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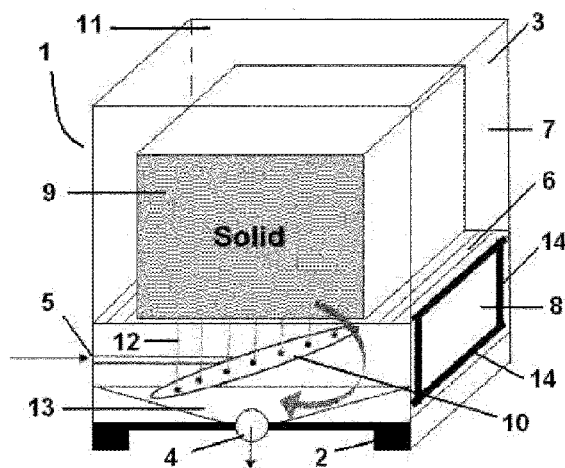


Fig. 1

- (57) Abstract:** The present invention refers to a pallet container (1) and a dispenser comprising a forklift pallet base (2), a container of a synthetic resin (3) comprising an upper opening (11), a lid for closing the upper opening, a lower outlet (4) and a water inlet (5), wherein a grid (6) is arranged within the container defining an upper cavity (7) and a lower cavity (8) within the container; wherein said grid is configured and intended to support one or more solid block(s) of chemical (9); spray means (10) are arranged in the container and are fluidly connected to the water inlet. The present invention further refers to a method of dispensing an aqueous washing or cleaning composition from a container comprising one or more solid block(s) of chemical (9) of a cleaning or washing composition, comprising the steps of: a) placing the solid block(s) of chemical onto the grid (6) arranged in the container of a pallet container (1) or of a dispenser as described; b) spraying water from the spray means (10) at the exposed surface of the solid block(s) of chemical (9) for dissolving the washing or cleaning composition and forming the aqueous washing or cleaning composition; c) directing the aqueous washing or cleaning composition through the outlet (4) of the pallet container (1) to the point of use.

IBC-LIKE SOLID DISPENSING SYSTEM FOR INDUSTRIAL SCALE APPLICATION AND METHOD FOR
DISPENSING AN AQUEOUS WASHING OR CLEANING COMPOSITION

Technical field of the invention

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The present invention relates generally to the dispensing of solid water soluble compositions used in cleaning processes. More specifically, the invention relates to the dispensing of a concentrated cleaning solution from a solid block of a cleaning composition. Typically, the concentrated cleaning solution is created by contacting
10 the solid cleaning composition with a dissolving liquid. Cleaning compositions include compounds such as detergents, rinse aids, and the like employed in cleaning fabrics and hard surfaces. In particular, the present invention refers to a strongly up-scaled dispenser for solid block(s) of a chemical, wherein an aqueous washing or cleaning composition is formed and dispensed.

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Background of the invention

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Containers for storage and shipment are well known in the art. The acronym IBS is used for designating an intermediate bulk container, which is basically a container
20 used for transporting and storing bulk fluid products. The most common container type is that formed by a high density polyethylene bag with outer steel tube reinforcement. The conventional capacity of such tanks ranges from 400 to 1000 liters according to the intended industrial use of the fluid or the nature thereof. For example, the documents US 4,909,387, US 4,947,988 and US 5,678,688 describe
25 pallet containers of the state of art for transport and storage of liquids are known, said containers having a flat pallet, an interchangeable inner container of plastic with upper, sealable fill opening and lower drain means as well as an outer jacket which surrounds the inner container and which consists of vertical and horizontal lattice bars of metal, which support the liquid-filled plastic inner container. The lattice rods
30 which are made as pipes may be indented at the intersections for formation of cavity-shaped, double-walled depressions which run in the longitudinal direction of the lattice rods such that at each intersection between the longitudinal edges of the

depressions of two lattice rods which lie at right angles on top of one another four contact points are formed with one material accumulation each which corresponds to four times the thickness of the lattice rod wall, and the four contact points of the two lattice rods are welded to one another at the intersections. Those IBC containers of the state of art are used for storage and shipment. Until present, no such containers were described to have means for dispensing a concentrated or application solution of a chemical from a solid.

Automated institutional and industrial ware-washing machines are generally configured with one wash tank for maintaining a readily available supply of a cleaning solution for use in the machine. During normal usage, at least a portion of, or all of, the used cleaning solution is discarded in order to keep the cleaning solution as clean as possible. Fresh water or other clean recycled water can be added to the wash tank to maintain an appropriate liquid level, thereby diluting the concentration of detergent in the solution. To obtain a cleaning solution at the most efficient cleaning concentration, a measured amount of a concentrated aqueous detergent solution can be periodically added to the reservoir by an auxiliary detergent dispenser where it is mixed with the fresh or recycled rinse water to form a cleaning solution of the desired strength.

A number of different techniques have been developed and used for converting a solid wash chemical into a concentrated wash chemical or application solution. The majority of such devices have been designed to convert solid detergent from its "powdered" form. See for example US 3,595,438, US 4,020,865, US 4,063,663. For this reason wash chemical dispensers will be discussed with respect to the dispensing of detergents.

One detergent dispenser technique for converting powdered detergent, is the so-called "water-in-reservoir" type. In the water-in-reservoir dispenser, the powdered detergent is completely submerged in an aqueous solution. A stand-pipe, usually located near the center of the dispenser tank, maintains a constant water/solution level within the dispenser tank. As water is added to the dispenser tank, a

concentrated, often saturated detergent solution or slurry is formed by the swirling action or agitation of the powdered detergent by the injected water.

Another technique for converting a powdered detergent into a concentrated detergent or application solution, involves the technique of placing the powdered detergent over the convex side of a conical or hemispherical screen having a mesh size smaller than the powdered detergent particles supported thereby. The powdered detergent which directly overlies the support screen is dissolved as needed, by a fine mist or spray of water from a nozzle disposed below and on the concave side of the screen. The concentrated detergent solution formed by the action of the water falls by gravity into an underling reservoir, or is directed by a conduit to the wash tank of the washing apparatus.

A number of different techniques have been developed and used for converting solid chemicals used in cleaning processes into a concentrated solution. For example, devices designed for a powdered, flaked or granular detergent are disclosed in US 3,595,438, US 4,020,865 and US 4,063,663. Another form of solid detergent is the pre-shaped detergent briquette. Dispensing systems for dissolving detergent briquettes are known in the art. See, for example, US 2,382,163, US 2,382,164, US 2,382,165 and US 2,412,819.

