



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
26.05.2010 Bulletin 2010/21

(51) Int Cl.:
B65D 85/04 (2006.01) B65D 85/67 (2006.01)

(21) Application number: **08169523.1**

(22) Date of filing: **20.11.2008**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR
Designated Extension States:
AL BA MK RS

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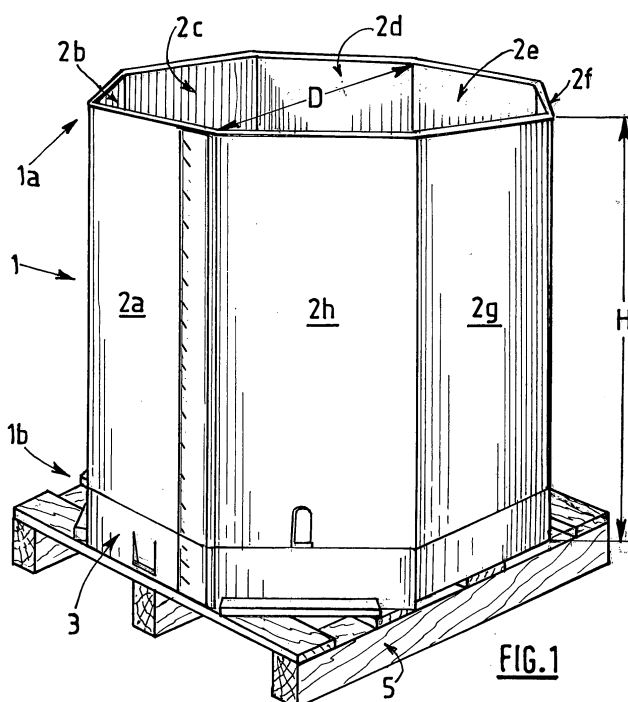
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(54) **Container for welding wire**

(57) A container for packaging a coil of welding wire comprising a hollow body (1) comprising several side panels (2a-2h) forming a polygonal periphery, a circular coil (6) of welding wire being arranged in said polygonal hollow body (1). The hollow body (1) has a given height (H) and a given internal diameter (D), such as the internal

diameter (D) of the hollow body is of at least 65 cm, the height (H) of the hollow body (1) is less than said internal diameter (D), and the number of side panels (2a-2h) is of at least 5. The container of the invention is useable for robotic or automatic welding, preferably for feeding welding wire to an electric arc welding torch, such as a MIG or MAG welding torch.



Description

[0001] The present invention relates to a container or drum for packaging, storing, transporting and unwinding a coil or spool of welding wire.

[0002] A major well-known problem in automatic or robotic welding, when using a welding wire that comes out of a drum, is the twists of the wire that are created by the spooling process. Indeed, twists often appear when the wire is extracted from the drum by the welding machine comprising the welding torch to which the wire is fed.

[0003] Actually, when a welding wire is packed in a round drum, i.e. a cylindrical container having a circular cross section typically of about 55 cm in diameter, the wire is always twisted and the twists are released, when the wire leaves the drum during the unwinding of the wire coil.

[0004] However, the twists are a serious issue as they involve subsequent welding defects or quality of the welding joints thus obtained.

[0005] Further, another problem exists with welding wire drums which is linked to the stability of the drum. Indeed, some existing drums have architectures and/or a sizes that render them unstable and lead to possible falling over, during transportation, storing or subsequent use.

[0006] Furthermore, when using a welding wire drum, the operator should be able easily to detect the end of the wire so as to be able to intervene as soon as possible for replacing an empty drum by a new one. This should be done without need of opening the cover.

[0007] So far, several solutions have already been proposed for trying to solve one or several of these problems.

[0008] For instance, EP-A-519424 discloses a container with a retainer device placed on the top of the coil and having an outer periphery matching the diameter of the inner wall of the container and an inner bell-mouthed portion defining a wire extraction opening. The retainer has a smaller size than the internal diameter of the container so that it can freely descend in the container in contact with the coil as the height of said coil decreases as the wire is being unwound from the coil.

[0009] Further, EP-A-636098 teaches to use of a square box with an internal flat cover, arranged on the wire coil. Said cover having a peripheral square border that matches the internal shape of the box so as to retain the welding wire and avoid or limit the twists.

