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(54) **Anti-choking safety cap assembly for a container, containers therewith and method for production of a filled container with an anti-choking cap assembly**

(57) An anti-choking safety cap assembly for a container comprises a unitary plastic cap body and a unitary plastic anti-choking body.

The cap body (1) has a closed top end (2) and an annular skirt (3) extending downwards from the top end to a lowermost skirt edge (4), the skirt having an upper skirt portion (3a) and a lower skirt portion (3b), the lower skirt portion generally having greater cross-sectional outer dimensions than the upper skirt portion, the skirt having a shoulder face (5) between said upper and lower skirt portions, the upper skirt portion (3a) adjacent said shoulder face being provided with gripping ribs (7).

The anti-choking body (20) has an inner portion (21) with an inner face (22) delimiting an opening (23) through said anti-choking body, said inner face having an upper inner face portion (22a), a lower inner face portion (22b), and a shoulder face (23), said lower inner face portion

(22b) being substantially complementary to the cross-sectional outer dimensions of the lower skirt portion (3b) near the shoulder face (5) of the skirt of the cap body (1), the upper inner face portion (22a) having one or more teeth (25) each adapted to be received between neighbouring gripping ribs (7). The anti-choking body (20) further has one or more outer portions (28) integral with the inner portion (21) and of greater cross-sectional dimensions than said inner portion so as to prevent choking of a person by the assembly.

The cap body (1) extends with its skirt (3) through said opening of the anti-choking body, such that the shoulder faces (5,22c) of said cap body and said anti-choking body abut one another and the lower skirt portion (3b) fits in said lower inner face portion (22b), the one or more teeth (25) of the anti-choking body being each received between neighbouring gripping ribs (7).

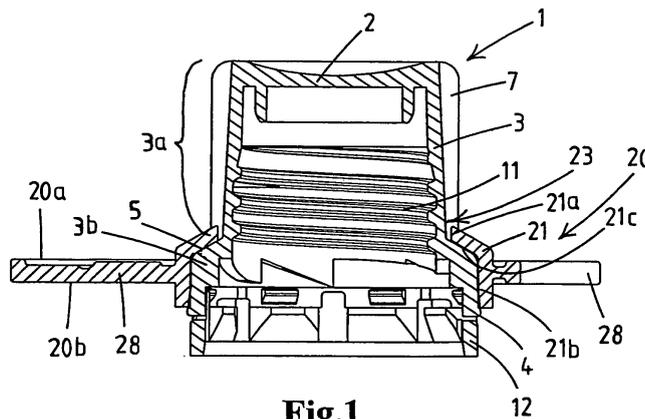


Fig.1

Description

[0001] A first aspect of the present invention relates to an anti-choking safety cap assembly for a container. The first aspect of the invention also relates to a container provided with an anti-choking safety cap assembly.

[0002] Many containers filled with a substance, e.g. for use in the domestic environment, such as for cosmetics, detergents, inks, food products, such as beverages, etc, are equipped with a unitary plastic cap, in particular a cap that is to be detached from the container. The cap can be adapted to effect the closing of the container, or the cap can be adapted as an overcap, e.g. covering the bidon-type closure of the container. In practice a significant percentage of all plastic caps has outer dimensions which are such that the cap forms a choke hazard, in particular for a child. In many countries objects that pass through a 3 cm inner diameter tube are considered a choke hazard, and many ordinary plastic caps fall in said category.

[0003] To reduce the choking risk it is a well known measure to create a unitary plastic cap having such large outer dimensions that it will not fit through said tube and/or to provide the cap with a breathing passage(s) structure allowing breathing while the cap is stuck in the air passage of a person. Providing the cap with relatively large outer dimension has the advantage that the likelihood of swallowing is greatly reduced.

