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3,629,389

METHOD FOR FLARING THE UPPER ENDS OF PLASTIC BAGS

Filed April 7, 1967

2 Sheets-Sheet 1

FIG. 1.

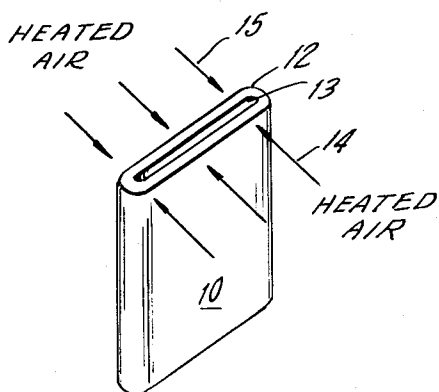


FIG. 2.

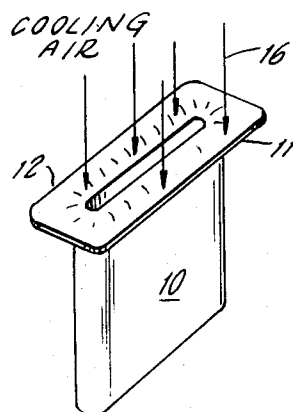


FIG. 3.

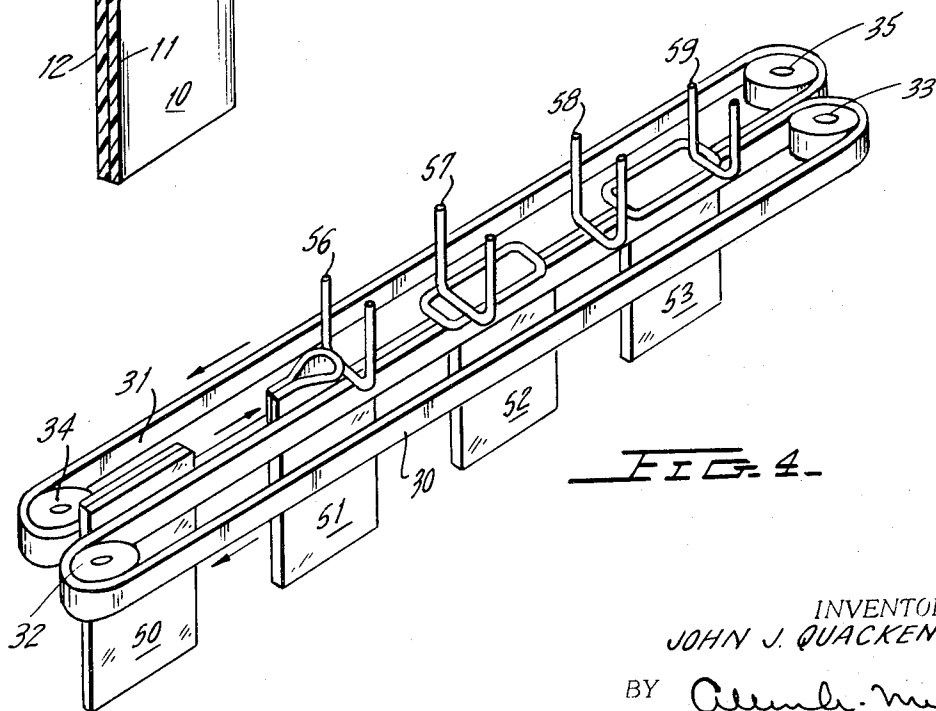
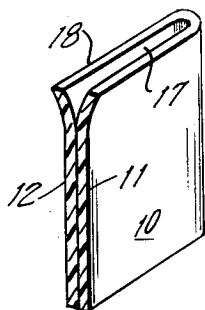


FIG. 4.

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2 Sheets-Sheet 2

FIG. 5.

