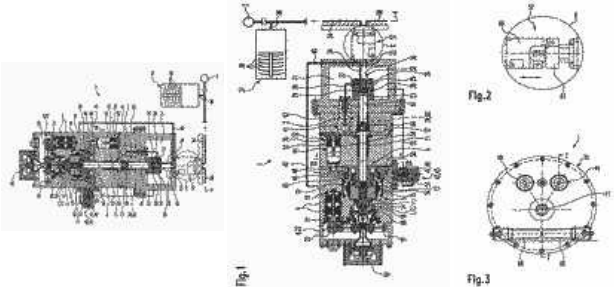
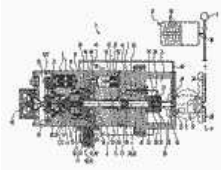


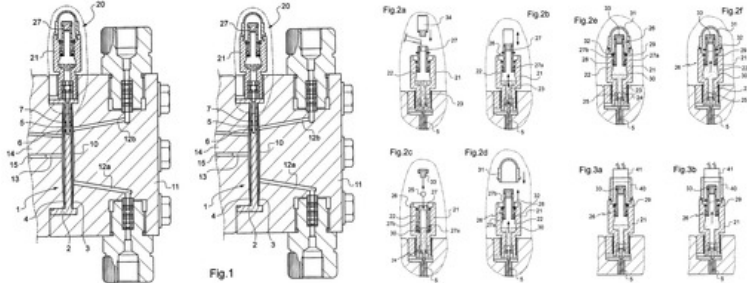
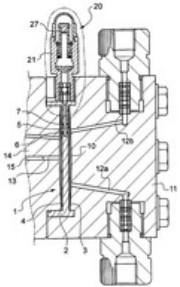
#	 Title	Publication number	1st app. date	Applicant/Assignee	1st publ. date	Publ. date
1.	Pump device for the hydraulic actuation of a valve	DE20311033	2003-07-17	COOPER CAMERON ONESUBSEA*	2004-11-25	2004-11-25

Pump device (1) for **hydraulically** activating a **valve** (2) in particular used for oil and gas exploration wherein such a **valve** may be a safety **valve** assigned to a riser or a tree, said **pump** device including a **piston cylinder** unit (3) from which pressurized **hydraulic** fluid (4) can be pumped in direction to the **valve** (2). To improve such a **pump** device so that the pressure of the **hydraulic** fluid is produced in particular at the corresponding site and near to the **valve** and is safe and constructed in a simple way an electrical drive means (5) is moveably connected to a **piston** (61) of the **piston cylinder** unit (3, 4) for alternating movement in axial direction of the **piston** within the **cylinder** (63).



2.	Diaphragm failure detection device for a hydraulically driven pump.	US20130183172	2012-01-17	MILTON ROY EUROPE MILTON ROY EUROPE*	2013-07-18	2013-07-18
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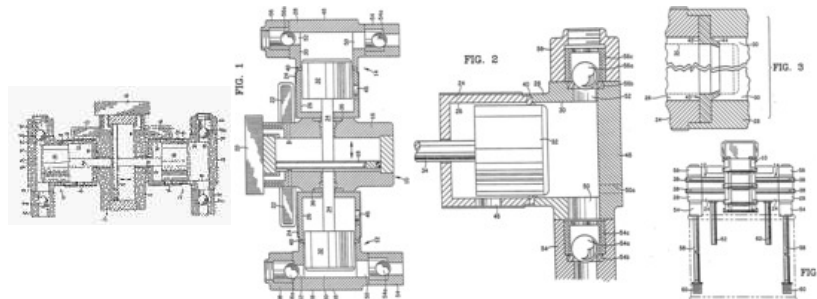
The device has a hollow body (21) in which a **chamber** (22) is formed at an end of the body and a duct (23) connects the **chamber** to another end. A **check valve** (24) allows a fluid to pass to the **chamber**. A **piston** (26) is mounted to move in translation in the body. The **piston** has a portion co-operating in a sealed manner with the **chamber**, where the portion is passed through a hole of diameter greater than that of a free ball (25) of the **valve**. The **piston** has another portion (33) co-operating in a sealed manner with the former portion to form a closed end of the **piston** remote from the latter end. Independent claims are also included for the following: (1) a method for mounting a break detecting device on a **pump** (2) a **hydraulically-actuated** diaphragm **pump**.



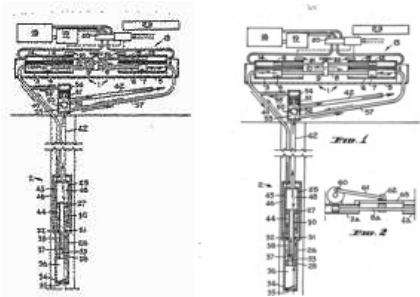
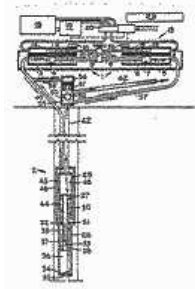
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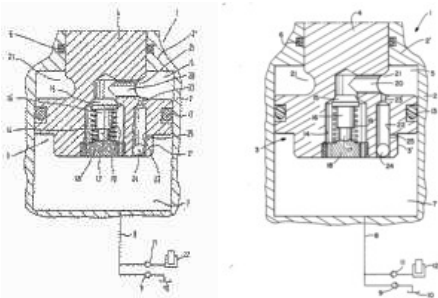
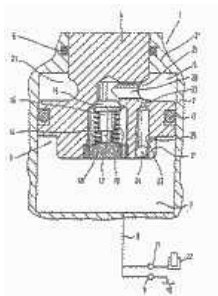
Figure 1 consists of two cross-sectional diagrams of a building facade, labeled (a) and (b). Diagram (a) shows a facade with a central window and a door. The window is labeled 'Window' and the door is labeled 'Door'. The facade is composed of several layers, including 'Exterior Wall', 'Insulation', 'Interior Wall', and 'Finish'. Diagram (b) shows a similar facade but with a different internal structure, including a 'Vent' and a 'Duct'. The layers are also labeled, showing the internal components and their arrangement.



