



SPECIFICATION

AK-9606

TITLE OF THE INVENTION

A BOTTLE HAVING A HANDLE FORMED BY STRETCH BLOW MOLDING

BACKGROUND OF THE INVENTION

5 1. Field of the Invention

This invention relates to a stretch blow molded bottle having a handle provided on its neck portion.

2. Background Art

It is known to injection mold a preform having a handle which is integrally formed and extended longitudinally and downwardly from a side surface positioned below a threaded portion of a neck of said preform and stretch blow mold said preform into a bottle which has a thin body wall from a distal end of the neck to a bottom so as to obtain a bottle integrally having a handle.

Such a bottle having a handle is disclosed in, for example, GB-A-2041286, EP-A-0061511, US-A-4,629,598, JP-A-3-268907, EP-A-0479139 etc..

Also in JP-A-56-30828, there is disclosed a bottle formed by stretch blow molding in which a ring shaped handle is integrally formed on a neck in a longitudinal direction.

This conventional handle has a certain thickness so as to acquire a strength. If a resin used as a material for molding a bottle is polyethylene terephthalate, although it has a certain hardness as no further process is provided



after the injection molding, it lacks an impulsive strength. This might cause a damage of the handle when the bottle filled with contents accidentally fell down on the ground from a shelf and the like. On the other hand, if a used
5 resin is polypropylene, the handle will not be damaged when falling down the bottle because of its flexibility. However, the hardness of the handle is not sufficient and thus a separately formed handle which is made of polyethylene is mounted afterward.

10 Another stretch blow molded bottle in which a ring shaped handle, besides the above mentioned handle, is integrally formed in a horizontal direction is disclosed in W082/02369. However, this ring shaped handle has the same thickness as a ring formed on the neck of the bottle. Thus,
15 if a formed resin is polyethylene terephthalate typically used for this type of bottle, the handle lacks flexibility and it is difficult to carry the bottle when it is filled with contents. In addition, there is a possibility of easily breaking of the handle when it is bent.

20 It is an object of the present invention to provide a newly structured bottle having a handle formed by stretch blow molding, wherein a bendable handle having a flat shape and extending in a transverse direction is integrally formed on a lower side of the neck of the bottle to facilitate
25 carrying even a relatively large bottle.

SUMMARY OF THE INVENTION

According to an aspect of the present invention, there is provided a bottle having a handle which is integrally formed at a lateral portion below a threaded
5 portion provided on the neck of the bottle at the time when a preform for the bottle is injection molded, has a flat shape extending in a transverse direction, comprises a connecting portion connected to the neck and an annular finger engaging tab which has a larger width than that of the connecting
10 portion, and said connecting portion includes a narrow portion which has a reduced thickness and is transversally provided at an intermediate portion of the connecting portion, whereby making the finger engaging tab bendable at the narrow portion in upper and lower directions, and
15 molecular orientation of the resin is performed by said narrow portion.

In addition, in the above construction a concave portion for supporting it by one's fingers may be provided at the bottom of the bottle on the side opposite to the portion
20 where the handle is positioned in order to facilitate pouring of the contents by carrying it by means of the handle.

The bottle may be made of polyester resins such as polyethylene terephthalate, polyethylene naphthalate or the like, or polypropylene. In a case where the used resin is
25 polypropylene, a flexibility of polypropylene can be added to



the bottle. In a case where the used resin is polyethylene terephthalate, even no further process is provided to the handle after injection molding, an outer portion of the handle from the narrow portion will have flexibility by performing a molecular orientation at the narrow portion and thereby bending strength and impulsive strength can be increased and consequently the handle will become difficult to chip though it has been thinly formed.

10 BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a front view a half of which shows a cross sectional view of a bottle having a handle formed by stretch blow molding according to the present invention.

Fig. 2 is a plane view of the bottle having the handle formed by stretch blow molding according to the present invention.

