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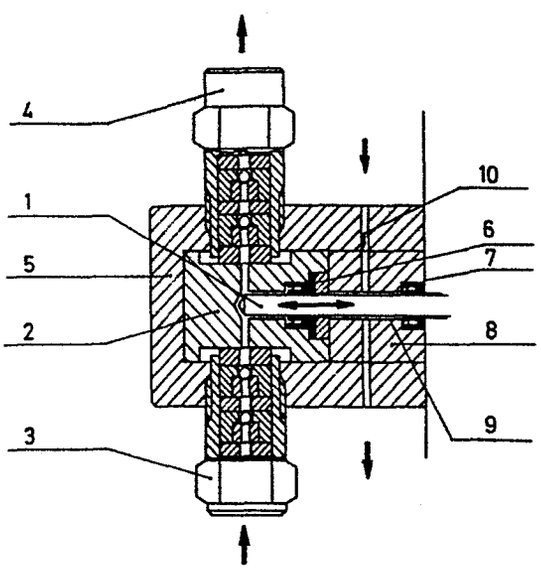
(54) Sealing device for a high pressure pump.

(57) A sealing device in a piston pump working at high pressure, e.g. for use in so-called High Performance Liquid Chromatography (HPLC), the pump comprising a piston (1) which carries out a reciprocating motion through a cylindrical sealing (6) in the displacement chamber (2) of the pump whereby the piston (1) at the side of the sealing (6) opposite to the displacement chamber (2) is surrounded by a sealed annular slot (9) which could be washed by a washing medium so as to remove residual products of the pump medium passing the sealing from the piston.



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to be used in so-called High Performance Liquid Chromatography (HPLC).

The present invention refers to a sealing device in a piston pump working at high pressure, e.g. for use in so-called High Performance Liquid Chromatography (HPLC), the pump comprising a piston which carries out a reciprocating motion through a cylindrical sealing in the displacement chamber of the pump.

In so-called HPLC (High Performance Liquid Chromatography), which is a chromatographical separation technique in which the solvent is added to a separation column under high pressure, the pressure is usually obtained by means of a reciprocating piston pump. The piston, usually a sapphire piston, thereby performs a reciprocating movement in the displacement chamber, and is sealed towards the pump housing by means of a cylindrical sealing. The lubrication necessary between the piston and the sealing is usually obtained by the solvent. This would however require that the solvent is such that it could evaporate from the piston without leaving any residual products which may damage the sealing.

In biochemical applications which are becoming more and more common within the HPLC technique liquids are however often used which at evaporation leave solid residuals which could give rise to damaging of the pump. The above defined principle of sealing will therefore not operate sufficiently in these applications.

It is an object of the present invention to provide a sealing device in an HPLC pump which makes the pump suitable for use also with liquids as defined above. The characteristics of the invention will appear from the claims attached to the specification.

The invention will now be described in detail, reference being made to the enclosed drawing which schematically shows a piston pump provided with the sealing device according to the invention.

In the drawing reference 1 denotes a reciprocating pump piston driven from a driving device not shown in the drawing. The piston is moving in a displacement chamber 2 through which liquid is flowing from below and upwards in the figure at the reciprocating movement of the piston by means of conventionally designed valve units, inlet valve units 3 and outlet valve units 4. The valve units and the displacement chamber are covered by a pump housing 5. The piston seals towards the displacement chamber by means of a cylindrical sealing 6 usually made of a polymer material and is furthermore surrounded by a piston skirt 8. The lubrication necessary between the piston 1 and the sealing 6 is usually achieved by means of the pump medium which forms a film between the piston and the sealing. This also means that parts of the pump medium will reach the piston skirt 8. In order to avoid damages on the parts of the pump which are exterior to the sealing, it is necessary that the pump medium is such that it evaporates without leaving any residual products. As mentioned above this is not always the case in biochemical applications. According to the invention the pump piston is therefore provided with an annular slot which is sealed by a further sealing 7. Through the slot a suitable washing medium would then be supplied via a washing channel 10, either continuously or intermittently, whereby the pump could also be used for such liquids which on evaporation leave solid residual products.

The annular slot as well as the supplying channel for washing medium could be designed in different ways, e.g. a bellows rigidly attached to the piston could be used as a sealing. The essential feature is that a sealed annular space is achieved around the piston outside the sealing 6 so that

residual solvent could be washed away. If the sealing 7 is designed as a bellows the annular slot could also operate as a displacement chamber for the washing liquid.

We claim:

1. A sealing device in a piston pump working at high pressure, e.g. for use in so-called High Performance Liquid Chromatography (HPLC), the pump comprising a piston which carries out a reciprocating motion through a cylindrical sealing in the displacement chamber of the pump, characterized in that the piston at the side of the sealing opposite to the displacement chamber is surrounded by a sealed annular slot which could be washed by a washing medium so as to remove residual products of the pump medium passing the sealing from the piston.