A more recent form of solid detergent is the "cast" or block form. The detergent block may comprise a detergent cast within a mold or container or a detergent block which is free-standing. Dispensing systems for these solids are known in the art. See, for example, US 4,426,362, US 4,569,781 and US 4,569,780. The cast detergent is dispensed by spraying a solvent onto the detergent block within the container, thereby dissolving the exposed surface of the detergent to form a concentrated working solution. The formed solution, which may be a concentrated solution, an application solution or a pre-application solution, falls into a reservoir or is directed by a conduit to the wash tank of a washing apparatus. When the chemical compound within the container is completely utilized, the exhausted container may be simply discarded and a fully charged container may be placed in the dispenser.

Solid, cast chemicals used in cleaning processes are preferably cast in a sturdy container which can act as a mold, a shipping and storage container, and a dispenser housing. The cast chemical may be dispensed by inverting the container over a spray nozzle and impinging solvent directly onto the exposed surface or surfaces of the chemical contained therein. The container may either be retained within the dispenser as the chemical is being used, or the chemical may be removed from the container and placed into the dispenser. However, hazardous chemicals used in cleaning processes such as highly alkaline detergents are preferably packaged such that they can be dispensed without coming into physical contact with the human body.

Known dispensing devices have sought to maintain a relatively constant rate of the chemical being dispensed, or a constant concentration, by maintaining a fixed distance between the dissolving spray nozzle and the exposed and erodible surface of the solid block of chemical. See, for example, US 4,687,121, US 4,690,305 and US 4,826,661. Alternatively, a separate control system has regulated the amount of detergent dispensed and has maintained a constant concentration, thereby making it unnecessary to control the nozzle-to-eroding surface distance.

The dispenser of the state of art as described above have a maximum load of below 5 kg of blocks of chemicals. However, for membrane cleaning, for example in dairy, for cleaning in place (CIP), for textile care, for water treatment and for other applications huge volumes of application solution are required. The small scale dispensers of the prior art can not provide such large volumes of cleaning solution. Therefore, up-scaled dispensers are required in order to provide such large volumes of cleaning solution. Further, presently the cleaning solution is provided as liquid concentrate. Liquid concentrate products are disadvantageous because they involve comparable higher transport costs, higher amounts of packaging material, are more hazardous, need more storage space and are less stable than compared to solid products.

Therefore, the object of the present invention was to provide an up-scaled dispensing apparatus which can simply, safely, efficiently and inexpensively

dispense a homogeneous, uniform, concentrated solution or application solution of a washing or cleaning chemical from a solid block of cleaning or wash chemical at relatively constant concentrations. The object of the present invention also was to provide a dispensing apparatus which may be used to transport and ship the chemical.

Summary

The present invention therefore provides a pallet container comprising a forklift pallet base, a container of a synthetic resin comprising an upper opening, a lid for closing the upper opening, a lower outlet and a water inlet, characterized in that

- a grid is arranged within the container defining an upper cavity and a lower cavity within the container; wherein said grid is configured and intended to support one or more solid block(s) of chemical;
- spray means are arranged in the container and are fluidly connected to the water inlet.

The present invention also provides a dispenser for one or more solid block(s) of a chemical, wherein an aqueous washing or cleaning composition is formed and dispensed, which dispenser comprises a pallet container comprising a forklift pallet base, a container of a synthetic resin comprising an upper opening, a lid for closing the upper opening, a lower outlet and a water inlet, characterized in that

- a grid is arranged within the container defining an upper cavity and a lower cavity within the container; wherein said grid is configured and intended to support one or more solid block(s) of chemical;
- spray means are arranged in the container and are fluidly connected to the water inlet.

The pallet container and dispenser according to the present invention can be used to dispense a concentrated solution or application solution of a washing or cleaning chemical from one or more solid block(s) of cleaning or wash chemical. The term "concentrated solution" as used herein also comprises a pre-application solution which does not have the exact concentration for use as application solution. The pre-

application solution is diluted to a final concentration of an application solution after being dispensed from the pallet container and dispenser according to the present invention using a sensor-controlled system, wherein a sensor detects the concentration of the dispensed concentrated or pre-applications solution and a control circuit is controls further dilution of this concentrated or pre-applications solution with water if and as required.

The pallet container and dispenser according to the present invention provide a much higher minimum loading capacity of at least 20 kg of blocks of chemicals. With the devices of the present invention much higher volumes of cleaning solution can be provided compared to conventional dispensers of the prior art. Further, the solid block products of chemical are advantageous as they are more sustainable compared to liquid products. They have lower transport costs due to the concentrated forms and less packaging material. Solid block products have recyclable (ApexTM) or reusable (IBC container) containers and fewer return cycles as for liquid products. They are less hazardous because of the lower reaction potential of solids and there is no danger of leakage during transportation compared to liquid concentrated products. Solid products need less storage space and are more stable, in particular in respect to enzymes, oxidizers and surfactants, than compared to liquid products. Further, no concentrated liquids are run through the customer's facility pipes.

The pallet container and dispenser is loaded with solid block(s) of chemical. As solid block(s) of chemical a solid block of a wash composition or of a cleaning composition may be used. In particular, the solid block of chemical is a solid block of a cleaning composition. As solid block(s) of chemical cast or pressed solid blocks, or blocks of pressed or compacted powder, briquettes, megapearls of gelled or solidified liquids, encapsulated liquids or solids may be used. The pallet container and dispenser may be loaded with one or more blocks of chemical, in particular 4 x 250 kg solid blocks of chemical.

The spray means are fluidly connected to the water inlet. The water inlet of the pallet container is configured and intended for fluid connection to a water pipe or a water

hose. In operation the spray means are supplied with pressurized source of water by means of a water supply line via the water inlet of the pallet container.

In a preferred embodiment of the present invention the spray means are configured to spray water at the one or more solid block(s) of chemical when in operation. In one preferred embodiment the said spray means are arranged in the upper cavity. If water flow is directed through the supply line and the nozzle of the spray means onto the one or more solid block(s) of chemical some of the solid chemical is eroded and dissolved from the one or more block(s) which then flows to the bottom part of the container and is directed by the underlying collector portion of the container to the outlet thereof and through the conduit to its utilization point.

