

July 10, 1962

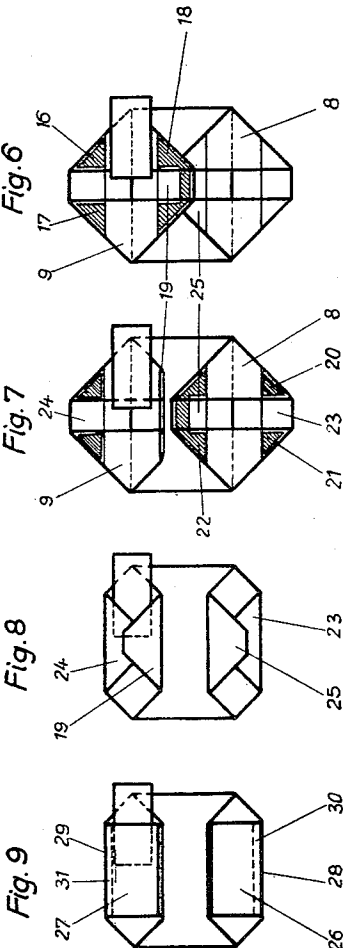
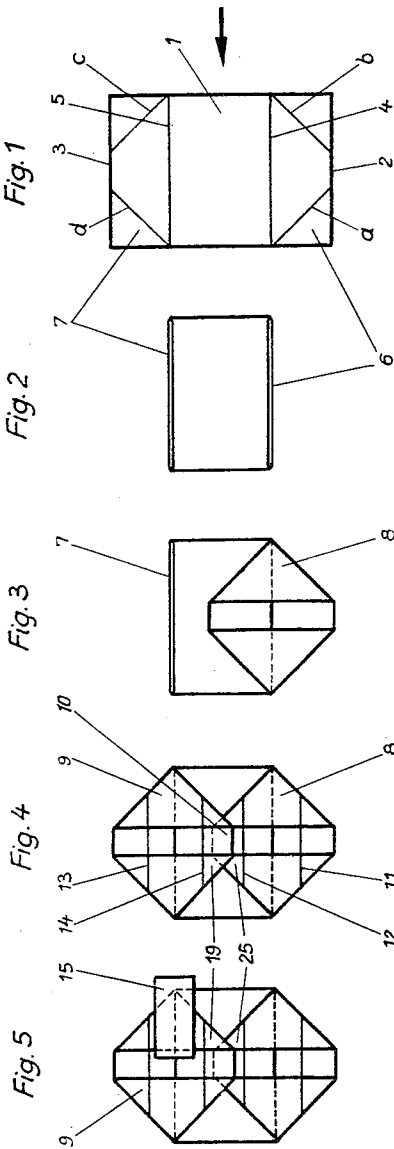
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3,043,199

