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(12) # EUROPEAN PATENT SPECIFICATION

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(54) **Atomizer which can be refilled and refilling device.**

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Description

The present invention relates to an aerosol bomb which utilizes compressed air as propellant and can be refilled by a suitable refilling device.

Theoretic principles and operation techniques of an aerosol bomb are well known in the art. An aerosol bomb contains products under pressure which can be sprayed in nebulized form due to the propelling action of a liquefied gas. Thus a number of products can be sprayed: toilet products, insecticides, foodstuffs, a.s.o.

The reservoir usually of metal contains the active component to be sprayed along with the liquefied propellant, such active component being stored in the reservoir under liquid state or in solution form.

Fluoridized hydrocarbons (freon), ethyl chloride, nitrogen oxide, a.s.o. are widely used as propellant.

It is also known that propellant and container are much more expensive than the active component. Moreover propellant and container can cause serious problem of pollution. In fact freon and fluorochloride are the most important causes of the reduction of the ozone layer.

The apparatus of this invention seeks to avoid pollution and to make the use of the aerosol bombs considerably cheaper by utilizing compressed air as propellant and reusing the same container once exhausted the content.

DE-U-88 08 407.8 discloses a device for refilling under pressure an aerosol bomb having a filling valve, which device is provided with a pressure tank and an electric delivery pump for the propellant which is operated by the bomb itself when the latter is in the refilling position. Such device does not allow, however, to either determine in advance the amount of liquid to be fed to the bomb or to adjust the pressure within the bomb.

Such drawbacks are overcome by the refilling device of the present invention which provides in combination a bomb which can be refilled and is provided with an atomizing valve, a refilling tank containing both the product to be nebulized and compressed air as propellant at a predetermined pressure, rapid-connect means coupling said bomb to said tank, and means to control the intake and the pressure of the compressed air from an outer source into both said refilling tank and said bomb through said rapid-connect valve.

This invention will be more readily apparent from the following description of a preferred, non-limitative embodiment shown only by way of example in the annexed drawings. In the drawings:

Fig. 1 is a schematic view of the bomb which can be refilled;

Fig. 2 schematically shows the refilling tank for the bomb;

With reference to the Figures the apparatus comprises in combination a bomb I of the size normally used for atomizers and a closed tank H which can be refilled.

Bomb I is provided at the upper side with an atomizing valve A and a bleed valve B, and at the lower side with a check valve C and a rapid-connect valve D intended to cooperate with a corresponding rapid-connect valve E wich is provided at the upper side of tank 6. The connection of the two valves is preferably of the male-female type.

The rapid-connect valve E draws the liquid to be nebulized from the bottom of the tank through pipe P. The tank is subjected to the desired pressure relative to a preliminary filling of bomb I (for example 1/4, 1/3, 1/2, a.s.o.) through a pressure regulator R placed in the intake conduit N of the compressed air from any outer source. The compressed air from the outer source is also conveyed to the rapid-connect valve E through a second pressure regulator S, branch pipe Q and cock F.

Once connected the bomb to the tank, cock F in branch pipe Q is closed and cock G in pipe P is opened so that bomb I is filled with the liquid to be nebulized from tank H. Subsequently, cock G in pipe P is closed and cock F in branch pipe Q is opened so that air at the desired pressure to have a proper jet can be injected into the bomb.

The removal of the bomb from the tank is effected by a rapid-disconnect lever L known in the art.

The refill of tank H with the liquid to be nebulized is performed through an opening closed by plug M.

When the pressure in bomb I is reduced due to the exaustion of the liquid to be nebulized, a short-time connection to tank H will re-establish the desired pressure in bomb I.