In another preferred embodiment said spray means are arranged in the lower cavity. In operation, water flow is directed through the supply line and the nozzle of the spray means and into engagement with substantially the entire lower surface of the grid or support screen. The dissolved chemical passes in solution through the grid or support screen and is directed by the underlying collector portion of the container to the outlet thereof and through the conduit to its utilization point.

As spray means any type of spray means may be used known in the prior art. The pallet container and dispenser may comprise one or more spray nozzles intended for spraying water at the solid block(s) of chemical in order to dissolve the solid blocks. In a preferred embodiment said spray means are rotating spray means, in particular rotating spray means comprising one or more spray arms. Such rotating spray means are typically known from (household) dishwashers. The advantage of the use of rotating spray means in the pallet container or dispenser of the present invention is the even distribution of the spray over the surface of the solid block(s) of chemical.

In a further preferred embodiment of the pallet container according to the present invention, the minimum loading capacity of the container is 20 kg of solid blocks of chemical, preferably at least 50 kg, more preferably at least 100 kg, further preferred at least 250 kg, more preferably at least 400 kg, still further preferred at least 500 kg,

even more preferred at least 750 kg, further preferred at least 1000 kg, still further preferred at least 1500 kg, preferably up to 2000 kg.

The pallet container and dispenser according to the present invention provide a much higher minimum loading capacity compared to the prior art devices. With the devices of the present invention much higher volumes of cleaning solution can be provided compared to conventional dispensers of the prior art. With the pallet container and dispenser of the present invention much larger volumes of liquid wash or cleaning concentrates can be prepared compared to the state of art dispensers.

Therefore it is possible to use the system of the present invention for the provision of large volumes of a concentrated solution or application solution of a wash or cleaning chemical for cleaning in place (CIP) e.g. in industrial application as in the food and beverage industries, for example membrane cleaning in dairy, for textile care, for water treatment and for other applications. A further advantage is that with the use of the system of the present invention lower transport costs and less packaging material is involved, and less storage space is required compared to liquid products.

In one embodiment the grid is arranged on and supported by an internal flange or internal projection formed on the inner wall of the side walls of the container. In an alternative preferred embodiment said grid is integral to a support structure, said support structure being an element separate from the container and arranged within the container. The support structure including the grid is an independent insert to be placed within the container. The support structure comprises besides said grid, legs and strut members extending downward from the grid for stably holding and securing the grid. The support structure including the grid is introduced into the container and is housed in the lower cavity of the container.

In another preferred embodiment the grid comprises a recess for holding and housing the one or more solid block(s) of chemical.

In a still further preferred embodiment the support structure further comprises a cage portion extending upwardly from the grid, said cage portion comprising side wall elements and optionally a top wall element, said cage portion is configured and

intended for holding and housing the one or more solid block(s) of chemical. The advantage of such cage portion is that the solid block(s) of chemicals is/are secured and that in case of a fall-over of the container the solid block(s) do not damage the walls of the container.

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In a particularly preferred embodiment of the pallet container said cage portion comprises spacer elements extending from the cage portion to the inner wall of said container for stabilizing the cage portion within the container, said spacer elements preferably being in contact with the inner wall of said container. The advantage of such spacer elements are that the cage portion is stabilized within the container and the solid block(s) of chemical is/are secured in case of fall-over of the container.

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The grid and the support structure including the grid and optionally a cage portion and optionally spacer elements as described above preferably are made of chemical resistant material, preferably a chemical resistant metal, which are also configured to resist forces of up to 1 t or even up to 1.5 t weight.

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Further preferred, the container comprises an indicator for indicating the filling height. In another preferred embodiment the container comprises a sensor for detecting the filling height.

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In a further preferred embodiment said container comprises a vent. In a still further preferred embodiment the vent is arranged in the upper lid. In a particularly preferred embodiment the pallet container comprises a vent having a degassing seal. The degassing seal comprises gas permeable membrane that selectively allows gas to flow through without allowing liquid to pass through. In an embodiment, the membrane is made from a material that is inert. Gas permeable membranes may be made from Teflon®, silicone and other gas permeable material. The membranes have hydrophobic and preferably also oleophobic properties and provide chemical stability and ventilation properties.

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As described above, the pallet container has an upper lid, which preferably is a snap-on type lid, for sealing the container in closed position. The lid preferably is made of

the same material as that of the container of a synthetic resin. The lid is for closing and preferably locking the upper opening of the container. The upper opening is defined by the rim of the side walls of the container. In a preferred embodiment the snap-on type lid has the following features: the lid comprises a circumferential
5 groove having a chemical resistant seal for sealing the container in closed position. Further, the lid comprises snap elements comprising an internal snap-edge which snap-edge in position is facing the outer surface of the side walls of the container. The snap elements comprise a recess which in position house an external snap-edge arranged on the outer surface of the side wall of the container in proximity to
10 the rim of the side walls. For closing the container the rim of the side walls of the container forming the upper opening is inserted into the circumferential groove of the lid and the snap-edge of the snap elements engage with the snap-edge (external snap-edge) of the side wall of the container. The lid comprises at least one snap element on each of the four sides for engagement with the respective snap-edges
15 arranged on the outer surface of the side walls of the container. Further preferred, additional locking means are comprised in order to lock and secure the lid on the container. The locking means can be closed and opened by using the corresponding key only, in order to avoid unauthorized access to the inner of the container. In addition, the inlet and/or the outlet may be closed or sealed, preferably by a cover,
20 cap, lid or plug.

In a further preferred embodiment the pallet container of the present invention further comprises an outer housing, said outer housing comprising vertical and horizontal rigid metal lattice bars having inner surfaces in contact with an outer wall of said
25 inner container. In this embodiment said container of a synthetic resin is an exchangeable inner container arranged within an outer housing. In this preferred embodiment said outer housing is comprising vertical and horizontal rigid metal lattice bars, which in particular have inner surfaces in contact with an outer wall of said inner container. The outer housing which comprises vertical and horizontal rigid
30 metal lattice bars protect the (inner) container and provides the possibility to stack the pallet containers. In this embodiment, wherein the pallet container comprises an outer housing said outer housing comprises means for opening the outer housing in

order to get access to the lid or door of the internal container for maintenance, cleaning and re-filling the container with solid block(s) of chemical.

In on preferred embodiment the said forklift pallet base is integral with the container of a synthetic resin. In an alternative preferred embodiment the said forklift pallet base is fixed to the outer housing.

