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(54) Title: ROLLABLE CONTAINER

(57) Abstract: The invention relates to a container comprising a hollow enclosed substantially cylindrical rigid body. The body is provided with an elongate passageway extending through the body along the cylindrical axis thereof, the body further provided with a sunken filler opening suitable for receiving a closure means in the form of a threaded cap. The container is provided with a handling means for retaining the container rotatably about the cylindrical axis by means of the passageway. A method for manufacturing the container by means of rotational moulding is also provided.

(56) Documents cited: FR - 416854 (Ferrania)

GB - 476638 (Dovey et al.)

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Field of the invention

This invention relates to a container. More particularly but not exclusively, the invention relates to a container such as a barrel, a can or a drum having a passageway therethrough and a process for manufacturing the container.

Many different containers presently exist, and containers such as barrels, cans, drums and the like are well known and widely used in many industries. However, beyond a portable size the manual conveyance of these types of containers creates difficulty since the shape to weight ratio of the containers when filled hampers their maneuverability and special equipment is therefore often required to maneuver them. When rollable, containers such as barrels, drums and cylindrical cans are often conveyed or maneuvered manually by way of rolling the containers. However, a rolling, filled container creates further difficulty in controlling the direction and the pace of the moving container. Thus, many different designs have seen the light aimed at improving the maneuverability of these containers, with features such as gripping or holding formations integral with or attachable to the containers.

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One such known design comprises a container having a cylindrical body with two opposing substantially flat end surfaces, the end surfaces having shallow blind socket formations projecting inwardly therefrom substantially along the cylindrical axis of the body.

This known container is used in conjunction with a rigid V-shaped handling means having a retainer mechanism in the form of plug formations protruding inwardly from the ends of the two opposing limbs of the V-shaped handling means. The container and handling means combination is used by locating and retaining rotatably the container about its cylindrical axis between the opposing limbs by means of the co-operating plug and socket formations, enabling the container to be maneuvered with the handling means.

A known modification to this design comprises stub elements protruding along the cylindrical axis outwardly from the opposing end surfaces to receive and secure a handling means for retaining and maneuvering the container rotatably about the

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cylindrical axis. A second known modification to
the above design comprises a similar container
mounted permanently on an axle extending through
the container along the cylindrical axis thereof,
5 the axle pivotably mounted on a handling means.

However, a limitation of the above known container
and the modified and/or related designs is the
constant need for a suitable handling means without
which the container is reduced to a conventional
10 substantially cylindrical container. This known
container is further limited in that the need for
standing or stacking the container in an upright
position and/or handling the container otherwise
than by rolling requires the handling means to be
15 detachable from the container or be capable of
retaining and/or suspending the container when
loaded from the retainer mechanism. The modified
and/or related designs are similarly limited, with
the designs having integral protruding elements
20 totally incapable of extending and/or stacking.

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Also, a further limitation is the top load
compression resistance of these containers that is
the ability of the containers to withstand large
loads such as when filled containers are being
5 stacked on top of each other. Thus, vertical
support structures are often essential to provide
added strength and increase the top load
compression resistance of stacked containers.

It is accordingly an object of the invention to
10 provide a container aimed at overcoming the above
limitations or at least to provide a useful and
novel alternative to existing containers of the
abovementioned type.

Summary of the Invention

20 According to a first aspect of the invention a
container comprises a hollow enclosed substantially
rigid body having an elongate passageway extending
substantially vertically through the body with the
body in the upright position to define an
25 annular-like enclosure substantially around and
evenly about the passageway, the passageway

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providing the container with a holding formation as well as a vertical support structure, the body being provided with a filler opening suitable for receiving a closure means.

5 The hollow enclosed body may be cylindrical with a cylindrical axis, the passageway extending substantially along the cylindrical axis to define a substantially cylindrical inner wall for the annular-like enclosure, the enclosure having a
10 substantially cylindrical outer wall consisting of a hollow cylindrical middle section integral with two hollow thrusto conical end sections, the two end sections diametrically converging away from the middle section to define a substantially
15 barrel-shaped annular-like enclosure. The annular-like enclosure preferably extends endlessly around the passageway.

The passageway may be tubular with a circular cross-section, the passageway converging
20 diametrically from opposing ends inwardly to provide a minimum circular cross-section substantially midway between the two opposing ends with the passageway preferably integral with the body.

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The container may be provided with a handling means extending at least partially into the passageway for retaining and maneuvering the container by means of the passageway. The handling means preferably retains the container rotatably about the cylindrical axis rendering the container rollable while being retained by the holding means.

