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(54) IMPROVEMENTS IN OR RELATING TO BLOCK-BOTTOM BAGS

(71) We, FISCHER & KRECKE KG, a Company organised under the laws of the Federal Republic of Germany of Apfels-
 5 trasse 8, 48 Bielefeld, Federal Republic of Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-
 10 This invention relates to a method of making a block-bottom bag from a tubular blank of a weldable plastics sheet material and to a block-bottom bag when made by the method.
 15 According to the present invention, there is provided a method of making a block-bottom bag from a tubular blank of a weldable plastics sheet material, comprising the steps of treating a zone on the inside of the
 20 blank to prevent welding to said zone, subjecting the blank to successive folding operations to form bottom flaps with mutually overlapping edge portions extending into double-layer triangular end flaps, weld-
 25 forming a seam along the full length of the overlapping edge portions, folding said flaps inwards and weld-forming a seam across each flap to close off passage between the layers of the flaps, and securing the
 30 inwardly-folded flaps to the bottom flaps, said zone being positioned so as to underlie the said overlapping edge portions to prevent welding thereof to either front or back wall of the bag during weld-forming of the associ-
 35 ated seam.
 Further, according to the present invention, there is provided a block-bottom bag when made by the method aforesaid.
 40 For a better understanding of the present invention and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:
 45 FIGURE 1 shows a plan view of a bag blank after incisions have been made and

after certain surfaces have been printed but before the beginning of folding;
 FIGURE 2 shows a longitudinal sectional view through the blank of Figure 1 on the line 2-2;
 50 FIGURE 3 shows a plan view of an open end of the blank of Figure 1 after the corner turn-ins have been made;
 FIGURE 4 shows a sectional view on the line 4-4 of Figure 3;
 55 FIGURE 5 shows another step in the folding of the bag bottom from the blank of Figure 1;
 FIGURE 6 shows a sectional view on the line 6-6 of Figure 5;
 60 FIGURE 7 shows the next step in the folding of the bag bottom from the blank of Figure 1;
 FIGURE 8 shows a partial view on an enlarged scale of a part of Figure 7;
 65 FIGURE 9 shows a partial view similar to Figure 8 but of another embodiment of the invention;
 FIGURE 10 shows a sectional view on the line 10-10 of Figure 7;
 70 FIGURE 11 shows a plan view corresponding to Figure 3 but shows a valved bottom;
 FIGURE 12 shows a sectional view on the line 12-12 of FIGURE 11;
 75 FIGURE 13 shows a plan view of another step in the making of the valve;
 FIGURE 14 shows a sectional view on the line 14-14 of Figure 13;
 80 FIGURE 15 shows a plan view of another step in the making of the valved bag bottom;
 FIGURE 16 shows a sectional view on the line 16-16 of Figure 15;
 85 FIGURE 17 shows a view similar to Figure 13 but of another embodiment of a valve bag;
 FIGURE 18 shows a sectional view on the line 18-18 of Figure 17;
 90 FIGURE 19 shows a plan view of another step in the making of the valve bag of Figure

17; and

FIGURE 20 shows a sectional view on the line 20-20 of Figure 19.

5 In the drawings, a tubular bag blank 1 is laid flat to form layers 15 and 16. Blank 1 has open ends 2 and 3. The end 2 is adapted to form a sealed block bottom, and the end 3 is adapted for the making of a valve. The end 2 is provided at a distance from side edges 6, 7 of blank 1 corresponding to substantially half the overlapping width of the bottom flaps - which will be described in greater detail hereinafter - with incisions 4 and 5 whose depth will be described with reference to Figure 3. The edge strips separated by the incisions 4 and 5 are so severed at the free ends that square corner cut-outs 8 and 9 arise.

20 The end 3 is provided on one side, near edge 6, with a corresponding incision 10 and a corner cut-out 11. At the other corner is an incision 12 whose distance from edge 7 is greater than half the bottom width of the bag, as will be described in greater detail hereinafter. No corner cut-out is associated with incision 12.