[0010] Furthermore, EP-A-1053189 discloses a polygonal box-like body for accommodating a circular coil of wire during the transportation and the unwinding of the coil, and a retainer device arranged inside the body on the coil for preventing accidental entanglement of the wire turn during the unwinding of the wire from an upper end of the coil, and a wire conduit device for the guidance of the wire out from the body during the unwinding.

[0011] EP-A-1693139 discloses a drum for a welding wire coil comprising a wire holding device positioned on the coil for holding the loops in position during an unwind-

ing of the wire. The holding device has a rigid central disc and a flexible cover with a dimension greater than an inner diameter of the drum so that corner portions of the cover slightly rise along an inner wall of the drum.

[0012] EP-A-1693140 teaches a drum with a conical, tapered or pyramidal inner wall formed of oblique pieces and comprising a rigid central disc with a central orifice positioned on the coil and across which the wire passes, and further with flexible and deformable peripheral expansions projecting beyond the edge of the disc to maintain the wire loops.

[0013] EP-A-1357059 describes a welding wire packaging formed of an internal cylindrical drum and external square box.

[0014] However, these existing solutions are either not totally satisfying or too complicated. In particular, some of the welding wire containers proposed in the prior art are not either very stable during use, storage or transportation, or easy to handle.

[0015] Further, some of these prior art drums are not or not totally environment friendly as they are made or comprise parts made of non-recyclable material, such as plastic or similar.

[0016] A goal of the present invention is to provide a new container for welding wire coil that overcomes or at least limits the above mentioned problems of twists and non uniform unwinding of the wire coil, that is further easy to transport and handle, stable during utilization and can be preferably made of recycle material, such as cardboard.

[0017] A solution according to the invention is a container for packaging a coil of welding wire comprising a hollow body comprising several side panels forming a polygonal periphery, a circular coil of welding wire being arranged in said polygonal hollow body, said hollow body having a given height and a given internal diameter, **characterized in that:**

- the internal diameter (D) of the hollow body is of at least 65 cm,
- the height (H) of the hollow body is less than or equal to said internal diameter (D),
- and the number of side panels is of at least 5.

[0018] Depending on the case, the container of the present invention can comprise one or several of the following features:

- it further comprises a bottom part at the lower end of the body, the circular coil of welding wire being arranged on said bottom part.
- the number of side panels is of between 6 and 10, preferably the hollow body is hexagonal or octagonal.
- said panels are made in one piece of cardboard that is bent, two of the panels being attached one to the other, preferably stapled, glued or bonded together.
- the internal diameter (D) of the hollow body is of be-

- tween 65 cm and 100 cm, preferably between 65 and 85 cm, for instance about 72 cm.
- the height (H) of the hollow body is of between 50 and 100 cm.
 - it further comprises a cover at the upper end of the body.
 - the cover comprises a central hole sized for allowing the passage of a welding wire during unwinding.
 - the cover and the bottom part are made of cardboard and the upper and lower ends of the hollow body being fit into said cover and the bottom part, respectively.
 - the cover comprises at least one cut obturated by a transparent material forming a window, i.e. a see-through opening allowing the operator to check that the unwinding of the spool take place smoothly. This constitutes an advantage over the prior art containers as thanks to these windows, the operator can easily check what is going on in the container, at any time and without need of opening the cover.
 - it further comprises a retainer arranged on the top of the welding wire coil so as to maintain the wire spires during unwinding.
 - at least one of the side panels comprises a cut or slot situated close to its bottom and forming an opening communicating with the internal volume of the body.
 - the polygonal peripheral body constituted by side panels made of rigid and recyclable material, i.e. without use of any further internal inserts. For instance, the side panels forming the polygonal peripheral body are made of a multi-layer cardboard material, preferable a three or more layers of cardboard.

[0019] The present invention will be better understood thanks to the following description of an embodiment of the container of the present invention, made in references to the accompanying figures among which:

- Figure 1 represents a side view of a container according to the invention without cover,
- Figure 2 represents a view of a container according to the invention with its cover,
- Figures 3 and 4 are internal views of the container of Figure 1,
- Figure 5 shows the lower part of the container of Figure 1,
- Figure 6 shows the internal structure of the panels forming the body of the container of Figure 1, and
- Figure 7 shows the structure of the cover of Figure 2.

[0020] Figure 1 shows an embodiment of a container for packaging a coil of welding wire, such as a flux cored wire or a metal cored wire, according to the present invention.

