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**Bodet et al.**(10) **Pub. No.: US 2013/0168413 A1**(43) **Pub. Date: Jul. 4, 2013**(54) **DISPENSING MODULE AND METHOD FOR  
FILLING A DISPENSING MODULE****Publication Classification**(75) Inventors: **Hervé Bodet**, Verdun (FR); **Eric  
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USPC ..... **222/137; 141/2; 141/3**(73) Assignee: **BAYER MATERIALSCIENCE AG**,  
Leverkusen (DE)(57) **ABSTRACT**(21) Appl. No.: **13/814,726**(22) PCT Filed: **Aug. 12, 2011**(86) PCT No.: **PCT/EP2011/063909**

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The invention relates to a dispensing module (1) for two liquid products, comprising: a first wall (3); a first piston (64) which can slide along the first wall, and which is embodied as a first chamber (30) having at least one outlet; a second piston (61) which is designed such that it can slide along a second wall (21). Coupling means (62) are provided in order to couple together both pistons when the product is being dispensed and at least one of the pistons comprises a piston head (7) which is separated initially by the coupling means, and securing means (641, 722) are provided in order to join the piston head to the coupling means.

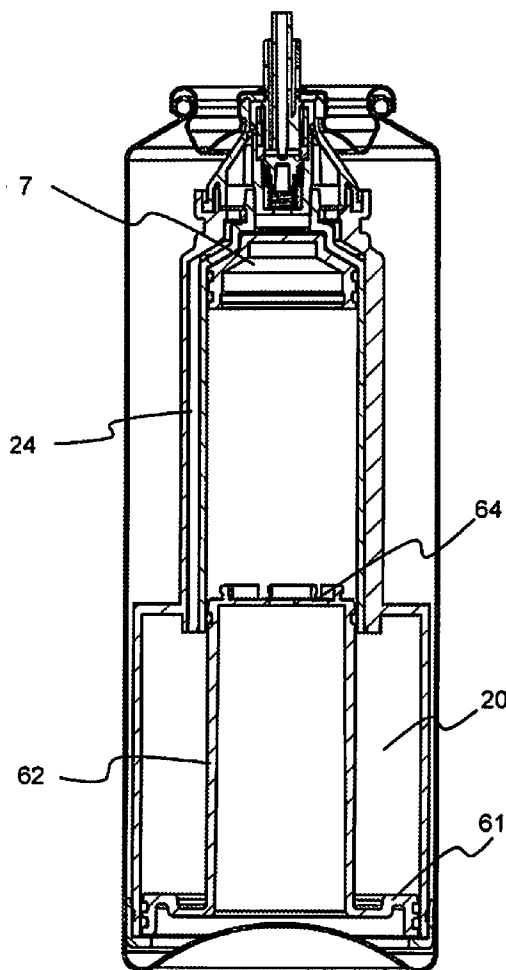


Fig. 1

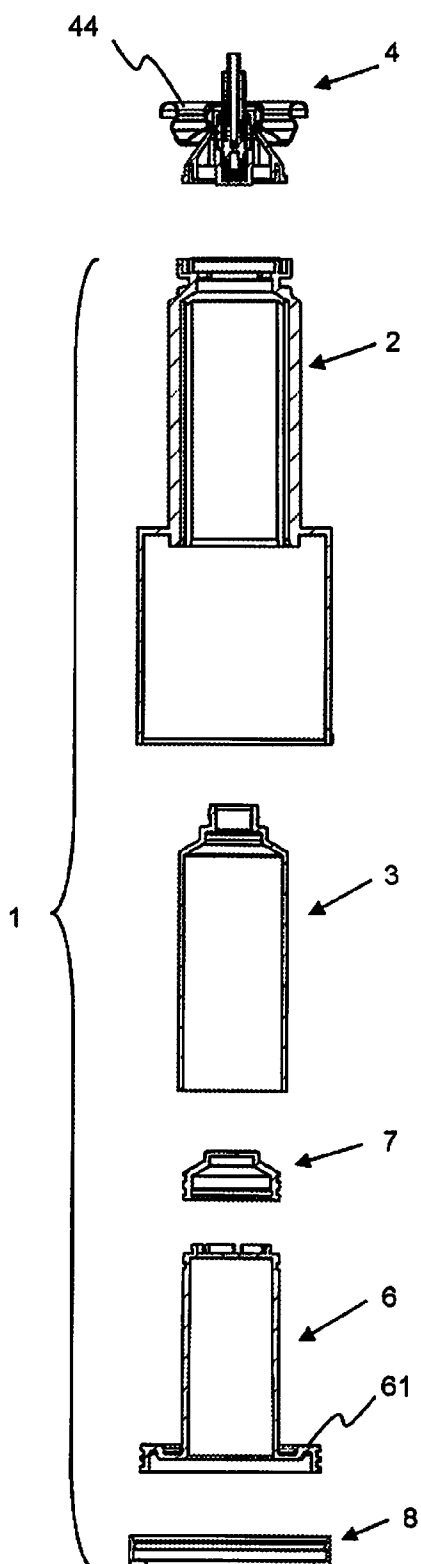


Fig. 2

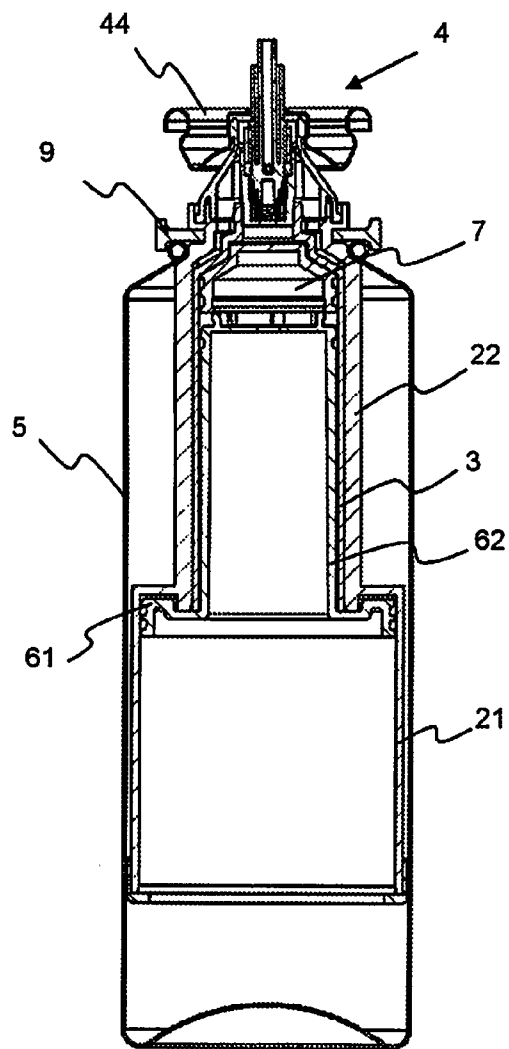


Fig. 3

Fig. 4

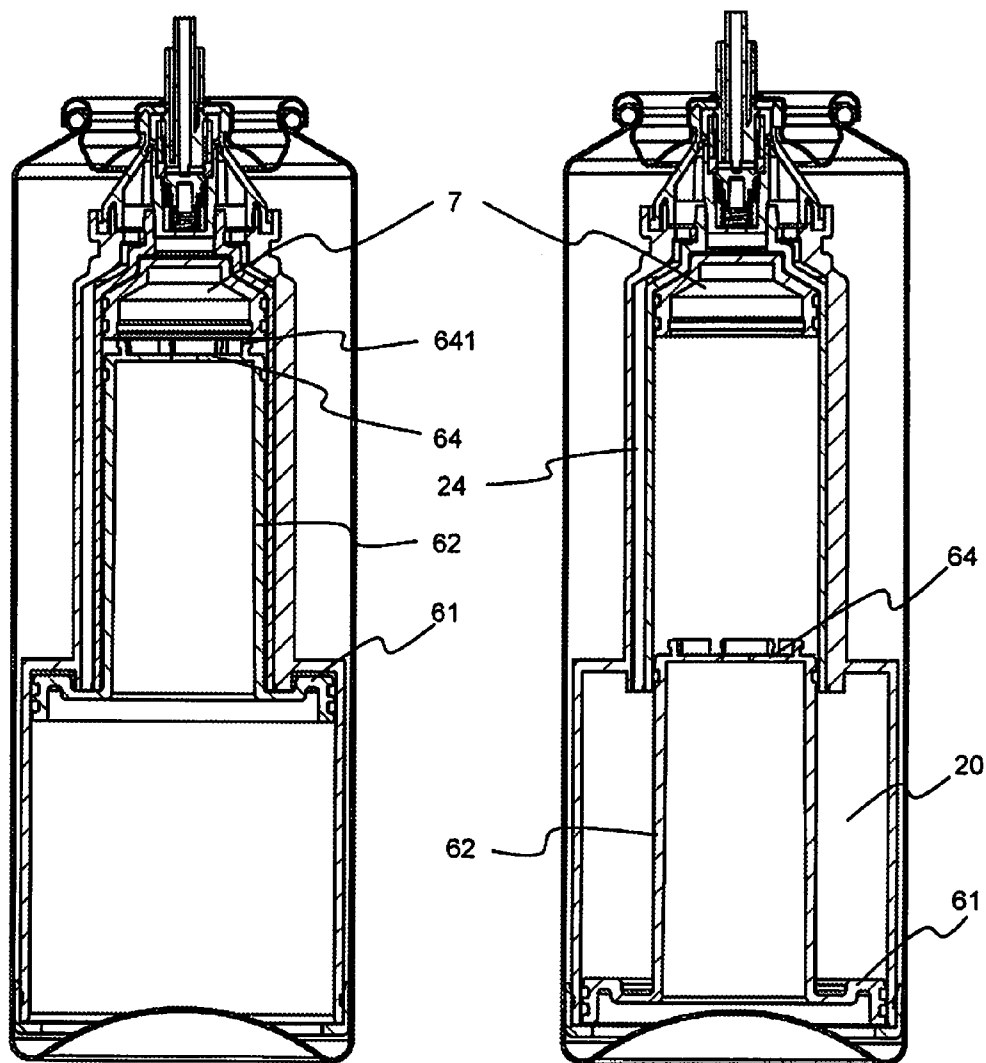


Fig. 5

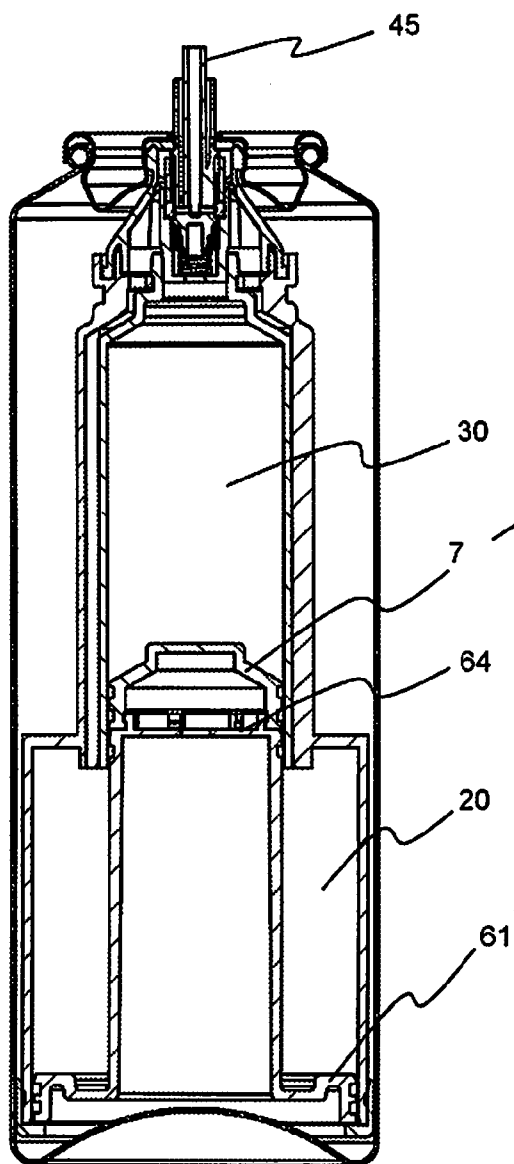
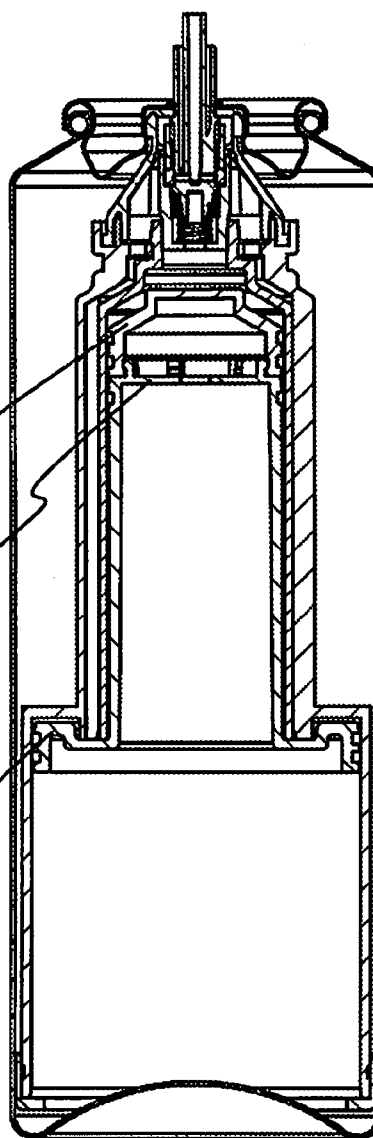


