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Orth

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[54] **CONTAINER FOR STORAGE AND PREPARATION OF A PLANT PROTECTIVE MATERIAL CONTAINING AT LEAST TWO COMPONENTS**

[75] Inventor: **Günther Orth,** Birken, Germany

[73] Assignee: **Wolf-Gerate GmbH,** Belzdorf, Sieg, Germany

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[52] **U.S. Cl.** **206/222,** 206/364, 215/6, 215/DIG. 8, 222/129, 259/48

[51] **Int. Cl.** **B65d 25/08,** B65d 1/04

[58] **Field of Search** ..... 206/219, 220, 221, 222, 206/364, 365; 215/6, DIG. 8; 222/90, 94

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Primary Examiner—William I. Price
Assistant Examiner—Bruce H. Bernstein
Attorney, Agent, or Firm—Ostrolenk, Faber, Gerb & Soffen

[57] **ABSTRACT**

The specification describes a container for storing and preparing a spraying liquid comprising at least two components and which is at least partly filled with a solvent. A capsule comprising at least two separate chambers extends into the container and is connected with it in a fixed manner. The chambers contain different plant protective components. A sliding sleeve for pressing out the separating bottoms of the chambers has an external diameter substantially corresponding to the internal diameter of the capsule. The sliding sleeve is adapted to remain in the capsule after pressing out the separating bottoms.

