Jan. 11, 1966

W. A. DOUGHERTY

BAG FOR BULKY MERCHANDISE

Filed Sept. 26, 1963

FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

FIG. 5.

INVENTOR

William A. Dougherty

BY

Emory Whittaker.

Dunn & Warren.

ATTORNEYS.
This invention relates to header bags. Plastic bags having reinforcing headers at their upper ends are becoming increasingly popular as merchandising containers. Such bags are generally made of plastic sheet material, such as polyethylene, polypropylene, and various laminations and the front and back panels of the bag are heat sealed to one another along the edges of the bag.

It is an object of this invention to provide an improved and more economical construction for header bags which increases the capacity of the bag by giving it folds which serve as gussets for the bag. Such a gusset construction improves the hang of the bag when supported from a hook or rod, and makes the packages more attractive in appearance, especially when filled with bulky merchandise.

Another object is to provide a header bag construction in which the header is in line with the back panel of the bag even though the bag is filled and the contents have a substantial fore-and-aft extent.

Another feature of the invention relates to correlation of the header and the folds in the body of the bag by which the header is made narrower than the width of the flat and empty bag so that when the bag becomes narrower as it is filled, the header is not wider than the filled bag. This not only improves the appearance, but it is a practical improvement in that it reduces the transverse space required for groups of bags on adjacent supports on a merchandising display rack.

Another object is to provide improved method and apparatus for making bags of the character indicated.

Other objects, features and advantages of the invention will appear or be pointed out as the description proceeds.

In the drawings, forming a part hereof, in which like reference characters indicate corresponding parts in all the views:

FIGURE 1 is a diagrammatic plan view of apparatus for making the improved bags of this invention, and this view illustrates the different steps in the manufacture of the bag:

FIGURE 2 is a sectional view of a portion of the bag illustrating the way in which it opens up because of the folds below the header:

FIGURE 3 is a front view of one of the bags made in accordance with this invention, the bag being shown in its empty condition:

FIGURE 4 is a view similar to FIGURE 3 but showing the way in which the bag becomes narrower when filled with bulky merchandise:

FIGURE 5 is a sectional view taken on the line 5—5 of FIGURE 3.

The bag making apparatus shown in FIGURE 1 includes a spool 12 rotatably supported on an axle 13 from a fixed frame 14. A web 15 of plastic material, preferably polyethylene, is wound on the spool 12, and this web 15 is withdrawn from the spool and passes over a folder guide 18 which folds the web 15 along a line 20 parallel to the longitudinal edge of the web and offset sufficiently from the center line of the web so that one side of the fold extends some distance beyond the others to provide a flap 21 (FIGURE 5).

A strip 24 of reinforcing material, preferably cardboard, is fed into the fold in a manner such as illustrated in FIGURE 1. The strip 24 is withdrawn from a spool 26 supported by an axle 28 which is carried by a fixed frame 29.
of the sealer and the speed and gauge of the web 15. The heat supplied is adjustable by controller 57 and it is also correlated with the kind of material used for the web 15, but the sealing by means of this hot wire 54 can be carried out only with thermoplastic materials capable of being fused by heat supplied through one layer of plastic to the next layer. Such seals are easily made on polyethylene webs so long as the amount of heat from the sealers is kept within a temperature range that does not burn or melt through the layers of the webs.

In the process of the invention, as thus far described, the webs move with continuous and uniform motion. For subsequent operations it is desirable to have the webs move with intermittent motion and it is necessary, therefore, to provide a slack accumulator 58.

The slack accumulator 58 may be of a number of different types, and the detailed construction of the slack accumulator need not be illustrated or described for a complete understanding of this invention. It is sufficient to understand that the folded web 15 travels back and forth around a number of rolls 76, some of which are movable toward and from others so as to accumulate loops of the web when necessary to keep the web moving continuously without the feed rolls 60. Eventually the folded web travels around a final roller 72 of the slack accumulator and continues its advance, with intermittent motion, toward other stations of the apparatus.

The next station is a notching station 74 at which pieces of the header are cut out, for purposes which will be described later. This notching station 74 can be put at a different location, if desired and can be located beyond the region where folds or gussets are formed in the web. The folded web 15 passes across a fixed die 76. There is a movable die element 77 located above the web 15 and this movable die element 77 slides up and down in guide bearings. Motion is imparted to the die element 77 by a bell crank 79 supported on a pivot 81 and rocking about this pivot by a piston rod 81 of a pneumatic actuator 82 (FIGURE 1).

Whenever the actuator 82 is energized, it moves the piston rod 81 toward the right in FIGURE 1 to rock the bell crank 79 in a direction to thrust the movable die element 77 downward so that the sealer is cut out of the folded web 15 for a distance extending from the fold across the full width of the reinforcing strip 24. The notch 83 formed by the movable die element 77 does not extend across the full width of the sealed zone produced at the sealing station.