2. Sealing device according to claim 1, characterized in that the pump medium is used as a lubrication means for the piston at the sealing.

3. Sealing device according to claim 1, characterized in that the annular space is limited by a further sealing.

4. Sealing device according to claim 1, characterized in that the annular space is limited by a bellows attached to the piston.

5. Sealing device according to claim 4, characterized in that the annular space is a displacement chamber for pumping the washing liquid.

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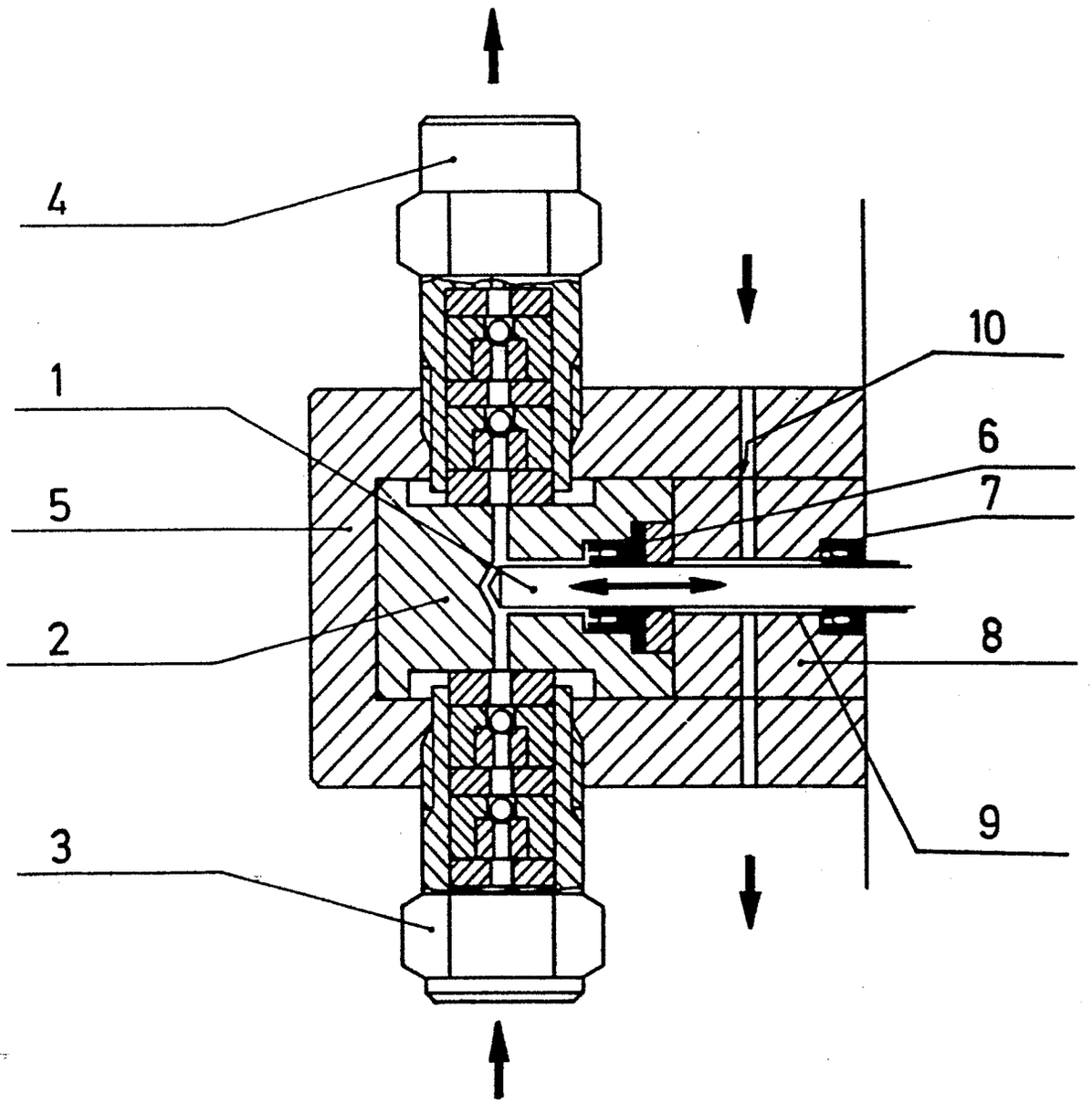

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EUROPEAN SEARCH REPORT

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DOCUMENTS CONSIDERED TO BE RELEVANT

EP 83850025.4

Category	Citation of document with indication where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
X	GB - A - 1 400 601 (F. HOFFMANN - LA ROCHE & CO. AG) * Totality, especially page 2, lines 106-123 * --	1,2,3	F 04 B 15/00 F 04 B 21/00
X	AT - B - 349 903 (MESSER GRIESHEIM GMBH) * Totality * ----	1,3,4, 5	

TECHNICAL FIELDS SEARCHED (Int. Cl. ³)

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F 04 B 19/00
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	30-06-1983	WITTMANN

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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