7 Claims, 4 Drawing Figures

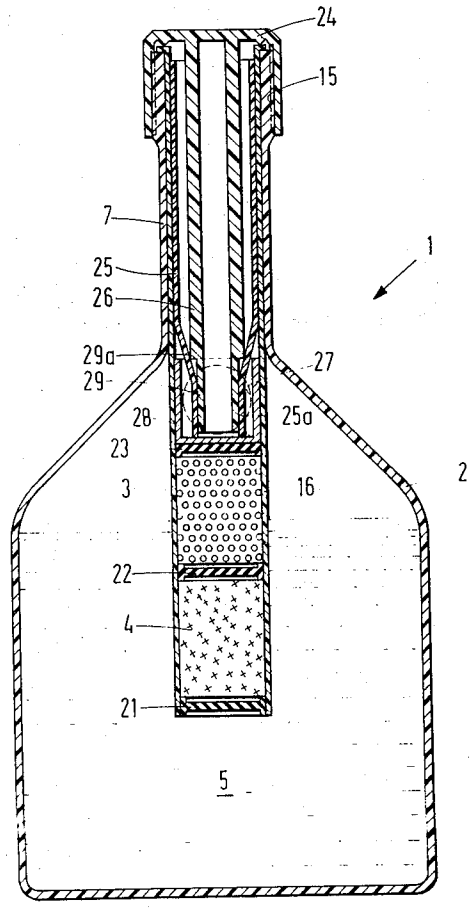


Fig. 1

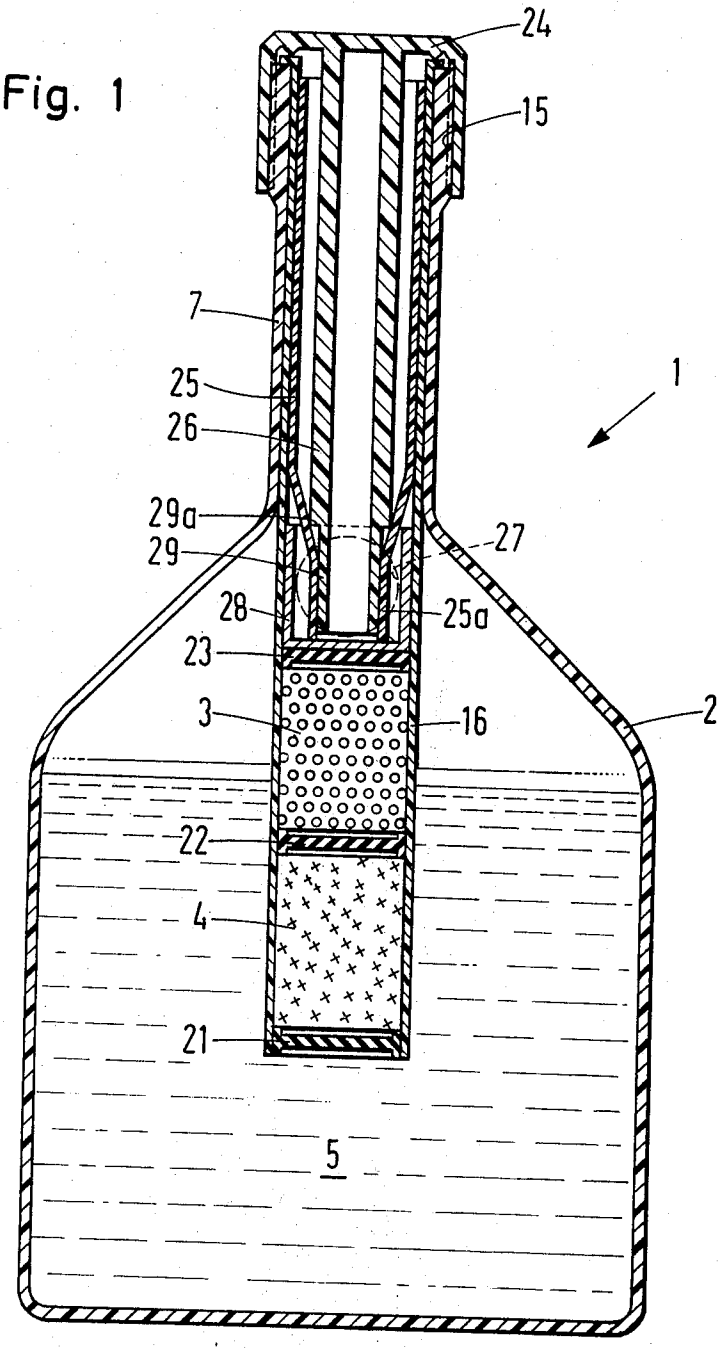


Fig. 2

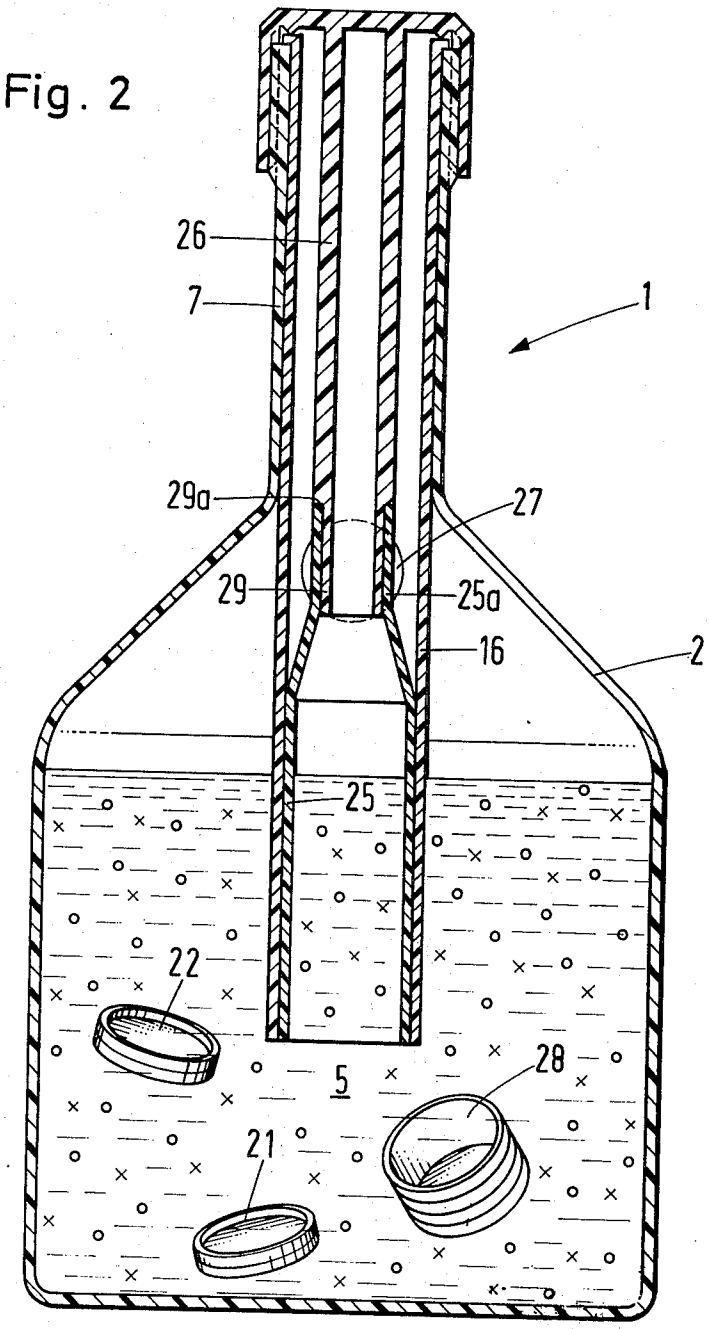


Fig. 3

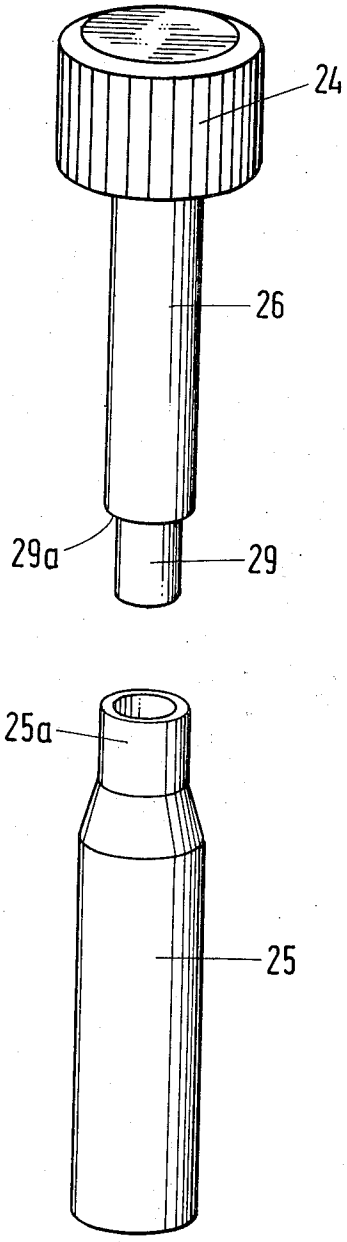
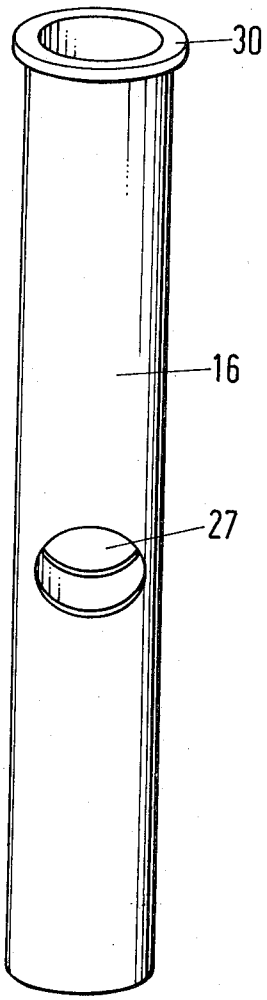


Fig. 4



CONTAINER FOR STORAGE AND PREPARATION OF A PLANT PROTECTIVE MATERIAL CONTAINING AT LEAST TWO COMPONENTS

BACKGROUND OF INVENTION

1. Field to which invention relates

The present invention relates to a container for storage and preparation of a plant protective material containing at least two components.

