# Nov. 18, 1924.

Fig.1.

## G. W. LEIMAN

PUMP



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2 Sheets-Sheet 1



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Fig.4. 

G. W. LEIMAN

PUMP

Filed Feb. 24, 1923

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## 2 Sheets-Sheet 2



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. - INVENTOR

Junge W. Luman

# ATTORNEYS

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## Patented Nov. 18, 1924.

# UNITED STATES PATENT OFFICE.

GEORGE W. LEIMAN, OF NEWARK, NEW JERSEY, ASSIGNOR TO LEIMAN BROS., OF NEW YORK, N. Y., A COPARTNERSHIP COMPOSED OF WILLIAM H. LEIMAN, GEORGE W. LEIMAN, GUSTAVE A. LEIMAN, EDWARD C. LEIMAN, AND JOHN LEIMAN.

Application filed February 24, 1923. Serial No. 620,883.

To all whom it may concern: a citizen of the United States, and resident spect to the wall of the casing 1. of Newark, in the county of Essex and State 5 of New Jersey, have invented a new and use- the casing 1 passing through the heads 2, ful Improvement in Pumps, of which the following is a specification.

This invention relates to rotary pumps and more particularly to a pump having 10 novel construction and arrangement of the 8 by means of a key and spline connection parts, whereby a high rate of speed may be 10 as shown in Figs. 3 and  $\overline{4}$ . attained, producing a maximum efficiency the parts.

15 Another object is to provide a pump, the moving parts of which are so supported and power and produce an efficient result.

3 is further provided with an inwardly ex-Be it known that I, GEORGE W. LEIMAN, tended hub 7 disposed eccentrically with re-55 A shaft 8 extends concentrically through 3 and hubs 5, 6 and eccentrically through the hub 7.

1,516,106

A cup shaped element 9 is mounted to ro- 60 tate in the casing 1, and secured to the shaft

A rotor 11 is journaled on the hub 7 within operation with the minimum friction of in the element 9 and mounted to rotate there- 65 with by means of a link 12. One end of this link is arranged to oscillate in the element 9 by means of an enlarged head 13 which is balanced as to require the least amount of journaled in a socket 14 in the element. The other end of the link is provided with 70 Another object is to provide certain im- a similarly enlarged head 15 which rocks 20 provements in the form, construction and in a socket 16 in the rotor 11. The rotor arrangement of the several parts, whereby is further provided with a recess 17 within it is brought in intimate contact with the 75 A practical embodiment of my invention inner wall of the element as shown in Figs. 2, 3 and 4. Thus it will be seen that by mounting the rotor on the hub 7 and the element 9 on the shaft 8, a crescent shaped chamber 18 will be formed between the ex- 80 terior wall of the rotor and the interior wall of the element. The head 3 is provided with an inlet port 19 which communicates with one end of the chamber 18, while an outlet port 20 also lo- 85 cated in the head 3 connects with the other end of the chamber. To open and close the ports 19, 20, at the proper time and to prevent the fluid passing from one port to the other, the link 12 is 90 provided with an offset portion 21, which coacts with the ports in its movement. The Fig. 6 represents a detail section taken in rotor is also provided with an arcuate offset the plane of the line VI-VI of Fig. 2 look- portion 22 in alignment with the portion 21, ing in the direction of the arrows. so as to extend the contacting surface and 95 Fig. 7 represents a side elevation of the control the operation of the ports. To compensate for the movement of these offset portions 21, 22, the element 9 is cut away to provide a recess 23 for the reception of The casing of the pump denoted by 1 is the portions, when in close proximity to 100

the above named and other objects may be which the body of the link 12 recedes when effectively attained.

<sup>25</sup> is represented in the accompanying drawings in which—

Fig. 1 represents a side elevation of my improved pump.

Fig. 2 represents a vertical section taken 30 in the plane of the line II-II of Fig. 1 looking in the direction of the arrows.

Fig. 3 represents a vertical section taken in the plane of the line III-III of Fig. 1 looking in the direction of the arrows. 35 Fig. 4 represents a vertical section taken in the plane of the line IV--IV of Fig. 2 looking in the direction of the arrows.

Fig. 5 represents a horizontal section taken in the plane of the line V-V of Fig. 40 3 looking in the direction of the arrows.