MANUFACTURE OF CROSS-BOTTOMED VALVE BAGS

Filed Oct. 14, 1960

3 Sheets-Sheet 1



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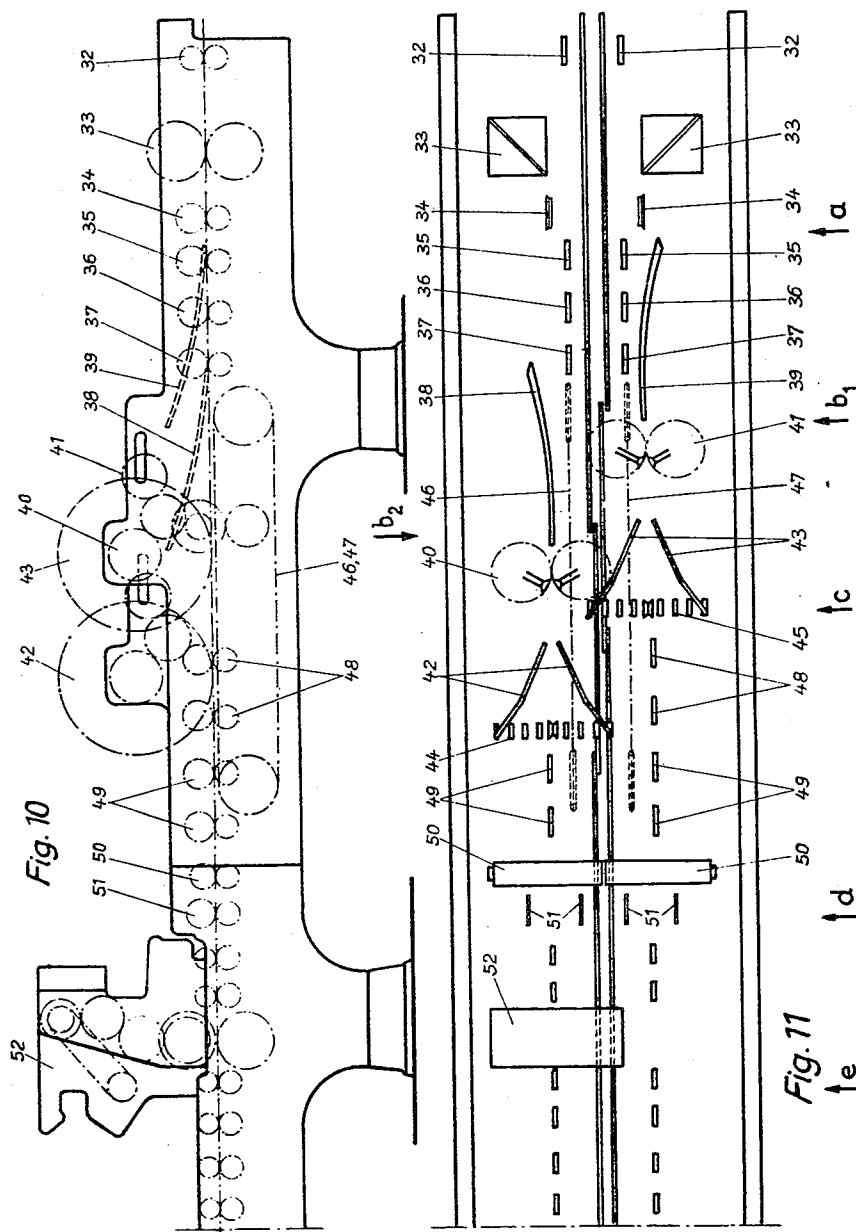
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MANUFACTURE OF CROSS-BOTTOMED VALVE BAGS

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3 Sheets-Sheet 2



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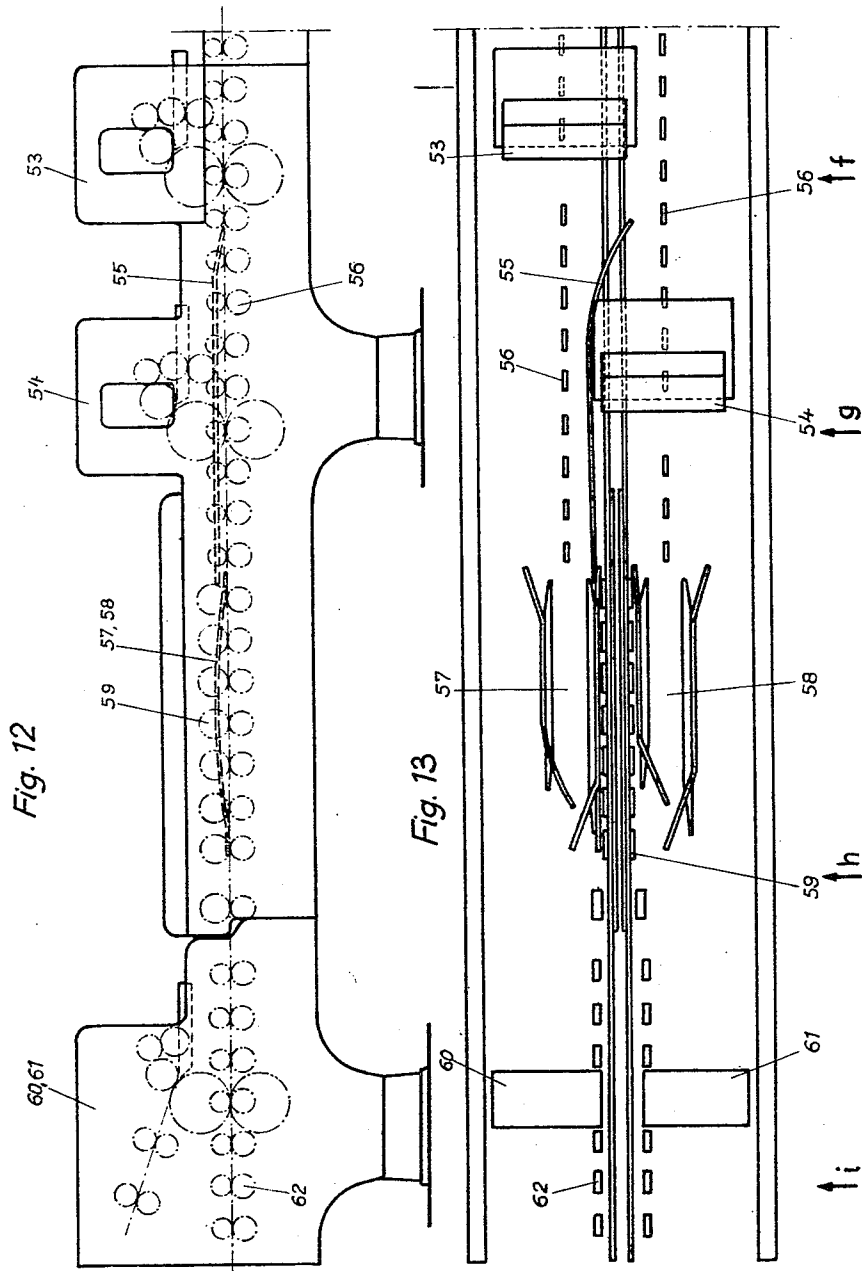
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MANUFACTURE OF CROSS-BOTTOMED VALVE BAGS