2. Prior proposals

The German Pat. Specification 1,939,086 describes a container for storing and preparing a plant protective material containing at least two components in the case of which all components intended for a ready-to-use spraying solution are so accommodated separately that mixing only occurs when the user desires it and takes suitable steps. This can be achieved because in the container containing a solvent a capsule provided with several separate chambers extends and the capsule is firmly connected with the container and the chambers comprise different plant protective components. For mixing the individual plant protective components it is necessary in this respect to pierce the bottoms of the chambers of the capsule with a suitable implement, for example with a plunger or with the projecting part of a spray gun.

In this respect it is possible in many cases for the plant protective components contained in the chambers of the capsule not to be fully removed from these chambers after the piercing of the chamber bottoms so that residues of in some cases highly poisonous plant protective components remain in the capsule and there is the danger that residues of the highly concentrated plant protective materials may remain on the plunger or projecting part of the spray gun used for piercing the bottoms of the chambers. Such residues lead to the danger that the user may come into contact with the highly concentrated active substances remaining on the plunger or projecting part of the spray gun when it has been withdrawn from the container.

SUMMARY OF INVENTION

One aim of the present invention is to provide a container of the above-mentioned type in the case of which complete emptying of the chambers of the capsule is guaranteed and in the case of which the mixing of the individual components with the solvent does not require any devices which must be removed out of the container again and on which highly concentrated active substances could remain as a contamination.

The present invention consists in a container for storing and preparing a spraying liquid comprising at least two components, and which is at least partly filled with a solvent, and a capsule comprising at least two separate chambers extends into the container and is connected with it in a fixed manner, the chambers containing different plant protective components, characterised by a sliding sleeve for pressing out the separating bottoms of the chambers with an external diameter substantially corresponding to the internal diameter of the capsule, the sliding sleeve being adapted to remain in the capsule after pressing out the separating bottoms.

This sliding sleeve can in an advantageous manner be adapted to be plugged on the screw connection for the neck of the container so that the container after the pressing out of the separating bottoms of the capsule is initially closed and mixing together of the active substances contained in the capsule with the solvent contained in the container can take place, for example by shaking.

It is furthermore possible to provide a rod-shaped extension in the interior of the screw closure, on whose free end the sliding sleeve can be plugged. In this case the sliding sleeve can be plugged in a concentric telescopic manner on this extension for transport and thus remains in the interior of the neck of the container so that it cannot be lost. For piercing the separating bottoms the sliding sleeve is removed after unscrewing the closure cap and after tilting through 180° is plugged on the end of the extension so that a pushing out of the separating bottoms as far as the end of the capsule is possible.

Since in the case of the use of several active substances in the capsule and of the simultaneous accommodation of the sliding sleeve in the neck of the container the capsule can extend to a substantial extent into the container it is advantageous to provide the sliding sleeve on the end which can be plugged on to the extension with a tapered part, which after the pressing out of the separating bottoms comes to lie at a position immediately under the neck shoulder of the container and that the part of the capsule, lying at this position, has an opening for the complete removal of the solution in the container. In this manner a complete emptying of the container is possible even without additional implements, such as for example the take-in tube of a spray gun.

The opening formed in the capsule can in this case be closed by a separating wall or partition constructed as a hollow plug for transport and before use, the wall of this hollow plug covering the opening.

LIST OF SEVERAL VIEWS OF DRAWINGS

The invention will now be described in detail in what follows referring to an embodiment shown in the accompanying drawings.

FIG. 1 is a cross-sectional view of the container with the capsule in the condition fixed for transport.

