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(54) TRANSPORT AND DELIVERY SYSTEM FOR LIQUID OR VISCOUS SUBSTANCES

(57) The present invention relates to a transport and delivery system (10; 20) of liquid or viscous substances comprising a bag-type and compressible storing device (110), provided with at least one opening (115) for the delivery of the liquid or viscous substances, and a carrier body (210) provided with at least two opposite stiff walls (212, 213) which define a storing chamber of the storing device (110); wherein the storing device (110) is able to be arranged within the storing chamber in the transport phase and in the delivery phase of the liquid or viscous substances and comprises a spacing device (150) arranged within the storing device (110) at the opening (115) and able to avoid the clog of the opening (115) during compression of the bag; the carrier body (210) is provided with a stiff framework (211), wherein the opposite stiff walls (212, 213) are operatively connected to the stiff framework (211) and is demountable to minimize the volume of the transport system (10; 20) when the storing device (110) is completely compressed after the delivery phase.

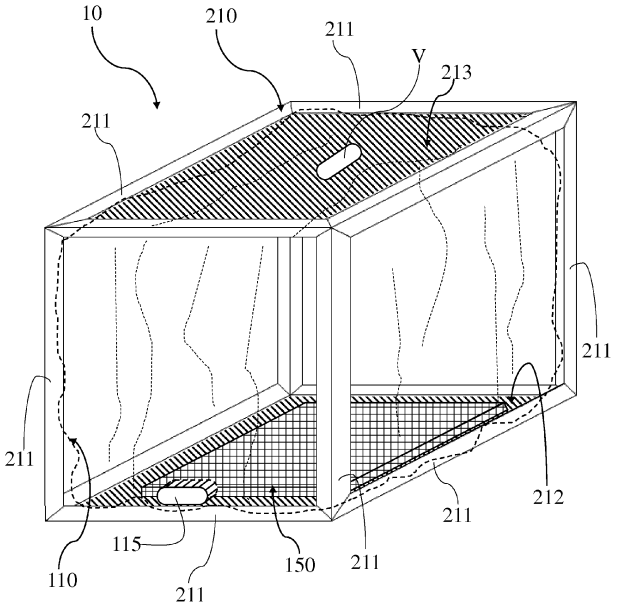

FIG. 1

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Description

Field of the invention

[0001] The present invention relates to a transport and delivery system of liquid or viscous substances. In particular, the present invention relates to a system of the compressible type, provided with a storing device of the liquid or viscous substances coupled and operatively connected to a carrier body.

Background art

[0002] Transport systems of liquid or viscous substances of various types and sizes are known. These are able to store and transport the aforesaid substances of both the food and the industrial types. Typically, the systems of the aforesaid types are made by means of rigid containers made of metallic material, for example aluminium alloy or the like, which guarantee the correct containment of the liquid or viscous substance to be transported, as well as the structural sealing, especially during the substance transport phase. However, such containers have considerable problems associated with the weight of the container itself and with the volume occupied by it, especially during the vacuum transport phase.

[0003] Transport systems for liquid or viscous substances made with a rigid structure of metallic material, for example of the tubular steel type, wherein a rigid container made of plastic is housed, are also known. Systems of the aforesaid type allow to reduce the overall weight, especially during the vacuum transport phase, but do not allow to solve the problems connected with the volume to be transported in the same vacuum transport phase. Documents DE1108102B and DE8214181U1 describe solutions of the aforesaid type.

[0004] Document DE3853527T2 also describes a transport system of liquid or viscous substances made with a rigid structure wherein a compressible container is housed for storing and delivering liquid or viscous substances. The aforesaid system, however, does not allow for optimal delivery of the contents since the compressible container could clog the delivery opening. Moreover, the volume in the vacuum transport phase, although reduced compared to the previously described solutions, remains high.

[0005] A further problem common to known systems is that of content contamination with respect to the surrounding environment. In particular, the rigid containers of the aforesaid type allow the extraction of the contents by simultaneously introducing another fluid into the same capable of compensating the pressure, typically air taken from the surrounding environment. This generates, as a consequence, a content contamination with the surrounding air which, for example, leads to a greater or more rapid oxidation of food and/or industrial products.

