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(54) **Spraying device with improved trigger arrangement**

(57) The present invention is related to a hand- operated sprayer for spraying a liquid, said sprayer comprising a bottle (1), a trigger (10) connected to a spring (12), an outlet spray head (20) at the front of the sprayer, a pump mechanism which can be actuated by the trigger, said pump mechanism comprising a piston (14) movably arranged in a cylinder (15),
wherein the trigger (10) is arranged behind the pump mechanism, and a connection means (21) is present between the trigger (10) and the piston (14).

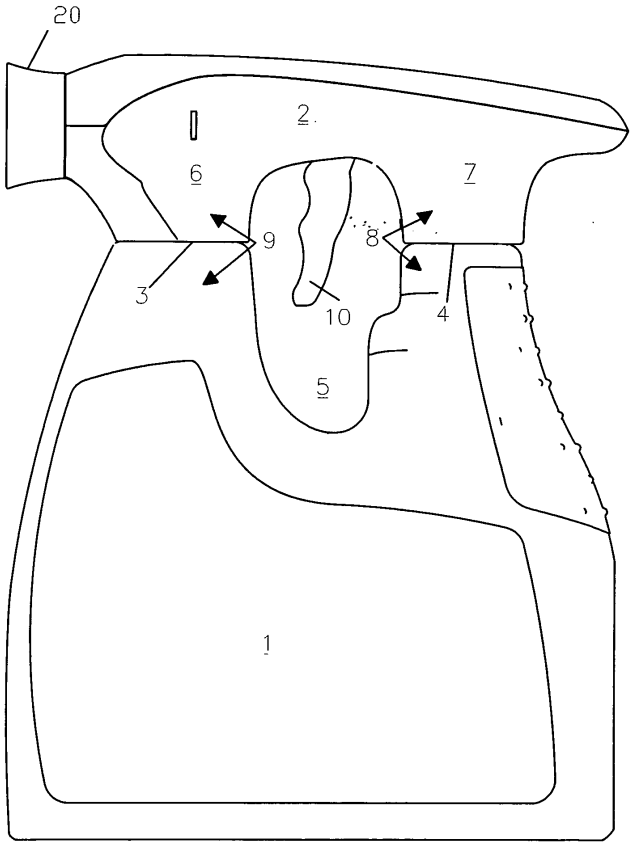

Fig 1

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Description

Field of the Invention

[0001] The present invention is related to sprayers, in particular but not limited to sprayers for pesticides and the like.

State of the Art

[0002] The devices which are currently on the market of pesticide sprayers are usually equipped with a pump/trigger mechanism, installed on a bottle comprising the liquid which is to be distributed. Hand-operated sprayers have a trigger which, when pulled, activates the movement of a piston in a cylinder. This movement pushes liquid present in the cylinder volume towards an outlet spray head, where it is distributed in the form of fine droplets. A spring is present for actuating the return movement of the trigger towards its rest position. During this return movement, the piston moves back to its initial position, so that a new amount of liquid is pumped up from the bottle and into the cylinder volume.

[0003] These mechanisms per se are known in the art. However, in current systems, the trigger is always directly underneath the spray head. This increases the probability of liquid spilling onto the user's hand during the spraying action. When hazardous liquids are used, the risk of injury is thus increased.

Aims of the Invention

[0004] The present invention aims to provide a sprayer with improved location of the trigger with respect to the spray head.

Summary of the Invention

[0005] The invention is related to a sprayer as disclosed in the appended claims. It concerns a hand-operated sprayer wherein the trigger is arranged behind the pump mechanism and spray head, the latter comprising a piston and cylinder arrangement. A connection means is present connecting the trigger to the piston, thereby allowing the normal pump action to be actuated by the trigger from the more remote location of the trigger.

[0006] According to the preferred embodiment, the connection means comprise at least one beam, connected between the piston and the trigger, in such a way that any movement of the trigger in a given direction causes a movement of the beam, and thereby the piston, in the same direction. A spring is present, to actuate the trigger's return to it's initial position. Preferably, there are two beams: one on each side of the pump mechanism. The material of the beam(s) is preferably polypropylene.