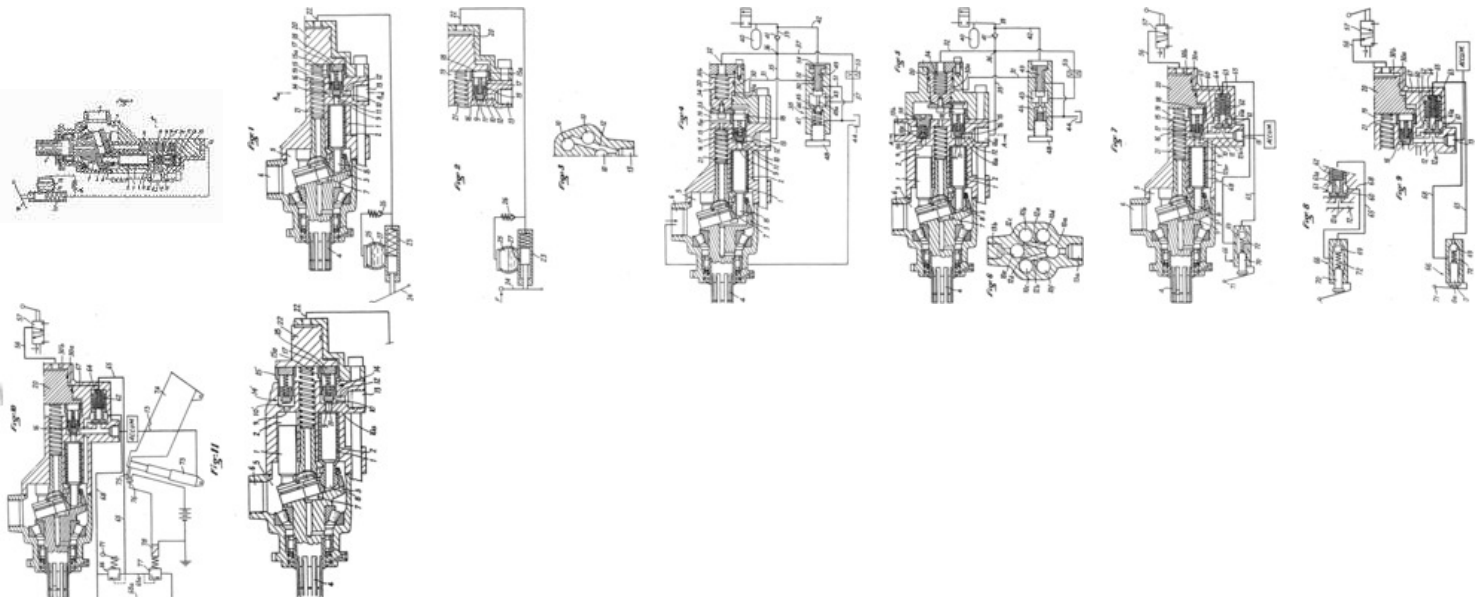
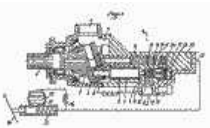
A **hydraulically actuated** bore or well **pump** in which a driving unit (1) at the bore or well surface comprises interconnected pistons (6 and 7) arranged to **hydraulically actuate** a slave **piston** (27) in a submerged well or bore unit (2) through a **hydraulic** pressure line (40) and a **pump** delivery line (42). The driving unit (1), being double-acting, imparts both pumping and return movement to the slave **piston** (27) and a coupled pumping **piston** (28) as the driving unit (1) is reciprocated. A **valve** (50) in the **pump** delivery line (42) allows outflow from the **pump** during the pumping stroke and also allows the **pump** delivery line (42) to be pressurised by the driving unit (1) for the return stroke of the coupled slave and **pump** pistons (27, 28). A controlled **hydraulic** drive motor (13) is preferred for **actuating** the driving unit (1).



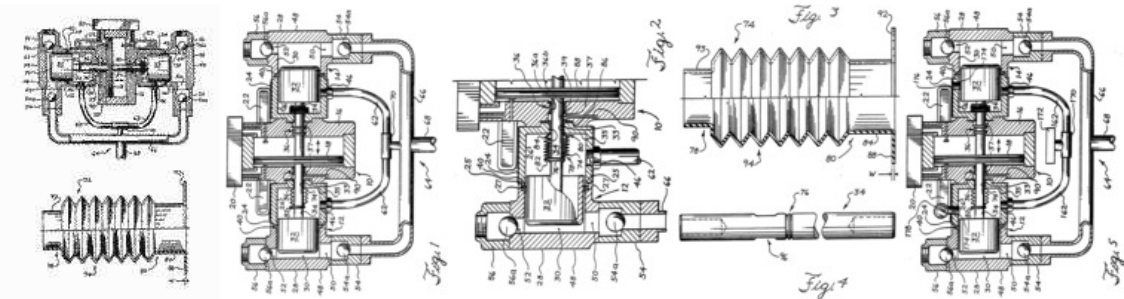
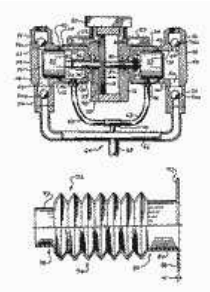
In a **hydraulic** manually-operated single-piston pump, the **piston** (3) has a first channel (14, 20) which runs from the **piston** interior (7) to the **rod** interior (5) and which has a non-return **valve** (15-19) which opens during the return stroke. The **piston** (3) is further provided with at least a second channel (22, 23, 25) running from the **piston** interior (7) to the **rod** interior (5), which is designed, at least over a part of its length, as a throttle drilling (23, 25).



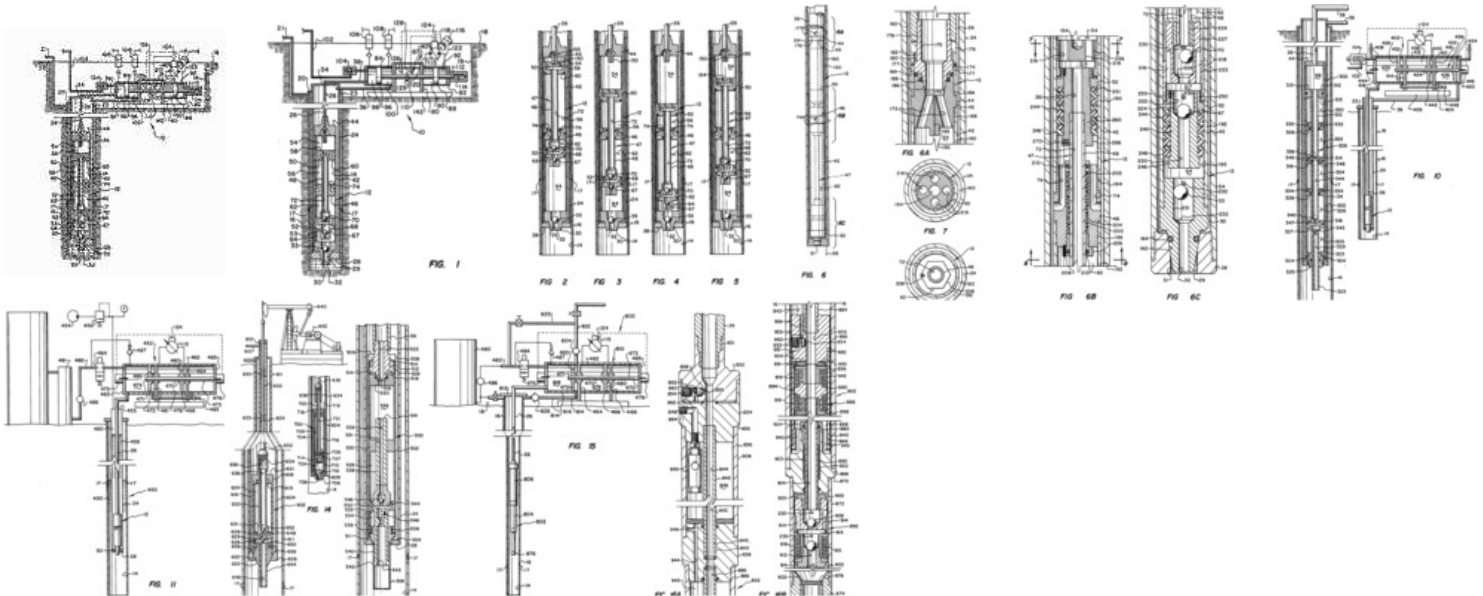
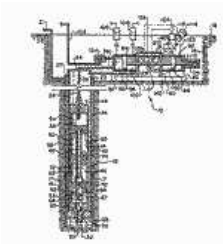
1. A **hydraulic pump** with axial pistons (1) in which each **piston** (1) drives the **hydraulic fluid** through a one-way **valve**, said one-way **valves** being linked to a control **cylinder** (20) by means of which the one-way **valves** can be rendered inoperative, characterized in that each one-way **valve** is placed in a **chamber** (10) and is constituted by a sliding support (15) inside which is disposed a spring (17) acting up-on a closing member (16) acting as a **valve** poppet which slides inside the sliding support (15), this support (15) being capable of being connected, at will, by any appropriate means, to the **piston** of the control **cylinder** (20).