[0004] Plastic caps with such relatively large outer dimensions, e.g. screw caps, may cause one or more problems. One of these problems lies in the manufacturing of the caps, which is commonly done in mass production by injection moulding. A large size cap causes relatively slow injection moulding. Another problem lies in the handling of such caps by automated container filling and capping machinery. A further problem may be observed when aseptic filling and capping of the container is desired. The large size cap may be difficult to clean according to aseptic standards and handling of such large size caps may be difficult in an aseptic chamber of an aseptic production line, in particular on an existing line.

[0005] The first aspect of the present invention aims to overcome one or more of the above-mentioned drawbacks.

[0006] The first aspect of the present invention provides an anti-choking safety cap assembly for a container according to claim 1.

[0007] The design of the cap body as described in claim 1 is well known in many different embodiments. The upper and lower portion of the skirt may have about equal height, but it is also envisaged that the heights of these upper and lower portions are quite different from one another, e.g. the lower portion being of a marginal height (e.g. 1-3 millimetres) so that the shoulder face is then located near the lowermost edge of the skirt.

[0008] The number of ribs, their shape and general size may differ. Caps are known with a multitude of slender elongated vertical ribs, but also caps with a quite low

number (e.g. eight) ribs distributed around the circumference, each ribs e.g. being relatively wide in said circumferential direction are also known.

[0009] The two parts of the assembly (the cap body and the anti-choking body) are manufactured preferably by injection moulding, allowing an efficient production for each part. Assembly of the assembly is simple as the anti-choking body can be simply lowered over the cap body from above (or the cap body inserted into the opening in the anti-choking body from below). This simple assembly can be automated effectively by suitable machinery. The abutting of the shoulder faces causes the correct positioning in "axial direction" of the cap body and the anti-choking body with respect to one another. The engaging of the one or more teeth, preferably multiple teeth, between the ribs allows to prevent relative rotation and thus also allows a user to grip the anti-choking body for handling of the cap, e.g. increasing the torque when the cap is a screw cap or bayonet cap.

[0010] The two-part design of the assembly also allows for the cap body to be handled under aseptic conditions when it is desired to fill and cap the container in such conditions, whereas the anti-choking body can be handled without aseptic requirements and simply be fitted later on the already filled and capped container (e.g. at an automated station arranged downstream of the aseptic chamber in a production line for filled and capped containers).

[0011] A second aspect of the present invention relates to a method for production of a container filled with a substance and equipped with an anti-choking safety cap.

[0012] As indicated above when discussing the assembly according to the first aspect of the invention production of containers filled with a substance and equipped with an anti-choking safety cap may suffer from one or more of the listed problems when the anti-choking safety cap is a relatively large unitary plastic body.

[0013] The first aspect of the invention also relates to a unitary plastic anti-choking body as specified in claim 1 for mounting on a cap body as specified in claim 1.

[0014] The second aspect of the invention aims to provide a method to overcome one or more of these problems.

[0015] The second aspect of the invention provides a method according to claim 8.

[0016] In a preferred embodiment the second aspect of the invention relates to a method wherein the filling of the substance takes place in an aseptic chamber so as to allow for filling under aseptic conditions.

[0017] The second aspect of the invention also relates to a container produced according to said method.

[0018] The skilled person will appreciate that the first and second aspect of the invention can advantageously be combined.

[0019] The aspects of the invention will be explained in more detail with referral to the drawing. In the drawing:

Fig. 1 shows in elevational cross-section an example

of an anti-choking safety cap assembly according to the invention,
 Fig. 2 the assembly of figure 1 in plan view,
 Fig. 3 schematic the lay-out of an installation for producing containers filled with a substance under aseptic conditions and provided with an anti-choking safety assembly.

[0020] With reference to figures 1 and 2 an example of an anti-choking safety cap assembly for a container according to the invention will be discussed.

[0021] The assembly is composed of two plastic parts, namely a unitary plastic cap body 1 and a unitary plastic anti-choking body 20. Both parts are manufactured by injection moulding from a suitable plastic materials.

