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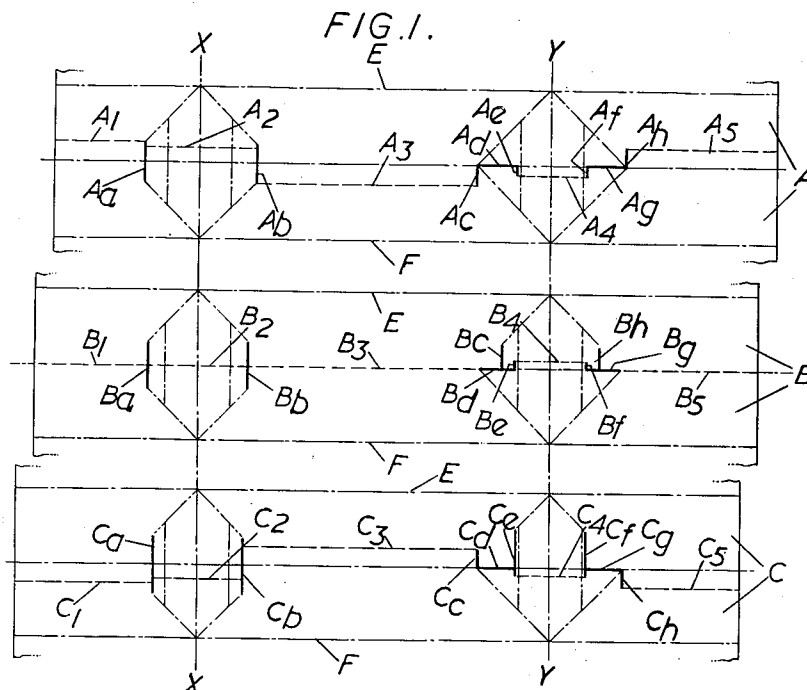
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2,990,102

MULTIPLY PAPER SACKS

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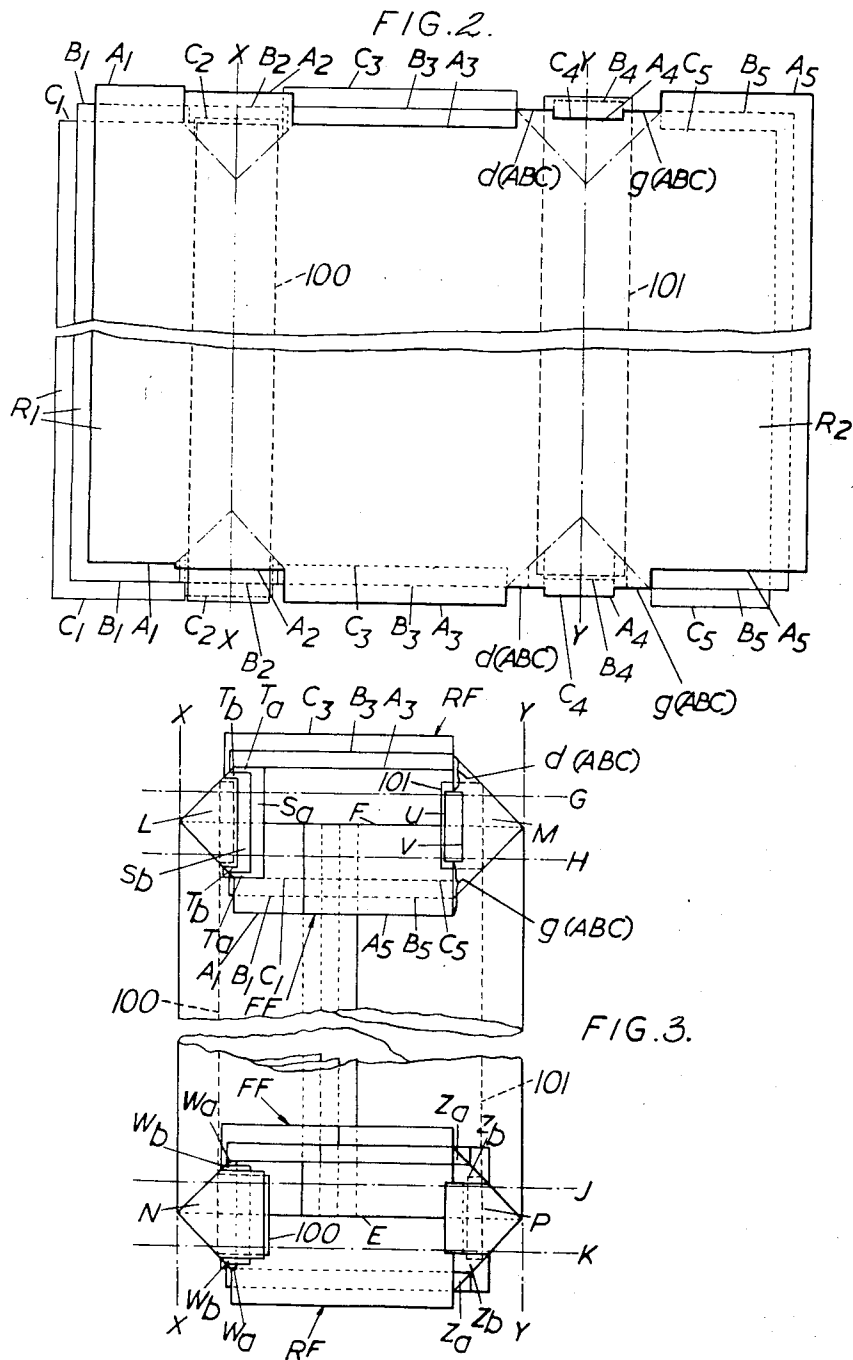
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MULTIPLY PAPER SACKS