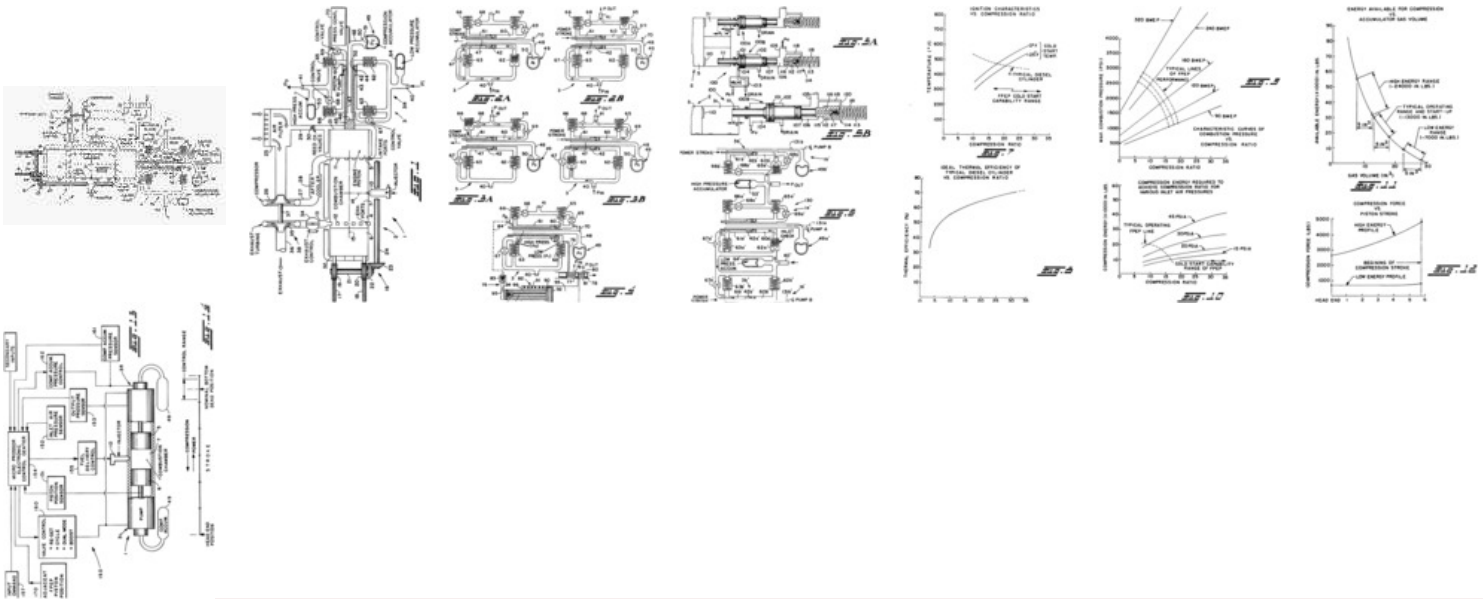
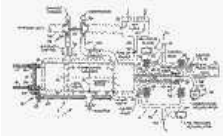
A **pump** that is in essence leak-proof and prevents the escape to ambient atmosphere of environmentally hazardous fluent materials is comprised of an outlet block defining a **pump chamber** having a fluid inlet and a fluid outlet, a **piston** having one end reciprocable within the **pump chamber** and sealed to the outlet block, a **piston rod** connected to the other end of the **piston** for reciprocating the **piston**, a dynamic block secured to the outlet block and defining a sealed dynamic **chamber** within which the other end of the **piston** reciprocates, and an outlet from the dynamic **chamber** in continuous closed-circuit communication with a recirculating system for preventing escape into the environment of any fluent material that may leak past the **piston** seal. The **pump** also includes an articulated seal for sealing the **piston rod** to the dynamic **chamber** to maintain the sealed integrity of the **chamber** while at the same time accommodating reciprocation of the **piston rod**. In a preferred embodiment, two pumps are **operated** alternately by a reciprocating fluid motor, a common manifold provides for delivery of fluent material to the inlets of both pumps, and the dynamic **chamber** outlets are in closed-circuit communication with one another so that fluent material can course back and forth between the two chambers without impeding **operation** of the pumps.



