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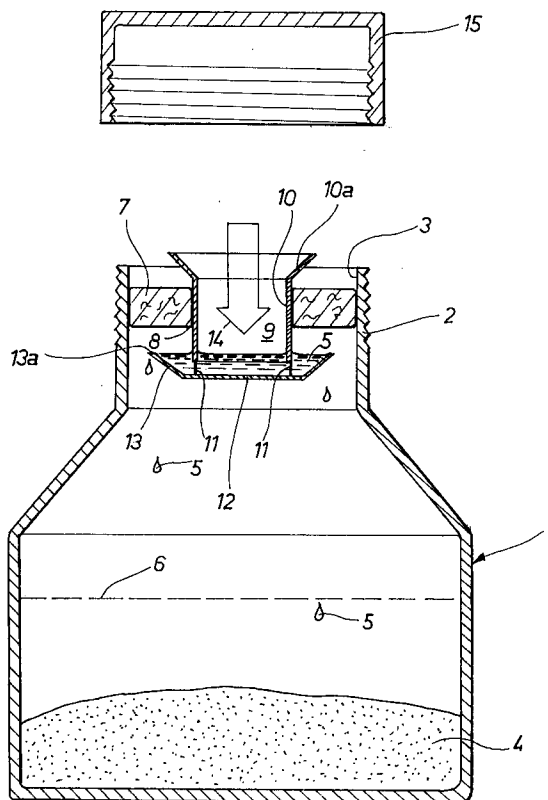
**0 543 435 A1**

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(54) **A device for mixing a fluid with a pulverized substance which has a tendency to emit dust when touched by the fluid.**

(57) A device for mixing a fluid (5) with a pulverized substance (4) which has a tendency to emit dust when touched by the fluid. The device comprises a container (1) for said substance, the container having a fluid lock (9) for permitting a gas blocking supply of the fluid to the container (1) and a filter (7) for blocking dust escape from the container.

**EP 0 543 435 A1**

## TECHNICAL FIELD

The present invention relates to a device for mixing a fluid with a pulverized substance which has a tendency to emit dust or powder when touched by the fluid. The term "substance" is intended to embrace particularly, but not exclusively, poisonous or toxic substances such as medicines, biocides or the like.

## PRIOR ART

Persons who carry out such mixing of poisonous, toxic or allergenic substances are often afflicted by dust that whirls up in the air when the fluid reaches the pulverized substance. A particular serious problem is the manual preparing of medical mixtures, for example water mixtures of antibiotic. Such mixtures, which are given to children because they have difficulty in swallowing tablets, have a durability of only two weeks, for which reason they cannot be prepared at the medical factory but have to be prepared at the drug-store each time. Therefore, the drug-store attendants are often susceptible to allergical problems due to the dust that whirls about in the air when the water is poured on the pulverized medical substance during the preparing of the mixture.

A method of avoiding that dust whirls up against the attendants is known from EP-A-0 356 480. The known method is, however, relatively complicated since it requires the use of a filter which has to be liquid as well as gas permeable.

## DISCLOSURE OF THE INVENTION

The object of the invention is, therefore, to provide a device of the aforementioned kind which has a satisfactorily dust blocking function which does not require any complicated filter of the above-mentioned type, but which only requires a simple and cheap gas permeable filter, for instance of so called dry filter type.

This object is achieved with a device having the characterizing features set forth in Claim 1.

Further developments of the invention will be apparent from the depending Claims.

## BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be described in more detail below with reference to the accompanying drawing, the only Figure of which illustrates a longitudinal section of a preferred embodiment of the invention.

## PREFERRED EMBODIMENT

The Figure shows a device according to the invention, including a container, namely a medical container in the form of a cylindrical glass bottle 1 having an externally screw-threaded cylindric neck 2, the circular opening 3 of which defines the only opening of the bottle 1. The container 1 is partially filled with a predetermined amount of a pulverized medical substance 4, for instance anti-biotic in the form of penicillin, for instance. The container 1 is designed to be partially filled with a predetermined amount of fluid 5, for example water, that is to be mixed with the medical substance 4, for instance up to a level 6.

Fastened in the circular opening 3 of the container is an annular gas permeable dry-filter 7, the central portion of which has a cylindrical opening 8 in which a water-trap 9 is mounted. The "water" of the water-trap 9 is constituted by the fluid 5, which does not have to be water, which is to be mixed with the substance 4. Therefore, the water lock 9 is below generally referred to as a fluid lock. The fluid lock 9 consists of a tube 10 which is fastened in the opening 8 and oriented coaxially in relation to the neck 2 of the bottle, the upper portion 10a of the tube, which is located outside the mouth of the neck 2, being funnel shaped in order to facilitate the filling of fluid into the bottle 1. The lowermost portion of the tube 10, which is inserted into the bottle 1, supports, for instance by means of threads 11 or other suitable supporting means, a circular dish 12 having a larger diameter than the tube 10 and an upwardly directed brim 13, the edge 13a of which extends a short distance above the lowermost end edge of the tube 10.

The function of the device is as follows:

When the fluid, here water, is poured into the bottle 1 in the direction of arrow 14, some of the fluid 5 will stay on the dish 12 up to a level in registry with the edge 13a of the dish, and also at a distance up in the tube 10. This fluid on the dish 12 and up in the tube 10 thereby form a fluid lock which blocks gas, here air, from flowing out through the fluid lock from the interior of the bottle 1. When the fluid passes through the fluid lock into the bottle 1, the corresponding amount of air will be released through the gas permeable filter 7. If this air is mixed with up-whirling dust from the substance 4, this dust will be trapped by the filter 7. Thereafter, a closing means in the form of an internally threaded cap 15 is screw-tightened over the neck 2. The bottle 1 is shaken such that the substance 4 and the fluid 5 will be carefully mixed. The mixture is now ready to be delivered to the patient. Before using the medicine, the patient has to remove and throw away the fluid lock.

