June 21, 1955 C. B. MOLLER 2,711,137

CHEMICAL FEED PUMP

Filed Feb. 20, 1951

Fig. 1.

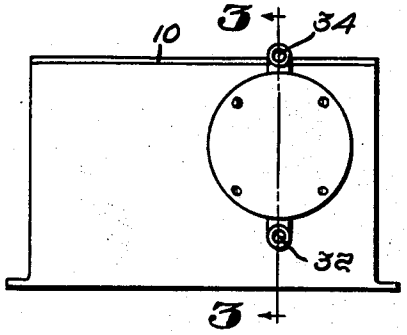


Fig. 2.

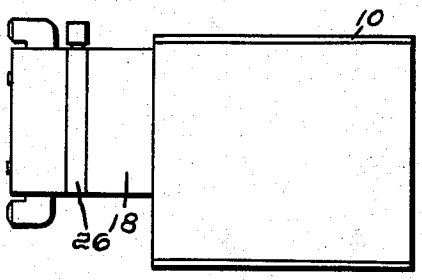
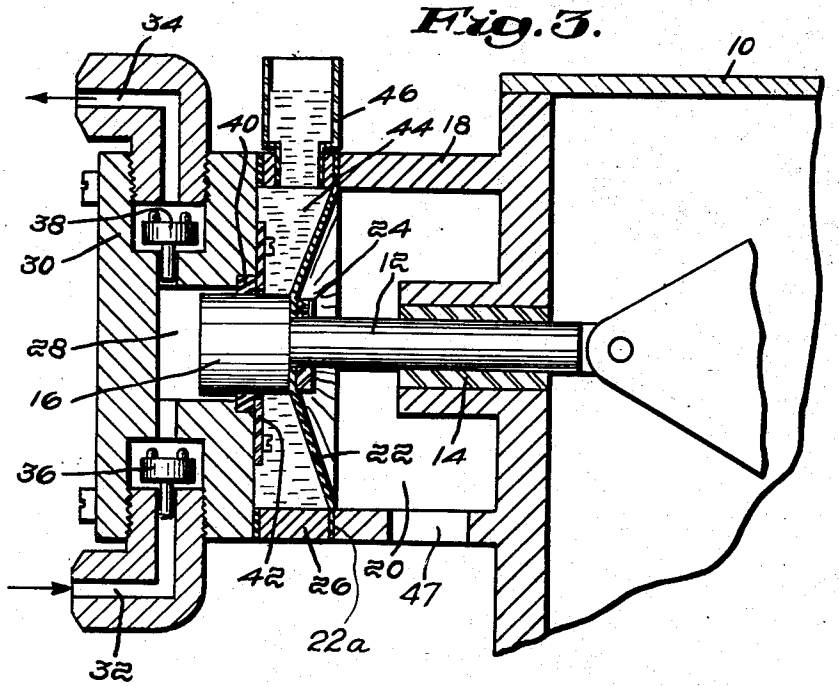


Fig. 3.



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CHEMICAL FEED PUMP

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2 Claims. (Cl. 103—202)

This invention relates to improvements in a chemical feed pump particularly adapted for use in a water purification system in which the water purification chemical is fed in small quantities at a predetermined rate into the water line. Pumps of this type should be designed for long periods of continuous service with little attention.

If the pumping member is a solid piston, it is difficult to lubricate the piston and to maintain a tight seal to prevent leakage of the chemical into the pumping mechanism. On the other hand, if the pumping member is a flexible diaphragm, the diaphragm will have a relatively short life and must be replaced.

It is an object of my invention to combine the advantages of the solid piston and diaphragm by providing a solid pumping member with a seal to prevent leakage of the chemical and to further provide a diaphragm connected to the piston and to the pump housing in back of the piston so that any fluid that may leak past the seal may be trapped.

Further objects and advantages of my improvements will be more readily apparent from the following description of a preferred embodiment thereof as illustrated in the attached drawings, in which:

Fig. 1 is a side elevation of the pump casing;

Fig. 2 is a top plan view thereof; and

Fig. 3 is a fragmentary vertical section on an enlarged scale taken on the plane indicated 3—3 in Fig. 1.

