

United States Patent [19]
Bosse

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[45] Aug. 21, 1973

[54] **PROCESS OF MANUFACTURING CARRYING BAGS WHICH COMPRIZE U-SHAPED CARRYING HANDLES OF PLASTICS MATERIAL SHEETING**

156/264; 150/12, 33; 229/53, 52; 270/93, 94, 41, 52.5; 93/1 G, 35 H, 84, 8 WA

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[56]

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[57]

ABSTRACT

[21] Appl. No.: **123,580**

The end portions of the strip are first folded toward the center of the strip during the folding of the carrying handle. The folded strip end portions are then engaged and rotated through 90° in mutually opposite senses about respective axes, which are spaced apart by the desired distance between the center lines of the legs of the carrying handles.

[30] Foreign Application Priority Data

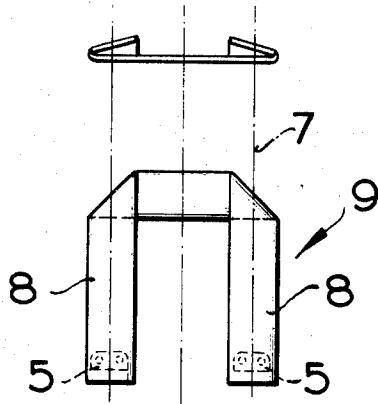
Mar. 13, 1970 Germany P 20 12 084.7
Nov. 4, 1970 Germany P 20 54 277.2

[52] U.S. Cl. **156/227, 93/35 H, 150/12, 156/256, 156/264, 229/52**

[51] Int. Cl. **B31f 1/08**

[58] Field of Search **156/226, 227, 256,**

5 Claims, 10 Drawing Figures



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FIG.1

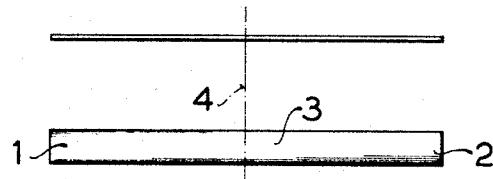


FIG. 2

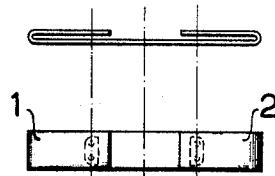


FIG. 3

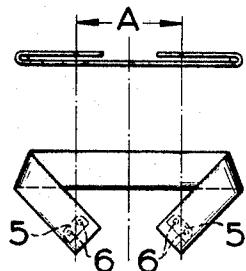
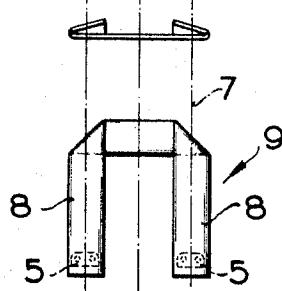


