United States Patent

[11] 3,558,039

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[54] **CARRYING BAG**
3 Claims, 7 Drawing Figs.

[52] **U.S. Cl.** **229/54,** 150/12
[51] **Int. Cl.** **B65d 33/06**
[50] **Field of Search** 93/35H; 264/248, 249; 229/54; 150/1.7, 3, 12, 33

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ABSTRACT: A reusable plastic bag formed of a thin film thermoplastic material and with a combined closure and carrying means also formed of thermoplastic material which is secured to the bag wall at the open mouth thereof. The thin film material of the bag walls, and the thermoplastic material of which the closure and carrying means is formed, may be made of different type thermoplastic materials, which ordinarily do not effectively heat-seal to each other. To effect securing of the carrying and closure means to the bag walls, the carrying and closure means is provided with elongate strip portions, which have integrally molded thereon a large number of pointed projections, or knurls so that when heat is applied along the joining surfaces of the bag walls and the thermoplastic strips, the ends of the pointed projections or knurls are deformed to thereby secure the thin film to the elongate strips.

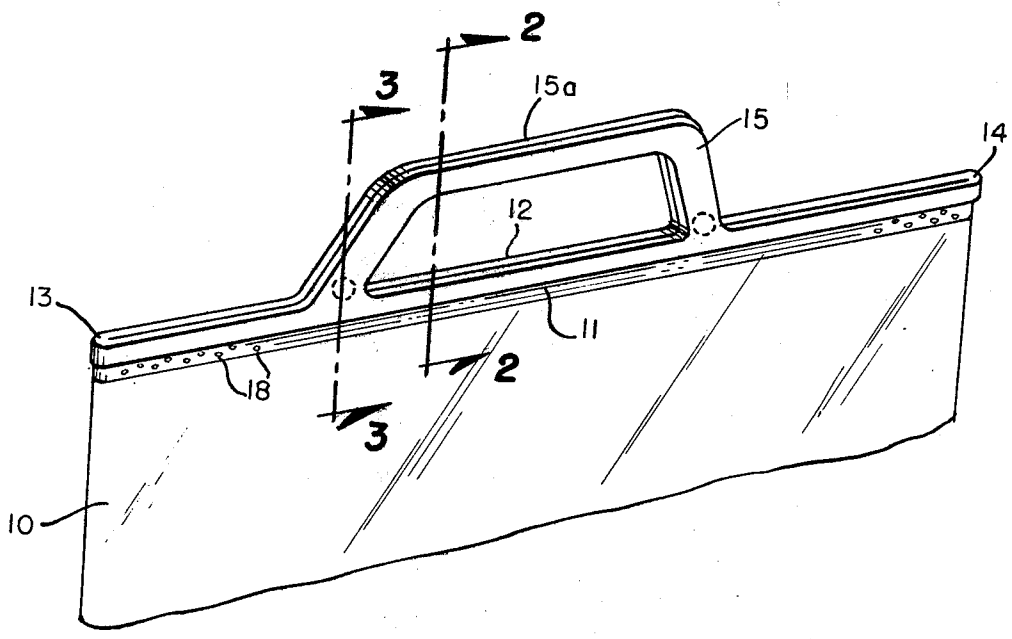

FIG. 1.

