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(54) Handle in a bag of plastics foil.

(57) Handle in a bag of plastics foil, which foil is joined and/or folded to form a flat tube with at least two layers of foil placed on top of each other, and in which the two layers are joined by means of crosswise weldings enclosing between the two foils a cavity for enclosing the contents of the bag, which handle comprises a punching forming an opening through at least one of the layers of foil. In order to obtain an optimal utilization of the foil used for manufacture of a bag with a predetermined volume, the punching is placed in the portion of the bag, which is intended for enclosing the contents, and the punching is surrounded by a welding joining the two layers. The handle is particularly advantageous in bags comprising a filling valve, the handle being placed in the opposite end of the filling valve.

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HANDLE IN A BAG OF PLASTICS FOIL

The present invention relates to a handle in a bag of plastics foil and of the type described in the preamble of claim I.

From Norwegian Patent Publication No. I23,99I open plastic bags are known with two punchings through the plastics foil at the open end of the bag forming handles. The user closes the bag by gripping through the two punchings in order to carry the bag without any risk that the contents of the bag will fall out.

Open plastic bags are not suited for distribution of loose goods, soap powder for washing, fertilizers, etc. Such goods are contained in plastic bags, which, before or immediately after the filling, are closed at both ends by means of a crosswise welding seam. Handles for such closed bags are known. The handles are punched in an extension of the foil, from which the bag is made, i.e. the handles are provided in a portion of the bag material outside the welding seam closing the cavity, in which the contents of the bag are enclosed. This arrangement causes a substantial increase in the amount of foil necessary for manufacturing a bag which contains a predetermined volume compared with the manufacture of a corresponding bag without a handle, as the portion of the foil, in which the handle has been punched out, does not contribute to the volume of the bag to be filled.

The object of the invention is to optimize the utilization of the foil necessary for the manufacture of a bag with a predetermined filling volume.

According to the invention this is obtained by means of a handle, which is characterized by the features stated in the characterizing clause of claim I.

By placing the handle in the portion of the bag, which is intended for enclosing the contents, part of the filling volume is lost corresponding to the size of the punching, but as the cavity of the bag surrounds the punching, it is still possible to utilize the volume surrounding the punching. The welding encircling the punching further adds to the strength of the bag around the punching, as the foil seems to be less inclined to tear starting from the punching owing to a strong tension of the handle. The welding surrounding preferably form a closed figure, but may in certain cases consist of two or three separate welding lines separated by passages,through which the contents will not flow out. This is used advantageously in certain cases, if the foil exhibits different shrinking in longitudinal and crosswise direction. The narrow passages do not constitute a leakage if the punching has been made with a warm tool making a welding at the edges of the handle.

The invention is particularly well suited for bags of the type comprising a filling valve, through which the bag may be filled after both weldings at the ends of the bag having been made. According to a preferred embodiment of the invention the handle is placed adjacent to the welding at the end most distant from the filling valve and at such a distance from the welding that a passage is formed, which passage through filling with the contents of the bag forms a substantially cylindric body with a diameter which is comfortable to grip. Usually, handles in foil bags will roll or fold from the tension owing to the weight of the contents and form a narrow, rather sharp string, which with a weight of I0 - 25 kg is very inconvenient for the fingers of the person carrying the bag. In the bag according to the invention the contents of the bag are used for making the handle more comfortable.

According to the invention this advantage is particularly useful if means are present at the ends of the passage hampering the outflow of the contents from the passage.

The requirements to the strenght of the foil at the punching are normally greater than the requirements to the strength of the remaining part of the bag. According to the invention a reinforcement may be made as described in claim 4. Surprisingly, it has been found that it is not necessary to adopt other measures for connecting the extra layer of foil with the foils, from which the bag are made, than providing the welding surrounding the punching.

In certain types of bags the filling valve is of a type which is placed in one of the two layers of foil in an area, in which one of the layers comprises two overlapping foils. Thereby, a reinforcement of the handle is obtained, although in certain cases this reinforcement entails an offset of the handle from the symmetry axis of the bag. This disadvantage may, however, be alleviated by a slightly oblique placing of the punching.

According to the invention the welding surrounding the punching is shaped like the letter D with its straight side adjacent to the end welding. Preferably, the welding surrounding the punching is placed with a maximum distance of I.5 cm from the edge of the punching.

The invention is described in details with reference to the drawing showing schematically a bag with a handle according to the invention.