FIG. 4



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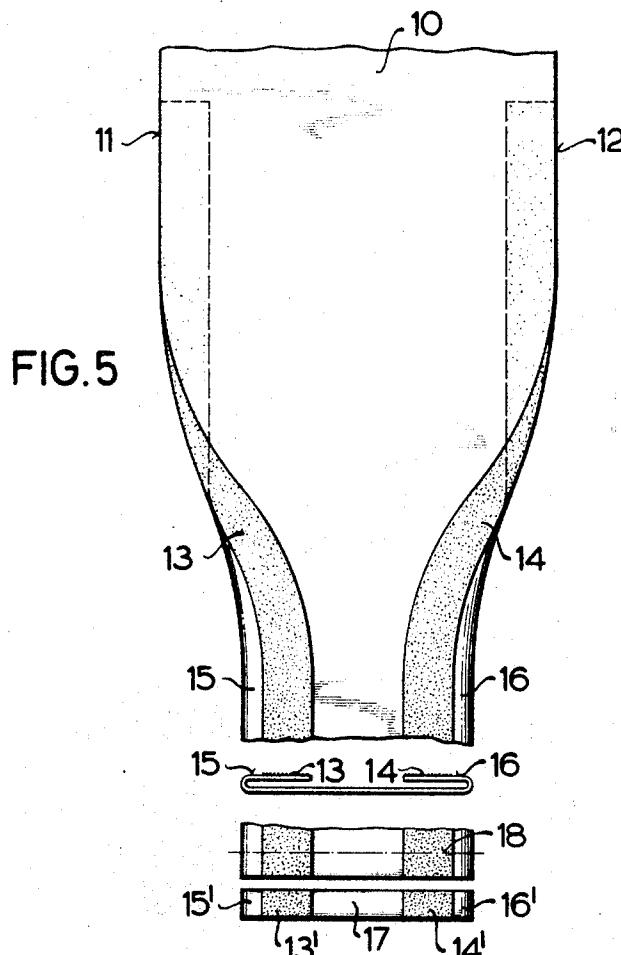
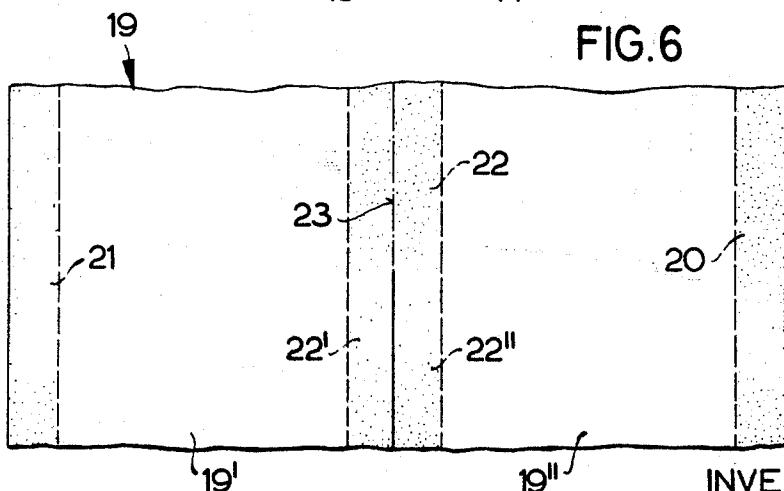