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3 Sheets-Sheet 3



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## 3,043,199 MANUFACTURE OF CROSS-BOTTOMED VALVE BAGS

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7 Claims. (Cl. 93-8)

This invention relates to the manufacture of cross-bottomed valve bags.

Machines for manufacturing cross-bottomed valve bags wherein flat open-ended tubular blanks are fed in a transverse direction lying in the plane of the blanks and, while the blanks are being fed in this way the two end portions of each blank are simultaneously formed into base squares lying in the plane of the blank and then glued and folded to form the cross-bottoms, are well known. A representative machine of this type is shown in U.S. Patent No. 2,570,047. In such machines, corresponding operations on the two ends of the blank or partially formed bag are performed simultaneously. This procedure cannot be followed, however, in the case of bags that are so short in relation to their width that the two base squares overlap one another. It has been proposed to manufacture such short bags by first completing the cross-bottom at one end and thereafter forming the cross-bottom at the other end of the bag, but this procedure necessitates using a machine of double the length as compared with a machine for manufacturing longer bags in which this overlapping does not occur.

In order to reduce the length of machines for manufacturing such short bags, it has been proposed that the end portions of each blank should be formed into base squares that lie in planes that are perpendicular to the plane of the main body portion of the blank that is to form the body of the bag. The base squares do not overlap one another and so can be formed simultaneously. One base square is then folded into the plane of the blank and then glued and folded to form a cross-bottom, and thereafter the other base square is folded into the plane of the blank and then glued and folded to form a cross-bottom. Thus, even according to this proposal, only the formation of the base squares is carried on simultaneously at each end of the blank, and the length of the part of the machine that performs the remaining operations has to be doubled as compared with the corresponding part of a machine for the manufacture of large bags. Such a process is described in German printed application W 14,665 VII/54b, published January 5, 1956.

The present invention provides a process for the manufacture of cross-bottomed valve bags, which comprises forming one end portion of a flat open-ended tubular blank into a first base square, thereafter forming the other end portion of the blank into a second base square that overlaps the first base square, applying an adhesive substance such as glue to at least the overlapping portion of the second base square, thereafter folding the overlapping portion of the second base square out of the plane of the blank, applying an adhesive substance such as glue to at least the previously overlapped portion of the first base square, and thereafter completing the two cross-bottoms substantially simultaneously.

The invention also provides apparatus for manufacturing cross-bottomed valve bags, which comprises feeding means for feeding flat open-ended tubular blanks successively to first forming means for forming one end portion of a blank into a first base square, second forming means for forming the other end portion of a blank into a second base square overlapping the first base square, first glueing means for applying glue to at least the overlapping

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portion of the second base square, means for folding the overlapping portion of the second base square out of the plane of the blank, second glueing means for applying glue to at least the previously overlapped portions of the first base square, and means for completing the formation of the two cross-bottoms.

The invention overcomes the prejudice that existed against allowing the two base squares of a partially formed bag to overlap one another during manufacture and that led to the procedure in which one cross-bottom was completed before formation of the other cross-bottom was started. The invention has resulted in the recognition that placing a valve member in position on one base square, of which a part overlaps the other base square, and subsequently glueing and folding that base square to form a cross-bottom, is not prevented by the prior formation of the other base square.

Comparison of the process of the invention with the conventional process for the manufacture of longer cross-bottomed valve bags wherein both the cross bottoms can be formed simultaneously shows that the process of the invention is lengthened only by one stage for forming the first-formed base square in the plane of the blank and by one stage for applying glue to this first base square. The folding of the overlapping portion of the second base square out of the plane of the blank takes place between the two stages for applying the glue, and requires only a short length of about  $\frac{1}{2}$  the width of the blanks.