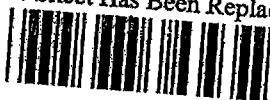
Fig. 3 is a front view of a preform in which the handle is integrally formed.

Fig. 4 is a partial sectional front view showing particularly the handle portion.

Fig. 5 is a explanatory view showing an application of the bottle having the handle formed by stretch blow molding according to the present invention.

Fig. 6 is another explanatory view showing an application of the bottle having the handle formed by stretch

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blow molding according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In figures, numeral 1 designates a bottle made of
5 polyethylene terephthalate, a neck 2 is not processed after
injection molded and the bottle is formed to have a thin wall
thickness by stretch blow molding from the distal end of the
neck 2 to a body 4 and a bottom 3.

Numerals 5 designates a handle which is formed
10 integrally on one side of a support ring 6 formed below a
threaded portion of the neck 2. The handle 5 has a flat
shape and extends in a transverse direction. In addition, it
comprises a connecting portion 51 connected to the neck and
an annular finger engaging tab 52 which has a larger width
15 than that of the connecting portion and is formed at its free
end. The periphery of a finger tip insertion hole 53 formed
within the finger engagement tab 52 is reinforced with a
convex edge 54 which is slightly projected in both upper and
lower directions around the inner peripheral edge in order to
20 lighten the load on a finger which is engaged with the finger
engaging tab 52. Taking a facilitation of carrying the
bottle into account, a width of the finger tip insertion hole
53 preferably has a space enough to accommodate at least
three fingers, i.e. about more than 5cm.

25 The above described connecting portion 51 includes

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a narrow portion 55 which is transversally provided at an intermediate portion of the connecting portion and has a thinner thickness than that of the connecting portion so as to make the finger engaging tab 52 bendable at the narrow
5 portion 55 in upper and lower directions. In addition, since molecular orientation of the resin is performed by said narrow portion when injection molded, the side of the finger engaging tab may have a flexibility while having a certain strength.

10 A dimension of the thickness of the narrow portion is not particularly subjected to any limitations, however, molecular orientation must be performed at the narrow portion. Without a performance of molecular orientation, the narrow portion, although its thickness is made thinner, is
15 provided with no strength against bending like as a conventional bottle in which there is no difference in thickness and consequently may cause a breaking of the handle portion when it is forced to be bent.

 The thickness of the narrow portion is preferably
20 0.5mm or less, most preferably 0.3mm or less.

 The width of the narrow portion in a longitudinal direction is preferably 1.5mm or more and it may be the same as that of the connecting portion, i.e. the entire connecting portion is the narrow portion.

25 The handle 5 is injection molded at the same time



when a preform 11 is injection molded. The molding can be easily performed by forming a flat cavity 15 for the handle 5 connected with a support ring 16 of a neck 12 at a parting surface between a forming mold 31 for the neck 12 and a forming mold 32 for a body 13 and a bottom 14, and injection filling a molten resin through the support ring 16 into the flat cavity 15.

The resin material filled into the cavity 15 through the support ring 16 is pressed out through a passage to limit a flow of resin by protrusions projected from both upper and lower surfaces of the cavity, i.e. the narrow portion 15a in the cavity and is forced to flow into the side of the finger engaging tab. At the same time molecular of the resin is oriented in a direction of a flow of resin.

Thus, as shown in Fig. 5, the handle 5 provided even on a large sized bottle which is filled with contents will not break when it is bent, and it facilitates carrying of the bottle since the handle has sufficient strength even in a bent condition.

At the side of the finger engaging tab where molecular orientation has been performed, even when the bottle 1 is made of polyethylene terephthalate, the handle will have a flexibility. And thus the narrow portion 55 having a thinner thickness will not be torn with fatigue after bending the side of the finger engaging tab repeatedly



in upper and lower directions as same as a case where polypropylene is used. However, in a bottle in which the narrow portion 55 is not provided the side of the finger engaging tab can be easily broken because it is hard to bend
5 for its solidity even when its thickness is approximately 1.5mm, and also because it hardly possesses flexibility.

