

"A DISPENSING DEVICE FOR LIQUIDS, E.G. PERMANENT
WAVE AGENTS"

The invention relates to a device for dispensing liquids, in particular liquid permanent wave agents, from a storage container provided with a dispensing closure into a portion container provided with a filling closure.

The dispensing of liquids from a large storage container into a smaller container is connected with great difficulties in all those cases in which a possible loss of liquid occurring during dispensing is felt to be particularly troublesome, for example on account of the resulting contamination, or when the contact with the air which occurs during free pouring causes, for example, the scape of noxious vapours or unpleasant smells, or when an undesired reaction of the liquid with atmospheric oxygen is to be feared.

Several of these considerations are to be taken into account when dispensing liquid permanent wave agents, when too much contact with atmospheric oxygen is primarily to be avoided because traditional permanent wave agents contain oxidizing constituents.

For example, when dispensing a liquefied gas into lighters from a storage container which is under high pressure, it is known to provide a filling closure constructed as a valve at the base of the lighter and to mount it directly on the dispensing closure of the storage container, which is also constructed as a valve. As a result of the pressure exerted thereby the dispensing closure of the storage container opens and

allows the pressurized liquefied gas to flow into the gas container of the lighter. This type of dispensing requires a relatively high pressure in the storage container, so losses during dispensing are unavoidable. However, in the given example of filling gas lighters these leakages are to a large extent insignificant because the emerging liquefied gas evaporates immediately and does not have any unpleasant or noxious effects. However, on account of the required high overpressure and possible leakages, this measure is not suitable for dispensing liquid permanent wave agents or similar liquids.

A possibility for dispensing liquid permanent wave agents or the like consists in providing the storage container with a tubular delivery nozzle which is inserted into a filling opening of the portion container. However, in this connection it is necessary to lift and tilt the storage container during each dispensing operation, so that there is not only the risk of liquid losses but also undesired contact with atmospheric oxygen occurs.

It must be taken as a starting point that for the dispensing of liquid permanent wave agents there is the requirement of simplifying the dispensing process so that the user can carry it out with one hand, and, while avoiding losses of liquid and restricting as far as possible the contact of the liquid with atmospheric oxygen, metering of the amount of liquid taken up into the portion container is to be made possible in a particularly simple manner so that the user can take the amount of liquid for the respective use.

The object of the invention is therefore to produce a dispensing device with which dispensing can be carried

out rapidly and simply, and losses of liquid are to be completely avoided and a contact of the liquid with the atmospheric oxygen is to be excluded as far as possible. No handling of the storage container should be necessary during and between the individual dispensing processes.

The invention provides a device for dispensing a liquid from a storage container with a dispensing closure into a portion container with a filling closure in its base, characterized by a frame having a lower part and an upper part constituting a support for the storage container; a filling valve for connection to the filling closure of the portion container, the filling valve being arranged in the lower part of the frame; and a dispensing connector for connection to the dispensing closure of the storage container, the connector being carried by the support and being spaced laterally and above the filling valve.

The storage container with its dispensing closure is connected to the dispensing connector. The flow connection between the dispensing connector and the filling valve can occur in a simple manner by a line, for example a flexible pipe. As a result of the difference in height between the storage container and the filling valve it is achieved that the liquid appears at the filling valve with an overpressure which is relatively slight but is sufficient for the dispensing process. The liquid rises upwards in the connected portion container from the filling closure in its base until the desired liquid level is reached in the portion container. In this case the liquid comes into contact with atmospheric oxygen as little as possible, especially as the liquid in the portion container rises

slowly and the liquid surface in the portion container remains smooth. Any free liquid jet with a considerable surface increase is thereby avoided.

- 5 In order to simplify use it is aimed to keep the manipulations required for the dispensing process to a minimum, and for example it is desired to dispense with separate operation of the filling valve.

