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### (54) Hydraulic Pump

(57) A sinusoidal hydraulic pump that is particularly suitable for use as a high pressure pump for a fuel injection system of a compression ignition engine. The pump includes first and second plungers, a filling plunger (110) and a delivery plunger (112), each of which is reciprocable within a respective bore (120, 122) provided in a pump housing (124) under the influence of a respective cam (114, 116) mounted upon a common cam shaft (118). The bores (120, 122) communicate with each other at their uppermost ends (in the orientation shown) and define, together with end surfaces of the filling and delivery plungers (110, 112), a pump chamber (126) for receiving fuel through a pump inlet port (130) provided in a wall of the pump housing (124). The filling plunger (110) cooperates with the inlet port (130) to provide a means for controlling fuel flow into the pump chamber (126) from a low pressure fuel supply. A delivery port (132) is also provided in the pump housing (124) in the region of the bore (122), and the outer surface of the delivery plunger (112) cooperates with the delivery port (132) to provide a means for controlling the delivery of pressurised fuel from the pump chamber (126) to a high pressure fuel volume.

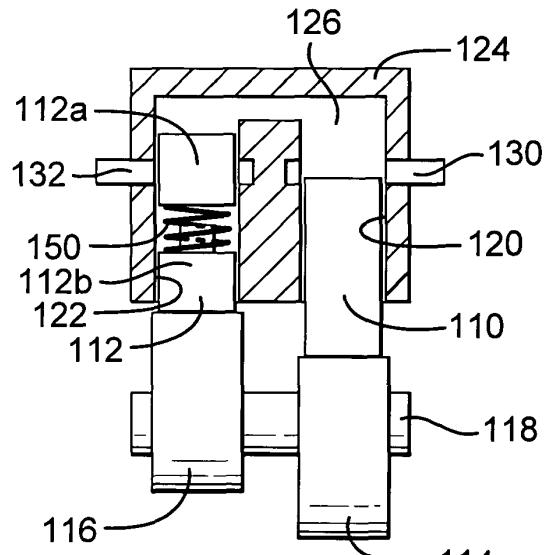


Fig.4



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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			F04B
<p>1 The present search report has been drawn up for all claims</p>			
Place of search		Date of completion of the search	Examiner
Munich		22 March 2005	Pinna, S
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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 ..... &amp; : member of the same patent family, corresponding document</p>			

**ANNEX TO THE EUROPEAN SEARCH REPORT  
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