In a particularly preferred embodiment of the pallet container and dispenser the container comprises more than one, preferably two, three or four compartments within the container of a synthetic resin, each compartment being equipped a lower outlet, a water inlet, a grid arranged within the compartment defining an upper cavity and a lower cavity of the respective compartment, wherein each grid is configured and intended to support one or more solid block(s) of chemical; and spray means, wherein each spray means is fluidly connected to the respective water inlet. This particularly preferred embodiment allows to dispense different concentrated solutions or application solutions of a washing or cleaning chemical from solid block(s) of cleaning or wash chemical different from each other. This is achieved by the provision of separate compartments within the container, wherein each compartment is equipped with own means allowing dissolving solid block(s) of chemical and dispensing concentrated solutions or application solutions, namely each compartment is equipped with a water inlet, a lower outlet, a grid and spray means. The different compartments of a pallet container and dispenser of the present invention may be loaded independently from each other, and also the forming of concentrated solutions and application solutions may be prepared within each compartment independently from each other.

The present invention also provides a method of dispensing an aqueous washing or cleaning composition from a container comprising one or more solid block(s) of chemical of a cleaning or washing composition, comprising the steps of:

- a) placing the solid block(s) of chemical onto the grid arranged in the container of a pallet container or dispenser comprising:
 - a forklift pallet base, a container of a synthetic resin comprising an upper opening, a lid for closing the upper opening, a lower outlet and a water inlet;

- a grid arranged within the container defining an upper cavity and a lower cavity within the container; wherein said grid is configured and intended to support one or more solid block(s) of chemical;

- spray means arranged in the container and are fluidly connected to the water inlet;

b) spraying water from the spray means at the exposed surface of the solid block(s) of chemical for dissolving the washing or cleaning composition and forming the aqueous washing or cleaning composition;

c) directing the aqueous washing or cleaning composition through the outlet of the pallet container to the point of use.

The method according to the present invention is used to dispense a concentrated solution or application solution of a washing or cleaning chemical from one or more solid block(s) of cleaning or wash chemical. Said concentrated solution may be provided as pre-application solution which does not have the exact concentration for use as application solution. After dispensing from the pallet container and dispenser according to the present invention the pre-application solution is further diluted to a final concentration of an application solution by using a sensor-controlled system, wherein a sensor detects the concentration of the dispensed concentrated or pre-applications solution and a control circuit is controls further dilution of this concentrated or pre-applications solution with water if and as required.

Alternatively, the method according to the present invention may provide an application solution of a washing or cleaning chemical ready-to-use when dispensed from the pallet container and dispenser of the present invention. The application solution which is ready for use has the exact concentration as desired. The preparation of the application solution ready-for-use may for example be achieved by controlling the pressure of the spray nozzles of the spray means.

In step b) of the method of the present invention by spraying water from the spray means at the exposed surface of the solid block(s) of chemical at least a part of the solid block(s) of chemical is dissolved and an aqueous washing or cleaning composition is formed as an application solution or a higher concentrated pre-

application solution which then is diluted with water to obtain the desired concentration, wherein said dilution step is carried out by a sensor-controlled system.

The solid block of chemical may be a solid block of a wash composition or of a cleaning composition. In the preferred method the solid block of chemical is a solid block of a cleaning composition. As solid blocks of chemical cast or pressed solid blocks, or blocks of pressed or compacted powder, briquettes, megapearls of gelled or solidified liquids, encapsulated liquids or solids may be used.

In a preferred method, one or more blocks of chemical, in particular 4 x 250 kg solid blocks of chemical are loaded into the pallet container or dispenser in step a).

In a particularly preferred method of the present invention more than one, preferably two, three or four different concentrated solution or application solutions are prepared independently from each other by using a pallet container or dispenser having the corresponding number of compartments within the container of a synthetic resin, each compartment being equipped a lower outlet, a water inlet, a grid arranged within the compartment defining an upper cavity and a lower cavity of the respective compartment, wherein each grid is configured and intended to support one or more solid block(s) of chemical; spray means, wherein each spray means is fluidly connected to the respective water inlet, and each compartment loaded with solid block(s) of chemical.

This particularly preferred method allows to dispense different concentrated solutions or application solutions of a washing or cleaning chemical from solid block(s) of cleaning or wash chemical different from each other. This is achieved by the use of a container having separate compartments, wherein each compartment is equipped with own means allowing dissolving solid block(s) of chemical and dispensing concentrated solutions or application solutions, namely each compartment is equipped with a water inlet, a lower outlet, a grid and spray means. The different compartments of a pallet container and dispenser of the present invention may be loaded independently from each other, and also the forming of concentrated

solutions and application solutions may be prepared within each compartment independently from each other, preferably sensor-controlled.

Detailed description of the invention

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The present invention provides a pallet container and dispenser comprising a forklift pallet base, a container of a synthetic resin comprising an upper opening, a lid for closing the upper opening, a lower outlet and a water inlet, wherein a grid is arranged within the container defining an upper cavity and a lower cavity within the container; wherein said grid is configured and intended to support one or more solid block(s) of chemical; and further wherein spray means are arranged in the container and are fluidly connected to the water inlet.

The container of a synthetic resin forms a housing that includes an upper storage portion for retainably holding solid blocks of chemical. The container preferably is made of high-density polyethylene (HDPE). HDPE is defined by a density of greater or equal to 0.941 g/cm^3 . HDPE has a low degree of branching and thus low intermolecular forces and tensile strength.

The container also defines an upper opening forming an upwardly disposed access port through which solid block(s) of chemical is/are loaded into the container. The upper opening is normally covered by a lid mounted on the container. The bottom of the container may preferably be configured in a collector portion that is downwardly converging to the lower outlet or outlet port. A conduit may be connected to the outlet of the container for directing the chemical solution therethrough by means of gravity feed from the collector portion of the container to its utilization point.

A flat generally horizontal continuous grid or support screen is arranged in the container at a position therealong defining the intersection of the upper cavity or storage portion and the lower cavity or lower collector portion of the container. The grid preferably is made of chemical resistant material, preferably a chemical resistant metal, which also must resist force of up to 1 t or even up to 1.5 t weight. The grid preferably is a metal grid.

The grid mesh size supports the solid block(s) of chemical. The mesh size will typically will be about 1 to about 3 cm. In an embodiment wherein the spray means are arranged within the lower cavity of the container, the grid mesh size will not significantly impede access of a water spray onto the lower face of the solid block(s) of chemical. Spray forming means preferably are axially mounted within the lower cavity of the container, i.e. in the collector portion of the housing.