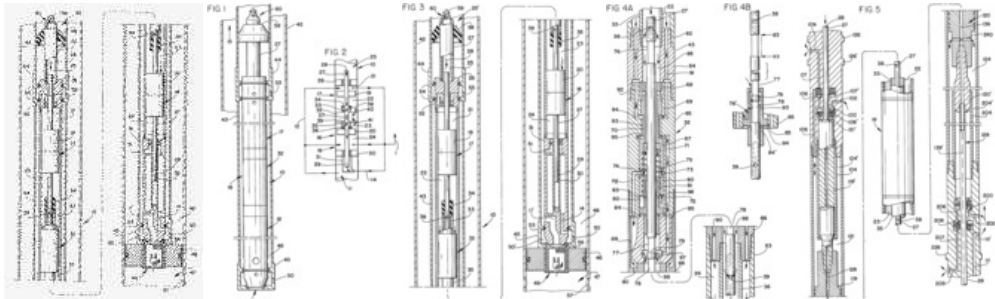
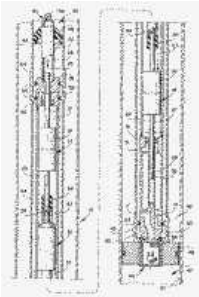
A downhole well **pump** system comprises a reciprocating **piston pump** disposed in a fluid conduit in a wellbore which is filled with a driving fluid having a density preferably greater than the production fluid being pumped. The **pump cylinder** has a transverse partition and a **piston** assembly including an elongated **piston rod** extending through the partition and connected at its opposite ends to spaced apart pistons. The **pump** pistons and the **cylinder** partition divide the **cylinder** into a production fluid intake **chamber**, a production fluid transfer and delivery **chamber**, a driving fluid **chamber** and a second production fluid delivery **chamber**. Production fluid is conducted to the surface through a production fluid conduit disposed coaxial within the driving fluid conduit. A power transfer apparatus includes opposed cylinders and an opposed **piston** assembly interconnected by a common **piston rod** forming opposed production fluid and driving fluid chambers wherein the fluids are oscillated by the power transfer apparatus in the respective conduits and a net delivery of production fluid is conducted to a production fluid delivery line. Opposed **hydraulic** fluid chambers in the power transfer apparatus are connected to a reversible **hydraulic pump**. **Pump** driving fluid may be biased by an accumulator formed in the driving fluid conduit or in an accumulator **cylinder** connected to the **pump** in a modified version of the system which eliminates the driving fluid conduit. Embodiments of the **pump** system include mechanical **rod actuated** pumps which are **operated** on a lifting stroke by the column of production fluid.



A free **piston engine pump** (FPEP) converts combustion energy into **hydraulic** power in an efficient, controlled and relatively uncomplicated manner, for example, for vehicle propulsion, auxiliary system power, etc. The FPEP is substantially naturally mass balanced having opposed engine pistons driving respective in-line **hydraulic** pumps. An adjustable accumulator with a deformable fluid-tight **chamber** containing a compressible fluid stores and delivers energy for compression, and an arrangement of control **valves** and **check valves** enables selective **operation** of the FPEP in primary (high flow) and secondary (high pressure) modes. Plural FPEP's may be interfaced for parallel **operation** sharing common elements and functions. Cycle rate, intermittent **operation** and start-up also may be controlled. Electronic monitoring and control of one or more **operational** parameters of a FPEP also are disclosed.



A downhole fluid **actuated pump** assembly for use in a borehole. Power fluid flows downhole to an engine which **actuates a pump**, and the **pump** lifts production fluid to the surface of the earth, with the spent power fluid from the **pump** assembly being co-mingled with the production fluid. The **pump** assembly has cylinders spaced from one another by a **valve** assembly with each of the cylinders being divided into upper and lower chambers by a **piston**, with one side of each **piston** being used as the engine while the remaining side of each **piston** is used for pumping formation fluid. A common connecting **rod** connects together the pistons and the **valve** assembly. The interior of the **rod** is hollow and forms a flow passageway for flow of power fluid to the **valve** assembly and to a balance tube.



13.

High pressure piston pumps

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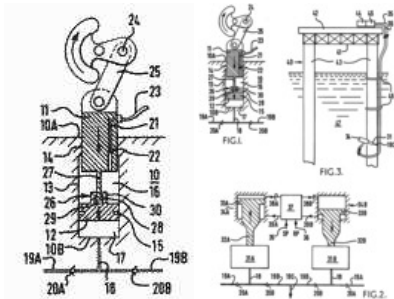
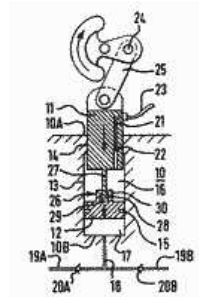
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BRITISH HYDROMECHANICS RESEARCH ASSOCIATION*
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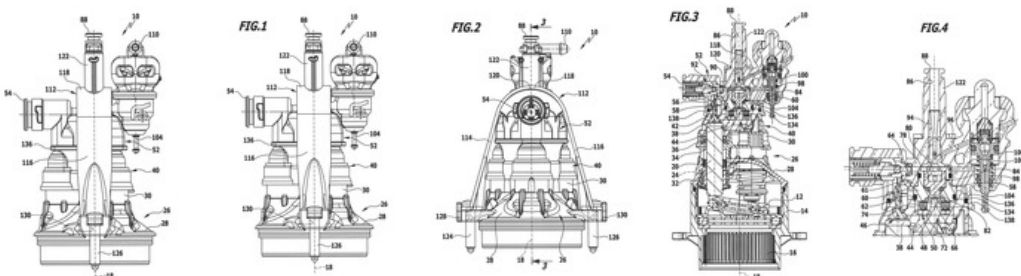
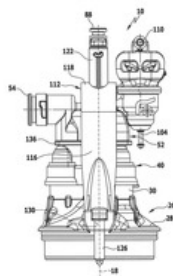
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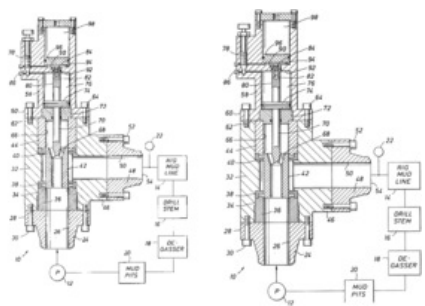
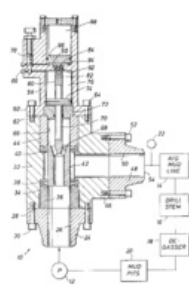
A high-pressure **piston pump** in which a low-viscosity working liquid supplied at a first pressure is delivered at a second, ultra-high pressure of, typically, up to 4,000 bars, for use in jet cutting and cleaning **operations** comprises a **cylinder** enclosing a first variable volume **chamber** for a viscous, **operating** liquid between a main **piston** and a subsidiary **piston**, and a second variable volume **chamber** for the working liquid, between the subsidiary **piston** and the head end of the **cylinder**. **Operating** liquid which leaks from the first **chamber** during working strokes of the **pump** and which thus reduces the volume of liquid in the first **chamber**, is replaced through a non-return **valve** in the main **piston** during non-working strokes as a result of the reduction in pressure in the first **chamber**. The subsidiary **piston** is provided with a coupling engageable with the main **piston** for limiting movement of the main **piston** away from the subsidiary **piston** during non-working strokes of the **pump**. This prevents excess **operating** liquid from flowing into the first **chamber** while ensuring that the first **chamber** is completely filled at the commencement of each working stroke with the **operating** liquid at an intermediate pressure between said first and second pressures.



