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ROTARY SLIDING-VANE PUMP

Original Filed June 28, 1963

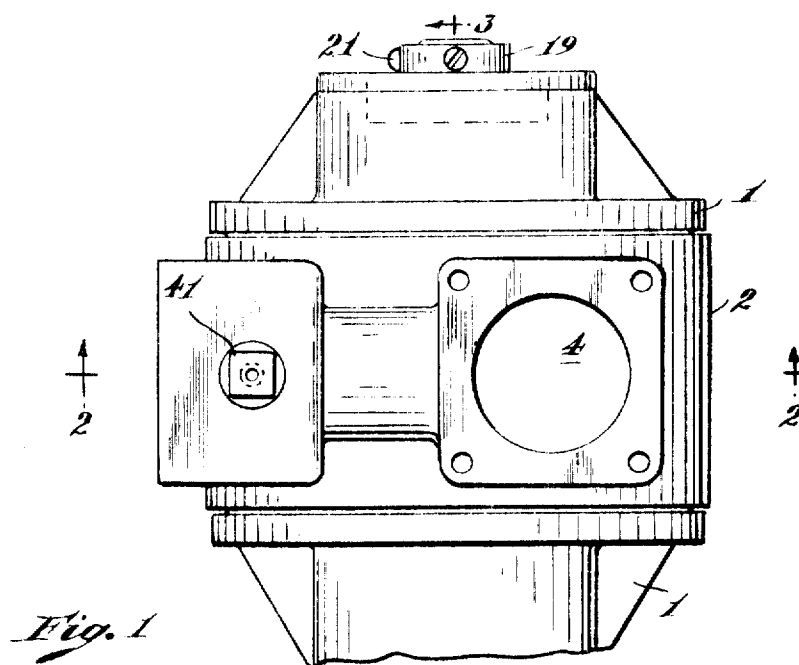


Fig. 1

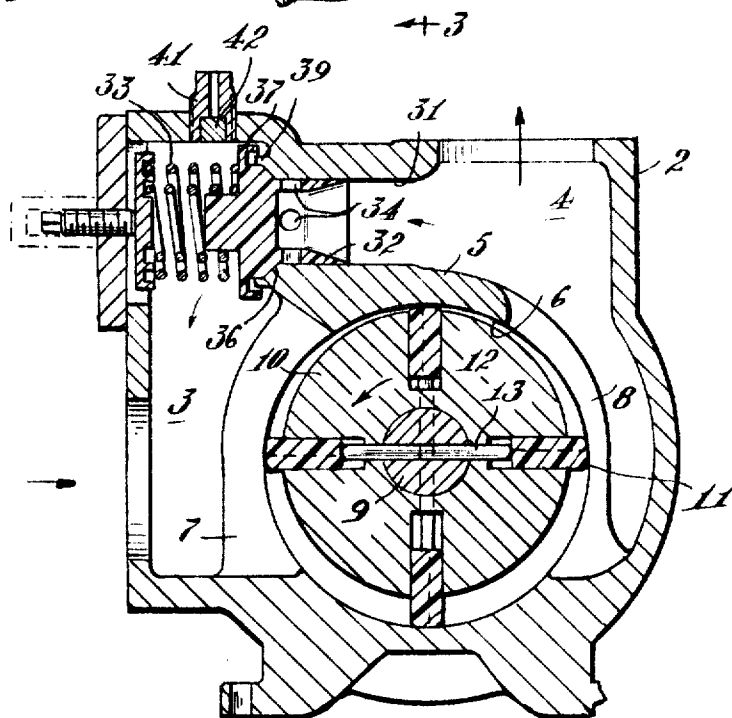


Fig. 2

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3,270,675

ROTARY SLIDING-VANE PUMP

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Original application June 28, 1963, Ser. No. 291,478.
Divided and this application Sept. 15, 1964, Ser. No. 396,697

3 Claims. (Cl. 103—42)

This application is a division of application Serial No. 291,478, filed June 28, 1963, now abandoned.

This invention relates to pumps of the sliding-vane type and particularly to pumps for oil trucks and other tank trucks.

The object of the invention is to produce a pump which will not overheat when left running with the outlet closed.

According to this invention the pump comprises a housing having inlet and outlet chambers, means for pumping fluid from the inlet chamber to the outlet chamber, a by-pass from the outlet chamber to the inlet chamber, a relief valve in the by-pass which opens in response to pressure in the outlet chamber, an air inlet in the inlet chamber, and a closure which normally closes said inlet and which opens at a predetermined temperature so that, when the pump reaches said temperature, it is cooled by air drawn through the inlet and circulated through the pump. Preferably said closure comprises a plug having an opening therethrough, the cross-sectional area of the inner end of the opening being greater than that of the outer end, and said inner end being closed with fusible material.