Claims

1. An apparatus including in combination an aerosol bomb (I) which can be refilled and a refilling device (H), said aerosol bomb comprising an atomizing valve (A), a bleed valve (B), a rapid-connect valve (D) of the male or female type adapted to be connected to a corresponding rapid-connect valve (E) of the female or male type, respectively, of the refilling tank, wherein said refilling tank (H) containes both the liquid to be nebulized and compressed air as propellant for refilling the bomb at a predetermined pressure and means for controlling the intake and the pressure of the compressed air from an outer source into both said refilling tank and said bomb through said rapid-connect valve, said means comprising:

   a pipe (P) which projects below the level of the liquid in the tank and is connected at the upper side to the rapid-connect valve (E);

   a branch pipe (Q) to directly supply the

pressure air from an outer source to the rapid connect-valve (E) bypassing the refilling tank;

one cock (G) positioned on the pipe (P) in order to prevent the liquid of refilling tank from being supplied to the rapid-connect valve and to prevent the pressure air from being supplied from branch pipe (Q) to refilling tank;

one cock (F) positioned on the branch pipe (Q) in order to prevent the pressure air from being supplied from the outer source to the rapid-connect valve and to prevent the liquid from being supplied from the refilling tank to the same branch pipe (Q).

2. The apparatus of claim 1, characterized in that there are provided two pressure regulators, the first one (R) for determining the amount of the liquid to be charged into the bomb, the second one (S) for regulating the pressure of the compressed air which is injected into the bomb itself.

3. The apparatus of the preceding claims, characterized in that the refilling tank is provided with a liquid level indicator and/or a pressure indicator for the intaken compressed air.

4. The apparatus of the preceding claims, characterized in that the refilling tank is provided with an opening closed by a plug (M) for the liquid transfer.

Patentansprüche

1. Vorrichtung mit einer wiederfüllbaren Aerosolbombe (1) und einer Wieder- bzw. Nachfülleinrichtung (H) in Kombination, bei der die Aerosolbombe ein Zerstäuberventil (A), ein Abblasventil (B) und ein Schnellanschlußventil (D) mit Kupplungsteil des male- oder female-Typs zum Anschluß an ein korrespondierendes Schnellanschlußventil (E) eines Kupplungsteils des female- bzw. male-Typs der als Nachfülltank ausgebildeten Nachfüllvorrichtung anschließbar ist, und bei der der Nachfülltank (H) sowohl die zu zerstäubende bzw. zu vernebelnde Flüssigkeit als auch Druckluft als Treibmittel zum Wiederfüllen der Bombe auf einen bestimmten Druck und Steuermittel zum Steuern des Eintritts und Drucks der Druckluft von einer Außenquelle sowohl in den Nachfülltank als auch in die Bombe durch das Schnellanschlußventil aufweisen,
gekennzeichnet durch folgende Merkmale:
eine Leitung (P), die sich bis unter das Niveau der Flüssigkeit im Tank erstreckt und oben an das Schnellanschlußventil (E) angeschlossen ist;
eine Querleitung (Q) zum direkten Anschluß von Druckluft von der Außenquelle an das Schnellanschlußventil (E) unter Nebenschluß (Bypass) des Nachfülltanks;
ein Absperrorgan (G) an der Leitung (P), das den Zutritt der Flüssigkeit des Nachfülltanks zu dem Schnellanschlußventil und der Druckluft aus der Querleitung (Q) an den Nachfülltank verhindert, und
ein Absperrorgan (F) an der Querleitung (Q), das den Zutritt von Druckluft von der Außenquelle zum Schnellanschlußventil und der Flüssigkeit aus dem Nachfülltank in die gleiche Querleitung (Q) verhindert.

2. Vorrichtung nach Anspruch 1,
dadurch gekennzeichnet,
daß zwei Druckregler verwendet sind, von denen der erste Druckregler (R) den Betrag der in die Bombe (1) einzufüllenden Flüssigkeit bestimmt, während der zweite Druckregler den Druck der in die Bombe (1) injizierten Druckluft regelt.

3. Vorrichtung nach einem der vorhergehenden Ansprüche,
dadurch gekennzeichnet,
daß der Nachfülltank (H) mit einem Füllstandsanzeiger und/oder einem Druckanzeiger für die eingelassene Druckluft versehen ist.

