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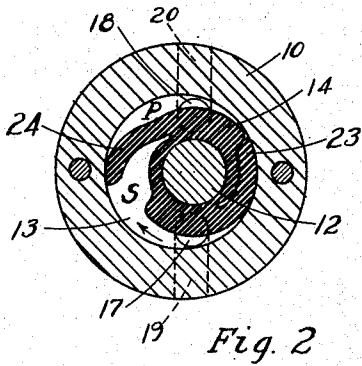


Fig. 2

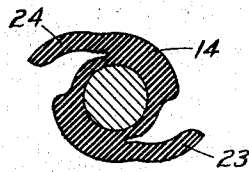


Fig. 4

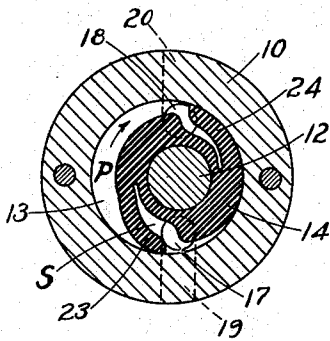


Fig. 3

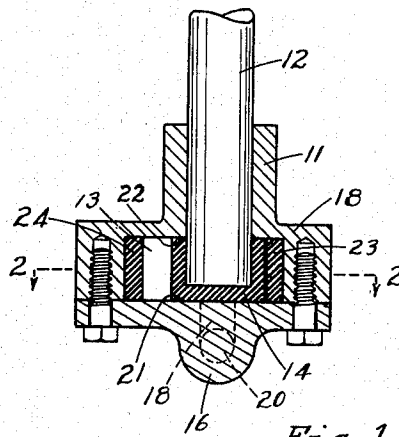


Fig. 1

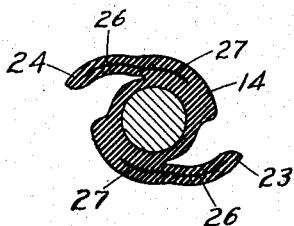


Fig. 5

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4 Claims. (Cl. 103-140)

This invention relates to pumps and particularly to rotary pumps for the delivery of liquids under pressure.

In rotary pumps of this character heretofore employed, difficulty has been encountered in preventing both internal and external leakage. Internal leakage is usually the result of the operating clearances necessarily provided between the rotor and the pump cavity, and external leakage is usually caused by the failure of packing materials between the pump head and the rotor and around the shaft bearings.

When pumps of this character are employed to force gasoline or other volatile liquids from supply tanks to internal combustion engines, the above-mentioned internal leakage has been a source of serious difficulty due to a condition commonly known as "vapor lock." This condition occurs when the temperature of the gasoline is sufficiently high to cause partial volatilization thereof and a perfect seal is not formed between the pump rotor and the walls of the pump cavity permitting vapor instead of liquid gasoline to be induced into the pump and forced therefrom to the engine, causing the engine to cease operation as is well known.

It is, therefore, an object of the present invention to provide a rotary pump wherein no clearance is provided between the relatively moving parts, thus preventing internal leakage.

It is another object of the invention to provide a pump of the above character which is self-sealing, thus obviating the use of packing materials previously employed to prevent external leakage.

Another object of the invention is to provide a pump rotor which is self-sealing against leakage.

Still another object of the invention is to provide a pump rotor formed of resilient material.

A further object of the invention is to provide a pump rotor having resilient blades adapted to engage the walls of the pump cavity.

Other objects and advantages of the invention will become apparent from a reading of the following description taken in connection with the accompanying drawing in which,

Fig. 1 is a longitudinal sectional view of a rotary pump embodying the present invention.

Fig. 2 is a sectional view taken substantially on the lines 2-2 of Fig. 1 and looking in the direction indicated.

Fig. 3 is a view similar to that of Fig. 2 but showing the pump rotor in a different angular position.

Fig. 4 is a view of the pump rotor shown in Figs. 1, 2 and 3, and

Fig. 5 is a view similar to that of Fig. 4 but showing a modified form of the pump rotor.

Referring now to the drawing, reference numeral 10 indicates a pump casing having a bearing portion 11 to receive a rotatable shaft 12 which may be driven by any suitable means and which extends through the bearing 11 interiorly of the casing 10 to a pump cavity 13 formed therein.

The pump rotor 14 comprising the present invention is bonded or otherwise suitably secured to the end of the shaft 12 within the cavity 13 to rotate with the shaft, and it will be noted that the axes of the shaft 12 and the rotor 14 are arranged in eccentric relation to the axis of the cavity 13.

A suitable head 16 is removably secured to the casing 10 to form a closure for the cavity 13 and is provided with inlet and outlet ports 17 and 18 and connecting conduits 19 and 20 leading to the exterior thereof.