25 At the ends 2 and 3, are two strips 13 and 14 represented by cross-hatching, which are printed strips on layer 16. Each strip constitutes an additional layer or coating as is more clearly apparent from Figure 2, the purpose of this coating being hereinafter explained. Each end of the strip 13, and the left-hand end of the strip 14, is spaced from the associated side 6, 7 by a distance equal to the distance between a diagonal 23 (See Fig. 3) and its adjacent side 6, 7. The right-hand end of strip 14 terminates adjacent the incision 12. The distance between the layers 15 and 16 and the thickness of the printed strips 13 and 14 are shown to an exaggerated scale in Figure 2 for the sake of illustration.

30 Figure 3 shows the open end 2 of Figure 1 after the production of corner turn-ins 17 and 18. The turn-ins 17 and 18 are mutually identical. The details associated with the regions of one such turn-in are as follows. The turn-in 17 is bounded by fold lines 19 and 20. Extending perpendicularly therefrom are two fold lines 21 and 22 which with the outer portions of fold lines 19 and 20 bound a square having a diagonal 23 of length equal to the intended width of the block bottom. The fold lines 21 and 23 terminate at the respective inner ends of the incisions 4. Since the diagonal 23 corresponds to the width of the block bottom, the lines connecting the end points of diagonal 23 to the corresponding end points of the diagonal in the other corner turn-in 18 define the longitudinal edges 24 and 25 of the block bottom. The layers 15 and 16 of the blank 1 and the turn-ins 17 and 18 are visible in cross-section in the sectional view of Figure 4.

65 Figure 5 shows another step or stage in

making the block bottom. The inner halves of the squares in the two turn-ins 17 and 18 are folded outwardly about the diagonals 23 to appear in Figure 5 as generally triangular shapes with portions 26 and 27 formed by the incisions 4,4 and 5,5 contiguous therewith. The bottom flaps 28 and 29 are simultaneously folded inwards so that triangular end zones 30 to 33 of the flaps 28 and 29 overlie the folded squares and form double-layer triangular flaps with the inner halves of these squares. The flaps 28, 29 overlap one another in the region of the overlapping width *x* (see Figure 5) forming overlapping strips 34 and 35. The strips 34, 35 are joined together by means of two longitudinal weld seams 36 and 37 which extend beyond the ends of strip 13 and over those halves of the squares which have been folded about the diagonals 23. The seams 36 and 37 thus connect the latter halves to the triangular end zones 30 to 33. The seams 36 and 37 extend transversely to the direction of stretch of the bag material, such direction corresponding to the tube direction of blank 1. The seams 36 and 37 are shrink seams, the welding tools separating from one another immediately after welding and before cooling. The strip 13 printed as shown in Figures 1 and 2 lies at the underside of the inner of overlapping strips 34 and 35. The strip 13 prevents unwanted sticking to layers 15 or 16 in the region of the seams 36, 37.

Figure 6 shows a view in longitudinal section, spread out exaggeratedly for the sake of illustration, of the overlapping strips 34 and 35 with the seams 36 and 37 and the printed strip 13.

Figure 7 shows another step in making the block bottom. The double-layer triangular flaps formed by the inner halves of the squares with the portions 26, 27 and the end zones 30 to 33 of the bottom flaps 28, 29 are now folded inwardly about diagonal 23. The layers of these triangular flaps are then further welded together by a cross-seam 38 which extends parallel to the diagonals 23 thereby to close off passage between the layers. To prevent unwanted sticking during the welding of the cross-seam 38, that zone of the bottom flaps which is below the seam 38 may have been printed previously. The provision of the cross-seam 38 in the folded-back position of the triangular flaps reduces stressing so that these flaps now remain above the bottom flaps. The portions 26 and 27 are welded to the bottom flaps by means of weld seams 39 and 40 on the bottom flaps, more particularly to the overlapping strips 34 and 35 by weld seams 39 and 40 extending parallel to the longitudinal seams 36 and 37. Details can be gathered more particularly from Figure 8.