In comparison with the method of manufacture of short cross-bottomed valve bags which results from the misapprehension that one crossed bottom must be completed before beginning work on the other one, the process is shortened by three stages: forming one base square, applying glue to one base square, and forming one base square into a cross bottom.

The shortening of the machine is a remarkable advantage of the invention. Another important advantage is that the means for performing corresponding operations on the two ends of each blank are not separated from one another by means for performing other operations, but follow each other immediately. Because of this, the lay-out of the machine remains in principle similar to that of a normal machine, because the drives and the basic arrangement of the machine, which in all their peculiarities are necessary for the individual stages, remain near each other and need not be brought up twice on the machine at separate points. It should be noted here that, for feeding the blanks during the drawing up and laying of the base squares, it is preferable to use gripping chains, whereas, at other stages, rollers are more suitable. In the case of a machine wherein the stages for forming the two crossed bottoms follow each other, the blank must be given up to the rollers after it has been fed by means of gripper chains and then must be released by the gripper chains and transferred to rollers again.

An embodiment of the invention will now be described by way of example in greater detail with reference to the accompanying drawings in which:

FIGURES 1 to 9 show the successive folding and glueing operations diagrammatically;

FIGURES 10 and 11 are a diagrammatic side elevation and plan view respectively of the front part of an apparatus for forming short cross-bottomed valve bags; and

FIGURES 12 and 13 are a diagrammatic side elevation and plan view respectively of the rear part of the apparatus shown in FIGURES 10 and 11.

Referring to FIGURES 1 to 9 of the drawings, the flat tubular blank 1 with open ends 2 and 3, and fold lines 4, a, b, 5, c, and d is fed in the direction of the arrow perpendicular to the long axis of the blank 1, and in the plane thereof, and is first folded into the form shown in FIGURE 2 by folding about the lines 4 and 5. Both the high raised end portions 6 and 7 are immediately opened, drawn

up and formed into base squares in the plane of the blank 1 one after another, whereby first the high raised end portion 6 is formed into a first base square 8 (see FIGURE 3) and then the end portion 7 is formed into a second base square 9 (see FIGURE 4) so that the second base square 9 overlaps the first base square 8 on a portion 10. In an accompanying joint operation, the fold lines 11, 12 and 13, 14 are produced for subsequent turning over of the side covers. A valve 15 is then inserted and after that, glue is applied to the second base square 9 as shown in FIGURE 6 by means of shaded areas 16, 17 and 18. Subsequently, the side layer 19 of the second base square 9 is folded perpendicular to the plane of the blank 1 so that glue can be applied to the first square 8, as shown in FIGURE 7 by means of shaded areas 20, 21 and 22. After this, in a simultaneous operation, both the crossed bottoms are formed by turning over the side layers of the two base squares 8 and 9. In this case the side layers 23 and 24 that are directed outwards may be turned over before the high raised side layer 19 or the inwardly directed side layer 25 (see FIGURE 8).

Finally, it is desired in most cases to cover and strengthen the crossed bottoms by means of glued wrappers 26 and 27 which may preferably be turned over around the external base lines and laid on a piece 30 and 31 and glued to with the bag walls.

The apparatus for carrying out this process is shown in FIGURES 10 to 13. To this apparatus is preconnected an isolating and restraining device not shown in the drawings. A feeding stage 32, which may also be combined with a device for forming the sections for production of rectangular side covers, is followed by the device 33 for forming the diagonal fold lines *a* to *d* (see FIGURE 1) to prepare for the formation of the base squares. This is followed by a stage 34 in which the fold lines 4 and 5 are produced. The blank then acquires, at the point indicated by the arrow, the form shown in FIGURE 1. Up to this point, the apparatus resembles the well known machines for the production of cross-bottomed valve bags with non-overlapping base squares.

There follow pairs of co-operating feed rollers 35, 36 and 37, which feed the blanks, at least partly, through the well known contrivances 38 and 39 for raising the end portions 6 and 7 of the blank. The places denoted by arrows *b*<sub>1</sub> and *b*<sub>2</sub> correspond to FIGURE 2.

Then follow the well known stages 40 and 41 for opening the raised end portion, and the stages 42 and 43, consisting of revolving spreaders which draw up the end portions and form them into base squares lying in the plane of the blank. FIGURE 3 here corresponds to the position indicated by the arrow *c*. The previously mentioned stages 40 to 43 for the right and left crossed bottoms are displaced so far in relation to each other that a trouble-free formation of the second base square 9 of the right immediately after the formation of the first base square 8 is possible. Pressure rollers 44 and 45 extending over the width of the base squares and attached to revolving spreaders 42 and 43 finally lay the base square in the known way.