The holding means may comprise an elongate flexible member capable of extending loosely through the passageway as well as creating a closed loop from which the container is rotatably retainable.

According to a second aspect of the invention a method for manufacturing by means of a rotational moulding process a container as herein defined or described includes the steps of;

- providing moulding apparatus having a two-part mould rotational about a plurality of axes, the mould defining a mould cavity substantially similar to the shape and configuration of the container, the mould having an elongate member

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spanning in use the mould cavity substantially along a centre line of the mould cavity to provide a mould formation for the passageway, the elongate member being of suitable dimensions relative to the dimensions of the mould cavity to provide an adequate mould formation without the use of a fusion surface of plastics material on the elongate member;

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10 - introducing a sufficient amount of thermosetting plastics moulding material to the mould;

- rotating the mould about the plurality of axes;

15 - providing sufficient heat to enable the thermosetting plastics moulding material to liquify; and

20 - discontinuing the provision of heat to allow the thermosetting plastics material to mould and set evenly along the surfaces of the mould; and

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- discontinuing the rotation of the mould allowing the moulded hollow body to be removed.

5 The method for manufacturing the container preferably includes the step of;

- providing moulding apparatus of which the ratio of the outer diameter of the elongate member at the opposing ends thereof to the inner width of the mould cavity at the corresponding opposing ends thereof is in the order of 1 : 3.

Specific description

20 A preferred embodiment of the invention will now be described by way of example only and with reference to the accompanying drawings wherein :-

Figure 1 is a perspective view of a substantially cylindrical container in accordance with the invention;

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Figure 2 is a cross-sectional side view of the container illustrated in Figure 1; and

Figure 3 is a cross-sectional plan view along line III-III of the container illustrated in Figures 1 and 2.

The same reference numerals are used to denote corresponding parts in the accompanying drawings.

A container 1 as illustrated in Figures 1, 2 and 3 comprises a hollow enclosed substantially cylindrical rigid body 2 provided with an elongate passageway 3 extending through the body along the cylindrical axis thereof, the body further provided with a sunken filler opening 4 suitable for receiving a closure means 5 in the form of a threaded cap.

The hollow enclosed substantially cylindrical rigid body 2 consists of a hollow cylindrical middle section 2a integral with two hollow thrusto conical end sections 2b. The two thrusto conical end sections 2b converge away from the cylindrical middle section 2a to define a substantially barrel-shaped container 2.

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The passageway 3 is integral with the body to define an annular-like enclosure 6 extending endlessly around the passageway. The passageway 3 is tubular with a circular cross-section and is flared at its two opposing ends 3a to integrate radially outwardly with the corresponding opposing end surfaces 2c of the cylindrical body 2 to define the annular-like enclosure 6. The passageway 3 converges diametrically from the two opposing ends 3a inwardly to provide the passageway with a minimum circular cross-section 3b midway between the two opposing ends.

The container 1 is provided with a handling means 7 for retaining the container rotatably about the cylindrical axis by means of the passageway 3. The retaining means 7 consists of an elongate flexible member in the form of a rope.

In use the handling means 7 is passed through the passageway 3 to retain the container 1 rotatably about the cylindrical axis rendering the retained container maneuverable by rolling or suspending the container by means of the handling means.

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The manufacture of small hollow articles (not shown) by means of rotational moulding is well-known. Also, the moulding of large hollow articles is known to require a fusion surface of plastics material on a mould member spanning a required mould cavity of a moulding apparatus (not shown), the member providing a mould formation for the passageway.

However, the manufacture of the substantially barrel-shaped annular-like enclosure 2 is alternatively and preferably carried out without the fusion surface. Conventional rotational moulding apparatus (not shown) as used for moulding drum-like containers from thermosetting plastics material is used with a two-part mould defining a mould cavity identical to the shape and configuration of the container 1, the mould having an integral elongate member spanning in use the mould cavity along the cylindrical axis of the mould cavity to provide a mould formation for the passageway 3. The mould and the elongate member is split into two parts along line III-III as illustrated in Figure 3, providing for the removal of the moulded hollow substantially barrel-shaped

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body 2. The elongate member has an outer shape and configuration identical to the inner shape and configuration of the passageway 3. It was found that, for a container such as container 1 with a total height of 540 mm and an outer diameter of 520 mm, an elongate member, with an outer shape and configuration such as the inner shape and configuration of the passageway 3, does not require a fusion surface of the plastics material to allow the thermosetting plastics material to distribute and set evenly along the inner surface of the mould and the outer surface of the elongate member. The passageway 3 has a shape and configuration as hereinbefore described, with a length of 540 mm, an inner diameter of 175 mm at the two opposing ends 3a of the passageway and an inner diameter of 135 mm midway 3b between the two opposing ends.

