstruction heretofore found practicable for the holes has consisted of paper wrappers or wax paper linings. Such wrappers or linings are usually of paraffined paper when the boxes contain something which would be affected by moisture. The use of such wrappers or linings adds materially to the expense which expense is, of course, eventually borne by the consumers of the goods.

An important feature of my invention consists in the provision of flexible tear-resisting corner reenforcements which are lightly and uniformly secured to the blanks and traverse the inner ends of the flap-defining slits and, after the box is filled, are folded with the flaps so as to not only strengthen the corners of the box but also effectively bar egress of any of the contents of the box no matter how finely comminuted it may be, and also prevent ingress of moisture, insects, or germs. This renders unnecessary the employment of any kind of outside wrapper, and enables the usual attractive printing, or directions, on the outside of the box to be seen without the cloudy effect produced when paraffined paper wrappings are employed.

The object of lightly but uniformly securing the reenforcements, adhesively, to the blanks, and the advantages thereof, will be explained hereinafter.

Preferably the reeinforcements are applied in the form of strips to that surface of the blank which is inside when the blank is folded to box form, but in any event such strips are applied to the blanks before they are converted to box form because, if applied after the box is made up and filled, the applying of the strips would either have to be effected manually or by the independent operation of rather expensive mechanism. Under my invention, the strips can be applied by the machine which folds the blanks to flat form for shipment to those who are to fill the boxes.

In the accompanying drawings I have illustrated my invention as applied to, or in connection with, a well known form of box now commonly used for containing sugar, said form being also used for other goods. It is but one of several forms of boxes in which the present invention may be embodied.

Of the drawings:—

Figure 1 is a plan view of the said ordinary blank alone.

Figure 2 is a plan view of the blank with the strips affixed thereto.

Figure 3 represents a section on line 3—3 of Figure 2 on an exaggerated scale.

Figures 4 and 5 are views to illustrate successive steps of closing either end of the box.

Numerals are employed to designate the different portions of the blank, and letters to indicate my improvements.

The material of which the blank is made is cut and creased to form wall sections 12, 13, 14, 15, a narrow strip 16 which is to be adhesively secured to the margin of the section 12 by the usual folding machine, and flaps 17, 18, 19 and 20 at the end of the wall sections. Said flaps are foldable in the usual manner to close the ends of the box. When the box is to be used for containing comminuted material it is customary to refer to one end as the bottom and the other end as the top. Automatic machines are employed in large plants, which machines first

fold and seal the bottom flaps, then fill through the still open upper end, and then fold and seal the flaps at the top. The folding and sealing is the same at each end, viz: the flaps 17, 19, are folded in until their end edges meet or (as is usual) slightly overlap, then while the flaps 18, 20, are held spread apart glue is applied to those surfaces which are then uppermost, then the flap 18 is folded onto the flaps 17, 19, and finally the flap 20 is folded onto the flap 18.

As so far described, the blank and the method of folding it, and filling and closing it, are well known. My improvements require no change in the blank itself so far as its shape is concerned, and require no change in the method of folding, filling and closing and sealing.

In carrying out my invention I affix to each blank, along and covering the two crease lines 21 on which the flaps are folded, strips *a* of strong flexible material such as Kraft paper, which material, as is well-known, is tougher and more wear-resisting than the kind of card board customarily employed for the blanks of boxes. This is easily effected while the blanks are flat as in Figure 1, by automatic machinery, so as to but slightly increase the cost of the reenforced blanks. It may be done while the bare blanks are on their way from a feeder to the usual mechanism which produces the flat folded cartons to be shipped to users or stored.

To enable the flaps to be closed successively in the usual order as hereinbefore described, without tearing the strips, said strips are held in position on the blanks by means of an adhesive (hereinafter referred to generically as glue) of a character which, while strong enough to prevent the strips from shifting out of position, is weak enough to hold the strips so lightly to the blank that when the flaps are closed down portions of the strips will pull away from the blank to enable portions of the strips to be doubled and interfolded with the flaps and result in the formation of packings at the corners of the boxes. Sometimes it is desirable that the strips shall be entirely free from the blanks along the crease lines 21. Therefore the mechanism which applies the glue for affixing each strip *a* is arranged to cause adherence only along those areas which are shaded in Figure 2, to leave the strip unsecured along a line *a'* coinciding with the crease line 21 of the blank. The reason for leaving the line or strips *a'* unsecured is to permit easier folding on the crease line 21. If glued at the crease line said crease line would be unduly stiffened, and therefore interfere with the correct flat inward folding of the flaps. Furthermore the moisture present in fresh glue would be liable to erase the crease line 21 by permitting it to flatten out.