[0006] It would therefore be desirable to have a transport and delivery system for liquid or viscous substances, capable of minimizing the drawbacks described above. It would be desirable to have a transport and delivery system of liquid or viscous substances capable of allowing the transport and delivery of the substance in optimal conditions and, at the same time, capable of achieving a significant cost saving in the vacuum transport phase of the same system. In this regard, it would be desirable to have a transport and delivery system of liquid or viscous substances capable of providing a rigid transport system in the transport phase of the liquid or viscous substances which would allow a reduced volume during the vacuum transport phase of the same system and, at the same time, an optimal delivery without the clog in the delivery phase.

[0007] Furthermore, it would be desirable to have a transport and delivery system of liquid or viscous substances capable of ensuring the absence of contamination during the delivery of the fluid at a reduced cost.

Summary of the Invention

[0008] An object of the present invention is to provide a transport and delivery system of liquid or viscous substances capable of minimizing the aforesaid problems.

[0009] Another object of the present invention is to provide a transport and delivery system of liquid or viscous substances capable of reducing transport costs, in particular during the vacuum transport phase.

[0010] Furthermore, an object of the present invention is to provide a transport system with reduced environmental impact.

[0011] The aforesaid objects are achieved by a transport and delivery system of liquid or viscous substance according to the attached claims.

[0012] The transport and delivery system of liquid or viscous substance comprises:

- a bag-type and compressible storing device of the liquid or viscous substances, the storing device comprising at least one opening for the delivery of the liquid or viscous substances;
- a carrier body provided with at least two opposite stiff walls, the carrier body defining a storing chamber of the storing device between the opposite stiff walls;

wherein the storing device is able to be arranged within the storing chamber in the transport phase and in the delivery phase of the liquid or viscous substances;
the containment and transport system of liquid or viscous substances is characterized in that the carrier body is provided with a stiff framework, wherein the opposite stiff walls are operatively connected to the stiff framework and wherein the storing device of the liquid or viscous substances comprises a spacing device arranged within the storing device at the opening and able to avoid the clog of the opening during compression of the bag, and
wherein the carrier body can be demounted to minimize the volume of the transport system when the storing de-

vice is completely compressed after the delivery phase.

[0013] Preferably, the spacing device is a grid, even more preferably made of metal material or plastic material.

[0014] In this way, it is possible to considerably reduce by weight the entire system, as well as the volume of the same system when the delivery is finished, obtaining a significant cost saving, in particular during the vacuum transport phase. Therefore, the system allows to effectively manage both the transport phase and the delivery phase. In particular, the carrier body allows to carry out an effective containment of the storing device, giving it the necessary mechanical strength. Similarly, the carrier body can be demounted to reduce the costs of empty transport. Moreover, the same structure provides the delivery phase, reducing the costs associated with the movement and use of the storing device.

[0015] Preferably, the opposite stiff walls have, when in use in the transport phase, a fixed spacing and such as to define the maximum volume of the storing chamber, and

wherein the opposite stiff walls have, when in use in the delivery phase, a variable spacing between a maximum position and a minimum position for the delivery of the liquid or viscous substances by compressing the bag, the maximum position corresponds to the volume maximum of the storing chamber and the minimum position corresponds to the minimum volume of the storing chamber.

[0016] In particular, the opposite stiff walls define, when in use in the delivery phase, a fixed wall and a movable wall with respect to the fixed wall such as to allow variable spacing.

[0017] The system therefore allows to obtain an important technical advantage in the use of a container intended for the containment of the substances and, at the same time, also for the delivery thereof. Furthermore, the mere container of the substance is separated from the part of the system that carries out the transport and the subsequent delivery thereof, significantly reducing the costs associated with the set-up management, the costs of transport of empty systems, as well as the costs related to the materials employed.

[0018] Preferably, the carrier body comprises a stiff framework coupled to the fixed wall and on which the movable wall is able to move in the direction of the fixed wall. Even more preferably, the movable wall is able to move in the direction of the fixed wall by gravity.

[0019] This solution is particularly suitable for transport and delivery of liquid substances, wherein the mere operation of a valve located at the bottom of the storing device enables the delivery of the liquid substance itself. Furthermore, such a solution is suitable for transport and delivery of viscous substances, when the system is operatively connected with, or provided with, a pump for viscous fluids, for example of the peristaltic type, which allows the delivery of the aforementioned viscous fluid.