Fig. 6



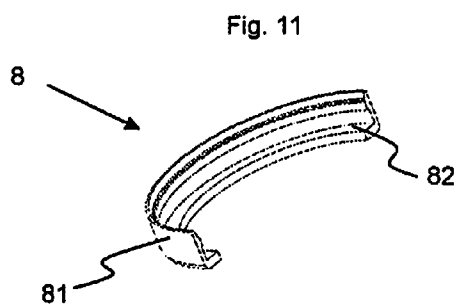
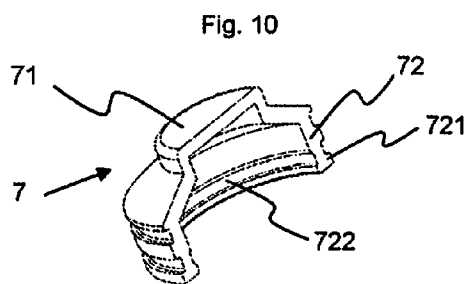
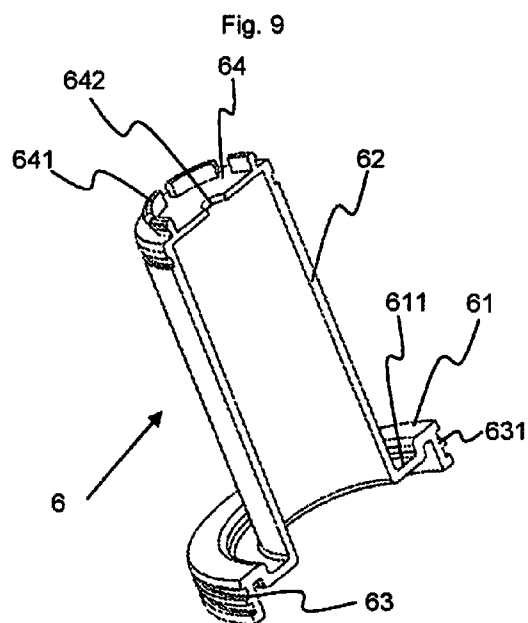
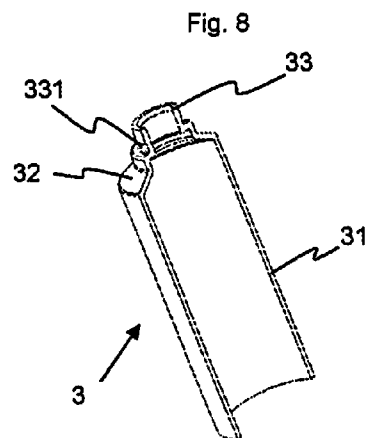
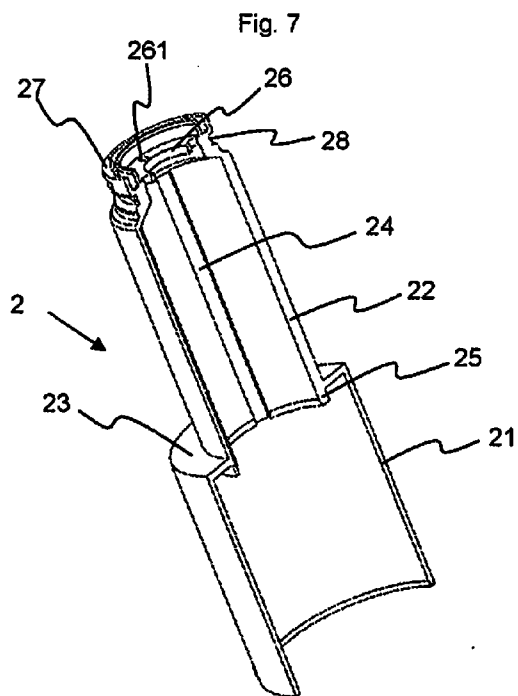
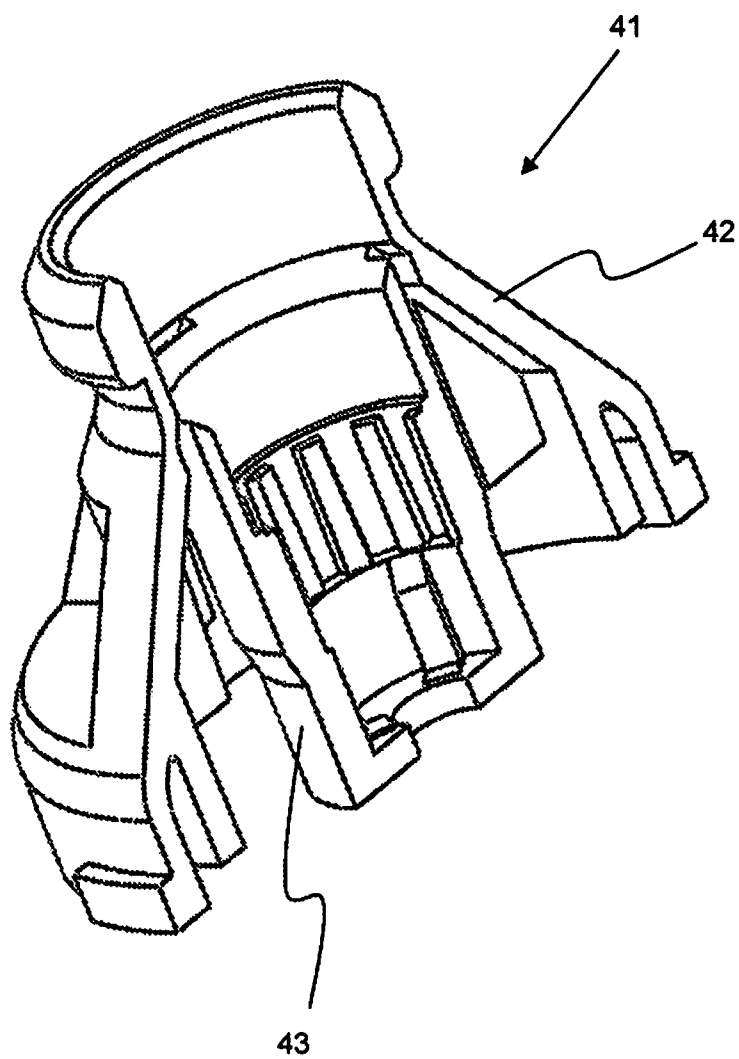


