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Caillot et al.

(54) **SUPPORT FOR WINDSHIELD WASHER FLUID CONTAINER, WINDSHIELD WASHER FLUID CONTAINER, AND DEVICE COMPRISING SAID SUPPORT AND CONTAINER**

(71) Applicant: **VALEO SYSTÈMES D'ESSUYAGE**, Le Mesnil Saint Denis (FR)

(72) Inventors: **Gérald Caillot**, Cernay La Ville (FR); **Frédéric Giraud**, Le Perray En Yvelines (FR); **Marcel Trebouet**, Chavenay (FR)

(73) Assignee: **Valeo Systèmes d'Essuyage**, Le Mesnil Saint Denis (FR)

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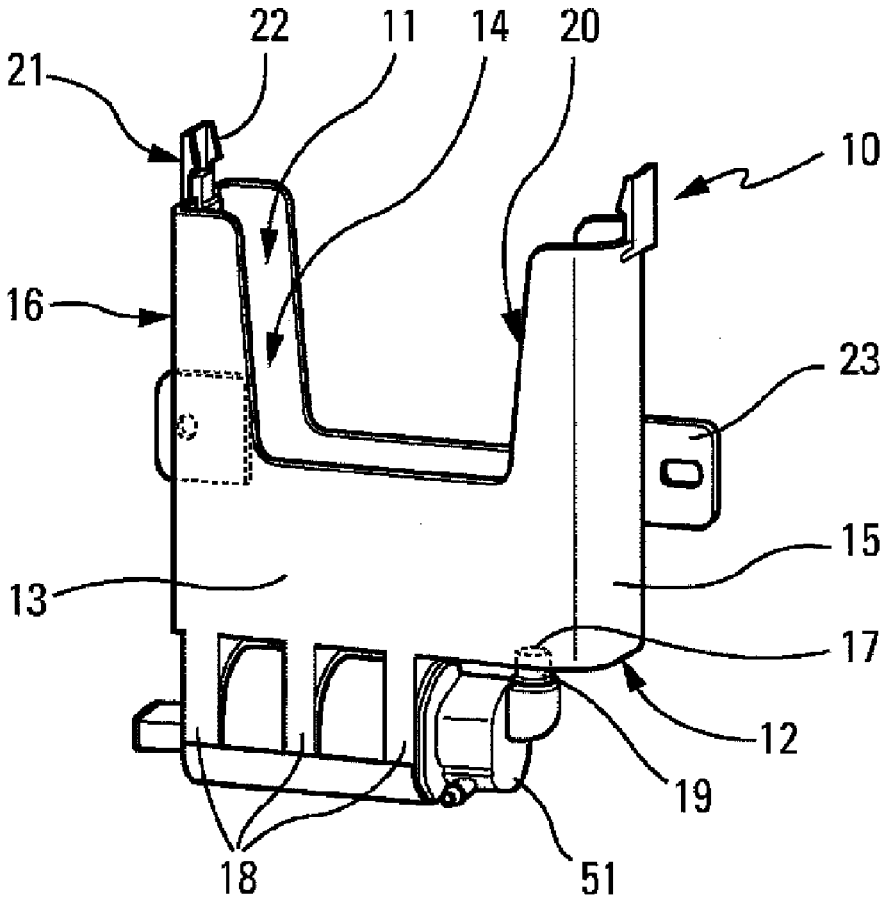
(57) **ABSTRACT**

The invention relates to a support (**10**) for a removable, interchangeable container for windshield washer fluid, said support (**10**) being designed to be secured to a vehicle and comprising a housing for one or more containers (**30**), which housing is designed to allow the repeated insertion and removal of the container(s) (**30**). The invention also relates to a removable, interchangeable container (**30**) for windshield washer fluid, designed to be mounted in such a support (**10**). The invention also relates to a device for supplying windshield washer fluid, comprising such a support (**10**) and such a container (**30**). The invention further relates to a vehicle windshield washing system comprising such a windshield washer fluid supply device.



