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(54) **CONTAINER FOR THE STORAGE AND TRANSPORT OF BULK MATERIALS**

(57) Container (IBC, Intermediate Bulk Container) for the storage and transport of bulk materials, typically liquids, powders, pastes, and granular materials, comprising a base pallet, a structural cage, an outer containment bag, and an inner flexible bag for containing the bulk product, where the pallet is integrated with the structural cage, where the structural cage is composed of vertical and horizontal profiles arranged along the perimeter of the pallet, defining the vertical sidewalls of the container, the outer flexible bag being placed inside and adheres to the structural cage, featuring at least one closable opening at the top and at least one opening at the bottom, the inner flexible bag is placed inside the outer flexible bag and features at least one filling spout corresponding to the top opening and at least one drainage valve corresponding to the bottom opening of the outer flexible bag, where the container includes one or more rigid upper horizontal ties fixed to the top of the structural cage and support means that engage the filling spout with at least one of the horizontal ties, allowing the positioning of the filling spout along two axes in the upper plane defined by the upper ties of the container.

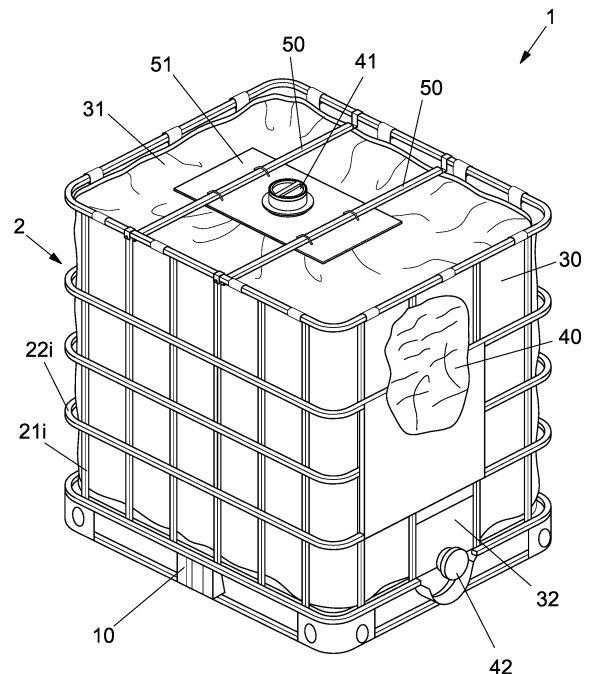


FIG.1

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Description

[0001] The present invention relates to an Intermediate Bulk Container (IBC) for the storage and transport of bulk products, typically liquids, powders, pastes, and granular materials.

[0002] For some time now, containers for the storage and transport of bulk materials with standardized dimensions have been available on the market, traditionally made of rigid containers, typically from polymeric materials suitable for contact with food.

[0003] It is known that the production process of such rigid containers exposes them to contamination risks, the porous surface does not allow for customizations such as logos or inscriptions, and in the case of reuse, the container must be washed, which carries a risk of contamination, or replaced before refilling, and additionally, the recycling of the material requires significant amounts of energy and water.

[0004] There are also known containers for the storage and transport of bulk materials, which consist of flexible containers enclosed within a structural cage, typically made of metal, where a first flexible bag containing the bulk material is placed inside a second external protective flexible bag with specific physical characteristics, such as mechanical resistance and UV protection.

[0005] Patent EP2149508 describes a container for the transport and storage of materials with such characteristics.

[0006] These containers are notoriously ineffective because the first inner bag, which has the filling spout at the top, is independent of the second outer bag, and these containers usually require the filling spout to be manually positioned and connected by the operator at the filling station to precisely align with the loading nozzle of the filling system, or the filling spout must be directly connected to the filling system.

[0007] There is therefore a need to simplify the loading operations of a known type of container.

[0008] The technical task of the present invention is, therefore, to create a container for the storage and transport of bulk products that eliminates the technical drawbacks of the known art.

[0009] As part of this technical task, one objective of the invention is to create a container for the storage and transport of bulk products that features and maintains the loading spout in a precise loading position.

[0010] Another objective of the present invention is to create a container for the storage and transport of bulk products that maintains the filling spout in a precise loading position, adjustable independently of the container's characteristics and dimensions.

[0011] Another goal of the invention is to create a container for the storage and transport of bulk products that is made entirely from easily recyclable materials.