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MULTIPLY PAPER SACKS

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The present invention relates to a multiply paper sack wherein one of the plies of the sack is a barrier ply. Multiply paper sacks are used for the packaging of a variety of materials some of which, for example, may have a corrosive effect on paper and/or must be protected from contamination by moisture. It is therefore the accepted practice to incorporate a barrier ply in a multiply paper sack which barrier ply is generally of special construction depending upon the proposed contents of the sack. The barrier ply may be the innermost, the outermost or the intermediate ply, but in the instance where it is the innermost ply it is desirable that the complete surface of the interior of the sack be constituted by the barrier ply; however, due to the outlines of the plies of a corner flap to obtain adequate strength thereof, a ply of the flap may project beyond the barrier ply and thus expose an area of paper to attack by the contents of the sack with possible consequent weakening of the corner flap, or moisture may enter the interior of the sack, the exposed paper acting as a wick.

According to the present invention, a multiply paper sack having a barrier ply wherein, at a corner of the sack due to the outlines of the plies of the corner flap constituting said corner, a ply or plies, other than the barrier ply, protrudes or protrude beyond the said barrier ply and exposes or expose, to the interior of the sack with respect to the barrier ply, an area or areas of paper, is characterised in that a barrier strip is interposed between the barrier ply and the other ply or plies, said barrier strip being so dimensioned as to protrude beyond the barrier ply and mask completely the exposed area or areas of paper of the other ply or plies.

Preferably the barrier strip extends longitudinally of the sack and extends beyond the innermost barrier ply at one or both ends of the sack depending upon the particular corner construction thereof. The barrier strip may be unattached or attached to any of the other plies of the sack and may be made of the same material as that of the barrier ply.

The invention is illustrated by way of example with reference to the construction of a multiply paper sack described in United States Patent No. 2,875,944, dated March 3, 1959, and in the accompanying drawings:

FIGURE 1 is a diagram of the outlines of the ends of the various plies for a three-ply bag as obtained by perforating, cutting and slitting the continuous webs of paper from which the plies are separated, each ply being taken from a separate web;

FIGURE 2 shows a severed bag tube length opened out, by releasing the tube forming seams, and incorporating a barrier strip according to the present invention; and

FIGURE 3 shows the bag tube length of FIGURE 2 after initial operations, in the forming of the blockbottom closures, have been performed.