[0021] It comprises a hollow body comprising several side panels 2a-2h forming a polygonal periphery, i.e. tri-

dimensional polygonal structure. In the present case, the number of panels equals to 8 and the body is hence octagonal. However, according to the invention, the number of side panels 2a-2h is of 5 or more.

[0022] The panels 2a-2h are preferably made in one piece or sheet of cardboard that is bent to get the desired polygonal structure. Then, the two panels 2a, 2h situated at the two opposite ends of said cardboard sheet are fixed together all along the height of the container so as to get the hollow body, as shown on Figure 9. The two panels 2a, 2h are preferably glued together and/or stapled one another.

[0023] As shown on Figure 3, a circular coil 6 of welding wire is inserted into the polygonal hollow body 1 and is retained therein by a retainer 7 that is arranged on the top of the welding wire coil 6 so as to maintain the wire spires during the transportation of the container and the unwinding of the coil during welding, i.e. for preventing accidental entanglement of the wire turn during the unwinding of the wire from an upper end of the coil 6.

[0024] The retainer 7 consists of a perforated disc made of cardboard, polymer, steel or a combination of these materials. Its shape or contour is preferably adapted to the inner contour of the drum. The retainer 7 provides a constant and continuous feeding of the wire at nearly constant drawing force. The spooled wire is prevented from opening, entangling and forming loops.

[0025] The hollow body 1 further comprises, at its upper end 1a, a cover part 4 for closing the container during transportation and storage, as shown on Figure 2 and Figure 7, and, at its lower part 1b, a bottom part 3 on which the coil 6 is arranged.

[0026] Preferably, the hollow body 1 is fit into the bottom part 3 and the cover 4 is fit on the hollow body. Hence, the bottom part 3 and the cover 4 have both a shape that matches the polygonal shape of the hollow body 1 as visible on Figures 1 and 2.

[0027] Further, the cover 4 comprises one or several cuts, for instance two circular cuts 10 as shown on Figure 7, forming windows that allow an easy survey of the wire coil during unwinding. Preferably, each cut 10 is recovered by a transparent sheet that prevents the ingress of dust and/or that someone touches, voluntary or involuntary, the interior of the drum and/or the wire during operation, i.e. unwinding.

[0028] During operation, the wire passes through a small central hole 11 arranged at the centre of the cover 4 and is subsequently send to an arc welding torch.

[0029] The body 1, the bottom part 3 and the cover 4 are preferably made of cardboard, preferably reinforced cardboard, as shown on Figure 6.

[0030] According to the present invention, the hollow body 1 of the container has an internal diameter (D) of at least 65 cm and a height (H) such as : $H \leq D$. According to the present invention, as illustrated on Figure 1, the diameter D is the internal maximum dimension of the cross section of the body 1, whereas the height H is the distance between the opposite ends of the hollow body 1.

[0031] A diameter (D) of at least 65 cm ensures improved characteristics of the twists while unwinding, and provides improved possibilities in spooling, which is not the case with prior art drums of diameter less than 65 cm.

[0032] Further, a larger diameter ($D > 65$ cm) allows to carry a load of more kg per height.

[0033] Furthermore, the reduction in height ($H \leq D$) improves the stability during transport and offers better handling in storage areas and at the robot with less risks of tumbling over, thanks to a center of gravity closer to the ground.

[0034] The relation $H \leq D$ improves the stability of the box itself and, even at maximum load, i.e. at maximum filling level, there is enough space between holder 7 and orifice 11 for getting a twist-free and smooth unwinding.

[0035] The hollow body consists of several panels without any further reinforcing inserts, made of a strong and recyclable material, for instance a three-layer cardboard.

[0036] Further, for transportation and storage, the container can be arranged on a pallet 5, for instance a pallet made of wood or of polymer material. In order to secure the container on the pallet, some abutment elements 8 can be provided in the corners of the pallet 5 as shown on Figure 5.

[0037] Further, as also represented on Figures 1 and 5, at least one of the side panels 2a-2h comprises an opening or slot 12 situated close to its bottom 1b, i.e. at proximity of the lower end of the body. The slot 12 constitutes an opening that communicates with the internal volume of the body comprising the wire spool. This slot 12 allows the operator to check the level of remaining wire in the box, i.e. to view the ending of the wire coil in operation. This is a great advantage as it makes possible to earn time and hence improve productivity as the detection by the operator of a near-empty container and its replacement by a new full one can be done at an earlier stage, without waiting that the container is totally empty.