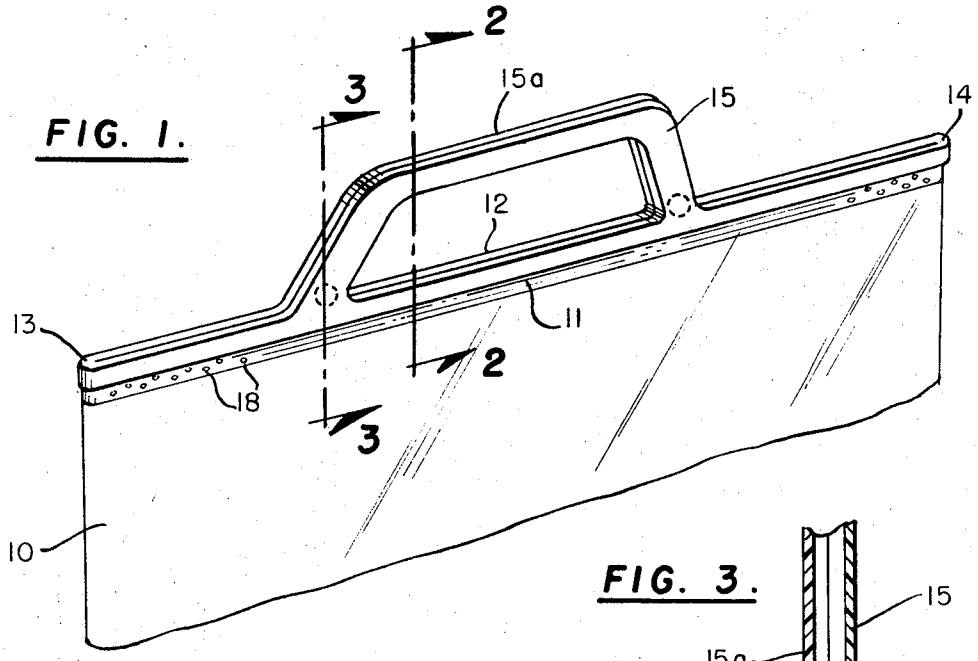

FIG. 2.

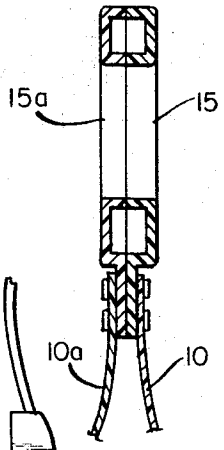

FIG. 3.

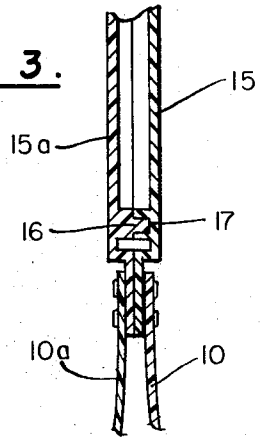

FIG. 4.

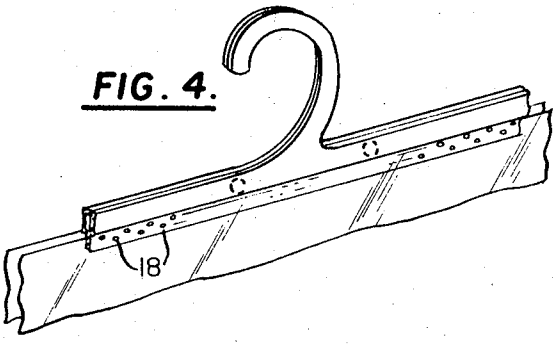

FIG. 7.

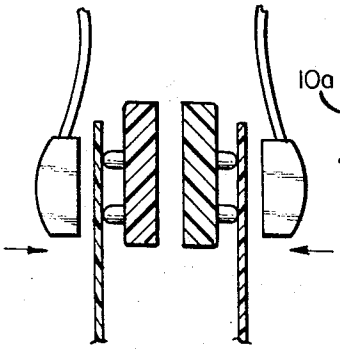

FIG. 5.

FIG. 6.

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CARRYING BAG

BACKGROUND OF THE INVENTION

Various types of bags are known in the art, including numerous kinds made of thermoplastic materials. Many of the prior art bags include a combination handle and closure means for the bag which makes it possible to provide a tight closure thereof so that its contents cannot readily be lost, nor can dirt or moisture readily enter the bag.