[0020] Alternatively, the transport system comprises movement means able to move the movable wall towards the fixed wall, wherein the movement means comprise a hydraulic or pneumatic cylinder.

[0021] On the contrary, this solution is particularly suitable for the delivery of viscous substances, when the system is not operatively coupled with, or provided with, a pump for viscous fluids and therefore needs a system for the movement of the viscous fluid.

[0022] Preferably, the stiff framework is made of metal or plastic material respectively and said opposite stiff walls are made of wood or paper material. Even more preferably, the carrier body is entirely made of wood or paper material.

[0023] The system thus has a reduced environmental impact, minimizing the plastic content employed.

[0024] Preferably, the storing device is of the liquid-tight type and is made of plastic or multilayer material comprising at least one plastic layer.

[0025] Preferably, the carrier body is provided with a delivery device operatively connected to an opening of the storing device, and

wherein the delivery device is provided with heating means of the liquid or viscous substance to be delivered.

Description of the figures

[0026] These and further features and advantages of the present invention will become apparent from the disclosure of the preferred embodiments, illustrated by way of non-limiting example in the appended drawings, wherein:

- Figure 1 is a perspective view of a first embodiment of the transport and delivery system, according to the present invention;
- Figure 2 is a perspective view of a second embodiment of the transport and delivery system, according to the present invention.

Detailed description of the invention

[0027] With reference to Figure 1, a first embodiment of the transport and delivery system 10 of liquid or viscous substances, according to the present invention, is illustrated. In particular, the same numerals will be maintained in the following for the same elements but relating to different embodiments.

[0028] The transport and delivery system 10 can be employed for the containment of any type of liquid or viscous substance, even of the food type, allowing to avoid the contact of the aforesaid substance with the external environment.

[0029] In the embodiments described therein, a containment volume for liquid or viscous substances equal to 1000 litres is assumed, but different volumes can be employed without modifying the inventive concept of the present invention.

[0030] The system 10 comprises two main elements

which constitute it, in particular a storing device 110 and a carrier body 210.

[0031] The storing device 110 is the portion of the system intended for the containment of the liquid or viscous substance to be transported and to be delivered. To obtain the technical results according to the present invention, the storing device 110 for the liquid or viscous substances is of the bag type and is compressible. In particular, the aforesaid storing device 110 is of the liquid-tight type and made of plastic or, preferably, multilayer material comprising at least one plastic layer, for example a multilayer comprising at least one PE layer and at least one aluminium layer. The use of plastic material allows to optimize the protection of the substance to be transported, avoiding exposure and relative contamination to the air or to other substances present in the environment wherein the transport and delivery system 10 is moved or placed. The employment of multilayer materials allows the preparation of suitable layers such as, for example, oxygen barrier layers or light barrier layers. In any case, the storing device 110 of the bag-type allows the flexibility and strength of the container to be exploited to obtain a transport system with reduced plastic content and low weight.

[0032] Thus, the storing device 110 allows the containment of both food and non-food substances, in any case allowing the insulation of the transported content to be delivered with respect to the air or environment wherein it is placed.

[0033] The carrier body 210 is provided with a stiff framework 211 which in the embodiment described therein has a plurality of uprights able to define the framework of the system 10. Preferably, the aforesaid structure is made of a metal or plastic material of the rigid type, so as to ensure the correct support for the weight of the system 10, as well as the possibility of stacking several transport and delivery systems 10 during the transport phase.

[0034] The carrier body 210 is also provided with at least two opposite stiff walls 212, 213 operatively connected to the aforesaid stiff framework 211. These constitute the base wall 213, at the opening for the delivery of the liquid or viscous substance, and the upper wall 212, opposite to the aforementioned base wall. Further walls can be defined to define the carrier body 210, until the transport and delivery system 10 is completely closed. In the embodiment illustrated in Figure 1, since the system 10 has a parallelepiped conformation, it would need four further walls, arranged at the perimeter between the aforesaid base and upper walls.

[0035] These opposite stiff walls 212, 213 are preferably made of wood, for example compressed chipboard, or of paper material, for example compressed cardboard. This allows to obtain the desired mechanical protection, for example necessary for supporting, moving and protecting the storing device 110 from any accidental impact. At the same time, the employed material allows to reduce the weight of the system and to obtain a significant environmental impact reduction.