[0038] Preferably, the cover 4 and the bottom part 3 are each made of a unique cardboard sheet or plate that is cut and bent to desired three-dimensional shapes thereby forming said cover 4 and said bottom part 3. The way said cardboard plates are bent according to one embodiment of the container of the invention is visible on Figure 1, 2 and 5 for instance. Of course, the cover 4 and bottom part 3 could have other shapes and dimensions or could be bent in another manner.

[0039] The container according to the invention is suitable for use in a robotic or automatic welding operation, preferably an electric arc welding process, such as a MIG or MAG welding process. During such a welding process, the wire extracted from the container is fed to a welding torch that is either arranged on a welding machine or on a robotic articulated arm.

Claims

1. Container for packaging a coil of welding wire comprising a hollow body (1) comprising several side panels (2a-2h) forming a polygonal periphery, a circular coil (6) of welding wire being arranged in said polygonal hollow body (1), said hollow body (1) having a given height (H) and a given internal diameter (D), **characterized in that:**
 - the internal diameter (D) of the hollow body is of at least 65 cm,
 - the height (H) of the hollow body (1) is less than said internal diameter (D),
 - and the number of side panels (2a-2h) is of at least 5.
2. Container according to Claim 1, **characterized in that** it further comprises a bottom part (3) at the lower end (1b) of the body (1), the circular coil (6) of welding wire being arranged on said bottom part (3).
3. Container according to any one of Claim 1 or 2, **characterized in that** the number of side panels (2a-2h) is of between 6 and 10, preferably the hollow body (1) is hexagonal or octagonal.
4. Container according to any one of Claims 1 to 3, **characterized in that** said panels (2a-2h) are made in one piece of cardboard that is bent, two (2a, 2h) of the panels (2a-2h) being attached one to the other.
5. Container according to any one of Claims 1 to 4, **characterized in that** the internal diameter (D) of the hollow body (1) is of between 65 cm and 100 cm, preferably between 65 and 85 cm, for instance about 72 cm.
6. Container according to any one of Claims 1 to 5, **characterized in that** the height (H) of the hollow body (1) is of between 50 and 100 cm.
7. Container according to any one of Claims 1 to 6, **characterized in that** it further comprises a cover (4) at the upper end (1b) of the body (1), preferably the cover (4) comprises a central hole (11) sized for allowing the passage of a welding wire.
8. Container according to any one of Claims 1 to 7, **characterized in that** the cover (4) and the bottom part (3) are made of cardboard and the upper and lower ends (1a, 1b) of the hollow body (1) being fit into said cover (4) and the bottom part (3), respectively.
9. Container according to any one of Claims 1 to 8, **characterized in that** the cover (4) comprises at least one cut obturated by a transparent material

forming a window (10).

10. Container according to any one of Claims 1 to 9,
characterized in that it further comprises a retainer
(7) arranged on the top of the welding wire coil (6) 5
so as to maintain the wire spires during unwinding.
11. Container according to any one of Claims 1 to 10,
characterized in that at least one of the side panels
(2a-2h) comprises a slot (12) situated close to the 10
bottom end (1a) of the body (1).
12. Container according to any one of Claims 1 to 11,
characterized in that the polygonal peripheral body
(1) constituted by side panels (2a-2h) made of rigid 15
and recyclable material.
13. Container according to any one of Claims 1 to 12,
characterized in that the side panels (2a-2h) form- 20
ing the polygonal peripheral body (1) are made of a
multi-layer cardboard material, preferable a three or
more layer cardboard.
14. Use of a container according to any one of the pre- 25
vious Claims, in a robotic or automatic welding op-
eration, preferably an electric arc welding process,
such as a MIG or MAG welding process.