[0012] The technical task, as well as these and other objectives, according to the present invention, are achieved by creating an Intermediate Bulk Container

(IBC) for the storage and transport of bulk products, typically liquids, powders, pastes, and granular materials, comprising a base pallet, a structural cage, an outer containment bag, and an inner flexible bag for containing the bulk product, where said base pallet is integrated with the structural cage, and the structural cage consists of vertical and horizontal profiles arranged along the perimeter of said pallet, defining the vertical sidewalls of said container, said outer flexible bag being placed inside and adheres to the structural cage, featuring at least one closable opening at the top and at least one opening at the bottom, said inner flexible bag being placed inside said outer flexible bag and featuring at least one filling spout corresponding to the top opening and at least one draining valve corresponding to the bottom opening of said outer flexible bag, characterized by having one or more upper horizontal ties fixed to the structural cage and support means engaging said filling spout with at least one of the horizontal ties, allowing the positioning of said filling spout along two axes in the upper plane of said container defined by the upper ties.

[0013] In a preferred embodiment, the support means engage the filling spout with two of said upper horizontal ties.

[0014] In another preferred embodiment, the support means engage the filling spout with one of said upper horizontal ties and the upper profile of the horizontal profiles of the structural cage.

[0015] Other characteristics of the present invention are also defined in the subsequent claims.

[0016] Further features and advantages of the invention will become more evident from the description of a preferred, though not exclusive, embodiment of a container for the storage and transport of bulk products according to the invention, illustrated for guidance and not limiting, in the accompanying drawings, in which:

Figure 1 shows an overall view of a container according to the invention;

Figures 2 and 3 show a detailed view of the filling spout and the support means, with the secondary locking means in the non-operational and operational positions, respectively;

Figures 4 and 5 respectively show variants of the container, where the horizontal support plate is supported by two horizontal ties or by one horizontal tie and an upper horizontal profile of the cage, and where the primary locking means are formed by slotted guides in the horizontal support plate, through which the horizontal support plate is adjustably engaged along two horizontal ties or one horizontal tie and an upper horizontal profile of the cage, respectively.

[0017] The following detailed description refers to the attached drawings, which are part of this document. In the drawings, similar reference numbers typically identify similar components, unless the context indicates other-

wise. The illustrative embodiments described in the detailed description and drawings are not intended to be limiting.

[0018] Other embodiments may be used, and other modifications may be made without departing from the spirit or scope of the subject matter presented herein.

[0019] The aspects of this description, as generally described in this context and illustrated in the figures, can be arranged, substituted, combined, and designed in a wide variety of different configurations, all of which are explicitly contemplated and are part of this description.

[0020] With reference to the cited figures, a container for the storage and transport of bulk products is shown, generally identified by reference number 1.

[0021] The container 1, internationally identified by the acronym IBC, Intermediate Bulk Container, is designed and made in standardized sizes for the loading, storage, and transport of bulk materials, typically liquids, powders, pastes, and granular materials, typically but not limited to food use.

[0022] These are low-cost unit containers that can be sold and/or leased or used in other forms by the user, even over a wide geographic area for distribution and recovery or disposal, even after a single shipment/storage operation.

[0023] Structurally, the containers can be designed for 1+1 stacking during transport or 1+3 stacking in storage.

[0024] The container 1 includes a base pallet 10, made of wood, steel, hybrid steel/plastic, or entirely of polymeric materials. The pallet 10 is integrated with a structural cage 20 consisting of a plurality of vertical profiles 21i and horizontal profiles 22i arranged around the perimeter of the pallet 10, defining the vertical sidewalls of the container 1.

[0025] The vertical profiles 21i and horizontal profiles 22i are typically made of galvanized steel and/or polymeric materials in different shapes and sizes depending on the manufacturer.

[0026] The container 1 includes an outer containment bag 30, placed inside and adhering to the structural cage 20, made of material resistant to UV rays and rodent attacks, typically a semi-flexible multi-layer material, usually recycled polyethylene, with a waterproof external layer that can be printed on and customized with logos and specifications, and a softer inner layer to protect against friction and abrasion of the inner flexible bag, reducing the risk of flex-cracking of the inner flexible bag. The outer containment bag 30 has at least one closable opening 31 at the top and at least one opening 32 at the bottom.

[0027] Through the opening 31, an inner flexible bag 40 for containing the bulk product is inserted into the outer containment bag 30.

[0028] The inner flexible bag 40 is typically made of polyolefin polymers, for standard and aseptic fillings, transparent and multi-layered for a barrier against UV, moisture, and permeability.

[0029] The inner flexible bag 40 is designed for use in a

vacuum-folded state and is shaped and capable of filling itself without external assistance, occupying the entire available volume inside the outer flexible bag 30.

