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(54) **DISINFECTING DEVICE PROVIDED WITH A COLLECTING DEVICE**

(57) The present invention relates to a disinfecting device comprising a collecting device disposed under a dispensing nozzle for disinfectant liquid and configured to collect disinfectant liquid dispensed by the dispensing nozzle, the collecting device comprising an at least substantially closed collecting surface and a grid that is permeable to disinfectant liquid, which grid is located some distance above the collecting surface, and which, seen in the position of use, has a horizontal cross-sectional area which is at least 25% open. The invention further relates to a disinfecting device provided with such a collecting device.

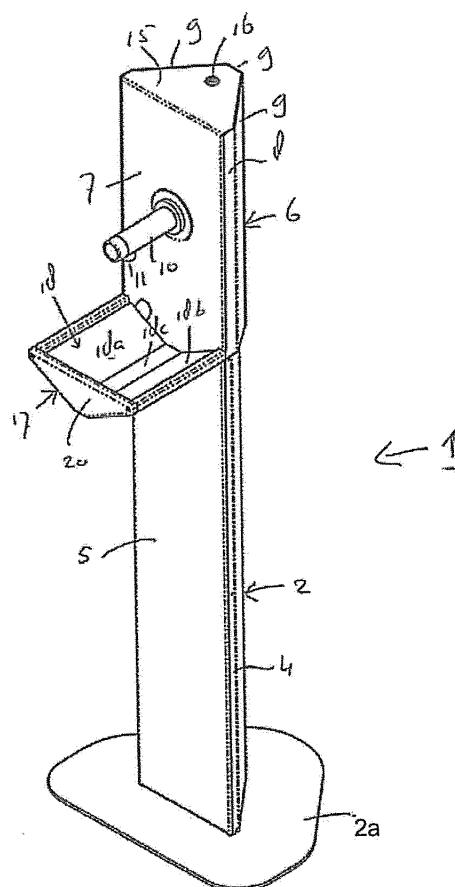


Fig 1

Description

[0001] The present invention relates to a disinfecting device comprising a collecting device configured to collect disinfectant liquid from a disinfecting device. The term "disinfectant liquid" as used herein is understood to mean a liquid, often in the form of a gel, with an alcohol percentage of more than 60%.

[0002] Collecting devices for disinfectant liquid from disinfecting devices are generally known. Known collecting devices have a collecting surface on which disinfectant liquid dispensed or leaking from the disinfecting device is collected. The collecting surface may form part of a tray with upright edges, on which a cover plate provided with leak holes is positioned. A problem of the known collecting devices is that disinfectant liquid that falls on the collecting device from the disinfecting device remains present on the cover plate and continues to be exposed to the environment. This is undesirable in environments where use is made of disinfectant liquid in connection with contamination of the cover plate.

[0003] Accordingly it is an object of the present invention to provide a disinfecting device as described in the introduction, wherein disinfectant liquid collected by the collecting device is hardly, if at all, directly accessible and/or visible from outside, in other words, wherein any disinfectant liquid or residue thereof is masked. This object is achieved by means of a disinfecting device comprising a housing provided with a receiving space that is configured to accommodate a reservoir containing disinfectant liquid, a dispensing nozzle which is communicatively connected to a reservoir accommodated in the receiving space and which is configured to dispense disinfectant liquid, a valve device which, in non-actuated condition, interrupts the communication between the reservoir and the dispensing nozzle and which, in actuated condition, allows disinfectant liquid to flow from the reservoir to the dispensing nozzle and be dispensed by the dispensing nozzle, and a collecting device connected to the housing, which is disposed under a dispensing nozzle, which collecting device is configured to collect disinfectant liquid dispensed by the dispensing nozzle, the collecting device comprising a collecting reservoir provided with an at least substantially closed collecting surface and with a grid that is permeable to disinfectant liquid, which grid is located some distance above the collecting surface and which has a projection perpendicular to a plane that extends parallel to the grid, which projection covers at most 75% of the projection area in question, wherein the grid mainly comprises textile and wherein the collecting surface is lighter in colour than the grid, such that an advantageous combination of initial absorption and permeability to disinfectant liquid and masking of the collecting surface is provided.

[0004] The aspect of the grid having a projection perpendicular to a plane that extends parallel to the grid, which projection covers at most 75% of the projection area in question, wherein the grid mainly comprises tex-

tile and wherein the collecting surface is lighter in colour than the grid, provides an advantageous combination of initial absorption and permeability to disinfectant liquid and masking of the collecting surface.