To this end in a further development of the invention it is provided that the filling valve comprises a hollow filling plug which projects upwards and can be inserted into the filling closure of the portion container; at least one movable, spring-loaded valve actuator projects from a base surrounding the filling plug, for supporting the portion container; and the valve actuator is connected to a valve closure member of the filling valve. The filling valve therefore opens automatically as soon as a portion container is mounted and the arrangement of the valve actuator or actuators in the base for the portion container ensures that the filling valve is only opened when the portion container is placed on the base, and it is thus ensured that the filling plug is inserted completely into the filling closure of the portion container. In a corresponding manner the filling valve closes as soon as the portion container is lifted from the base so that it is prevented that liquid can still issue from the filling plug after the portion container is taken off. Contamination by escaping liquid is thereby avoided as far as possible.

According to a particularly advantageous embodiment of the filling valve it is provided that the valve actuator and the valve closure member are connected to a lower, movable valve housing supported on a spring; and the lower, movable valve housing part is connected to an upper valve housing which is rigid with the frame and connected to the base and the filling plug by a movable valve housing seal which is preferably a bellows. Thereby transition points to be sealed for movable components are avoided on the filling valve, which after a lengthy period of use could lead to leaks.

One embodiment of the subject matter of the invention has proved to be particularly advantageous in which the storage container is provided with lateral undercut recesses into which projections mounted on the support engage in the manner of a bayonet closure in the mounted state of the storage container. Thus a secure fastening of the storage container on the support is achieved so that, even in the case of very inappropriate handling and even when dispensing, no liquid can emerge.

10 In order to prevent the storage container from being necessarily closed before it is taken away from the dispensing device, which would lead to contamination and losses of liquid, in a further advantageous form of the invention it can be provided that the dispensing closure of the storage container
15 is a dispensing valve and comprises a valve screw cap bearing an inwardly projecting valve seat lip which in the closed state abuts in the manner of a seal against a central valve seat cylinder rigidly connected to the storage container; and the valve screw cap comprises longitudinal ribs extending
20 axially parallel on its outer side, into which guide ribs - which also extend axially parallel - of the dispensing connector engage.

Since the valve screw cap is connected to the dispensing connector of the support by interlocking ribs so as to be
25 axially displaceable but non-rotatable, only the rotation of the storage container, which is required to close the bayonet closure, opens the dispensing valve. In a corresponding manner the dispensing valve is closed in the case of the opposite rotational movement, which is required in order
30 to release the bayonet closure. In this manner not only is a simplification of handling achieved in that the storage

container is automatically opened when it is fitted to the support and closed again automatically when it is taken off but it is also ensured that no losses of liquid can occur when the storage container is mounted or taken off.

- 5 In order to guarantee a free flow of the liquid to be dispensed, various measures are possible in order to ventilate the storage container when liquid is drawn off.

In the simplest manner this ventilation is achieved in that the storage container comprises a closable ventilation opening
10 on its wall lying opposite the dispensing closure. Since the free surface of the liquid in the storage container is particularly great on account of its size, and because the liquid remains longer in the storage container in contrast to the portion container, it is particularly important that
15 the liquid surface in the storage container is distributed as little as possible. In this case it is particularly important that the liquid is drawn off on the underside of the storage container.

In order not to allow the ventilation opening to be opened
20 for an unnecessarily long period of time it is constructed so as to be closable. The amount of work required for the opening and closing of the ventilation opening can be avoided and the ventilation process limited to those periods of time in which ventilation is in fact necessary, i.e. only
25 during the decanting of the liquid into the portion container, by mounting a ventilation valve in the base in addition to the filling plug, the valve actuator of the valve projecting upwardly above the base and being connectible via a ventilation line to the ventilation connection in the dispensing connector.
30 Ventilation of the storage container only occurs when the portion container has been mounted.

Further advantageous forms of the invention constitute the subject-matter of the sub-claims.

The invention will be described further, by way of example, with reference to the accompanying drawings.

