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L. H. LOGUE

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2 Sheets-Sheet 1

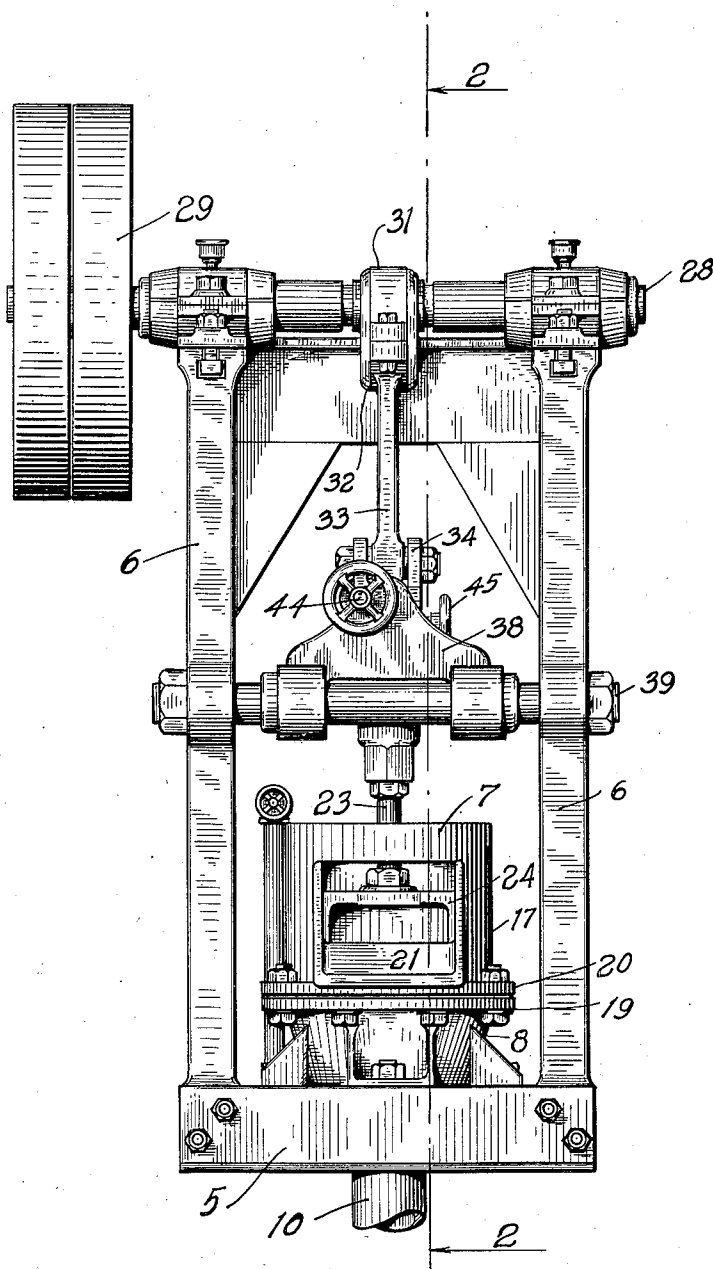


FIG. 1.