The water inlet of the pallet container is configured and intended for fluid connection to a water pipe or a water hose. In operation the spray means are connected to a pressurized source of water by means of a water supply line via the water inlet of the pallet container. Spray control means including a valve in the water supply line controls the flow of water to the spray-forming nozzle. In operation, the valve normally blocks water flow to the nozzle and is operative in its open position only upon receipt of an external control signal. Upon receipt of such a control signal, water flow is directed through the supply line and the nozzle onto the surface of the solid block(s) of chemical. The dissolved chemical passes in solution through the grid (or support screen) and is directed by the underlying collector portion of the container to the outlet thereof and through the conduit to its utilization point.

Optionally, a lower screen having smaller mesh size of preferably 0.2 to 0.6 cm can be placed in the collector portion of the container upstream of the outlet to catch any undissolved chunks of chemical small enough to pass through the grid or support screen. This prevents small chunks of chemical collecting in the outlet or the conduit connected thereto and blocking the flow of concentrated chemical solution out of the container or dispenser.

As used herein, the term "utilization point", when used in combination with chemical solution, refers to the place where the solution is used such as a wash tank, a rinse spray nozzle, etc.

As used herein, the term "cleaning chemical" refers to those chemical compounds or chemical mixtures commonly added to aqueous liquids for cleaning of hard surfaces, membranes etc. Such wash chemicals include detergents, disinfectants, etc.

5 As used herein, the term "wash chemical" refers to those chemical compounds or chemical mixtures commonly added to aqueous liquids present in machine washing units to aid in the cleaning and rinsing of fabrics and wares. Such wash chemicals include detergents, softeners, bleaches, rinse aids, etc.

10 The present invention will be described in further detail in respect to the figures. The figures and their description are not intended to limit the scope of the present invention in any way.

Figure 1 shows a schematic drawing of the pallet container and dispenser of the
15 present invention.

Figure 2 shows a schematic drawing of the support structure for supporting and holding the solid block(s) of chemical.

20 **Figure 3** shows a schematic drawing of the support structure, the grid and the cage portion for supporting and holding the solid block(s) of chemical.

Figure 4 shows a detail of the pallet container and the lid.

25 **Figure 1** shows a pallet container 1 and dispenser 1 comprising a forklift pallet base 2, a container of a synthetic resin 3 comprising an upper opening 11, a lid 19 (not shown in Figure 1) for closing the upper opening 11, a lower outlet 4 and a water inlet 5. The pallet container 1 comprises a grid 6 which is arranged within the container 3. Said grid 6 is defining an upper cavity 7 and a lower cavity 8 within the
30 container 3. The grid 6 is intended to hold and support one or more solid block(s) of chemical 9.

The pallet container and dispenser 1 typically have a loading capacity of about 500 to 1500 kg of block(s) of chemicals 9. The container of a synthetic resin 3 represents a housing that defines an upper opening or access port 11 through which solid block(s) of chemical 9 is/are loaded into the container 3. The upper opening or access port 11 as shown in the figure may be covered by a lid or a door (shown in Figure 4) mounted on the container 3. As shown in figure 1 the bottom of the container 3 forms a collector portion 13 which downwardly converges to the lower outlet 4 or outlet port. A conduit may be connected to the outlet 4 of the container 3 for directing the chemical solution therethrough (arrow) by means of gravity feed from the collector portion 13 of the container to its utilization point.

The container 3 comprises spray means 10, which are in fluid connection with the water inlet 5. As shown in Figure 3, the spray means 10 in the embodiment shown is a rotating spray means 10 mounted in the collector portion 13 of the housing 3. Such rotating spray means 10 are typically known from household dishwashers. In operation the spray means 10 are connected to a pressurized source of water by means of a water supply line via the water inlet 5 of the pallet container 3. In operation a water flow 12 is directed through the supply line, the water inlet and the nozzle of the spray means 10 onto the surface of the solid block(s) of chemical 9. The dissolved chemical passes through the grid 6 and is directed by the underlying collector portion 13 of the container 3 to the outlet 4 thereof and through the conduit to its utilization point.

The pallet container 1 may be arranged in that the container of a synthetic resin 3 represents an exchangeable inner container which is arranged within an outer housing (not shown). The outer housing comprises vertical and horizontal rigid metal lattice bars. If the pallet container 1 comprises an outer housing then means are comprised for opening the outer housing in order to get access to the lid 19 or door of the internal container 3 for maintenance, cleaning and re-filling the container with solid block(s) of chemical 9.

Figure 2 shows the support structure 14 comprising the grid 6 which is integral with the support structure 14. The support structure 14 further comprises legs 15 and

strut members 16 extending downward from the grid 6 for stably holding and securing the grid 6. The support structure 14 including the grid 6 represents an insert which is introduced into the container 3 and is housed in the lower cavity 8 of the container 3.

5

Figure 3 shows a schematic drawing of another embodiment of the support structure 14, including the grid 6 and a cage portion 17 for supporting and holding the solid block(s) of chemical (not shown in Figure 3). The support structure 14 comprises legs 15 and strut members 16 extending downward from the grid 6 for stably holding and securing the grid. In addition, the support structure 14 comprises a cage portion 17 extending upwardly from the grid 6, said cage portion 17 comprising side wall elements 18 and optionally a top wall element (not shown). The cage portion 17 is configured and intended for holding and housing the one or more solid block(s) of chemical 9. The support structure 14 including the grid 6 and cage portion 17 represents an insert which is introduced into the container 3 and is housed in the container 3. The cage portion 17 further may comprise spacer elements (not shown) extending from the cage portion 17 to the inner wall of said container 3 for stabilizing the cage portion 17 within the container 3. The dimensions of the spacer elements are preferably determined in that way that the terminal points, edges or surfaces of the spacer elements opposed to the cage portion 17 are in contact with the inner wall of said container 3.