A multiply paper sack according to the present invention may be manufactured according to accepted sack making procedure. In the manufacture of a sack a number of continuous lengths of paper, corresponding to the number of plies of a sack, are fed into a continuous tubing machine, which lengths of paper are superposed in transverse staggered relationship and then continuously folded longitudinally to form a tube, the overlapping

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longitudinal edges of the plies respectively being adhesively secured to each other. The individual lengths of paper, prior to passing through the tubing machine, are transversely perforated at spaced locations corresponding to a sack tube length so that, as the continuous tube passes out from the tubing machine, individual sack tube lengths may be severed therefrom, the individual plies being ruptured along said perforations.

Referring now to FIGURE 1, the paper web for the innermost ply A is perforated across part of its width along the dash lines A(1, 2, 3, 4, and 5) and slit in the direction of its length along the lines A(a, b, c, e, f and h). The web for the intermediate ply B is perforated across part of its width along the lines B(1, 2, 3, 4 and 5) and slit in the direction of its length along the lines B(a, b, c, e, f and h). The web for the outermost ply is perforated across part of its width along the lines C(1, 2, 3, 4 and 5) and slit in the direction of its length along the lines C(a, b, c, e, f, and h). The lines A(d and g), B(d and g), and C(d and g) indicate where the webs will subsequently be cut. It will be appreciated that in each case the outline of the head of one ply simultaneously outlines the tail of the ply immediately before it so that there is no waste of paper.

In FIGURE 1 the lines X—X and Y—Y are the longitudinal fold lines about which the plies are folded to form a bag tube. After perforation and slitting, the webs, as hereinbefore mentioned, are superposed on one another in a tubing machine so that they are staggered to provide stepped side edges R₁ and R₂, as shown in FIGURE 2, for securing together when formed into a tube.

A continuous tube having thus been formed, the bag tube lengths are separated therefrom by tensioning the leading length to rupture along the perforation lines whilst simultaneously chopping through all the webs along the lines A(d and g), B(d and g) and C(d and g), where the edges of all the plies are to be coincident. This will be seen best from FIGURE 2.

FIGURE 3 shows a bag tube length where the corner flaps L, M, N and P have been folded in and the front face flaps FF have been folded back about the lines E and F. Considering first the blockbottom valve closure, which is at the top of the sack as shown in FIGURE 3, it will be seen that the corner flap L at the non-valve corner exposes areas of both inner plies A and B for adhesive sealing to the face flaps FF and RF when they are folded in about their fold lines G and H. At this corner the innermost ply A extends beyond the other plies as indicated at Sa.

Turning now to the valve corner generally indicated at M, the intermediate ply B is longitudinally extended beyond the other plies to form a tongue U to constitute a valve seal and which extends in width slightly beyond the fold lines G and H of the face flaps. The other two plies A and C are cut back as at V for the same width as the tongue U and all the plies across the remainder of the corner flap have their edges coincident at d(A, B and C) and g(A, B and C).

Considering the blockbottom valve closure from the interior of the sack, as thus far described, it will be seen that at the non-valve corner the innermost ply A extends beyond and thus masks the remaining plies. Thus if the innermost ply A is a barrier ply at the non-valve corner L none of the non-barrier plies are exposed to attack by the contents of the sack. At the valve corner M the innermost ply A is cut back to V and the intermediate ply B extends as indicated at U. Thus at this corner an area of the intermediate ply B is exposed to the interior of the sack and thus open to attack by the contents thereof.

Referring now to the non-valve blockbottom valve closure, which is at the bottom of the sack as shown in

FIGURE 3, the corner flap N diagonally opposite the valve M is so constructed that both the intermediate ply B and the outermost ply C extend beyond the innermost ply A and thus expose areas to attack by the contents of the sack. At the corner P immediately under the valve corner M the innermost and outermost plies A and C have their edges coincident and extend beyond the intermediate ply B. Due to the fact that the edges of the innermost ply A and outermost ply C are coincident, the outermost ply C is masked completely by the innermost ply A.