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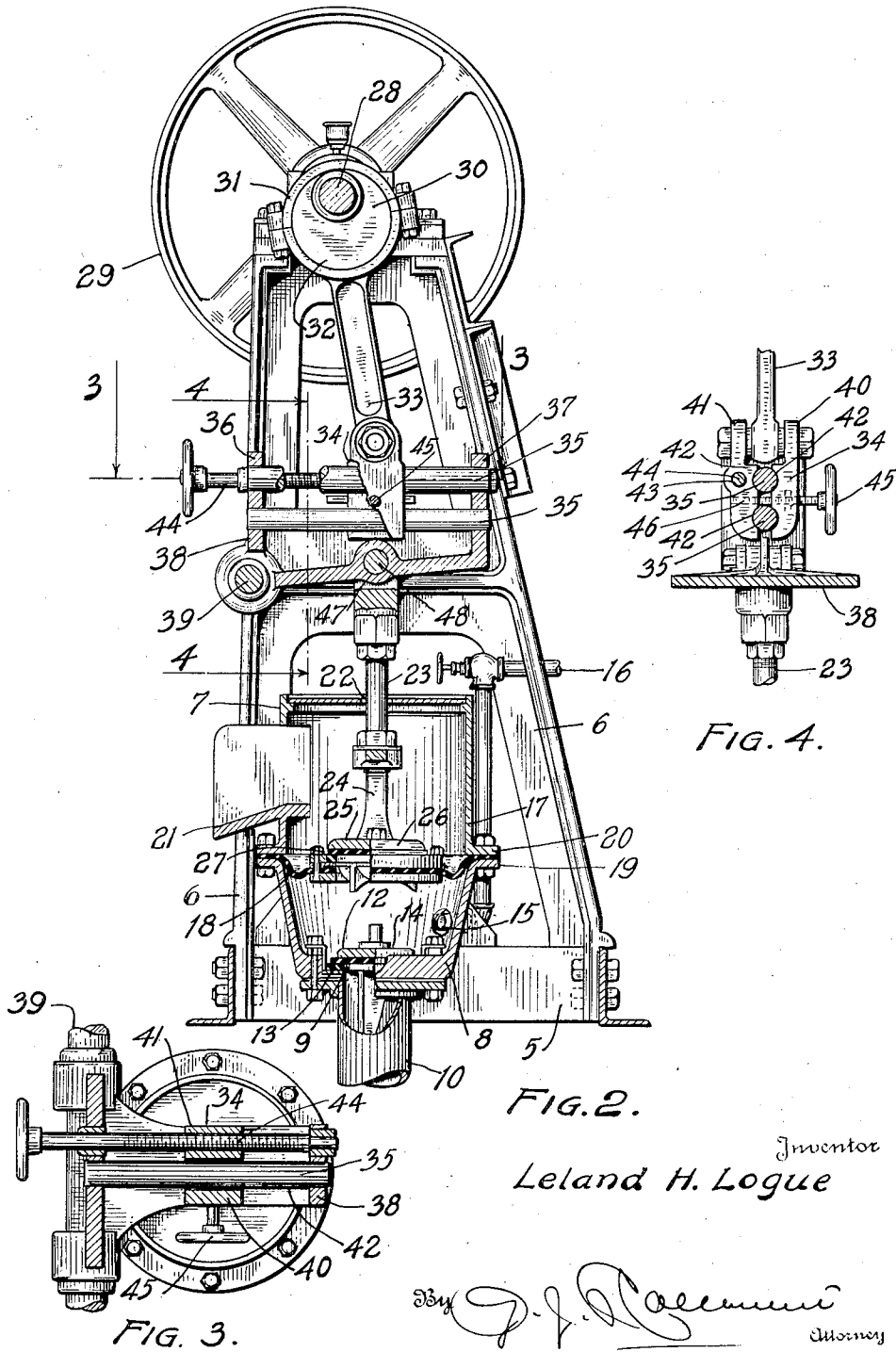
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2 Sheets-Sheet 2



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6 Claims. (Cl. 74—40)

My invention relates to mechanical movements, and more particularly to a mechanical movement for the operation of a pump of the reciprocating diaphragm type.

It is an object of the present invention to provide in a device of this character reciprocating mechanism which is simple, durable and economical and which may be readily adjusted to increase or decrease the stroke of a reciprocating part as, for example, the flexible diaphragm of a suction pump.

Another object is to provide an oscillating element to transmit the movement of a driving element to a reciprocating element, at a selective ratio, and to provide in connection therewith, an adjusting means which may be operated while the pump or other apparatus to which the invention is applied continues in operation.

Other objects reside in details of construction and in the combination and arrangement of parts, as will more fully appear in the course of the following description.