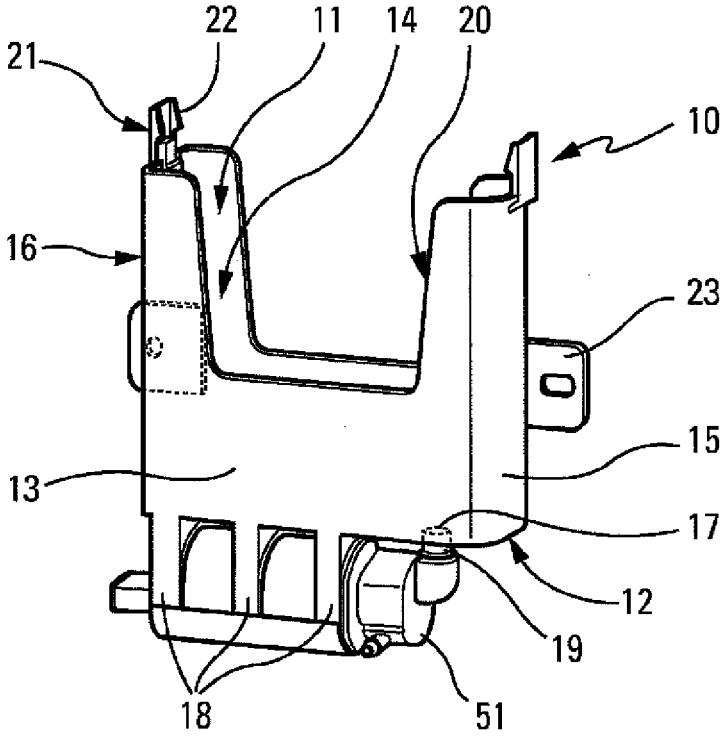


Fig. 1

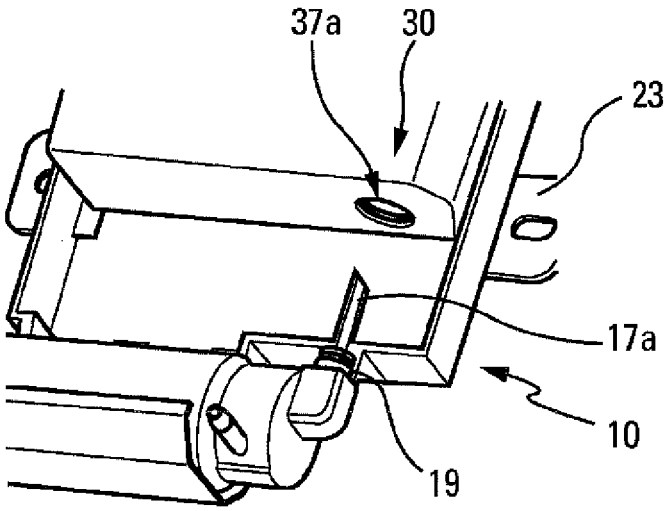


Fig. 2

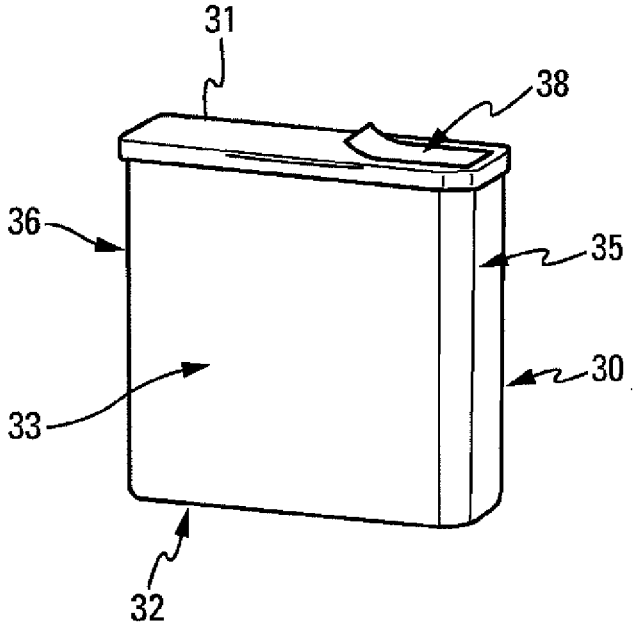


Fig. 3

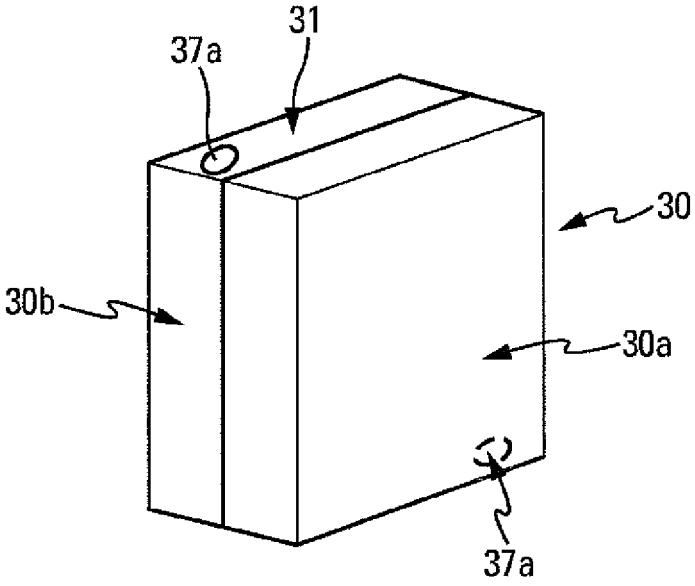


Fig. 4

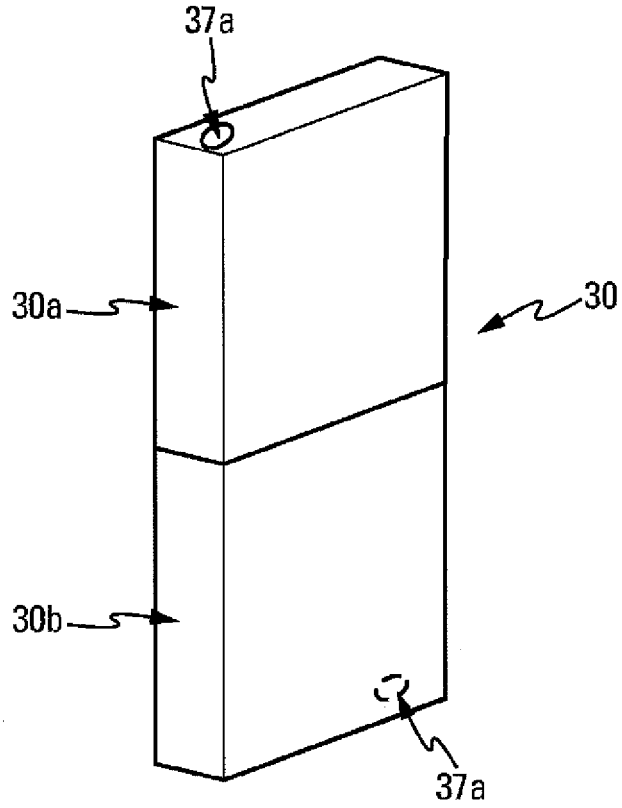


Fig. 5

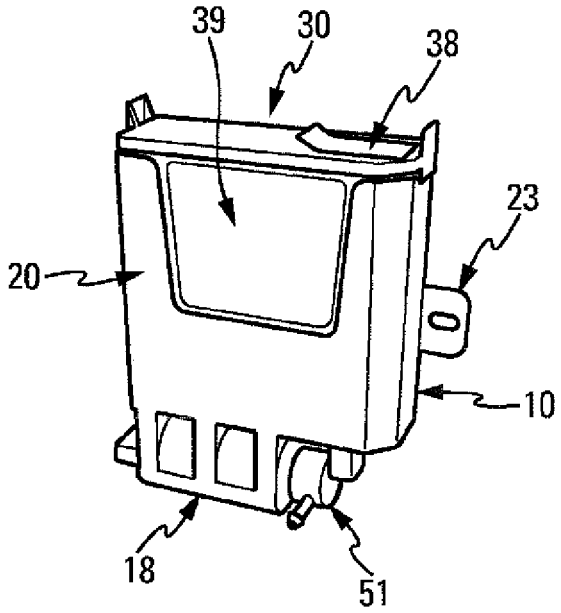


Fig. 6

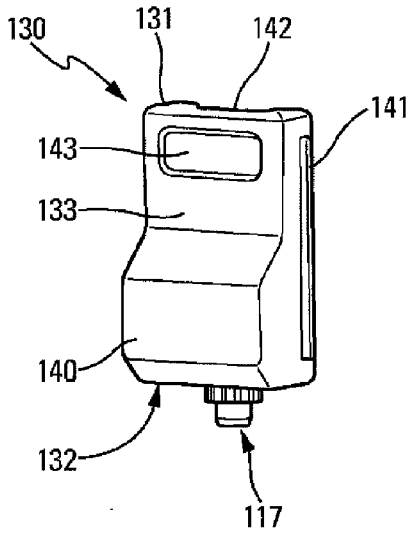


Fig. 7a

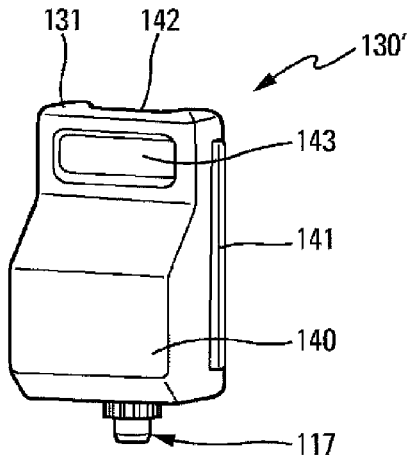
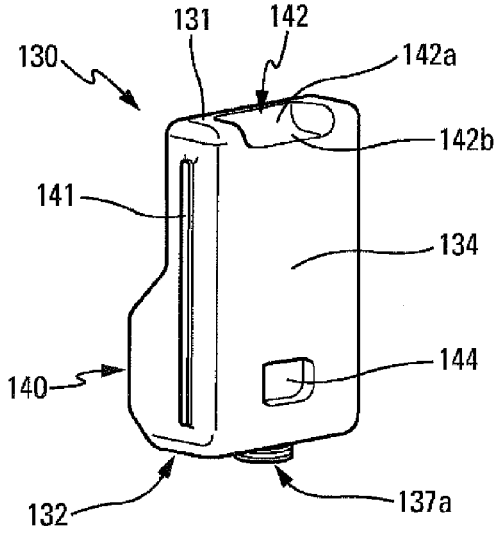


Fig. 7b



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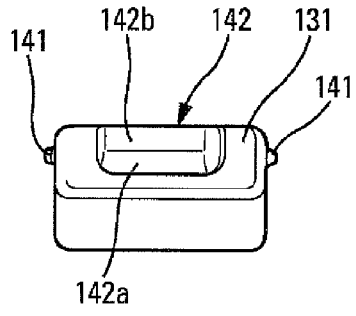


Fig. 9

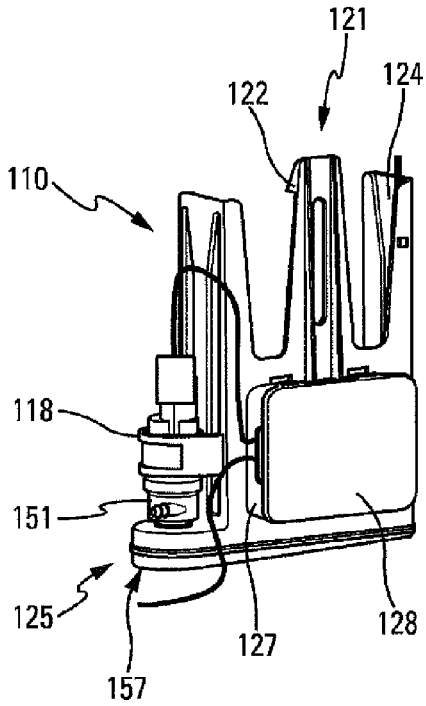
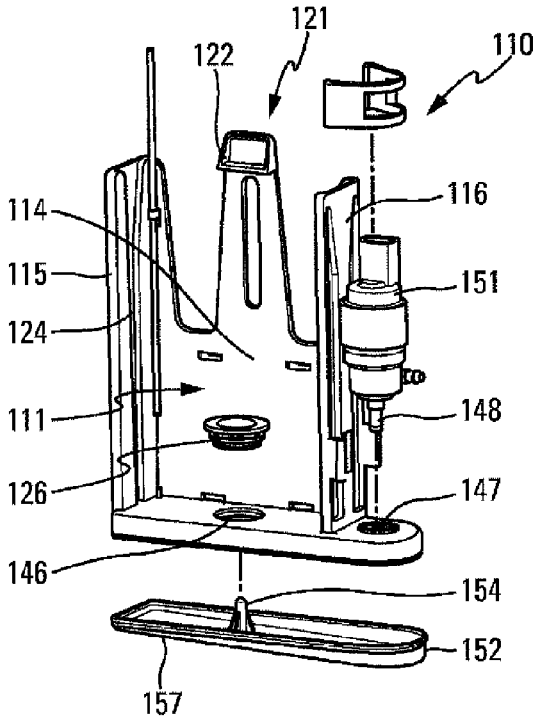