- 5 Figure 1 shows a dispensing device for dispensing a liquid permanent wave agent, in section, a portion container being illustrated in the raised state;

Figure 1a shows a storage container used in the device according to Figure 1, in the closed state;

- 10 Figure 2 shows an enlarged partial section through the dispensing device in the region of the filling valve, above which the lower part of the portion container is illustrated;

Figure 3 shows, in a sectional illustration corresponding to Figure 2, the state of the portion container when mounted;

- 15 Figure 4 shows a partial view in the direction of the arrow IV in Figure 3;

Figures 5 and 6 show a modified embodiment in illustrations corresponding to Figures 2 and 3, respectively;

- 20 Figure 7 shows an enlarged partial section through parts of the filling valve and the filling closure according to Figure 6;

Figure 8 shows in a vertical partial section a modified embodiment of a storage container connected to the dispensing connection part in vertical section;

Figure 9 shows in a vertical section another embodiment of a storage container in the closed state;

Figure 10 shows, in an illustration corresponding to Figure 1, an embodiment with a ventilation valve in the base for the portion container;

Figure 10a shows the storage container used in the device according to Figure 10, the dispensing closure being shown in section;

Figure 11 shows the embodiment according to Figure 10 in a partial section corresponding to Figure 5;

Figure 12 shows an enlarged longitudinal section through the dispensing valve and the dispensing connection part according to Figure 10 in the opened state; and

Figure 13 shows, in a longitudinal section according to Figure 12, the dispensing valve of the storage container in the closed state.

The dispensing device shown in Figure 1 comprises a frame or housing 1 consisting of two housing shells, the lower part 2 of the frame comprising a filling valve 4 inside an upright rim 3. A bottle-shaped portion container 5, which is made from at least partially transparent plastics and bears a screw cap 6 with a tubular delivery nozzle 7, has in its base a filling closure 8 which is only indicated in Figure 1 by broken lines and is opened when the container 5 is mounted on the valve 4.

From the other end of the lower part 2 of the frame a support 9 projects upwards and there bears a dispensing connector 10 to which a dispensing closure 11 of a storage container 12 can be connected. The connector 10 is connected via a pipe 13 to the filling valve 4.

As shown in detail in Figures 2 to 4, the filling valve 4 comprises an upwardly projecting hollow filling plug 14 which protrudes from a substantially horizontal base 15 for the portion container 5. When the container 5 is mounted, the plug 14 is introduced into its filling closure 8, which is provided with a central recess 16 and is made from resilient material, for example rubber. The part of the filling closure 8 projecting into the interior of the container 5 comprises two closure flaps 8a, 8b which can be moved laterally from a closing position (Figure 2) against their own spring force into an open position (Figure 3). In the position shown in Figure 3 the filling plug 14 projects into the container 5 so that the bore of the plug 14 is connected to the inner space of the container 5.

20 Three valve actuators 17 protrude from the base 15 and are connected to a lower, movable valve housing 18. The housing 18 is supported via a screw spring 19, against an insert 20 arranged in the lower part 2 of the frame.

The filling plug 14 and the base 15 are connected to an upper valve housing 21 which is rigid with the frame and preferably constructed in one piece. The two valve housings 18 and 21 are connected by a bellows 22 so as to be leak-tight but relatively movable. The pipe 13 terminates in the space which is enclosed by the bellows 22 and lies between the valve housings 18 and 21.

In a central bore 23 of the lower valve housing 18 a valve closure member 24 is inserted, whose hemispherical head 25 forms on its outer side a curved sealing surface 26 which engages with a conical valve seat 27 on the lower end of the filling plug 14. When the container 5 is mounted on the base 15, as shown in Figure 3, the valve actuators 17 are pressed downwards; they entrain the lower valve housing 18 and the valve closure member 24 so that the head 25 is lifted from the valve seat 27. The liquid located in the inner space of the filling valve 4 which subsequently flows through the pipe 13 rises in the container 5 to the desired level, which can be determined on the container 5 by markings. As soon as the desired liquid level in the container 5 has been reached, it is taken off again and all the parts return to the position shown in Figure 2.

The embodiment shown in Figures 5 and 6, in which the same reference numerals are used for the same parts as in Figure 1 to 4, differs from the previously described embodiment in that the valve closure member 24 is connected to a pin 28 projecting into the filling plug 14. In the closed state, the upper end of the pin 28 is in contact with an annular sealing surface 29 of the filling plug 14. Thereby not only is a double valve closure achieved but also the liquid remaining behind in the plug 14 when the filling valve 4 has been closed is prevented from drying up.