[0005] An indication is furthermore given in this regard that the grid be at least 25% open, or in other words, comprise meshes. Because of the relatively open nature of the grid surface, disinfectant liquid that falls on the grid can easily pass through the grid and fall on the collecting surface whilst relatively small meshes are used. As a result, the visibility and/or accessibility of such remaining disinfectant liquid or residue is/are minimised. As a result of the relatively small mesh size, disinfectant liquid that has collected on the collecting surface is hidden from view, which makes the environment look hygienic. Because the disinfectant liquid is hidden from view, it is not necessary to remove leaked disinfectant liquid; the residue can be allowed to accumulate in the collecting device insofar as it does not evaporate. At first sight this may seem to be merely an optical improvement. However, it is known that an environment that looks clean induces users to keep that environment cleaner in comparison with an environment that looks less clean. Thus, a functionally advantageous effect is indeed obtained. Furthermore, the relatively open nature of the grid contributes toward improving the extent of evaporation of disinfectant liquid on the collecting surface.

[0006] It is preferable if the grid is durably connected, for example fused together, with the collecting reservoir. This has the advantageous effect that the grid cannot be damaged to the extent that it needs to be replaced.

[0007] It is furthermore preferable if the collecting reservoir comprises three hingedly, i.e. pivotally, interconnected parts forming collecting surfaces.

[0008] The advantage of this is that the two outer parts can slope upward relative to the centre part, so that the disinfectant liquid is led to the collecting surfaces. In this way an improved collection of the disinfectant liquid is ensured.

[0009] It is advantageous in this regard if the grid is fused together with the collecting reservoir at the location of its circumferential edges and at the location of two hinge lines so as to form the three hinged-together collecting surfaces. The inventor has realised that in order to prevent unevennesses, irregularities, in the grid, it will be practical to fuse the grid fused together with the collecting reservoir in any case at the location of the joints about which the collecting device can pivot. This prevents, among other things, the grid from exhibiting a convexity or similar irregularity at the location of the centre part. By fusing the grid fuse with the collecting reservoir at the hinge lines and at the circumferential edges, it is thus ensured that the collecting reservoir can pivot without the grid coming loose or exhibiting unevennesses. Optically, the grid will thus consist of three parts, each part defining a substantially straight plane.

[0010] It is preferable that at least one spacer is provided, which spacer provides the spacing between the

collecting surface and the grid. Such a spacing prevents capillary action of disinfectant liquid that has collected on the collecting surface, which would result in disinfectant liquid remaining in or on the grid yet. Moreover, a sufficient distance apart, for example of at least 5 mm, furthermore preferably at least 8 mm, will help to hide from view any disinfectant liquid that has collected on the collecting surface.

[0011] In a preferred embodiment of the present invention, the grid is made of a, preferably flexible, wire material. Wire material, preferably in a thickness of at most 2.5 mm, furthermore preferably at most 1.5 mm, provides a surface from which disinfectant liquid will easily fall in the direction of the collecting surface. This adds to the extent to which disinfectant material collected by the collecting device will be inaccessible.

[0012] The grid is preferably a mesh grid, or at any rate, at least 60%, furthermore preferably at least 80% of the grid area is made up of mesh. According to another possibility, the entire grid area consists of mesh. Mesh enhances the aforesaid advantageous properties of the grid. The size of the meshes of the mesh is preferably at least 1.5 mm², furthermore preferably at least 2.5 mm². The size of the meshes of the mesh is preferably at most 10 mm², furthermore preferably at most 7 mm². With these preferred sizes a good equilibrium is obtained between permeability to (residue of) disinfectant liquid on the one hand and masking capacity on other hand.

[0013] The grid preferably comprises a fabric. A fabric combines the properties of wire material and/or mesh with a relatively regular pattern of meshes between the material of the fabric.

[0014] According to the present invention, the grid mainly comprises textile. The inventor has realised that textile provides an advantageous combination of initial absorption and permeability to disinfectant liquid and masking of the collecting surface.

[0015] In a preferred embodiment of the present invention, the material of the grid is relatively matt in comparison with the material of the collecting surface. The relatively matt material has a relatively impeding effect on the ingress of light between the grid and the collecting surface. The relatively low degree of mattness of the material (i.e. relatively glossy material) of the collecting surface corresponds to reflection properties of disinfectant liquid, so that the aforesaid properties help to mask disinfectant liquid that is present on the collecting surface.

[0016] According to the present invention, for the aforesaid reasons it is preferable for the collecting surface to be lighter in colour than the grid.

[0017] If the grid is flexible, i.e. the grid can be bent so that it properly abuts the collecting surface, or at least a possible upright edge thereof. The collecting surface is preferably made of a shape-retaining material.