[0022] The cap body 1 shown here is a screw cap with tamper-evident features. The cap body 1 can be screwed on the neck of a container which is not shown, e.g. of a (plastic) bottle, a collapsible pouch provided with a spout having a neck, etc.

[0023] The cap body 1 has a closed top end, here formed by an substantially planar circular top wall 2, and an annular skirt 3 extending downwards from the top end to a lowermost skirt edge 4. As can be observed the skirt 3 here joins the top wall 2 at the outer periphery thereof. In another possible design e.g. the top end is dome-shaped and the skirt could e.g. be more conical or pointed towards such a dome shaped top end.

[0024] The skirt 3 has an upper skirt portion 3a and a lower skirt portion 3b, the lower skirt portion 3b generally having greater cross-sectional outer dimensions than the upper skirt portion 3a.

[0025] The skirt 3 has a shoulder face 5, here an annular extending face 5 as is preferred, between said upper and lower skirt portions 3a,b.

[0026] In a circumferentially extending region of the exterior of the upper skirt portion 3a, here the entire exterior of the upper skirt portion 3a, and at least adjacent the shoulder face 5 this region is provided with gripping ribs 7 spaced apart in circumferential direction. In this example a multitude of quite slender ribs 7 is present. As is preferred the ribs 7 extend in axial or vertical direction of the cap body.

[0027] As the cap body 1 shown here is a screw cap the interior of the skirt 3 is provided with a screw thread 11.

[0028] In this example the cap body 1 also includes an integral tamper-evident feature, here formed by a tamper-evident band 12 connected to the skirt via one or more breakable bridges as is known in the art.

[0029] The anti-choking body 20 has an upper side 20a and a lower side 20b. The body 20 has a portion 21, here annular as is preferred, with an inner face 22 delimiting an opening 23 which extends throughout the anti-choking body 20.

[0030] The inner face 22 has an upper inner face portion 22a, a lower inner face portion 22b, and a shoulder face 22c between said upper and lower inner face por-

tions 22a,b.

[0031] The lower inner face portion 22b is substantially complementary to the cross-sectional outer dimensions of the lower skirt portion 3b near the shoulder face 5 of the skirt 3 of the cap body 1.

[0032] The upper inner face portion 22a has one or more teeth 25 each adapted to be received between neighbouring gripping ribs 7 on the upper skirt portion 3a of the cap body 1.

[0033] The anti-choking body 20 further has one or more outer portions 28 integral with the inner portion 22 and of greater cross-sectional dimensions than said inner portion 22 so as to prevent choking when the assembly is swallowed, preferably rendering the assembly unable to pass through a 3 cm inner diameter tube. Here multiple outer portions 28 are arranged around the inner portion 21, here of triangular shape so as to obtain a star shape outer contour. It will be appreciated that the one or more outer portions 28 can have widely differing shapes, e.g. flower petals, a cross, an annular portion, etc. The one or more outer portions 28 preferably define breathing passages at the outer contour of the body (as in this example) and/or a provided with breathing passages.

[0034] As is preferred the one or more outer portions 28 are of planar design, but other shapes (more three-dimensional shapes) are possible as well.

[0035] As can be recognized that cap body 1 extends with its skirt 3 through the opening 23 of the anti-choking body 20, such that the shoulder face 7 of said cap body 1 and the shoulder face 22c of the anti-choking body 20 abut one another.

[0036] The lower skirt portion 3b fits in the lower inner face portion 22b.

[0037] The lower skirt portion and the lower inner face portion are designed to provide a retaining of the one body with respect to the other. Preferably the retaining force is at least 50N when it is attempted to pull the bodies apart.