In a similar manner to the previously described embodiment the valve closure member 24 is inserted in the bore 23 of the lower valve housing 18 in the manner of a seal and so as to be axially displaceable.

In Figures 5 and 6 it is further shown that the two closure flaps 8a and 8b of the filling closure 8 are pressed by a surrounding rubber ring 30 into their closing position (Figure 5).

- 5 Figure 7 is an enlarged partial section of Figure 6 and shows parts of the filling valve 4 and the filling closure 8 of the portion container 5.

The storage container shown in the example according to Figure 1 comprises in the original closed state (Figure 10 1a) a stopper 31 within its dispensing closure 11 which is fitted on the base; the stopper 31 can be pressed into the interior of the container when the storage container is mounted by a projection 32 of the dispensing connector 10. The dispensing closure 11 has an external thread 33 15 which in the closed state (Figure 1a) bears a screw cap 34. After the cap 34 is taken off, the thread 33 is screwed into a connection thread 35 on the dispensing connector 10, and the stopper 31 is pushed upwards. The storage container 12 is thus connected to the pipe 13.

- 20 In order to be able to ventilate the storage container 12 when liquid is removed a closable ventilation opening 36 is provided on its upper side.

Another way of ventilating the storage container 12 is illustrated in Figure 8. In the dispensing connector 10 in addition 25 to a dispensing opening 37 connected to the pipe 13 a spherical non-return valve 38 is arranged which forms a ventilation valve and allows the corresponding amount of air to enter when liquid is dispensed from the storage container 12.

- In the construction of the storage container 12 according to Figure 9 no closable ventilation opening or ventilation valve is required. The liquid is contained in the storage container 12 in a foil bag 39, which is connected so as to be leak-tight to the dispensing closure 11. As the dispensing of the liquid continues, the foil bag 39 collapses. Contact of the liquid contained in the foil bag 39 with the surrounding air, which can flow in through a small ventilation bore 40 into the storage container 12, is completely prevented.
- 10 In the embodiment according to Figures 10 to 12, in addition to the pipe 13 intended for the liquid, a ventilation line 41 is provided which leads from the filling valve 4 to the dispensing connector 10. The ventilation line 41 is connected at the base of the connector 10 to a hollow needle 42 (Figure 15 12). The storage container 12 (Figure 10a) comprises a ventilation pipe 43 projecting upwards from its dispensing closure, which in the mounted state of the storage container 12 is connected to the ventilation line 41 in a manner which will be further described subsequently.
- 20 As Figure 11 shows in detail on an enlarged scale, in the base 15 of the dispensing connector 4 in addition to the filling plug 14 there is a ventilation valve 44 whose valve actuator is a tappet 45 connected at its lower end to a valve closure member 47 which abuts at its base against an annular valve seat 46 and at its upper end is provided with spring arms 48 extending radially outwards and downwards. The part of the valve tappet 45 projecting above the base is actuated by the base of the portion container 5, so that the ventilation line 41 is only opened when the container 5 is completely mounted and thus the filling plug 14 is also connected to the filling closure 8 of the container 5 so as to be leak-tight.

Figure 12 shows in detail the structure of the dispensing closure of the storage container 12. In this case the closure is in the form of a dispensing valve 49 comprising a valve screw cap 50 which bears an inwardly projecting valve seat lip 51. In the closed state the lip 51 lies in the manner of a seal against a central valve seat cylinder 52 which is rigidly connected to the storage container 12. The cap 50 has longitudinal ribs 53 which extend axially parallel on its outside and into which guide ribs 53a - which also extend axially parallel - of the dispensing connector 10 engage, which in the illustrated embodiment are constructed as webs between slots of the connector 10.