For the purpose of illustration a typical embodiment of the invention is shown in the accompanying drawings in which

FIG. 1 is a plan view; and

FIG. 2 is a section on line 2—2 of FIG. 1.

The particular embodiment of the invention chosen for the purpose of illustration comprises a housing 2 between two bearing supports or stators 1. The housing 2 has an inlet chamber 3 and an outlet chamber 4 separated by partition 5 which forms rotor chamber 6. Said rotor chamber communicates with inlet chamber 3 through slots 7 and with outlet chamber 4 through slots 8. Mounted in chamber 6 on shaft 9 is a cylindrical rotor 10. At the top of the rotor chamber the rotor has close clearance with the periphery of the chamber but the radius of the chamber increases toward the bottom to provide the usual pumping space.

The rotor 10 has a plurality of radial slots to receive sliding vanes 11 which in cooperation with the circumference of the rotor and interior surface of chamber 6 provide a series of pockets for conveying fluid from inlet 3 to outlet 4.

To assist the centrifugal force in throwing the vanes into intimate contact with the wall of chamber 6, a plurality of push rods 13 extending radially through shaft 16 and rotor 10 are provided. As one vane is pushed inwardly by the contracting portion of chamber 6 rod 13 pushes a diametrically located vane outwardly to maintain an intimate contact with the expanding wall of chamber 6.

Extending from the outlet chamber 4 to the inlet chamber 3 is a cylindrical passageway 31 and slidably fitted into the machined outlet of said passageway is a relief valve 32 which is yieldingly held in closed position by means of springs 33. When the pressure in the outlet chamber reaches a predetermined value corresponding to the setting of springs 33, the valve opens to permit some

fluid to be by-passed through holes 34 from the outlet chamber to the inlet chamber, thus maintaining the predetermined pressure. Holes 34 are so arranged in size and number so that only sufficient fluid is by-passed to maintain the predetermined pressure yet the maximum output of the pump is substantially maintained.

Valve 32 has an angled surface 36 which seats on angled portion of the outlet of conduit 31, and outside this seat is a flange 37 which faces an annular recess in the end of the outlet, the flange having an annular recess 38 opposed to flange 39.

The force which initially opens valve 32 is the product of the outlet pressure and the area of the cylindrical portion of said valve. When said valve opens, the effective force to maintain the valve open increases due to the larger area of flange 37. This increase in effective force on the valve balances the increase in the force of springs 33 to their gradient. This prevents the valve from closing due to the spring gradient and reopening when normal spring setting is restored, thereby eliminating the repetition of closing and opening the valve and the resultant loud chatter of the valve.

The inlet chamber 3 has an opening which is threaded to receive a plug 41 having an axial bore containing fusible material 42 in its larger inner end. The outer end of the bore is much smaller than the inner end so that the internal pressure does not force the fusible material out until it melts. The melting point of the fusible material is chosen so as to prevent damage to any component. If the outlet of the pump is closed without stopping the pump, the recirculation of the fluid in the pump through the by-pass heats the fluid in the pump, as well as the pump to dangerous temperatures in a few minutes. However the fusible material melts long before any damage is done, some fluid leaks out until the pressure drops to atmosphere after which the pump sucks in air which cools the pump and causes cavitation resulting in loud hammering noise which calls attention of the attendant to shut the pump off.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents which fall within the scope of the appended claims.

I claim:

1. A pump comprising a housing having inlet and outlet chambers, means for pumping fluid from the inlet chamber to the outlet chamber, a by-pass from the outlet chamber to the inlet chamber, a relief valve in the by-pass which opens in response to pressure in the outlet chamber, an air inlet in the inlet chamber, and a closure which normally closes said inlet and which opens at a predetermined temperature so that, when the pump reaches said temperature, it is cooled by air drawn through the inlet and circulated through the pump.

2. A pump according to claim 1 wherein said closure comprises fusible material.

3. A pump according to claim 2 wherein said closure comprises a plug having an opening therethrough, the cross-sectional area of the inner end of the opening being greater than that of the outer end, and said inner end being closed with fusible material.

References Cited by the Examiner

UNITED STATES PATENTS

2,371,339 1/1944 Markwart _____ 103—39

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