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[54] **DEVICE FOR STORING TWO LIQUIDS SEPARATELY AND DISPENSING THEM SIMULTANEOUSLY UNDER PRESSURE**

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[51] **Int. Cl.** **B65d 83/14**

[58] **Field of Search** 141/20, 348, 349; 222/135, 222/136, 153

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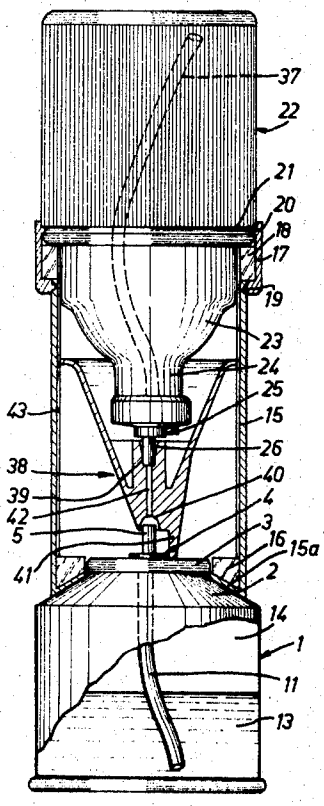
[57] **ABSTRACT**

Storage and dispensing device comprises a storage container for holding one liquid under pressure and a dispensing container in which another liquid is stored. The two containers are connected by a connecting tube along which one of the containers is axially slidable. Such sliding movement opens valves on both containers, so that liquid from the pressurized storage container is driven into the dispensing container, which is then separated from the tube and storage container and used as a dispenser.