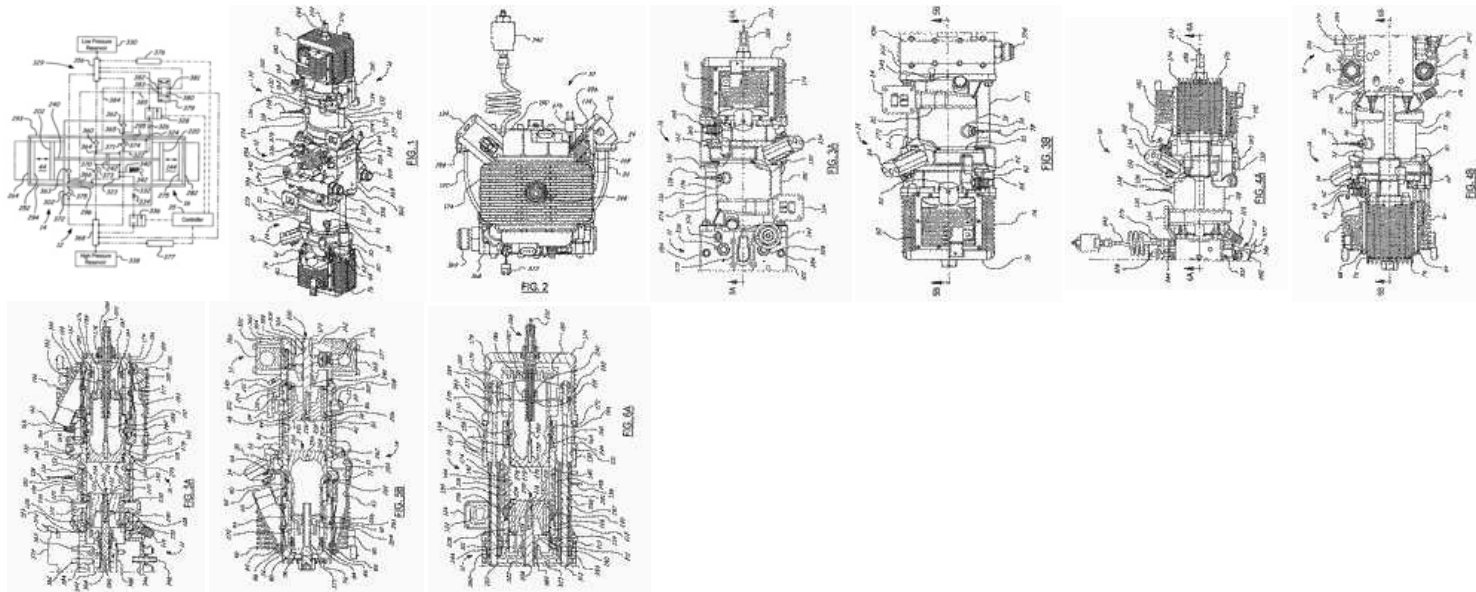
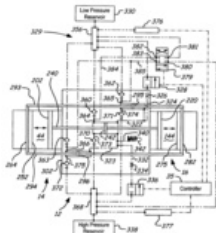
The invention relates to a **piston pump** (10) for a high-pressure cleaning device, having a **pump block** (40) which has a plurality of **pump chambers** (38), into which in each case one **piston** (20) dips, and having a **pump head** (52) which has a suction inlet (54) and a pressure outlet (88), wherein each **pump chamber** (38) is flow-connected via an upstroke **valve** (46) to the suction inlet (54) and via a delivery **valve** (50) to the pressure outlet (88), and having a clamping hoop (112) which engages around the **pump head** (52). In order to develop the **piston pump** in such a way that it can be produced less expensively and can be assembled more easily, it is proposed that it has a single U-shaped clamping hoop (112) which is oriented symmetrically with respect to the **pump** longitudinal axis (18), and that the **pump head** (52) and the **pump block** (40) form a pressure **chamber** (58) between themselves downstream of the delivery **valves** (50), in which pressure **chamber** (58) a **piston-like central insert part** (60) is arranged which is surrounded by at least one sealing element (62, 64) and has a passage (66), wherein a pressure line (86) which is oriented coaxially with respect to the **pump** longitudinal axis (18) is arranged downstream of the passage (66).



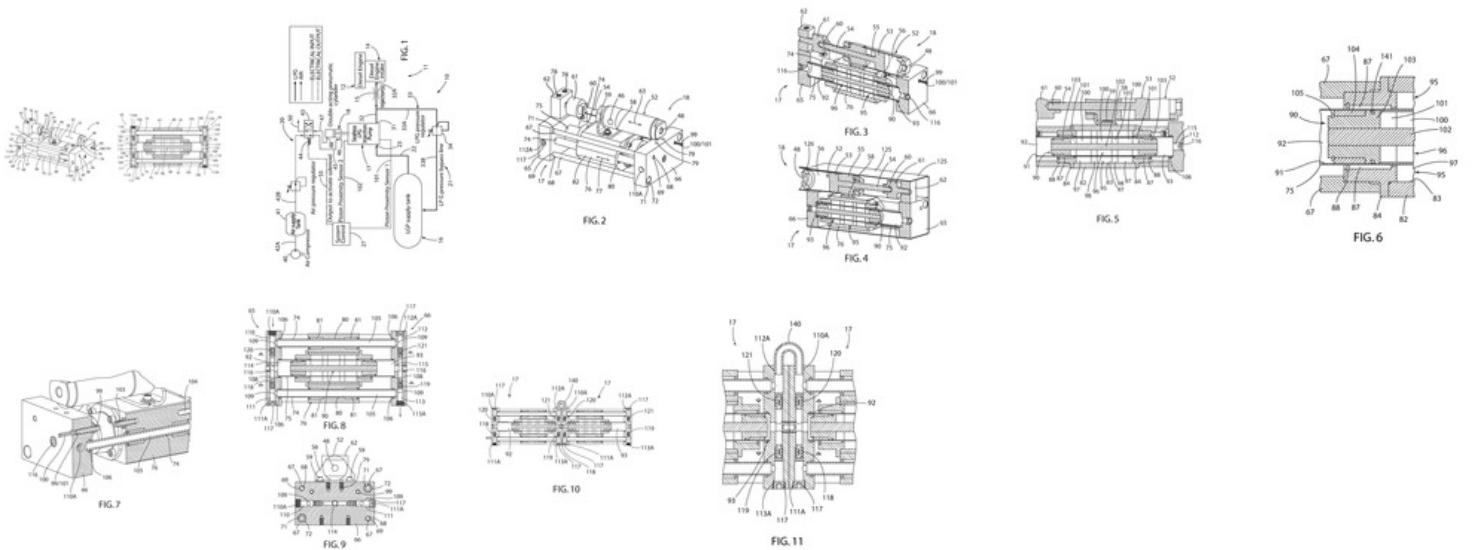
This disclosure is directed to a relief **valve** connected to the output manifold of a triplex mud **pump**. The **valve** body includes an inlet mud flow opening, an internal passage with a movable **valve** element to modulate flow, and a mud outlet opening for connection with the mud line and drill stem. The movable **valve** element connects to a **piston rod**. The **rod** is connected to a dual **chamber, hydraulically operated** force creating, air cushioned regulator which adjusts the force on the **piston rod** and thereby adjusts the position of the **valve** element.



