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LUBRICATING SYSTEM FOR ROTARY PUMPS

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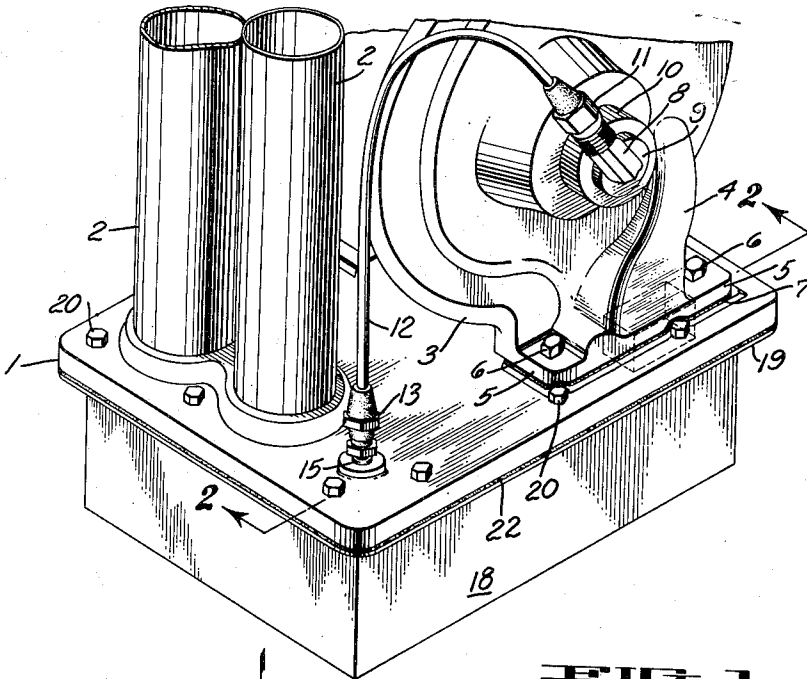


FIG. 1

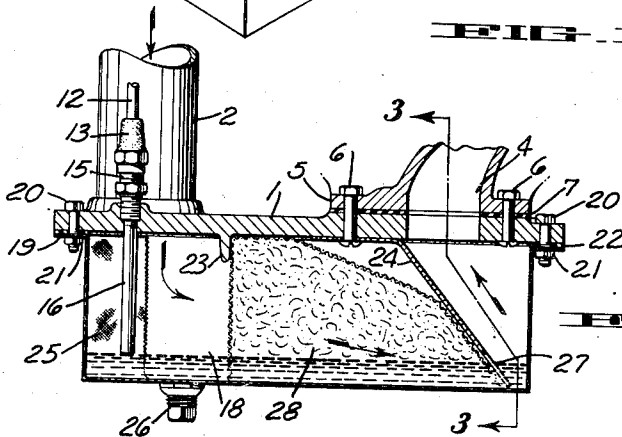


FIG. 2

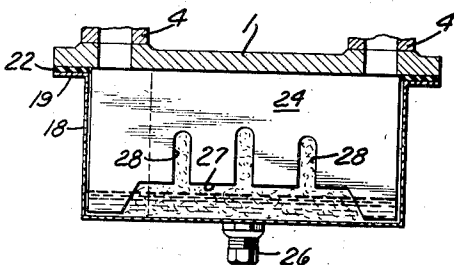


FIG. 3

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LUBRICATING SYSTEM FOR ROTARY PUMPS

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3 Claims. (Cl. 230-207)

1

This invention relates to rotary pumps of the sliding vane type and particularly to lubricating systems for pumps of this classification.

It is an object of the invention to provide a circulatory lubricating system for rotary pumps which will assure at all times an adequate supply of lubricant to the working parts of the pump and particularly the vanes thereof.

A further object of the invention is to provide a lubricating system for rotary pumps characterized by the supply of lubricant in the form of an oil mist suspended in the incoming flow of fluid to the pump.

Another object of the invention is to provide a lubricating system which not only supplies lubricant to the working parts of the pump but also returns excess oil therefrom to a storage reservoir in the system.

A still further object of the invention is to provide a lubricating system for rotary pumps which is automatically operated by the action of the pump mechanism without the necessity of auxiliary built-in or extraneous equipment.

Still another object of the invention is to provide a lubricating system of the character described that is efficient, inexpensive, and is capable of performing its function without attention, throughout the useful life of the pump.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawing accompanying and forming part of the specifications. It is to be understood, however, that variations in the showing made by the said drawing and description may be adopted within the scope of the invention as set forth in the claims.

Referring to the drawings:

Figure 1 is a perspective view of a rotary pump incorporating my improved lubricating system. A portion of the view is broken away so as to conserve space in the drawing.

Figure 2 is a reduced scale vertical sectional view taken in the plane indicated by the line 2-2 of Figure 1.

Figure 3 is a vertical sectional view taken in the plane indicated by the line 3-3 of Figure 2.