FIG. 5

FIG. 6



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FIG. 7

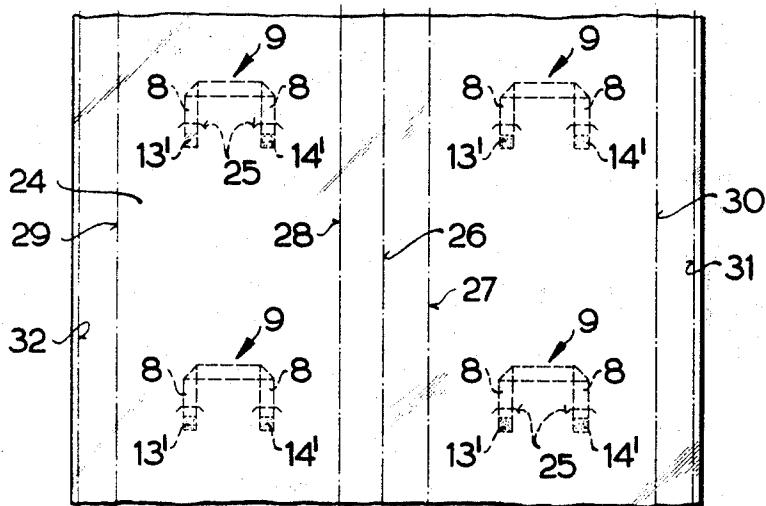


FIG. 8

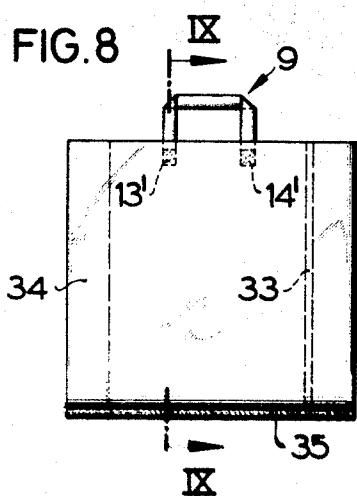


FIG. 9

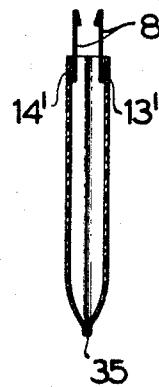
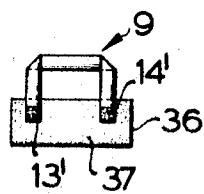


FIG. 10



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**PROCESS OF MANUFACTURING CARRYING
BAGS WHICH COMPRIZE U-SHAPED CARRYING
HANDLES OF PLASTICS MATERIAL SHEETING**

This invention relates to a process of manufacturing carrying bags which comprise U-shaped carrying handles of plastics material sheeting, such as polyethylene or the like, the carrying bags themselves consisting usually of the same material.

The German Patent Specification 1,181,035 discloses a process of manufacturing carrying bags which are made from paper or the like and are provided on each of two opposite bag walls with a U-shaped carrying handle, which consists of paper or the like and protrudes above the opening of the bag. The carrying handles are made from a carrying handle strip, which is formed into the shape of a U. This carrying handle strip is transversely severed from a supply web which has a width that corresponds to the length of the carrying handle strips and the strip during its further processing is conveyed in a transverse direction until the finished U-shaped carrying handles are attached to the bags, which are conveyed in the same direction. The end portions of the carrying handle strip are angled and are turned about their respective axes at the same time to form the legs of the U-shaped carrying handle. It has been found in practice that such process cannot be used in the manufacture of a carrying handle from plastics material sheeting because, contrary to paper, plastics material owing to its flexibility and elasticity has properties which differ entirely from those of paper during the processing. Specifically, plastics material cannot be provided with permanently folded edges.

From the German Patent Application P 14 36 861.7 it is known in the manufacture of carrying bags from plastics material to fold the carrying handles made from flat plastics material sheeting into the shape of a U and in this operation to take hold of the end portions of the strips beside the desired fold lines and to move them toward each other in the plane of the strip while the intermediate portion is relaxed and is thus folded about two fold lines which are inclined at 45° to the longitudinal direction of the strip. Hence, the carrying handle is formed in that the end portions of the strip are rotated and approached to each other at the same time so that a complex movement must be imparted to the end portions of the strip during its formation into the shape of a U. That movement consists of a rotational movement and a translational movement. Such superposition of two different kinds of movements is not desirable because a device which is complicated in structure is required for this purpose.

It is an object of the invention to provide a simple process of manufacturing carrying bags having U-shaped carrying handles of plastics material sheeting, in which process a satisfactory formation of the carrying handle is ensured in spite of the specific properties of the plastics material sheeting and yet the end portions of the strip need not be approached to each other while they are rotated.

This object is accomplished according to the invention in that the end portions of the strip are first folded toward the center of the strip during the folding of the carrying handle, and the folded strip end portions are then taken hold of and thereafter rotated through 90° in mutually opposite senses about respective axes, which are spaced apart by the desired distance between the center lines of the legs of the carrying handles. Dur-

ing this rotation, the fold line between the legs of the carrying handles and the intermediate portion of the carrying handle is continuously displaced toward the center of the intermediate portion and the inclination of said fold line also increases progressively from an original orientation at an angle of 90° to the longitudinal direction of the strip to an orientation at an angle of 45° to the longitudinal direction of the web and of the legs when the rotation has been completed. This displacement of the fold line is readily enabled by the flexibility of the plastics material. During this operation, the intermediate portion of the strip, which intermediate portion is not taken hold of, progressively moves away from the end portions of the strip, which are taken hold of and rotated. The process of manufacture is particularly simple because it is sufficient to impart pivotal movements to the strip end portions. These pivotal movements are performed first about two parallel axes lying in the plane of the strip and then about two axes which are also parallel and at right angles to the plane of the strip.