The remainder is pulled through the apparatus, beyond the slack accumulator 58, with a step-by-step movement imparted to it by feed rollers 90 which move the web, with each operation, for a distance equal to the intended width of each individual bag that is to be made from the web. The intermittently-operated feed rollers 90 withdraw slack from the slack accumulator 58 when they are operating, and the slack accumulates in the slack accumulator 58 when there is an interruption in the operation of the feed rollers 90.

The operation of the intermittent feed rollers 90 and that of the continuously or uniformly operating feed rolls 60 is so correlated that there is very little change in the speed of the feed rolls 60 as the result of the movement of the slack accumulator. Thus the operation of the feed rolls 60 does not vary in speed sufficiently to cause any perceptible change in the fused seal produced by the sealer 54 which seals off the top compartment for the bag.

Beyond the slack accumulator 58 and the notching station 74, web 15 passes a hole-punching station which the web passes over a block 98. The block 98 is located under the header portion of the folded web and there is a bar 100 supported at one end from a bearing 102 (FIGURE 1) and at the other end of the bar there is an actuator arm 104 which rocks about the fulcrum 106 to move a puncher 108 toward and from the block 98.

The actuator arm 104 is moved by a pneumatic motor or by a linkage 110 from a crank pin on a fly wheel 114. This fly wheel is rotated by an axle in timed relation with the feed rolls of the apparatus so that as to bring the pin 108 down into the opening in the block 98 when the web 15 is at rest between intermittent folds which will be made when the puncher pin 108 makes a hole 109 in the header portion for each individual bag so that the bag can be hung from a pin or rod on a display rack.

Beyond the hole-punching station there is a folding station 120 where guides fold the web 15 in a manner that will be described, in connection with FIGURE 2.

The web 15 continues its intermittent travel to a sealing and cut-off station 122. At this station there is a hot element 132 located over the folded web 15 and this hot element 132 extends from the notch which was cut in the folded web at the station 74 and across the remaining width of the folded web. A roller 142 is located under the hot element 132 and this roller 142 supports the web 15. When the hot element 132 is brought down against the web 15, it melts its way through the web to sever the plastic along the lines at which the web is divided into separate bags.

In the region where the hot element 132 exerts its maximum pressure against the web 15, the web is melted. On both sides of this region there are other regions where the web 15 is heated highly enough to seal the upper and lower portions of the web together but not hot enough to melt through the plastic. Thus the hot element 132 not only severs individual bags from one another but it seals the front side of one bag and the rear side of the next adjacent bag.

In the preferred embodiment of the invention, it is desirable that the severance of the web by the hot element 132 be not complete. By having short interruptions in the face of the hot element 132, uncut lands can be left between successive bags for continuing the feeding of the web to a conveyor 164.

This conveyor 164 which is preferably of the endless belt type, runs at a higher speed than the speed of the web 15. The conveyor advances the web 15 by friction with it, but there is slippage between the rapidly moving conveyor 164 and the web 15. A pressure roller 166 on an operating arm 168 is periodically brought into contact with the web 15 to press the end portion of the web against the conveyor belt and this pressure stops the slippage between the conveyor belt and the web and causes the conveyor belt to jerk the end bag of the web forward and to break the bag loose from the web.

FIGURE 2 shows the construction at one end of one of the bags of this invention. The web 15 is shown folded over the strip 24 and connected to the strip by adhesive 170. This adhesive, which is preferably applied over both faces of the strip 24 throughout their entire area produces a laminated construction for the header of the bag and thus provides a maximum stiffness.

Below the strip 15, the web is heat sealed across a zone 175. The perforations 41A, previously described, extend through the web at a location intermediate to the upper and lower limits of the zone 175.

For purposes of identifying and forming the construction of the bag, the portion of the web 15 on one side of the fold will be referred to as a back panel 180 of the bag and the portion of the web on the other side of the fold will be referred to as a front panel 182. The original fold of the web at the top of the header will be referred to as the "first" fold 184 to distinguish it from other folds which will be described in connection with the construction of the bag.

In FIGURE 2 there is a "gusset" formed by making a second fold 186 in the front panel 182 where the material of the web is folded outwardly and then upwardly as shown in dotted lines in FIGURE 2. A third fold 188 is then made in the front panel 182 by folding the material forwardly and downwardly as also shown in dotted lines in FIGURE 2. The advantage of these folds is that when
the bag is filled with merchandise, it can open up as shown in full lines in FIGURE 2 to provide a substantial volume of space between the front panel 182 and the back panel 180 below the third fold 188.

FIGURE 3 is a front view of the empty bag. The notches which were cut out at the notching station 74 leave the strip 24 and the parts of the web 15 which cover it substantially shorter than the width of the body of the bag below the zone 175. When the front panel 182 is moved upwardly away from the back panel 180 as illustrated in solid lines in FIGURE 2, this causes the side edges 191 and 192 to move inwardly to the positions shown in FIGURE 4. Thus the body of the bag, when the bag is filled, is substantially equal to the length of the header above the zone 175.