Figure 9 corresponds to Figure 8 but relates to another embodiment of the inven-

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tion wherein the inner halves of the squares are connected to the triangular end zones 30 to 33 of the bottom flaps 28 and 29 not only by a cross-weld seam 55 but also by a number of weld seams 41 to 44 which extend parallel to the seams 36 and 37.

Figure 10 is a view in cross-section corresponding to Figures 7 and 8. As will be more particularly apparent, folding the inner halves of the squares with the contiguous portions 26 and 27 over the bottom flaps ensures that the seams retaining such portions and the folded-over halves of the squares are lightly loaded.

Figures 11 to 16 show the making of a valve at end 3. To make a valve, a valve sheet or leaf must be welded to contiguous parts of the bag. Since bags of the kind of interest here usually have printed particulars on their outside about their contents and since printed foils are difficultly weldable, it may be convenient to use an initially inside zone of the bag for the securing of the valve leaf.

Accordingly, and as can be seen in Figure 1, incisions 12 are first cut in the two layers 15 and 16 of the bag blank 1. After the corner turn-ins have been made, the incisions 12 bound a rectangular area 45 which can be seen on the right-hand side of Figure 11. The left-hand side of Figure 11 is identical with the view given in Figure 3. Figure 12 shows a cross-section on the line 12-12 during this stage of folding. In Figure 13, the rectangular surface 45 is folded outwardly on to the remaining corner turn-in and welded there in a number of spots which are not shown. A rectangular valve sheet or leaf 46 is placed on the surface 45 and the contiguous zone of the still open bottom flaps 28 and 29. Sheet 46 is secured by means of a weld seam 47 extending along the three free edges of the rectangular surfaces 45, merges into the contiguous zone of the bottom flaps and then branches off at right-angles and outwardly towards the edge of the bottom flaps or valve sheet 46. Figure 14 shows this stage of folding in a cross-section on the line 14-14 of Figure 13.

Figure 15 shows the next step in producing the valved bag bottom. The left-hand side corresponds for example to the illustration of Figure 7 and need not be explained again, but a completed valve is visible on the right-hand side. As can be seen in Figure 13, the valve sheet 46 extends as far as the edge of the flap 29 in the bottom of Figure 13 while at the top of Figure 13 the sheet 46 terminates at a distance from the edge of flap 28, thus ensuring that when the overlapping strips of the flaps are laid on top of one another, four layers of material are not positioned one above another. The folding of the bottom flaps brings the sheet 46 into a tubular state and the overlapping strips of the bottom flaps are welded together as basically described in the foregoing. An inlet valve

therefore arises which is compressed automatically and closed by the material present in a filled bag. Figure 16 is another view of the complete valve, the view being in cross-section on the line 16-16 of Figure 15.

Figures 17 to 20 show another embodiment of a valve which has been found to provide a very reliable and tight closure. As in the previous case, the incisions 12 of Figure 1 are used to bound a rectangular surface 45 but the same is not folded outwardly on to the remainder of the corner turn-in. A rectangular valve sheet 48 is welded to the rectangular surface 45, the contiguous region of the bottom flaps and the contiguous remaining part of the corner turn-in. Weld seam 49 extends on the corner turn-in parallel to an imaginary connecting line between the end points of the incisions 12, then meets the surface 45 at right-angles, then departs therefrom at right-angles to the bottom flaps. Referring to Figure 17, a line 50 shown chain-dotted separates off an edge strip 51 of member 48, edge strip 51 having been welded in the manner hereinbefore described. It is possible to provide further weld seams 52 and 53 which extend parallel to the longitudinal centre-line of the bag bottom between line 50 and weld seam 49. Figure 18 shows another cross-sectional view corresponding to Figure 17. The main zone 54 of member 48, such zone being contiguous with the edge strip 51, is now folded through 180° over the edge strip, whereafter the complete system comprising the bottom flaps and the valve sheet is assembled in the manner described and interconnected to give the arrangement shown in Figures 19 and 20.

An important process step described above is the printing of one of the overlapping strips of the bottom flaps as shown in Figures 1 and 2. To this end, the layers 15 and 16 of the blank 1 may be spread apart and the printing effected.