The outlines of the individual plies of the sack hereinbefore described are so chosen as to give maximum strength at the corner L directly opposite the valve M and adequate strength at the corners N and P. To achieve maximum strength at the corner L, the innermost ply A is extended beyond the intermediate and outermost ply so as to expose an area for adhesive sealing to the face flaps FF and RF, but masking the other plies from the interior of the sack. Due to the fact that the outline of the head of one ply simultaneously outlines the tail of the ply immediately before it, it follows that at the corner N, immediately below the corner L, the innermost ply A will stop short of the intermediate ply B and outermost ply C. At this corner, therefore, as hereinbefore mentioned, both the intermediate and outermost plies would expose areas to the interior of the sack. In the case where the innermost ply A is a barrier ply these exposed areas of the plies B and C would be open to attack by the contents of the sack unless they are masked.

The areas of plies, other than the barrier ply, which would thus be exposed to the interior of the sack are masked, according to the present invention, by a barrier strip 100 as shown in FIGURES 2 and 3. The barrier strip 100 extends at the corner N to mask the exposed areas of the plies B and C, but stops short at the corner L. This barrier strip 100 is inserted between the innermost ply A and the intermediate ply B at the stage when the plies are superposed on each other and inserted into a bag tubing machine. The barrier strip 100 is ruptured simultaneously as the continuous bag tubing passing out from the tubing machine is ruptured. This is achieved by perforating a continuous length of barrier strip 100 transversely at intervals corresponding to the bag tube length. The feed of the continuous length of barrier strip 100 is synchronised with the feeding of the paper webs into the tubing machine and in this manner a multiply paper sack according to the present invention and incorporating a barrier strip can be manufactured according to accepted methods.

The barrier strip 100 extends down one side of the bag and a second barrier strip 101 extends down the other side of the bag as indicated in FIGURES 2 and 3. The barrier strip 101 extends at the valve corner M beyond the edge V of the innermost ply A to mask the exposed area, which terminates at U, of the intermediate ply B. There is no need for the barrier strip 101 to extend at the corner P because the barrier ply A is coincident with the outermost ply C.

The barrier strips 100 and 101 preferably are made of similar material to that of the barrier ply, which may comprise a sheet of kraft paper with a coating on one surface of a plastic film forming material, for example polyethylene the film of polyethylene constituting the barrier surface. In this particular instance the coated sur-

face of the barrier strip would lie in the same direction as the coated surface of the barrier ply.

The barrier strip may be secured to the barrier ply or to any of the other plies, for example the intermediate ply B, but in practice it has not been found necessary to do this because the friction between the barrier strip and the other plies, between which it is sandwiched, is generally sufficient to prevent movement of said strip during the course of manufacture of the sack. If it is desired to secure the barrier strip to one of the other plies, this may be achieved by applying to the barrier strip prior to assembly with the other plies, a suitable adhesive so that during the course of manufacture of the continuous tube, said strip is caused to adhere to at least one of the other plies. The barrier strip may comprise only a film of plastic material, for example polyethylene, and in this instance it may be secured over the majority of its length to one of the plies between which it is sandwiched.

The present invention has been described with reference to one particular construction of sack, but it may be applied to any combination of multiply paper sack having two or more plies.

What is claimed is:

1. A multiply paper sack having a barrier ply and other plies and wherein a corner of the sack is constituted by a corner flap in which one of said other plies protrudes beyond said barrier ply and exposes to the interior of the sack, with respect to the barrier ply, an area of said one of said other plies, and including a barrier strip interposed between the barrier ply and said one of the other plies, said barrier strip protruding from between said barrier ply and said one of said other plies beyond the barrier ply and masking completely the exposed area of said one of said other plies which protrudes beyond said barrier ply, with respect to the interior of the sack.

2. A multiply paper sack having a barrier ply and other plies and wherein a corner of the sack is constituted by a corner flap in which one of said other plies protrudes beyond said barrier ply and exposes to the interior of the sack, with respect to the barrier ply, an area of said one of said other plies, and including a barrier strip interposed between the barrier ply and the other plies, said barrier strip extending longitudinally of the sack and protruding from between said barrier ply and said one of said other plies beyond the barrier ply and masking completely the exposed area of said one of said other plies which protrudes beyond said barrier ply, with respect to the interior of the sack.

3. A multiply paper sack according to claim 2 wherein the barrier strip is unattached to any of the plies of the sack.

4. A multiply paper sack according to claim 2 wherein the barrier strip is attached to at least one of the plies of the sack.

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