In a desirable development of the invention, the carrying handle strips are severed from a web of plastics material sheeting having a width which corresponds to the length of the desired strips and having side portions which are infolded toward the center. In this way, the folding of the strip end portions toward the center of the strip is performed on the starting web and need not be performed on the individual strips. The severing of the individual strips from the web having lateral margins which are folded inwardly toward the center may preferably be effected in known manner first in an incomplete degree so as to leave small lands. In this case, the strips can be handled more conveniently. The small lands will be torn only shortly before the next step consisting of the rotation of the strip end portions.

It is another object of the invention so to develop the process according to the invention that the U-shaped carrying handles may be connected in a particularly simple manner to a carrying bag web which consists also of plastics material sheeting and from which carrying bags are subsequently made.

It is known, e.g., from the French Patent Specification 1,448,468 in the manufacture of carrying bags from paper to provide carrying handles folded in U shape and to apply said handles in pairs to a web of plastics material for making the carrying bags and then to adhere reinforcing sheets over the leg end portions. The web which has thus been prepared is then processed in the usual manner in that it is formed into a tubing, sections corresponding to the bag length are severed, and these sections are shaped to form the bag bottom so that complete carrying bags are obtained. The adhesive for adhering the handles and the reinforcing sheets is locally applied to the bag web by means of adhesive applying blocks.

That known operation cannot be used in the processing of plastics material sheeting because the adhesives for use with plastics material, e.g., contact adhesives, cannot be applied to form defined adhesive-covered surfaces but can be applied only to form continuous stripes or surfaces because they tend to form threads when the adhesive-covered blocks are lifted and these threads deposit on adjacent areas. For this reason it has been believed before that carrying bags made of plastics material sheeting and comprising two carrying handles made from flat strips of plastics material sheeting

and folded into the shape of a U cannot be made with adhesive joints but only with welded joints.

The further object set forth hereinbefore is accomplished according to the invention in that the plastics material sheeting is provided at both longitudinal edges with respective adhesive layers which are continuous in the longitudinal direction and the solvent is extracted from the adhesive before the sheeting strips are severed and folded into the shape of a U. In this way, the legs of the carrying handles folded into the shape of a U are provided with an adhesive covering during the manufacture of said handles and this adhesive covering may be used to adhere the carrying handles to the bag web with application of pressure. The application of adhesive to defined areas of the bag web is avoided; such application is not desired in the processing of adhesives for plastics material.

In a development of the process according to the invention, the carrying handles may be applied in pairs to the bag web, as disclosed in said French Patent Specification 1,448,468, in that, in a development of the process according to the invention, a double-width plastics material sheeting is provided centrally between the two marginal adhesive coverings with an additional adhesive covering, which is continuous in the longitudinal direction and has twice the width of each marginal adhesive covering, and, when the solvent has been extracted from the adhesive, the plastics material sheeting is severed into two individual sheeting webs along a line which bisects the intermediate adhesive covering, whereafter said individual sheeting webs are processed as described to form U-shaped carrying handles.

The invention will be explained more fully hereinafter with reference to the drawing, which shows embodiments by way of example.

FIG. 1 shows a strip,

FIG. 2 shows the strip having reversely folded end portions.

FIG. 3 shows a position of the strip during the rotation.

FIG. 4 shows the complete carrying handle.

FIG. 5 shows an embodiment of a plastics material sheeting which is provided with adhesive coverings and intended for use in the making of carrying handles.

FIG. 6 shows another embodiment of a carrying handle web provided with adhesive coverings.

FIG. 7 shows a portion of a bag web to which carrying handles have been adhered.