A free **piston** engine is configured with a pair of opposed engine cylinders located on opposite sides of a fluid pumping assembly. An inner **piston** assembly includes a pair of inner pistons, one each **operatively** located in a respective one of the engine cylinders, with a push **rod** connected between the inner pistons. The push **rod** extends through an inner pumping **chamber** in the fluid pumping assembly and forms a fluid plunger within this chamber. An outer **piston** assembly includes a pair of pistons, one each **operatively** located in a respective one of the engine cylinders, with at least one pull **rod** connected between the outer pistons. The pull **rod** extends through an outer pumping **chamber** in the fluid pumping assembly and forms a fluid plunger within this **chamber**.



A fuel supply system for a vehicle uses a seal-less **piston** LPG injection **pump** which pumps fluid from a storage tank to an engine. The **pump** uses the vehicle's pneumatic air system, wherein the pressurized air of this system alternatingly drives an **actuator** magnetically coupled to a **piston**.



18

HANSEN DOWNHOLE PUMP SOLUTIONS*

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A wellbore

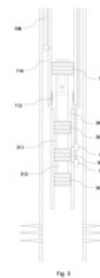
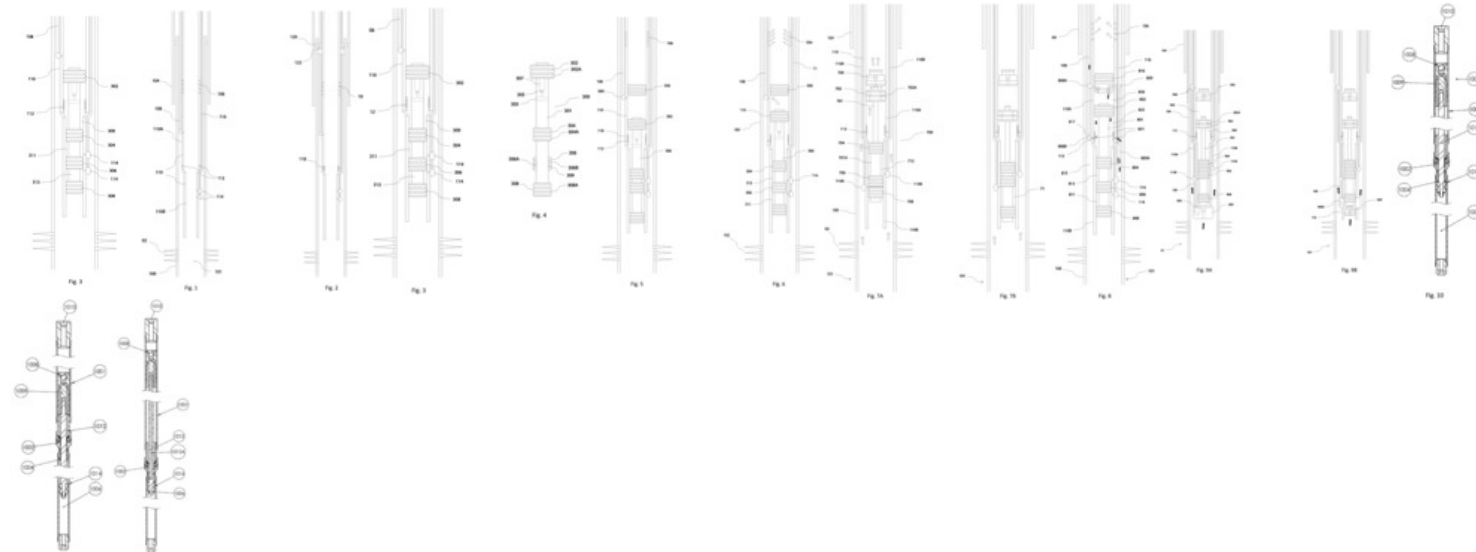


