

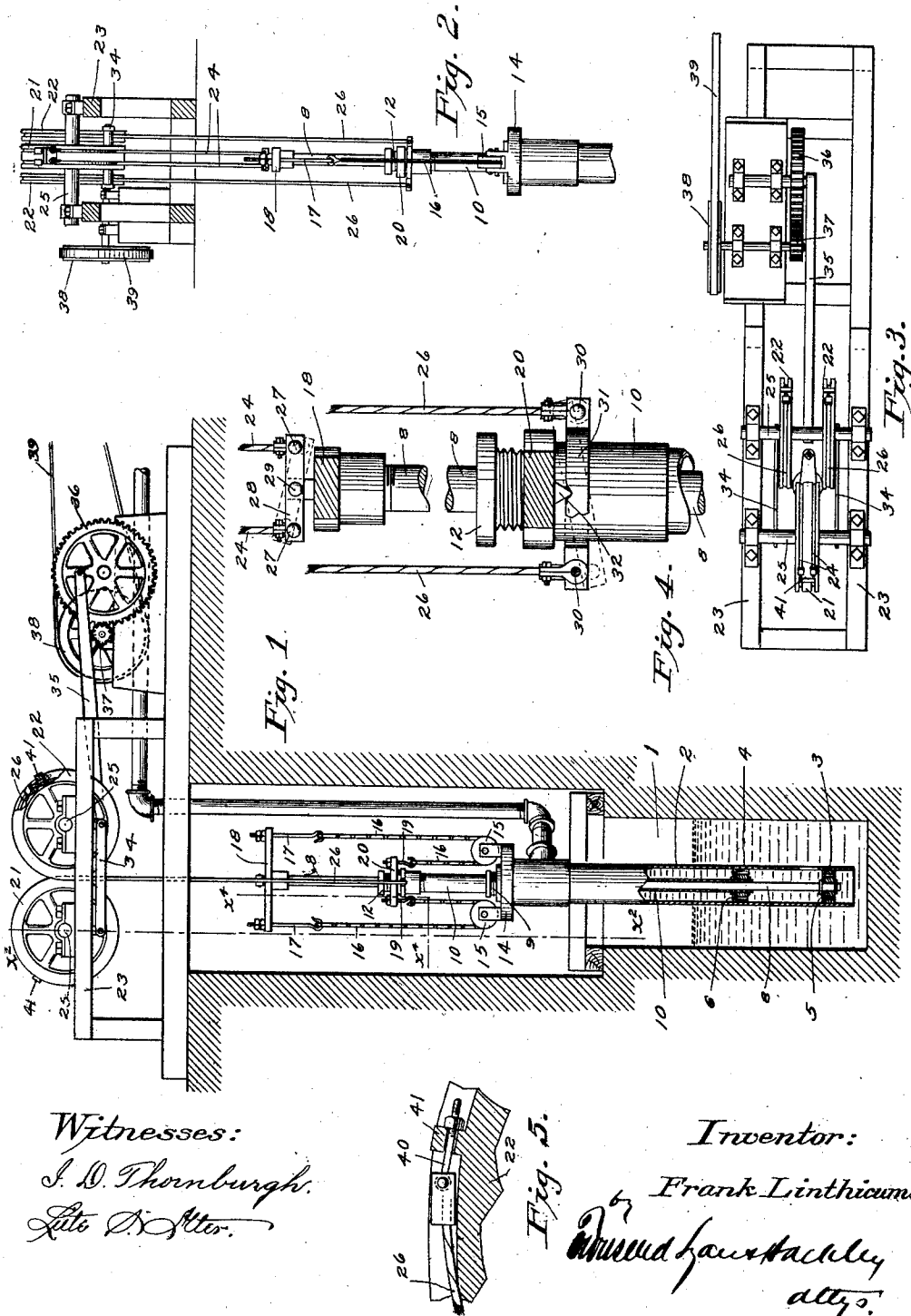
F. LINTHICUM.

PUMP.

APPLICATION FILED AUG. 29, 1910.

1,003,000.

Patented Sept. 12, 1911.



Witnesses:

J. D. Thornburgh.
Atto D. S. Alter.

Inventor:

Frank Linthicum.
Atty.

UNITED STATES PATENT OFFICE.

FRANK LINTHICUM, OF LOS ANGELES, CALIFORNIA.

PUMP.

1,003,000.

Specification of Letters Patent.

Patented Sept. 12, 1911.

Application filed August 29, 1910. Serial No. 579,597.

To all whom it may concern:

Be it known that I, FRANK LINTHICUM, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Pump, of which the following is a specification.

This invention relates to an improvement on the type of pumps shown in my application Serial Number 517,501, filed September 13th, 1909, and the main object of the present invention is to provide improved means for operating the pump rods in such manner as to eliminate lateral strains.

Another object of the invention is to provide supporting and operating means which will support and operate the pump rods by a direct line vertical connection.

A further object of the invention is to provide means for connecting and operating the pump rods in such manner as to balance the strains relatively to the rods so as to produce a direct pull on the rod and eliminate bending action thereon.

The accompanying drawings illustrate the invention, and referring thereto:—Figure 1 is a side elevation of the apparatus with parts in section. Fig. 2 is a vertical section on line x^2-x^2 in Fig. 1. Fig. 3 is a plan of the apparatus. Fig. 4 is a section on line x^4-x^4 in Fig. 1. Fig. 5 is a detail section of a means for connecting the flexible operating connection for the pump rod to the operating rocking member therefor.