[0038] In this example the lower skirt portion 3b and corresponding inner face portion 22b are configured to obtain a snap-fit as is preferred. Not shown in the drawings is that the lower skirt portion has one or more snap members, e.g. tabs or an inwardly direction snap rim, snapping under the lowermost edge of said inner face portion 22c. The lower skirt portion could also be provided with a groove or recess to receive such a snap member or the configuration could be the reverse wherein the skirt has one or more snap members and the portion 22b a corresponding recess or groove. As an alternative to a snap-fit a press-fit could be envisaged between the bodies 1, 20. Less advantageous are connections that require an adhesive, welding, or the like fastening techniques.

[0039] The one or more teeth 25 of the anti-choking body 20 are received between neighbouring gripping ribs 7. As explained this e.g. allows the user to exert a torque on the cap body (here for screwing and unscrewing) which is greater than when the body 20 would be absent.

[0040] In figure 3 an installation for the production containers filled with a substance and capped with an anti-choking safety cap assembly is showing very diagrammatically.

[0041] The installation comprises an arrangement of one or more conveyors 30 forming a conveying path. Here a station 31 is provided to feed previously manufactured containers to the conveying path. In another arrangement, e.g. for cartons or collapsible pouches, one or more stations are adapted to create the container, e.g. by erecting a blank or creating a pouch from film material. In any event a container to be filled with a substance is provided.

[0042] The installation comprises a filling station 33 where each container is filled with said substance, mostly via the neck of the container or via another opening (e.g. via a seam in a pouch which is later sealed).

[0043] Commonly a cap application station 34 is positioned downstream of the filling station to effect the closing of the pouch.

[0044] It is noted that installations are also known wherein a spout already provided with a cap is placed on container, the filling taking place along another opening or even that the cap is temporarily removed for the filling.

[0045] In any event at some stage a filled and closed container provided with a cap is established in the installation. As mentioned before it is quite common for the cap to have a unitary plastic cap body on said container, said unitary plastic cap body having a closed top end and an annular skirt extending downwards from the top end to a lowermost skirt edge, at least a circumferentially extending region of the exterior of the skirt being provided with gripping ribs spaced apart in circumferential direction.

[0046] Figure 3 now shows that in the installation a further station 35 is provided along the conveyors 30, where a unitary plastic anti-choking body (such as body 20) is placed on said cap body, said anti-choking body having an upper side and a lower side, the body having inner portion with an inner face delimiting an opening, said inner face having an inner face portion being substantially complementary to the cross-sectional outer dimensions of a skirt portion of the skirt of the cap body, the inner face having one or more teeth each adapted to be received between neighbouring gripping ribs on the skirt of the cap body, the anti-choking body further having one or more outer portions integral with the inner portion and of greater cross-sectional dimensions than said inner portion so as to prevent choking, the cap body extending with its skirt in said opening of the anti-choking body, such that the one or more teeth of the anti-choking body being each received between neighbouring gripping ribs.

[0047] Figure 3 shows with dotted lines the contour of an aseptic chamber 36 wherein the steps of filling of the container and application of the cap body is performed. The station 35 is placed outside said chamber 36 so that the application of the anti-choking body on the cap body is performed after said steps and outside of said aseptic

chamber.

Claims

1. Anti-choking safety cap assembly for a container, said assembly comprising:

- a unitary plastic cap body (1) having a closed top end (2) and an annular skirt (3) extending downwards from the top end to a lowermost skirt edge (4), the skirt having an upper skirt portion (3a) and a lower skirt portion (3b), the lower skirt portion generally having greater cross-sectional outer dimensions than the upper skirt portion, the skirt having a shoulder face (5) between said upper and lower skirt portions, at least a circumferentially extending region of the exterior of the upper skirt portion (3a) adjacent said shoulder face being provided with gripping ribs (7) spaced apart in circumferential direction,