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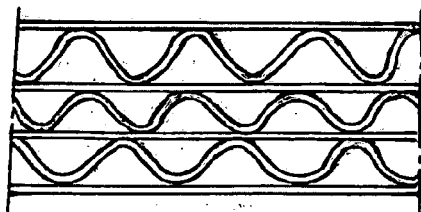
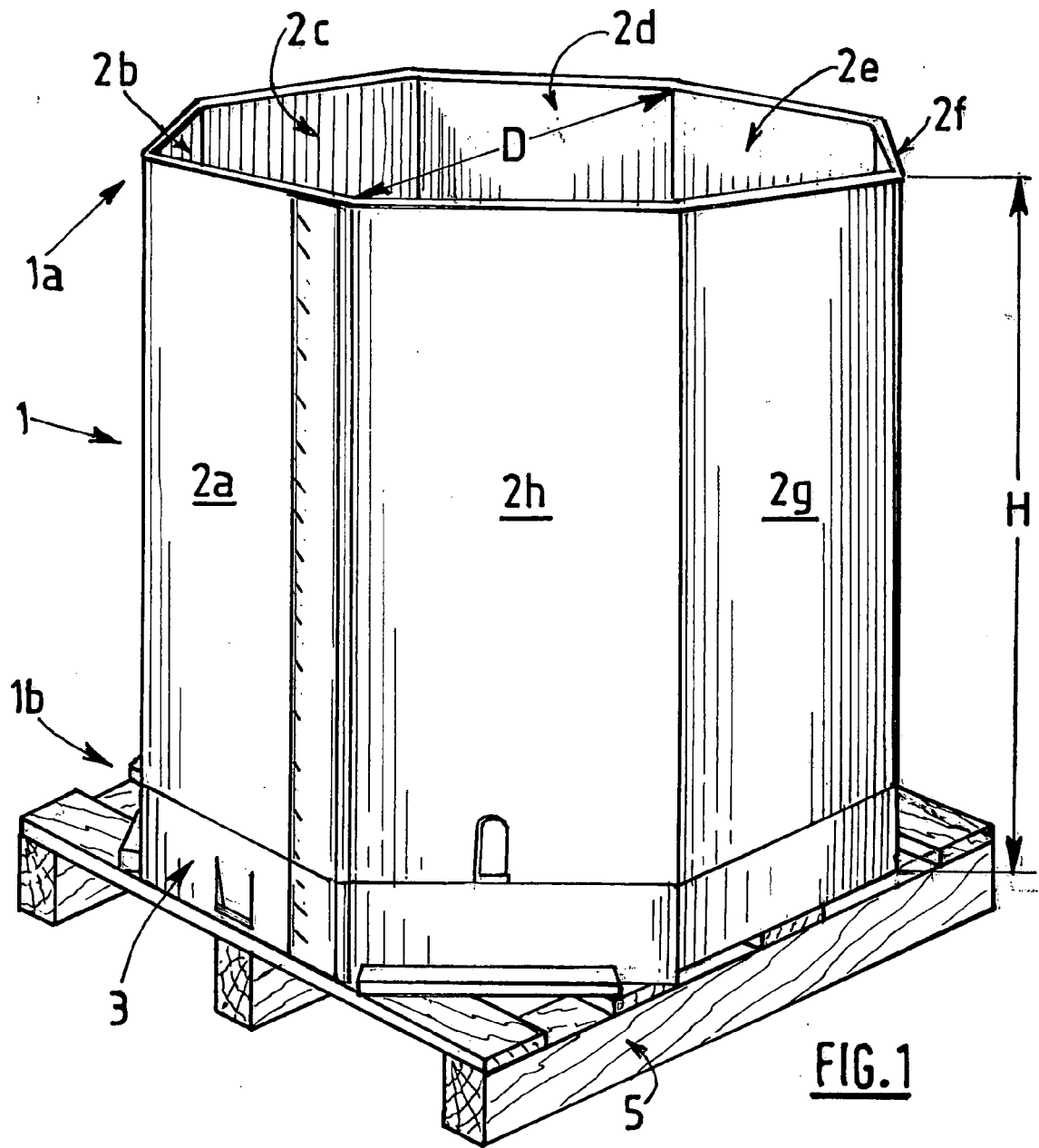