The valve seat cylinder 52 is connected to the ventilation pipe 43 and is closed at its lower end with a diaphragm 54 which is perforated by the hollow needle 42 when the storage container 12 is mounted, in order to produce a connection between the ventilation pipe 43 and the hollow needle 42 connected to the ventilation line 41. As soon as a portion container 5 is mounted and thus the ventilation valve 44 is opened, the space lying above the liquid level in the storage container 12 is ventilated in this manner via the ventilation line 41 so that liquid can flow into the container 5. The liquid flows from the storage container 12 through the gap released between the valve seat lip 51 and the valve seat cylinder 52 downwards into the dispensing opening 37 to which the pipe 13 is connected.

In order to produce a sealing closure between the valve screw cap 50 and a container cap 55, an axially projecting cylinder attachment 56 is provided on the cap 55 fitted to the storage container 12, which attachment 56 engages in an axially extending sealing groove 57 of the valve screw cap 50 in the manner of a seal.

Figure 13 shows the closed position in which the valve seat lip 51 abuts in the manner of a seal against the lower end on the outer side of the valve seat cylinder 52. When the valve screw cap 50 is screwed downwards the annular gap
5 for removing the liquid between the valve seat lip 51 and the valve seat cylinder 52 is released.

In the embodiment according to Figures 10 to 12, the storage container 12 comprises laterally undercut recesses 58 (Figure 10a) into which projections 59 mounted on the support 9
10 engage in the manner of a bayonet closure in the inserted state of the storage container 12. After inserting the storage container 12, however, the longitudinal ribs 53 of the valve screw cap 50 are also made to engage with the guide ribs 53a of the dispensing connector 10. When the
15 storage container 12 is subsequently rotated in order to bring the bayonet closure parts 58, 59 into engagement and thus to produce a rigid connection between the storage container 12 and the support 9, the valve screw cap 50 is rotated relative to the storage container 12 and thereby screw downwards.
20 It is only by this screwing movement that the valve seat lip 51 comes out of engagement with the valve seat cylinder 52 and releases the removal gap so that liquid can issue from the storage container 12 into the line 13. Thereby any loss of liquid is prevented when the container is mounted
25 and when dispensing is commenced.

Furthermore, in a corresponding manner at the end of dispensing, any loss of liquid is prevented because if necessary the storage container 12 must be rotated before being taken away from the support 9 in order to bring the bayonet closure
30 parts 58, 59 out of engagement. In this rotational movement

the valve screw cap 50 is rotated upwards into its closing position so that it is ensured that the valve seat lip 51 and the valve seat cylinder 52 engage in the manner of a seal before the storage container 12 can be taken off.

- 5 When the storage container 12 is taken off, the hollow needle 42 is simultaneously pulled out of the diaphragm 54, the opening of which closes again so as to be leak-tight.

CLAIMS:

1. A device for dispensing a liquid from a storage container (12) with a dispensing closure (11) into a portion container (5) with a filling closure (8) in its base, characterized by a frame (1) having a lower part (2) and an upper part constituting a support (9) for the storage container (12); a filling valve (4) for connection to the filling closure (8) of the portion container (5), the filling valve (4) being arranged in the lower part (2) of the frame (1); and a dispensing connector (10) for connection to the dispensing closure (11) of the storage container (12), the connector (10) being carried by the support (9) and being spaced laterally and above the filling valve (4).
2. A device as claimed in claim 1, in which the filling valve (4) comprises a hollow filling plug (14) which projects upwardly and is insertable into the filling closure (8) of the portion container (15); at least one movable, spring-loaded valve actuator (17) projects from a base (15) surrounding the filling plug (14), for supporting the portion container (5); and the valve actuator (17) is connected to a valve closure member (24) of the filling valve (4).
3. A device as claimed in claim 2, in which the valve actuator (17) and the valve closure member (24) are connected to a lower, movable valve housing (18) supported on a spring (19); and the lower housing (18) is connected to an upper valve housing (21) which is rigid with the frame and connected to the base (15) and the filling plug (14) by a movable valve housing seal (22).