The extent to which the side edges 191 and 192 move inwardly depends upon how much the front panel 182 is moved away from the back panel 180; and this in turn depends upon the vertical extent of the portion of the front panel 182 between the second fold 186 and the third fold 188. There is, therefore, a correlation between the amount of material which should be removed at the notching station 74 (FIGURE 1) and the distance between the second fold 186 (FIGURE 2) and the third fold 188. In practice, the amount of material removed by notching the folded web preferably has a length, measured in the direction of the length of the web, equal to approximately two times the distance, in a vertical direction, between the folds 186 and 188. This correlation is approximate, and in the preferred construction the longitudinal length of the notches is somewhat longer than the distance between the folds 186 and 188.

With folds 186 and 188 in the front panel 182, and with no corresponding folds in the back panel 180, the header is in line with the back panel 180 and this produces a neat package when hung from a hook or rod of a merchandising rack. For bags having even greater volume to the merchandise enclosed therein, other folds 186' and 188' are made in the back panel 180, as shown in FIGURE 5. When the front and back panels of the bag shown in FIGURE 5 are pulled away from one another, there is an even greater reduction in the width of the bag and for bags having such a gusset construction for both the front and back panels, the notching of the web to shorten the header should be even greater; the longitudinal length of the notches being approximately four times the distance between the folds 186 and 188.

Ordinarily the folds 186, 188, 186' and 188' are made in the panels of the bag at the same time the bags are supported by the header, the longitudinal width of the cut-outs being approximately equal to four times the spacing of the folds from one another in each of the gussets.

5. A bag including
(a) front and back panels formed from a sheet folded over at the upper end of the bag and sealed to one another across the full transverse width of the bag over an area generally parallel to the fold but spaced a substantial distance down from said fold,
(b) the front and back panels below the sealed area having side edges and being sealed to one another along the respective sides of the bag,
(c) a reinforcing and stiffening strip between the panels above the transversely sealed area and forming with the upper end portions of the panels a reinforced header for the bag,
(d) the panels at the header being narrower, on both sides of the bag, than are said panels below the header and having an abrupt change in width at a region near the lower end of the header,
(e) the transversely sealed area being of substantial height and extending below the region of change in width and including the upper ends of the wider parts of the panels,
(f) the transversely sealed area also extending above the region of change in width and holding the nar-
rower parts of the panels together below the reinforcing and stiffening strip, and
(g) an outward and upward fold extending transversely across the bag at a substantial distance below the header, and an outward and downward fold parallel to the upward fold and closer to the header and forming with the upward fold a gusset for expanding the volume of the bag.

References Cited by the Examiner

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Patent Number</th>
<th>Date</th>
<th>Inventor</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,278,503</td>
<td>6/1945</td>
<td>Rohdin</td>
<td>229—62</td>
</tr>
<tr>
<td>2,790,591</td>
<td>4/1957</td>
<td>Rosen</td>
<td>229—53</td>
</tr>
<tr>
<td>2,971,874</td>
<td>2/1961</td>
<td>Canno</td>
<td>229—55</td>
</tr>
<tr>
<td>3,061,170</td>
<td>10/1962</td>
<td>Baker</td>
<td>229—55</td>
</tr>
<tr>
<td>3,085,737</td>
<td>4/1963</td>
<td>Horton</td>
<td>229—55</td>
</tr>
<tr>
<td>3,087,668</td>
<td>4/1963</td>
<td>Oler</td>
<td>229—53</td>
</tr>
<tr>
<td>3,096,013</td>
<td>7/1963</td>
<td>Kugler</td>
<td>229—55</td>
</tr>
<tr>
<td>3,097,788</td>
<td>7/1963</td>
<td>Nichols</td>
<td>229—55</td>
</tr>
<tr>
<td>3,101,887</td>
<td>8/1963</td>
<td>Kugler</td>
<td>229—62</td>
</tr>
<tr>
<td>3,106,140</td>
<td>10/1963</td>
<td>Baker</td>
<td>93—35</td>
</tr>
<tr>
<td>3,110,231</td>
<td>11/1963</td>
<td>Stein</td>
<td>93—35</td>
</tr>
<tr>
<td>3,136,475</td>
<td>6/1964</td>
<td>Geimer</td>
<td>229—57</td>
</tr>
</tbody>
</table>

FOREIGN PATENTS

<table>
<thead>
<tr>
<th>Patent Number</th>
<th>Date</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>550,631</td>
<td>9/1956</td>
<td>Belgium</td>
</tr>
<tr>
<td>91,099</td>
<td>6/1961</td>
<td>Denmark</td>
</tr>
</tbody>
</table>

FRANKLIN T. GARRETT, Primary Examiner.

GEORGE O. RALSTON, Examiner.