[0030] The inner flexible bag 40 suitably has at least one filling spout 41 located at the top opening 31 and at least one drainage valve 42 located at the bottom opening 32 of the outer flexible bag 30. Preferably, the inner flexible bag 40 can be filled from the top opening 31 by gravity, or from the drainage valve 42 by pressure filling.

[0031] Conveniently, the container 1 features one or more rigid horizontal ties 50, engaged at the top of the structural cage 20. Innovatively and conveniently, the container 1 includes support means 51 that engage the filling spout 41 with at least one of the horizontal ties 50.

[0032] In a preferred embodiment, the support means 51 engage the filling spout 41 with at least two of the horizontal ties 50. In a preferred embodiment, the support means 51 engage the filling spout 41 with at least one of the horizontal ties 50 and at least one upper profile of the horizontal profiles 22i of the structural cage 20.

[0033] The support means 51 include first locking means 52, adjustable to the horizontal ties 50, and second locking means 53, adjustable to the filling spout 41.

[0034] The support means 51 in the illustrated case include a horizontal plate; the first locking means 52 may include, for example, clamps with which the horizontal plate is slidably attached to the horizontal ties 50 along the ties themselves, and the second locking means 53 may include a longitudinal slot in the horizontal plate that extends orthogonally to the horizontal ties 50 and through which the filling spout 41 slides.

[0035] By way of example and not limitation, the first locking means 52 and the second locking means 53 may include supports made of plastic, Velcro, elastic material, or any other material. In one embodiment, the support means 51 can simply rest on the horizontal ties 50.

[0036] The combined adjustment action of the first locking means 52 and second locking means 53 allows the adjustable positioning of the filling spout 41 along two orthogonal XY axes in the upper plane defined by the upper horizontal ties 50 of the container 1. Conveniently and advantageously, almost all of the materials used to manufacture container 1, and in particular the base pallet 10, the structural cage 20, the outer containment bag 30, the upper horizontal ties 50, the support means 51, and the first and second locking means 52 and 53 for the filling spout 41, are made from recycled and recyclable materials.

[0037] The operation of a container for the storage and transport of bulk materials according to the invention is evident from what has been described and illustrated, and, in particular, is essentially as follows. The container is manufactured and assembled in the factory with recycled materials, in standardized dimensions and sizes: once the user and the characteristics of the filling system have been defined, the factory adjusts the support means 51 and the first and second locking means 52 and 53 to

set and secure the position of the filling spout 41 in the upper plane of the container 1, independently of the construction characteristics of the cage 20 and the upper horizontal ties 50, which typically do not have strict dimensional tolerances. The container, thus specifically prepared, is sent to the user, who receives it ready for use on their production lines, and after filling it, prepares it for transport.

[0038] Once emptied, the container can then be re-used by replacing the inner flexible bag 40, with only the used bag being sent to a recycling facility; given the relative low cost of the container as described and manufactured above, single-use applications are also common, after which the entire container and its components are selectively recycled.

[0039] An advantage of the present invention is the preservation of the product contained in the inner bag: since it is a vacuum bag, the product inflates it to the customer's desired level upon entry.

[0040] Once the upper filling spout is sealed, during emptying through the lower valve, the bag will deflate following the flow of the exiting product, thereby avoiding the intake of air that could come into contact with the product and cause deterioration.

[0041] Modifications and variants, beyond those already mentioned, are naturally possible.

[0042] It has been practically demonstrated that a container for the storage and transport of bulk materials according to the invention is particularly advantageous for the precise positioning of the filling spout, independent of the construction characteristics of the container itself.

[0043] Another advantage of the present invention is that it is made from materials that are easily and selectively recyclable.

[0044] A container for the storage and transport of bulk materials conceived in this way is subject to numerous modifications and variations, all falling within the scope of the inventive concept, as defined by the claims; moreover, all details can be replaced by technically equivalent elements. In practice, the materials used, as well as the dimensions, may be any, depending on requirements and the state of the art.

Claims

1. Container (1) (IBC, Intermediate Bulk Container) for the storage and transportation of bulk materials, typically liquids, powders, pastes, and granular materials, comprising a base pallet (10), a structural cage (20), an outer flexible containment bag (30), an inner flexible bag (40) for containing the bulk product, wherein said base pallet (10) is integrated with said structural cage (20), wherein said structural cage (20) is composed of a plurality of vertical profiles (21i) and horizontal profiles (22i) arranged around the perimeter of said base pallet (10) defining the vertical

side walls of said container (1), said outer flexible bag (30) being disposed internally and in adherence to said structural cage (20) and having at least one closable opening (31) positioned at the top and at least one opening (32) positioned at the bottom, said inner flexible bag (40) being disposed internally within said outer flexible bag (30) and having at least one filling spout (41) positioned at said at least one top opening (31) and at least one discharge valve (42) positioned at said at least one bottom opening (32) of (said outer flexible bag (30), **characterized by** the presence of at least one or more rigid upper horizontal struts (50) engaged with said structural cage (20) and support means (51) engaging said filling spout (41) on at least one of said upper horizontal struts (50) and capable of allowing the positioning of said filling spout (41) along two orthogonal axes (XY) in the upper plane defined by said upper horizontal struts (50) of said container (1).