10 Claims, 4 Drawing Figures



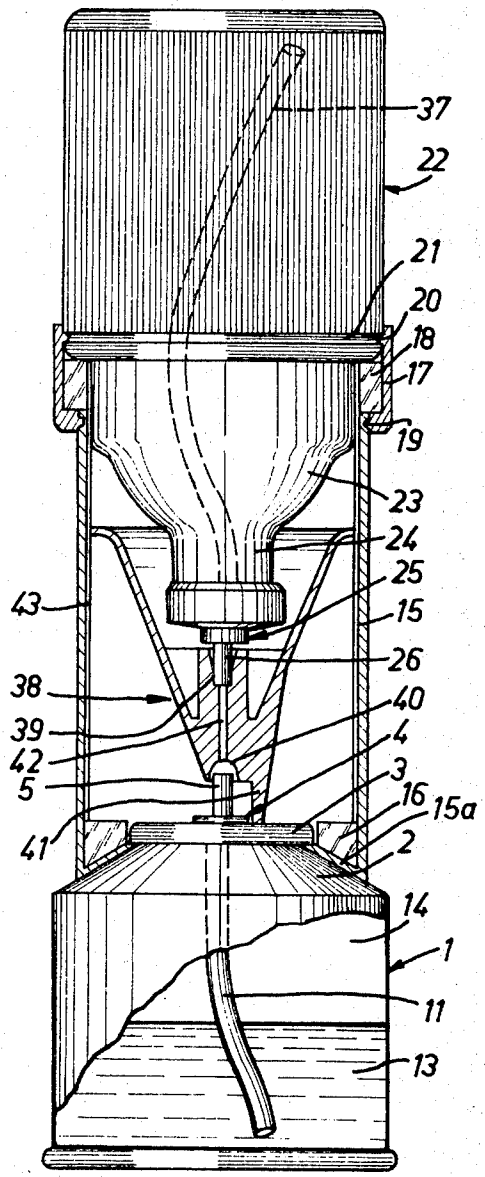

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FIG. 1

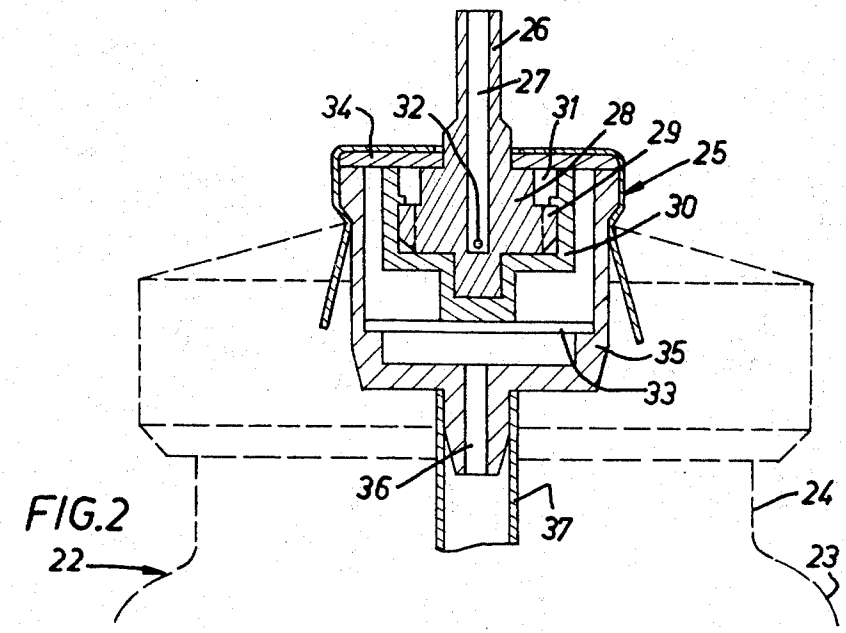

FIG.2

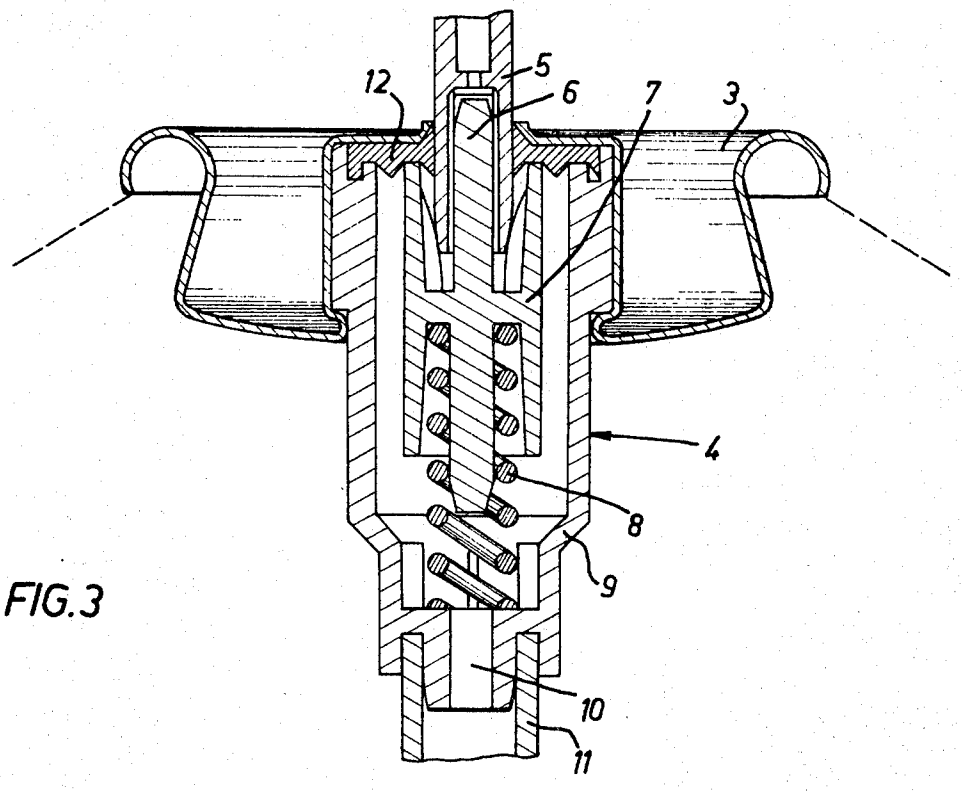

FIG.3

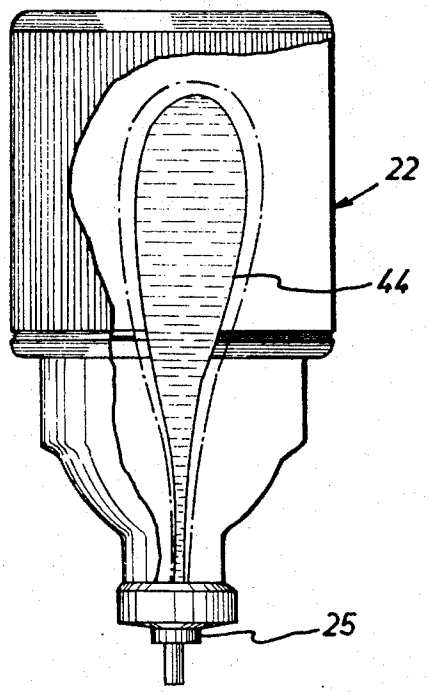

FIG. 4

DEVICE FOR STORING TWO LIQUIDS SEPARATELY AND DISPENSING THEM SIMULTANEOUSLY UNDER PRESSURE

SUMMARY OF THE INVENTION

It is often necessary to make simultaneous use of two compositions which are incompatible during storage. In order to facilitate such use it is desirable to be able to dispense both of these products from a single container.

It is accordingly necessary either to separate the two products inside the dispensing container and mix them at the moment of use, or store the two products in two separate containers and introduce the contents of one into the other just before they are dispensed. This problem is particularly important in connection with the packaging and dispensing under pressure of oxidation dyes for the hair. The use of these dyes requires that, at the moment of use, the dye be mixed with a suitable oxidizing composition. It is clear that the oxidizing composition cannot be stored while mixed with the dyeing composition without resulting in deterioration of the dye before it is applied.

It is the object of the present invention to provide a device comprising two containers each holding one of the two compositions to be simultaneously dispensed. This device permits the contents of one of the containers to be transferred to the other just before they are dispensed and to then dispense the mixture of these two compositions from the other container under pressure.

The present invention accordingly relates to a new article of manufacture which consists of a device for storing and dispensing two liquid products which are separately stored and simultaneously dispensed under pressure, essentially characterized by the fact that it comprises, firstly, a storage container holding one of the liquid products under pressure of a non-reactive gas which is substantially insoluble in said product. This container is closed at its upper end by a valve which is opened by depressing an outlet tube, said valve being provided with a depending tube which extends downwardly into