March 17, 1931. L. C. MATTHEWS 1,796,935

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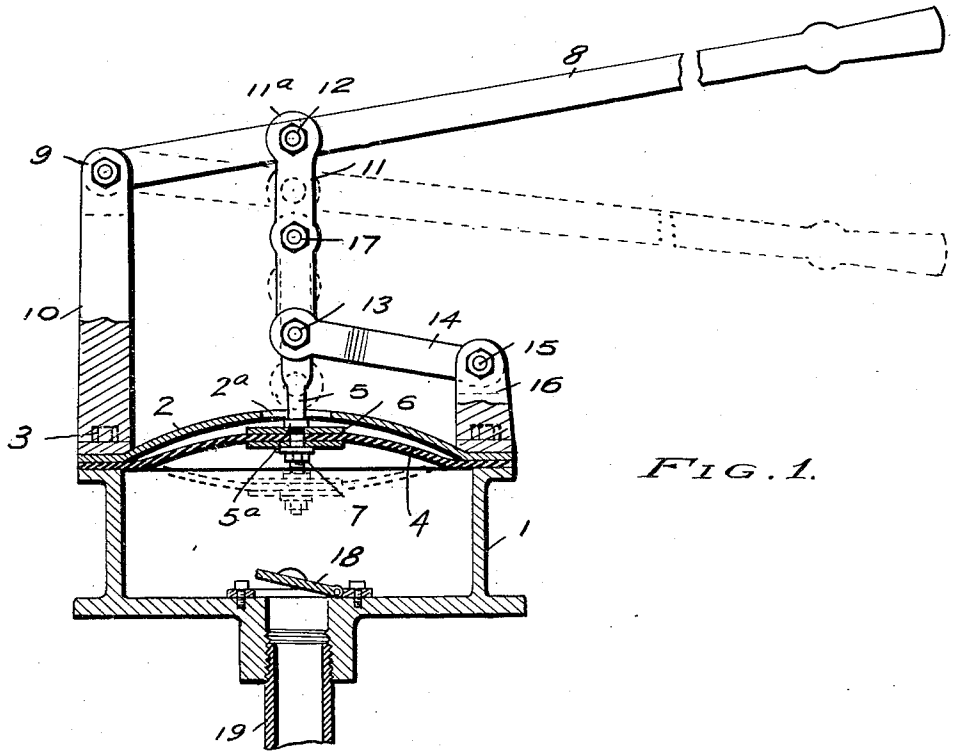


FIG. 1.

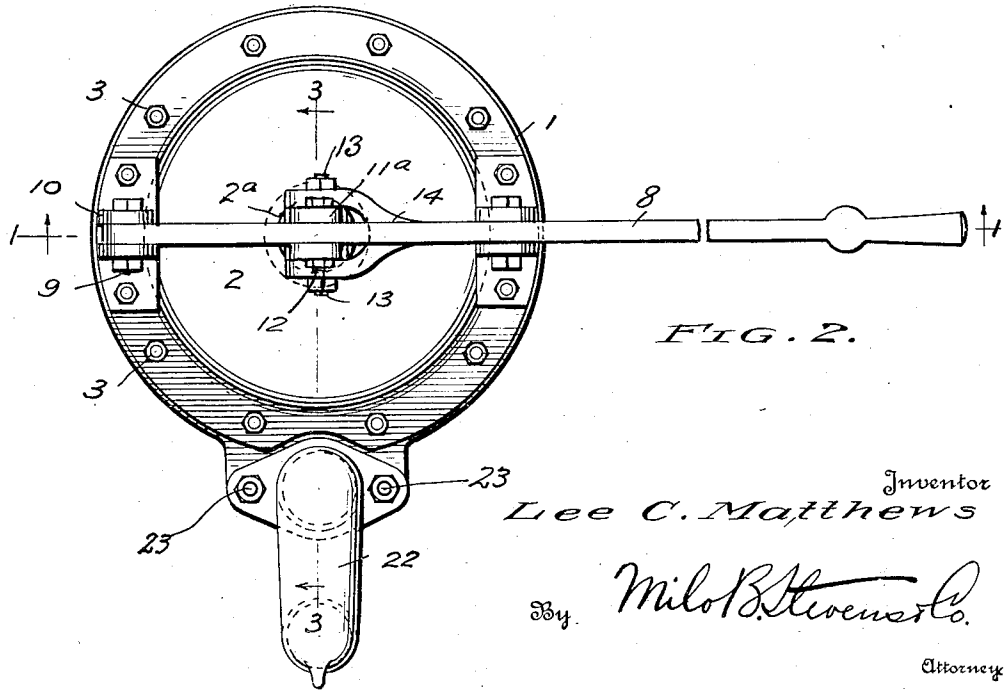


FIG. 2.