Fig. 10



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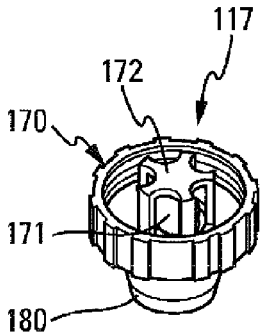

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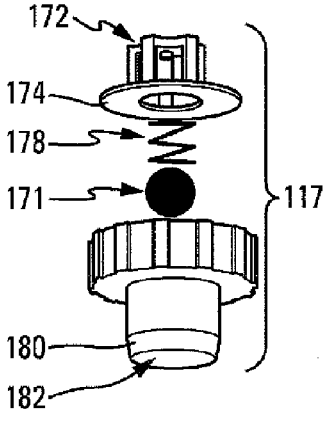

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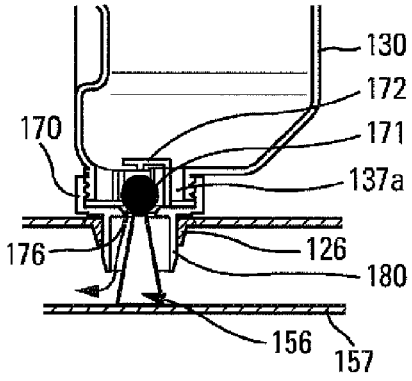

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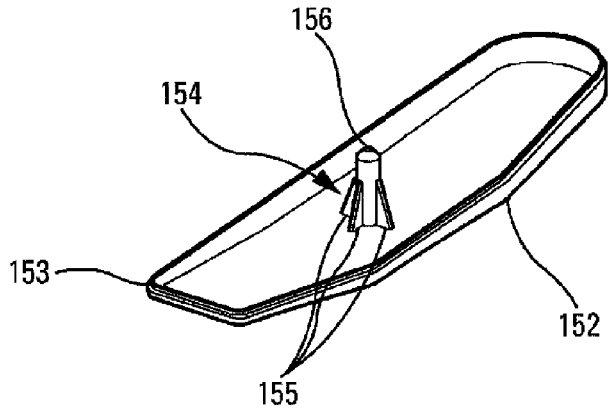

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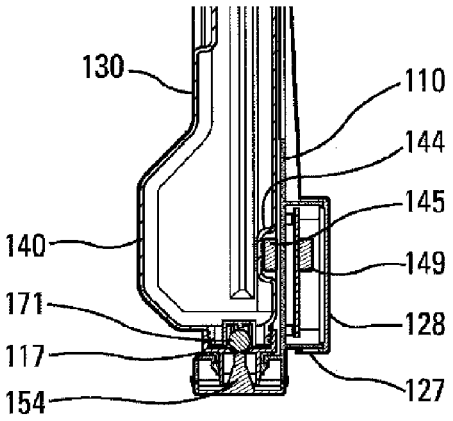

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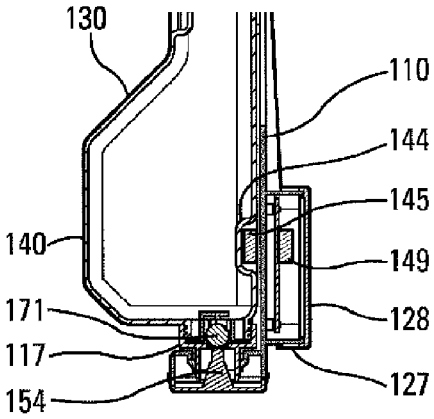

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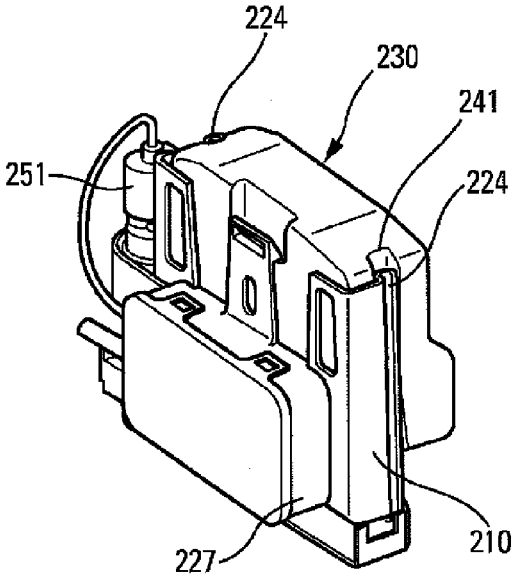

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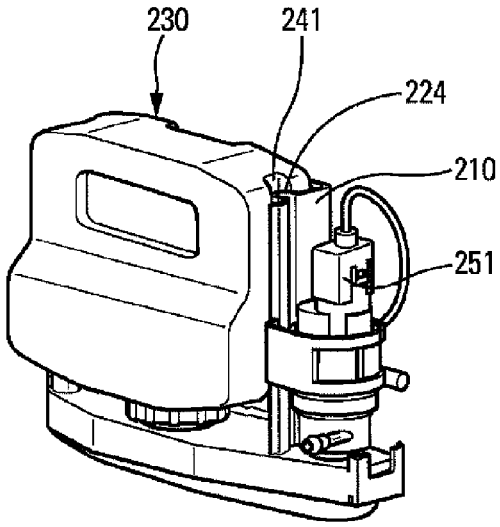


Fig. 19

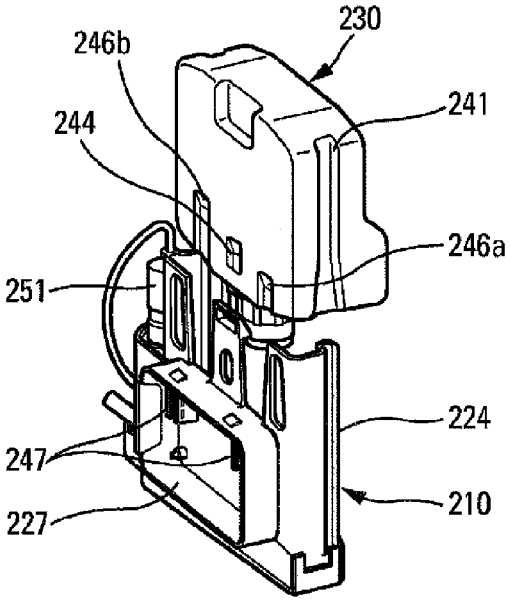
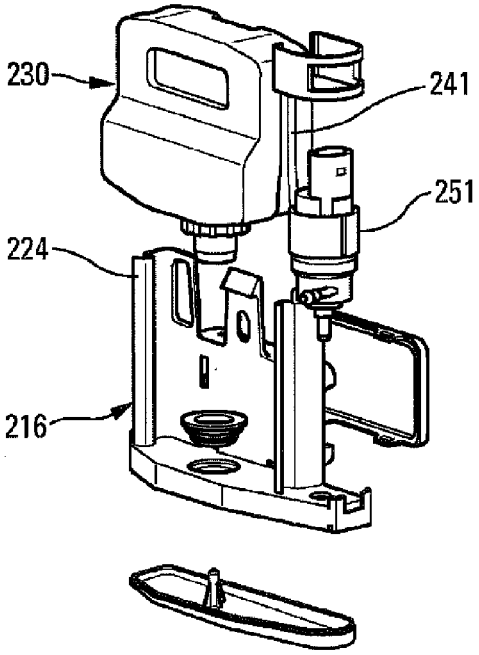