[0018] The grid is preferably made of a material that absorbs disinfectant liquid. That is, disinfectant liquid can to a small extent be absorbed by the material. Materials that have such absorbing properties and that could be

used for a grid, among which polymers and textile types, are known to the skilled person. The absorbing properties of the grid material ensure that also disinfectant liquid that has remained behind on the grid becomes inaccessible from the environment and/or is at least hidden from the users' view. Given the aim of realising a sufficient masking capacity of the grid, the meshes of the grid may be relatively small, for example so small that disinfectant liquid will remain "stuck" in a mesh, so that (residue of) disinfectant liquid cannot easily fall onto a collecting surface. If the grid is made of a material that absorbs disinfectant liquid, the material will absorb disinfectant liquid that has fallen on the grid until the material is saturated. The force of gravity and communication through the material of the grid will then ensure that the disinfectant liquid can pass through the material of the grid and is transported to the collecting surface in this way. If the material does not become saturated, the absorbed disinfectant liquid will already be hidden from view, of course.

[0019] If the collecting surface and the grid are integrally connected, disinfectant liquid that has fallen onto the collecting device will be permanently inaccessible from the environment, at least insofar as said liquid has fallen onto the collecting surface via the grid. After a certain, possibly predetermined, period of use, the collecting device can be exchanged for an unused identical collecting device. Although disinfectant material is relatively volatile, any residue that has remained behind in the collecting device, for example in the form of a rehydrating substance, such as glycerol, can be easily removed along with the collecting device. This prevents the risk of contamination resulting from improper or inexperienced use of the collecting device.

[0020] In a preferred embodiment of the present invention, the material of the collecting surface and the material of the grid are resistant against alcoholic disinfectant liquid. The resistance of the materials prevents the exterior of the collecting device being affected during use thereof in combination with a disinfecting device.

[0021] A very good permeability to disinfectant liquid is provided with a device in which the horizontal cross-sectional area of the grid is at least 25%, furthermore preferably at least 40%, open. A more open structure of the grid may of course affect its ability to mask disinfectant material that is present on the collecting surface. Sufficient alternative measures for reducing said visibility are known to the skilled person, however. Think in this connection of two superposed grids or grid elements that extend at an angle relative to the vertical, seen in vertical direction.

[0022] The collecting device is preferably freely positioned on a support in use. The support functions to position the collecting device, for example. Because the collecting device is freely positioned on the support, the collecting device can be easily exchanged for a comparable collecting device. Periodically exchanging the collecting device contributes to the hygiene of the environment in which the collecting device is present.

[0023] It is preferable in that regard that the support forms part of a disinfecting device comprising a dispenser for disinfectant liquid. A dispensing nozzle and the collecting device of the disinfecting device in question will thus be correctly oriented relative to each other at all times.

[0024] To provide a sufficiently large collecting surface, it is preferable that a vertical projection of the grid on a horizontal projection plane has a surface area of at least 100 cm², preferably at least 150 cm², even more preferably at least 200 cm².

[0025] If a vertical projection of the grid on a horizontal projection plane has a surface area of at most 1000 cm², preferably at least 800 cm², furthermore preferably at least 750 cm², the collecting device will remain relatively compact.

[0026] According to a second aspect, the present invention relates to a disinfecting device comprising a housing provided with a receiving space that is configured to accommodate a reservoir containing disinfectant liquid, a dispensing nozzle which is communicatively connected to a reservoir accommodated in the receiving space and which is configured to dispense disinfectant liquid, a valve device which, in non-actuated condition, interrupts the communication between the reservoir and the dispensing nozzle and which, in actuated condition, allows disinfectant liquid to flow from the reservoir to the dispensing nozzle and be dispensed by the dispensing nozzle, and a collecting device connected to the housing according to the first aspect of the present invention. In this way a disinfecting device is provided that exhibits the aforesaid advantageous aspects of the collecting device according to the invention.

[0027] A hygienic solution is provided if contactless operation of the valve device is possible. A user can simply place his hands under the dispensing nozzle and over the collecting device, wherein the dispensing of disinfectant liquid is initiated by means of a motion or presence sensor, for example.

[0028] If the housing defines a column that can be independently placed on a ground surface, wherein the dispensing nozzle is positioned at a height of between 80 cm and 180 cm from the ground, the disinfecting device can be flexibly installed at any desired location. Such a disinfecting device may be configured for independent operation, i.e. without the necessity to connect the column to the electric mains and/or other supply or discharge channels. The location of the column can be freely selected in that case.

[0029] The present invention will now be explained with reference to exemplary embodiments of a device according to the present invention and with reference to the appended figures, in which:

Figure 1 is a perspective view of the disinfecting device according to the present invention;

Figure 2 is a vertical cross-sectional view of the disinfecting device of figure 1 a;

Figure 3 is a perspective view of a collecting element for use with a disinfecting device; and

Figure 4 is a perspective view of an alternative collecting element for use with a disinfecting device according to the present invention.