[0036] The opposite stiff walls 212, 213 can also be coated with epoxy paints capable of withstanding rigid temperatures and improving resistance to aggressive chemical components, such as acids and oils. Preferably, the aforesaid coating is made at the internal surfaces of the walls 212, 213, i.e. at the surfaces of the walls which are at and/or in contact with the storing device 110. The aforesaid coating allows to maintain the liquid-tight sealing in case of accidental breakage of the storing device 110.

[0037] The epoxy resin coating can be made on one or more walls of the carrier body. In particular, in the case wherein the carrier body has all the sides provided with a respective wall, each wall can be provided with the aforesaid epoxy resin coating.

[0038] The carrier body 210 defines a storing chamber of the storing device 110. In particular, the containment is carried out within the volume defined by the walls of which the aforesaid carrier body 210 is provided, i.e. at least between the aforesaid opposite stiff walls. Furthermore, the carrier body 210 can be demounted to minimize the volume of the transport system 10 when the storing device 110 is completely compressed after the delivery phase.

[0039] According to an alternative embodiment, the carrier body is entirely made of wood or paper material. In other words, both the frame and the walls it is provided with can be made of wood, for example compressed chipboard, or of paper material, for example compressed cardboard. This allows to create a system with reduced environmental impact, minimizing the content of plastic employed, i.e. employing easily recyclable materials when their life cycle has run out.

[0040] To allow a better sealing of the carrier body 210, in particular when made entirely of wood or paper material, the uprights can be joined to the fixed walls by means of expanded polyethylene gaskets, making the structure liquid-tight and with improved insulation features of the storing chamber.

[0041] However, preferably the content of the plastic material of the system 10 is reduced to less than 1% by weight, reducing the environmental impact of the plastic material.

[0042] The components of the transport and delivery system 10 allow to considerably reduce the weight of the entire system 10, as well as the volume of the same system 10 when the delivery is finished, for example by compressing the storing device 110 and demounting the transport structure 210. The result is a significant cost saving, particularly in the vacuum transport phase, where the weight and volume of the system are extremely reduced compared to conventional transport and delivery systems.

[0043] As illustrated in Figure 1, the storing device 110 is further provided with a suitable opening 115 preferably arranged at the bottom thereof, i.e. at the base wall of the carrier body 210, capable to allow the delivery of the

liquid or viscous substance contained. In this regard, the carrier body 210 is further provided with a delivery device, not illustrated in Figure 1, operatively connected to the aforesaid opening 115 of the storing device 110. In this way, it is possible to carry out the delivery phase without removing the storing device 110 from the carrier body 210. This delivery device is preferably made by means of a discharge tube arranged at the base wall preferably of a metal material, for example galvanized or stainless steel, or of plastic material, for example PVC.

[0044] In a further embodiment, the delivery device comprises suitable heating means which allow to heat the liquid or viscous substance during the delivery phase. Such heating means can, for example, be made by means of suitable filaments capable of transforming electrical energy into thermal energy. The heating means can therefore be an integral part of the delivery device, for example an integral part of the discharge tube, or be coupled thereto, for example arranged along the outer surface of the discharge tube.

[0045] Furthermore, the storing device 110 is provided with an exchange hole 116 substantially opposite to the opening 115 and able to allow the evacuation of the air during the filling phase of the bag itself. This exchange hole 116 comprises, in particular, a non-return valve capable of ensuring the escape of air but of avoiding that of the substance to be delivered, in particular during the filling phase.

[0046] The aforesaid storing device 110 is further able to be arranged within the storing chamber in the transport phase and in the delivery phase of the liquid or viscous substances. This allows, therefore, to minimize the operations necessary to arrange the transport system 10 in the delivery phase, optimizing the set-up time and obtaining consequent cost savings.

[0047] In order to obtain the correct delivery and avoid the clog of the opening 115, the storing device 110 is also provided with a spacing device 150, capable of allowing the substance to be delivered to flow out but at the same time avoiding the bag structure from collapsing on the opening 115 itself. Such spacing device 150 is in fact arranged within the storing device 110 at the aforesaid opening 115 and is able to avoid the clog of the opening 115 during the compression of the bag. The spacing device 150 consists of a grid, preferably of a metal material such as stainless steel or plastic material, capable of obtaining the aforesaid effects and of maintaining a reduced impact on the volume and weight of the system 10. In the same way, the spacing device 150 must be made in such a way as to allow a quick cleaning of the storing device 110 and avoid undesired reactions with the transported content, i.e. with the substance to be delivered.