2. Container (1) for the storage and transportation of bulk products according to claim 1, **characterized by** the fact that said support means (51) mutually engage said filling spout (41) on at least two of said upper horizontal struts (50).

3. Container (1) for the storage and transportation of bulk products according to claim 1, **characterized by** the fact that said support means (51) mutually engage said filling spout (41) on at least one of said upper horizontal struts (50) and at least one upper profile of said horizontal profiles (22i) of said structural cage (20).

4. Container (1) for the storage and transportation of bulk products according to any preceding claim, **characterized by** the fact that said support means (51) for said filling spout (41) comprise adjustable first fastening means (52) on said upper horizontal struts (50).

5. Container (1) for the storage and transportation of bulk products according to the preceding claim, **characterized by** the fact that said support means (51) for said filling spout (41) comprise adjustable second fastening means (53) on said filling spout (41).

6. Container (1) for the storage and transportation of bulk products according to any preceding claim, **characterized by** the fact that the positioning of said filling spout (41) is adjustable.

7. Container (1) for the storage and transportation of bulk products according to claims 4 to 6, **characterized by** the fact that said support means (51) comprise a horizontal plate, said first fastening means (52) comprise straps with which the horizontal plate

is slidably attached to said struts (50) along said struts (50), and said second fastening means (53) comprise a longitudinal slot passing through the horizontal plate that extends orthogonally to said struts (50) and along which said filling spout (41) 5 engages slidably.

8. Container (1) for the storage and transportation of bulk products according to any preceding claim, **characterized by** the fact that said support means (51) for said filling spout (41) are made of recyclable semi-rigid material. 10

9. Container (1) for the storage and transportation of bulk products according to any preceding claim, **characterized by** the fact that said inner flexible bag (40) is vacuum-folded and shaped and capable of self-filling without external assistance, occupying all the available volume inside the outer flexible bag (30). 15 20

10. Container (1) for the storage and transportation of bulk products according to any preceding claim, **characterized by** the fact that said inner flexible bag (40) is made of polyolefinic polymers for standard and aseptic fillings, transparent and multi-layer for UV, moisture, and permeability barrier. 25

11. Container (1) for the storage and transportation of bulk products according to any preceding claim, **characterized by** the fact that said outer flexible bag (30) is made of multi-layer semi-flexible material resistant to UV rays and rodent attacks, typically made of recycled polyethylene, with an outer waterproof layer that is printable and customizable for logos and specifications, and an inner softer layer to protect against friction and abrasion of the inner flexible bag. 30 35

12. Container (1) for the storage and transportation of bulk products according to any preceding claim, **characterized by** the fact that said base pallet (10), said structural cage (20), said outer containment bag (30), said inner flexible containment bag (40), and said upper horizontal struts (50) are made of recycled and recyclable materials. 40 45