[0030] With reference now to the figures, figure 1 shows a perspective side view of a disinfection column 1, being an example of a disinfecting device according to the present invention. Figure 2 shows a vertical sectional view through the centre plane of the disinfection column 1 of figure 1, which has a height of 150 cm. Located at the bottom side of the disinfection column is an upright 2 of hexagonal cross-section, which is made of sheet metal and which comprises a front wall 3, two side-walls 4, a rear wall 5 made up of two converging parts and a connecting piece, which are only partially shown in the figures, and a base 2a. On the upright 2 is a housing 6 of hexagonal cross-section, which comprises a front wall 7, two sidewalls 8 and a three-part rear wall, which are likewise made of sheet metal. The shape of the upright 2 and the housing 6 is not particularly relevant for the use of the present invention.

[0031] Centrally located in the front wall 7 of the housing 6, at a height of 115 cm above the base 2a of the upright 2, is an outlet 10 in the form of a horizontally extending hollow tube of a plastic material such as PET which is resistant against alcoholic disinfectant liquid, wherein a motion sensor (not shown) and a dispensing nozzle 11 are provided at the underside, near the distal end of the outlet 10. The dispensing nozzle 11 is in contact with a reservoir 13 (not shown) via a conduit 12 extending through the outlet 10, in which reservoir a disinfectant liquid (not shown) is present. The reservoir 13 is an exchange reservoir, which is exchanged for a filled reservoir when the disinfectant liquid is (practically) used up. Thus, a supply line for supplying disinfectant liquid to the disinfection column from outside is not needed, and the column can function independently, which adds to the freedom of placement of the disinfection column 1. In an upper wall 15 of the housing 6, a lock 16 is provided for locking the housing against unwanted access. Disposed at the bottom of the housing 6, under the dispensing nozzle 11, is a collecting tray functioning as a collecting device for disinfectant liquid. The collecting tray 17 has a substantially V-shaped cross-section, comprising two sloping walls (not shown in the figures) which are interconnected at the bottom side by means of a horizontal connecting piece 19. A collecting reservoir 18 made up of three hinged-together collecting surfaces 18a, 18b, 18c is loosely provided on the sloping walls and the connecting piece. The sloping walls have a length of 17 cm (seen in the direction perpendicular to the longitudinal direction of the upright 2) and a width of 12.5 cm (seen in the direction of slope). On one side, the collecting tray 17 is bounded by the front wall 7 of the housing 6. Located at the distal end is an end wall 20. The collecting tray 17, defined by the sloping walls, the connecting piece 19,

the front wall 7 and an end wall 20, forms a closed unit and is made of the same material as the housing 6. The collecting reservoir comprising collecting surfaces 18a, 18b, 18c is made of a material that is not affected by the disinfectant liquid, for example plastic plate material and plastic edges.

[0032] Figure 3 shows a perspective side view of a collecting reservoir 61, which can be detachably placed in a collecting tray of a disinfection column according to the present invention. The collecting reservoir 61 comprises three parts forming collecting surfaces, which parts are hinged together by means of hinges 63 for movement in the directions indicated by arrows P. The central collecting part 62 is hingedly connected to two side parts 64 via hinges 63 (only one of which is partially shown in figure 3). The central collecting part 62 is provided with cross - shaped support means 65. The side parts 64 are provided with ribs 66. The collecting reservoir 61 is provided with a lip 67 on one side, which lip functions to enable easy removal of the collecting reservoir from a disinfecting device. Figure 3 shows a separate grid 68 in the form of a woven textile with a mesh width of 0.3 mm, which is attached to the outer edges of the parts of the collecting reservoir 61.

[0033] Figure 4 shows a schematic side view of a composite collecting reservoir 71 for use with a disinfection column as shown in figure 1. The elements are indicated by the same numerals as the comparable elements in figure 3, augmented by 10. The collecting reservoir 71 is based on the lining element 61 in figure 3. The collecting reservoir 71 is different from the collecting reservoir 61 in figure 3 in that a textile fabric 78 is provided at the upper side of the central collecting part 72 and the side parts 74. The collecting reservoir 71 may or may not be provided with support elements or ribs as shown in figure 3.

[0034] Figures 3 and 4 further show two hinge lines 81, 82. At the location of these two hinge lines 81, 82, the grid (in this example) is fused together with the collecting reservoir. Furthermore, the grid (in this example) is connected to the collecting reservoir at the location of its circumferential edge.