the container almost to the wall thereof opposite the valve. The device comprises secondly, a dispensing container holding a liquid product which may or may not be under pressure, which container is closed by a valve which is opened by the depression of lateral inclination of its outlet tube. This valve may or may not be provided with a depending tube which extends almost to the wall of the container opposite the valve. The pressure in this container is always lower than that inside the storage container. The device comprises thirdly, a connecting member, to one end of which the dispensing container is attached and to the other end of which the storage container is attached. The connecting member is adapted to permit one of the containers to slide relative to the other along the axis of the connecting member. The device also comprises, fourthly, a spigot positioned inside the said connecting member between the dispensing container and the storage container, said spout being adapted to fit the outlet tubes of the two valves of the two containers and comprising a passageway connecting said two outlet tubes.

In a preferred embodiment of the invention one end of the spigot is conical in shape and fits over the outlet

tube of the valve on the dispensing container, with the base of the cone positioned near that container. The spigot is provided, near the storage container, with a projection adapted to abut the wall of said storage container after movement of the spigot. The storage and dispensing containers are generally cylindrical in shape and provided at one end with a narrowing conical portion supporting a cap on which the corresponding valve is mounted. This cap is crimped to the end of the cylindrical side wall of the container. In the case of cylindrical containers the connecting member is cylindrical and fits around the dispensing container and rests on the conical portion of the storage container. A removable safety ring is positioned between the connecting member and the dispensing container to prevent possible movement of the container inside the connecting member. The pressurizing gas in the storage container is nitrogen. The storage container contains an oxidation dye for the hair, whereas the dispensing container holds a liquid oxidizing composition.