It will be appreciated that many variations in detail are possible without departing from the scope and/or spirit of the invention.

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CLAIMS

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1. A container comprising a hollow enclosed rigid body having an elongate passageway extending vertically through the body with the body in the upright position to define an annular-like enclosure around and evenly about the passageway, the passageway providing the container with a holding formation as well as a vertical support structure, the body being provided with a filler opening suitable for receiving a closure means.
 - 2 A container as claimed in claim 1 wherein the hollow body is cylindrical with a cylindrical axis, the passageway extending along the cylindrical inner wall for the annular-like enclosure, the enclosure having a cylindrical outer wall consisting of a hollow cylindrical middle section integral with two hollow thrusto

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conical end sections, the two end sections diametrically converging away from the middle section to define a barrel-shaped annular-like enclosure.

- 3 A container as claimed in claim 2 wherein the annular-like enclosure extends endlessly around the passageway.
- 4 A container as claimed in claim 2 wherein the passageway is tubular with a circular cross-section, the passageway converging diametrically from opposing ends inwardly to provide a minimum circular cross-section midway between the two opposing ends.
- 5 A container as claimed in claim 4 wherein the passageway is intergral with the body.
- 6 A container as claimed in claim 1 wherein the container is provided with a handling means extending at least partially into the passageway for retaining and maneuvering the container by means of the passageway.

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- 7 A container as claimed in claim 6 wherein the handling means retains the container rotatably about the cylindrical axis rendering the container rollable while being retained by the holding means, the holding means comprising an elongate flexible member capable of extending loosely through the passageway from which the container is rotatably retainable.
- 8 A method of manufacturing by means of a moulding process a container comprising a hollow enclosed rigid body having an elongate passageway extending vertically through the body with the body in the upright position to define an annular-like enclosure around and evenly about the passageway, the passageway providing the container with a holding formation as well as a vertical support structure, the body being provided with a filler opening suitable for receiving a closure means and made from thermosetting plastics moulding material, the method including the steps of:

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- providing moulding apparatus having a two-part mould rotational about a plurality of axes, the mould defining a mould cavity similar to the shape and configuration of the container, the mould having an elongate member spanning in use the mould cavity along a centre line of the mould cavity to provide a mould formation for the passageway, the elongate member being of suitable dimensions relative to the dimensions of the mould cavity to provide an adequate mould formation without the use of a fusion surface of plastics material on the elongate member;
- introducing a sufficient amount of thermosetting plastics moulding material to the mould;
- rotating the mould about the plurality of axes;
- providing sufficient heat to enable the thermosetting plastics moulding material to liquify;
- discontinuing the provision of heat to

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- allow the thermosetting plastics material to mould and set evenly along the surface of the mould; and
 - discontinuing the rotation of the mould allowing the moulded hollow body to be removed.
- 9 A method of manufacturing as claimed in claim 8 including the step of :
- providing moulding apparatus of which the ratio of the outer diameter of the elongate member at the opposing ends thereof to the inner width of the mould cavity at the corresponding opposing ends thereof is in the order of 1 : 3.

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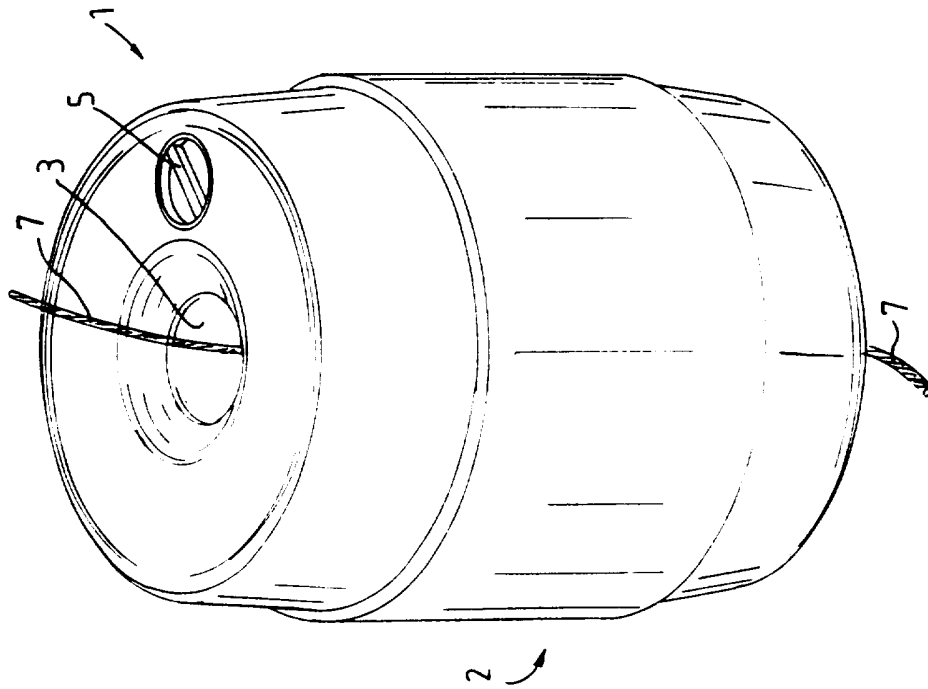