[0035] In use of the disinfection column 1, 31, the dispensing of disinfectant liquid a disinfection gel containing 70% of alcohol and glycerol in the application described herein, from the dispensing nozzle 11, 41 is initiated in that a user who wishes to disinfect his hands places his hands under the dispensing nozzle 11, 41. This causes the motion sensor provided in the outlet 10, 40 to deliver a signal, in a manner that is known per se, to a pump (not shown in the figures) to dispense disinfectant liquid 14 via a conduit 12 and the dispensing nozzle 11, 41. Thus, disinfectant liquid 14 is dispensed for a predetermined period of time. Said period of time has been determined so that the amount of disinfectant liquid 14 that is dispensed will suffice to ensure that a user will be able to properly disinfect his hands. A user will position his hands so that the major part of the disinfectant liquid will

fall on his hands, but some the disinfectant liquid being sprayed may move further down past or between the user's hands. Said excess disinfectant liquid will fall on the collecting tray 17, 47. As a result of the high concentration of alcohol in the liquid, the liquid will disinfect the user's hands and evaporate. The glycerol is absorbed by the skin. The risk of disinfectant liquid falling from the user's hands is thus reduced.

[0036] In the embodiment shown in figure 1, disinfectant liquid collected in the collecting tray 17, 47 falls directly onto the grid of the collecting reservoir 18. The collecting surface is not sensitive to attack by the cleansing liquid. Cleansing liquid that has fallen on the grid 18 will evaporate after some time, partially as a consequence of the high concentration of alcohol. As shown in figures 3 and 4, a grid 68, 78 functioning as a lining element for the collecting tray 17, 47 can be embodied in various ways. As figure 3 shows, support elements 65 and ribs 66 are provided. The support elements 65 and the ribs 66 help to prevent the accumulation at a central location of disinfectant liquid that has collected in a collecting tray. If the disinfectant liquid is well-spread, it will evaporate more quickly. A collecting reservoir can be removably placed in a disinfection column according to the present invention. This makes it easier to exchange the collecting reservoir.

[0037] In the appended drawings and the above description the present invention is shown and described merely with reference to a few embodiments thereof. It will be understood that the drawings and the description are not intended to limit the invention. Many variants, which may or may not be obvious to the skilled person, are conceivable within the scope of the present invention as defined in the appended claims. Thus, the invention is not limited to the materials described herein. It is of course preferable that the constructive elements used for the housing and the upright provide sufficient strength to the disinfecting device. It would for example be possible to use a plastic material instead of sheet metal. It is furthermore preferable that the collecting device and/or the grids are resistant against disinfectant materials that are used in combination with the disinfecting device. The shape and the dimensions of the collecting tray are not limited to those of the V-shaped collecting tray described herein. Also other shapes, for example a flat plane, can be used with the present invention. Furthermore, several manners of dispensing disinfectant liquid by the disinfecting device are known. Instead of using a sensor, it will for example be possible to use a foot controller. The disinfectant liquid need not be carried to the dispensing nozzle by means of a pump device, but it can also be dispensed from the dispensing nozzle on the basis of gravity.

Claims

1. A disinfecting device comprising a housing provided

- with a receiving space that is configured to accommodate a reservoir containing disinfectant liquid, a dispensing nozzle which is communicatively connected to a reservoir accommodated in the receiving space and which is configured to dispense disinfectant liquid, a valve device which, in non-actuated condition, interrupts the communication between the reservoir and the dispensing nozzle and which, in actuated condition, allows disinfectant liquid to flow from the reservoir to the dispensing nozzle and be dispensed by the dispensing nozzle, and a collecting device connected to the housing, which is disposed under a dispensing nozzle, which collecting device is configured to collect disinfectant liquid dispensed by the dispensing nozzle, the collecting device comprising a collecting reservoir provided with an at least substantially closed collecting surface and with a grid that is permeable to disinfectant liquid, which grid is located some distance above the collecting surface and which has a projection perpendicular to a plane that extends parallel to the grid, which projection covers at most 75% of the projection area in question, wherein the grid substantially comprises textile and wherein the collecting surface is lighter in colour than the grid, such that an advantageous combination of initial absorption and permeability to disinfectant liquid and masking of the collecting surface is provided.
2. A disinfecting device according to claim 1, **characterised in that** the grid is durably connected with the collecting reservoir.
 3. A disinfecting device according to claim 2, **characterised in that** the grid is fused together with the collecting reservoir.
 4. A disinfecting device according to any one of the preceding claims, **characterised in that** the collecting reservoir comprises three pivotally interconnected parts forming collecting surfaces.
 5. A disinfecting device according to claim 4 and claim 3, **characterised in that** the grid is fused together with the collecting reservoir at the location of its circumferential edges and at the location of two hinge lines so as to form the three hinged-together collecting surfaces.
 6. A disinfecting device according to any one of the preceding claims, **characterised in that** at least one spacer is provided, which spacer provides the spacing between the collecting surface and the grid.
 7. A disinfecting device according to any one of the preceding claims, **characterised in that** the grid is a mesh grid.
 8. A disinfecting device according to any one of the preceding claims, **characterised in that** the textile of the grid is relatively matt in comparison with the material of the collecting surface.
 9. A disinfecting device according to any one of the preceding claims, **characterised in that** the textile of the grid comprises a material that absorbs disinfectant liquid.
 10. A disinfecting device according to any one of the preceding claims, **characterised in that** the material of the collecting surface and the material of the grid are resistant against disinfectant liquid.
 11. A disinfecting device according to any one of the preceding claims, **characterised in that** the horizontal cross-sectional area of the grid is at least 25%, preferably at least 40%, open.
 12. A disinfecting device according to any one of the preceding claims, **characterised in that** a vertical projection of the grid has a surface area of at least 100 cm².
 13. A disinfecting device according to any one of the preceding claims, **characterised in that** a vertical projection of the grid has a surface area of at most 1000 cm².
 14. A disinfecting device according to any one of the preceding claims, **characterised in that** the housing defines a column that can be independently placed on a ground surface, wherein the dispensing nozzle is positioned at a height of between 80 cm and 180 cm from the ground.
 15. A collecting device for use in a disinfecting device according to any one of the preceding claims, the collecting device comprising a collecting reservoir provided with an at least substantially closed collecting surface and with a grid that is permeable to disinfectant liquid, which grid is located some distance above the collecting surface and which has a projection perpendicular to a plane that extends parallel to the grid, which projection covers at most 75% of the projection area in question, wherein the grid mainly comprises textile and wherein the collecting surface is lighter in colour than the grid, such that an advantageous combination of initial absorption and permeability to disinfectant liquid and masking of the collecting surface is provided.