[0048] Therefore, the system 10 allows to effectively manage both the transport phase and the delivery phase. In particular, the carrier body 210 allows to carry out an effective containment of the storing device 110, giving it the necessary mechanical strength. Similarly, the carrier body 210 can be demounted to reduce the costs of empty transport. Moreover, the same structure 210 allows to carry out the delivery phase, reducing the costs associated with the movement and the use of the storing device 110.

[0049] In this regard, even if not detailed in Figure 1, the opposite stiff walls defining part of the carrier body 210 have a spacing that can be varied according to the user's needs. In particular, the aforesaid opposite stiff walls can be arranged with a fixed spacing or with a variable spacing, as described in greater detail below. In particular, the opposite stiff walls define, when in use in said delivery phase, a fixed wall and a movable wall with respect to the fixed wall such as to allow variable spacing. In the embodiment described and illustrated in Figure 1, the base wall defines the fixed wall and the upper wall defines the movable wall.

[0050] Further embodiments are possible wherein both walls are movable, or the arrangement of the fixed wall and the movable wall is inverted.

[0051] Moreover, according to a further embodiment, the fixed wall is provided with a pallet structure, for example of the European type, such as to allow the suitable movement of the system 10 without the employment of further elements to promote movement. This also allows a better stacking of the transport and delivery systems.

[0052] In use in the transport phase, i.e. with the storing device 110 filled with the substance to be transported, the base and upper opposite stiff walls are kept at a fixed spacing and such as to define the maximum volume of the storing chamber. This allows both to carry out the filling phase to the maximum capacity and to avoid unwanted mechanical deliveries or stresses during the transport phase.

[0053] The same opposite stiff walls are, therefore, arranged with a variable spacing when in use in the delivery phase. In particular, these can be moved between a maximum position and a minimum position for the delivery of liquid or viscous substances by compressing the bag, wherein the maximum position corresponds to the maximum volume of the storing chamber and the minimum position corresponds to the minimum volume of the storing chamber, for example the volume occupied by the spacing device 150.

[0054] In the embodiment described therein, the carrier body 210 comprises the stiff framework 211 coupled to the aforesaid fixed wall 212 and on which the movable wall 213 is able to move in the direction of the fixed wall 212. Such movement is preferably obtained by gravity, i.e. the movable wall 213 defines the aforesaid variable spacing during the crushing of the bag and the consequent delivery of the liquid or viscous substance from its opening 115.

[0055] The system 10 therefore allows to obtain an important technical advantage in the use of a container intended for the containment of the substances and, at the same time, also for the delivery thereof. Furthermore, the mere container of the substance is separated from the

part of the system that carries out the transport and the subsequent delivery thereof, significantly reducing the costs associated with the set-up management, the costs of transport of empty systems, as well as the costs related to the materials employed.

[0056] The solution described therein is particularly suitable for transport and delivery of liquid substances, wherein the mere operation of a valve located at the bottom of the storing device enables the delivery of the liquid substance itself. Furthermore, such a solution is suitable for transport and delivery of viscous substances, when the system is operatively connected with, or provided with, a pump for viscous fluids, for example of the peristaltic type, which allows the delivery of the aforementioned viscous fluid, i.e. of isotropic fluid.

[0057] According to a further embodiment, illustrated in Figure 2, the transport and delivery system 20 of liquid or viscous substances substantially consists of the same components previously described for the first embodiment of the transport and delivery system 10, which for this reason will not be further detailed.

[0058] The transport and delivery system 20 is further provided with movement means 400 able to move the movable wall 213, i.e. the upper wall, towards the fixed wall 212, i.e. the base walls. This solution is particularly suitable for the delivery of viscous substances, in particular isotropic substances, when the system 10 is not operatively coupled with, or provided with, a pump for viscous fluids and therefore needs suitable movement means of isotropic fluids that would otherwise not be delivered.

[0059] As shown in Figure 2, the movement means 400 preferably comprise a covering structure 410 to be arranged at the movable wall 213, i.e. the upper wall, and a hydraulic or pneumatic cylinder 420, able to apply the correct pressure to the movable wall 213 and capable of allowing the locking of the position when the delivery must be interrupted. The applied pressure is preferably lower than 0.5 bar and such as to allow the delivery of isotropic substances.