The type of structure to which my lubricating system is applied is that more specifically shown and described in my concurrent copending application Serial No. 24,991, filed May 4, 1948. However, since such specific pump structure is not essential to an understanding of this invention nor is it dependent thereon, the usual sliding

2

vane rotary pump components shown in Figure 1 are sufficient for the purposes of disclosure of the present invention and will be now referred to. In Figure 1 a base 1 supports intake ducts, shown for convenience as a pair of conduits 2, and also the pump end plates 3 closing one end of the cylindrical pump chamber containing the pump rotor as is well known in the art. The end plate 3 is formed with a suction passageway 4 communicating with the pump chamber and also with flange extensions 5 projecting laterally of the intake passageway through which bolts 6 are extended to secure the end plate 3 to the base 1. The usual gasket 7 is interposed between the base 1 and the flanges 5 to form a seal. An angle fitting 8 is threadedly engaged with a bored plug 9, the latter being tightly fitted into a larger bore within the boss 10 of the end plate 3. The usual centrally bored pump shaft terminates just short of the inner end of the plug 9 so that a lubricant passageway from the fitting 8 into the interior of the pump chamber is thereby provided. The passageway mentioned is continued to a point below the base 1 by means of a coupling fitting 11, a conduit 12, a second coupling fitting 13, a nipple 15 threaded into the base 1 and a lower conduit extension 16. A suitable preferably sheet metal oil reservoir 18 having upper marginal flanges 19 is bolted to the marginal portions of the base 1 by bolts 20 secured by nuts 21, there being also provided a suitable oil gasket 22 as shown in Figure 2 to seal the connection between the base 1 and the oil reservoir.

Within the reservoir 18 and extending laterally thereof, is provided a downwardly projecting rib 23 which, together with an inclined sheet metal baffle 24 secured to the base 1 by the bolts 6, retains in place the compacted mass 28 of steel or copper wool. A strainer 25 of fine wire mesh rising from the bottom of the reservoir surrounds the conduit extension 16 and serves to screen out foreign matter from the oil returned from the pump chamber through the conduit 16, while a drain plug 26, suitably threadedly engaged in the bottom of the reservoir 18, furnishes a convenient way of draining the latter when desired. It will be noted that the baffle 24 is cut away to provide a major exit opening 27 and additional slots 28 associated therewith through which the air or other fluid being pumped and drawn into the right side of the reservoir through the intake ducts 2, may flow and thence pass into the pump through the intake passageway 4. Since the air entering through the conduits 2 passes downwardly and through the mass of mineral

wool, which is oil saturated throughout by virtue of capillary attraction from the pool of liquid oil lying in the bottom of the reservoir and into which the entire lower portion of the wool is immersed, the air entering the pump intake 4 will be considerably charged with oil vapor or mist acquired by its passage through the reservoir and which, carried into the pump chamber by the air flow and the pulsating pressure differential produced by the pump vanes, will settle on and effectively lubricate the pump vanes and their cooperative pump surfaces in said chamber. As stated hereinbefore the pressure existing within the pump chamber will periodically rise during the operation of the pump above that of the free space above the oil level in the reservoir 18 so that excessive amounts of oil in the pump chamber will thereby be forced to return through the conduit extension 16 to the reservoir for screening and re-circulation to the pump chamber. Thus it will be seen that I have provided a pump lubricating system that is entirely automatic in operation and requires practically no attention, other than occasional replenishment of the oil in the reservoir, during the useful life of the pump.

I claim:

1. In a rotary pump of the hollow shaft type having intake and discharge passageways, a lubricating system comprising a closed reservoir having a discharge opening communicating with the intake passageway of said pump and a fluid intake opening, a quantity of liquid lubricant in the lower portion of said reservoir, a quantity of compacted mineral wool within said reservoir and having a portion extending into said lubricant and another portion disposed above the level of said lubricant whereby all fluid entering said pump intake passageway must pass through said mineral wool, a pair of baffles extending transversely of said reservoir at least one of which is apertured for retaining said wool in position, a closed conduit between said reservoir and the hollow shaft of said pump, air intake means associated with said reservoir whereby an oil vapor will be drawn through said mineral wool above said lubricant, through said aperture and into said pump during normal pumping operation thereof, and whereby excess oil in said pump will flow through said closed conduit into said reservoir, and screening means in said reservoir and around said closed conduit outlet for filtering said excess oil.

2. In a rotary pump of the hollow shaft type

having intake and discharge passageways, a lubricating system comprising a closed reservoir having a discharge opening communicating with the intake passageway of said pump and a fluid intake opening, a quantity of liquid lubricant in the lower portion of said reservoir, a quantity of compacted mineral wool within said reservoir and having a portion extending into said lubricant and another portion disposed above the level of said lubricant, a pair of baffles extending transversely of said reservoir at least one of which is apertured for retaining said wool in position, a closed conduit between a screened upper portion of said reservoir and the hollow shaft of said pump, whereby excess oil in the pump may be returned through said conduit into said reservoir, and said mineral wool being positioned so as to be in the flow path of all fluid entering said pump intake passageway.

3. In a rotary pump of the hollow shaft type having intake and discharge passageways, a lubricating system comprising a reservoir having a discharge opening communicating with the intake passageway of said pump and a fluid intake opening, a quantity of liquid lubricant in the lower portion of said reservoir, a quantity of compacted mineral wool within said reservoir and having a portion extending into said lubricant and another portion disposed above the level of said lubricant and completely filling a cross-sectional area of the reservoir whereby fluid entering said intake passageway will pass through said mineral wool, a pair of baffles extending transversely of said reservoir at least one of which is apertured for retaining said wool in position, a closed but readily detachable conduit between a screened upper portion of said reservoir and the hollow shaft of said pump, whereby an excess oil in said pump may be returned through said closed conduit to the reservoir.

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