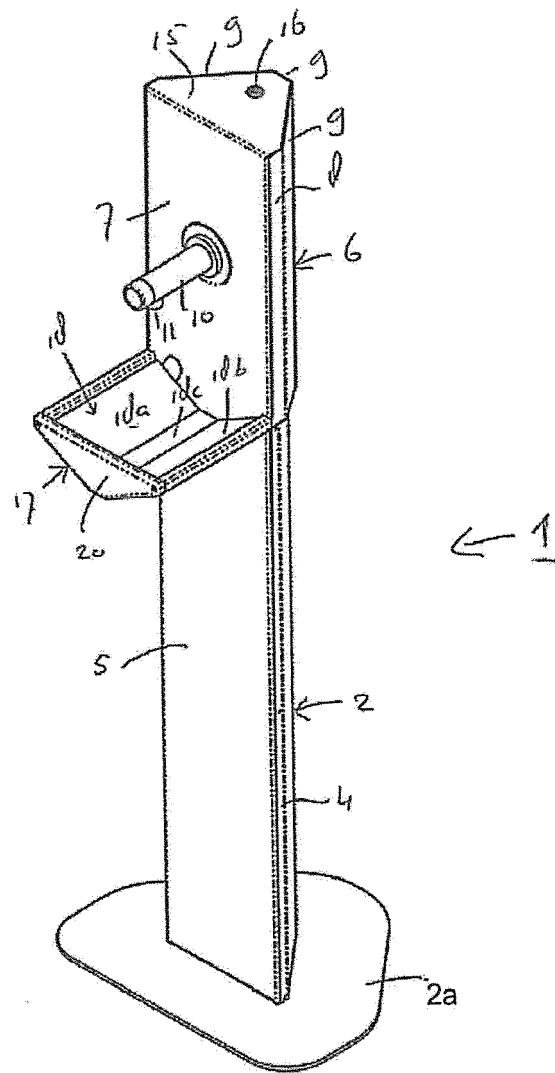


Fig 1

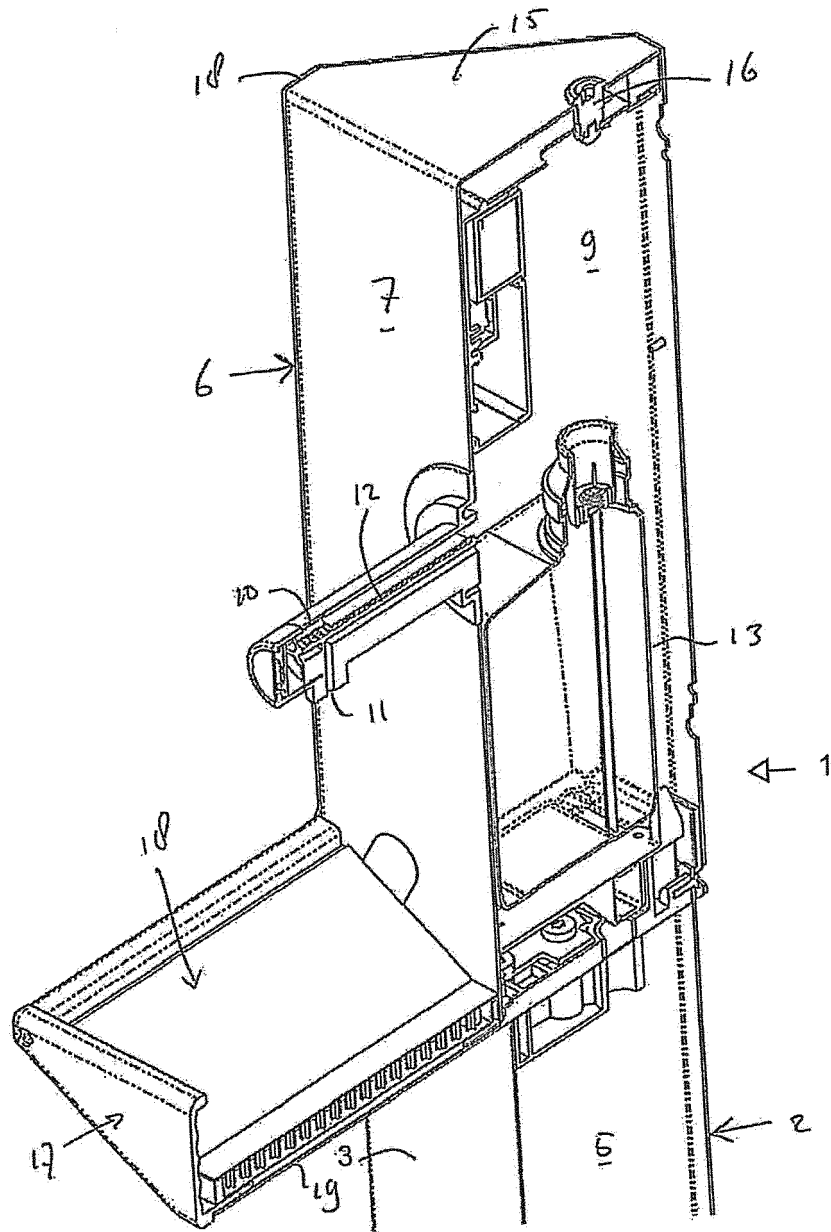


