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EMBOSSED PLASTIC BAG

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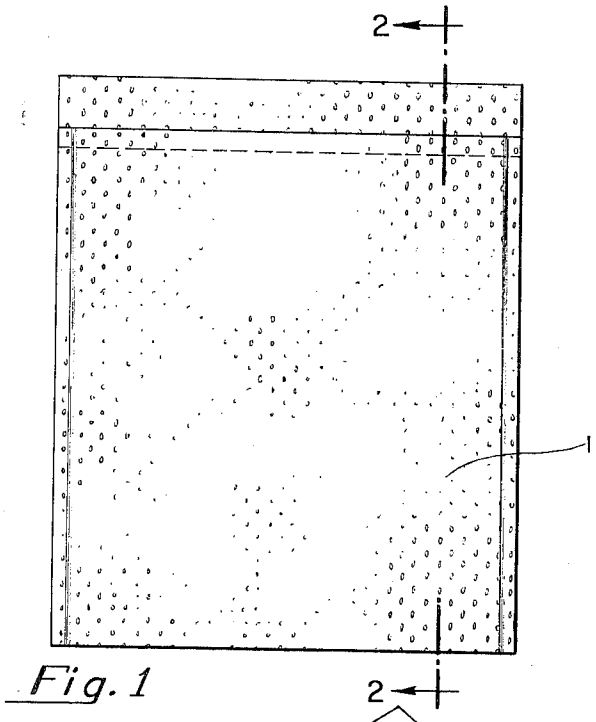

Fig. 1

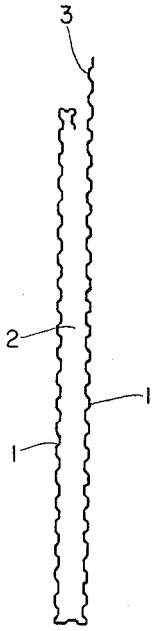

Fig. 2

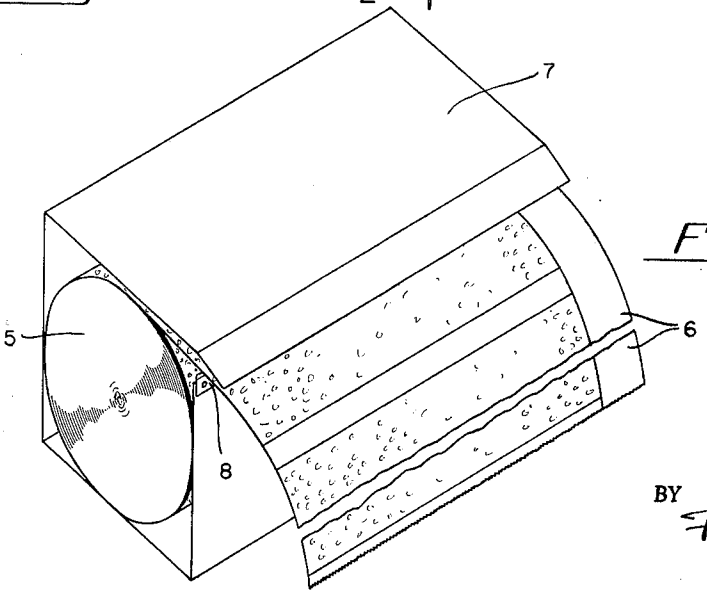

Fig. 3

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EMBOSSED PLASTIC BAG

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This invention relates to plastic bags and, more particularly, to embossed bags of a thermoplastic film such as polyethylene characterized by easy opening and handling obtained without any increase in use of material or production expense.

Household and food products are frequently packaged in bags manufactured from thermoplastic materials such as polyethylene, polypropylene, polyvinyl chloride, etc. At the present time, these bags are made either from a ring-die extruded tube or from a thermoplastic film folded upon itself. In both types of bag the packaging enclosure is defined by heat sealing. The bags are conventionally separated by weakened portions in the film.

The first type of bag or "ring-die bag" is in common use today. However, it suffers from certain shortcomings; for example, the bag is made from a continuous strip or tube; thus the opening of the bag is hard to distinguish because the front side and the back side of the bag are coequal in length. Opening the detached bag often requires pulling the two panels apart which is resisted by the mutual adhesion of the film and vacuum created in the bag as it is stored in rolled form. In use, this behavior often requires keeping a bag open and attempting to prevent its collapse while at the same time inserting an article to be packaged. In the event the bag collapses, the process has to be repeated—hopefully, this time, without the annoying adhesion and vacuum.

In the second type, or the folded bag, similar problems exist. The natural tendency of the film is to adhere to itself. Adding to it the fact that the rolled-up strip of bags has most of the air squeezed out, this ahesion presents a detrimental feature in the otherwise very acceptable packaging article.

Various attempts have been to alleviate this problem in the folded type of plastic bag. For example, "bulked-up" portions of the thermoplastic sheet are made to show, first, where the opening of the bag lies and, second, to allow easy grasping and separation of the two panels. Other attempts to alleviate this problem have been made by deforming the shorter edge of the bag opening by materially distorting the shorter lip causing a "bulked-up" appearance of the front panel. Despite all these steps the plastic bag is still a less than highly acceptable packaging container because the mere provision of an opening has not rectified the problems of mutual adhesion and vacuum in the interior of the bag which cannot be avoided if highly protective packaging is desired.