Fig. 12



## DISPENSING MODULE AND METHOD FOR FILLING A DISPENSING MODULE

[0001] The invention relates to a dispensing module for two liquid products, said dispensing module including:

[0002] a first cylindrical wall;

[0003] a first piston which can slide along the first wall, wherein it forms a first chamber which has at least one outlet opening,

[0004] a second piston which is dimensioned such that it can slide along a second wall,

[0005] wherein coupling means are provided in order to couple the two pistons together during product dispensing,

[0006] and at least one of the pistons has a piston head which is initially separated from the coupling means and fastening means are provided in order to connect the piston head to the coupling means.

[0007] The invention also relates to a method for filling a dispensing module.

[0008] The term liquid products in the present application refers to all products which can be output by means of a dispensing module, that is to say also highly viscous or gaseous products as well as solids dispersed in a gas.

[0009] It is frequently necessary to separate two products contained in one container until the point of their use in order, for example, to avoid unwanted chemical reactions between the products. In such cases, the two products are kept in two chambers of the container, which are separated apart from each other, and are conveyed by means of two-way valves or two-way pumps to the dispensing opening where they come into contact with each other.

[0010] Two-piston systems are also known. DE 20 2007 004 662 U1 makes known a container with two pistons which are arranged one above the other and slip along the wall of the container. A two-way pump is arranged on the container. A first way of the pump opens out at the top end of the container. The second way opens out in a line which traverses the first piston and the latter can slip along the same. The first product is situated in the space above the first piston, whilst the second product is situated in the space between the first and the second piston. The risk of conveying the two products in an insufficiently precise mixing ratio is relatively great also in the case of said device.

[0011] Said disadvantage is avoided in that the two pistons are coupled together in a mechanical manner such that when the one piston is displaced, the other piston is also displaced in a corresponding manner. This solution proceeds from the documents U.S. Pat. No. 3,915,345 A or DE 20 07 199 A. In both cases, there is a central cylinder which is fastened to a two-way valve. Said two-way valve is fastened on a housing which is also cylindrical. A first piston slides along the inner wall of the central cylinder and thus forms a first chamber, whilst a second circular ring-shaped piston slides along the outer wall of the central cylinder by way of its central edge and along the wall of the housing by way of its outer edge and thus forms the second chamber. The two pistons are connected together. In the case of document U.S. Pat. No. 3,915, 345 A, they are connected by a double wall which surrounds the bottom edge of the central cylinder. In the first exemplary embodiment of DE 20 07 199 A, the two pistons are separated by a circular ring-shaped space and by way of their bottom ends are connected by means of a base plate. The propellant necessary for the common displacement of the two pistons is situated under the base plate or under the piston.

[0012] In both cases, the filling of the two chambers causes problems. As, on account of the dimensions of the input openings, it is not possible to fill the two chambers at the same time, it is necessary to fill first one chamber and then the other. As, however, the two pistons are connected together in a mechanical manner, when the one chamber is being filled, the piston arranged therein is pressed down and entrains the other piston. The second chamber is formed and is filled with air. Consequently, the air that has entered into the second chamber has to be removed before the second chamber is filled with product.

[0013] The object of the invention, consequently, is to create a dispensing module as claimed in the preamble which is easier to fill and to create a method for filling said dispensing module.

[0014] Said object is achieved in that the second wall is formed by a housing into which the dispensing module can be inserted, wherein the second piston and the second wall form a second chamber which has at least one outlet opening.

[0015] The first and the second wall are preferably cylindrical, other developments also being conceivable however, for example walls with an oval cross section.

[0016] The problem of filling such types of dispensing modules for two liquids is solved by initially decoupling the two pistons which are not coupled together until during the filling operation. The descending of the piston of the chamber filled first of all does not result in the piston head which is not yet coupled also descending. As soon as the second liquid is filled in, the second piston head, in turn, descends and is coupled to the coupling means.

[0017] It is claimed in the invention that the second wall is an integral component of the dispensing module, the second piston and the second wall forming a second chamber which has at least one outlet opening. The second chamber is consequently an integral component of the dispensing module.

[0018] As an alternative to this, it is also possible that the second wall is formed by a housing into which the dispensing module can be inserted, wherein the second piston and the second wall form a second chamber which has at least one outlet opening.

[0019] Associated with the invention is that at least one pressure-equalizing opening is provided in the coupling means in order to connect the side of the piston head or piston heads, which is facing away from its respective chamber in the operating state of the outlet opening(s), to the side of the other piston which lies opposite its respective chamber in the operating state of the outlet opening(s).

[0020] Said pressure-equalizing opening avoids the forming of a vacuum when the first liquid is being filled into the dispensing module.

[0021] Within the framework of the invention, it is provided that removal means which are connected to the outlet openings of the chambers are provided.

[0022] In this context, it is advantageous that the removal means include a two-way valve or a two-way pump, wherein the first way is connected to the outlet opening of the first chamber and the second way is connected to the outlet opening of the second chamber.

[0023] One development of the invention consists in that the removal means include a metering device.