Fig. 2

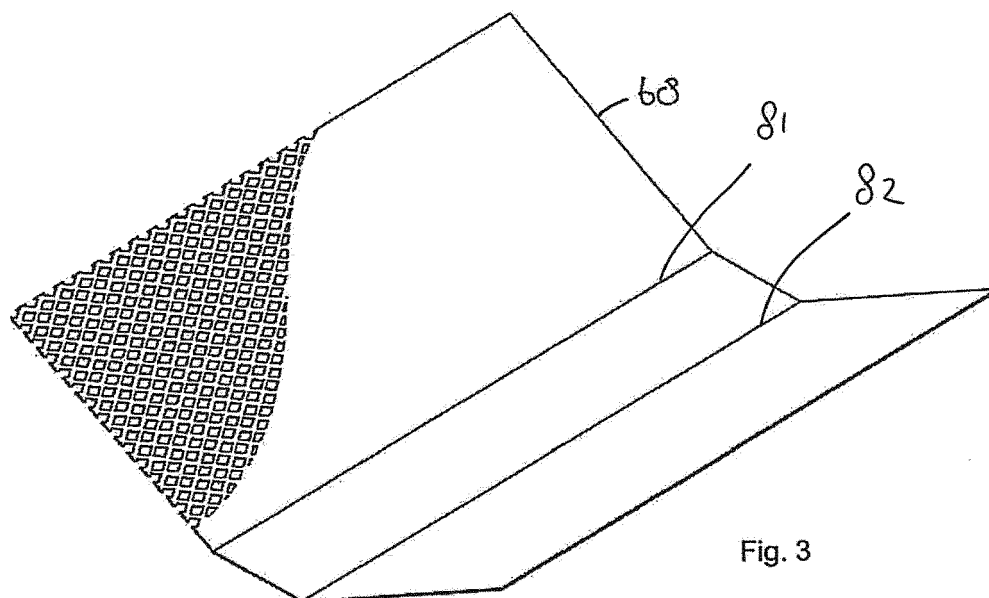
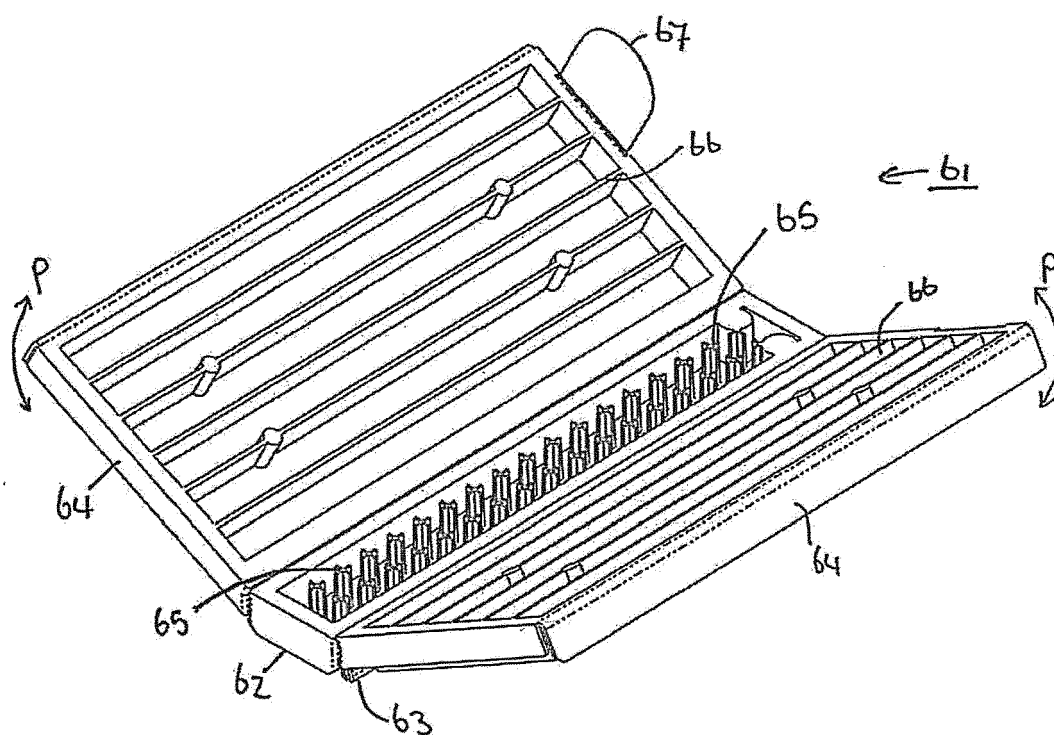