FIGURE 1

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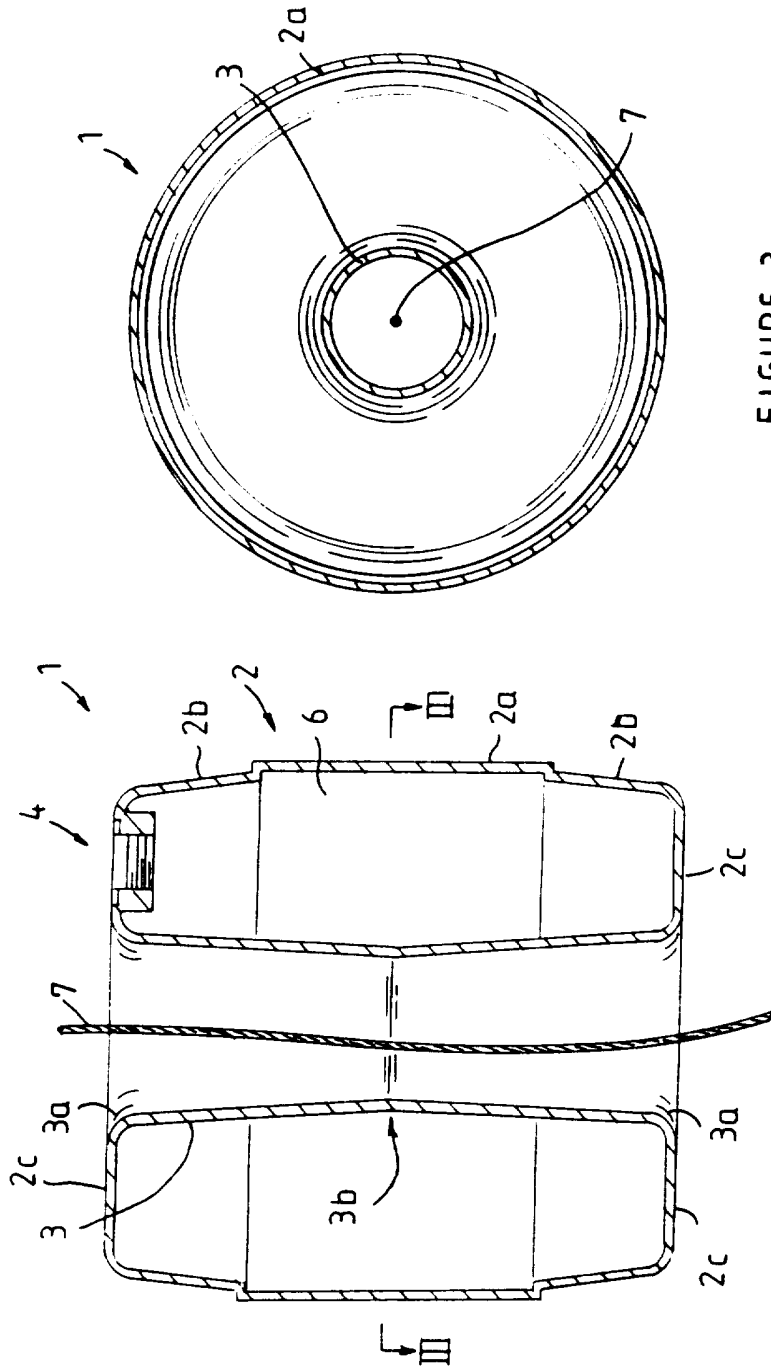


FIGURE 3

FIGURE 2

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[Signature]
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