

Device for Transporting and/or Storing

5 This invention relates to a device for transporting and/or storing of a powdery or liquid medium, comprising an outer container, which is predominantly stable with respect to its shape, open on the topside and is formed pallet-like in its bottom, for an inner container accommodating the medium, displaying an upper bottom with an opening for filling and/or discharging located therein, said inner container being
10 adjacent to the outer container's inner surface and being, if necessary, secured by a covering element that may be attached to the outer container, wherein at least the inner container has a wall made of plastic materials.

Such devices for transporting and/or storing, which in most cases have a volume
15 of several hundred liters are used more and more often. Thereby, the inner container always comprises plastic materials, wherein the wall can comprise one or several layers. The inner container has an opening for filling and/or discharging in its so-called upper bottom and is secured in many cases by means of a covering element in the outer container. The inner container is realized with a relatively
20 thin wall and is enclosed within an outer container for the purpose of its stabilization. The outer container may comprise metal or of plastic materials. In most cases, the outer container is arranged on a pallet that comprises wood, metal or plastic materials. A metallic outer container is undesired in many fields, in particular in the fields of chemical industry and food processing. For example, in
25 fields in which acids and/or corrosive materials are used, the danger of corroding exists if the outer container is made of steel. By contrast, the danger of corroding is avoided if the outer container is made of stainless steel. However, such a container comprising stainless steel is expensive and lavish with respect to its making. In order to eliminate this disadvantage, it is known to produce also the outer
30 container made of plastic materials wherein the wall of said container can be made

of one or of several layers as well. Such an outer container made of plastic materials is inexpensive in its production and is not subjected to corrosion.

- However, there are fields in industry, in which such devices, with the inner container and/or the outer container being made of plastic materials, cannot be used for reasons of security with respect to explosions. By using plastic materials, the danger exists that electrostatic charging may occur due to poor electrical conductance. This may also lead to electrostatic surface charge effects.
- Therefore, the object of the present invention is to design a device for transporting and/or storing of a powdery or a liquid medium, wherein at least the inner container of said device comprises plastic materials, characterized in that electrostatic surface charge effects cannot occur.
- According to the invention, this object is met by using a device of the kind described above, wherein the parts of the device that comprise plastic materials have at least one electrically conducting layer on their outer surfaces and wherein said electrically conducting layers are mutually electrically conductive connected.
- Furthermore, the invention relates to a device for transporting and/or storing of a powdery or liquid medium, comprising an outer container, which is predominantly stable with respect to its shape, open on the topside and is formed pallet-like in its bottom, for an inner container accommodating the medium, displaying an upper bottom with an opening for filling and/or discharging located therein, said inner container being adjacent to the outer container's inner surface and being, if necessary, secured by a covering element that may be attached to the outer container, wherein at least the inner container has a wall made of a plastic material, characterized in that the parts of the device made of plastic have at least one electrically conductive layer on their outer surfaces and are mutually electrically connected.

By using this design, it is possible to conduct electrical charges away so that electrostatic surface charge effects cannot occur. If the electrically conductive layer comprises a plastic material mixed with an electrically conducting filling material, this layer may be kept extremely thin. This leads to the advantage that relatively
5 little of the yet considerably expensive electrically conducting plastic material is needed. The electrically conducting layer does not need to display good mechanical properties.

Further characteristics of a device according to the invention are disclosed in the
10 claims 3 to 6.

According to the present invention the device is characterized in that the electrically conductive layer comprises an electrically conductive filling material mixed with plastic materials.
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Furthermore, the device is characterized in that the electrically conductive layer has an electrical resistance of equal to or less than 10^7 Ohms.

Furthermore, the device is characterized in that the non-conductive inner layer of
20 the inner container has a wall strength of no more than three mm.

Furthermore, the device is characterized in that the inner layer of the inner container comprises a plastic material of high purity that releases less than 100 ppt of each metallic impurity, respectively, into the filling material.
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Furthermore, the device has a tube for filling and discharging, which immerses into said medium, characterized in that the tube for filling and discharging comprises a plastic material that is mixed with an electrically conductive filling material.
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In the following, the invention is explained in more detail by means of examples that are illustrated by drawings. The figures are

- Fig. 1 a depiction of the device according to the invention in perspective,
5 Fig. 2 a different embodiment of the device according to the invention
 and
Fig. 3 a cross-sectional view of the lower area of the edge of a device
 according to the invention.
- 10 A device for the transport and/or the storage of a powdery or liquid medium is shown in figures 1 and 2 of the drawing, respectively. This device comprises an outer container 4 that is rectangular-box-shaped and is made of a plastic material in the case of the example shown. However, this outer container 4 may also be made of metal, e. g. of sheet metal. The outer container 4 is either formed as a
15 pallet or rests on a pallet 5 at its bottom. The outer container 4 is designed to be open on the top. The wall of this outer container 4 is made of a plastic material and may be designed to have one or several layers. The outer container 4 accommodates a relatively thin-walled inner container 1 that comprises a plastic material of high purity that is suited to accommodate the medium. The purity of the plastic
20 material of the inner layer is sufficiently high so that said plastic material releases less than 100 ppt of metallic impurities, possibly contained within the plastic material, into the filling material. The inner container 1 not only rests on the bottom of the outer container 4, but also on the inner side of the jacket body 6 of the outer container 4. The inner container 1 has an opening for filling located on its upper
25 bottom that is formed by means of a spout 2 in combination with the outer thread, wherein said opening is closed by means of a cover. This opening for filling may also be used as an opening for discharging, whereby it is necessary to place a discharge tube onto the spout 2, wherein said discharge tube may also be used as a filling tube and is immersed into the medium that is contained inside the inner
30 container. This tube for filling and discharging is advantageously made of an electrically conductive plastic material that is mixed with an electrically conduc-