[0024] It is also expedient that closing means are provided in order to close the outlet openings of the first chamber and of the second chamber, wherein the closing means have an open and a closed position.

[0025] In the case of a further development of the invention, it is provided that the chamber(s) provided with a piston head is/are dimensioned such that with the first piston inserted in a maximum manner into the first chamber in the direction of the outlet opening, in the fill-ready state there is still sufficient space for the piston head which is not connected to the coupling means.

[0026] Within the framework of the invention there is also a method for filling a dispensing module as claimed in the invention having the following method steps:

[0027] a1) the dispensing module is assembled such that the first piston is situated in the position in which it is arranged closest to the outlet opening or openings of the first chamber, wherein the piston head or piston heads is/are not connected to the coupling means;

[0028] b1) if necessary, the dispensing module is inserted into a housing in order to form the second chamber insofar as the dispensing module does not already have a second cylindrical wall;

[0029] c1) the first liquid is filled into the chamber which is not provided with a piston head or selectively into either of the two chambers if both chambers are provided with a piston head;

[0030] d1) the second liquid is filled into the still empty chamber which is provided with a piston head at sufficient pressure in order to bring about the connecting of the piston head to the coupling means at the end of the filling operation.

[0031] One development of the invention consists in that prior to step c1), in a step c0i) removal means or closing means are applied to the outlet openings of the two chambers.

[0032] Another development of the invention consists in that, prior to step c1), in a step c0ii) the dispensing module is introduced into the interior of the container, the inner wall of which does not serve as a wall for the second chamber.

[0033] It is claimed in the invention that, prior to step c1), in a step c0iii) pressurized gas is introduced into the housing.

[0034] As an alternative to this, it is also possible that, after step d1), in a step e1) pressurized gas is introduced into the housing.

[0035] An exemplary embodiment of the invention is described below by way of drawings, in which:

[0036] FIG. 1: shows an exploded drawing of the dispensing module as claimed in the invention;

[0037] FIG. 2: shows a sectioned side view of a container during assembly;

[0038] FIG. 3: shows a sectioned side view of the container according to FIG. 2, which can be filled;

[0039] FIG. 4: shows a sectioned side view of the container according to FIG. 2 where the first product has been filled into the second chamber;

[0040] FIG. 5: shows a sectioned side view of the container according to FIG. 2 after the second product has been filled into the first chamber;

[0041] FIG. 6: shows a sectioned side view of the container according to FIG. 2 after emptying;

[0042] FIG. 7: shows a sectioned perspective representation of the outer casing;

[0043] FIG. 8: shows a sectioned perspective representation of the inner casing;

[0044] FIG. 9: shows a sectioned perspective representation of the piston unit;

[0045] FIG. 10: shows a sectioned perspective representation of the head of the first piston;

[0046] FIG. 11: shows a sectioned perspective representation of the stop for the second piston;

[0047] FIG. 12: shows an enlarged representation of the valve housing.

[0048] The dispensing module (1) shown is provided with two chambers (20, 30), said dispensing module being fastened to a valve (4) of a container (5), preferably a pressure container. Each chamber (20, 30) is provided with a piston (61, 64 and 7). Coupling means (62) are provided in order to couple the two pistons (61, 64 and 7) together once the chambers have been filled such that they are moved simultaneously. The valve (4) is preferably a two-way valve such that the product contained in the first chamber (30) does not come into contact with the product from the second chamber (20) until exiting from the valve (4) or possibly until exiting from the outlet opening fastened to the valve (4).

[0049] The dispensing module (1) consists substantially of an inner casing (3) in which the first piston (64) slides and forms the first chamber (30), of an outer casing (2) in the bottom region (21) of which the second piston (61) slides and forms the second chamber (20), of coupling means (62) in order to couple the two pistons (61, 64 and 7) together and retaining means (8) in order to serve as a stop for the second piston (61).

[0050] The outer casing (2) consists of a first, bottom cylindrical part (21) and a second, top cylindrical part (22) with a smaller diameter. The two cylindrical parts are connected together by means of a radial connecting wall (23). In the exemplary embodiment shown, the wall of the top cylindrical part (22) penetrates slightly into the top part of the first cylindrical part (21) by penetrating the radial wall (23). Said projection (25) serves as a top stop for the second piston (61). However, it would also be possible to dispense with said projection and to use the radial wall as a stop. The top cylindrical part (22) has in its top region a ring-shaped radial shoulder (26) which is penetrated by one or several openings (261). It is achieved in this way that the outer casing is realized in a tubular manner with openings at both ends. Channels (24) are arranged on the inside surface of the top cylindrical part (22). They extend over the entire height of said top part (22). The top surface of the second cylindrical part (22) is provided with fastening means (27), by way of which the two-chambered dispensing module (1) is fastened to the two-way valve (4). Said fastening means (27) include a crown which is provided with latching means which can interact with complementary latching means on the two-way valve (4).

[0051] The inner casing (3) consists substantially of a cylindrical main part (31), the outside diameter of which corresponds substantially to the inside diameter of the top cylindrical part (22) of the outer casing (2). The cylindrical main part (31) is tapered in its top region, preferably by forming a truncated cone-shaped wall (32) and is closed off with a cylindrical part which forms a sleeve (33). Just as the outer casing (2), the inner casing also has a tubular form with openings at both ends. The sleeve (33) has a ring-shaped radial groove (331) which is open to the outside and the bottom diameter and height of which correspond to the inside diameter and the height of the ring-shaped shoulder (26) of the top cylindrical part (22) of the outer casing (2). Consequently, the inner casing (3) can be inserted into the interior of the top cylindrical wall (22) of the outer casing (2) until the sleeve (33) engages into the opening in the center of the ring-shaped shoulder (26) and said shoulder (26) engages into



the groove (331). In this way, the inner casing (3) is fastened in a fixed manner in the interior of the outer casing (2). The length of the inner casing (3) is selected such that the bottom end, in the position locked into the outer casing (2), is aligned with the bottom end of the top cylindrical part (22) of the outer casing (2). The inner casing (3) serves, with the channels (24), for the purpose of defining the outlet lines for the product contained in the second chamber (20). For this purpose, the channels (24) are dimensioned such that they open out in the space, which is arranged above the truncated cone-shaped wall (32), but below the ring-shaped shoulder (26).