Figure 4 shows a detail of the pallet container 1 and the lid 19. The lid is for closing and optionally locking the upper opening 11 of the container. The upper opening 11 is defined by the rim 26 of the side walls 27 of the container 3. The upper lid 19 is a snap-on type lid and comprises a circumferential groove 20 having a chemical resistant seal 21. The lid 19 further comprises snap elements 22 comprising an internal snap-edge 23. In position the snap-edge 23 is directed to the outer surface of the side walls 27 of the container 3. The snap elements 22 comprise a recess 24 which in position house an external snap-edge 25 arranged on the outer surface of the side wall 27 of the container 3. When closing the container 3 the upper edges of the rim 26 of the side walls 27 defining the upper opening 11 of the container 3 are

inserted into the circumferential groove 20 of the lid 19. The snap-edge 23 of the snap elements 22 engages with the external snap-edge 25 of the side wall 27 of the container 3. The lid 19 comprises at least one snap element 22 on each of the four sides of the container 3 for engagement with the respective snap-edges 25 arranged
5 on the outer surface of the side walls 27 of the container.

Reference list

- 1 pallet container
2 forklift pallet base
5 3 container of a synthetic resin
4 outlet
5 inlet
6 grid
7 upper cavity
10 8 lower cavity
9 block(s) of chemical
10 spray means
11 upper opening
12 water flow/water spray
15 13 collector portion
14 support structure
15 leg
16 strut member
17 cage portion
20 18 side wall member (of cage portion)
19 lid
20 groove
21 seal
22 snap element
25 23 internal snap-edge (of the snap element of the lid)
24 recess
25 external snap-edge (of the side walls of the container)
26 rim
27 side walls (of container)

30

Claims

1. A pallet container (1) comprising a forklift pallet base (2), a container (3) of a synthetic resin comprising an upper opening (11), a lid (19) for closing the upper opening (11), a lower outlet (4) and a water inlet (5), characterized in that
- 5 a grid (6) is arranged within the container defining an upper cavity (7) and a lower cavity (8) within the container (3); wherein said grid (6) is configured and intended to support one or more solid block(s) of chemical (9);
- 10 - spray means (10) are arranged in the container (3) and are fluidly connected to the water inlet (5).
2. The pallet container (1) according to claim 1, wherein said spray means (10) are configured to spray water at the solid block(s) of chemical (9) when in operation.
- 15 3. The pallet container (1) according to claim 1 or 2, wherein said spray means are arranged in the upper cavity.
4. The pallet container (1) according to claim 1 or 2, wherein said spray means are arranged in the lower cavity.
- 20 5. The pallet container (1) according to any one of claims 1 to 4, wherein said spray means (10) are rotating spray means, in particular rotating spray means comprising one or more spray arms.
- 25 6. The pallet container (1) according to any one of claims 1 to 5, wherein said water inlet (5) is configured and intended for fluid connection to a water pipe or a water hose.
- 30 7. The pallet container (1) according to any one of claims 1 to 6, wherein the minimum loading capacity of the container is 20 kg, preferably at least 50 kg of solid block(s) of chemical, more preferably at least 100 kg, further preferred at least 250 kg, more preferably at least 400 kg, still further preferred at least 500 kg, even more

preferred at least 750 kg, further preferred at least 1000 kg, still further preferred at least 1500 kg.

8. The pallet container (1) according to any one of claims 1 to 7, wherein said
5 grid (6) is integral to a support structure (14) arranged within the container (3), said support structure (14) comprises in addition to said grid (6), legs (15) and strut members (16) extending downward from the grid (6) for stably holding and securing the grid (6).

10 9. The pallet container (1) according to any one of claims 1 to 8, wherein said grid (6) arranged within the container (3) comprises a recess for holding and housing the one or more solid block(s) of chemical (9).

15 10. The pallet container (1) according claim 8 or 9, wherein said support structure (14) further comprises a cage portion (17) extending upwardly from the grid (6), said cage portion (17) comprising side wall elements (18) and optionally a top wall element, said cage portion (17) is configured and intended for holding and housing the one or more solid block(s) of chemical (9).

20 11. The pallet container (1) according to claim 10, wherein said cage portion (17) comprises spacer extending from the cage portion (17) to the inner wall of said container (3) for stabilizing the cage portion (17) within the container (3), said spacer preferably being in contact with the inner wall of said container (3).

25 12. The pallet container (1) according to any one of claims 1 to 11, wherein the container (3) comprises an indicator for indicating the filling height or a sensor for detecting the filling height.

30 13. The pallet container (1) according to any one of claims 1 to 12, wherein said container (3) comprises a vent.

14. The pallet container (1) according to claim 13, wherein said vent is arranged in the upper lid (19).

15. The pallet container (1) according to claim 13 or 14, wherein said vent comprises a degassing seal.

5 16. The pallet container (1) according to any one of claims 1 to 15, wherein said lid (19) is a snap-on type lid.

17. The pallet container (1) according to any one of claims 1 to 16, further comprising an outer housing, said outer housing comprising vertical and horizontal
10 rigid metal lattice bars having inner surfaces in contact with an outer wall of said inner container (3).

18. The pallet container (1) according to any one of claims 1 to 16, wherein said forklift pallet base (2) is integral with the container of a synthetic resin.

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19. The pallet container (1) according to claim 17, wherein said forklift pallet base (2) is fixed to the outer housing.

20. The pallet container (1) according to any one of claims 1 to 19, comprising
20 more than one, preferably two, three or four compartments within the container (3) of a synthetic resin, each compartment being equipped a lower outlet (4), a water inlet (5), a grid (6) arranged within the compartment defining an upper cavity (7) and a lower cavity (8) of the respective compartment, wherein each grid (6) is configured and intended to support one or more solid block(s) of chemical (9); and spray means
25 (10), wherein each spray means is fluidly connected to the respective water inlet (5).

21. A dispenser (1) for one or more solid block(s) of a chemical (9), wherein an aqueous washing or cleaning composition is formed and dispensed, which dispenser comprises a pallet container comprising a forklift pallet base (2), a container (3) of a
30 synthetic resin comprising an upper opening (11), a lid (19) for closing the upper opening, a lower outlet (4) and a water inlet (5), characterized in that

- a grid (6) is arranged within the container (3) defining an upper cavity (7) and a lower cavity (8) within the container (3); wherein said grid (6) is configured and intended to support one or more solid block(s) of chemical (9);
- spray means (10) are arranged in the container (3) and are fluidly connected to the water inlet (5).

22. A method of dispensing an aqueous washing or cleaning composition from a container (1) comprising one or more solid block(s) of chemical (9) of a cleaning or washing composition, comprising the steps of:

- a) placing the solid block(s) of chemical (9) onto the grid (6) arranged in the container (3) of a pallet container (1) according to any one of claims 1 to 19 or of a dispenser (1) according to claim 20;
- b) spraying water from the spray means (20) at the exposed surface of the solid block(s) of chemical (9) for dissolving the washing or cleaning composition and forming the aqueous washing or cleaning composition;
- c) directing the aqueous washing or cleaning composition through the outlet (4) of the pallet container to the point of use.