The drawing shows a bag I manufactured from plastics foil. The foil is folded lengthwise to form longitudinal edges 2 and 3. The folded portions of the foil thereby form an overlapping area 4, which is used for formation of a filling valve 5. The

overlapping foil portions are welded together along a line 7 extending along the overlapping free edge of the overlapping foils from one end of the folded foil to a point, the distance of which from the other end corresponds to the size of the desired valve. From this point the welding extends along the line 8 parallel to the edge at the end of the foil and finally along the underlying edge of the overlapping foils along the line 9. By the folding the foil forms a flat tube with two layers except in the area, in which the folded foils overlap and in which, therefore, there are three layers. The flat tube is then closed at the ends by means of weldings I0,II extending crosswise. The valve is now limited by the welding II and the welding along the line 8. It is understood that the weldings along the lines 7,8,9 join the overlapping foils only and not the base foil. For such a bag a two-layer foil is normally used, the number of layers thereby being doubled without otherwise changing the principle. By the use of a two-layer foil an extra sealing edge in the filling valve is obtained preventing unintentional outflow of the contents of the bag.

The above bag may according to the invention be provided with a handle I2. The handle comprises a punching I3 shaped like the letter D, and with the straight portion extending parallelly to the crosswise welding I0. The punching may be made with a sharp tool cutting a hole or a U-shaped slit in the foil, or the punching may be made with a hot, sharp edge simultaneously with the welding of the bag. Surrounding the punching I3 a welding I4 extends, which welding joins the two layers of the flat tube, of which the bag I cnstis. The welding I4 primarily prevents the contents from flowing out through the punching, but also provides a certain change in the structure of the plastic around the punching I3, so that tearing due to a tension in the handle is less likely to generate. Normally, the welding I4 forms a closed figure around the punching I3, but in certain cases, when the shrinking in lengthwise or crosswise directions is different, it may consist of two or three lines separated by narrow passages. The passages must be narrow in order not to provide leaks for the contents of the bag. If the punching is made with a hot tool, leaks will not be a problem. The welding I4 may comprise a substantially straight welding seam separated at the ends from the curved seam forming the remaining part of the letter D. Tests with a bag of the type 340 × 440 × 650, manufactured from a 70 µm PELD plastics foil, have given the following results:

Handle, which is punched only: tear at a tension of 22.5 kp

Handle with a surrounding welding: tear at a tension of 30 kp

The handle I2 is preferably arranged in the end opposite to the filling valve. During the filling process of the bag the content will therefore distend the bag around the handle and flow into the passage I5, said passage being formed between the welding I4 and the welding I0. The portion of the handle being gripped by the carrying person is therefore inflated by the contents of the bag and is therefore less liable to cut itself into the fingers of the carrying person than in the case of an deflated foil, the latter being a well-known phenomenon for users of plastic handbags. The distance between the two weldings is adapted to create a passage containing such an amount the content of the bag that the handle is convenient in use.

The thickness of the foil is normally defined by the volume and the weight of the content filled into the bag and by the resistance to puncturing and tearing by sharp and pointed objects. The foil thickness providing sufficient resistance against this may not be able to provide sufficient strength to the handle. In order to reinforce the handle a reinforcing patch I6 may be inserted, said patch being joined with the foil, of which the bag consists, by the welding I4 only. The reinforcing effect obtained substantially equals the strength obtained by increasing the foil in the bag itself with the thickness of the patch. To prove this reinforcing effect of the inserted patch a series of tests were made with a bag manufactured from a 70 µm two-layer PELD foil:

Without reinforcement: tear at 30 kp

With a 80 µm patch: tear at 36.5 kp

With a I20 µm patch: tear at 40 kp

The increased strenght is not quite proportional with the increased thickness, but with 85 per cent of it. As the increased consumption of foil is only one twentieth of the increase in weight of foil, if the foil in the bag has been increased to obtain a corresponding strength, the loss of I5 per cent of the reinforcing effect is of no importance in practice.

The reinforcing patch I6 may possibly be provided with folds allowing the contents of the bag to enter into the passage between the weldings I0 and I4, but hampering return to the remaining part of the bag. This contributes to retain the convenient handle also after the partial emptying of the bag.

A reinforcement of the handle I2 may also be obtained by arranging the handle as a whole in the area of the overlapping foils. In certain cases it entails that the handle is offset from the center of the welding I0, but then the handle may be slightly oblique in order to arrange it perpendicularly to a line connecting its center with a point slightly under the center of the bag, said point being approximately the center of gravity of the contents of a filled bag.

Claims

I. Handle in a bag of plastics foil, which foil has been joined and/or folded to form a flat tube with at least two layers of foil placed on top of each other, and in which the two layers are joined or are adapted to be joined immediately after filling of the bag with its contents to be joined at both ends of the bag to define a closed cavity between the two layers of foil, which cavity is containing the contents of the bag, said handle comprising a punching to form an opening through at least one of the foil layers, **characterized** in that the punching is arranged in the portion of the bag defining the cavity, in which the contents are enclosed, and that the punching is surrounded by a welding joining the two layers of foil.

2. Handle according to claim I, and in which the bag comprises a valve, through which the bag may be filled after making the two welds at the ends of the bag, **characterized** in that the handle is arranged adjacent to the welding most distant from the filling valve and in such a distance from the welding that a passage is formed, which passage by being filled with the contents of the bag forms a substantially cylindric body with such a diameter that it is comfortable to grip.