It has now been found that by a very simple and yet unexpected expedient all these problems can be eliminated without incurring concomitant expenses in additional material and/or processing. Thus, the invention is accomplished by providing a thermoplastic bag, preferably made of polyolefin film, and especially, polyethylene, and embossing this film to provide protrusions and depressions in the bag. These displacements of the material from the plane of the film, i.e., hills and valleys, or dimples, introduce and maintain an air layer between the sheets. Further, the elastic protrusions resist the complete expelling of air from the rolled-up strip of bags and this results not only in each individual bag being easily separable from the roll, but also in a bag allowing very easy opening and insertion of articles.

The production of this bag can be accomplished in this same manner as illustrated in U.S. application S.N. 169,192, now Patent No. 3,160,273. The embossing is accomplished as part of the film forming sequence; for example, in preparing the plastic material, molten polyethylene film is made to contact a chilled surface. Instead of using a conventional smooth surface, as is done in the prior art, the fast descending film is made to contact a cooled drum covered with wire or mesh or screen. At the point of the tangential contact of the film an air stream is directed perpendicularly to the moving film and drum. This variance in pressure causes the still pliable thermoplastic film to assume, to a degree, the configuration of the wire protrusions. By regulating the temperature of the impinging air, the temperature of the cooling drum, the height of the protrusions and rate of the extrusion various degrees of embossing may be obtained.

Varying the type of wire screen or mesh can be done to obtain various patterns with various depths and heights for the hills and valleys in the film. As can easily be envisioned, wire screens ranging from very coarse to very fine grids can be used in this operation to produce the desired degrees of embossing and aesthetic appeal. Also, with proper temperature control, various embossing patterns may be superimposed on each other.

In addition to these properties, the plastic bag presents a very pleasing sense of touch to the hand. Embossed film behaves somewhat like a stiff yet resilient cloth. While this is obviously a subjective evalution, the novel bag still has a considerably more appealing handling quality or "hand" than the smooth film.

Referring now to the accompanying drawings:

FIGURE I is a plane view of the bag.

FIGURE II is a cross section of FIGURE I on the line 2—2.

FIGURE III is a perspective view of a roll of bags of the invention arranged to be dispensed from a container, one end of which has been removed for purposes of illustration.

FIGURE I shows the novel thermoplastic film **1**, in this case, of the same material at the back as well as the front. Different bags may be made from different types of front and back panels joined together by a U seal around the periphery of the bag enclosure. The film in FIGURE I is shown to contain a folded-over lip for the front panel. In the drawing, an inner fold is illustrated. An equally good fold may be obtained by an outwardly folded lip. In order to obtain a more protected enclosure for the article to be packed, pressure-sensitive adhesive may be applied to the extended lip. Generally, it will be a non-blocking adhesive, although slightly blocking adhesives may be used.

FIGURE II illustrates the protrusions or the hills and valleys of the front and back panels. These protrusions on each film **1** allow sufficient air layer **3** to be maintained or introduced into the interior of the bag. The natural resiliency of the thermoplastic film reacts to restore this air layer between the two films in the event the bag is slightly unwound from the roll. Removing the bag from the roll or relieving the outside pressure when the bag approaches its dispensing turn results in the resilient action causing the somewhat compressed protrusions to expand. A dispensing container useful for the present roll of bags is shown in FIGURE III wherein a roll **5** of bags **6** is positioned within a container **7**, one end of which is removed for purposes of illustration. Container **7** has an opening along one side thereof, one edge of which opening is formed by a metal cutting strip **8** secured to container **7** and arranged to serve as a means for severing individual bags

6 from roll 5. This coaction of resilience and air introduction is also an aspect of this invention.

Another benefit obtained from the embossing is the increase in the recovery of the film when distorted under loading by the articles enclosed in the interior of the bag. Sharp objects are thus less likely to cause puncturing of the embossed thermoplastic film.

In the present invention, a wide variety of thermoplastic materials can be used. An illustrative list of materials useful for the film includes polyethylene, both conventional and linear, nylon, polystyrene, polyolefins such as polypropylene, blends of polyethylene with polybutene, polyisobutylene, and polypropylene and polyesters, etc.

What is claimed is:

1. An article of manufacture in the form of a plastic bag suitable for inserting articles therein, said bag being comprised of a front panel and a rear panel, made of a thermoplastic material, said front panel made of the same sheet and folded upon the rear sheet, said front panel having a small lip, said front panel being optionally shorter than said rear panel, said panels being joined by heat and pressure distortion of the thermoplastic material along the lines necessary to define the outlines of a bag and, at the same time, providing an opening for insertion of articles in the interior of said bag, said thermoplastic sheet material possessing a plurality of

protrusions and depressions resembling hills and valleys distributed throughout the sheet, said hills and valleys introducing a resiliency in the film capable of preventing the adhesion of the said front and rear panels and concomitant creation of vacuum, said adhesion being prevented by the resilient maintenance in a spaced-apart relationship of the front and rear panels in the thermoplastic film of said bag.

2. An article of manufacture according to claim 1 wherein bags are in the form of a strip, said strip being rolled up and said bags being torn from the strip dispensed from a container.

3. An article of manufacture according to claim 1 whrein the thermoplastic material is polyethylene.

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