WHAT WE CLAIM IS:-

1. A method of making a block-bottom bag from a tubular blank of a weldable plastics sheet material, comprising the steps of treating a zone on the inside of the blank to prevent welding to said zone, subjecting the blank to successive folding operations to form bottom flaps with mutually overlapping edge portions extending into double-layer triangular end flaps, weld-forming a seam along the full length of the overlapping edge portions, folding said flaps inwards and weld-forming a seam across each flap to close off passage between the layers of the flaps, and securing the inwardly-folded flaps to the bottom flaps, said zone being positioned so as to underlie the said overlapping edge portions to prevent welding thereof to either front or back wall of the bag during weld-forming of the associated seam.

2. A method according to claim 1,

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wherein the said zone is a strip extending along part of one of said edge portions, the ends of said strip being spaced from the ends of the edge portion so that the strip does not extend into said triangular end flaps when formed during said folding operations.

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3. A method according to claim 1 or 2, wherein the blank is provided with incisions which are positioned adjacent the side edges of the blank when laid flat and which produce a rectangular single-layer tab at the free extremity of each said double-layer triangular flap, and the blank has portions removed adjacent the said incisions so that said tabs do not extend beyond said side edges during the folding operations.

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4. A method according to any one of the preceding claims, wherein the weld-formed seam along said overlapping edge portions is a shrink seam.

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5. A method according to claim 3 or 4, including the step of weld-forming seams to connect said tabs to the bottom flaps.

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6. A method according to any one of the preceding claims, including the step of weld-forming further seams mutually to interconnect the layers of said triangular flaps, said further seams being parallel with and spaced from said overlapping edge portions.

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7. A method of making a block-bottom bag from a tubular blank of a weldable plastics sheet material, substantially as hereinbefore described with reference to Figs. 1 to 10 of the accompanying drawings.

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8. A block-bottom bag when made by the method according to any one of the preceding claims.

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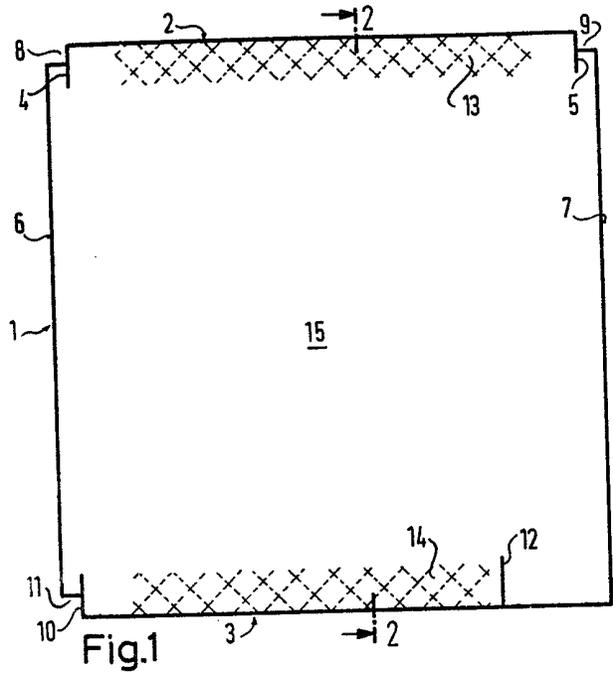