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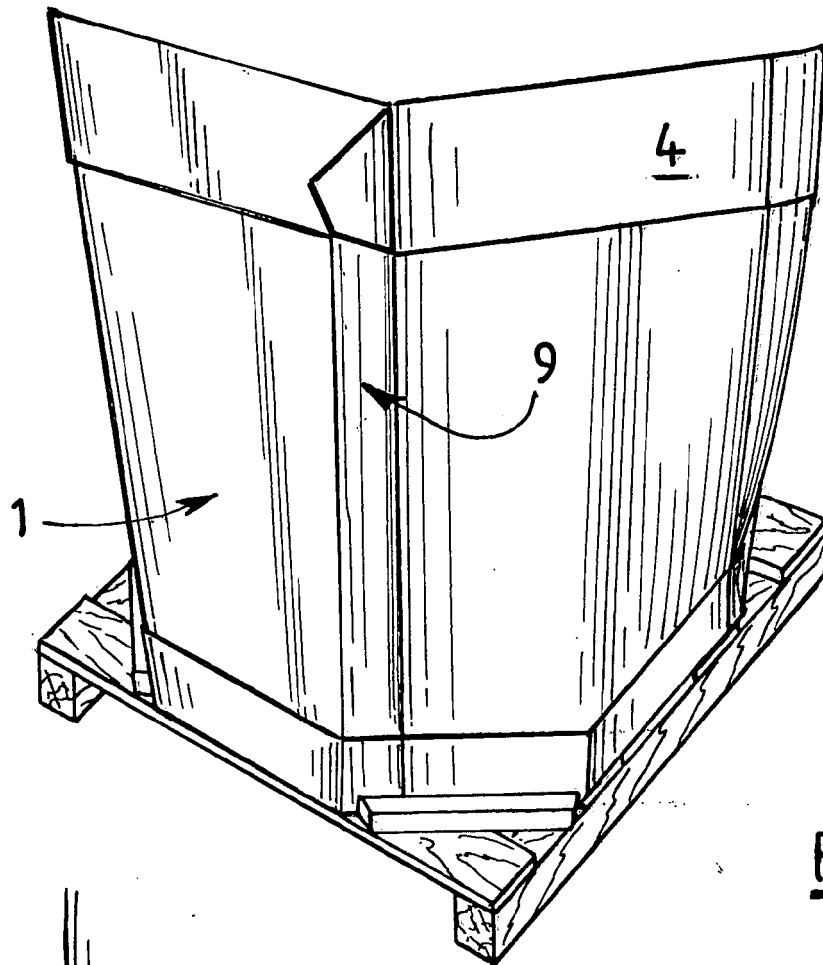


