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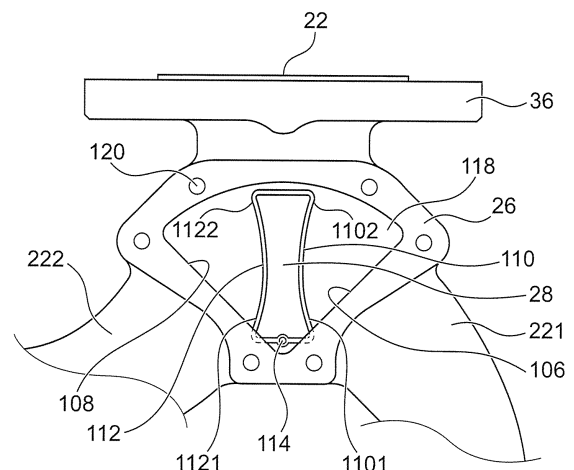
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(54) **DISCHARGE MERGING PORTION, PUMP CASING, AND PUMP APPARATUS**

(57) There is provided a discharge merging portion for a plurality of passages to transfer the liquid, reduced in pressure loss as compared with an existing discharge merging portion. An on-off valve 28 includes a first surface 110 to close a first opening 106, and a second surface 112 to close a second opening 108. The first surface 110 and the second surface 112 are opposed to each other. Each of the first surface 110 and the second surface 112 includes an upstream end part 1101 positioned on an upstream side of the liquid which is transferable, a downstream end part 1102 positioned on a downstream side, and a center part 1103 positioned between the upstream end part 1101 and the downstream end part 1102. The first surface 110 is a curved surface curved toward the second surface 112. The center part 1103 of the first surface 110 is recessed toward the second surface 112 relative to the upstream end part 1101 and the downstream end part 1102 of the first surface 110, and a recessed amount is increased from the upstream end part 1101 and the downstream end part 1102 toward the center part 1103.

Fig. 6





EUROPEAN SEARCH REPORT

Application Number

EP 22 17 7041

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	GB 1 563 172 A (MATERIEL TELEPHONIQUE) 19 March 1980 (1980-03-19) * page 2, line 80 - line 90; figures 1,2 * -----	1, 2, 8, 9	INV. F04D15/00
X	EP 2 930 326 A1 (MAN TRUCK & BUS AG [DE]) 14 October 2015 (2015-10-14) * figures 1-5 * -----	1, 8, 9	
			TECHNICAL FIELDS SEARCHED (IPC)
			F04D
The present search report has been drawn up for all claims			

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EPO FORM 1503 03.82 (F04C01)

Place of search Munich	Date of completion of the search 21 October 2022	Examiner Morales Gonzalez, M
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		



Application Number

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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:

1, 2 (completely); 8, 9 (partially)

☐ 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).



LACK OF UNITY OF INVENTION SHEET B

Application Number

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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, 2(completely); 8, 9(partially)

Discharge merging portion with an on off valve comprising a first and second surface curved toward another surface

2. claims: 3(completely); 8, 9(partially)

Discharge merging portion with an on-off valve configured to block inflow and a valve fixing portion

3. claims: 4(completely); 8, 9(partially)

Discharge merging portion with an on-off valve configured to close the first opening and the second opening and includes a third surface and fourth surfaces opposed to the first and second surfaces respectively

4. claims: 5(completely); 8, 9(partially)

Discharge merging portion with an on-off valve configured to close the first opening and the second opening and a surface of the on-off valve does not allow the liquid to pass therethrough

5. claims: 6(completely); 8, 9(partially)

Discharge merging portion with an on-off valve and is made of an elastic material and the intermediate part of the first surface is recessed toward the second surface

6. claims: 7(completely); 8, 9(partially)

Discharge merging portion with an on-off valve a valve fixing portion including a third opening, a fourth opening and a fifth opening that respectively face the first opening, the second opening, and the discharge port and an interval between the third and interval between the third surface and the fourth surface is increased, a position of the second closing portion with respect to the first closing portion is fixed and a recessed amount is increased toward an intermediate part

**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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