[0052] The two pistons are combined in one piston unit (6). The second piston (61) has a radial ring-shaped part which is fastened to the bottom end of a cylindrical part (62). At its edge, the radial ring-shaped part has an axial rim (63) which extends proceeding from the side of the ring-shaped part which faces away from the cylindrical part (62). The outside diameter of said rim (63) corresponds to the inside diameter of the bottom part (21) of the outer casing. The rim (63) is provided with sealing means in order to seal off the piston (61) to the inside surface of the bottom part (21) of the outer casing (2). Said sealing means are realized, for example, as free-flowing, highly-viscous sealing means in the form of sliding gels or of sealing lips (631) which consist, for example, of elastomer materials. The outside diameter of the cylindrical part (62) of the piston unit (6) corresponds substantially to the inside diameter of the inner casing (3).

[0053] In this way, the second chamber (20) is formed by a ring-shaped space between, on the one hand, the cylindrical bottom part (21) of the outer casing and the cylindrical part of the piston unit (6) and, on the other hand, between the second piston (61) and the radial wall (23) of the outer casing which connects the bottom part (21) and the top part (22) together.

[0054] The second piston (61) can slide in the interior of the bottom cylindrical part (21) of the outer casing (2). In order to prevent it escaping from the same, it is provided, that once all the parts of the dispensing module (1) have been inserted into the outer casing (2), to fasten retaining means (8) of the same to the bottom end. Said retaining means (8) are realized as an axial rim (81), the inside diameter of which corresponds substantially to the outside diameter of the bottom cylindrical part (21) of the outer casing. Said axial rim (81) extends in its bottom region beyond a ring-shaped radial wall (82) toward the center. The retaining means (8) are fastened to the bottom end of the bottom part (21) of the outer casing (2), for example by way of latching means. The piston (61) can consequently be displaced between a first position, in which it strikes against the radial wall (23) of the outer casing (2) (see FIG. 3) and a second position in which its bottom rim (63) strikes against the ring-shaped wall (82) of the retaining means (8) (see FIG. 4).

[0055] The first piston (64) is formed by the top surface (64) of the cylindrical part (62) of the piston unit (6). Said cylindrical part (62) consequently serves as coupling means which make it possible to displace the two pistons (61, 64) simultaneously.

[0056] A separate piston head (7) is fastened to the top surface of the first piston (64). Said piston head (7) consists substantially of a radial circular wall (71) which is lengthened downward by a rim (72). Sealing means are provided on the outer surface of the rim in the form of sealing lips (721). The outside diameter of the rim (72) corresponds to the inside diameter of the cylindrical main part (31) of the inner casing (3).

[0057] Consequently, the first chamber (30) is defined by the space between, on the one hand, the inner surface of the inner casing (3) and, on the other hand, the top surface (32) of the same and the piston head (7). The piston head (7) also serves as a sealing ring for the top part of the second chamber (20).

[0058] The piston head (7) is provided with latching means (722) which make it possible to lock it into place in an irreversible manner on complementary latching means (641) which are arranged on the top surface of the piston unit (6). Said latching means (641, 722) are dimensioned such that a sufficiently strong pressure has to be exerted onto the piston head (7) so that it locks into place on the top surface of the piston (64), and in a preferred manner is provided with one or several grid elements which are able to balance out possible fill tolerances. In this way, unwanted engagement is avoided, in particular during storage or when handling the empty dispensing modules. In addition, the height of the cylindrical main part (31) of the inner casing (and consequently the height of the top part (22) of the outer casing) is selected such that when the piston unit (6) is situated in the top position, in which the second piston (61) strikes against the radial connecting wall (23), there is sufficient space in the interior of the inner casing for the cylindrical part (62) and the released, non-engaged piston head (7).

[0059] When assembling, the inner casing is first of all fastened in the outer casing, the piston head (7) is inserted into the interior of the inner casing (3), the piston unit (6) is then inserted, it being inserted as far as possible, i.e. until the second piston (61) strikes against the connecting wall (23). In this position, the piston head (7) is situated above the top part of the piston unit (6) without being locked in place therein. The sealing means (631, 721) of the two pistons (61, 64) exert sufficient pressure onto the inner wall of the respective chamber in order to hold the piston unit (6) and the piston head (7) in their position for as long as no product is filled in.

[0060] Such a unit with two chambers is intended for the purpose of being fastened on dispensing means, such as a two-way valve (4) or a two-way pump. It is also possible to provide only closing means which are opened during the dispensing operation. The dispensing means can include metering means such that when the dispensing means are actuated, a predetermined amount of each of the products is output. Two-way valves are known, for example from documents U.S. Pat. No. 3,915,345 or WO 2007/132 107 A1. In the example shown here, this is a two-way valve of the type described in the last-mentioned document. The method of operation of said valve is consequently not described in any more detail.

[0061] As in the case of the two-way valve of document WO 2007/132 017 A1, it is possible to provide one or several openings in the body of the valve (41) such that the gas can escape from the second chamber (20) along the same path as the product when the valve is actuated. There is nothing against providing the propellant with a third product to which it does not react. The container then contains three products which are separated spatially during storage.

[0062] The unit consisting of the two-chambered dispensing module (1) and the dispensing means (4) can then be fastened in a housing (5). If the dimensions of the dispensing unit (1) and in particular of the outside diameter of the outer casing (2) and/or of the diameter of the valve disk (44) of the dispensing means allow, the dispensing module (1) can be inserted into the inner region of a prefabricated housing.

Otherwise, it is necessary to realize the housing (5) around the dispensing module (1). This is the case with the example shown in the figures.

**[0063]** The ratio between the initial volume of the first and of the second product is determined by the ratio between the area of the first piston (64) and of the second piston (61). The dispensing module consequently makes possible a very high level of precision, which is what is required for the ratio between the initial volumes of the two products. As a result of the area ratio between the area of the first piston (61) and of the second piston (64), it is also possible to fill the second chamber (30) at a higher pressure than the external pressure.

**[0064]** It is obvious that the second piston (61) can also be realized with a separate piston head. The piston head is then ring-shaped. The height of the bottom cylindrical part (21) of the outer casing and/or of the cylindrical part (62) of the piston unit has to be sufficiently large in order to make it possible for the piston unit to be able to penetrate completely into the inner casing, said piston unit striking by way of its top part without the ring-shaped piston head locking into place in the piston unit (6). If the second piston (61) has a separate piston head, it is not necessary for the first piston (64) also to be provided with a separate piston head (7).