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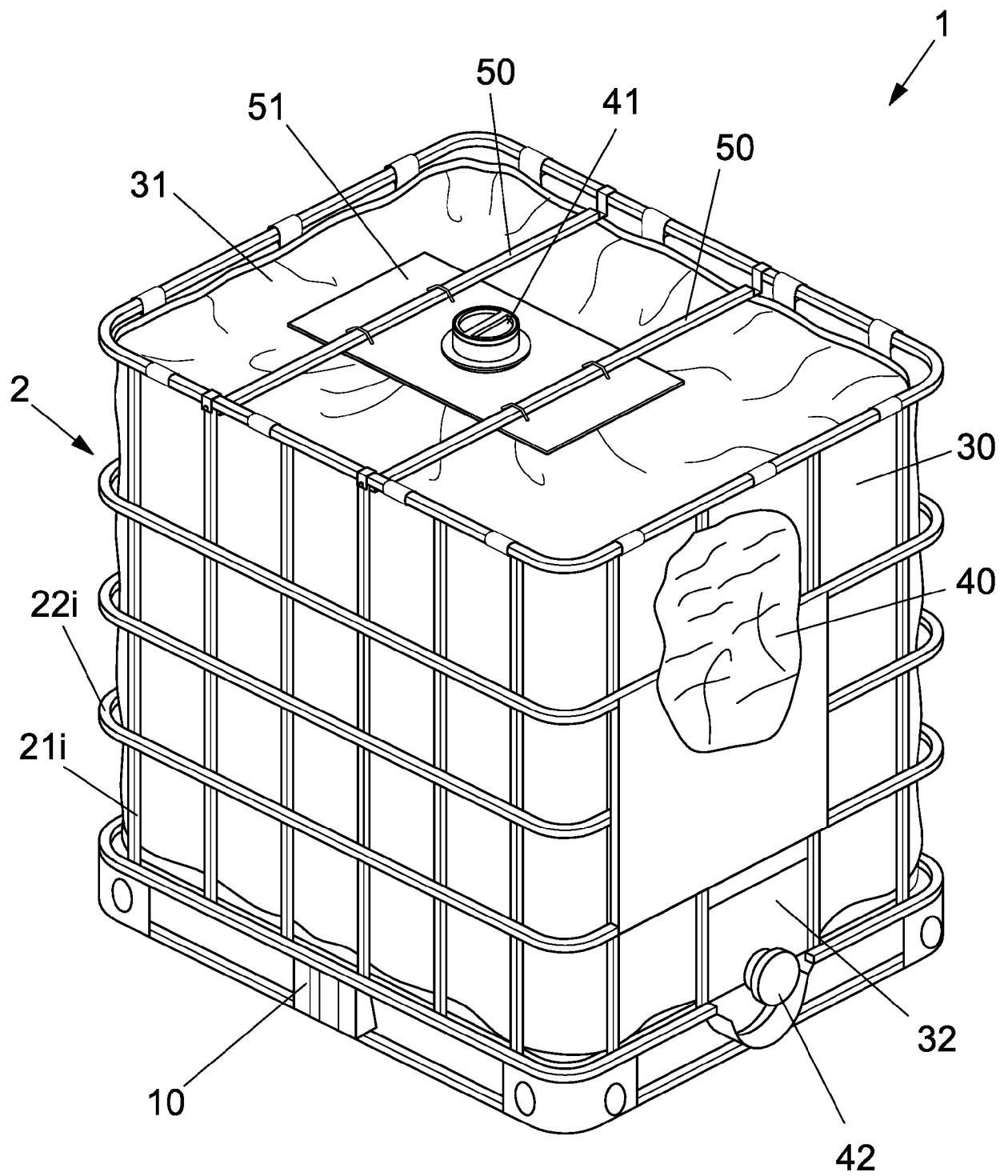