According to an alternative embodiment, not shown, the cap 15 is so designed that it, when screw-tightened over the neck 2, automatically destroys or deforms the fluid lock such that the patient can pour out the content without having to first remove the fluid lock. 5

## Claims

1. A device for mixing a fluid (5) with a pulverized substance (4) which has a tendency to emit dust when touched by the fluid, **characterized** by a container (1) partially filled with said substance (4), the container (1) being provided with a fluid lock (9) for permitting a gas blocking supply of said fluid (5) to the container (1), and a gas permeable filter (7) permitting gas to escape from the container but blocking dust from escaping from the container (1). 10  
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2. A device according to Claim 1, **characterized** in that the filter (7) is of a dry filter type. 20
3. A device according to any preceding Claim, **characterized** in that the container (1) has an opening (3) in which the fluid lock (9) as well as the filter (7) is mounted. 25
4. A device according to Claim 3, **characterized** in that the filter (7) concentrically surrounds the fluid lock (9). 30

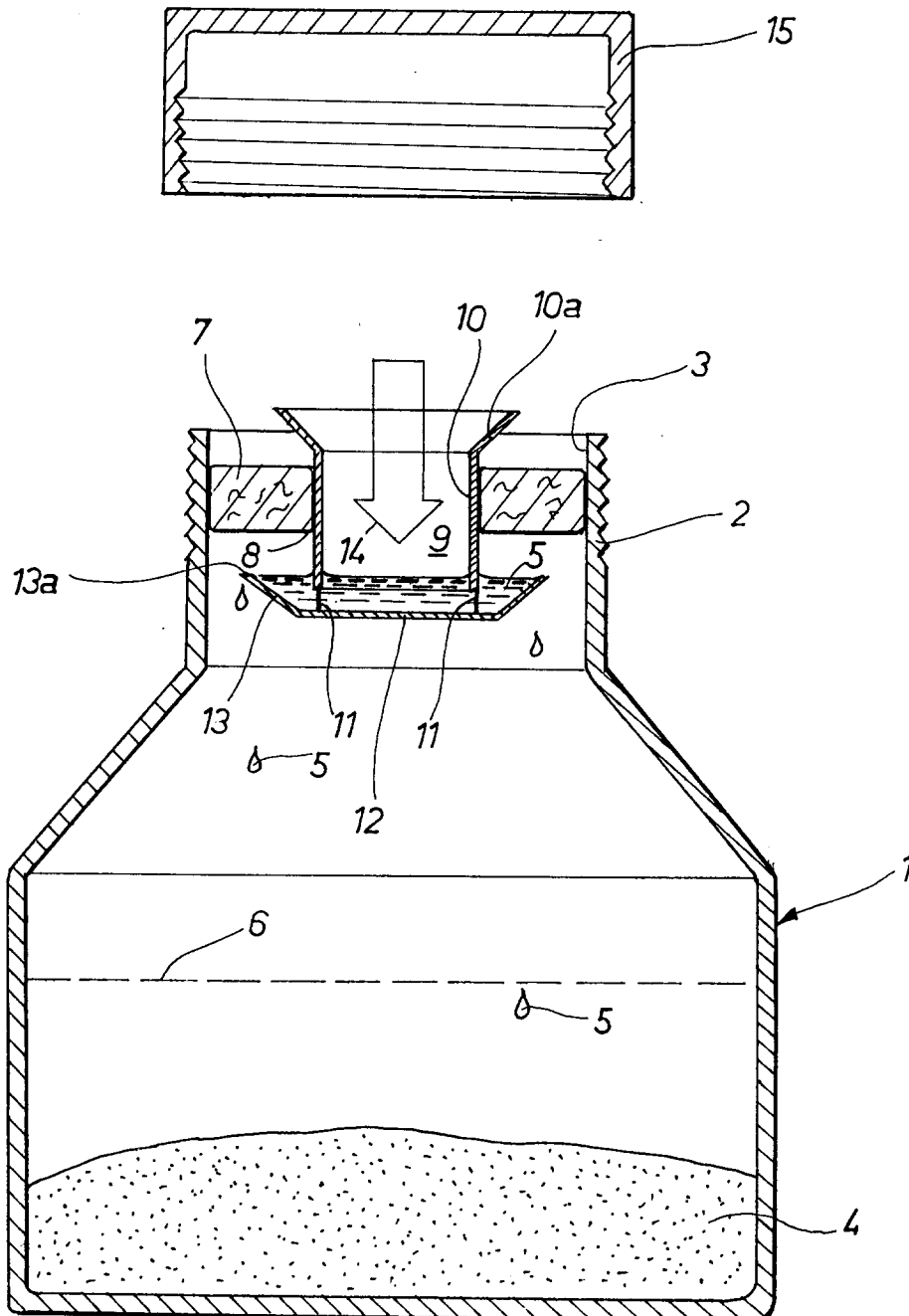
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## EUROPEAN SEARCH REPORT

Application Number

EP 92 20 3359

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A,D	WO-A-8 907 434 (WALLMARK) * abstract * * figure 1 * ---	1	A61J1/00 B01F15/00
A	AU-D-8 452 575 (HUGHES STEEL PRODUCTS PTY. LTD.) * claims 1-3; figures * -----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			A61J B65D B01F A61C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 13 JANUARY 1993	Examiner GODOT T.
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document			