

ABSTRACT OF THE DISCLOSURE

RECIPROCATING PUMPS WITH LINEAR MOTOR DRIVER

A reciprocating pump includes a cylinder with a closed interior compartment. A piston assembly has a dispensing end and an opposed end and is moveably mounted within the compartment for reciprocating movement in opposed linear directions between opposed ends of the closed interior compartment. A linear magnetic drive generates a linearly moving magnetic field for moving the piston assembly in opposed linear directions through a swept volume in each of said opposed linear directions, one of said linear directions being a dispensing stroke and the other of said linear directions being a suction stroke. A sealing member is provided between the cylinder and the piston assembly to divide the interior compartment of the cylinder into a dispensing chamber and a reservoir chamber. A valve-controlled inlet conduit communicates with the dispensing chamber from which liquid is dispensed and a valve-controlled outlet conduit communicates with the dispensing chamber for directing pumped liquid out of the interior compartment as the piston assembly is moved through the swept volume in a dispensing stroke. An energy storage and release media communicates with the reservoir chamber for storing energy as a result of movement of the piston assembly in a direction away from the dispensing end of the interior compartment and for releasing the stored energy as the piston assembly is moved in a direction toward the dispensing end of the interior compartment. In certain preferred embodiments, the pumps are hermetic and the energy storage and release media includes a gaseous substance in the reservoir chamber. Methods of pumping liquids with the pumps of this invention also constitute a part of the present invention.

(Figure 1)