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(54) **Cryogenic refrigerator.**

(57) A cryogenic refrigerator comprising a closed cylinder (111) provided with an inlet (134) and an outlet (135) for introducing and discharging a coolant gas into and out of the cylinder (111), a displacer (119) slidably housed in the closed cylinder (111) and housing a cooling member (124) therein and having a passage (141) through which the coolant gas flows, a device (142) coaxially arranged in and along the passage (141) of the displacer (119) in which the cooling member (124) is housed to divide the passage (141) into outer and inner ones, a device for reciprocating the displacer (119) in the cylinder (111), and a device for repeating the process of introducing the high pressure coolant gas into the cylinder (111) through the inlet (134) and discharging it out of the cylinder (111), synchronizing with the reciprocating displacer (119).

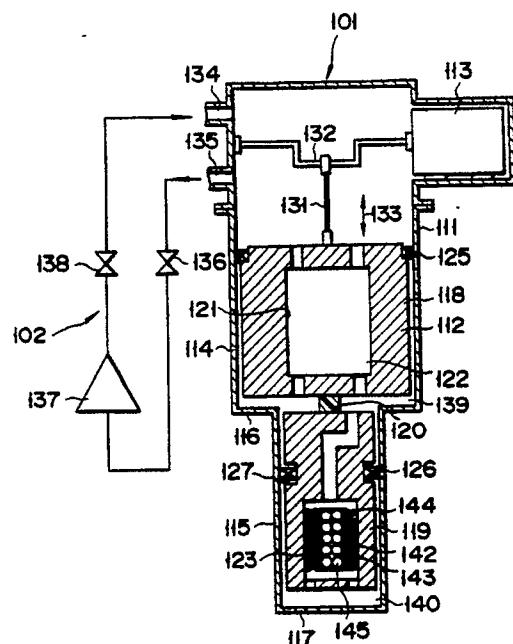


FIG. 8

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EUROPEAN SEARCH REPORT

Application Number

EP 90 30 5632

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)
2	A US-A-4 825 660 (OKUMURA) * Whole document * ---	1	F 25 B 9/14
2	A US-A-4 366 676 (WHEATLEY et al.) * Column 4, lines 28-43; figures 1,5,6 * ---	1,2	
7	A FR-A-2 000 669 (RAYTHEON) * Page 10, line 29 - page 11, line 13; figures 10,11 * ---	1,2,3	
7	A GB-A-1 168 814 (PHILIPS) * Page 3, lines 22-25; figures 1b,2 * -----	1,2	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			F 25 B F 02 G F 28 F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 28-08-1990	Examiner BROMAN B.T.
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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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ All claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for all claims.
- ☐ Only part of the claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claims:
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

X LACK OF UNITY OF INVENTION

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

1. Claims 1-4: Cryogenic refrigerator having a cooling member with a divided flow. Grains of different size.
2. Claims 5-7: Cryogenic refrigerator having a cooling member with premeable diaphragms, perpendicular to the gas flow.
3. Claims 8-11,14: Cryogenic refrigerator with a cooling member having magnetic grains and a method to make these.
4. Claims 12-13: Cryogenic refrigerator with a cooling member having a fibrous member.

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ 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 has 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: 1-4