FIG. 8 is an elevation showing the carrying bag made by the process according to the invention.

FIG. 9 is a sectional view taken on line IX-IX in FIG. 8.

FIG. 10 shows a reinforcing sheet to which a carrying handle has been adhered.

The end portions 1, 2 of the strip 3 are reversely folded toward the center 4 of the strip in such a manner that the distance between the reversely folded end portions 1, 2 is approximately as large as the length of the top of the intended grip portion of the carrying handle. Two vacuum cups 5 are provided, each of which has two suction openings 6 indicated in dash-dot lines. Each of said vacuum cups grips one of the reversely folded end portions of the strip 3 adjacent to the line which will subsequently form the center line 7 of the leg 8 of the carrying handle 9. The strip end portions 1, 2 are then rotated by means of the vacuum cups 5

in mutually opposite senses through 90° to form the carrying handle 9 into its final shape.

This reverse folding of the end portions of the strip affords the advantage that there will be substantially no strip end portions protruding beyond the vacuum cups during the formation of the carrying handle.

A designates the distance between the center lines 7 of the completely rotated carrying handle legs 8. This distance is equal to the distance between the axes of rotation of the vacuum cups. The reversely folded strip end portions cannot extend beyond the center line 7 even when the vacuum cups are eccentric with respect to the axis of rotation. Only the exact distance A between the axes of the vacuum cups is essential.

15 In accordance with FIG. 5, a plastics material sheeting 10 is provided, which has a width corresponding to the length of the sheeting strip to be folded to form a U-shaped carrying handle. This sheeting 10 is flat and unfolded and is provided on its underside with longitudinally continuous adhesive coverings 13 and 14 along the two longitudinal edges 11 and 12 of the sheeting. The two side portions 15 and 16 of the plastics material sheeting 10 are then infolded toward the center of the sheeting so that the adhesive coverings 13 and 14 lie on

20 the top of the side portions 15 and 16. When the solvent has been extracted from the adhesive (contact adhesive), so that the latter is dry, individual strips 17 having reversely folded ends 15' and 16' and having the width desired for the carrying handle are severed from the sheeting 10 along the line 18. By means of the vacuum cups engaging the strip end portions 15' and 16' at the dry adhesive coverings 13' and 14', the strips 17

25 are folded into the U shape, such as had been described with reference to FIGS. 1 to 4. To avoid in this operation an adherence of the vacuum cups to the adhesive coverings, the suction surface of the vacuum cups may be covered with an anti-blocking material, such as polytetrafluoroethylene. The need for this measure will be eliminated if the adhesive coverings 13 and 14 do not extend as far as to the longitudinal edges of the plastics material sheeting 10 but a space is left between the longitudinal edges and the adhesive coverings and said space is at least as wide as the vacuum cups 5 because the vacuum cups 5 can then engage the adhesive-free end portion of the strip 17.

The U-shaped carrying handles and any reinforcing sheets previously joined to them may be adhered to the bag web by means of the adhesive coverings 13' and 14' so that it is not necessary to provide the bag web with defined adhesive coverings corresponding to the desired areas in which the handle legs are to be joined.

When it is desired to apply carrying handles in pairs to a bag web, two carrying handles are made in accordance with FIG. 6 from a plastics material sheeting 19 which has twice the width of the plastics material sheeting 10. The sheeting 19 is provided on its underside along its two longitudinal edges with respective adhesive coverings 20 and 21, which are longitudinally continuous. Centrally between the two adhesive coverings 20 and 21, the sheeting 19 is provided with another adhesive covering 22, which is longitudinally continuous and has twice the width of each marginal adhesive covering. When the solvent has been extracted from the adhesive, the sheeting 19 is severed into individual sheetings 19' and 19'' of equal width along a line 23, which bisects the central adhesive covering 22 into two equal halves 22' and 22''. Each individual sheeting 19'

or 19" has now along both longitudinal edges adhesive coverings 21, 22' and 20, 22" of equal width and is processed to form U-shaped carrying handles as described.