Fig. 20



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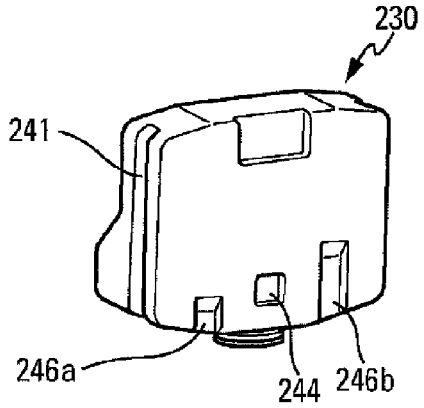

Fig. 22a

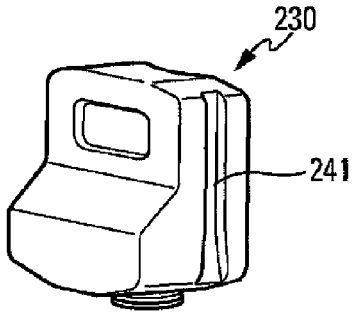

Fig. 22b

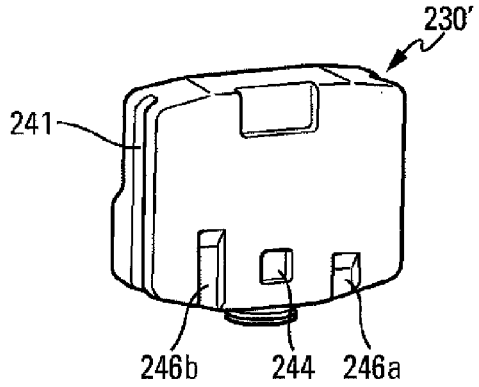

Fig. 23a

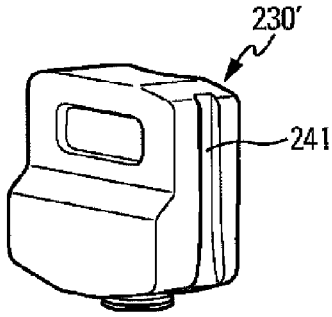

Fig. 23b

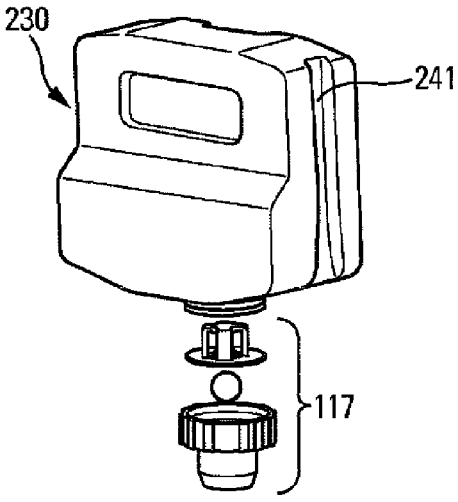

Fig. 24

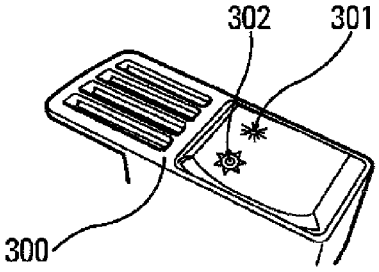

Fig. 25

SUPPORT FOR WINDSHIELD WASHER FLUID CONTAINER, WINDSHIELD WASHER FLUID CONTAINER, AND DEVICE COMPRISING SAID SUPPORT AND CONTAINER

[0001] The present invention consists in a support for a windshield washer fluid container, a windshield washer fluid container, a windshield washer fluid supply device and a vehicle windshield washer system.

[0002] Motor vehicles are routinely equipped with washer systems for cleaning the windshield of what could block the view of the passengers in the vehicle, such as mud splashes, insects, frost, ice. These washer systems are accompanied by windshield wiper systems and include a windshield washer fluid container installed on the vehicle and sprayer means enabling the liquid contained in the container to be sprayed in the direction of the windshield. For improved cleaning of the windshield, it is possible to add to the usual windshield washer fluid an additional product suited to the time of year and/or the required effect. For example, this product could improve the removal of insects in summer or de-icing of the windshield in winter. It is either added to the usual windshield washer mixture or contained in a second container and sprayed onto the windshield in combination with the windshield washer fluid.

[0003] Such systems are relatively inflexible and necessitate either a complex assembly with a plurality of pumps in the case of a plurality of containers or draining the container and replacing the liquid with an appropriate liquid and/or adding an additional product in the case of a single container.

[0004] Moreover, in the current systems, the fixing and the retention of a container are not suited to repeated fitting and removal thereof or to demounting of the support. The support is generally configured for one type of container and is not adapted to receive containers of varied shapes and/or volumes. Similarly, the current technology cannot show which type of fluid is being used.

[0005] An object of the present invention is to simplify the washer system, to improve the flexibility and the practicality thereof at the same time as improving the cleaning of the windshield. Generally speaking, it proposes an improvement to the current technology in this field. The invention further proposes to solve at least some of the problems mentioned above.

[0006] To this end, the invention consists in a support for a removable, interchangeable container for windshield washer fluid, said support being configured to be fixed to a vehicle and including a housing for one or more containers, said housing being configured to allow repeated fitting and extraction of said container or containers.

[0007] In other words, the support includes a housing into which a windshield washer fluid container can easily be fitted and from which the latter can be easily removed, in particular a pre-filled container. This easy fitting and removal of the container make it possible to be able to change the windshield washer fluid in a simple and practical manner as many times as necessary. The user can therefore adapt the windshield washer fluid according to their requirements, the season and/or the required effect.

[0008] In accordance with various embodiments of the invention, in combination or separately:

[0009] said housing is configured to enable said container or containers to be fixed by clipping,

[0010] said support includes means of connection to one of said containers enabling said container to communicate with a circuit of said fluid,

[0011] said connecting means are configured to enable opening of one of said containers,

[0012] said support includes means for fixing a pump for said fluid,

[0013] said connecting means include a pipe intended to connect said container and said pump,

[0014] said pipe includes a beveled end for opening said container or containers,

[0015] said support includes means for guiding the container or each container when it is mounted in the housing,

[0016] said guide means include a rectilinear slot or rib,

[0017] said guide means are located on lateral walls of said support.

[0018] The invention further concerns a removable and interchangeable container for windshield washer fluid, configured to be mounted in the support as described above.

[0019] In accordance with various embodiments of the invention, in combination or separately:

[0020] said container includes means for guiding the container or each container when it is mounted in the housing,

[0021] said guide means are translation guide means,

[0022] said guide means include a groove or a rectilinear rib,

[0023] said guide means are located on lateral walls of the container,

[0024] said container includes at least one opening, referred to as the first opening,

[0025] said first opening is adapted to cooperate with said connecting means,

[0026] said container is rigid and includes a second opening,

[0027] said second opening is adapted to maintain a pressure inside said container identical to atmospheric pressure,

[0028] said container is flexible and said first opening is the only opening of said container,

[0029] said container includes means for closing said openings,

[0030] said closure means are films,

[0031] said films are configured to close said openings after extraction of said container from said support,

[0032] said container is pre-filled with a windshield washer fluid,

[0033] said fluid is a de-icing liquid, a cleaning liquid or an anti-insect liquid,

[0034] said container comprises two independent compartments, and each of said compartments includes a first opening,

[0035] said first openings of said compartments are opposite one another.

[0036] The invention further concerns a windshield washer fluid supply device including a support and a container as described above. Said container is advantageously clipped into the housing or housings of said container.