Fig. 1



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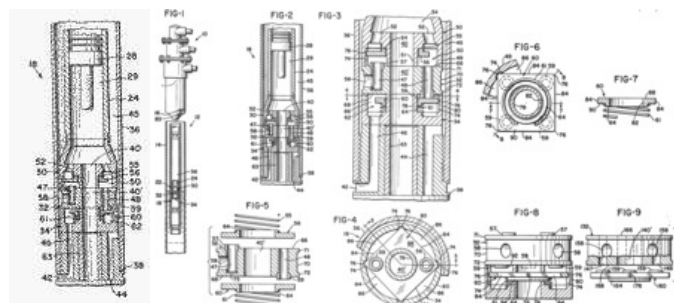
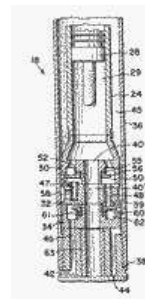
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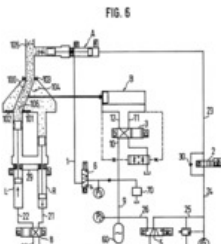
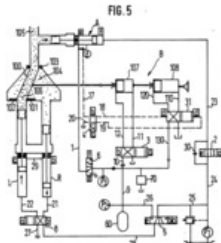
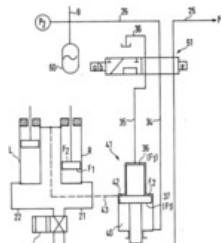
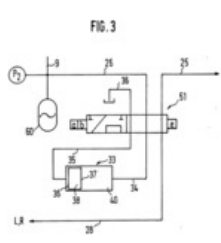
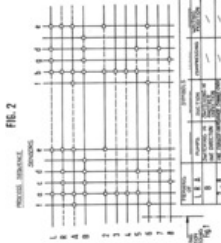
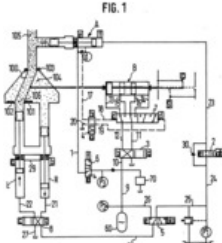
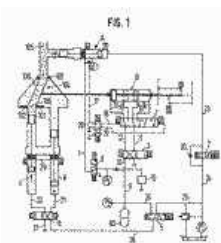
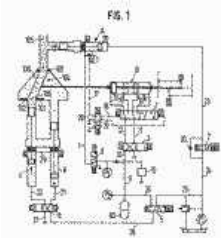
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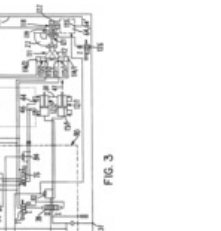
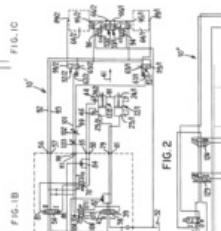
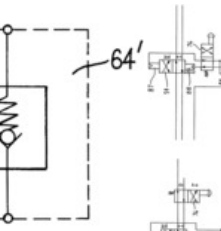
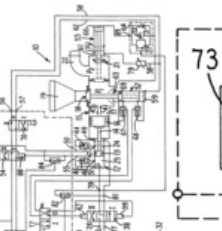
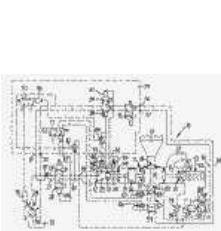
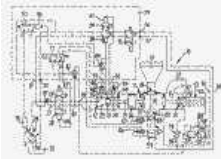
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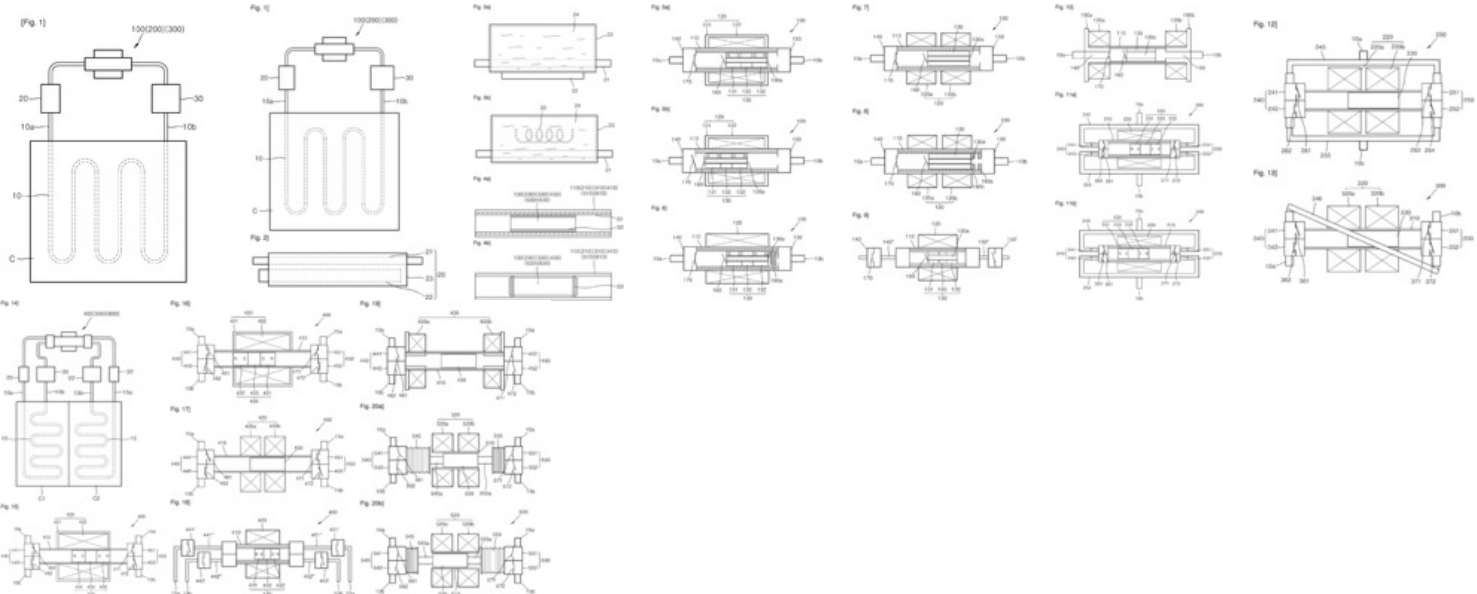
The invention relates to a **pump** for viscous materials having cylinders, especially to a two-**cylinder concrete pump** having a viscous-material flow control between a feed hopper, the two cylinders and a delivery line, a linkage circuit which controls the drives of the cylinders and the viscous-material flow control, a control **valve** and an equalising **cylinder** which during switch-over of the control **valve** precludes breaks in the flow of the viscous material. According to the invention it is provided that the linkage circuit causes the drive of the **cylinder** which is delivering at any given time to increase delivery by the measure of the amount of viscous material received by the equalising **cylinder**, and delays switch-over of the control **valve** in such a way that one of the **valve** plates, which are assigned to each **cylinder** at both ends of the inlet orifice of the control **valve** and whose size is matched to an area between the **cylinder** ports in such a way that in the switching centre position of the control **valve** the **cylinder** port is sealed by the **valve** plates and the inlet orifice in the control **valve** is sealed on the face between the cylinders, in order to carry out a part stroke of the **cylinder piston**, which part stroke compresses the viscous material drawn in, closes the port of the delivering **cylinder**. ...<IMAGE>...



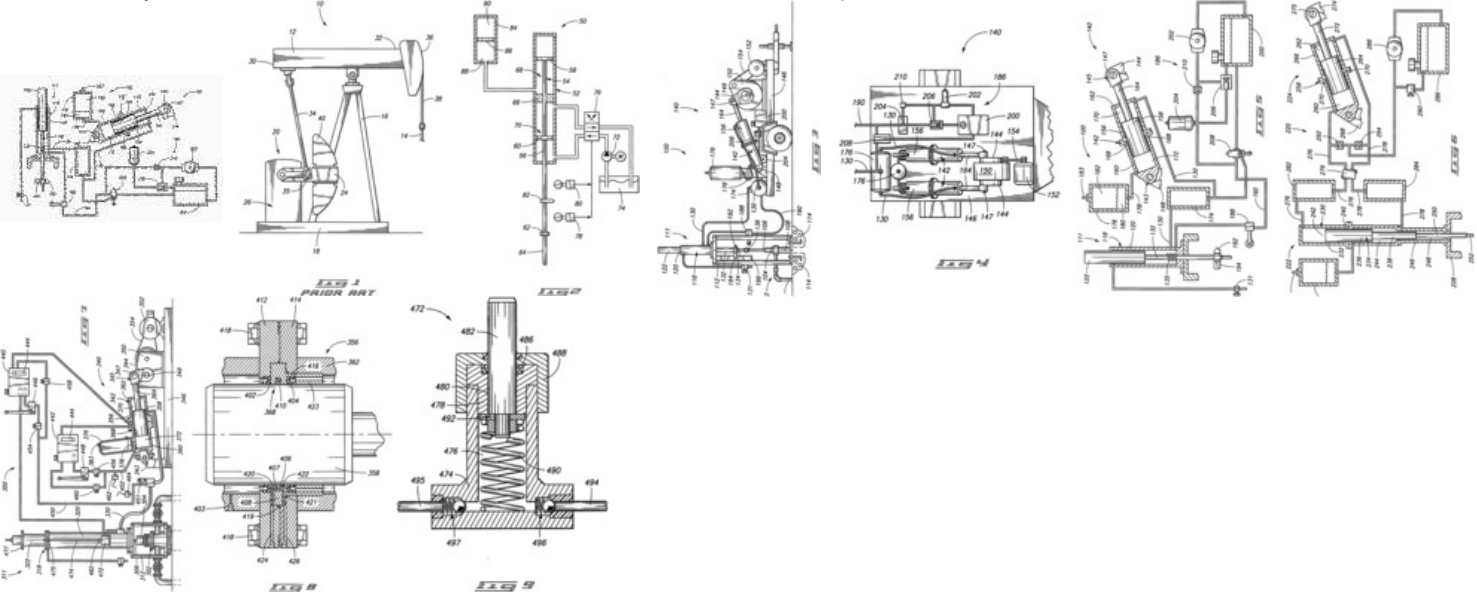
In a **hydraulic control device** for a viscous fluid **pump** with at least one feed **cylinder** (11) drivable by a **hydraulic cylinder** (12), the feed **chamber** (17) of which can be alternately connected via a **hydraulically** operable inlet **valve** (18) a **hydraulically** operable outlet **valve** (21) to a reservoir (19) and a feed line (22), whereby in the loading phase of the feed **cylinder** (11) the inlet **valve** (18) is open and the outlet **valve** (21) closed and in the feed phase of the feed **cylinder**, in which its **piston** is driven so as to reduce the volume in the feed **chamber** (17), the outlet **valve** is open and the inlet **valve** is closed, and with a **hydraulic** sequence control **actuating** the correct cyclic changeover between the inlet and outlet **valves** and the changeover of the **pump** drive, a **valve** forming part of the changeover control device of the sequence control and relieving the pressure in the feed **chamber** of the control **cylinder** (53) designed to **actuate** the outlet **valve** (21) takes the form of an electrically or **hydraulically actuated valve** (71) controlled dependently upon the high pressure in the drive **cylinder** (12) of the feed **cylinder** (11). Said **valve** (71) is switched to its through-flow setting on reaching an adjustable and predeterminable minimum of the pressure in the drive **cylinder** (12).