**[0065]** If the dispensing module (1) is used on a pressure container, as is the case in the example shown here, it can then be sensible to arrange the unit comprising the dispensing unit (1) and the dispensing means (4) in a sturdy position in the housing (5), the valve disk (44) not yet being connected to the housing (85). This makes it possible to fill in the propellant during the filling before the valve disk (44) is fastened on the housing (5). In order to secure the unit comprising dispensing module/dispensing means in said position (as shown in FIG. 2), there is provided a fork (9) which blocks the unit such that the tip of the second cylindrical part (22) of the outer casing strikes against the inner surface of the top surface of the housing (5). Said removable fork (9) penetrates into a groove (28) which is provided for this purpose at the tip of the outer casing (2) below the fastening means (27).

**[0066]** The principle of a removable piston head can also in the case of apparatuses such as those described in DE 20 07 199 A or U.S. Pat. No. 3,915,345 A. In this case, the dispensing module (1) consists only of one first chamber (30) in which the first piston (64 and 7) slides, one second piston (61) and coupling means (62). The wall which the second chamber forms is not associated with the dispensing module. It consists, for example, of the inner wall of the housing (5). In this case too, the piston head can be used selectively for the first chamber or for the second chamber that is not yet realized.

**[0067]** The filling of the dispensing module as claimed in the invention is described with reference to FIGS. 3, 4, 5 and 6.

**[0068]** FIG. 3 shows a container provided with a dispensing module (1) fastened to a two-way valve (4), the two-way valve (4) being fastened on the neck of the housing (5). The gas has already been brought into the housing and exerts a pressure onto both the piston head (7) of the first piston (64) and onto the second piston (61). The container can now be filled with the two products. In this connection, first of all, by means of the second way of the dispensing means (4), then by means of the channels (24) the first product is filled into the second chamber (20) which does not have a separate piston head. The piston unit (6) is pushed back by the incoming product which presses onto the second piston (61). The separate piston head (7) remains in its initial position, i.e. in the top

region of the first chamber (30), whilst the top part of the piston unit (6) is pushed downward by the second piston (61). A pressure-equalizing opening (642) in the top part (64) of the piston unit prevents a vacuum forming between the fixed piston head (7) and the top part which is moving downward. At the end of the fill operation of the second chamber (20), the rim (63) of the second piston (61) strikes against the ring-shaped radial wall (82) of the retaining means (8), as shown in FIG. 4.

**[0069]** The second product can then be filled into the first chamber (30) by means of the first way of the valve (4), the faucet (43) and the sleeve (33). The incoming product presses the piston head (7) downward. The gas in the space between the interior of the cylindrical part (62) of the piston unit is pressed out in the top part of the piston unit by means of the pressure-equalizing opening (642). The pressure exerted onto the piston head (7) by the second product is sufficient in order to overcome the resistance of the latching means (641, 722) and to lock the piston head (7) in place in the piston unit (6). The two pistons (61, 64) then are coupled together and can just be moved simultaneously. This corresponds to the situation shown in FIG. 5. A spray head still has to be placed in position on the rod (45) of the valve and possibly a protective cap mounted thereon. The container is ready for use. Thanks to the separate piston head (7), it is possible to fill the container at two separate fill units without it being necessary to suck out the air prior to filling the first chamber, as is necessary in the case of two-chamber devices as claimed in the prior art.

**[0070]** The method can consequently be summarized in the following steps:

**[0071]** a1) preparation of the dispensing module, the piston unit being positioned as close as possible to the outlet opening or openings of the first chamber (30). This ensures that the piston head (7) is detached from the coupling means (62). The dispensing module (1) is situated in the state shown in FIG. 3, the removal means (4) and the housing (5) have been omitted.

**[0072]** b1) If the dispensing module (1), as in the above-mentioned case, does not have a second chamber, it has to be inserted into a cylindrical wall which serves as an outer wall for the second chamber. The cylindrical wall can be formed as in U.S. Pat. No. 3,915,345 A or DE 20 07 199 A by the housing of the container.

**[0073]** c0i) If the liquids are to be removed by removal means, such as a two-way valve (4) or a two-way pump or the outlet openings of the chambers are simply to be closed by way of plugs, it is sensible to install said removal means or closing means prior to filling in the liquids.

**[0074]** c0ii) Should the dispensing module be arranged in the interior of a container, the inner wall of which is not to serve as a wall for the second chamber, this should preferably be undertaken prior to filling in the liquids.

**[0075]** c0iii) If the container is to be pressurized, it is possible to fill the gas in the container before the dispensing module or the removal means are connected to the container from step b0) or c0ii).

**[0076]** c1) The first liquid is filled into the second chamber (20). If the piston head is not to be arranged in the first chamber but rather in the second chamber, the first chamber is filled first of all. If a piston head is to be provided in both chambers, it is possible to begin with either the first or the second chamber.

[0077] d1) The second liquid is brought into the first chamber (30) at a sufficient pressure in order to connect the piston head (7) to the coupling means (62) at the end of the fill operation. If the second chamber is provided with the piston head (7), the second liquid is then brought into said second chamber. If both chambers are provided with a piston head, the chamber which is still empty is filled.

[0078] e1) If the container is to be pressurized and the gas has not yet been introduced in step c0iii), it is possible to bring in the gas after the liquids have been filled in, by means of an opening on the bottom of the container which is closed by way of a plug.

[0079] It is understandable for the chambers (20, 30) not to be formed until the product has been filled in. The chamber with the separate piston head, in this case the first chamber (30), is not realized at the same time as the other chamber, in this case the second chamber (20). On the contrary, it is not formed until the second product is filled. It is consequently not necessary to provide a suction device for withdrawing the air from the chamber filled with the second product, in this case the first chamber (30), before the second product is filled in.

[0080] Compressed gases, such as nitrogen, oxygen and compressed air as well as liquefied gases such as hydrocarbons, for example butane and isopentane, dimethyl ether and fluoro-hydrocarbons can be considered in particular as propellant to discharge the product. However, it is also possible to discharge the product by means of mechanical systems such as springs or elastic materials with a restoring force such as elastomers.