In a first variation of this embodiment the storage container holds, in addition to the liquid product to be used, a certain quantity of liquefied gas other than the insoluble non-liquefied pressurizing gas such as nitrogen. In this case the dispensing container holding the liquid product to be dispensed is not pressurized.

When the user desires to utilize the device according to the invention he removes the safety strip which prevents movement of the dispensing container with respect to the connecting member and urges the dispensing container along the axis of the connecting member, the storage container being held stationary at the lower part of the device. By this action the two valves of the two containers are simultaneously opened. The insoluble non-liquefied pressurizing gas in the storage container then ejects the product stored in the storage container through the depending tube and the valve of the storage container into the passageway in the spigot so that it penetrates into the dispensing container through its open valve. The initial pressure of the insoluble non-liquefied pressurizing gas is adjusted so that when the storage container is completely emptied of its liquid contents, the residual pressure of this gas is substantially equal to the vapor tension of the liquefied gas initially enclosed in the storage container. As this moment the user releases his pressure on the dispensing container and extracts the container and its transfer spout from the connecting member. The dispensing container then holds a mixture of the two liquid products initially stored separately and also contains the liquefied gas for ejecting this mixture.

In order to dispense the mixture the user presses with two fingers on the spigot so as to force the outlet tube of the valve on the dispensing container inwardly or so as to swing said tube and thereby open this valve. When the valve is opened the mixture is ejected by the vapor pressure of the liquefied gas enclosed in the dispensing container. It should be noted that the product thus ejected is in the form of a foam since the liquefied gas is mixed with the two products to be dispensed.

In a second embodiment, the storage container holds only one of the liquid products to be dispensed, together with an insoluble non-liquefied pressurizing gas such as nitrogen. On the contrary, the dispensing container holds a flexible bag which is sealed fluid tight

to the valve of said container. This bag holds the other product to be dispensed, but has an inner volume large enough to also hold the product to be dispensed which is enclosed in the storage container. The flexible bag is subjected within the dispensing container to the external pressure of a pressurizing gas such as a liquefied gas. In this case the device is operated by removing the safety strip which prevents movement of the dispensing container with respect to the connecting member and by moving the dispensing container along the connecting member to depress the outlet tubes of the two valves on the two containers. This brings the interior of the two containers into communication through the passageway in the spigot. The insoluble non-liquefied pressurizing gas in the storage container then forces the liquid product in the storage container out thereof through the depending tube and its valve so that this product is driven into the flexible bag in the dispensing container. The initial pressure of the pressurizing gas enclosed in the storage container is such that when said container is emptied of its liquid contents it is substantially equal to the vapor tension of the liquefied pressurizing gas inside the dispensing container. The user then releases the dispensing container and removes said container with its spigot from the connecting member. The contents are then dispensed as before by pressing on the spigot to depress or incline the outlet tube of the valve of the dispensing container. It should, however, be noted that, in this case, the mixture of two products which are ejected from the dispensing container is in the form of a non-foaming liquid, since the pressurizing gas is separated from this mixture by the wall of the flexible bag. It is obvious that if the wall of the flexible bag is slightly permeable to the liquefied pressurizing gas used, the mixture ejected may be slightly foamy.

It should be emphasized that, in this device, the spigot is used not only to transfer a product from one container to the other, but also to dispense the mixture of the two products which are to be dispensed simultaneously. A suitable insoluble pressurizing gas is non-liquefied nitrogen and a suitable liquefied pressurizing gas is butane or one of the chloro-fluorinated hydrocarbons conventionally used for this purpose.