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FIG. 4.

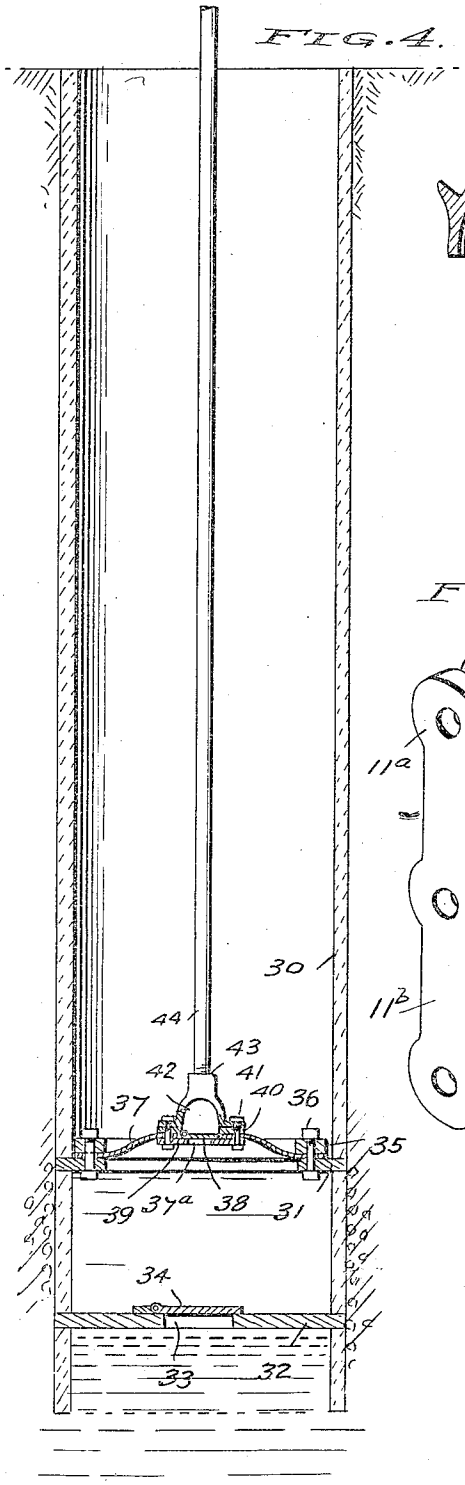


FIG. 3.