It is also well known in the art to provide bags whose main body portion is formed of a thin film of thermoplastic material, such as the more common vinyl or polyethylene plastic or polypropylene. The prior art further teaches the use of a combination carrying and closure means for such a thin film plastic bag which is heat sealed to the thin film. It is also common to fabricate the carrying and closure means from thermoplastic material having substantially heavier gauge than that of the thin film used for the main portion of the bag, since this provides greater strength and provides a desirable rigidity to the mouth of the bag, thereby making it more convenient to open the bag and to maintain it open for obtaining access to the bag's interior.

In addition to the foregoing, it is also known in the art to provide a combination carrying and closure means which comprises essentially two generally congruent strips of a semirigid material, such as a heavy gauge plastic, each of which is welded or heat sealed to the mouth of the bag. To open the bag, it is then only necessary to grasp the two portions of the carrying and closure means with one's right and left hands, respectively, and separate the two portions.

Quite often, a securing or locking means is employed, which tends to hold the two oppositely disposed portions of the carrying and closure together, thereby effectively maintaining a tight closure of the mouth of the bag. In its most practical form, such a fastening means may comprise a small protuberance on one member, which frictionally engages an indentation or recess in the opposite member, as, for example, shown in the U.S. Pat. No. 3,140,038 to Laguerre.

Although the most common thin film material used for the bag walls is probably polyethylene, polypropylene is often preferred because of its greater transparency which renders more visible the contents of the bag and thus increases the saleability of the goods merchandised in the bag. In the past, when polypropylene has been used to form the bag itself, it has usually been considered necessary to form the carrying and closure means of polypropylene as well since an effective heat-seal between the bag walls and the carrying and closure means can only be effected when both are formed of the same type of thermoplastic material; specifically, it has been found that it is quite difficult to seal effectively a film of polypropylene to a handle formed of polyethylene.

Although polypropylene handles can be used, their use does present a problem since polypropylene does not readily lend itself to the formation of a carrying and closure means for a bag wherein the two opposed portions thereof are integrally joined together at their ends in a sharp bend. Carrying and closure means of the latter type are specifically disclosed and claimed in the U. S. Pat. No. 3,310,224 to Laguerre. The reason for the impracticality of the use of polypropylene for this type is that the material is significantly more brittle than polyethylene; because of this, frequent opening and closing of the bag soon results in cracking of the material in the region of the integral joining together of the two opposed strip portions. Because of this problem, there has been a long felt need for a successful and economical way of sealing bag material of polypropylene to a carrying and closure means formed of polyethylene because of the greater flexibility of the latter type material.

The present invention provides an entirely effective solution to the aforementioned problem. Instead of effecting a heat seal by welding of the bag material directly to the carrying and closure means, what is done instead, according to the present

invention, is to form the carrying and closure means with opposed elongate strip portions whose outer surface has integrally molded thereon a great many projections or knurls, which are, of course, also formed of polyethylene material. When the handle is inserted into the bag mouth, and the combination then placed between the jaws of a heat-sealing machine, the application of heat causes the upstanding pins or knurls to deform at their tips and thereby become "upset." Dependent upon the applied temperature, the polyethylene film becomes more elastic, but may not rupture, with the result that it then becomes secured about the mushroomed pin end or knurls, thereby securely fastening the thin film material to the elongate strip portions. It has been found that such a technique makes possible the low cost sealing of the bag walls to the handle and closure means, even where the materials to be sealed are of different types which heretofore have not been compatible for sealing purposes. The result just described is that which appears to occur when the thin film material has a higher melting point than that of the thicker thermoplastic surface to which it is secured, as is the case where polypropylene film is secured to a polyethylene handle. This technique results in an exceptionally strong connection between the film and the base material, since the film tends to remain imperforate, and thus retain a high effective tensile strength.

Where, on the other hand, the thin film material has a lower melting temperature than that of the thicker surface to which the film is to be secured, as where polyethylene film is to be secured to a polypropylene base, the mechanics of the securing of the one to the other appears to be different. In the latter case, upon the application of heat and pressure simultaneously, the film melts first and the pins or knurls, therefore, pierce the film. The projecting ends or knurls of the pins are then disformed or "upset," thereby securing the film tightly to the base material under the upset ends.