FIG. 2

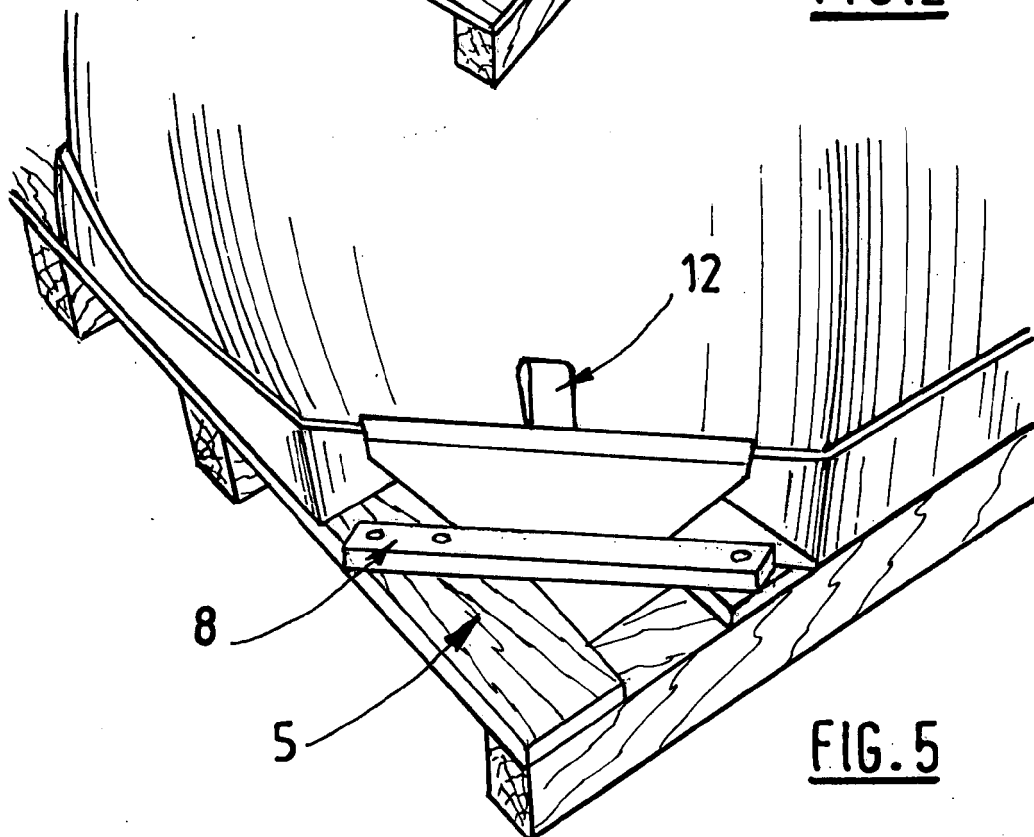


FIG. 5

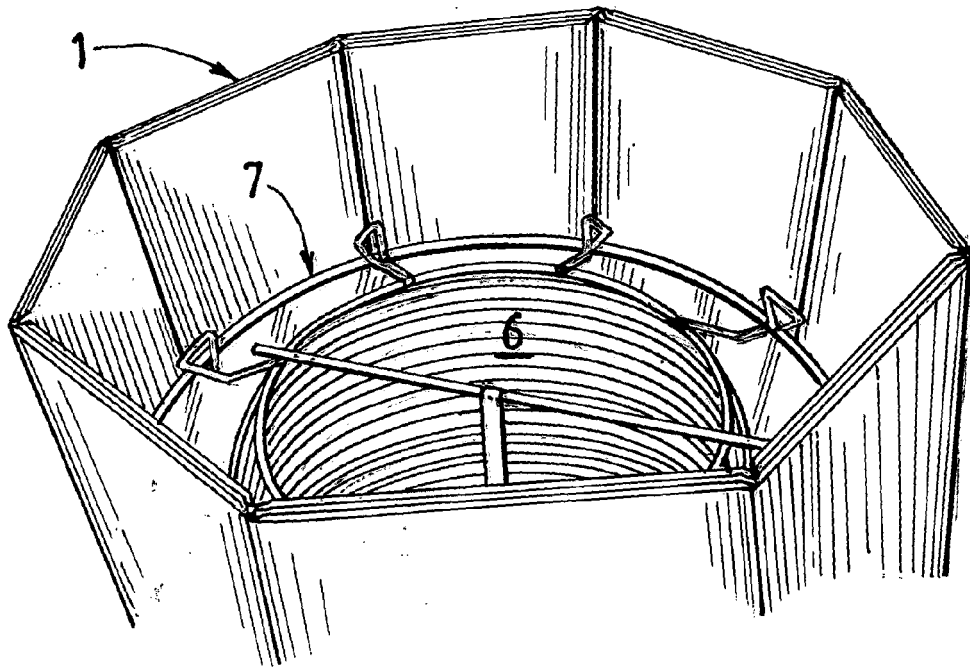


FIG. 3

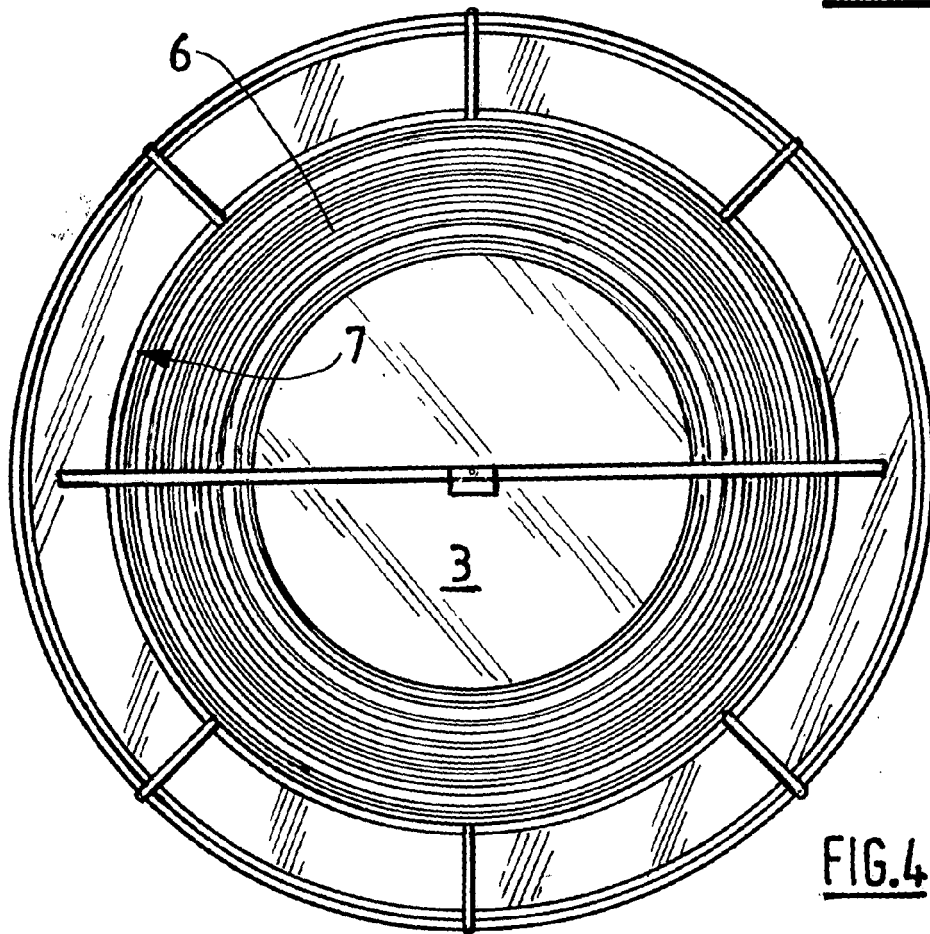


FIG. 4

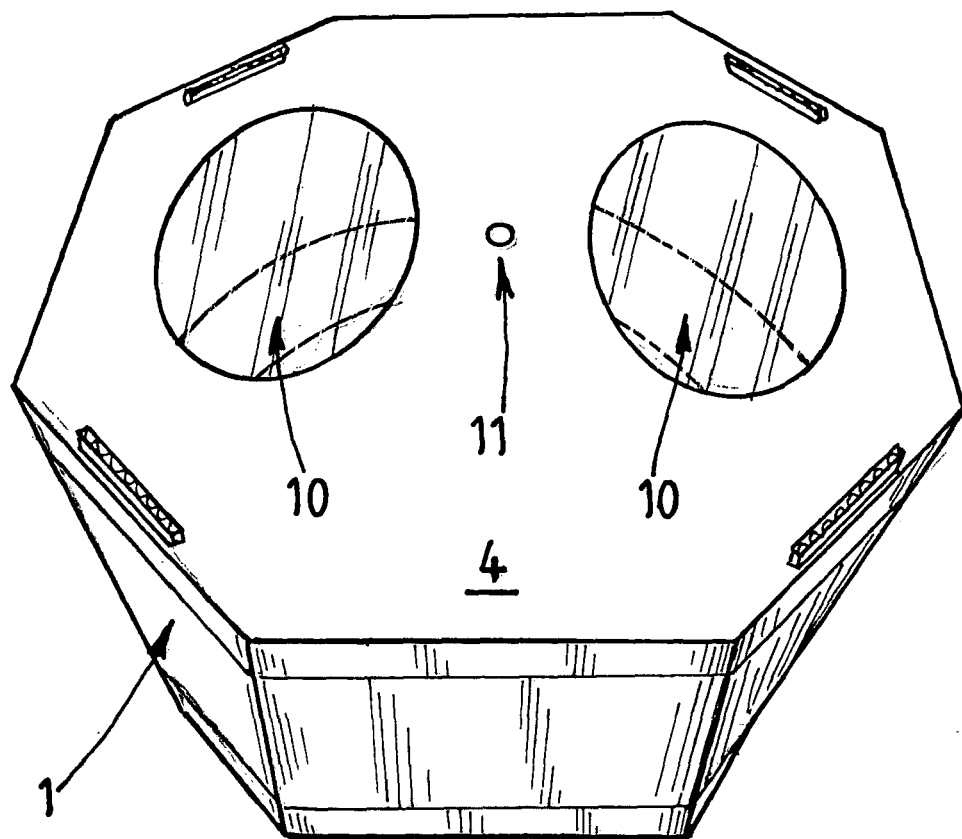


FIG. 7



EUROPEAN SEARCH REPORT

Application Number
EP 08 16 9523

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Place of search		Date of completion of the search	Examiner
Munich		29 April 2009	Ngo Si Xuyen, G
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document 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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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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