FIG.1

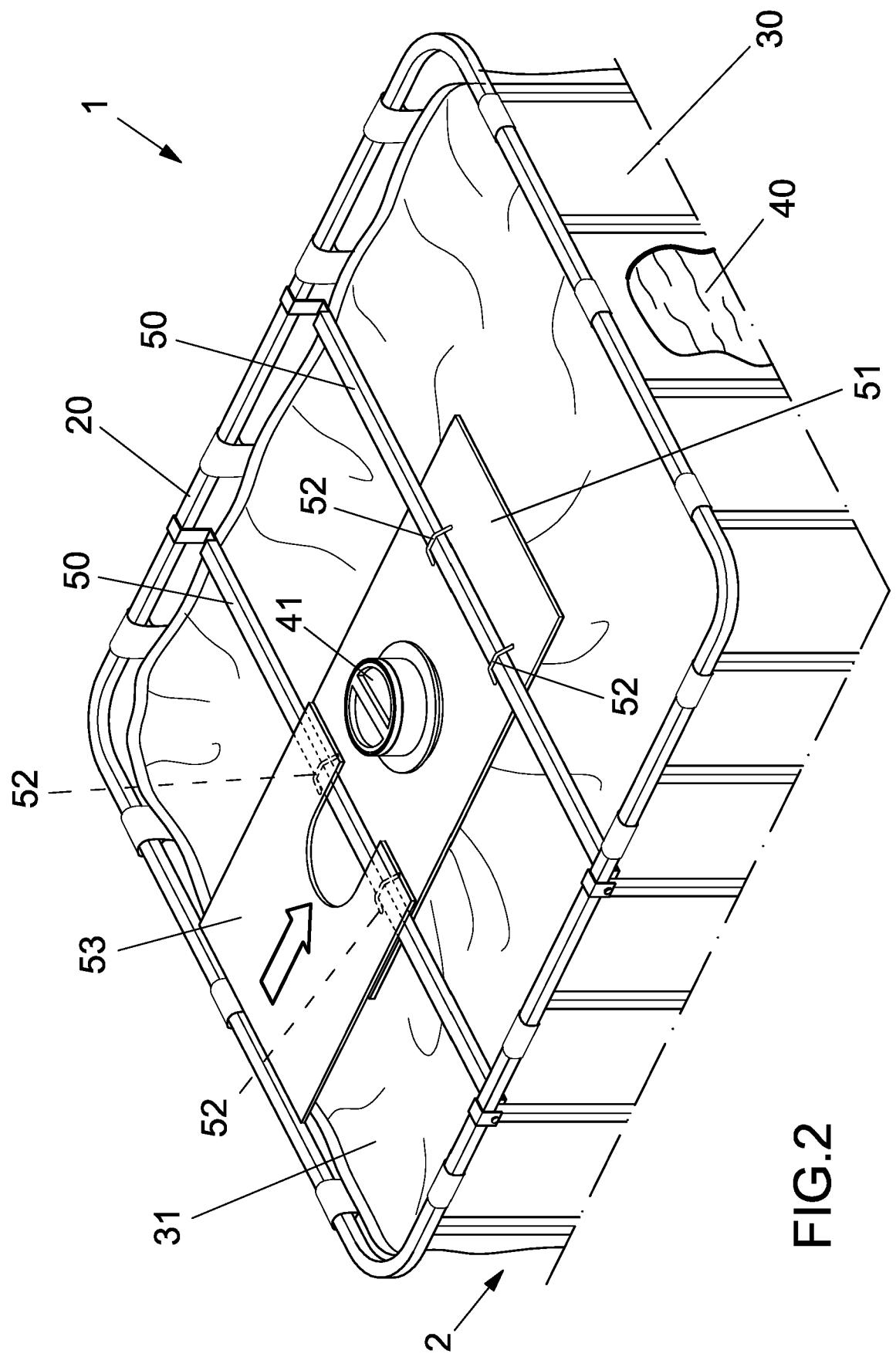
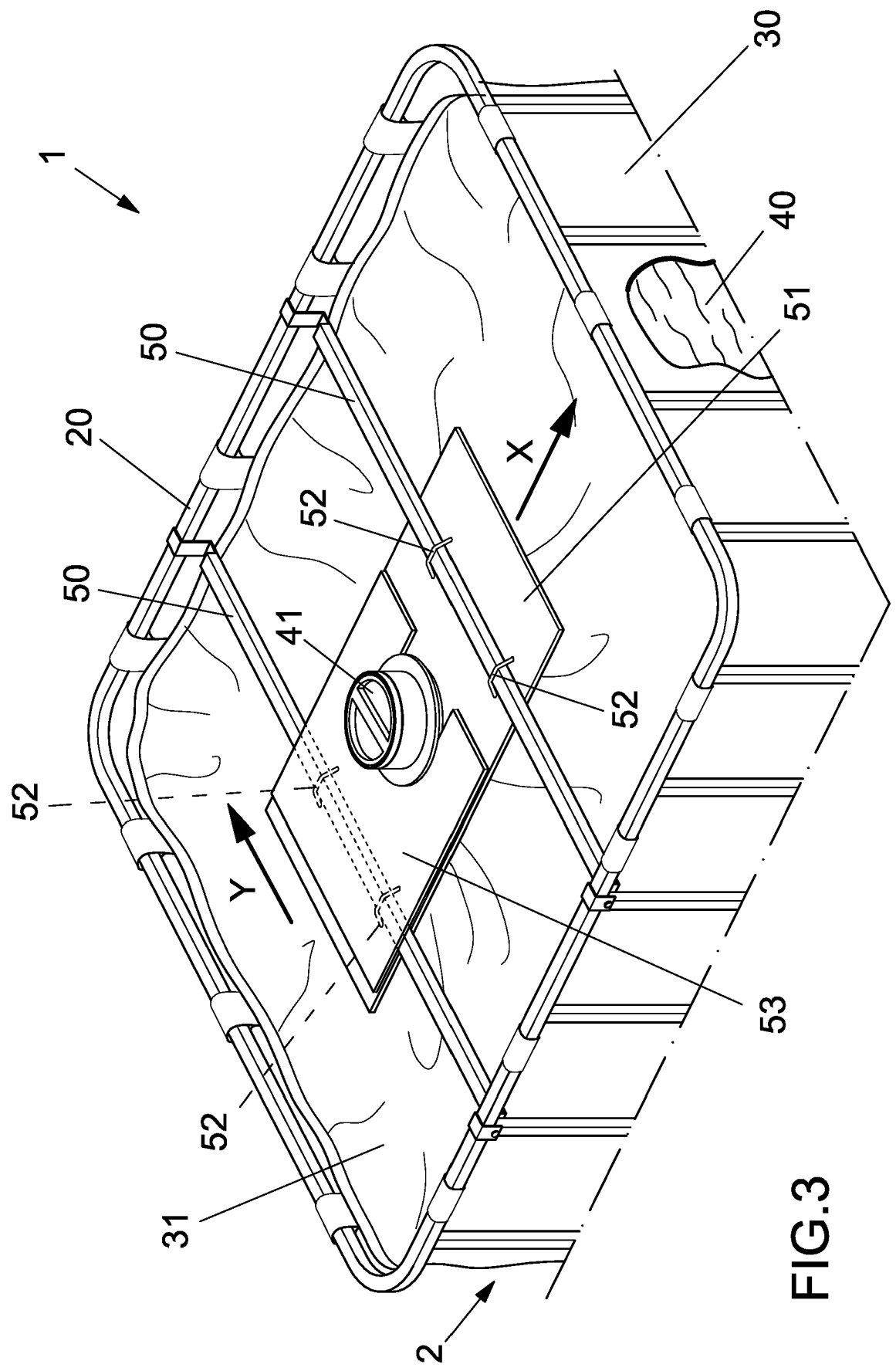