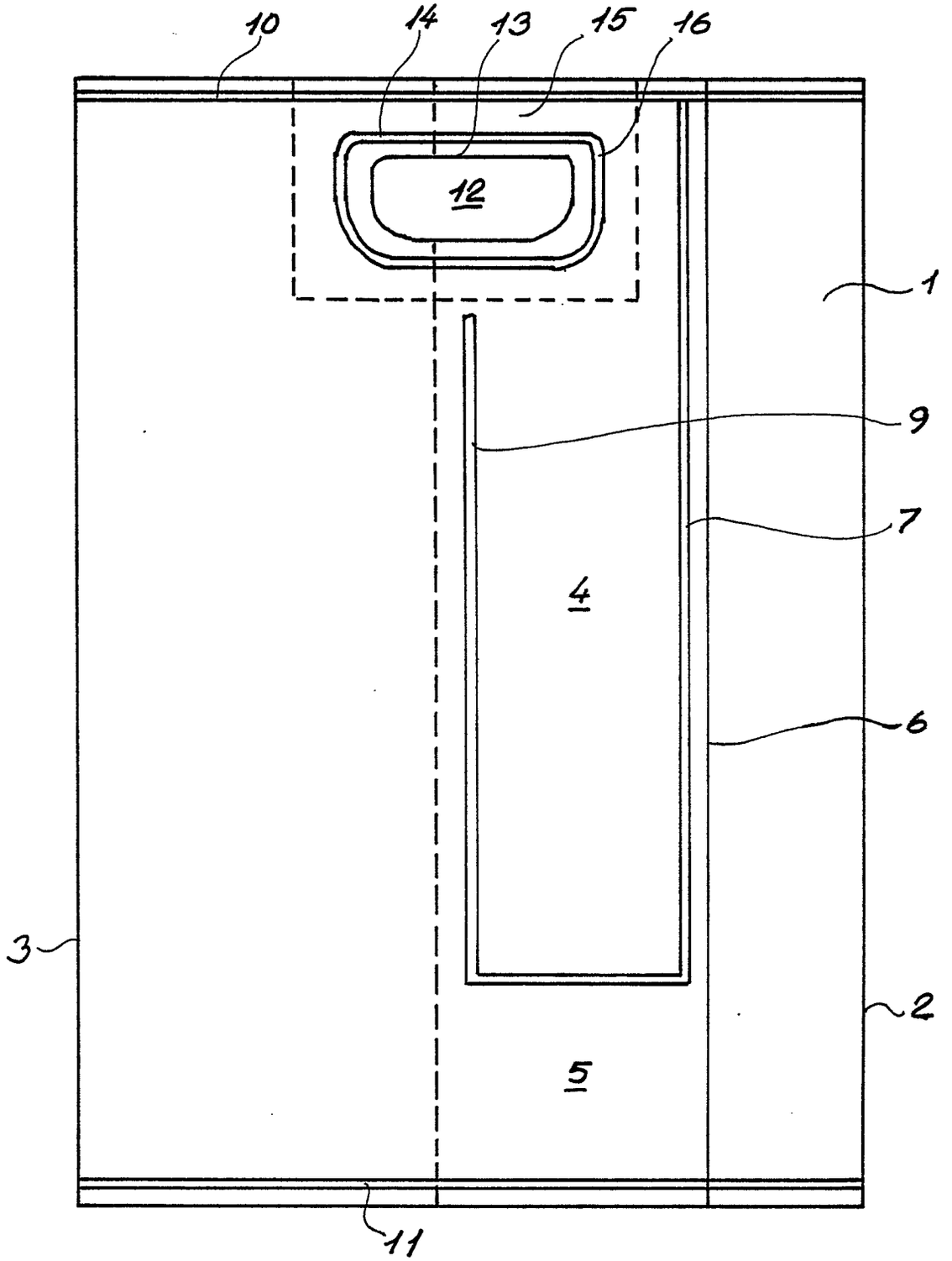
3. Handle according to claim I or 2, **characterized** in that at the ends of the passage there are means for hampering the outflow of the contents from the passage.

4. Handle according to claim I or 2, **characterized** in that between the joined foils in the area of the punching at least one patch of foil has been inserted, which patch is welded together to the two layers of foil by means of the welding joining the two layers.

5. Handle according to claim 2, in which the filling valve is arranged in one of the foil layers in an area, in which it comprises two overlapping foils, **characterized** in that the handle is placed adjacent to one of the ends of the foil in the area, in which one of the layers of foil comprises at least two overlapping foils.

6. Handle according to any of the claims I-5, **characterized** in that the welding around the handle is shaped as the letter D, and with the substantially straight side adjacent to the crosswise end welding.

7. Handle according to any of the claims I-6, **characterized** in that the welding surrounding the handle is placed at a distance of at the most I.5 cm from the edge of the punching.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