[0060] The aforesaid movement means 400 can be permanently coupled to the movement and delivery system 20 or, alternatively, replace the movable wall 213, for example in the case of operation with the systems 10 according to the first embodiment. In this case, the movement means 400 can be arranged wherein the delivery will be carried out and be employed for a plurality of transport and delivery systems of liquid or viscous substances.

[0061] The system according to the present invention, and in all its embodiments, allows to effectively manage both the transport phase and the delivery phase. In particular, the carrier body allows to carry out an effective containment of the storing device, giving it the necessary mechanical strength. Similarly, the carrier body can be demounted to reduce the costs of empty transport. Moreover, the same structure provides the delivery phase, reducing the costs associated with the movement and use of the storing device.

Claims

1. A transport and delivery system (10; 20) of liquid or viscous substances comprising:

   - a bag-type and compressible storing device (110) of said liquid or viscous substances, said storing device (110) comprising at least one opening (115) for the delivery of said liquid or viscous substances;
   - a carrier body (210) provided with at least two opposite stiff walls (212, 213),said carrier body (210) defining a storing chamber of said storing device (110) between said opposite stiff walls (212, 213);

   wherein said storing device (110) is able to be arranged within said storing chamber in the transport phase and in the delivery phase of said liquid or viscous substances;
   said transport and delivery system (10; 20) of liquid or viscous substances is **characterized in that** said carrier body (210) is provided with a stiff framework (211), wherein said opposite stiff walls (212, 213) are operatively connected to said stiff framework (211), and
   wherein said storing device (110) of said liquid or viscous substances comprises a spacing device (150) arranged within said storing device (110) at said opening (115) and able to avoid the clog of said opening (115) during compression of said bag, and wherein said carrier body (210) is demountable to minimize the volume of said transport system (10; 20) when said storing device (110) is completely compressed after said delivery phase.

2. Transport and delivery system (10; 20) of liquid or viscous substances according to claim 1, wherein said spacing device (150) is a grid, preferably made of metal material or plastic material.

3. Transport and delivery system (10; 20) of liquid or viscous substances according to claim 1 or 2, wherein said opposite stiff walls (212, 213) have, when in use in said transport phase, a fixed spacing such as to define the maximum volume of said storing chamber, and
   wherein said opposite stiff walls (212, 213) have, when in use in said delivery phase, a variable spacing between said maximum position and a minimum position for the delivery of said liquid or viscous substances by said compression of the bag, said maximum position corresponds to said maximum volume of said storing chamber and said minimum position corresponds to the minimum volume of said storing chamber.

4. Transport and delivery system (10; 20) of liquid or

viscous substances according to one or more of claims 1 to 3, wherein said opposite stiff walls (212, 213) define, when in use in said delivery phase, a fixed wall (212) and a movable wall (213) with respect to said fixed wall (212) such as to allow said variable spacing.

5. Transport and delivery system (10) of liquid or viscous substances according to claim 4, wherein said carrier body (210) comprises said stiff framework (211) coupled to said fixed wall (212) and on which said movable wall (213) is able to move in the direction of said fixed wall (212) by gravity.

6. Transport and delivery system (20) of liquid or viscous substances according to claim 4, wherein said carrier body (210) comprises said stiff framework (211) coupled to said fixed wall (212) and on which said movable wall (213) is able to move in the direction of said fixed wall (212), and
wherein said transport and delivery system (20) comprises movement means (400) able to move said movable wall (213) in the direction of said fixed wall (212), wherein said movement means (400) comprise a hydraulic or pneumatic cylinder (420).

7. Transport and delivery system (10; 20) of liquid or viscous substances according to one or more of claims 1 to 6, wherein said stiff framework (211) is made of metal material or plastic material, and said opposite stiff walls (212, 213) are made of wood or paper material.

8. Transport and delivery system (10; 20) of liquid or viscous substances according to one or more of claims 1 to 7, wherein said carrier body (210) is entirely made of wood or paper material.

9. Transport and delivery system (10; 20) of liquid or viscous substances according to one or more of claims 1 to 8, wherein said storing device (110) is of the liquid-tight type and made of plastic or multilayer material comprising at least one plastic layer.