BRIEF DESCRIPTION OF THE DRAWINGS

In describing the invention, reference will be made to the accompanying drawing, in which:

FIG. 1 is a perspective view of a bag constructed according to the present invention;

FIG. 2 is a cross-sectional view taken along the section line 2–2 of FIG. 1;

FIG. 3 is a cross-sectional view taken along the section line 3–3 of FIG. 1;

FIG. 4 illustrates a modification of the embodiment illustrated in FIG. 1;

FIGS. 5 and 6 are enlarged views showing the manner of sealing of the carrying and closure means to the thin film material, and

FIG. 7 illustrates a typical apparatus for the application of pressure and heat to the parts to be sealed.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 is a perspective view of a carrier bag constructed in accordance with the present invention. The carrier bag comprises front and rear bag walls 10 and 10 *a* (see FIG. 2) which are formed of a thin film of thermoplastic material such as polypropylene which is often favored for use in such an application because of its clarity or transparency which it possesses to a substantially greater degree than polyethylene which has a somewhat cloudy appearance. This factor is of some significance in the merchandising of certain products, particularly where it is desired that the bag be as transparent as possible in order that its contents can be most readily displayed to view.

The carrier bag of FIG. 1 also comprises a carrying and closure means for the bag which comprises, preferably, a unitary means including two parallel elongate strips 11 and 12 which are integrally joined at their end portions 13 and 14 in a sharp reverse bend which is formed in the molding process of making the handle and closure means.

In the production of the carrier bag of FIG. 1, the unitary carrying and closure means is inserted within the bag mouth, and the front and rear bag walls are then secured at their topmost edges to a sealing portion of the strips 11 and 12.

The carrying and closure means comprises, in addition to the elongate strip portions 11 and 12, laterally, outwardly extending bow-shaped handle portions 15, 15*a*, each of which is integrally connected with a respective one of the elongate portions 11 and 12. As shown in FIG. 2, each handle portion 15, 15*a*, and also the two elongate strip portions 11 and 12 may be channel-shaped in cross section with the open portions of the channels facing each other. Although the present invention is particularly disclosed in connection with a handle-type structure, it is, of course, also readily possible to use the concept of the invention in connection with a hook structure as shown, for example, in FIG. 4.

The carrying and closure means of FIG. 1 further includes means for detachably securing together the two portions thereof as by means of one or more stud and recess combinations. Thus, as shown more particularly in the cross-sectional view of FIG. 3, each stud and recess closure means comprises a projecting stud 16 on one of the portions which is adapted to frictionally engage within a corresponding recess 17 in the other portion, all as disclosed, for example, in the above-mentioned patent to Laguerre. When the two opposed handle portions are snapped together by means of these stud and recess combinations, the bag mouth is effectively closed and is opened only when the two handle portions are forcibly pried apart so as to release the engaged studs and recesses.

As mentioned previously, one of the problems involved in the heat sealing of the bag walls on a carrier bag to the opposite handle and closure means comes about because of the fact that effective sealing can ordinarily take place only when the two materials to be sealed are of the same general type. Thus, polyethylene bag walls will quite readily seal to a handle and closure means also formed of polyethylene. However, it has been found that there are substantial problems in the heat sealing of a bag material of polypropylene to a handle and closure means which is molded of polyethylene. Ordinarily, what is done then is to use materials of like quality so that if it is desired to make carrier bags where the bag walls are formed of polypropylene for increased transparency, it is then also customary to mold the associated handles of polypropylene. This latter solution is quite effective when using the more conventional handle and closure means comprising two quite separate and distinct handle members, but becomes relatively impractical when the handle closure means is a unitary assembly, as disclosed, for example, in the Laguerre U.S. Pat. No. 3,310,224. The reason for this is the sharp reverse bend at the ends where the two portions 11 and 12 are joined together. It can be appreciated that when the bag mouth is opened repeatedly, the separation of the portions 11 and 12 produces a substantial stress at the end portions where these two members are joined together, and this requires that the material have a substantial amount of flexibility. For this reason, polyethylene is particularly suitable for a handle construction of the type shown herein, whereas polypropylene, because of its somewhat more brittle nature, is not as suitable.