In the accompanying drawings, in the various views of which like parts are similarly designated, Figure 1 represents an elevation of a pump including an operating mechanism to which the invention is applied,

Figure 2 represents a sectional elevation, taken along the line 2—2 in Figure 1,

Figure 3 is a section taken along the line 3—3, Figure 2, and

Figure 4 is a section taken along the line 4—4, Figure 2.

Referring to the drawings, the reference numeral 5 represents a base on which standards 6 are mounted to provide a supporting structure for a suction pump 7 and its reciprocating mechanism.

The pump 7 is fastened to the base 5 and comprises a flanged bowl 8 providing a suction chamber and having an inlet 9 in its bottom for communication with a supply conduit 10. A check valve 12, comprising a valve seat 13 and a movable member 14, controls the movement of material from conduit 10 through the inlet 9. The bowl is apertured at 15 for connection with a valve controlled air intake for regulating suction in the bowl. A flanged housing 17 which provides a pumping chamber is mounted on the bowl 8, and a centrally apertured, flexible diaphragm 18 is clamped at its periphery between flange 19 of the bowl and flange 20 of the housing. The housing 17 is provided with an overflow lip 21 and is apertured at 22 to admit a piston rod 23 connecting the reciprocating mechanism

with a yoke 24, which fastens on the flexible diaphragm 18. A check valve 26 comprises a movable part 25 in the opening of diaphragm 18, and a seat 27 carried by the diaphragm 18 engages the movable part 25 when the valve is in closed position.

The reciprocating mechanism comprises a shaft 28 supported for rotation on standards 6, and a pulley 29 is carried at an end of the shaft beyond the standards 6 for connection with a source of motive power (not shown). Intermediate of the standards 6 an eccentric 30 is mounted on the shaft, and under certain conditions a double eccentric may be used. Strap sections 31 and 32 secure a rod 33 to the eccentric 30, and at its opposite end the rod 33 is pivotally connected to a crosshead 34, mounted for sliding movement on guides 35. The guides 35 are supported in walls 36 and 37 of a rocker arm 38 which is pivotally mounted on a shaft 39 on the standards 6.

The crosshead 34, best shown in Figure 3, comprises two sections 40 and 41, each grooved as at 42 for engagement with guides 35. The section 41 has a threaded bore 43, and a threaded screw 44 journaled in walls 36 and 37 of the rocker arm extends through and meshes with the threads in the bore 43. A tightening screw 45 inserted in an aperture between the grooves 42 of section 40 and engaging a threaded bore 46 in section 41 holds the sections together, and also acts as a lock to hold the rider in selected positions.

The rocker arm 38 is apertured at 47 to support a shaft 48 providing a pivotal connection between it and the piston rod 23. It has been found advantageous in practice to position the shaft 48 directly over the valve 26 so that the motive force is directed substantially perpendicularly against the diaphragm.

It is to be understood that while the oscillating element and its associated mechanism have been shown as applied to a suction pump, the mechanical movement comprises a distinct invention in itself, and may be applied to structures generally, wherein a reciprocating movement is required.

In the operation of the device shown in Figure 2 the pulley 29 is connected to a source of motive power, effecting a rotation of shaft 28. The eccentric 30 on shaft 28 produces an up and down movement of rod 33, thereby rocking the pivoted arm 38. The rocking of the arm 38 imparts an up and down stroke to rod 23 attached to the diaphragm 18. During the upward movement of the reciprocating mechanism, the check valve 12

is opened by the partial vacuum in bowl 8, admitting liquid from conduit 10, and valve 26 remains closed during this movement. During downward movement, valve 12 is closed and valve 26 opens, the liquid in bowl 8 entering into the pumping chamber for subsequent removal over the overflow lip 21.

It will be understood that the proximity of the crosshead 34 to the pivot 39 determines the length of the stroke of rod 23. The screw 44 permits movement of the crosshead to any point on the guides within the rocker arm. When the crosshead abuts the wall 36, a maximum stroke is produced, while the minimum stroke is produced by moving the crosshead until it contacts wall 37. Tightening screw 45 locks the crosshead at any selected point. Both the screw 44 and the tightening screw 45 may be adjusted while the mechanism is operating, without stopping the oscillating movement, so that any increase or decrease in the stroke may be made at any time it is required.