[0007] According to the preferred embodiment, the sprayer comprises a shielding portion separating the spray head from the trigger.

Brief Description of the Drawings

[0008] Fig. 1 is representing an outside view of a sprayer according to a preferred embodiment of the invention.

[0009] Fig. 2 shows the pump/trigger mechanism of a sprayer according to the invention.

Detailed Description of the Invention

[0010] Figure 1 shows an outside view of a trigger according to a preferred embodiment of the invention. The sprayer comprises a bottle portion 1, and a top portion 2. The bottle comprises two connection area's 3 and 4, essentially at the same height level, and separated by a recess area 5. The top part comprises front and back portions 6 and 7 which fit onto the connection area's 3 and 4 respectively, thereby forming a grip portion 8 and a frontal shielding portion 9 of the assembled sprayer. The trigger 10 is located in between the grip portion 8 and the shielding portion 9, preferably within the recess 5. In this way, the user's hand is effectively protected from the spray head 20, by the presence of the shielding portion 9.

[0011] Figure 2 shows the mechanism present inside the top portion 2, according to a preferred embodiment of the invention. As seen on the figure, the trigger 10 is effectively arranged behind the pump mechanism. The trigger 10 is connected to the housing in a hinge point 11. A blade type spring 12 is connected to the trigger, and is loaded by being pushed against the top wall 13 of the top portion 2, when the trigger is pulled. When the trigger is released, the spring pushes it back to its initial position.

[0012] The pump mechanism comprises a piston 14, movable in a cylinder 15. A tube 16 is present, through which the liquid from the bottle can be pumped up to the cylinder volume, by moving the piston out of the cylinder (to the left on the drawing). This movement takes place when the trigger is released. By pulling the trigger, the piston is moved in the opposite direction (to the right on the drawing) and the liquid which is present in the cylinder, is pushed out towards the spray head 20, through inner connections (not shown on the drawing, but known to the skilled person).

[0013] The movement of the trigger is transferred to the piston through connection means 21. In the embodiment shown, these connection means are in the form of a beam 21, having a distal end 22 and a proximal end 23. Preferably, two beams are present, one on each side of the pump mechanism. The proximal end of the beam is connected to a point on the trigger located underneath the hinge point 11, so that when the trigger is pulled, the beam is pulled backwards as well. The distal end 22 of the beam is connected to the distal end of the piston 14, thereby pulling the piston into the cylinder when the trigger is pulled. The beam is sufficiently rigid to be able to pull the piston out of the cylinder when the trigger is re-

leased. The beam(s) are preferably produced from polypropylene.

[0014] As stated above, the main advantage offered by the present invention is related to the protection of the user's hand, obtained by arranging the trigger towards the back of the sprayer, to a location behind the pump mechanism. In the preferred embodiment, a shielding portion 9 is present in between the spray head and the user's hand. In other embodiments, the shielding portion may be absent. In stead of the beam(s) 21, other connection means may be used, such as a wire further equipped with a spring operated pulley or a wire in combination with another spring arrangement, e.g. a spring in between the piston and the cylinder, or between the housing and the trigger.

[0015] In addition to that, the sprayer of the preferred embodiment may show some additional advantages. Due to the specific design of the sprayer, especially when the sprayer includes the front shielding portion 9, the gravity point of the sprayer as a whole, is moved forward with respect to the grip portion, in comparison to prior art sprayers. Consequently, when the sprayer is held, it always has a tendency to tilt in the forward direction, i.e. with the spray head pointing downwards. Given that this is in most cases the direction in which the spraying needs to be done, this design facilitates operation and manipulation of the sprayer.

[0016] Furthermore, the connection area's 3 and 4 being essentially on the same height level, the assembly of this type of sprayer is easy, as the top portion 2 can be fixed onto the bottle portion 1 in one production step.

Claims

1. A hand-operated sprayer for spraying a liquid, said sprayer comprising a bottle (1), a trigger (10) connected to a spring (12), an outlet spray head (20) at the front of the sprayer, a pump mechanism which can be actuated by the trigger, said pump mechanism comprising a piston (14) movably arranged in a cylinder (15),
   characterized in that the trigger (10) is arranged behind the pump mechanism, and that a connection means (21) is present between the trigger (10) and the piston (14).