[0037] In accordance with various embodiments of the invention, in combination or separately:

[0038] said device includes said pump,

[0039] said support and/or said container include container position poke yoke means, in particular making it possible to view the compartment intended to be used,

[0040] said support and/or said container include complementary guide means enabling the fitting of the container or containers in the housing,

[0041] the connecting means penetrate into said container or containers, in particular into said compartment.

[0042] In accordance with one aspect of the invention, which may be used with all or some of the above features, the support comprises reading means configured to detect identification means carried by the container or containers.

[0043] In accordance with various embodiments of the invention, in combination or separately:

[0044] said reading means are configured to detect the identification means with or without contact,

[0045] said reading means are configured to read the code of a transponder,

[0046] said support includes an electronic module housing the reading means.

[0047] Still in accordance with this aspect of the invention, the container includes identification means configured to be detected by reading means carried by the support.

[0048] In accordance with various embodiments of the invention, in combination or separately:

[0049] said identification means are configured to be detected by the identification means with or without contact,

[0050] said identification means include a transponder,

[0051] said identification means are covered or carried by a label,

[0052] said container includes on one of its walls a recess or a cavity for housing the identification means,

[0053] said container includes a label stuck to said wall and covering the recess.

[0054] This aspect of the invention further concerns a windshield washer fluid supply device including a support and a container as described above.

[0055] In accordance with various embodiments of the invention, in combination or separately:

[0056] said identification and reading means face each other in the position with the container mounted in the housing of the support,

[0057] in the position with the container mounted in the housing of the support said identification and reading means may be separated from each other by a wall of the container and/or a wail of the support.

[0058] In accordance with the aspect of the invention, the invention also concerns a vehicle including a vehicle windshield washer system as described and also, in the passenger compartment, means for displaying information relating to the container.

[0059] In accordance with this aspect of the invention, the invention finally concerns a method of controlling the windshield washer system of a vehicle as described including a step of identification of the container or containers in the housing of the support.

[0060] In accordance with various embodiments of this aspect of the invention, in combination or separately:

[0061] said method includes a step of transmitting information relating to the container to the passenger compartment of the vehicle,

[0062] said information transmitted includes one or more of the following: the type of fluid contained in the container, the level of fluid in the container, the quantity of fluid already used, and the benefit of using the fluid from the container for washing the windshield, etc.

[0063] In accordance with a further aspect of the invention that may be used with some or all of the above features, said container defines an internal enclosure connected to a fluid dispensing opening and includes at an end opposite the dispensing opening means for holding the container.

[0064] Said internal enclosure includes a first part, situated in the vicinity of the dispensing opening, that has a section different from that of a second part situated in the vicinity of the holding means.

[0065] In accordance with various embodiments of this aspect of the invention, in combination or separately:

[0066] said first part has a section larger than that of the second part so that the tank has a bulge at the level of this first part,

[0067] said first part has a section smaller than that of the second part so that the tank has a recess at the level of this first part,

[0068] said sections of the first and second parts each have a substantially rectangular shape,

[0069] said container has two substantially plane and parallel lateral walls connected at their rear ends to a substantially plane rear wall perpendicular to the lateral walls and at their front ends to a front wall that has an upper part and a lower part, the lower part of the front wall being substantially plane and parallel to the rear wall and connected to the upper part of the front wall by an inclined part,

[0070] said upper part of the front wall includes a depression or a cavity defining with the upper part of the container said holding means.

[0071] In accordance with this aspect of the invention, said support includes a housing for a container or containers as described above.

[0072] In accordance with various embodiments of this aspect of the invention, in combination or separately:

[0073] said housing is configured to receive containers the aforementioned first parts of the enclosures of which have different sections,

[0074] said housing is defined by two substantially parallel lateral walls of elongate shape the rear longitudinal edges of which are connected to one another by a rear wall substantially perpendicular to the lateral walls and the front longitudinal edges are free.

[0075] This aspect of the invention further concerns a windshield washer fluid supply device including a support and a container as described above.

[0076] In accordance with another aspect of the invention, which may be used with some or all of the above features, the invention also concerns a tank including a windshield washer fluid supply opening and a closing lid.

[0077] Said lid carries a projecting element substantially coaxial with the opening.

[0078] In accordance with various embodiments of this aspect of the invention, in combination or separately:

[0079] said projecting element is a finger,

[0080] said finger is substantially cylindrical,

[0081] said finger has a substantially pointed free end,

[0082] said finger is connected to the lid by webs of material each of which has a substantially radial orientation relative to the longitudinal axis of the finger,

[0083] said webs of material are regularly distributed around this axis,

[0084] at least a part of said projecting element passes through the opening,

[0085] said projecting element is formed in one piece with the lid,

[0086] said projecting element is added and fixed to the latter,

[0087] said lid includes means nesting over a part of the tank.

[0088] In accordance with this aspect of the invention, said support includes a housing for a container or containers as described above and further includes a tank as described above.

[0089] In accordance with various embodiments of this aspect of the invention, in combination or separately:

[0090] said opening of the tank opens into the housing of the container or containers,

[0091] said lid of the tank forms the base or lower part of the support.

[0092] This aspect of the invention further concerns a windshield washer fluid supply device including a support and a container as described above.

[0093] In accordance with various embodiments of this aspect of the invention, in combination or separately:

[0094] said container includes a fluid dispensing opening that is equipped with means of connection to the opening of the tank,

[0095] said connecting means are configured to be at least partly engaged in said opening,

[0096] said connecting means of the container include an element mobile from a first position blocking the opening of the container to a second position freeing that opening,

[0097] said projecting element of the tank of the support is configured to cooperate with and to move the mobile element from its first position to its second position when the connecting means are engaged in the opening of the tank,

[0098] said mobile element is a ball that is trapped in a housing of the connecting means,

[0099] said connecting means include a plug that is mounted in the opening of the container,

[0100] said plug is covered by a removable film.

[0101] In accordance with a further aspect of the invention, that may be used with some or all of the above features, said container includes at least one cavity configured to receive immobilizing or locking means carried by the support.

[0102] In accordance with various embodiments of this aspect of the invention, in combination or separately:

[0103] said cavity is situated on an upper part of the container,

[0104] said cavity is opposite a fluid dispensing opening of the container,

[0105] said cavity has a substantially parallelepipedal general shape,

[0106] said cavity is formed in an area connecting an upper wall of the container to a rear wall,

[0107] said cavity is delimited by two plane walls that are substantially perpendicular to each other.

[0108] In accordance with this aspect of the invention, said support includes a housing for a container or containers as described above.

[0109] Said support includes locking means configured to be at least in part engaged in the cavity of the container and to bear on a wall of that cavity with a view to immobilizing the container in said housing.

[0110] In accordance with various embodiments of this aspect of the invention, in combination or separately:

[0111] said locking means are of the elastic clipping type,

[0112] said locking means include at least one hook,

[0113] said hook is carried by an elastically deformable tongue,

[0114] said locking means are located on an upper part of the support.

[0115] This aspect of the invention further concerns a windshield washer fluid supply device including a support and a container as described above.

[0116] In accordance with various embodiments of this aspect of the invention, in combination or separately, said cavity of the container cooperates with said locking means of the support to immobilize the container in the housing of the support.

[0117] Finally, the invention concerns a vehicle windshield washer system including a windshield washer fluid supply device as described above, means for spraying the windshield with said fluid and means for wiping the windshield.

[0118] The invention will be better understood, and other objects, details, features and advantages thereof will become more clearly apparent in the course of the following detailed explanatory description of at least one embodiment of the invention given by way of purely illustrative and non-limiting example and with reference to the appended diagrammatic drawings.

