

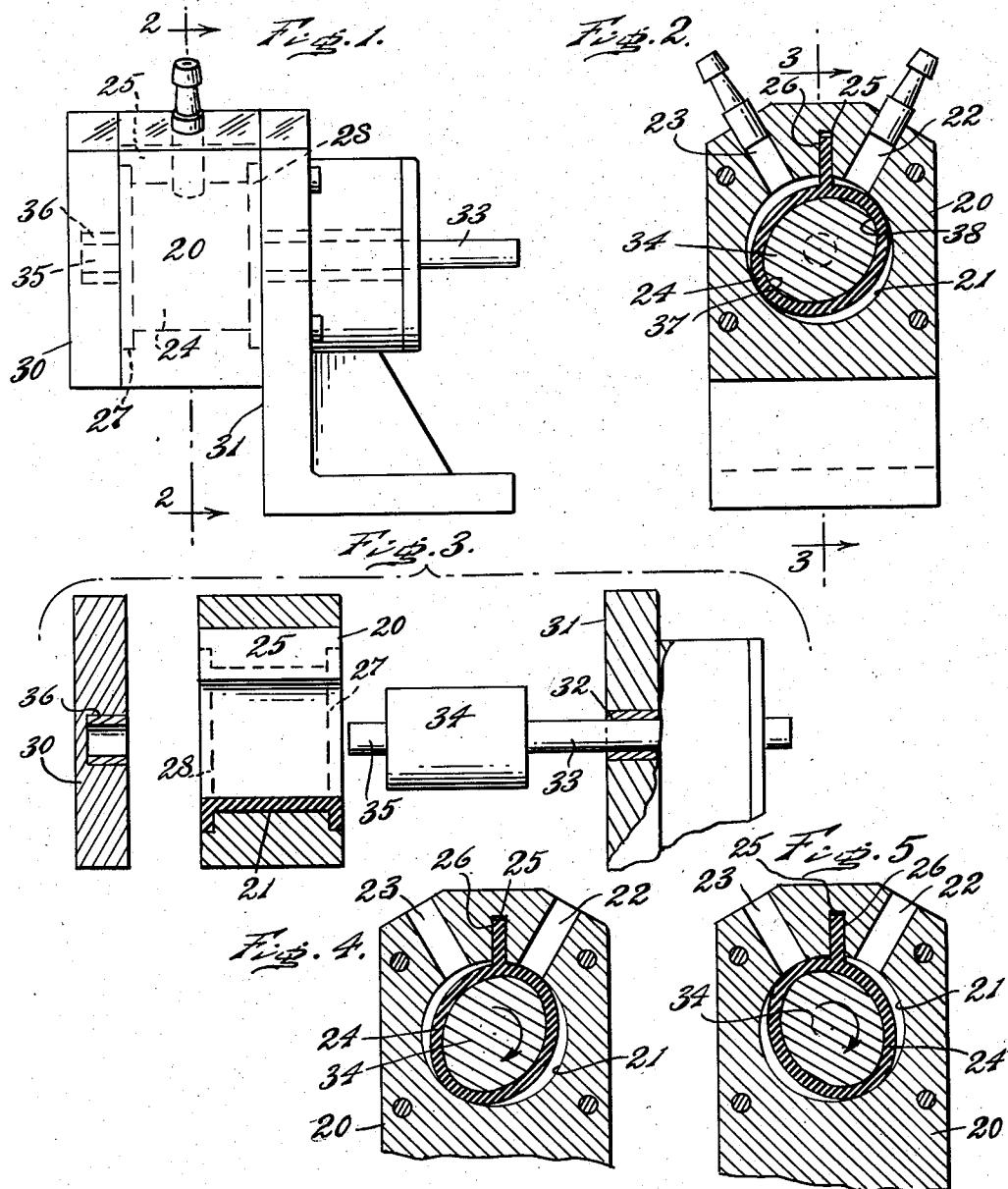
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PUMP FOR CHEMICALS AND THE LIKE.

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PUMP FOR CHEMICALS AND THE LIKE

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3 Claims. (Cl. 103—149)

The present invention relates to pumps of the character employing a plastic sealing liner.

A purpose of the invention is to make a plastic liner engage the inside of a circular cylindrical pump chamber at diametrically opposed positions under the action of a wave generator.

A further purpose is to deform a liner into an elliptoidal contour.

A further purpose is to produce a pump employing a plastic liner which delivers fluid by positive displacement rather than by impulse.

Further purposes appear in the specification and claims.

In the drawings I have chosen to illustrate one only of the numerous embodiments in which my invention may appear, selecting the forms shown from the standpoints of convenience in illustration, satisfactory operation and clear demonstration of the principles involved.