It is apparent that the oscillating mechanism may be readily disassembled for replacements or repairs. Although the reciprocating mechanism has been shown as operating in a substantially vertical plane, it is equally effective in imparting reciprocating movement when placed in a horizontal or an inclined position.

Changes in the construction and arrangement of parts may be availed of without departing from the spirit and scope of the invention.

What I claim and desire to secure by Letters Patent is:

1. The combination with a pump having a reciprocating element, of operating mechanism comprising a pivoted rocker arm, a guide on the rocker arm, a crosshead on the guide, an eccentric operatively connected with the rocker arm through the intermediary of the crosshead, a piston rod pivoted to the rocker arm and connecting with the element for its reciprocation by the oscillating movement of the rocker arm, and means to move the crosshead relative to the pivot of the rocker arm to thereby vary the oscillating movement.

2. The combination with a driven element, of an oscillating element in operative connection therewith and comprising a pivoted rocker arm, a guide carried thereby, a crosshead on the track, means to move the rider along the guide to vary the oscillating movement, locking means to hold the crosshead in an adjusted position, and an eccentric operatively connected with the crosshead for imparting an oscillating movement to the rocker arm.

3. The combination with a driven element, of in oscillating element operatively connected therewith and comprising a pivoted rocker arm, a guide carried by the crosshead and a crosshead on the guide including two complementary sections, each having one of its sides engaging the guide, means for clamping the sections on the guide, means for moving the crosshead along the guide, and an eccentric operatively connected

with the crosshead for imparting an oscillating movement to the oscillating element.

4. Mechanism for changing rotary motion into straight line reciprocating motion and for varying the length of the reciprocation, comprising in combination, a stationary support, a shaft mounted on the support for rotation about its axis, an eccentric carried by the shaft, a member mounted for straight line reciprocation, a rocker arm located between the shaft and the reciprocating member and pivoted at one end to the support, a pivotal connection between the rocker arm and the reciprocating member, a guide bar carried by the rocker arm, a crosshead slidably mounted on the guide bar, a connecting rod having one end operatively connected with the eccentric and the other pivotally connected with the crosshead, means for adjusting the position of the crosshead along the guide bar, and means for clamping the crosshead on the guide bar to hold it in adjusted position.

5. Mechanism for changing rotary motion into straight line reciprocating motion and for varying the length of the reciprocation, comprising in combination, a stationary support, a shaft mounted on the support for rotation about its axis, an eccentric carried by the shaft, a member mounted for straight line reciprocation, a rocker arm located between the shaft and the reciprocating member and pivoted at one end to the support, a pivotal connection between the rocker arm and the reciprocating member, a guide bar carried by the rocker arm, a crosshead slidably mounted on the guide bar, the crosshead being formed of two parts provided with cooperating grooves to receive the guide bar, means for forcing the two parts of the crosshead together for clamping it in position on the guide bar, means comprising a screw rotatably connected with the rocker arm and threadedly connected with the crosshead for adjusting the position of the latter along the guide bar, and a connecting rod having one end operatively connected with the eccentric and the other end pivotally connected with the crosshead.

6. Mechanism for changing rotary motion into straight line reciprocating motion and for varying the length of the reciprocation, comprising in combination, a stationary support, a shaft mounted on the support for rotation about its axis, an eccentric carried by the shaft, a member mounted for straight line reciprocation, a rocker arm located between the shaft and the reciprocating member and pivoted at one end to the support, a pivotal connection between the rocker arm and the reciprocating member, two parallel guide bars carried by the rocker arm, a crosshead slidably connected with the guide bars, a connecting rod having one end operatively connected with the eccentric and the other end pivotally connected with the crosshead, means for adjusting the position of the crosshead along the guide rods, and means for clamping the crosshead in adjusted position, said means comprising a screw.

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