2. The sprayer according to claim 1, wherein said connection means comprise at least one beam (21), having a distal end (22) and a proximal end (23), the proximal end being connected to the trigger (10), in such a way that a movement of the trigger in a given direction causes a movement of the beam in the same direction, and the distal end being connected to the piston (14).

3. The sprayer according to claim 2, wherein two beams are present, one on each side of the pump mechanism.

4. The sprayer according to claim 2 or 3, wherein said beam(s) is(are) produced from polypropylene.

5. The sprayer according to any one of the preceding claims, wherein the trigger (10) is separated from the spray head by a shielding portion (9) of the sprayer.

6. The sprayer according to claim 5, wherein the bottle (1) comprises a front and back connection area (3,4), with a recess (5) in between, the sprayer further comprising a top portion (2), said top portion itself having a front and back portion (6,7), which fit onto said connection areas (3,4), thereby forming the grip portion (8) and the shielding portion (9) of the assembled sprayer, with the trigger (10) being located in between the shielding portion (9) and the grip portion (8).

7. The sprayer according to claim 6, wherein said connection area's (3,4) are essentially at the same height.

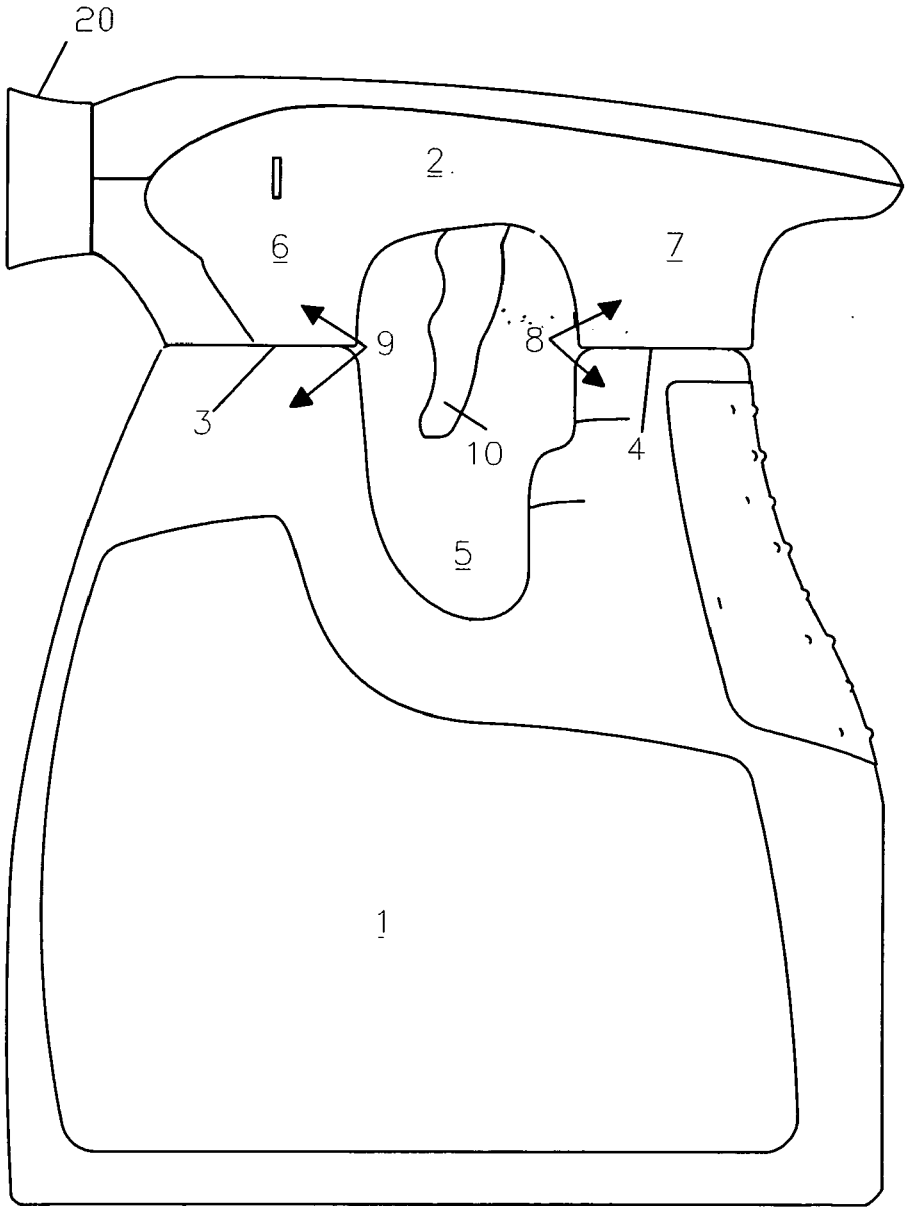

Fig 1

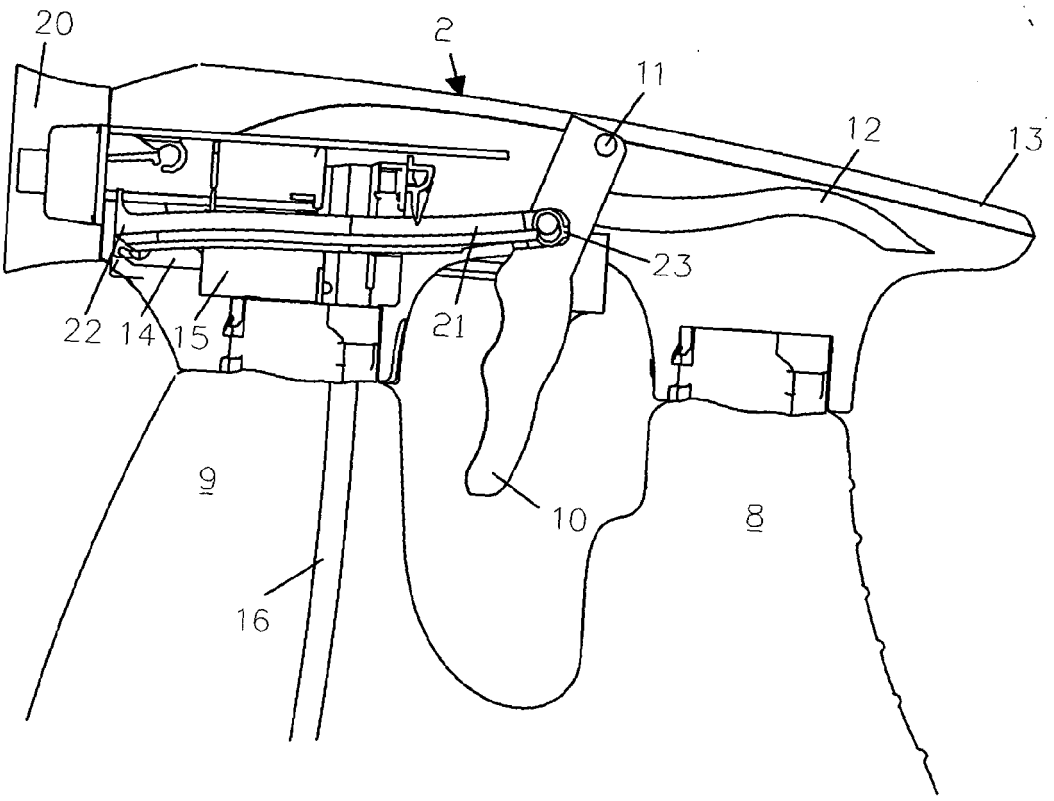

Fig 2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 44 7055

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 6 443 368 B1 (KOHLS CORWIN) 3 September 2002 (2002-09-03) * column 1, lines 9-16 * * column 4, lines 46-54 * * column 10, line 52 - column 12, line 65 * * figures 9a,25,26 * -----	1-5	INV. B05B11/00
X	US 4 456 153 A (MESHBERG ET AL) 26 June 1984 (1984-06-26) * column 1, line 5 - column 3, line 19 * * figure 1 * -----	1-5	
			TECHNICAL FIELDS SEARCHED (IPC)
			B05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	28 July 2006	Gineste, B

CATEGORY OF CITED DOCUMENTS

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
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T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 06 44 7055

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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28-07-2006

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82