[0081] As an alternative to this, it is also possible to fasten the valve disk (44) to the housing (5) of the pressure container, then to fill the dispensing module (1) and to fill in the gas by means of an opening in the bottom of the pressure container which is subsequently closed. If the gas is filled in from above, provision must be made for the gas to be able to flow as far as the bottom for example by means of channels provided for this purpose.

[0082] Fields of application for the dispensing module as claimed in the invention can be found, for example, in the technical or pharmaceutical sector, in the sector of medical products, foodstuffs, cosmetics, personal hygiene, biocides, disinfectants or bleaching agents. In addition, the most varied product concepts can be realized: reactive systems can provide, for example, gas-generating systems (e.g. CO<sub>2</sub>), hardening systems (e.g. chemical reactions such as chain lengthening, cross linking, coagulation, polymerization, in particular in the area of polyurethane chemistry), gelling systems with, where applicable, modification of viscosity, generation of active substances (e.g. chlorine, hypochlorite, H<sub>2</sub>O<sub>2</sub>, sulfur, iodine), enzymatic systems, acid-base systems, temperature-modifying systems (e.g. exothermic or endothermic mixtures) or adhesive systems. Further product concepts provide mixtures and the generating of specific material properties such as emulsions, dispersions, water-in-oil, oil-in-water, water-in-oil-in-water, odors, additive mixtures (AM), mixtures of active substances (e.g. vitamins), colors (e.g. coloring of objects and body parts), active disinfecting mixtures as well as certain flow or sliding properties.

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List of references:

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1	Dispensing module
2	Outer casing
21	First cylindrical part (bottom part)
22	Second cylindrical part (top part)
23	Radial connecting wall
24	Channels
25	Projection
26	Radial ring-shaped shoulder
261	Openings
27	Fastening means
28	Groove for the removable fork
3	Inner casing
31	Cylindrical main part
32	Truncated cone-shaped part
33	Part forming a sleeve
331	Radial ring-shaped groove
4	Two-way valve
41	Valve body
42	Collar-shaped part
43	Faucet-shaped part
44	Valve disk
45	Rod
5	Housing
6	Piston unit
61	Second piston
611	Ring-shaped groove
62	Cylindrical part
63	Sealing rim
631	Sealing lips
64	First piston
641	Latching means for the piston head
642	Pressure-equalizing opening
7	Head of the first piston
71	Radial wall
72	Sealing rim
721	Sealing lips
722	Latching means
8	Holding means
81	Axial rim
82	Radial ring-shaped groove
9	Removable fork

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1. A dispensing module for two liquid products, said dispensing module comprising:

a first cylindrical wall;

a first piston which can slide along the first wall, wherein it forms a first chamber which has at least one outlet opening,

a second piston which is dimensioned such that said second piston can slide along a second wall,

wherein coupling means are provided in order to couple the two pistons together during product dispensing,

and at least one of the pistons has a piston head which is initially separated from the coupling means and fastening means are provided in order to connect the piston head to the coupling means, wherein said second wall is formed by a housing into which the dispensing module can be inserted, wherein the second piston and the second wall form a second chamber which has at least one outlet opening.

2. The dispensing module as claimed in claim 1, wherein at least one pressure-equalizing opening is provided in the coupling means in order to connect the side of the piston head or piston heads, which is facing away from its respective chamber in an operating state of the outlet opening, to the side of the other piston which lies opposite a respective chamber thereof in the operating state of the outlet opening.

3. The dispensing module as claimed in claim 2, wherein removal means which are connected to the outlet openings of the chambers are provided.

4. The dispensing module as claimed in claim 3, wherein said removal means include a two-way valve or a two-way pump, wherein a first way is connected to the outlet opening of the first chamber and a second way is connected to the outlet opening of the second chamber.

5. The dispensing module as claimed in claim 4, wherein the removal means include a metering device.

6. The dispensing module as claimed in claim 4, wherein closing means are provided in order to close said outlet openings of the first chamber and of the second chamber, wherein said closing means have an open and a closed position.

7. The dispensing module as claimed in the claim 1, wherein said chamber provided with a piston head is dimensioned such that, with said first piston inserted in a maximum manner into said first chamber in a direction of said outlet opening, in a fill-ready state there is sufficient space for said piston head which is not connected to said coupling means.

8. A method for filling a dispensing module as claimed in claim 1, comprising:

- a1) assembling said dispensing module such that said first piston is situated in a position in which said first piston is arranged closest to the outlet opening or openings of said first chamber, wherein said piston head or piston heads are not connected to said coupling means;
- b1) if necessary, said dispensing module is inserted into a housing in order to form said second chamber insofar as the dispensing module does not already have a second cylindrical wall;
- c1) the first liquid is filled into said chamber which is not provided with a piston head or selectively into either of the two chambers if both chambers are provided with a piston head;
- d1) the second liquid is filled into an empty chamber which is provided with a piston head at sufficient pressure in

order to bring about connecting of said piston head to said coupling means at end of a filling operation.

9. The method as claimed in claim 8, wherein prior to c1), in c0i), removal means or closing means are applied to the outlet openings of the two chambers.

10. The method as claimed in claim 8, wherein prior to c1), in c0ii), the dispensing module is introduced into an interior of a container, an inner wall of which does not serve as a wall for the second chamber.

11. The method as claimed in claim 10, wherein prior to c1), in c0iii) pressurized gas is introduced into the housing from b1) or c0ii).

12. The method as claimed in claim 10, wherein, after d1), in step e1) pressurized gas is introduced into the housing from b1) or c0ii).

13. The dispensing module as claimed in claim 5, wherein closing means are provided in order to close said outlet openings of the first chamber and of the second chamber, wherein said closing means have an open and a closed position.

14. The method as claimed in claim 9, wherein in prior to c1), in c0ii), the dispensing module is introduced into the interior of a container, the inner wall of which does not serve as a wall for the second chamber.

15. The method as claimed in claim 8, wherein in prior to c1), in c0iii), pressurized gas is introduced into the housing from step 1)1).

16. The method as claimed in claim 9, wherein in prior to c1), in c0iii), pressurized gas is introduced into the housing from step 1)1).

17. The method as claimed in claim 8, wherein, after d1), in e1), pressurized gas is introduced into the housing from step 1)1).

18. The method as claimed in claim 9, wherein, step d1), in e1), pressurized gas is introduced into the housing from step 1)1).

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