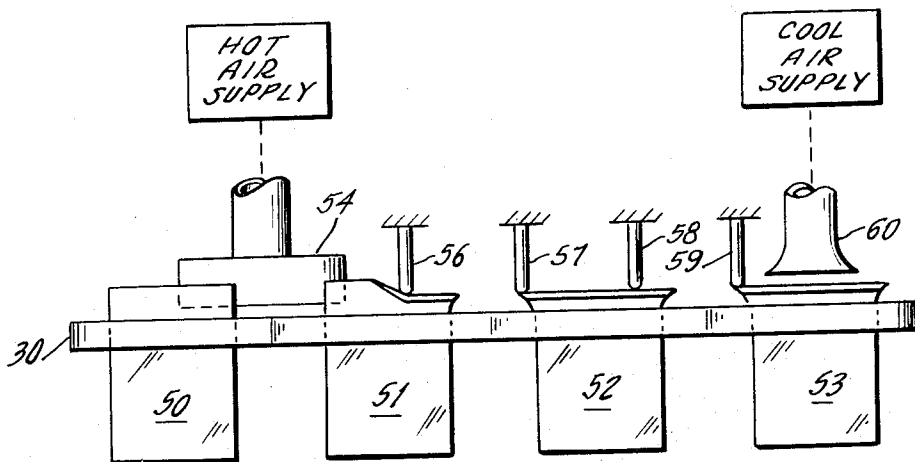
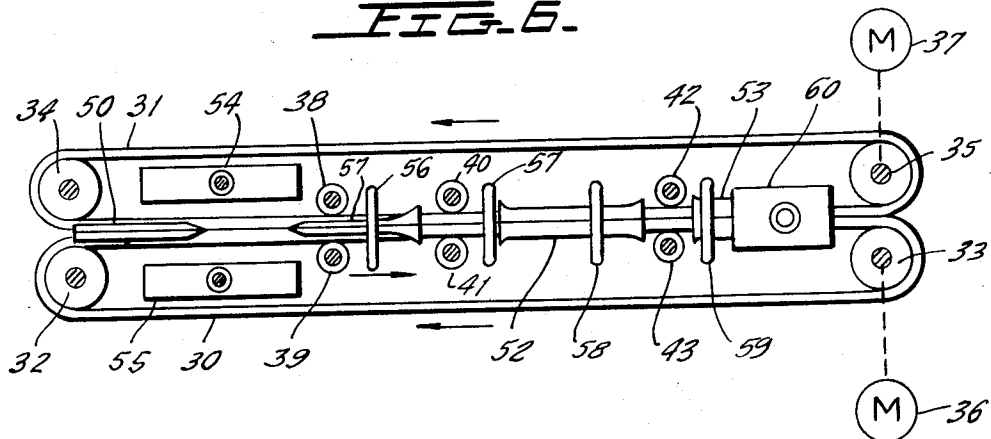


FIG. 6.



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1

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METHOD FOR FLARING THE UPPER ENDS OF PLASTIC BAGS

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4 Claims

ABSTRACT OF THE DISCLOSURE

In order to cause the opposing panel ends of a plastic bag to curl outwardly, the bags are captured between moving belts with a portion of their upper surfaces extending above the belts. The outer surfaces of the bag panels are heated, and the panel edges are forced to flare open by passing through a stiff wire. The interior surfaces of the open panel lips are then rapidly cooled to introduce a permanent tendency for the bag panels at the bag opening to curl away from one another.

This invention relates to plastic bags, and more particularly relates to a novel process for imparting an outwardly curling or flaring tendency to the upper opposing panels of a plastic bag.

It is well known that it is sometimes difficult to separate the opposing panels of a plastic bag at the open end thereof because of a tendency of the panels to cling to one another. This is especially inconvenient in bags for packaging fertilizer, or the like, where an operator must take a bag from a stack, open the bag, and place it in a filling spout which automatically, and at pre timed intervals, ejects a particular weight, such as fifty pounds of the material to be packed. If the operator cannot open the bag quickly enough to place it on the spout, the load will be deposited on the floor, and in some cases, on the operator.

In accordance with the present invention, the bags are caused to have their opposing panels, at the top opening of the bag, flare or curl outwardly so the bag can be easily opened. This outward curl is formed by first heating the upper outer surfaces of the panels, and then opening the panels and rapidly cooling the interior surfaces of the panels. This treatment sets up differential stresses in the plastic which imparts a permanent outwardly curling tendency in the bag around the exterior and originally heated surface.

Accordingly, a primary object of this invention is to simplify the opening of plastic bags.

Another object of this invention is to provide an inexpensive process for imparting an outward curl in the top panel sections of a plastic bag.

These and other objects of this invention will become apparent from the following description when taken in connection with the drawings, in which:

FIG. 1 shows a plastic bag in perspective, exposed to heated air at the upper portions of its opposite panels.