In order that the invention may be better understood, two embodiments thereof will now be described, purely by way of illustration and example, with reference to the accompanying drawings, on which:

FIG. 1 is an elevational view, partly in section, showing a first embodiment of the device according to the invention;

FIG. 2 is a detail view in axial section of the valve of the dispensing container shown in FIG. 1;

FIG. 3 is a detail view in axial section showing the valve of the storage container of FIG. 1; and

FIG. 4 is an elevational view, partly in section, showing a second embodiment of a component of the device according to the invention, which may be used to replace the dispensing container shown in FIG. 1.

Referring now to the drawings and especially to FIGS. 1 to 3, it will be seen that reference numeral 1 indicates the storage container which is positioned at the bottom of the device according to the invention. The container 1 is substantially cylindrical in shape and comprises at its upper end a conical portion 2 to which a cap 3 is crimped. This cap carries a central valve 4 for the container 1. The valve 4 is a conventional valve of the type which operates by depression. It comprises an outlet tube 5 mounted on the central projection 6 of a movable member 7 biassed by the helical spring 8.

One end of the spring 8 bears on the movable member 7 and its other on the outer cup 9 of the valve 4. The outer cup 9 is generally cylindrical and its interior is in communication with the inside of the storage container 1 through an orifice 10 and a depending tube 11. The removable member 7 is biassed by the spring 8 against a sealing ring 12.

The storage container 1 holds 60 cm^3 of an oxidation hair dye to which reference numeral 13 has been assigned. About 6 cm^3 of liquefied butane has been added to this dyeing composition. The inside of the container 1 is pressurized by the nitrogen filling the space 14 in said container which remains free above the space occupied by the composition 13. This nitrogen is at a pressure of about six bars. The total inner capacity of the storage container 1 is about 100 cm^3. On the storage container 1 is mounted a connecting member 15 consisting of a cylindrical sleeve, the lower part 15*a* of which fits onto the conical part 2 of the container 1. The lower part 15*l* of the connecting member 15 is snapped onto the container 1 along the edge of the cap 3 which carries the valve 4. The flanges 16 provide sufficient stiffness to enable the part 15*a* to hold tightly.

At the upper end of the connecting member 15 is a removable safety strip 17 comprising radial flanges 18. The safety strip 17 externally grips the connecting member 15 to which it is attached by a ring 19. At the upper end of the safety strip 17 is another ring 20 which cooperates with a groove 21 in the outer wall of the dispensing container 22.

The dispensing container 22 is substantially cylindrical in shape and comprises a substantially conical portion 23 which leads to a neck 24, to the end of which a valve 25 is attached. The valve 25 comprises an outlet tube 26 which is axially pierced by a central passageway 27. The base of the tube 26 consists of a cylindrical member 28 which carries radial flanges 29. The cylindrical member 28 is positioned within a cup 30, an annular space 31 being provided between the member 28 and the cup 30, which space communicates with the axial passageway 27 through radial ports 32. The cup 30 is biassed by a leaf spring 33 against the sealing ring 34 at the top of the cup. The device comprising the cup 30 and the cylindrical member 28 is enclosed within the outer cup 35 of the valve, which outer cup communicates with the inside of the container 22 through an orifice 36 and a depending tube 37. The dispensing container 22 has an inner volume of about 150 cm^3 and contains 60 cm^3 of 6 percent hydrogen peroxide. The dispensing container 22 is not pressurized.

Between the dispensing container 22 and the storage container 1, inside the connecting member constituted by the cylindrical sleeve 15, is a transfer spigot 38. The spigot 38 is generally conical in shape. It is provided with a bore 39 into which the outlet tube 26 of valve 25 is inserted. The base of the cone which constitutes the transfer spigot 38 is near the dispensing container and the summit of the cone is near the storage container 1. At the summit of the cone is a seat 40 adapted to

receive the outlet tube 5 of the valve 4. The transfer spigot 38 also carries near the summit of the cone a projection 41 adapted to limit the path of travel of the spigot 38 inside the connecting member 15. An inner passageway 42 connects the seats 39 and 40 of the transfer spigot 38. Guide ribs 43 are provided inside the cylindrical sleeve which constitutes the connecting member 15 so as to insure proper translational movement of the transfer spigot 38 therein.