23. The method according to claim 22, wherein in step b) at least a part of the solid block(s) of chemical is dissolved and an aqueous washing or cleaning composition is formed as an application solution or a higher concentrated pre-application solution which then is diluted with water to obtain the desired concentration, wherein said dilution step is carried out by a sensor-controlled system.

24. The method according to claim 22 or claim 23, wherein the solid block(s) of chemical (9) is/are solid block(s) of a cleaning composition.

25. The method according to any one of claims 22 to 24, wherein more than one, preferably two, three or four different concentrated solution or application solutions are prepared independently from each other by using a pallet container or dispenser having the corresponding number of compartments within the container of a synthetic resin, each compartment being equipped a lower outlet, a water inlet, a grid arranged within the compartment defining an upper cavity and a lower cavity of the

respective compartment, wherein each grid is configured and intended to support one or more solid block(s) of chemical; spray means, wherein each spray means is fluidly connected to the respective water inlet, and each compartment loaded with solid block(s) of chemical.

5

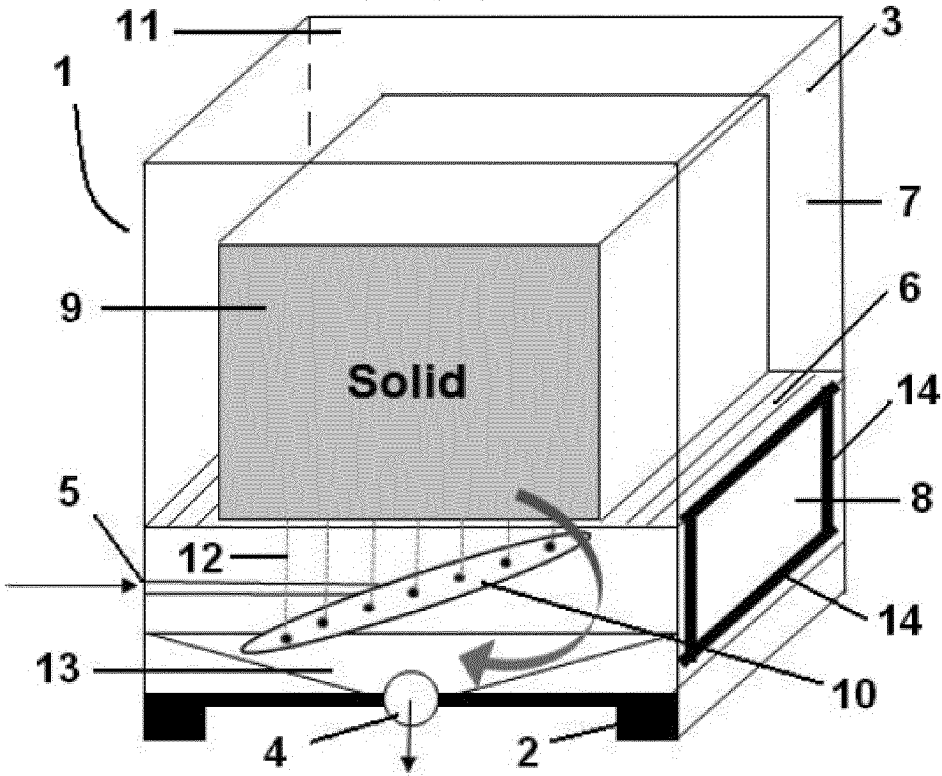


Fig. 1

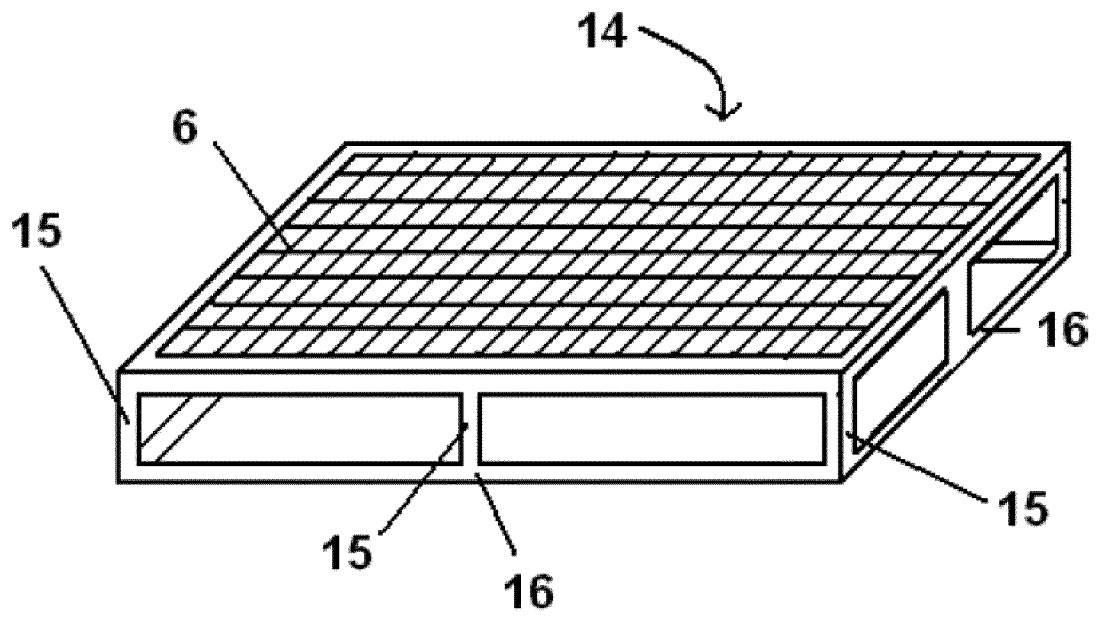


Fig. 2

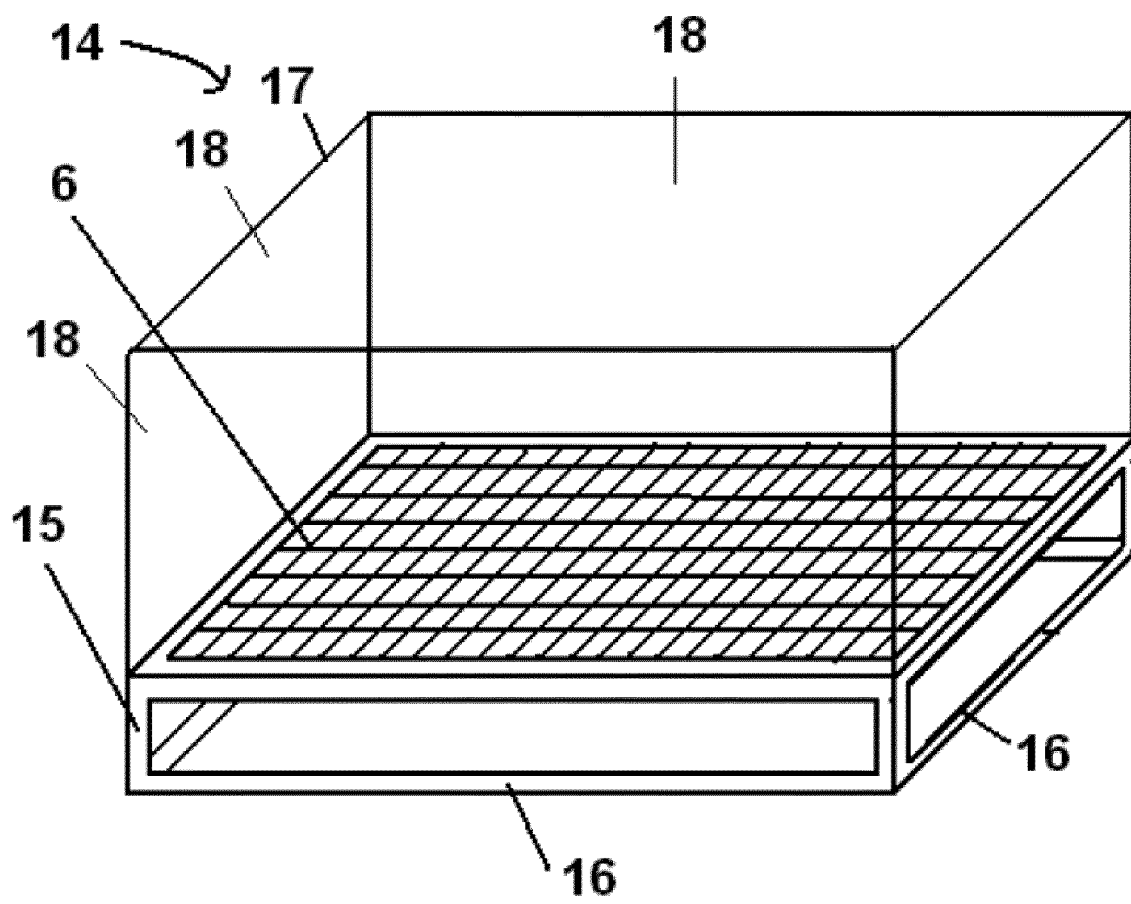


Fig. 3

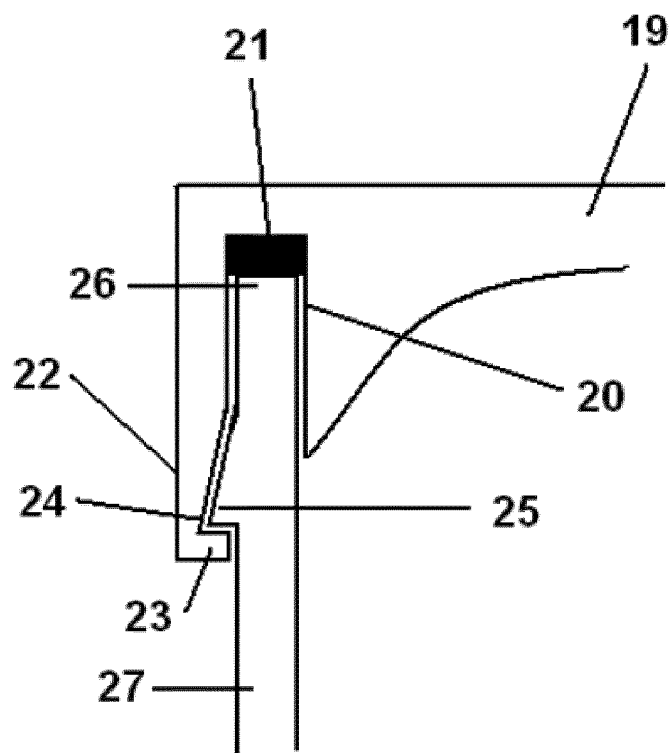


Fig. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2015/062190

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-8, 12-19, 21-24

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2015/062190

A. CLASSIFICATION OF SUBJECT MATTER

INV. B01F1/00 B01F13/00 B65D77/04 B01F15/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B01F B65D C02F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	paragraph [0001] paragraph [0005] paragraph [0027] - paragraph [0029] paragraph [0039] - paragraph [0043] paragraph [0052] - paragraph [0053] figures	