tive filling material. In the case of the examples shown, the inner container 1, however, contains in its lower area an opening for discharge 3 that is equipped with a closing device, wherein said opening for discharge is located in a gap of the outer container 4.

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In the drawings with respect to the examples of figures 1 and 2, the upper rim 7 of the outer container 4 protrudes over the upper bottom of the inner container 1 by a given margin. A covering element 8 with a rim for attaching 14 is plugged onto this rim 7. Said covering element is advantageously made of plastic materials.

10 According to Figure 1 of the drawing, said covering element 8 only covers a part of the upper bottom of the inner container 1, wherein in the case of Figure 2 the covering element 8 completely covers the upper body of the inner container 1 and therefore also the outer container 4. In the examples shown in Figures 1 and 2, the attaching rim 14 of the covering element 8 can be attached to the rim 7 of the
15 outer container 4 by screwing. Furthermore, the covering element 8 has an indentation 9 that surrounds the spout 2 of the inner container 1 by means of an opening 10, wherein said indentation lies on top of a sealing device 11 on the upper bottom of the inner container 1. Furthermore, an overflow-groove 12 is shaped into the covering element 8 allowing, for example, that a liquid medium being spilled
20 during the process of filling can be guided to the outside and discharged via the openings 13.

It is obvious from Figure 3 that the inner container 1 on the one hand rests on the bottom 15 of the outer container 4 and lies flush with the inner area of the jacket
25 body 6. However, the depiction of Figure 3 also shows in an obvious manner that the wall 16 of the inner container 1 that is made of a plastic material and that may display a thickness of up to three millimeters is equipped at its outer surface with a layer 17 made of an electrically conductive plastic material. This layer 17 that is made of plastic material is realized as an extremely thin layer since the layer does
30 not have to perform any mechanical function. Conductivity is achieved by means

of adding an electrically conductive filling material to the plastic material. The electric resistivity of layer 17 equals to or is less than 10^7 Ohms.

Figure 3 of the drawing also shows the set-up of the wall 18 of the outer container
5 4. Said wall comprises a supporting layer 19 that is made of a plastic material and that may be realized in one or in several layers. In addition, this wall 18 also has an outer layer 20 that is made of an electrically conducting plastic material, similarly to the case of the inner container 1. Said layer also displays an extremely small thickness. This layer 20 also has no mechanical functions to perform. In the
10 case of the example chosen, the outer container 4 rests on the pallet 5, wherein said pallet is connected to the outer container 4 by means of a clip. In the example chosen, this pallet 5 also comprises a plastic material, wherein the outer surface is equipped with a layer 21 made of an electrically conductive plastic material. The covering element 8 may also be made according to a similar design, i. e. contain
15 an electrically conductive layer. This ensures that no electrostatic charging may occur, possibly leading to electrostatic surface charges.

Claims

1. Device for transporting and/or storing of a powdery or liquid medium, comprising an outer container, which is predominantly stable with respect to its shape, open on the topside and is formed pallet-like in its bottom, for an inner container accommodating the medium, displaying an upper bottom with an opening for filling and/or discharging located therein, said inner container being adjacent to the outer container's inner surface and being, if necessary, secured by a covering element that may be attached to the outer container, wherein at least the inner container has a wall made of a plastic material, characterized in that the parts of the device made of plastic (1, 4, 5) have at least one electrically conductive layer (17, 20, 21) on their outer surfaces and are mutually electrically connected.
2. Device according to claim 1 characterized in that the electrically conductive layer (17, 20, 21) comprises an electrically conductive filling material mixed with plastic materials.
3. Device according to claim 1 or 2, characterized in that the electrically conductive layer (17, 20, 21) has an electrical resistance of equal to or less than 10^7 Ohms.
4. Device according to at least one of the claims 1 to 3, characterized in that the non-conductive inner layer of the inner container (1) has a wall strength of no more than three mm.
5. Device according to at least one of the claims 1 to 4, characterized in that the inner layer of the inner container (1) comprises a plastic material of high purity that releases less than 100 ppt of each metallic impurity, respectively, into the filling material.

6. Device according to at least one of the claims 1 to 4, having a tube for filling and discharging, which immerses into said medium, characterized in that the tube for filling and discharging comprises a plastic material that is mixed with an electrically conductive filling material.