[0119] In those drawings:

[0120] FIGS. **1** to **6** concern a first embodiment of the invention, in which:

[0121] FIG. **1** is a perspective view of a support in accordance with the invention,

[0122] FIG. **2** is a sectional perspective view of the bottom part of the support from FIG. **1**, a container in accordance with the invention being in the process of being mounted or demounted,

[0123] FIG. **3** is a perspective view of a container in accordance with the invention,

[0124] FIGS. **4** and **5** are diagrammatic perspective views of the container in accordance with two particular embodiments of the invention comprising two independent compartments,

[0125] FIG. **6** is a perspective view of a device in accordance with the invention in which poka yoke means are shown,

[0126] FIGS. **7** to **17** concern a second embodiment of the invention, in which:

[0127] FIGS. **7***a* and **7***b* are perspective views of two containers in accordance with the invention seen from the front and from the side,

[0128] FIG. **8** is a perspective view of the container from FIG. **7***a* seen from the rear and from the side,

[0129] FIG. **9** is a perspective view of the container from FIG. **7***a* seen from above,

[0130] FIG. **10** is a perspective view of a support in accordance with the invention seen from the rear and from the side,

[0131] FIG. **11** is an exploded perspective view of the support from FIG. **10** seen from the front and from the side,

[0132] FIGS. **12** and **13** are perspective views of the means for connecting the container to the support from FIG. **10**,

[0133] FIG. **14** is a sectional view of the connecting means from FIGS. **12** and **13**,

[0134] FIG. **15** is a perspective view of a base forming a lid of the support from FIG. **10**,

[0135] FIGS. **16** and **17** are sectional views of a device in accordance with the invention and show identification and reading means,

[0136] FIGS. **18** to **25** concern a third embodiment of the invention, in which:

[0137] FIG. **18** is a perspective view of a device in accordance with the invention seen from the rear and from the side,

[0138] FIG. **19** is a perspective view of the device from FIG. **18** seen from the front and from the side,

[0139] FIGS. **20** and **21** are other partly exploded perspective views of the device from FIG. **18**,

[0140] FIGS. **22***a* and **22***b* are perspective views of a container in accordance with the invention,

[0141] FIGS. **23***a* and **23***b* are perspective views of another container in accordance with the invention,

[0142] FIG. **24** is an exploded perspective view of a container and of its connecting means, and

[0143] FIG. **25** is a perspective view of display and activation means of the device in accordance with the invention located in the passenger compartment of a vehicle.

[0144] As shown in the various figures, the invention concerns first of all a support **10** for a windshield washer fluid container **30**. Said support **10** is configured to be fixed to a vehicle. It includes a housing **11** that is configured to allow repetitive fitting and removal of said container or containers **30**. The user can therefore change the container **30** as many times as required.

[0145] The housing shown in FIG. **1** is of parallelepiped shape; it may have any other shape provided that it is able to accommodate a container and that this shape is adapted to the shape of the container and to retaining it in the housing. It includes a lower wall **12**, a front wall **13** and a rear wall **14** and two opposite sides **15** and **16**, so as to form said housing **11**. The front and rear walls **13**, **14** and/or the opposite sides **15**, **16** are integral with said rear wall **14**. The opposite sides **15** and **16** connect the front and rear walls **13** and **14**.

[0146] The front wall **13** and/or the rear wall **14** include a notch **20** allowing the container to be seen and/or allowing it to be manipulated.

[0147] The support **10** is configured to be fixed to the vehicle; here it is fixed by pierced flanges **23** situated on respective opposite sides of the support **10** and in the same plane as the rear wall **14** of the support. These fixing means are shown by way of illustration only. Any other means or any other location is possible.

[0148] Said support **10** could further include means for locking the container **30** in said housing **11**, notably clipping means. Here said locking means include a flexible tongue **21** ending in a hook **22** integral with one and/or the other of the upper ends of said opposite sides **15**, **16**.

[0149] The lower wall **12** advantageously includes connecting means **17** that enable the connection between the container **30** and a windshield washer fluid circuit. The circuit includes a pump **51** and a set of pipes (not shown) connecting the pump **51** to the sprayer means. It is possible to connect the container **30** directly to the pump **51**. In this case, the support **10** includes fixing means **18** for fixing the pump to the support. It is also possible for the container **30** to be connected to the circuit, in particular to said pump, by way of a pipe **19** of the connecting means **17**.

[0150] The connecting means **17** may be configured to allow automatic opening of the container, such as by a beveled end **17***a* of said pipe **19** piercing of the bottom of the container.

[0151] As shown in the various FIGS. **1** to **6**, the invention also concerns the windshield washer fluid container **30**, configured so as to be mounted on the support **10** described above. It is removable and interchangeable. It can therefore be repeatedly fitted, removed and then replaced by another container **30** by the user as a function of their requirements and as many times as necessary.

[0152] The container **30** shown in FIG. **3** is of parallelepiped shape; it may have any other shape provided that the latter is adapted to the shape of the support **10** and the container can be inserted in the housing **11** of the latter. It includes an upper wall **31**, a lower wall **32**, a front wall **33**, a rear wall **34** and two opposite sides **35** and **36**.

[0153] The container **30** includes at least one opening **37**. The opening **37** situated on the lower wall is referred to as the first opening **37***a*. This opening **37***a* is adapted to cooperate with the connecting means **17** situated on the support **10**. This opening **37***a* allows dispensing of the windshield washer fluid to the circuit.

[0154] The container **30** may also include a second opening **37***b* situated on the upper wall **31** of the container **30**. This serves to maintain a pressure inside the container **30** identical to atmospheric pressure. This second opening **37***b* may therefore be necessary in the case of a rigid container **30** to facilitate the windshield washer fluid leaving it. On the other hand, in the case of a flexible container **30**, this second opening **37***b* is optional, the container being able to deform to allow the fluid to exit to the circuit. In the case of a flexible container **30**, it is then possible to design a container with a single first opening **37***a*.

[0155] The openings **37***a* and **37***b* may include closure means **38**. These may be films. These films will notably be configured to be able to close the openings **37**, in particular the first opening **37***a*, after extracting the container **30** from the support **10**. The containers extracted in this way can be reclosed for improved storage until the next use of the container, in particular if they are removed when not yet empty. This prevents deterioration or leaking of the windshield washer fluid.

[0156] By way of nonlimiting example, the closure means **38** may be chosen from stickers, membranes, plugs or flexible valves. In the case of a container **30** with a plurality of openings **37**, the closure means **38** may be identical or a combination of the means listed above.

[0157] The container **30** in accordance with the invention is advantageously pre-filled with a windshield washer fluid. This may be a de-icing liquid, a cleaning liquid or an anti-insect liquid, for example. The user therefore chooses the liquid required to be able to clean their windshield effectively.

[0158] In accordance with one aspect of the invention, said container **30** is disposable after using the liquid. In other words, said container **30** is not intended to be refilled after the pre-filled quantity of liquid has been used up. It therefore includes either a single first opening **37***a*, serving to drain it, or first and second openings. In the case of the presence of a second opening **37***b*, for maintaining it at atmospheric pressure, this could be a simple vent orifice, of small diameter, too small to allow it to be refilled.

[0159] In one particular embodiment of the container **30**, shown in FIGS. **4** and **5**, the container comprises two independent compartments **30***a* and **30***b*. It is therefore possible to have two different windshield washer fluids, one of which is being used and other of which is ready for use. Each of the compartments includes at least one first opening **37***a*. The first

openings **37***a* are preferably opposite one another so that the fluid ready for use does not weigh on the first opening **37***a* of the corresponding compartment.

[0160] FIG. **6** shows the device in accordance with the invention comprising a support **10**, a container **30** and a pump **51**. The front wall **13** of the support **10** and the front wall **33** of the container **30** include poka yoke means **20** and **39**. As shown, the poka yoke means **20** of the front wall **13** may notably take the form of a notch configured so that the poka yoke means of the container **39**, here a sticker of a particular color with a text and a diagram that are representative, can be seen, in particular through said notch **20**. By way of nonlimiting example, the poka yoke means of the container **30** may be a particular shape, a label, a sticker, a text, a diagram or a color. The user can therefore easily visualize the type of fluid contained in the container/the compartment being used.

[0161] Obviously any other poka yoke means may be envisaged, such as complementary shapes of the support and the container, respectively, intended to nest one in the other when the appropriate container is mounted on the support.

[0162] Note that variant embodiments are of course possible. It is notably possible, in an additional embodiment, for the housing **11** to be adapted to receive a container with double compartments **30***a* and **30***b*. In this embodiment, the housing **11** will be of a size and a shape adapted to the container and will include connecting means for putting the compartment being used in communication with the windshield washer fluid circuit. The poka yoke means **20** and **39**, if any, will make it possible to render the compartment being used visible.