10. Transport and delivery system (10; 20) of liquid or viscous substances according to one or more of claims 1 to 9, wherein said carrier body (210) is provided with a delivery device operatively connected to said opening (115) of said storing device (110), and
wherein said delivery device is provided with heating means of said liquid or viscous substance to be delivered.

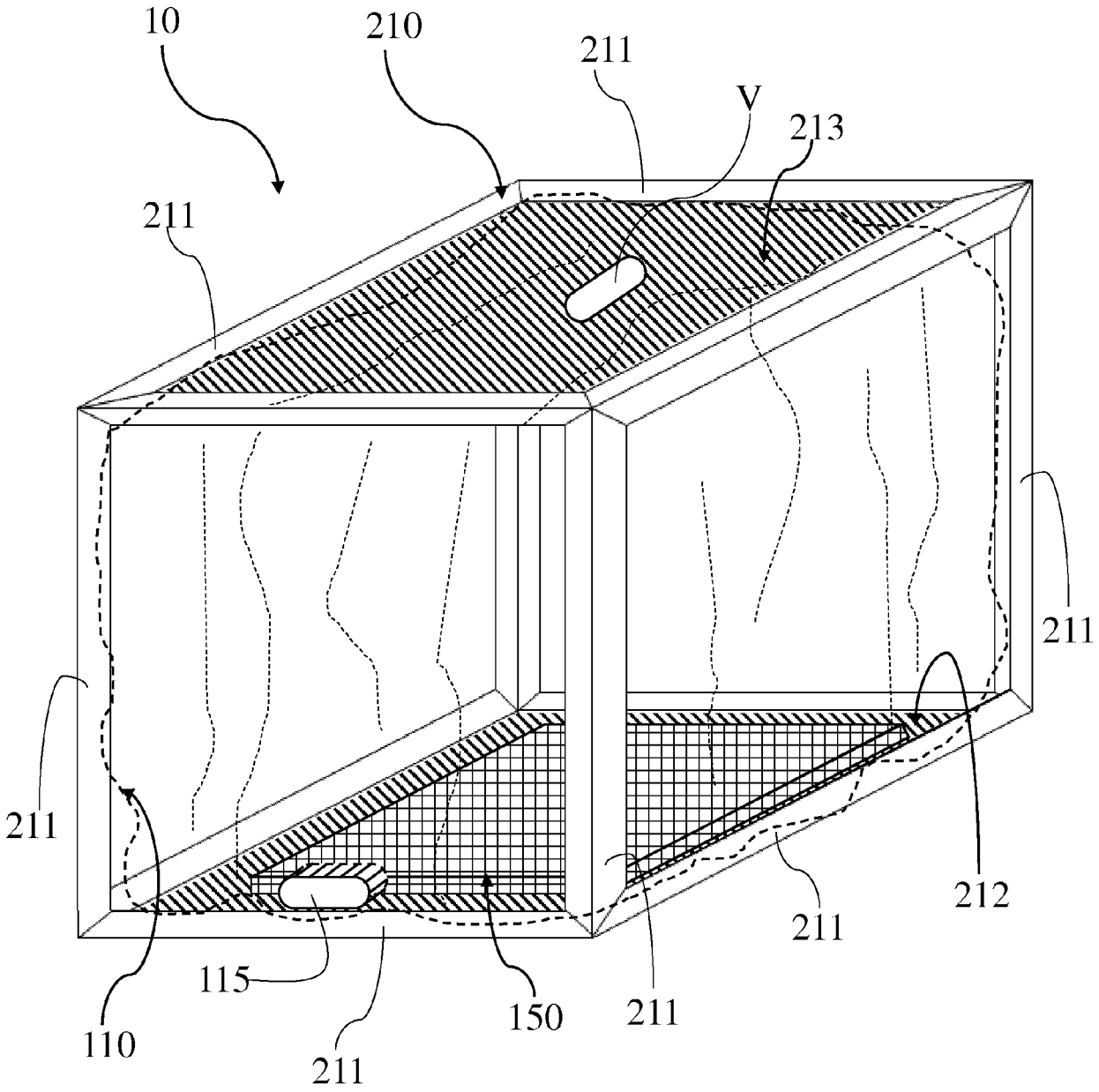

FIG. 1

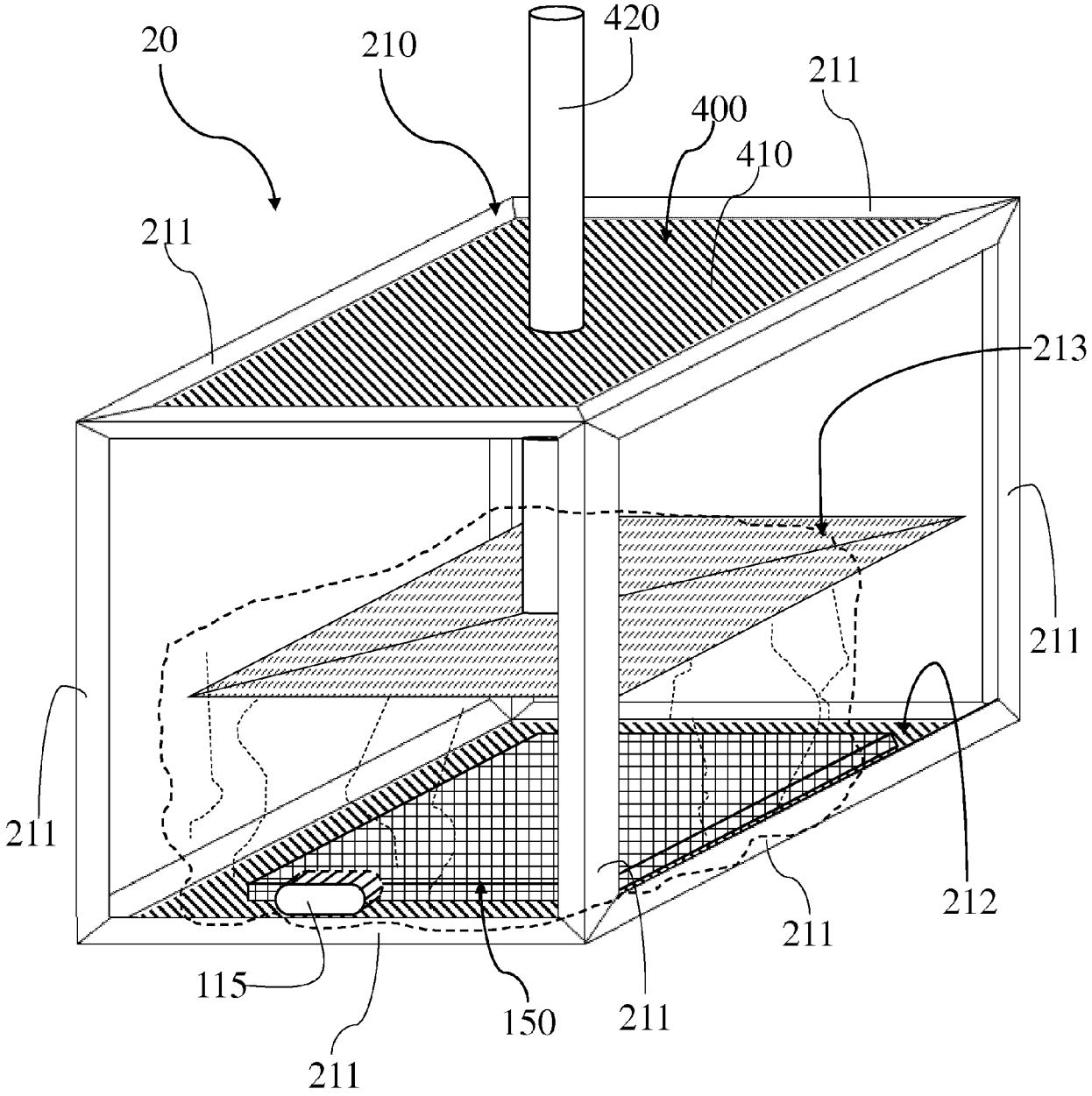

FIG. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 19 16 9612

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 38 53 527 T2 (SONOCO LTD [GB]) 21 December 1995 (1995-12-21) * page 5, line 21 - page 10, line 2; figures 1-6 *	1-10	INV. B65D77/06 B65D83/00
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A	DE 82 14 181 U1 (BAUSER PAUL HEINZ [DE]) 26 August 1982 (1982-08-26) * page 7, line 7 - page 12, line 13; figures 1,2 *	1-10	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	17 July 2019	Lämmel, Gunnar

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 19 16 9612

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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17-07-2019

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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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