4. Vorrichtung nach einem der vorhergehenden Ansprüche,
dadurch gekennzeichnet,
daß der Nachfülltank (H) mit einer Öffnung versehen ist, welche durch einen Stopfen (M) für den Flüssigkeitsübertritt verschließbar ist.

Revendications

1. Appareil combinant un atomiseur (I) qui peut être rechargé et un dispositif de recharge (H), ledit atomiseur comprenant une vanne de pulvérisation (A), une vanne de mise à l'air (B), une vanne à branchement rapide (D) du type mâle ou femelle appropriée pour être reliée à une vanne à branchement rapide correspondante (E), respectivement du type femelle ou mâle, du réservoir de rechargement, dans lequel ledit réservoir de rechargement (H) contient à la fois le liquide à vaporiser et de l'air comprimé comme gaz propulseur pour recharger l'atomiseur à une pression prédéterminée et comprenant des moyens pour commander l'admission et la pression de l'air comprimé, en provenance d'une source extérieure, à la fois dans ledit réservoir de rechargement et dans l'atomiseur par l'intermédiaire de ladite vanne à brachement rapide, ledits moyens comprenant :

un tuyau (P) qui s'étend au-dessous du ni-

veau du liquide dans le réservoir et qui est relié, à sa face supérieure, à la vanne à branchement rapide (E) ;

un tuyau de dérivation (Q) pour amener directement l'air sous pression, en provenance d'une source extérieure, vers la vanne à branchement rapide (E) en évitant le réservoir de rechargement ;

un robinet (G) situé sur le tuyau (P) destiné à empêcher le liquide du réservoir de rechargement d'être amené vers la vanne à branchement rapide et à empêcher l'air sous pression d'être amené du tuyau de dérivation (Q) vers le réservoir de rechargement ;

un robinet (F) situé sur le tuyau (Q) destiné à empêcher l'air sous pression d'être amené de la source extérieure vers la vanne à branchement rapide et à empêcher le liquide d'être amené du réservoir de rechargement vers le même tuyau dérivé (Q).

2. Appareil selon la revendication 1, caractérisé en ce que deux régulateurs de pression sont prévus, le premier (R) pour déterminer la quantité de liquide à charger dans l'atomiseur, le second (S) pour réguler la pression de l'air comprimé qui est injecté dans l'atomiseur lui-même.

3. Appareil selon les revendications précédentes, caractérisé en ce que le réservoir de rechargement est pourvu d'un indicateur de niveau de liquide et/ou de pression pour l'air comprimé admis.

4. Appareil selon les revendications précédentes, caractérisé en ce que le réservoir de rechargement est pourvu d'une ouverture fermée par un bouchon (M) pour le passage du liquide.

FIG. 1

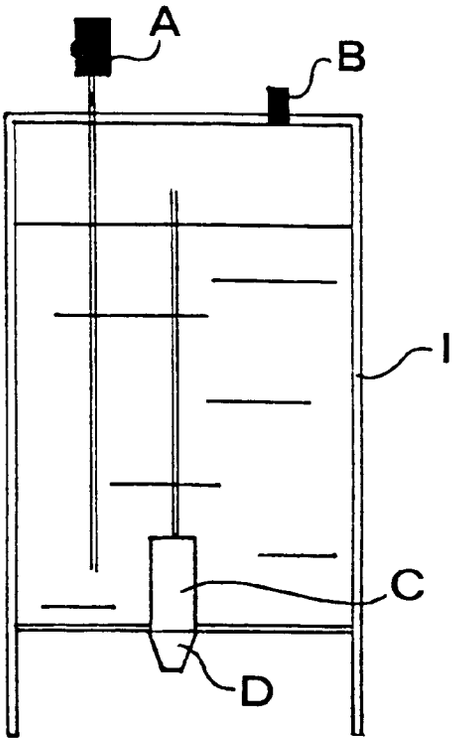

FIG. 2