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Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

10 February 2016

Date of mailing of the international search report

28/04/2016

Name and mailing address of the ISA/

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Authorized officer

Real Cabrera, Rafael

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2015/062190

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	US 2005/167448 A1 (SCHALL KIRK M [US] ET AL) 4 August 2005 (2005-08-04) paragraph [0002] paragraph [0007] - paragraph [0012] paragraph [0070] - paragraph [0071] paragraph [0084] - paragraph [0086] paragraph [0095] - paragraph [0096] figures -----	1-8, 12-19, 21-24
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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2015/062190

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	US 4 909 387 A (SCHUTZ UDO [DE]) 20 March 1990 (1990-03-20) cited in the application column 1, line 7 - line 12 column 2, line 23 - column 3, line 12 figures -----	17 1-8, 12-16, 18,19, 21-24

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International application No

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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-8, 12-19, 21-24

Pallet container comprising a grid and spray means, the spray means being rotating spray means, and other features.

1.1. claims: 1-8, 12-16, 18, 19, 21-24

Pallet container comprising a grid and spray means, the spray means being rotating spray means.

1.2. claim: 17

Pallet container comprising a grid and spray means, the pallet container comprising an outer housing.

2. claims: 9-11

Pallet container comprising a grid and spray means, the grid comprising a recess for holding and housing solid blocks of chemical.

3. claims: 20, 25

Pallet container comprising a grid and spray means, the container comprising more than one compartments therein.