The housing **10** encloses the conventional mechanism for operating the pump. The piston rod **12** is mounted in the bearing **14** and is reciprocated by suitable mechanism in the housing **10**. The piston head **16** preferably made of glass forms the pumping member. The cylindrical wall **18** extending from the housing **10** encloses the piston rod **12**. On the outer end of the cylindrical wall **18** is mounted a ring-shaped member **26**, to which is attached a pump casing **30**. The latter contains a pumping chamber **28**, and has an inlet passage **32** and an outlet passage **34** communicating with this chamber. An inlet valve **36** is mounted in the inlet passage, and an outlet valve **38** is mounted in the outlet passage. The piston head **16** projects into chamber **28** and is surrounded by a packing ring **40** held in place by a retainer ring **42**.

A flexible diaphragm **22** is mounted between wall **18** and ring member **26**. This diaphragm has a marginal rim **22***a*, which is clamped between member **26** and wall **18**, and a central portion **24** which is connected in a fluid-tight manner to the back of the piston head **16**. This diaphragm divides the enclosure formed by casing **30**, member **26**, wall **18**, and the side of housing **10**, into two compartments **44** and **20**. Compartment **44** is filled with lubricant and communicates at the top with an open relief tank **46** which receives the excess lubricant as diaphragm **22** is flexed to the left. Compartment **20** is ordinarily empty and has an opening **47** at the bottom.

The lubricant in the compartment **44** serves to lubricate the piston pumping member **16**. If the corrosive chemical being pumped leaks past the packing **40** it will

be trapped in the lubricant compartment and an overflow from the relief tank **46** indicates that the packing **40** should be replaced.

The diaphragm **22** is not subjected to the pressure of the pumping chamber and should have a relatively long life. If the diaphragm should fail, the lubricant and any chemical which leaks past the packing will pass into the compartment **20** and run out through the opening **47** at the bottom of the compartment **20**. The chemical will therefore not corrode the operating mechanism for the pump.

I claim:

1. In a chemical feed pump, having a closed housing provided with a bearing, a piston rod projecting through said bearing, and a piston mounted on the outer end of the rod, the housing containing a pumping mechanism adapted to reciprocate said piston rod: a wall attached to said housing and surrounding said rod; a pump casing mounted on the outer end of said wall and forming, with said wall and said housing, an enclosure around said rod, said casing containing a pump chamber and said piston projecting into said chamber; a packing between said piston and said casing forming a seal around said piston between said chamber and said enclosure; and a flexible diaphragm, having a central portion attached to the back of said piston and a marginal rim attached to said wall, said diaphragm dividing said enclosure into two compartments, the compartment adjoining said casing being adapted to receive lubricant and to trap fluid leaking past said packing and having means for relieving pressure of the lubricant on the diaphragm, and the compartment adjoining said housing having a drain outlet for escape of fluid in case of rupture of said diaphragm.

2. In a chemical feed pump, having a closed housing provided with a bearing, a piston rod projecting through said bearing, and a piston mounted on the outer end of the rod, the housing containing a pumping mechanism adapted to reciprocate said piston rod; a tubular wall projecting from said housing concentric with said bearing and spaced therefrom; a pump casing secured to the outer end of said wall, said casing containing a pumping chamber and having a circular opening, concentric with said rod, leading to said chamber, said piston being disposed to reciprocate through said opening; a packing around said opening forming a seal around said piston; a flexible diaphragm having a marginal rim sealed to said tubular wall, and a central portion sealed to said piston, said diaphragm dividing the space enclosed by said wall into a first and a second compartment, the first compartment, that adjoining said casing, being adapted to hold lubricant, and the second compartment having a drain outlet for escape of fluid in case of rupture of said diaphragm; and a tank for lubricant having an opening communicating with said first compartment, said tank being adapted to receive overflow from said first compartment as the diaphragm is carried by the piston toward said chamber and to store excess lubricant for refilling said first compartment upon motion of the diaphragm in the opposite direction.

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