[0163] In a variant embodiment shown in FIGS. **7** to **17**, the support **110** includes a housing **111** formed of a lower wall, a rear wall **114** and two opposite sides **115** and **116**. In this variant, the support **110** does not include a front wall, which makes it possible to mount a number of types of container **130** in the housing **111** and in particular containers having different internal volumes and shapes.

[0164] FIGS. **7***a*, **8** and **9** show a container **130** of one type and FIG. **7***b* shows container **130'** of another type, the capacities and the shapes of these containers **130**, **130'** being different.

[0165] Each container **130**, **130'** includes an upper wall **131**, a lower wall **132**, a front wall **133**, a rear wall **134** and two opposite sides.

[0166] The container **130** includes at least one opening, referred to as the first opening **137***a*, situated on the lower wall **132**. The latter opening is intended to be equipped with means **117** for connection to the support **110**. The opening **137***a* enables the windshield washer fluid or washer fluid to be dispensed to the circuit. The opening **137***a* may include closure means such as a film, in particular when the container **130** has not yet been used. This film is intended to be pierced when placing the container **130** on the support **110**, for example.

[0167] The container **130**, **130'** further includes a bulge or swelling **140** for adjusting its capacity. Here this swelling **140** is located in the lower part of the container **130**. To be more precise, the front wall **133** of the container includes a lower part and an upper part that are substantially parallel and that are joined to each other by an inclined part, the lower part being in front of the upper part. Because of this swelling **140**, the internal enclosure defined by the container does not have the same section in the lower part and in the upper part. The larger the swelling of the container the greater the capacity of the container. The container **130'** in FIG. **7***b* has a swelling larger than that **130** in FIG. **7***a* and therefore has a greater capacity (internal volume of 1.5 l for the container **130'** compared to 1.2 l for the container **130**). The swelling **140** can vary as a function of the type of fluid contained. Thus for a fluid that is used a lot and/or necessitates a greater quantity of product to be effective, such as a de-icing liquid, the swelling **140** will be larger than for a fluid used less and/or necessitating a smaller quantity, such as an anti-insect liquid. The size difference also makes it possible to distinguish the types of liquid and to tell the type of liquid being used.

[0168] In another variant embodiment, not shown, at least one of the containers may include a recess instead of a bulge. This is the case if the fluid contained in the container is used in very small quantities, for example, and a container of small capacity is sufficient for that fluid.

[0169] The container **130** can also include guide means **141** intended to cooperate with complementary guide means **124** of the support. Here the guide means **141** include rectilinear parallel ribs located on the sides of the container **130**, over substantially all the height thereof. Such ribs form guide rails.

[0170] The container **130** can also include a depression or a cavity, referred to as the first cavity **142**, located in the area joining the upper wall **131** and the rear wall **134** of the container. Here this is a cavity of substantially parallelepipedal shape, which is configured to cooperate with locking means **122** of the support **110** that are described in more detail hereinafter. The cavity **142** has a width or transverse dimension less than that of the container **130** and is formed substantially in the middle of the aforementioned connecting area. Here the cavity **142** is delimited by two substantially perpendicular walls, a vertical wall **142***a* and a horizontal wall **142***b*, the lower edge of the vertical wall **142***a* being joined to the front edge of the horizontal wall **142***b*.

[0171] The container **130** can also include a depression or cavity, referred to as the second cavity **143**, on the upper part of the front wall **133**. Here this is a substantially parallelepipedal cavity. It has a width or transverse dimension less than that of the container and is formed substantially in the middle of the front wall **133**. This second cavity **143**, and where applicable the first cavity **142**, form means for holding the container **130** when mounting and/or demounting it. The size of the two cavities will advantageously be sufficient for the user to be able to place the fingers of one hand therein for mounting and/or demounting the container **130**. The holding means of the container are therefore situated at the end of the container opposite its opening **137***a*.

[0172] The container **130** can also include one or more cavities on the lower part of the rear wall **134**, referred to as the third cavity **144**, as shown in FIG. **8**. Here the container includes a single third cavity **144** smaller than the other cavities **142**, **143** that is configured to accommodate means **145** for identification of the container, as described in more detail hereinafter.

[0173] To insert the container **130** and to retain it in complete safety in the housing **111** of the support **110**, the support **110** includes locking means **121**, **122** and guide means **124**. The locking means include a flexible tongue **121** terminated by a hook **122**, this tongue **121** extending upward from the rear wall **114** of the support **110**, substantially in line with that wall. The hook **122** is adapted to cooperate with the horizontal wall **142***b* of the first cavity **142** of the container.

[0174] The hook **122** locates in the cavity **142** and bears on the horizontal wall **142***b* thereof, thus preventing any move-

ment of the container **130**. This guarantees correct positioning of the container **130** and a good seal at the level of the connecting means **117** between the container and the support through the application of a slight force to the container by the hook. Moreover, the first cavity **142** also makes it possible to place the hook **122** lower down than if it had to be positioned directly on the upper wall **131** of the container **130**. The hook **122** therefore does not exceed much if at all the height of the container **130**, which prevents the hook from being in the way and therefore facilitates the accommodation and fixing of the support **110** in the vehicle. The location of the first cavity **142** is advantageously dependent on the location of the locking means. It is also possible to have a plurality of cavities **142** as a function of the number of locking means.

[0175] Alternatively, the locking means **121**, **122** can be adjustable so as to adapt to different sizes and notably different heights of the container.

[0176] The guide means **124** of the support **110** are configured to cooperate with the complementary guide means **141** of the container **130**. Here the guide means **124** of the support **110** are grooves formed on the sides **115**, **116** of the support **110**, these grooves being substantially rectilinear and having a substantially vertical orientation in the position of use of the support. As explained above, the guide means **141** of the container include complementary ribs (FIGS. **7***a* to **9**).

[0177] The support **110** can also include means **118** for fixing a pump **151** to the support **110**. In the example shown, the pump **151** is fixed to one side **116** of the support **110** by means of a ring that surrounds the pump and is removably fixed by appropriate means, such as hooks, to complementary means on the side of the support **110**.

[0178] The support **110** includes a base **125** that includes an internal tank **157**, this tank being closed and sealed by a lid **152** that is fixed by nesting means **153** to the upper part of the base **125**. The tank **157** is intended to be fed with fluid by the container **130** and to dispense the fluid to the pump **151**. The tank **157** is therefore in fluid communication with the container and the pump. First connecting means **117** are provided between the dispensing opening **137***a* of the container **130** and a supply opening **146** of the tank **157** and second connecting means **148** are provided between a dispensing opening **147** of the tank and an inlet of the pump **151** (FIG. **11**).

[0179] To provide the seal between the connecting means **117** and the tank **157**, a seal **126** is mounted in the opening **146** of the tank and is intended to be slightly compressed between the tank and the connecting means **117**. Another seal can be mounted in the opening **147** of the tank intended to be connected to the inlet of the pump **151**.

[0180] In the example shown, the connecting means **117** include a plug **170** that is fixed to a neck of the container **130**, at the level of its opening **137***a*, for example by screwing it thereto. The plug **170** may be permanently fixed to the container. The plug includes a mobile element, here a ball **171**, that is trapped in a housing, here a cage **172** of the plug **170**.

[0181] The plug **170** includes a transverse wall **174** carrying the cage **172** and including a central orifice **176**, this central orifice having a diameter less than that of the ball **171** and being conformed to form a seat for that ball **171**. The ball **171** is movable inside its cage **172** between a position in which it bears on the seat and blocks the orifice **176** and a position in which it is at a distance from the seat and therefore leaves the orifice **176** free, which orifice then communicates with the opening **137***a* of the container **130**. Return means such as a spring **178** are mounted in the cage **172** and urge the ball **171** into the position blocking the orifice **176**.

[0182] The plug **170** further includes a cylindrical rim **180** nesting in the opening **146** of the tank **157**. As shown diagrammatically in FIG. **14**, the lid **152** of the tank carries a projecting element **154** which here is a finger or a striker **156** that is intended to bear on the ball **171** and to move it during the aforementioned nesting. In the nested position, the striker **156** is engaged in the rim **180** and its free end bears on the ball **171** and moves it away from its seat. The fluid contained in the container **130** can then pass through the orifice **176** of the plug into the tank **157** (FIG. **14**).