It has been proposed to affix somewhat analogous strips to blanks by means of glue applied to some areas and not to others, but this necessitates the employment of gluing devices having a certain pattern. Such devices add to the expense of production and tend to reduce speed of production. And a more important objection is that whenever different shapes or sizes of blanks are to be provided with the reenforcing strips, changes must be made in the particular pattern or style of glue applying devices. Under my invention, including the employment of a weak glue which will enable any portions of the strips to be pulled away from the blanks without tearing or mutilation of either, the gluing devices may comprise the ordinary glue disks or wheels having uniform peripheries such as are commonly employed in box making machinery.

The result of weakly but uniformly securing the strips is that when the flaps 17, 19, are folded in (see flap 17 in Fig. 4) such portions of the strip as indicated at a^2 will be pulled away from the blank without tearing the strip but only doubling it.

The folding in of the two flaps 17, 19, after the set up box has been filled, carries with the flaps those portions of the strip *a* which extend across said flaps and pulls away the portions a^2 and doubles or folds them as indicated in Figure 5 because other portions of the strip are held supported by the flaps 18, 20. Then the flap 18 the inner surface of which is, in practice, preliminarily coated with glue, is folded onto the tops of the flaps 17, 19, the doubled portions a^2 being, of course, flattened out. Finally the flap 20, also carrying glue, is folded onto the flap 18. This order of folding is the same for both ends of the box and is as now practiced. But by the interposition of the strips *a* lightly secured and folded substantially as described, the crease lines of the box at top and bottom are reenforced and, most important of all, the corners of the box can have no holes through which anything deleterious can pass.

As indicated in Figure 3, the strip *a* is creased in line with the blank crease 21. Such creasing of the strip may be effected before applying the strip, or after. By such creasing of the strip liability of tearing at the corners of the box when the flaps are folded in is reduced. It also facilitates proper folding of the flaps on the crease lines 21.

The strips *a* even when continuous from end to end as is preferred, do not interfere with the flaps being held up during a filling operation conducted in the same manner as is customary. During filling there is no need for the flaps to be swung outwardly. After filling, and after the flaps 17, 19, are folded

in as in Figure 5, the presence of the strip can no longer interfere with outward turning of the flaps 18, 20, to enable their then upper surfaces to be coated with glue in the same manner as now practiced. In brief, the presence of the strips *a* interferes in no way with the present practice of converting the flat folded cartons to open condition and then closing the bottom flaps, depositing goods, and then closing the top flaps. The strips are applied to the blanks while the latter are flat and therefore add but slightly to the cost thereof. And they cause no increase whatever in the time required for packaging goods because they not only permit conversion of the blanks to flat folded form for shipment in the same manner as now practiced, but also require no variation whatever in the present methods of setting up, filling, and closing and sealing. In fact, for many classes of goods, expenses and time are reduced because no outside wrappers are necessary to ensure integrity of the contents of the boxes and therefore no wrapping machines are needed.

It will now be understood that blanks or boxes made according to my invention are characterized by tough tear-resisting reenforcing or leak-stopping material adhesively affixed by glue which is weaker than said material so that any tendency or effort to separate the said reenforcing material from the blank or box will pull the said material away without tearing it and without any liability of causing any holes to appear at the corners of the box.

Having now described my invention, I claim:—

A paper box blank cut and creased to provide foldable flaps and having strips of tough tear-resisting reenforcing material extending across the crease lines of the flaps, the entire areas of said strips being lightly glued to the blank whereby any portions of said strips may be pulled away from the blank without tearing the blank or the strips.

In testimony whereof I have affixed my signature.

ELIE W. LABOMBARDE.