Fig.1

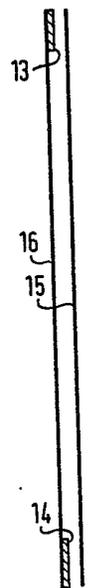


Fig.2

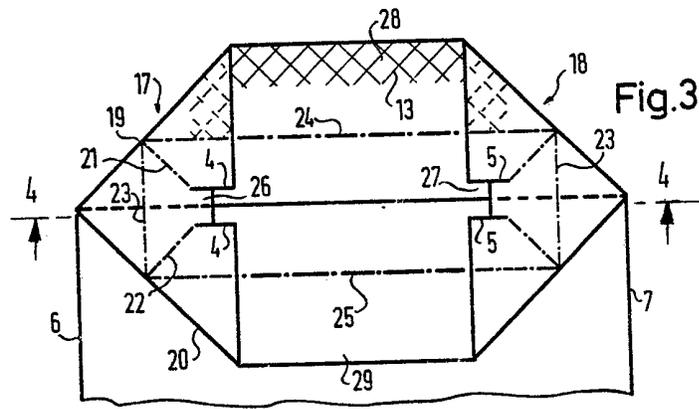


Fig.3

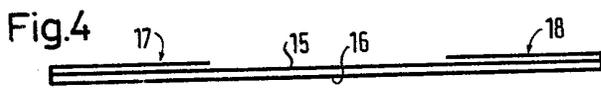
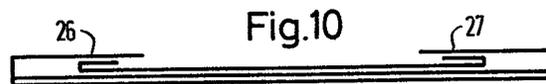
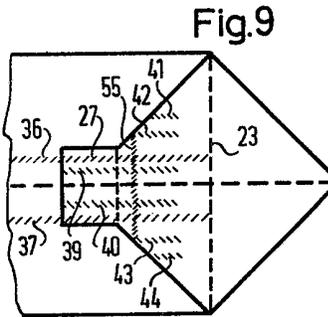
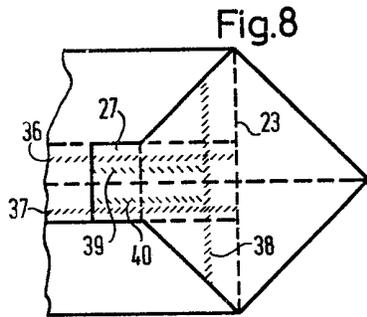
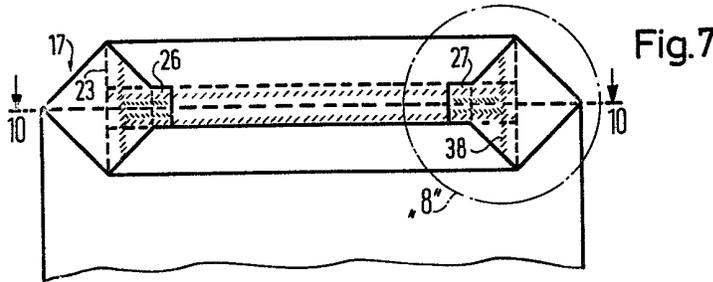
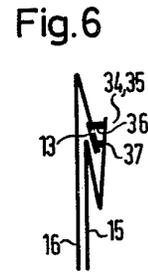
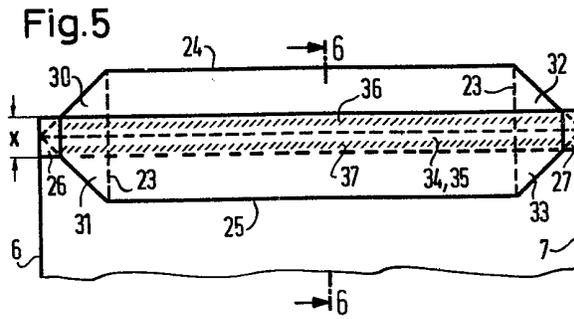