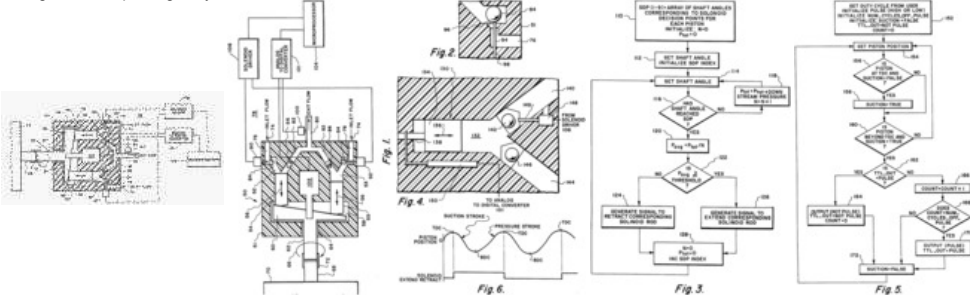
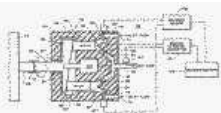
The present invention relates to a **piston pump** heating system. The **piston pump** heating system includes: first and second heating hoses (10)(15) installed in first and second heating targets (C1)(C2), respectively, which are separately partitioned; first and second medium hoses (10a)(10b) connected to the first heating hose (10); third and fourth medium hoses (15a)(15b) connected to the second heating hose (15); a heat-medium-heating unit (20) for heating a heat-medium passing through the first and second medium hoses (10a)(10b); a heat-medium-heating unit (20) for heating a heat-medium passing through the third and fourth medium hoses (15a)(15b); supplementary heat-medium storage units (30)(30') for supplementing the heat-medium passing through the first and second medium hoses (10a)(10b) and the third and fourth medium hoses (15a)(15b); and a fluid **pump** for circulating a heat medium between the first heating hose (10) and the heat-medium-heating unit (20) connected to the first medium hoses (10a)(10b) and circulating a heat medium between the second heating hose (15) and the heat-medium-heating unit (20') connected to the second medium hoses (15a)(15b) so as to provide a reciprocating **piston** in a **cylinder**.



A **hydraulic oil well pump** drive system (100) for driving an oil well sucker **rod** (not shown) includes a master **piston** (158) positioned within a master **cylinder** (156) for axial displacement between first and second ends of the master **cylinder** (156). The master **piston** (158) has a **piston** drive **rod** (164) which extends through one end of the master **cylinder** (156). The drive **rod** (164) is connected to a crankpin (147) of an eccentric crank (144). The eccentric crank (144) is driven at a constant rotational speed to reciprocate the master **piston** (158) within the master **cylinder** (156) at a sinusoidal rate. A center seal assembly (168) divides the master **cylinder** (156) into a working **chamber** (170) and a pressure **chamber** (172) in opposite ends of the master **cylinder** (156). Each respective **chamber** defines a fluid volume which varies with the displacement of the master **piston** (158). The master **piston** (158) displacement creates a bi-directional flow of working fluid from the working **chamber** (170). A wellhead **hydraulic** assembly (111) is operably connected to the oil well sucker **rod** and is in fluid communication with the master **cylinder** working **chamber** (170) to receive the working fluid flow. The wellhead **hydraulic** assembly (111) is responsive to the working fluid flow to reciprocate an oil well sucker **rod** at a rate which relates to the rate of master **piston** (158) displacement. A gas accumulator (176) is in fluid communication with the master **cylinder** pressure **chamber** (172) to bias the master **piston** (158) toward the master **cylinder** working end, providing an upward biasing force at the wellhead **hydraulic** assembly (111).



A multi-piston pump is provided which uses microprocessor controlled check ball valves to control flow rate of a fluid at the pump's outlet port. The pump includes nine cylindrical shaped chambers and associated reciprocating pistons which are driven by a cam attached to a shaft. The pump's shaft is coupled to the shaft of a motor which, in turn, drives the pump's shaft and cam resulting in a fluid, such as seawater, filling each of the nine chambers and then having the fluid forced from the chamber by the movement of its associated piston from bottom dead center to top dead center. A pressure transducer which monitors the pressure at the pump's outlet port and a shaft encoder which monitors the angular position of the pump's shaft respectively provide analog signals indicative of the pump's outlet port's pressure and the shaft's angular position. A microprocessor receives these analog signals in a digital form, processes the signals and provides digital pulse signals to either extend or retract the rod of nine solenoids depending upon the pressure at the pump's outlet port. Each of the nine solenoid rods when extended engage a check ball valve within one of the pumps nine inlet passageways allowing the passageway to remain open when the associated reciprocating piston is in a pumping stroke. This allows seawater to be discharged through the inlet passageway maintaining fluid flow at the outlet port at a pressure level which is commensurate with the intended use of the pump.



The invention relates to a reciprocating piston pump for delivering a liquid. The pump includes a solenoid with an actuator and an outlet port. A check valve with a seat body is assigned to the outlet port for keeping a return flow of the liquid out of the reciprocating piston pump. The seat body bears an impact damping face at a front face facing away from a valve seat of the check valve, and the valve seat of the check valve and the impact damping face are made from the same elastomer material.