- a unitary plastic anti-choking body (20) having an upper side (20a) and a lower side (20b), the body having inner portion (21) with an inner face (22) delimiting an opening (23) through said anti-choking body, said inner face having an upper inner face portion (22a), a lower inner face portion (22b), and a shoulder face (23) between said upper and lower inner face portions, said lower inner face portion (22b) being substantially complementary to the cross-sectional outer dimensions of the lower skirt portion (3b) near the shoulder face (5) of the skirt of the cap body (1), the upper inner face portion (22a) having one or more teeth (25) each adapted to be received between neighbouring gripping ribs (7) on the upper skirt portion of the cap body,

the anti-choking body (20) further having one or more outer portions (28) integral with the inner portion (21) and of greater cross-sectional dimensions than said inner portion so as to prevent choking of a person, the cap body (1) extending with its skirt (3) through said opening of the anti-choking body, such that the shoulder faces (5,22c) of said cap body and said anti-choking body abut one another and the lower skirt portion (3b) fits in said lower inner face portion (22b), the one or more teeth (25) of the anti-choking body being each received between neighbouring gripping ribs (7).

2. Assembly according to claim 1, wherein the cap body has a top end wall.

3. Assembly according to claim 1 or 2, wherein the anti-choking body has substantially triangular outer portions defining a star shaped outer contour of said anti-choking body.

4. Assembly according to one or more of claims 1-3, wherein one or more outer portions have one or more breathing passages to allow breathing when the assembly is swallowed. 5
5. Assembly according to one or more of the claims 1-4, wherein the interior of the skirt is provided with screwthread. 10
6. Assembly according to one or more of the claims 1-5, wherein the cap body has an integral tamper-evident band below said lowermost skirt edge, one or more breakable bridges being present between said skirt and the tamper-evident band. 15
7. A container provided with an assembly according to one or more of the preceding claims. 20
8. A method for production of a container filled with a substance and capped with an anti-choking safety cap assembly, said method comprising:
- providing a container to be filled,
 - filling said container with said substance,
 - application of a unitary plastic cap body on said container, said unitary plastic cap body having a closed top end and an annular skirt extending downwards from the top end to a lowermost skirt edge, at least a circumferentially extending region of the exterior of the skirt being provided with gripping ribs spaced apart in circumferential direction, and thereafter 25
 - application of a unitary plastic anti-choking body on said cap body, said anti-choking body having an upper side and a lower side, the body having inner portion with an inner face delimiting an opening, said inner face having an inner face portion being substantially complementary to the cross-sectional outer dimensions of a skirt portion of the skirt of the cap body, the inner face having one or more teeth each adapted to be received between neighbouring gripping ribs on the skirt of the cap body, 30
- 45
- the anti-choking body further having one or more outer portions integral with the inner portion and of greater cross-sectional dimensions than said inner portion so as to prevent choking, the cap body extending with its skirt in said opening of the anti-choking body, such that the one or more teeth of the anti-choking body being each received between neighbouring gripping ribs. 50
9. A method according to claim 8, wherein at least the step of filling of the container and application of the cap body is performed in an aseptic chamber, and wherein the step of application of the anti-choking 55
- body on the cap body is performed after said steps and outside of said aseptic chamber.
10. A container filled with a substance according to the method of claims 8 or 9.