In the manufacture of the bags, the handles 9 are applied to the bag web 24 (FIG. 7) in pairs with spacings corresponding to the desired length and width of the bag by means of the adhesive coverings 13' and 14' on the carrying handle legs 8. The bag web 24 has preferably a rooflike perforation line 25 adjacent to the carrying handle legs 8 somewhat above the intended bonding areas. When the handles have been applied to the bag web 24, the latter is formed into a tubing, e.g., a tubing having side gussets, by folding about the fold lines 26 to 32 indicated in dash-dot lines in FIG. 7. The resulting tubing having side gussets is provided with a welded side seam 33 (FIG. 8), whereafter individual carrying bags 34 are severed from the tubing by transverse cuts taken along lines which are extensions to the ridge lines of the rooflike perforations 25, and the perforation lines are torn open. Each carrying bag is then closed by a welded bottom seam 35. It is apparent from the above that adhesive coverings are applied throughout the manufacture only to the plastics material sheeting 10 or 19, where these adhesive coverings need not be interrupted so that even the lifting of paste-applying blocks will not give rise to difficulties due to a splashing of adhesive or a formation of threads by the adhesive.

To reinforce the portions where the handles 9 are adhered to the edge of the carrying bag 34, a reinforcing sheet 36 (FIG. 10) provided with an adhesive covering 37 from which the solvent has already been extracted may be bonded to each handle 9 before the latter is adhered to the bag web 24. The unit formed by the handle 9 and the reinforcing sheet 36 is then joined to the bag web 24 in that the adhesive covering 37 of the reinforcing sheet 36 and the adhesive coverings 13' and 14' of the handle 9 are adhered to the bag web. The reinforcing sheets 36 may be made from a plastics material sheeting web, which is provided throughout its surface with a continuous adhesive covering 37 and from which individual reinforcing sheets 36 are severed when the solvent has been extracted from the adhesive covering. Hence, even in the manufacture of bags which comprise reinforcing sheets adhered to the bag web, it is not necessary to provide defined adhesive coverings on the bag web so that the difficulties involved therein, which have been explained hereinbefore, will be eliminated.

What is claimed is:

1. A process of manufacturing U-shaped carrying handles for use in manufacturing carrying bags comprising forming a strip of flexible plastic sheet material, folding the end portions of said strip toward each other and toward the center of said strip so that said end portions are equidistant from the center of said strip and lie parallel to said strip, and gripping the end portions of the folded strip and rotating said end portions in mutually opposite directions about respective axes which are spaced from the center of said strip by the desired distance between said center and the legs of said U-shaped carrying handles until said legs are parallel to each other and form the legs of said U-shaped carrying handle.

5 2. The process of claim 1 in which said forming and folding steps comprise forming a web of a flexible plastics sheet material having a width equal to the length of the desired strip, folding the side portions of said web toward each other and toward the center of said web until said side portions are equidistant from the center of said web and are parallel to said web and severing said strip from said web.

10 3. The process of claim 2 in which said strip is first incompletely severed from said web to leave small lands and then completely severed from said web shortly before the ends of said folded strip are gripped and rotated.

15 4. The process of claim 2 and further comprising forming an adhesive layer comprising removable solvent on each of the side portions of said web so that they run continuously in the longitudinal direction and further comprising extracting said solvent from said adhesive layers before said strip is severed.

20 5. The process of claim 1 in which said forming and folding steps comprise forming a web of flexible plastics sheet material having a width which is twice the length of the desired strip, forming an adhesive layer comprising removable solvent on each of the side portions of said web, forming an adhesive layer comprising removable solvent in the central portion of said web which is twice the width of said adhesive layers on said side portions and whose edges are equidistant from the center of said web, extracting solvent from said adhesive layers, severing said web along a line which bisects said intermediate adhesive layer to form two individual sheets and severing said strip from each of said individual sheets.