4. A device as claimed in claim 3, in which the valve housing seal is a bellows (22).
5. A device as claimed in claim 3, in combination with the portion container (5), in which the filling closure (8) of the portion container (5) comprises at least two closure flaps (8a,8b) movable from a closing position laterally against spring force into an open position.
6. A device as claimed in claim 5, in which the filling closure (8) is made from resiliently deformable material.
- 10 7. A device as claimed in claim 2, in which the valve closure member (24) comprises a sealing surface (25) which engages with the conical valve seat (27) arranged at the lower end of the filling plug (14).
- 15 8. A device as claimed in claim 7, in which the valve closure member (24) is connected to a pin (28) projecting into the filling plug (14), which pin (28) engages at its upper end in the manner of a seal with a sealing surface (29) in the filling plug (14).
- 20 9. A device as claimed in claim 3, in which the valve closure member (24) is inserted into a central bore (23) of the lower, movable valve housing (18) in the manner of a seal and so as to be axially displaceable.
- 25 10. A device as claimed in claim 1, in combination with the storage container (12), in which the storage container (12) is provided with lateral, undercut recesses (58) into which projections (59) on the support (9) engage in the manner of a bayonet closure.



11. A device as claimed in claim 1, in combination with the storage container (12), in which the dispensing closure (11) of the storage container (12) comprises a closure stopper (31) which can be pushed into the interior of the container.

12. A device as claimed in claim 11, in which the dispensing closure (11) of the storage container (12) comprises an external thread (33) which fits a connection thread (35) on the dispensing connector (10) of the support (9).

13. A device as claimed in claim 1, in combination with the storage container (12), in which the storage container (12) comprises a closable ventilation opening (36) on its wall lying opposite the dispensing closure (11).

14. A device as claimed in claim 1, in combination with the storage container (12), in which the storage container (12) contains a foil bag (39) which is connected so as to be leak-tight to the dispensing closure (11).

15. A device as claimed in claim 1, in which the dispensing connector (10) comprises a dispensing opening (37) and a ventilation valve constructed as a non-return valve (38).

16. A device as claimed in claim 1, in combination with the storage container (12), in which the dispensing connector (10) comprises a dispensing opening (37) and a ventilation connection (41) which connects in the manner of a seal to a ventilation pipe (43) projecting upwardly from the dispensing closure (11) of the storage container (12) into the inner space of the container.



17. A device as claimed in claim 2, in combination with the storage container (12), in which the dispensing connector (10) comprises a dispensing opening (37) and a ventilation connection (42) which connects in the manner of a seal to a ventilation pipe (43) projecting upwardly from the dispensing closure (11) of the storage container (12) into the inner space of the container, and base (15) in addition to the filling plug (14) is provided with a ventilation valve (44) having a valve actuator (45) which projects upwardly above the base (15) and is connectible via a ventilation line (41) to the ventilation connector (42) in the dispensing connector (10).

18. A device as claimed in claim 17, in which the ventilation valve (44) comprises a valve closing member (47) which lies against an annular valve seat (46) from below, and the valve closing member (47) is connected to a valve tappet (45) which projects upwardly above the base (15).

19. A device as claimed in claim 18, in which the valve tappet (45) is provided at its upper end with spring arms (48) which extend radially outwards and downwards.

20. A device as claimed in claim 10, in which the dispensing closure of the storage container (12) is constituted by a dispensing valve (49) comprising a valve screw cap (50) bearing an inwardly projecting valve seat lip (51) which in the closed state lies in the manner of a seal against a central valve seat cylinder (52) rigidly connected to the storage container (12), the valve screw cap (50) having axially parallel longitudinal ribs (53) on its outside, the dispensing connector (10) having axially parallel ribs (53a) which engage with the said longitudinal ribs (53).



21. A device as claimed in claim 16, in which a hollow needle (42) which projects upwardly is fitted on the ventilation connection (43) and the dispensing closure (11) of the storage container (12) comprises a diaphragm (54) which closes the ventilation pipe (43) and can be perforated by the hollow needle (42).

22. A device as claimed in claim 20, in which the dispensing valve (49) includes a cylinder attachment (56), which is connected to the storage container (12) and projects axially, engaging in the manner of a seal into an axially extending sealing groove (57) of the valve screw cap (50).

23. A device for dispensing a liquid from a storage container into a portion container, substantially as described with reference to, and as shown in, the accompanying drawings.