Fig.4



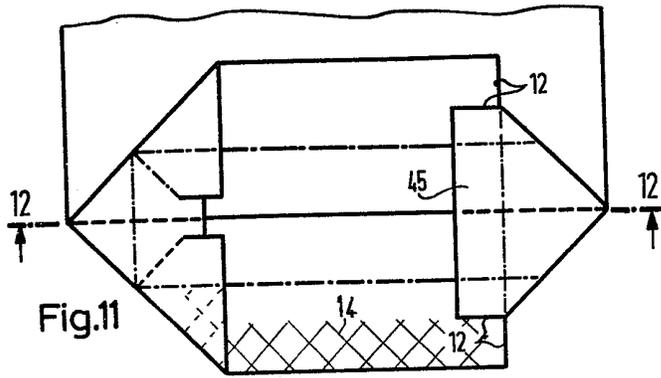


Fig. 12

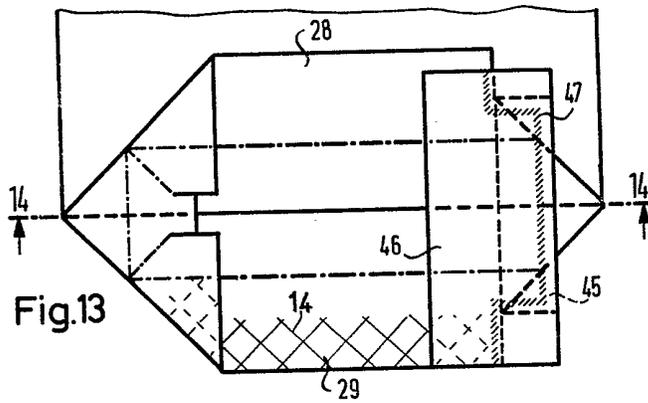
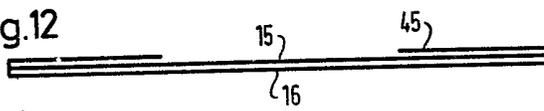


Fig. 14



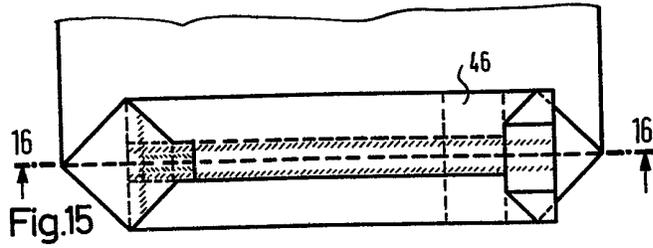


Fig. 16

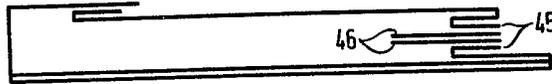


Fig. 17

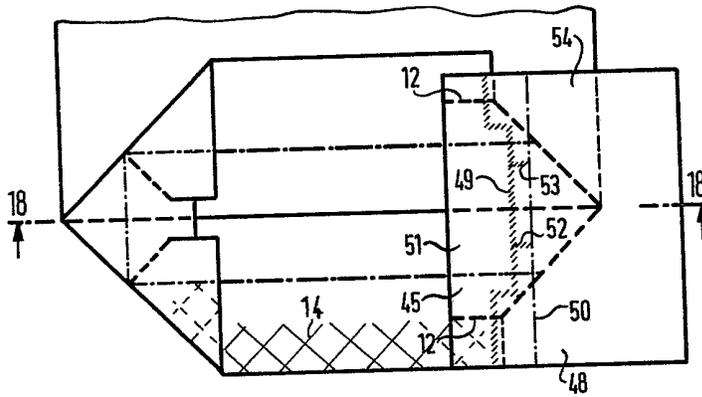


Fig. 18

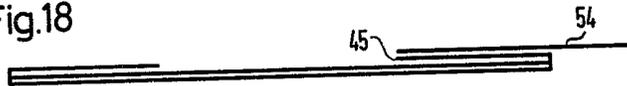


Fig.19

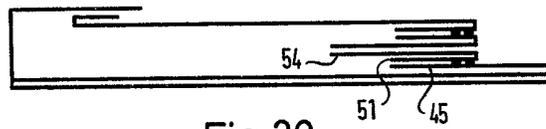
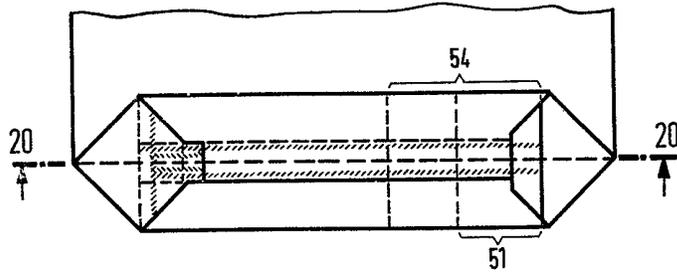


Fig.20