FIG.2



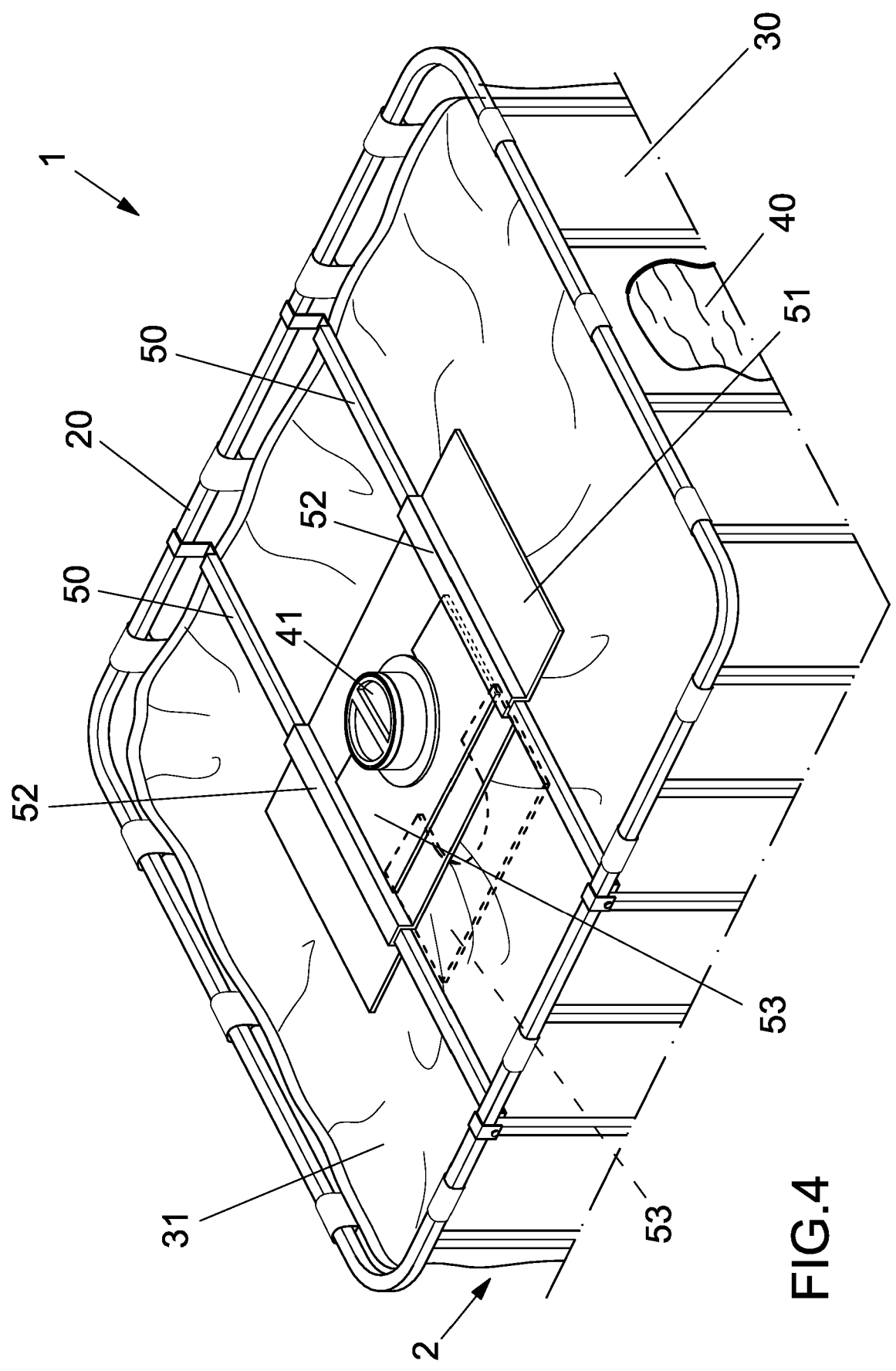


FIG.4

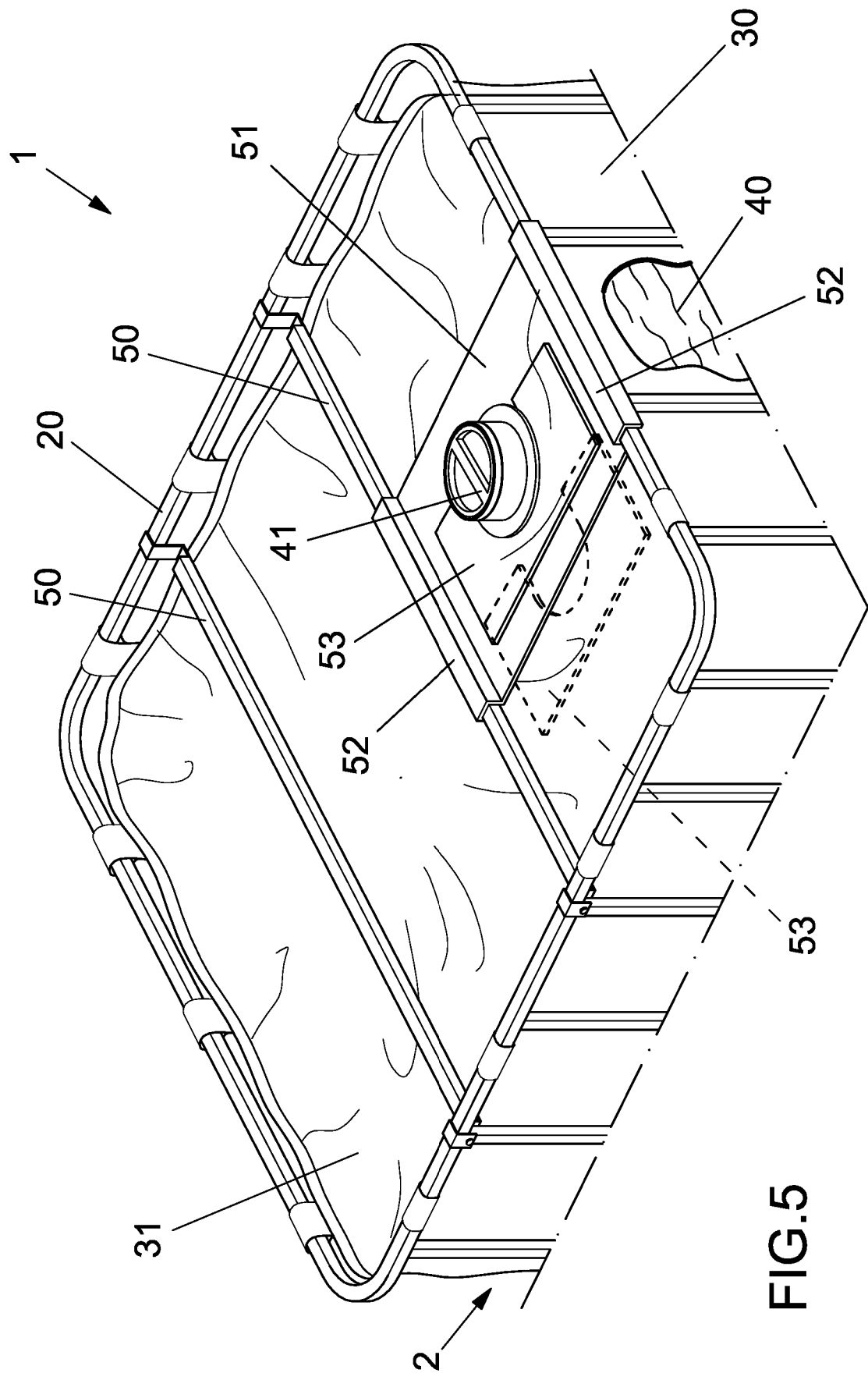


FIG. 5



EUROPEAN SEARCH REPORT

Application Number

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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		22 April 2025	Jervelund, Niels
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