In this apparatus, the setting up of both the end portions 6, 7 is effected in the same time interval after one another, as the laying of the base squares 8 and 9. For this purpose, the contrivances 38 and 39 are displaced relatively to each other by the same distance as are the base-laying stages 40 to 45, in order to provide similar contrivances 38 and 39 on the right and the left, and to secure access to the opening stages.

The transport through the base square laying stages is effected in the usual way by means of grips, which are attached to two circulating chains 46 and 47. For holding down the left or first base square 8, extra conveyor-roller pairs 48 are arranged beside the chain 47. The work pieces are then taken over in the usual way from the chains 46 and 47 by conveyor-roller pairs 49 and transferred to compressor roller pairs 50. Behind the compressor rollers, are arranged grooving tools 51 for simultaneous production of the fold lines 11, 12 and 13, 14 for the subsequent

folding of the side covers. The arrow *d* indicates the part of the machine corresponding to FIGURE 4. This is followed by the contrivance 52 for the insertion of a valve 15 in the second base square 9, so that the bag in the position indicated by the arrow *e* corresponds to FIGURE 5.

These are followed by stages 53 and 54 for applying the areas of glue indicated by the reference numerals 16, 17, 18 and 20, 21, 22 (FIGURE 6 corresponds to the arrow *f* and FIGURE 7 corresponds to the arrow *g*). In this apparatus, these devices 53 and 54 are displaced from each other so that, with the help of a rod 55 arranged between them, the base side cover 19 which overlaps the first base square 8 on the piece 10, is raised out of the plane of the blank during the feeding of the blank from the contrivance 53 to the contrivance 54 so as not to prevent the application of glue to the first base square 8. The feeding of the blank through these stages is effected by transport roller pairs which are arranged on both sides along the entire conveyor path.

This is followed by well known contrivances 57 and 58 for folding the side covers 19, 24 and 23, 25 with the help of more centrally arranged powerful conveyor-roller pairs 59, from which the bag departs at position *h* in the form shown in FIGURE 8. The last operation is performed by contrivances 60 and 61, for applying wrappers 26, 27 (FIGURE 9 corresponds to the arrow *i*). The finished cross-bottomed valve bags are transferred to a depositing device not shown in the drawings by means of conveyor roller pairs 62, which have effected the feed of the bags through the valve insertion stage.

I claim:

1. A process for the manufacture of cross-bottomed valve bags, which comprises forming one end portion of a flat open-ended tubular blank into a first base square, thereafter forming the other end portion of the blank into a second base square that overlaps the first base square, applying an adhesive substance to at least the overlapping portion of the second base square, thereafter folding the overlapping portion of the second base square out of the plane of the blank, applying an adhesive substance to at least the previously overlapped portion of the first base square, and thereafter completing the two cross-bottoms substantially simultaneously.

2. A process as claimed in claim 1, wherein the application of glue to the second base square is completed before the overlapping portion of the second base square is folded out of the plane of the blank.

3. A process as claimed in claim 1, wherein the application of glue to the second base square is completed and a valve member is placed in position on the second base square before the overlapping portion of the second base square is folded out of the plane of the blank.

4. A process as claimed in claim 1, wherein the two end portions of the blank are first folded to bring them perpendicular to the plane of the main body portion of the blank that is to form the body of the bag and the end portions so folded are thereafter successively formed into the first and second base squares.

5. Apparatus for manufacturing cross-bottomed valve bags which comprises feeding means for feeding flat tubular blanks having two open ends simultaneously along first and second parallel series of bottom forming devices so that one of the ends of each blank passes through each series of devices, said two series comprising in relative succession first forming means positioned in said first series for completing the formation of one end of each blank into a first base square, second forming means located in said second series for completing the formation of the other end portion of each blank into a second base square overlapping the first, first adhesive applying means positioned in said second series for applying an adhesive to at least the overlapping portion of said second base square, means in said second series for folding the overlapping portion of the second base square out of the plane of the blank so that it no longer overlaps the first base square, second adhesive applying means

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in said first series for applying glue to at least the previously overlapped portions of the first base square, and folding means positioned in each series for completing the formation of the two cross-bottoms.

6. Apparatus as claimed in claim 5, wherein there is provided roller means positioned in said first series for holding the first base square in the plane of the blank during the formation of the second base square.

7. Apparatus as claimed in claim 5, comprising valve member inserting means positioned in said second series

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between the second base square forming means and the first adhesive applying means.

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(VII/546)