FIG. 2 shows a cross-sectional view similar to FIG. 1 after the pushing out of the separating bottoms for mixing the active substances with the solvent.

FIG. 3 shows a view of the closing cap and the sliding sleeve.

FIG. 4 shows a view of the capsule for receiving the active substances.

DESCRIPTION OF PREFERRED EMBODIMENT

In FIG. 1 the container for storing and preparing the plant protective agents is denoted by the general reference numeral **1**. This container consists of a bottle body **2**, with whose bottle neck **7** a capsule is connected for receiving the individual active substances. In this capsule several chambers **3, 4** are provided for receiving the individual active substances and the chambers are sealed off by the separating bottoms **21–23**. In the embodiment shown only two chambers are provided but the number of chambers can, however, be changed as may be desired. The uppermost separating bottom **23** is constructed as a hollow plug with a wall **28** for reasons which will be explained presently.

In the upper part of the capsule **16** or of the bottle neck **7** a sliding sleeve **25** is accommodated, which sur-

rounds an extension **26** of a closing cap **24** in a telescoping manner.

The closing cap **24** has an internal screw thread, which cooperates with an external screw thread **15** on the upper end of the bottle neck **7** so that the closure cap **24** can be screwed onto the bottle neck to make a liquid-tight seal.

The sliding sleeve **25** has a tapered part **25***a* at its one end and the internal diameter of this part corresponds to the external diameter of the free end of the extension **26** of the closure cap **24.** This extension preferably has at its free end an end section **29** with a shoulder **29***a* formed by this. This shoulder acts as an abutment for the end of the tapered part **25***a* of the sliding sleeve **25** in the plugged together condition.

For mixing the active material in the chambers **3** and **4** of the solvent **5** in the bottle body **2** the closure cap **24** is unscrewed, the sliding sleeve with the tapered part **25***a* is plugged on the free end of the extension **26** of the closure cap **24** and the arrangement formed in this manner is pressed under pressure into the capsule so that the upper separating bottom **23** constructed as a hollow plug and the further separating bottoms **21** and **22** are pressed out of the capsule. The pressing through in a sliding manner of the hollow plug through the capsule ensures that complete emptying of the capsule takes place.

FIG. **2** shows the container **1** with the sliding sleeve **25** completely inserted into the capsule **16.** Since the sliding sleeve **25** is made hollow emptying of the container through this sliding sleeve **25** is possible.

In order to make possible complete emptying of the container even in the case of a capsule **16** extending for a considerable distance into the container, an opening **27** is placed at a position immediatley underneath the bottle neck **7** in the capsule **16** and this opening **27** simultaneously lies in part of the tapering part **25***a* of the sliding sleeve **25.** In this manner a complete emptying of the container **1** is possible.

This opening **27** is closed before use by the wall **28** of the separating bottom **23** constructed as a hollow plug. Also during the insertion of the sliding sleeve **25** this opening is closed before the complete insertion of the sliding sleeve, since the outer wall of the sliding sleeve covers the opening.

FIG. **3** shows the closure cap **24** with the extension **26** and the closure cap **24** separately. As can be seen from figure **3** the end of the extension **26** has a section **29** with a reduced diameter, by means of which an abutment shoulder **29***a* is formed. The sliding sleeve **25** has a tapered section **25***a* with an internal diameter, which corresponds to the internal diameter of the part **29** with the reduced diameter. In this manner the sliding sleeve **25** can be plugged on the end of the extension **26.** As can be seen fron FIG. **1** the diameters of the extension **26** and the sliding sleeve **25** are so selected that the sliding sleeve **25** can be plugged in a telescoping manner on the extension **26** before use in the condition ready for transport of the container **1** and therefore it takes up little space.

Naturally it is also possible to provide a correspondingly longer sliding sleeve or a sliding sleeve with an extension abutment, which is delivered with the container and also remains in the capsule after pressing in of the separating bottoms. In this case an extension on the closure cap is not necessary.