Numeral 7 designates a concave portion for supporting the bottle by one's fingers which is provided at the bottom of the bottle 1 on the side opposite to the
10 portion where the handle is positioned and is formed at the time when the bottle 1 is stretch blow molded. As shown in Fig. 6, the concave portion 7 is provided in order to facilitate inclining the bottle 1 when pouring the liquid contents by engaging a finger or fingers on one hand into the
15 handle 5 while supporting the bottom 4 with the other hand. The concave portion 7 may preferably be adopted to relatively large bottles include a capacity of 3 liters and having a problem in attaching a hand on the bottom because of weight of the contents and a diameter of the bottle.

20 The above mentioned bottle 1 is capable of carrying by engaging a fingertip or fingertips into the finger engaging tab 52 of the handle 5, pouring the contents by, as mentioned above, and carrying the handle with one hand while supporting the bottom by the other hand with engaging
25 fingertips to the concave portion 7. Since the handle is



flat and thinly formed, it requires less amount of resin material than a conventional handle does. In addition, since the handle is restorable when bent at the narrow portion, it does not take any extra space when the bottle is packed in a
5 box.

Example 1

Used Resin Polyethylene terephthalate

Size of the bottle

10 Capacity 3 liters
Height (mm) Total height 309, Neck 33mm
Diameter (mm) 130

Size of the handle

Length (mm) Total length 40, Connecting portion 10
15 (including 2mm of width of the narrow
portion), Finger engaging tab 30
Width (mm) Connecting portion 22, Finger engaging
tab 64
Thickness (mm) Flat portion 1.5, Narrow portion 0.3
20

Comparative Example 1

The narrow portion is excluded from the bottle described in the above Example 1 and a portion having a thickness of 1.5mm which is same as the flat portion is
25 provided instead.

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Two of the above mentioned bottles are filled with water and carried with engaging fingers into the respective handle.

The bottle according to the present invention
5 described in the Example 1 was easily carried due to bending of the handle in upper direction as shown in Fig. 5. No crack or the like was seen on the bendable narrow portion after 20 times of repeatedly bending.

Conversely, in the bottle described in the
10 Comparative Example 1, the handle could not been bent sufficiently because of the thickness provided which is same as the flat portion, and consequently caused difficulty in carrying of the bottle. The handle was forced to bend during carrying of the bottle, which cause cracks and then tearing
15 off of the handle itself.

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WHAT IS CLAIMED IS:

1. A bottle having a handle formed by stretch blow molding,
said handle being integrally formed on a lateral portion
below a threaded portion of a neck of the bottle at the time
5 when a preform therefor is injection molded, a portion of the
bottle from a distal end of the neck to a bottom being thinly
formed by stretch blow molding, wherein said handle has a
flat shape extending in a transverse direction and comprises
a connecting portion connected to said neck and an annular
10 finger engaging tab formed at its free end having a larger
width than that of said connecting portion, and said
connecting portion includes a narrow portion which is
transversally provided at an intermediate portion of said
connecting portion and has a reduced thickness, whereby
15 making said finger engaging tab bendable at said narrow
portion in upper and lower directions, and molecular
orientation of the resin is performed by said narrow portion.

2. A bottle according to claim 1, wherein said bottle
20 comprises a concave portion for engaging finger provided at
the bottom of said bottle on a side opposite to the portion
where said handle is positioned.

3. A bottle according to claim 1, wherein said bottle is made
25 of polyester resin.





4. A bottle according to claim 1, wherein the thickness of said narrow portion is 0.5mm or less.
5. A bottle according to claim 1, wherein the inner peripheral edge of said annular finger engaging tab is reinforced by providing a convex edge which is protruded in upper and lower directions around the inner peripheral edge.
6. A bottle according to claim 1, wherein a width of the hole of said annular finger engaging tab is about 5cm or more.

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