[0183] The striker **156** is seen better in FIG. **15**. It has a cylindrical general shape the free upper end of which is substantially pointed. It is joined to the lid **152** by webs **155** of material each of which has a substantially radial orientation relative to the longitudinal axis of the finger and that are regularly distributed around that axis. These webs **155** form blades intended to slit the aforementioned film **182** that can cover the free end of the cylindrical rim **180** of the plug **170** when mounting the container on the support (FIG. **13**). Here there are four of these webs. The striker **156** can be in one piece with the lid **152** or a piece added and fixed to the lid.

[0184] A single movement in translation of the container **130** relative to the reservoir **157**, until the plug **170** nests in the opening **146** of the tank, is sufficient to establish fluid communication between the container and the tank.

[0185] FIGS. **16** and **17** show the identification means **145** carried by the container **130** and referred to above. These identification means **145** notably enable a management system (not shown) to tell the type of washer fluid being used. They can also be connected to the washer fluid circuit, in particular to the pump **151**, for example to detect the number of cycles of use and to determine whether the container **130** is empty and must be replaced. The identification means **145** can also make it possible to confirm that the container **130** is legitimate and to detect any infringement.

[0186] The identification means **145** can be accommodated in the aforementioned third cavity **144** of the container **130** and can be protected by means for closing said third cavity **144**, such as an adhesive label. Alternatively, the container can carry a label supporting the identification means, in which case the container does not necessarily need a third cavity, unless the identification means are relatively thick and it is preferable to protect them by accommodating them in this cavity.

[0187] In the example shown, the identification means are intended to be detected remotely by reading means **149** carried by the support **110**. As can be seen in FIGS. **16** and **17**, in the position of mounting a container in the housing of the support, the identification means **145** are positioned substantially facing the reading means **149** but may be separated from one another by a wall of the support such as its rear wall **114**, which nevertheless does not impede the identification of the container. Here the reading means **149** are accommodated in an electronic module **127** fixed to the rear of the support. This module **127** is closed and sealed by a removable lid **128**. In one particular embodiment of the invention, the identification means **145** include a transponder and the reading means **149** are adapted to read the code of that transponder.

[0188] The module **127** can further include means that are connected by electrical cables to the pump **151** in order to control it (FIG. **10**).

[0189] FIGS. **18** to **25** show another variant embodiment of the device in accordance with the invention.

[0190] This variant embodiment differs from that described above notably in that the guide means **224**, **241** of the container **230** and of the support **210** are different and the identification means **246***a, b* and the reading means **247** are different. The device in accordance with the invention essentially includes all the other features described above in so far as they conform to the drawings.

[0191] The guide means **224** carried by the support **210** include rectilinear ribs that are substantially vertical and extend over all the height of the support, on its sides. The guide means **241** carried by the container **230** include grooves that are situated on the sides of the container and are substantially complementary to the guide ribs of the support.

[0192] The identification means are of mechanical type and here take the form of two additional cavities situated on the rear wall of the container **230**, referred to as the fourth cavities **246**, configured to cooperate with reading means **247** by contact situated to the rear of the support **210** and accommodated in an electronic module **227** of the aforementioned type. These four cavities **246** are situated on respective opposite sides of the aforementioned third cavity **244**. Each has a rectangular general shape and they have different heights, one of them **246***a* being short and the other one **246***b* being long. Accordingly, for a given type of container **230** and washer liquid, the short cavity **246***a* is on a given side (FIGS. **22***a* and **22***b*) and for another type of container **230'** and liquid, the short cavity **246***a* situated on the other side (FIGS. **23***a* and **23***b*). The containers **230**, **230'** also have swellings of different sizes, as explained above. The reading means **247**, which are of switch type, each include at least one pin mobile between a retracted position and a deployed position. When the reading means are situated facing a long cavity **246***b,* the corresponding pin is in the deployed position and is engaged in that cavity. When the reading means are situated facing a short cavity **246***a,* the corresponding pin is in the retracted position and bears on the rear wall of the container. When placing the container **230** in the support **210**, the reading means **247** are therefore able to identify information relating to the container and to send a corresponding signal to the aforementioned management system.

[0193] Thus if a container without these cavities placed on a support, the management system can inhibit the operation of the pump, for example, so as not to deliver the fluid contained in said container to the washer system of the vehicle.

[0194] Similarly, the information identified by the identification means can be transmitted to a device for displaying this information in the passenger compartment of the vehicle. FIG. **25** shows a button **300** that can be located in the passenger compartment and that can for example include two indicator lamps **301**, **302** each corresponding to one type of washer liquid, i.e. to one type of tank mounted on the support of the washer device. The lamp **301** can indicate that a container containing de-icing liquid is mounted on the support and the lamp **302** can indicate that a container containing anti-insect liquid is mounted on the support, these lamps taking the form of representative diagrams, for example. Each of these lamps can be activated thanks to the information coming from the reading means **247** or the identification means **145** described above and from the management system (the type of fluid contained in the container, the level of fluid in the container, the quantity of fluid already used, the benefit of using the fluid from the container for washing the windshield, taking account of the ambient temperature, for example, etc.). This button **300** may be a control button that may be used to activate the fluid supply device and notably its pump **251**.

[0195] Regardless of the embodiment, the invention that has just been described finds a preferred application in motor vehicle windshield washer systems.

1. A device for supplying washer fluid, comprising:
at least one washer fluid container; and
a support configured to be fixed to a vehicle and comprising a housing able to receive at least one of said containers, in which the support and/or the container comprise poka yoke means for the positioning of the container.

2. The device as claimed in claim **1**, in which said container and said support are configured to allow repeated fitting of said container in and repeated extraction of said container from the housing of said support.

3. The device as claimed in claim **1**, in which the support comprises connecting means for connection to one of said containers allowing said container to be placed in communication with a circuit of said fluid.

4. The device as claimed in claim **3**, in which the connecting means are configured to allow the opening of one of said containers.

5. The device as claimed in claim **3**, in which said support comprises fixing means for a pump.

6. The device as claimed in claim **5**, in which the connecting means comprise a pipe intended to connect said container and said pump.

7. The device as claimed in claim **1**, in which the support and/or the container further comprise guide means able to allow one of said containers to be mounted in the housing of the support.

8. The device as claimed in claim **7**, in which guide means comprise a rectilinear rib or groove.

9. The device as claimed in claim **1**, in which said housing of the support has a substantially parallelepipedal shape delimited by at least two lateral walls connected by a wall belonging to the front or rear part of said support.

10. The device as claimed in claim **1**, in which the support further comprises locking means intended to hold said container in position.

11. The device as claimed in claim **1**, in which said container comprises at least one opening, referred to as first opening, able to collaborate with said connecting means.

12. The device as claimed in claim **11**, comprising a second opening able to maintain a pressure, identical to atmospheric pressure, inside said container, said container being rigid.

13. The device as claimed in claim **11**, in which said first opening is the only opening of said container designed to be flexible.

14. The device as claimed in claim **11**, comprising means for closing at least one of said openings, said closure means preferably being configured to re-close said openings after extraction of said container from said support.

15. The device as claimed in claim **1**, in which the container is pre-filled with a washer fluid that is one selected from the group consisting of, a de-icing liquid, a cleaning liquid and an anti-insect liquid.

16. The device as claimed claim **1**, in which the container comprises at least two independent compartments), each one of said compartments comprising a first opening, said first openings preferably being opposite one another.

17. The device as claimed in claim **16**, in which said container is clipped into said housing.

18. The device as claimed in claim **1**, in which the poke yoke means of the support comprise a cutout made in one of the faces of said support so that the poke yoke means of the container may be seen.

19. The device as claimed in claim **1**, in which the poke yoke means of the container are a specific shape and/or a label and/or a sticker and/or writing and/or a drawing and/or a color.

20. The device as claimed in claim **1**, in which the poke yoke means of the container and of the support are complementary shapes intended to nest one inside the other when the appropriate container is mounted on said support.

21. A vehicle windshield washer system comprising a washer fluid supply device as claimed in claim **1**, means for spraying the windshield with said fluid and means for wiping the windshield.

* * * * *