To overcome the aforementioned problem, the handle and closure means of FIG. 1 is particularly adapted to enable it to be effectively heat sealed to a thin film bag wall material. This is accomplished by providing along the elongate strips 11 and 12 a great number of quite sharply pointed projections or knurls 18, which are integrally molded with the elongate strips 11 and 12 and project outwardly therefrom a short distance.

In the construction of the carrier bag of this invention, the carrying and closure means is inserted into the mouth of the bag in such manner that the thin film material of the bag walls lies against and is effectively supported by the tops of such projections or knurls. Thereafter the jaws of a heat-sealing machine of conventional construction are brought against the bag walls at the desired sealing location and pressure exerted thereagainst as shown, for example, in FIG. 6. The pressure is, of course, applied directly to the thin film which is supported on the other side only by the sharply pointed projections or knurls.

When the thin film material has a higher melting temperature than the much heavier gauge handle or hook, (as is true when the film is polypropylene and the handle or hook is polyethylene) the application of heat and pressure causes deformation of the projections or knurls, but does not ordinarily rupture the film. However, the elasticity of the film causes it to form around the upset end of each projection or knurls so that the two are tightly secured together, as shown in FIG. 5. Where, on the other hand, the film has a lower melting temperature than the heavier gauge hook or handle, the film is ruptured by each projection or knurls upon the application of heat and pressure. The end of each projection or knurls then pierces the film and is upset over the top of the film, thereby securing the two as shown in FIG. 6. In either case, upon the removal of the bag from the heat-welding machine, the bag walls are securely fastened to the elongate strip portions 11 and 12 by each of the numerous projections 18 or knurls.

The present invention has been described particularly in connection with the securing of a carrying means for a thermoplastic bag to the thin film material of the bag walls. In its broader aspects, however, the invention is not limited to thermoplastic bags, but is broadly concerned with the sealing of a thin film thermoplastic material to a thermoplastic surface of greater thickness and rigidity than that of the thin film material. Also, it should be understood that the invention is not limited to the fastening of a thin film material to a heavier thermoplastic material where the two materials are necessarily of different types; thus, the invention also comprehends the securing of materials of the same type. Moreover, the invention comprehends not only the resulting product, but also the method of securing such materials as described herein.

Having described an improved thermoplastic carrier bag and the method for making the same, I desire it to be understood that various modifications and alterations may be made to specific forms of my inventions shown without departing from the scope thereof.

I claim:

1. A carrier bag of the type having bag walls formed of a thin film thermoplastic material of a first kind and a carrying means formed of a thermoplastic material of a second kind, said thermoplastic material of said first kind having a higher melting point than said thermoplastic material of said second kind, said carrying means comprising at least one elongate strip portion bearing over its surface a myriad of outwardly extending integrally formed projections, said strip portion being adhered to said thin film and with said projections extending into and deforming said thin film, said projections being deformed at their tips to thereby effectively lock said thin film material to said strip portion.

2. The carrier bag of claim 1 in which said thermoplastic material of said first kind is polypropylene and said thermoplastic material of said second kind is polyethylene.

3. A carrier bag of the type having bag walls formed of a thin film thermoplastic material of a first kind and a carrier means formed of a thermoplastic material of a second kind, said thermoplastic material of said first kind having a lower melting temperature than said thermoplastic material of said second kind, said carrying means comprising at least one elongate strip portion bearing over its surface a myriad of outwardly extending integrally formed projections, said strip portion being adhered to said thin film and with said projections piercing said thin film, the tip ends of said projections which pierce said film being deformed to thereby effectively lock said thin film to said strip portion.