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(54) Trigger type liquid discharge device

(57) A trigger type liquid discharge device is provided with a valve structure designed to open only when the liquid inside the device shows a proper discharge pressure and arranged upstream relative to the discharge aperture of the nozzle head thereof and also with a flow path arranged in the cylinder of the pump unit of the de-

vice for returning any residual pressure in the liquid flow paths of the device after the end of a liquid discharging cycle. With such an arrangement, it can effectively prevent liquid from dripping out of the discharge tiperture of the residual pressure in the liquid flow paths in the initial rind/or final stages of the liquid discharging operation.

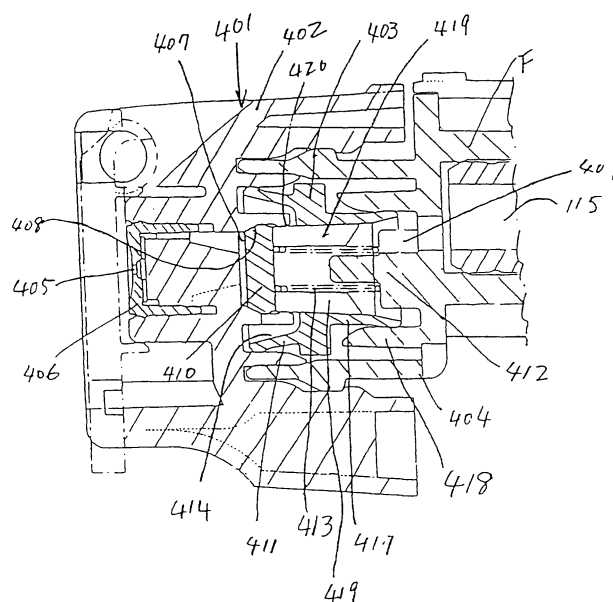


Fig. 30

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Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 02 4747

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	JP 04 017855 U (N.N.) 14 February 1992 (1992-02-14) * the whole document * * figure 2 *	9,10	INV. B05B11/00
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A	US 4 365 751 A (SAITO TADAO ET AL) 28 December 1982 (1982-12-28) * column 2, line 17 - column 6, line 45; figures *	1-17	
A	US 4 273 290 A (QUINN DAVID R) 16 June 1981 (1981-06-16) * column 2, line 40 - column 3, line 38; figures *	1-17	TECHNICAL FIELDS SEARCHED (IPC) B05B
A	US 4 989 790 A (MARTIN DOUGLAS S ET AL) 5 February 1991 (1991-02-05) * column 5, line 52 - column 9, line 65; figures *	1-17	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 3 July 2008	Examiner Schaefer, Patrick
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 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			

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EPO FORM 1503 03.82 (P04C01)

**CLAIMS INCURRING FEES**

The present European patent application comprised at the time of filing claims for which payment was due.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☒ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:
- ☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1,3,7

A trigger type liquid discharge device as known from e.g. JP-U-4-17855 (D1) and characterized by the provision of a specific valve structure (liquid guide 3, resp.403), whereby the opening of the valve only occurs when a predetermined pressure is reached, as claimed in independent claims 1,3,7 with their dependent claims;

2. claims: 4,5

A trigger type liquid discharge device as known from e.g. JP-U-4-17855(D1) and characterized by the provision of a plurality of short and shallow grooves and an air intake port, whereby return of residual liquid to the container is achieved through the port at the end of stroke, as claimed in independent claims 4,5 and their dependent claims;

3. claims: 8,9

A trigger type liquid discharge device as claimed in independent claims 8,9 and, as explained below, substantially known from JP-U-4-17855 (D1);

4. claim: 10

A trigger type liquid discharge device as known from e.g. JP-U-4-17855(D1) and characterized by the provision of a hole 321 closed by a resilient valve 323 to be opened by a pin body 330, whereby return of residual liquid to the container is achieved through the hole at the end of stroke, as claimed in independent claim 10 and its dependent claims)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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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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03-07-2008

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