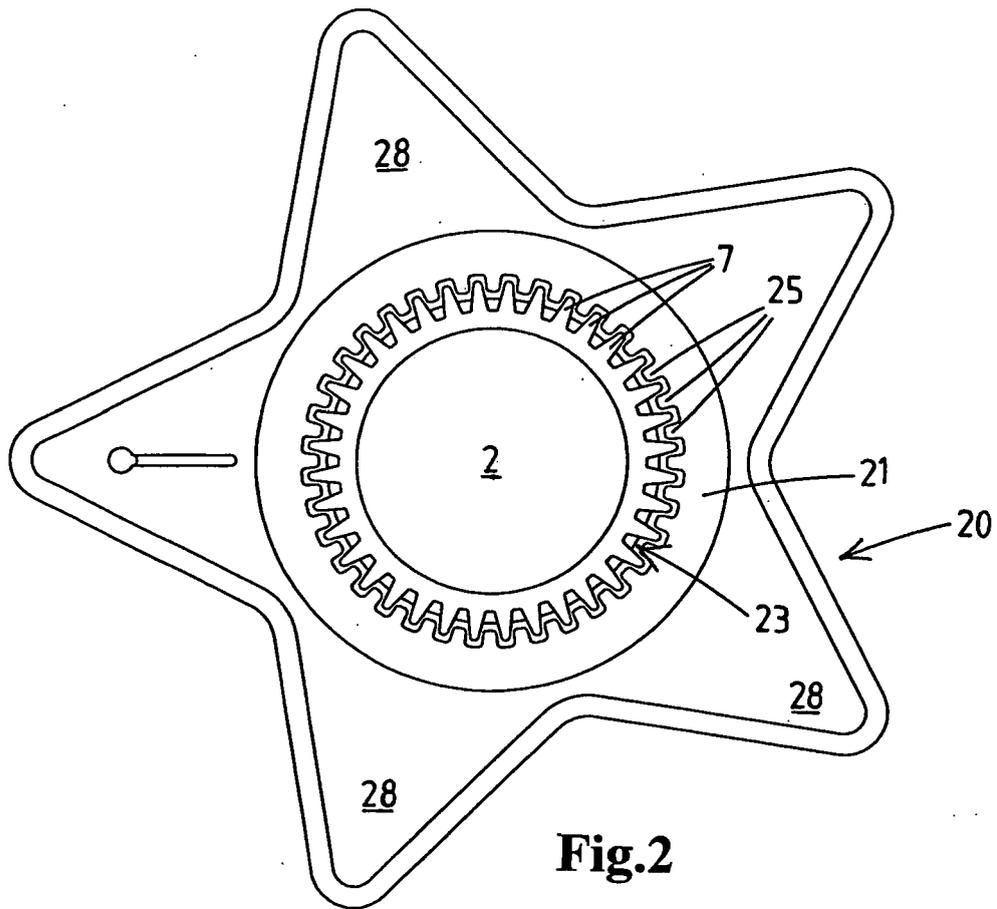


Fig.2

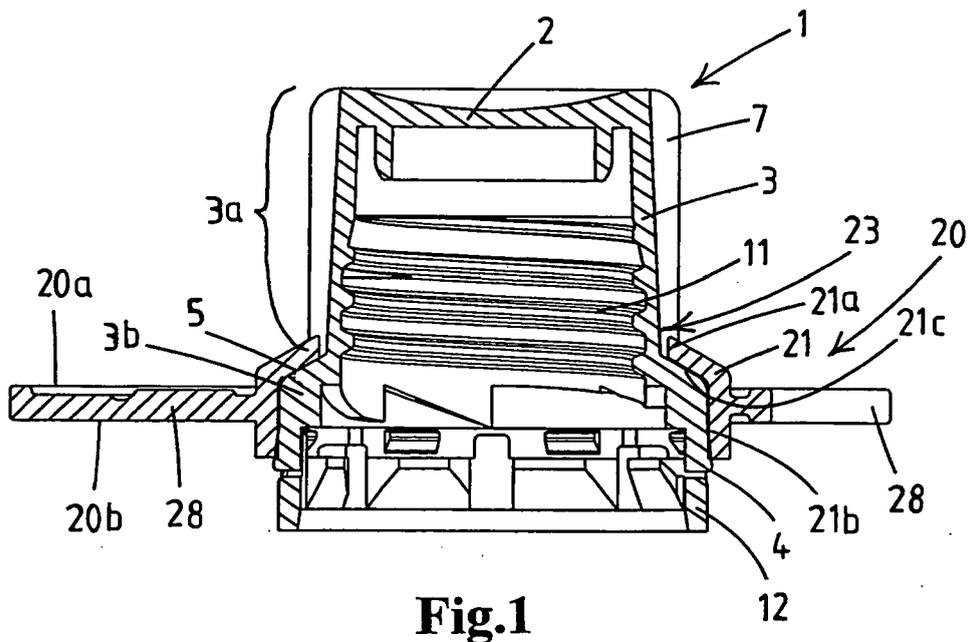


Fig.1

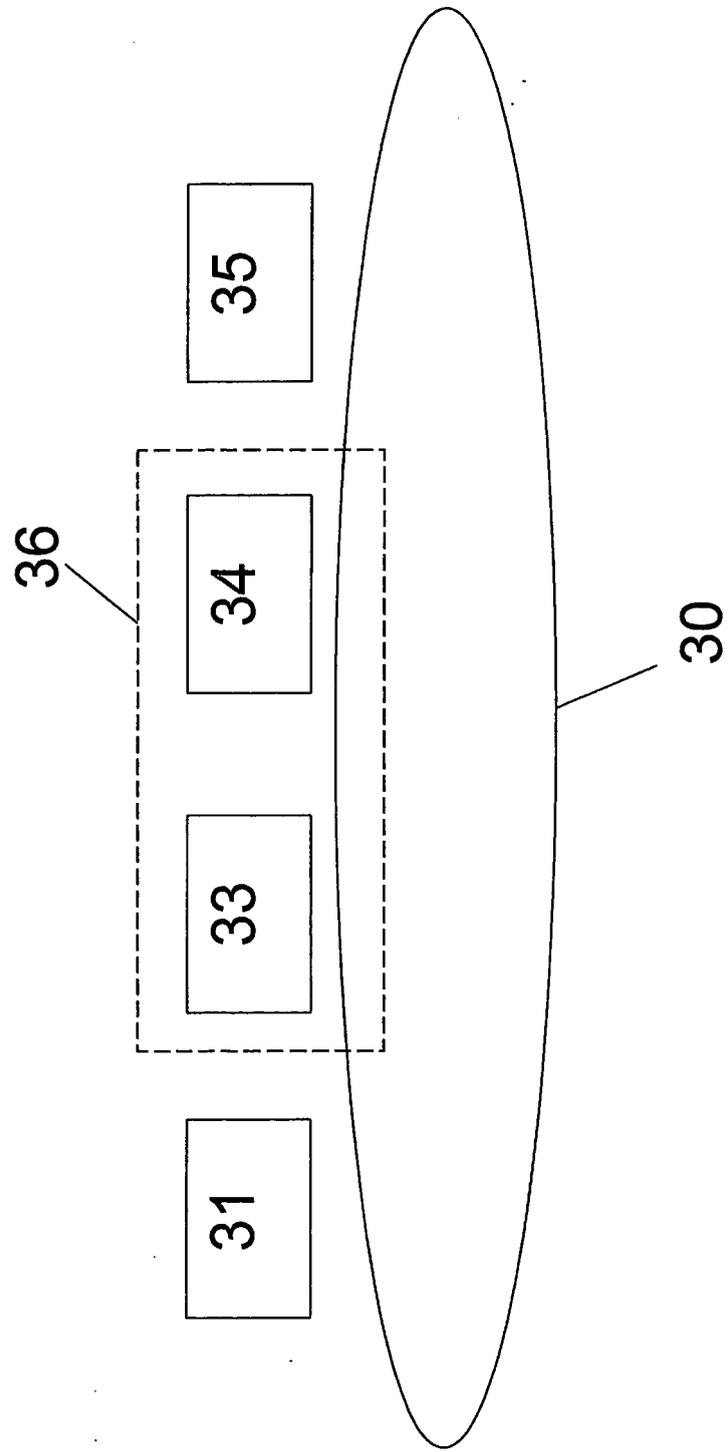


FIG 3



EUROPEAN SEARCH REPORT

Application Number
EP 08 16 3746

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			B65D A61J A47G
4	Place of search Munich	Date of completion of the search 2 December 2008	Examiner Piolat, Olivier
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
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ON EUROPEAN PATENT APPLICATION NO.**

EP 08 16 3746

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