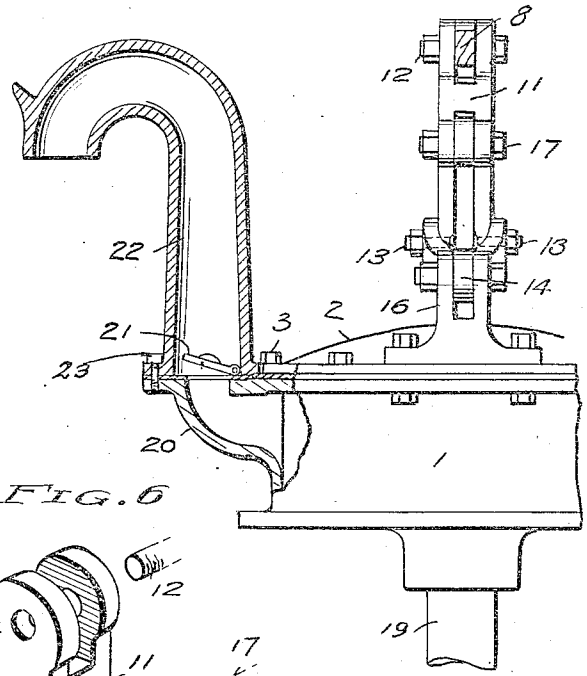


FIG. 6

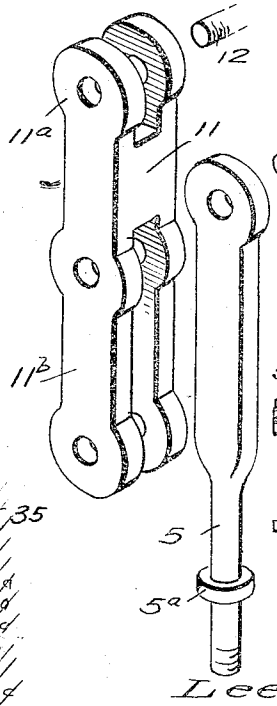
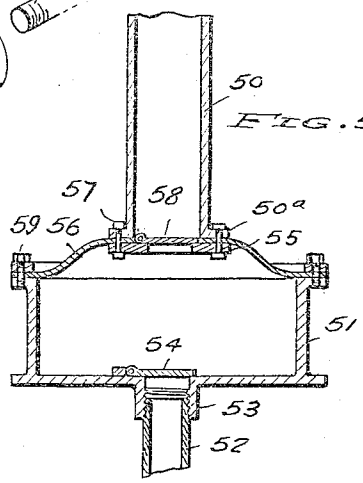


FIG. 5.



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UNITED STATES PATENT OFFICE

LEE C. MATTHEWS, OF INGOT, CALIFORNIA

PUMP

Application filed September 15, 1927. Serial No. 219,700.

My invention relates to pumps, and has for its primary object to provide a force pump including a minimum number of parts of an inexpensive character and which will operate without friction.

Another object of the invention is to provide a pump of this character which may be used in a variety of ways,—there being provided a novel diaphragm which is availed of for raising the fluid.

Other objects and advantages of the invention will be apparent as the description proceeds,—reference being had to the accompanying drawings forming a part of this specification and which illustrate the now preferred form of the invention. It is to be understood however, that the structures shown may be modified considerably within the scope of the subject matter claimed.

In the drawings, wherein the same reference characters have been used to designate the same parts in all views,

Figure 1 is a sectional view illustrating one form of the invention which includes a novel lever and link structure whereby the diaphragm operating rod will be moved in a straight line;

Figure 2 is a top plan view of the form of the invention shown in Figure 1;

Figure 3 is a sectional view taken at right angles to Figure 1;

Figure 4 is a longitudinal sectional view through a well pipe and showing a further form of the invention;

Figure 5 is a vertical sectional view of a further modified form of the invention, wherein the outlet pipe serves as a pump rod; and

Figure 6 is a group perspective view of the pump rod and link elements.

Referring to Figures 1, 2 and 3 the chambered casing head 1, which is designed to be disposed at the mouth of the well is provided with a dome-like closure 2 having a central opening 2^a. The dome-like closure 2 is bolted to the rim of the chambered casing head, as indicated at 3 and between the rim of the casing head and the closure is confined the flexible peripheral portion of a disk 4, which is preferably made of leather, rubberized fabric material, (such as are used in automobile tire casings) or the like.

The pump rod 5 passes through the hole 2^a in the closure 2 and its threaded end extends through a central hole in diaphragm 4. Apertured disks 6 are disposed on either side of the diaphragm 4, the pump rod 5 extending therethrough so that the shoulder 5^a thereof engages the upper disk 6. The end of the pump rod is threaded to receive a nut 7, suitable gaskets being provided to prevent leakage.

The pump rod 5 is operated by a hand lever 8, the end of which is pivoted as at 9 to a post 10 which is bolted to casing 1 upon closure 2, a pair of the closure bolts 3 being availed of for this purpose. A link member 11 depends from lever 8,—being pivoted thereto as indicated at 12,—the pivot pin 12 passing through a pair of spaced ears 11^a which straddle the lever 8. The lower half of the link 11 is forked, as indicated at 11^b and each arm of the fork portion 11^b is connected by a rivet or pin 13 to the bifurcated end of a guide link 14 which is pivoted at 15 to an upstanding post 16 which is bolted to the casing 1 in the same manner as post 10. The upper end of the pump rod 5 is pivoted upon pin 17 which is apertured (Fig. 6) inserted through the arms of the bifurcated portion 11^b of the link 11. It is noted that pivot pin 17 is exactly midway between pivot pins 12 and 13,—likewise that the distance from pivot pin 12 to pivot pin 13 is exactly equal to the distance between pivot pin 12 and pivot pin 9, which connects lever 8 to the post 10. By reason of this structure,—taken with the fact that the distance from pivot pin 13 to pivot pin 15 is equal to the distance between pivot pin 9 and pivot pin 12,—the pivot point 17 of the pump rod 5 will move in a vertical line when the lever 8 is actuated up and down. This is believed to be self-evident.