1 designates a well in which is the usual pump cylinder or barrel 2. Plungers 3, 4 working in said cylinder and provided with valves 5, 6, are operated vertically in opposite directions to raise the water in the barrel or cylinder, plunger 3 having an upwardly extending rod 8 passing through a gland 9 at the top of the well, and plunger 4 having an operating tubular rod 10 surrounding the rod 8 and provided at its upper end with a gland 12 through which the rod 8 slides. The cross head 14 at the upper end of the cylinder or barrel carries two sheaves 15 around which pass respectively two chains 16, one end of each chain 16 being connected by hooks 17 to a cross head 18 on the upper end of the inner plunger rod 8, and the other end of the respective chains being connected by hooks 19 to a cross head 20 on the upper end of the outer plunger rod 10, whereby said plunger rods are forced

to move in opposite direction so that as one moves up the other moves down.

The operating means for the plunger rods comprises rocking members formed preferably as wheels or drums 21, 22 on parallel shafts 25 journaled in a frame 23, and cables or flexible members connected to and winding on said drums for operating the plunger rods. A single drum 21 may be provided with its cables 24 secured thereto and winding thereon, the lower ends of said cables 24 being connected by pivotal connections 27 with the ends of an equalizing lever 28 pivotally mounted at 29 on the upper end of the rod 8, the fulcrum 29 on rod 8 serving as fulcrums for lever 28. The outer plunger rod 10 is operated by two drums 22 extending at each side of the drum 21 and provided with cables 26 wound and secured thereto, the lower ends of said cables 26 being pivotally connected at 30 to an annular equalizing lever formed as an annular frame 31 extending around the outer plunger rod 10 and engaging fulcrums 32 thereon so as to rock thereon and thereby equalize the motion. Levers 28 and 31 extend horizontally at each side of their fulcrums. The rocking members or drums 21, 22 are connected by links or connecting rods 34 so as to operate in unison, and are connected by pitman 35 to an operating wheel 36, said wheel being, for example, a gear wheel operated by pinion 37 from a driving wheel 38 to which power is applied in any suitable manner, for example, by means of a belt 39. The cables 24 and 26 are connected to the drums 21 and 22 by adjustable means consisting, for example, of bolts 40 connected to said cables and engaging lugs 41 on the drums.

An important feature of this invention is that a nearly uniform rate of movement is imparted to each plunger throughout its entire stroke in each direction, which has not heretofore been attained so far as I am aware, in any pump wherein the oscillation of the plunger operating members is obtained by means of a pitman having dead centers. In this present invention I accomplish this uniformity of speed by passing the flexible connections 24 and 25 over the peripheries of oscillating drums 21, 22, whereby said wheels exert an unchanging leverage ratio on the leverage connections, but this would not in itself be sufficient were

not means provided for giving substantially a constant rate of oscillation to the wheels themselves. I accomplish this by connecting one end of the pitman 35 to the drums 22 at a greater distance from the center 25 thereof than the other end of the pitman is located from the center of gear 36. Thus, while the end of pitman 35 on gear 36 has two dead centers, the slow motion of the pitman adjacent those centers is minimized at the other end of the pitman by reason of that end being at a proportionately greater distance from the axis 25. It is true that there is a slowing of the speed of oscillation of drums 22 near the termination of each stroke, but as stated, their speed of oscillation in general is more uniform which, together with the passing of the flexible connections around their peripheries, results in a much more uniform rate of travel of the plungers than where the plungers are operated by pitmen, which are in turn operated by cranks.

The operation is as follows:—The operating means 38 being set in motion, the connecting devices 35 and 34 cause the rocking members or drums 21 and 22 to turn back and forth through a limited angle, thereby raising and lowering the flexible connections or cables 24, 26, connections 24 from the drum 21 to the inner rod 8 moving upwardly as the connections 26 to the outer plunger rod 10 move downwardly and vice versa. The flexible connections 24 and 26 extend in substantially the same vertical plane, said plane passing through the axis of the inner and outer plunger rods 8 and 10 so that the stresses exerted by said flexible connections are all in the same plane and there are no lateral stresses at right angles to that plane. Moreover, the rocking connections, by means of the equalizing bars 28 and 31, between the lifting cables 24 and 26 and the respective plunger rods 8 and 10, equalize the pull and motion of the said cables on said rods so that there is no side pull or bending action, such as might result from greater stretch or from greater tight-

ness of either cable relatively to the other, and the stresses are applied in the same manner as if they were applied at the vertical axis of the plunger rod.

What I claim is:—

1. In a pump, the combination with two plunger rods and means connecting said rods to cause the same to move reversely, of a pair of flexible lifting connections connected to each rod at each side thereof, rocking means supporting said flexible connections and comprising three drums journaled on parallel shafts, one of said drums having flexible connections to the inner plunger secured thereto and wound thereon, and the two other drums extending at either side of the first named drum and having flexible connections to the outer plunger rod secured thereto and wound thereon, said flexible connections extending vertically downward from said rocking means in the same vertical plane, and means for operating said rocking means to move the flexible connections to one plunger rod upwardly as the flexible connections to the other plunger rod move downwardly.

2. In a pump, the combination with inner and outer plunger rods, provided with fulcrums at the upper ends of the respective rods, equalizing levers fulcrumed on said fulcrums and extending horizontally at each side of said fulcrums, a pair of flexible lifting connections attached to the respective ends of each equalizing lever, rocking means supporting said pairs of flexible connections, and means for operating said rocking means to move the flexible connections to one plunger rod upwardly, as the flexible connections to the other plunger rod move downwardly.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 23rd day of August 1910.

FRANK LINTHICUM.

In presence of—

ARTHUR P. KNIGHT,
FRANK L. A. GRAHAM.