When the user wants to put the device which has just been described into operation, he tears off the safety strip 17, which permits the dispensing container to slide freely inside the connecting member 15. He then presses on the dispensing container 22 so as to cause translation of that container and the transfer spigot 38 within the connecting member 15. This translation simultaneously depresses the outlet tubes 5 and 40 of the two valves 4 and 25 respectively. The depression of the outlet tube 5 compresses the spring 8 and the member 7, thus bringing the inner passageway 42 and the outlet tube 5 into communication with the inside of the outer cup 9 and consequently with the inside of the container 1 through the depending tube 11 and the orifice 10. The depression of the outlet tube 26 causes depression of the leaf spring 33, bringing the annular space 31 into communication with the inside of the outer cup 35 and consequently bringing the axial passageway 27 into communication with the inside of the container 22 through the orifices 36 and the depending tube 37. It follows that when the user presses on the dispensing container 22 this opens the two valves 25 and 4 and connects the interiors of the storage container 1 and the dispensing container 22 through the passageway 42. The pressure of the nitrogen inside the base portion 14 of the storage container drives the oxidation dye 13 mixed with the liquefied butane into the container 22 so that the composition 13 is mixed with the hydrogen peroxide in the dispensing container 22.

When this operation is carried out the user withdraws the dispensing container 22 from the connecting member 15 and presses on the spigot 38 so as to depress the tube 26 or swing it slightly to one side. This action results, as has already been explained, in the opening of the valve 25, and consequently in the dispensing of the mixture of the oxidation dye and hydrogen peroxide through the passageway 42 in the spigot 38. This dispensing is carried out in response to the vapor pressure of the butane, which has been introduced into the container 22 as already indicated and, since the butane is mixed with the liquids, the mixture leaves the container 22 in the form of a foam. It should be noted that the spigot 38 serves both to transfer the composition 13 and the liquefied butane which is associated therewith from the container 1 to the container 22 and to dispense the mixture of compositions in the container 22. The translational movement of the spigot 38 inside the connecting member 15 is limited by the abutment of the projection 41 against the cap 3 which carries the valve 4. The pressure of the nitrogen in the space 14 is so regulated that when all of the liquid composition has been driven from the container 22 the residual pressure of the nitrogen is substantially equal to the vapor tension of the liquefied butane.

FIG. 4 shows a second embodiment of the device according to the invention. In this embodiment the dispensing container 22 has the same shape as the one which has been described in connection with FIG. 1 and also comprises a dispensing valve 25 identical to the one which has just been described and which is illustrated in FIG. 2. To the outer cup 35 of the valve 25 a flexible bag 44 made, for example, of plastic material is connected. This bag has a volume of about 130 cm^3 and its interior is in communication with the interior of outer cup 35 through a bore 36. When the container 22 is positioned, during storage, on the connecting member 15 with the safety strip 17 in place, the bag 44 holds 60 cm^3 of 6 percent hydrogen peroxide and the inside of the container 22 outside the bag 44 is pressurized by liquefied butane.

In this embodiment the connecting member 15, the spigot 38, and the storage container 1 are identical to those which have been described and are illustrated in connection with FIGS. 1 and 3, except that the storage container 1 does not hold liquefied butane. The container 22 is also placed at the top of the connecting member 15. When the user wants to place this device in operation he removes the safety strip 17 and presses on the container 22 as hereinbefore indicated. This pressure depresses the outlet tubes 5 and 40 of the valves 4 and 25 which, as hereinbefore indicated, places the interiors of the containers 1 and 2 in communication with each other through the passageway 42 in the transfer spigot 38. The pressure of the nitrogen enclosed in the space 14 drives the composition 13 in the storage container into the flexible bag 44 in the container 22, within which the mixture of the composition 13 and hydrogen peroxide takes place. The volume of the bag 44 is sufficient to permit it to contain both the hydrogen peroxide initially stored therein and the composition 13 which is introduced thereinto. When all of the composition 13 has been driven out of the container 1 the residual pressure of nitrogen is substantially equal to the vapor tension of the liquefied butane which is exerted inside the container 22 against the walls of the flexible bag 44.