FIG. 2 shows the bag of FIG. 1 in perspective, after the top portions of the panels have been flared open and cooling air is applied to the interior surfaces of the panels.

FIG. 3 shows a cross-sectional view, in perspective, of the permanently set outward flare of the plastic bag panels after the treatment of FIGS. 1 and 2.

2

FIG. 4 shows, in perspective, a portion of the apparatus of the invention including the conveyor belts and opening wires.

FIG. 5 shows a side plan view of FIG. 4, and additionally shows one of the side heaters and the cool air supply.

FIG. 6 is a top view of FIG. 5 and shows the location of the two heaters, the cool air supply, and idler rollers for maintaining belt tension on the bags.

Referring first to FIG. 1, there is illustrated a plastic bag 10 having a front panel 11, a rear panel 12, and an open end 13. The bag may be formed of any desired thermoplastic material, such as polyethylene, having a density of from .915 to 1.5, typically .925, and a thickness of from 2 to 20 mils, typically 5 mils. In accordance with the invention, heated air, shown by arrows 14 and 15 is directed at the upper portions of panels 11 and 12, heating the surface thereof to about 220° F. Thereafter, the bag lips are opened, as shown in FIG. 2, and the inner surfaces of the top portions of panels 11 and 12 are quickly cooled by a blast of cool air, shown by arrows 16, to from 34° F. to 75 °F. Any type of cooling medium could be used in place of the air 16, such as a water spray or mist. This cooling will cause a permanent outward curl in the upper panel portions of panels 11 and 12, as shown in FIG. 3 by curled sections 17 and 18, which is retained until the plastic is reheated to about 220° F. which relieves the internal strains causing the curling action.

FIGS. 4 to 6 illustrate a novel apparatus for economically carrying out the process of FIGS. 1, 2 and 3. Referring to FIGS. 4 to 6, the apparatus comprises two counter-rotating belts 30 and 31 which are carried on spaced rollers 32-33 and 34-35. Suitable drive rollers 36 and 37 are connected to rollers 33 and 35, respectively (FIG. 6), to cause the belts to rotate in the direction shown by the arrows at about 60 feet per minute. If necessary, idler rollers 38-39, 40-41 and 42-43 can press the belts together, as shown. The conveyor may have any desired length such as 6 feet, and bags, such as the bags of FIGS. 1, 2 and 3 are loaded between the belts 30 and 31 at the lefthand end of the belts. About 2 inches of the bag top are exposed above the top of belts 30 and 31.

FIGS. 4 to 6 show four bags 50, 51, 52 and 53 loaded between belts 30 and 31, where each of bags 50 to 53 may be identical to the bag of FIGS. 1 to 3.

Two sources of hot air 54 and 55 are located above belts 30 and 31 and direct heated air toward the upper exterior exposed surfaces of the bags as they progress past the heaters. The bags then engage a series of fixed and rigid wire hoops, or the like, such as wire hoops 56 to 59 which have transverse lower surfaces which engage the bags about 1 inch below their tops. The wires have the effect of opening the bag tops, and holding open the bag tops as they traverse below the wire hoops.

The bags which have been opened in this manner then pass below a cool air blast from duct 60, shown in FIGS. 5 and 6. The cool air supply may be replaced by a water or mist spray. The effect of this cooling is to impart a permanent outward flare, or curl, in the upper end of the bag panels, as shown in FIG. 3.

Although this invention has been described with respect to its preferred embodiments, it should be understood that many variations and modifications will now be ob-

3

vious to those skilled in the art, and it is preferred, therefore, that the scope of the invention be limited not by the specific disclosure herein, but only by the appended claims.

The embodiments of the invention in which an exclusive privilege or property is claimed are defined as follows:

1. The process for imparting a permanent outward curl to the upper ends of the panels of a thermoplastic bag which consists of contacting the upper exterior surfaces of said panels with a source of heat, spreading said upper portions away from one another and, while said upper portions are in the spread condition, contacting only the interior surfaces of said upper portions to a cooling medium.

2. The process of claim 1 wherein said upper outer surfaces are heated to about 220° F. and said interior surfaces are cooled to less than about 75° F., said bag being formed of polyethylene.

3. The process of claim 1 wherein the bag is formed

4

of a thermoplastic material having a density in the range 0.915 to 1.5.

4. The process of claim 1 where the bag is formed of polyethylene.

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18—19 BE; 264—230, 327, DIG. 66