The rotor 14 is preferably formed of a resilient material which is impervious to the action of gasoline, oil, alcohol, benzol and similar liquids and which retains its resiliency when operated in such liquids. Rubber, synthetic rubber or the various well-known substitutes therefor, such as "Du Prene" or "Thiokol," are all suitable materials. As shown, the rotor is annular in form with the inner periphery thereof in bonded engagement with the shaft 12 and is of a thickness at least equal to the depth of the pump cavity 13 and preferably slightly thicker. The rotor 14 is formed with flat faces 21 and 22 closely engaging the flat wall of the cavity 13 and the inner face of the head 16, forming a tight seal against external leakage of liquid from the cavity 13.

As shown, the rotor 14 is somewhat smaller in diameter than the cavity 13 and is provided on its periphery with resilient blades 23 and 24 which may be arranged diametrically opposite each other to yieldably engage a portion of the peripheral wall of the cavity 13 at all times, forming a perfect seal against internal leakage. The outer cylindrical surfaces of the rotor 14 intermediate the blades 23 and 24 are in substantially tangential contact with the nearer portion of the casing 10 which is between the inlet and outlet ports 17 and 18. The rotor may be formed with the blades in the position shown in Fig. 4 and compressed when placed in the cavity 13.

The amount of delivery pressure obtainable by the pump is determined by the resiliency of the blades 23 and 24. By proper selection of the material forming the rotor and by varying the size

of the blades, any desired pressure capacity may be obtained.

- In some instances it may be desirable to provide yieldable metal inserts 26 for the blades 23 and 24 by imbedding such inserts in the material forming the rotor. As shown in Fig. 5, one end of the inserts may be imbedded in the body of the rotor as at 27 and the free end thereof may extend substantially the length of the blades.
- 10 This construction will increase the pressure of the blades on the peripheral wall of the cavity 13 and correspondingly increase the pressure output of the pump.

- In operation, assuming the rotor to be rotating in the direction of the arrows in Figs. 2 and 3, the tips of the blades 23 and 24 will closely engage and follow the peripheral wall of the cavity 13 and thus the size and capacity of the space S in Fig. 2 will be gradually increased while the size and capacity of the space P will be gradually decreased due to the eccentric relation of the rotor and the cavity. As the liquid is induced through the passageway 19 and port 17 into the cavity 13 and space S between the rotor 14 and the peripheral wall of the cavity 13, it will be forced clockwise by the blade 23 in Fig. 3 and expelled through port 18 and passageway 20. Fig. 2 illustrates the manner in which the blades 23 and 24 are received in complemental recesses formed in the rotor 14. Fig. 4 indicates the profile and separates the blades 23 and 24 from the rotor 14.

- As the resistance to the outgoing fluid may be increased, as by increasing the closure of the outlet piping by a valve or other means, a back-pressure will be built up sufficient to overcome the resiliency of the blades 23 and 24 causing them to yield and permit a slippage of the liquid backward from the pressure side P to the inlet side S, and if the outlet should be entirely closed, the pump would cease to discharge liquid but will continue to rotate.

- It will thus be seen that a rotary pump has been provided which obviates the necessity of packing materials usually necessary to prevent external leakage and is constructed in such a manner as to prevent internal leakage.

- It will be apparent to those skilled in the art that various modifications in construction and design may be made without departing from the

spirit or scope of the invention as defined by the appended claims.

What is claimed and desired to be secured by Letters Patent is:

1. A rotary displacement pump comprising a casing having inlet and outlet ports, a rotor body within said casing in tangential contact with the wall thereof between the inlet and outlet ports, and an integral blade extending from the rotor body and having a free end engaging the wall of said casing, said blade being of sufficient resiliency to yield toward said rotor body under a predetermined amount of back pressure of the fluid being pumped.

2. A rotary displacement pump comprising a casing having inlet and outlet ports, a rotor body within said casing in tangential contact with the wall thereof between the inlet and outlet ports, in integral blade extending from the rotor body and having a free end engaging the wall of said casing, and a resilient member connected to the rotor and the blade, said blade being of sufficient resiliency to yield toward said rotor body under a predetermined amount of back pressure of the fluid being pumped.

3. A rotary displacement pump comprising a casing having inlet and outlet ports, a rotor body within said casing in tangential contact with the wall thereof between the inlet and outlet ports, and integral blades extending tangentially from the rotor body and having free ends engaging the wall of said casing, said blades being of sufficient resiliency to yield toward said rotor body under a predetermined amount of back pressure of the fluid being pumped.

4. A rotary displacement pump comprising a casing having inlet and outlet ports, a rotor body within said casing in tangential contact with the wall thereof between the inlet and outlet ports, integral blades extending tangentially from the rotor body and having free ends engaging the wall of said casing, and resilient members extending from the rotor body into the blades and completely embedded therein, said blades being of sufficient resiliency to yield toward said rotor body under a predetermined amount of back pressure of the fluid being pumped.

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