The user than withdraws the container 22 from the connecting member 15 and presses on the spigot 38 to depress or laterally incline the outlet tube 26 of the valve 25. This action brings the valve 25 into an open position and, in response to the pressure exerted by the liquefied butane on the outside of the bag 44, the mixture of the two liquid products within this bag is evacuated from the container 22 through the passageway 42 in the spigot 38.

It should be noted that, in this embodiment, the butane which expels the mixture does not come into direct contact with the mixture being dispensed, so that the mixture escapes in a liquid rather than a foam form. If the wall of the bag 44 is slightly permeable to butane, it is possible to nevertheless produce a light foam.

The device according to the invention makes it possible to store two products which may be incompatible separately in a simple and inexpensive manner, yet nevertheless dispense them simultaneously under pressure from a single container.

It will of course be appreciated that the embodiments hereinbefore described have been give purely by way of illustration and example, and may be modified as to

detail without thereby departing from the basic principles of the invention.

What is claimed is:

1. In combination with a pair of storage containers for storing separately two products which are to be dispensed simultaneously, each of said containers being provided with a valve having an externally projecting outlet tube which opens said valve when depressed, and each being provided with an external abutment, the improved means for connecting said containers which comprises:

a rigid cylindrical connecting member having snap fastening means at one end thereof shaped and dimensioned to snap over the abutment means on one of said containers, and removable fastening means at the other end of said connecting member for detachably engaging the abutment means on the other of said containers, said connecting member serving to hold said containers in a fixed position relative to each other when said fastening means are in engagement with said abutments, but to permit said containers to be forced toward each other along the axis of said connecting member when said removable fastening means is detached, and

a transfer spigot slidably mounted inside the connecting member between said containers, said spigot simultaneously engaging the outlet tubes of the two valves of the two containers and defining a duct bringing said outlet tubes into communication with each other when said containers occupy said fixed position, said spigot being dimensioned to depress said outlet tubes and thereby open said valves when said containers are forced toward each other.

2. The combination claimed in claim 1 in which one of said containers is a storage container holding one of said products under the pressure of a pressurizing gas and the other is a dispensing container holding the other product under a pressure less than that in said storage container.

3. Device as claimed in claim 2 essentially characterized by the fact that the spigot is conical in shape with its base toward the dispensing container.

4. Device as claimed in claim 2 in which the part of the spigot near the storage container is provided with a projection adapted to abut the wall of said storage container after movement of the spigot for a limited distance within the connecting member.

5. Device as claimed in claim 2 in which the pressurizing gas in the storage container is nitrogen.

6. Device as claimed in claim 2 in which the storage container holds an oxidation hair dye whereas the dispensing container holds a liquid oxidizing composition.

7. Device as claimed in claim 2 in which the storage container holds, in addition to the liquid to be dispensed a certain quantity of a liquefied gas other than the insoluble pressurizing gas, and the dispensing container holds the liquid to be dispensed under atmospheric pressure.

8. Device as claimed in claim 2 in which the storage container holds only one of the liquid products to be dispensed and an insoluble non-liquefied pressurized gas and the dispensing chamber holds a flexible fluidtight bag attached to the valve of said dispensing container, said bag holding the other product to be dispensed, but having an inner volume sufficient to also contain the products initially held in the storage container, said flexible bag being subjected to an external pressure inside the dispensing container due to a pressurizing gas.

9. Device as claimed in claim 2 in which the storage and dispensing containers are generally cylindrical in form and each has at one end a conical portion supporting a cap in which its valve is mounted, said cap being crimped to the end of the lateral wall of the container.

10. Device as claimed in claim 9 in which the connecting member is slidable with respect to the dispensing container and rests on the conical portion of the storage container.

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