Fig. 3



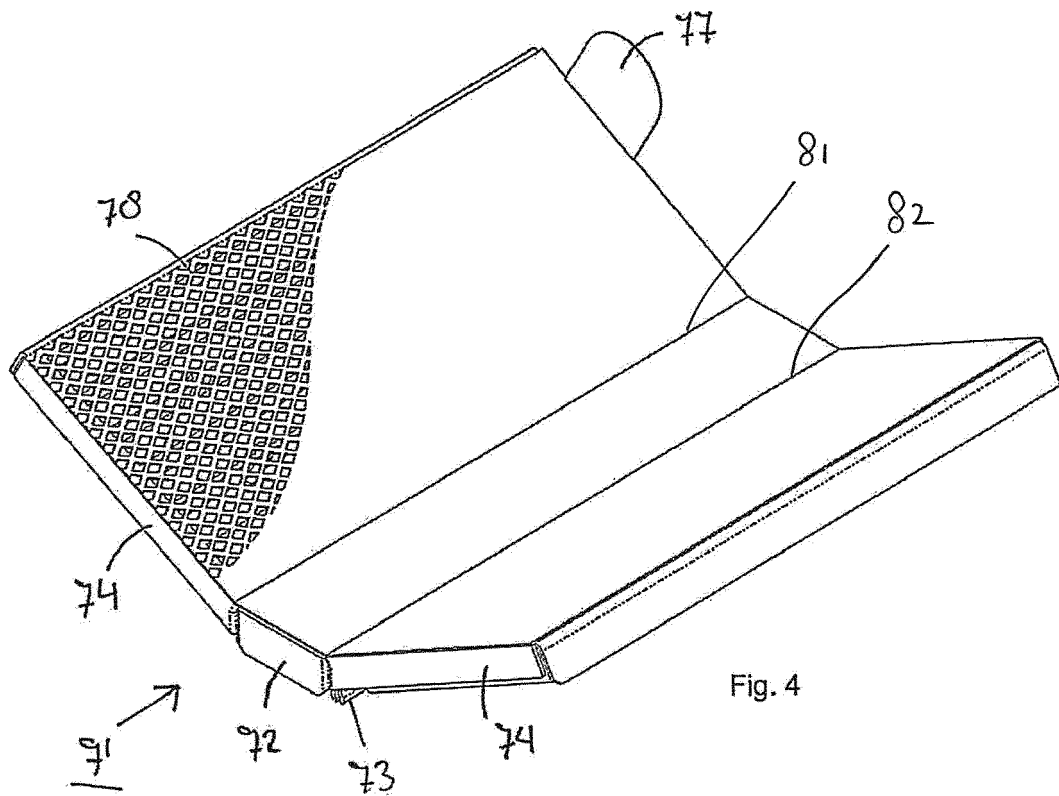


Fig. 4



EUROPEAN SEARCH REPORT

 Application Number
 EP 16 16 5377

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 31 August 2016	Examiner Schikhof, Arnout
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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