Figure 1 is a side elevation of the pump of the invention.

Figure 2 is a section of Figure 1 on the line 2—2.

Figure 3 is an exploded axial section of the components taken on line 3—3 of Figure 2.

Figure 4 is a fragmentary view corresponding to Figure 2, showing the pump on one phase of the cycle.

Figure 5 is a view corresponding to Figure 4, showing the pump at a later phase of the cycle.

Describing in illustration but not in limitation and referring to the drawings:

Pumps utilizing a plastic liner which is distorted by a single lobe cam are widely and successfully employed, especially for pumping chemicals. They have the advantage that no stuffing box or seal in the ordinary sense is required and no check valves are needed. They are, however, subject to the disadvantage that where the lobe of the cam crosses from discharge to suction, flow back is prevented only by momentum of the liquid, and the pumping action is not really positive.

In accordance with the present invention, the liner is distorted to form two opposing lobes which are suitably at diametrically opposed positions, so that each follows the other in sealing and even when one lobe crosses from discharge to suction the other lobe effectively accomplishes sealing and continues positively pumping.

In accordance with the invention the pump has a rigid suitably metallic body 20 provided with a cylindrical inner chamber 21 of circular cross section, which has a radial inlet port 22 and an adjacent outlet port 23.

Within the pumping chamber is a liner 24 of tube-like character having a sealing tongue 25 extending out into a recess 26 radial of the body between the inlet and the outlet ports on the closed spaced side. The tubular wall of the liner and the tongue extend to the end and the tubular wall is provided with flanges 27 and 28 fitting into

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flange recesses in the body to seal at the ends. The ends of the pump chamber are closed by rigid end plates 30 and 31 suitably bolted in place.

The end plate 31 has a suitable central shaft bearing 32 which receives shaft extension 33 of wave generator 34, and concentric with the shaft extension 33 is a shaft extension 35 at the other end, which is journaled in bearing 36 in the plate 30.

The wave generator has opposing lobes 37 and 38 which distort the liner into engagement with the interior of the wall of the chamber, suitably at diametrically spaced points, the liner sealing against the wall at the lobes, with intermediate non-sealing positions. The lobes are large enough to provide adequate sealing pressure and the contour of the wave generator is preferably elliptoidal, that is, it consists of two sine waves in 360 degrees with their crossover points or points of zero deflection spaced 90 degrees. The heights of the bumps equal the heights of the recesses when super-imposed on a cycle.

In operation the wave generator is rotated, as by a motor drive on shaft 33, and this causes the two lobes to rotate and propagate a wave like sine wave with engagement of the liner with the interior of the pump chamber at the lobes and non-engagement in between.

The effect, therefore, is that one of the lobes always seals against leakage between the discharge and the inlet on one axial side, and the tongue 25 seals on the other axial side, while the liner flanges seal the ends all around. The pumping is positive.

The parts may suitably be of all metal or rigid plastic except the liner, which is of an elastomer such as rubber, synthetic rubber such as Buna N, neoprene, or silicone rubber or polytetrafluoroethylene or nylon.

The number of lobes in the wave generator is not critical in the present invention, it being unimportant as to whether two lobes, three lobes, four lobes, or more lobes are employed.

In view of my invention and disclosure variations and modifications to meet individual whim or particular need will doubtless become evident to other skilled in the art, to obtain all or part of the benefits of my invention without copying the structure shown, and I, therefore claim all such insofar as they fall within the reasonable spirit and scope of my claims.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a pump, a hollow body having a cylindrical interior of circular cross-section, opposite end walls on said body closing said interior and thus forming a pump chamber having a circular cylindrical inside face, a radial slot in said hollow body, a generally elliptical elastomer liner occupying space inside said chamber and having a sealing tongue extending outward into said slot, said tongue fixing said liner against rotation about the liner axis and the ends of the liner sealingly engaging said opposite end walls of the chamber, inlet and outlet ports in said body on opposite sides of said tongue and connecting said pump chamber to the outside, the tongue separating the outlet from the inlet, a generally elliptical wave generator completely filling the interior of the liner, the liner constantly conforming to the outside of the wave generator and the wave generator being rotatable on its axis with respect to the liner, said generator having a plurality of spaced lobes deflecting the liner into engagement with the circular cylindrical interior face of said chamber, with intermediate portions of said liner between said lobes being disengaged from said cylindrical

face, and means for axially rotating the wave generator.
 2. A pump of claim 1, in which the wave generator is elliptoidal in periphery.
 3. A pump of claim 1, in which the liner has flanges at the ends sealing against the body.

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