When the lever 8 is moved downwardly the diaphragm 4 assumes the dotted line positions of Figure 1 closing the valve 18 in the inlet pipe 19, which is threaded into the bottom of casing 1 and forcing the air within

the chambered casing out through the integral elbow 20 past the valve 21 and out through spout 22. Spout 22 has a flange base which is bolted as at 23 to the flange horizontal portion of the elbow 20. When the lever 8 is moved upwardly and the diaphragm 4 again assumes the full line position the inlet valve 18 will be opened and water will be drawn into the chambered casing 1 from the pipe 19. The next downward stroke of the lever 8 forces the water from the chambered casing 1 out through the spout 22 in an obvious manner. In case the outlet valve 21 is made of very light material and is not absolutely leak proof it may be necessary to hold a cup of water so as to submerge the outlet end of the spout 22 when the diaphragm is moved upwardly after its initial down stroke. By doing this sufficient water will be drawn into the spout 22 to hold the valve 21 closed. The operation of the pump thereafter is perfectly satisfactory and large volumes of water will be drawn up.

In the structure shown in Figure 4, the well casing 30 is caused to function as the outlet pipe. An annulus 31 is secured at a point well below the mouth of the casing and in spaced relation to a partition 32, which has a central opening 33 controlled by a flap valve 34. A clamp ring 35 is bolted to the annulus 31, as indicated at 36, and serves to confine the peripheral portion of the flexible diaphragm 37 in place. The diaphragm 37 has a central opening and to the upper surface of the diaphragm is pivoted a flap valve 38 for closing the diaphragm opening 37^a. Ring-like plates 39, 40 are bolted as at 41 to opposite sides of the diaphragm 37 surrounding the opening 38. The ring-like plate 39 is provided with a substantially smaller opening than the plate 40 so as to support the peripherial portion of the valve 38. The bolts 41 also serve to secure to the plate assembly the legs 42 of the socket member 43 into which is threaded the end of the pump rod 44. The legs 42 are spread laterally considerably so as to leave plenty of room for the operation of the flap valve 38.

In the form of the invention as disclosed in Figure 4 it is believed to be evident that when the pump rod 44 is reciprocated the diaphragm 37 will take the same motion as previously described in connection with Figure 1. On the down stroke of the pump 44 the valve 38 will open and air will be forced out of the chamber between the valve and the partition 32. On the up stroke of the pump rod 44 the inlet valve 34 will be opened and the chamber between the partition and the diaphragm will be filled with water. On the down stroke of the pump rod the valve 38 will again open and the water will be forced into the area above the diaphragm 37 and up through the well casing 30 to be delivered to a suitable spout or outlet pipe not shown.

A further modified form of the invention is disclosed in Figure 5. Here the pump rod 50 is made to serve as the outlet pipe for the water. In this form of the invention a chambered casing 51 is employed the same as in Figures 1 to 3. The inlet pipe 52 is threaded into the central nipple 53 in the bottom of the chamber 51,—the inflow of water being controlled by a flap valve 54 secured to the bottom of the chamber 51. The lower end of the tubular pump rod or outlet 50 is flanged, as indicated at 50^a and rests upon the diaphragm 56 while an annular plate 55 is disposed beneath the diaphragm being bolted to the flange 50^a, as indicated at 57. A flap valve 58 controls the flow of water through the outlet pipe pump rod 50. Downward movement of the outlet pipe 50 serves to open valve 58 and exhaust the air from the chambered casing 51. Upward movment of the outlet pipe 50 opens valve 54 and draws water into the chamber. Subsequent downward movement of the pipe 50 forces water up therethrough and past the valve 58. The diaphragm 56 is secured to the wall of the chambered casing 1 by means of a clamp ring 59.

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

Operating mechanism for a pump comprising a base, an upstanding post mounted on said base, an operating lever having one end pivoted to the upper end of said posts, a link having its upper end pivoted to said operating lever, a second post mounted on said base in diametrically opposed relation to the first post, an arm having one end pivoted to this second post and its other end pivoted to the lower end of said link, and a pump rod pivoted to said link at a point midway between the arm and lever, the distance on the lever between the post and link pivot points being equal to the distance between the pivot connections of the arm with the link and second post whereby the pivot point of the pump rod will move in a straight line when the lever is oscillated, said link being formed of a body bifurcated at its upper end to snugly engage the operating lever and bifurcated at its lower end to snugly engage and limit the movement of the pump rod, said pump rod being flattened to fit in the bifurcated lower end of the link.

In testimony whereof I affix my signature.

LEE C. MATTHEWS.