FIG. **4** shows the capsule **16** separately. This capsule can have a flange **30** at its upper end. The flange can be connected with the upper end of the bottle neck **7** by welding or in an other suitable manner.

I claim:

1. Container means for separate storing and for mixing at least two components, one a dissolving component and another a solvent; said container means comprising:

a container for containing one component; said container having a body, an opening into said body and a neck leading from said body to said container opening;

a capsule for containing the other component and being positioned to extend into said container body; said capsule having sidewalls, a normally sealed openable base, a normally sealed first stopper spaced away from and above said base along said sidewalls, whereby said capsule is sealed closed

a removable second stopper for closing said body opening; affixed to said second stopper and normally positioned in and extending into said neck toward said first stopper is an operating sleeve of a first length for operating a capsule rammer; said sleeve having a first free end portion that is away from its said second stopper and which is shaped to define a first abutment to abut the capsule rammer;

also normally positioned in said neck and extending along at least part of the length of said sleeve is a removable capsule rammer; said rammer having a second end portion that is shaped to define a second abutment to abut said first abutment; said rammer having a rammer end opposite its said second end portion; said rammer end in the said normal position of said rammer extending up through said neck toward said second stopper and away from said capsule; with both said sleeve and said rammer in their respective said normal positions, said first and said second abutments are separated and are out of engagement with each other;

upon removal of said rammer from said container neck, inversion of said rammer and replacement of said rammer in said neck in the inverted position such that said rammer end extends into said container and said rammer second end portion extends toward said second stopper, and upon moving of said second stopper and its said sleeve onto said container neck toward said container body, said first and said second abutments abut; said rammer being of a length such that its said rammer end engages and breaks through both said capsule first stopper and said capsule base, thereby causing mixing of the components in said capsule and said container.

2. The container means of claim **1,** wherein said rammer is a hollow open ended sleeve such that mixed components in said capsule may pass through said rammer after it has opened said first stopper and said capsule base.

3. The container means of claim **2,** wherein said stopper sleeve is also hollow and has an open lower end extending toward said container body, and with said first and second abutments in engagement, said rammer and said sleeve being so shaped and positioned as to form a continuous flow pathway from said container body through said rammer and said sleeve.

4. The container means of claim 2, wherein said container neck is defined by sidewalls thereof; said rammer in its said normal position is in said container neck between said container neck sidewalls and said second stopper sleeve; said rammer second end being narrowed to a first cross-section to define said second abutment, and said first abutment having said first cross-section thereby causing said first and said second abutments to abut.

5. The container means of claim 4, wherein said second stopper sleeve has an annular, radially inward step thereon which defines said first abutment; said rammer second end portion passes over said sleeve first end portion to engage said second abutment.

6. The container means of claim 2, wherein said capsule comprises two capsule elements that are aligned with respect to motion of said rammer and both being defined by the same said sidewalls which extend past both said capsule elements and both include a respective normally sealed openable base and spaced away therefrom along said sidewalls a respective normally openable first stopper;

said rammer being of a length such that once said first and said second abutments abut, said rammer end engages and breaks successively through said first stopper of the upper said capsule component, said base of the upper said capsule component, said first stopper of the lower said capsule component and said base of the lower said capsule component, thereby to mix the components in said capsule elements and in said container.

7. The container means of claim 2, wherein said capsule is formed in an elongated tube through said container neck and said elongated tube defining said capsule sidewalls; said capsule base and first stopper being spaced along said tube;

a tube opening through said capsule tube and communicating from within said tube to into said container, said tube opening being located along said tube above said capsule;

said capsule first stopper including a cylindrical shell with upstanding walls extending through said tube a height to extend past said tube opening and said cylindrical shell being of the cross-section of the interior of said tube, such that said cylindrical shell normally covers said tube opening; said first stopper being shiftable by said rammer away from the position where it convers said tube opening to open said tube opening.

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