45 oscillating coupling link, and

Fig. 8 represents an inverted plan view of the same.

of cylindrical construction and provided or contact with the element. with heads 2, 3 secured thereto by screws 4. The chamber 18 is arranged, when in cer-The heads 2, 3 are provided with outwardly tain positions, to be divided into an inlet extended hubs 5, 6 respectively. The head compartment and an outlet compartment by

the link 12 and by means of a spring actuated wing 24, having an enlarged head 25 which oscillates in a socket 26 in the element. This wing is arranged to engage the 5 rotor 11, which engagement prevents the fluid from passing from the inlet to the outlet ports through the chamber 18. A recess 27 is formed in the element 9 for housing the wing when in its closed position. In 10 operation as the element 9 is rotated by means of the shaft 8, in the direction of the arrows, the air received through the inlet means connecting the element and rotor for 19 in the chamber 18 between the link 12 moving the rotor. and the wing 24 will be carried forward to 4. A pump comprising a cylindrical cas-15 the outlet 20, and forced out, the operation ing having heads, a shaft mounted therein, 80 being repeated as the wing and link succeed a rotary element in said casing secured to each other. As the element 9 is moved from said shaft, said element having a cup shaped the position shown in the several figures, chamber, one of said heads being provided  $\cdot$ the link 12, by its connection, will cause the with a hub extending into said chamber, a 20 rotor 11 to travel on the hub 7, so that the rotor mounted on said hub, inlet and outlet 85 link will be caused to move outwardly away ports communicating with the chamber, and from the recess 17, while the wing 24, which means connecting the element and rotor for is diametrically opposite the link, will by moving the rotor, said means being arranged its contact with the rotor be caused to re- to oscillate in the chamber.

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ment and rotor for moving the rotor, said means being arranged to oscillate in the chamber.

3. A pump comprising a cylindrical casing having heads, a shaft mounted therein, 70 a rotary element in said casing secured to said shaft, said element having a cup shaped chamber, one of said heads being provided with a hub extending into said chamber, a rotor mounted on said hub, inlet and outlet 75 ports communicating with the chamber, and

1,516,108

25 cede towards its recess 17. When the mem- 5. A pump comprising a cylindrical cas- 90 bers have moved substantially 180°, the ing having heads, a shaft mounted therein, body of the link will be out of its recess 17 a rotary element in said casing secured to and bridge the chamber 18, while the wing said shaft, said element having a cup shaped 17 will be housed in its recess 27, by its chamber, one of said heads being provided 30 contact with the interior wall of the cham- with a hub extending into said chamber, 95 ber 18. By reason of the position of the said hub being mounted eccentrically with bearings and the movement of the element respect to the wall of the chamber, a rotor and the rotor, one with respect to the other, mounted on the hub, inlet and outlet ports the link and wing will be caused to oscil- communicating with the chamber, and is late toward and away from their recesses means connecting the element and rotor for 100 as they approach and depart from the upper moving the rotor. part of the chamber. Similarly the link and 6. A pump comprising a cylindrical caswing will move away from their recesses as ing having heads, a shaft mounted therethey approach the bottom of the chamber in, a rotary element in said casing secured 40 and move toward their recesses as they de- to said shaft, said element having a cup 105 part from the bottom of the chamber. shaped chamber, one of said heads being It is evident that various changes may be provided with a hub extending into said resorted to in the form, construction and chamber, said hub being mounted eccentricarrangement of the several parts without ally with respect to the wall of the cham-45 departing from the spirit and scope of my ber, a rotor mounted on the hub, inlet and 110 invention; hence, I do not intend to be lim- outlet ports communicating with the chamited to the specific details herein shown and ber, and means connecting the element and described, except as they may be included in rotor for moving the rotor, said means being arranged to oscillate in the chamber. the claims. What I claim is:---7. A pump comprising a cylindrical cas- 115 501. A pump comprising a cylindrical cas- ing having heads, a shaft mounted therein, ing having heads, a shaft mounted therein, a rotary element in said casing secured to a rotary element in said casing secured to said shaft, said element having a cup said shaft, said element having a cup shaped shaped chamber, one of said heads being 55 chamber, a rotor mounted in said chamber, provided with a hub extending into said 120 inlet and outlet ports communicating with chamber, said hub being mounted eccenthe chamber, and means connecting the ele- trically with respect to the wall of the chamment and rotor for moving the rotor. ber, a rotor mounted on the hub, inlet and 2. A pump comprising a cylindrical cas- outlet ports communicating with the cham-60 ing having heads, a shaft mounted therein, ber, and a link connecting the element and 125 a rotary element in said casing secured to rotor for moving the rotor. said shaft, said element having a cup shaped 8. A pump comprising a cylindrical caschamber, a rotor mounted in said chamber, ing having heads, a shaft mounted thereinlet and outlet ports communicating with in, a rotary element in said casing se-65 the chamber, and means connecting the ele- cured to said shaft, said element having 130

## 1,516,106

a cup shaped chamber, one of said heads and closing the inlet and outlet ports, and being provided with a hub extending into a recess in the element for the reception said chamber, said hub being mounted ec- of said means. 13. A pump comprising a cylindrical cascentrically with respect to the wall of the ing having heads, a shaft mounted therein, 70 5 chamber, a rotor mounted on the hub, ina rotary element in said casing secured to let and outlet ports communicating with the said shaft, said element having a chamber, chamber, and a link connecting the element and rotor for moving the rotor, said one of said heads being provided with a link being arranged to oscillate in the chamhub extending into said chamber, said hub being mounted eccentrically with respect to '' 10 ber.

9. A pump comprising a cylindrical casing having heads, a shaft mounted therein, a rotary element in said casing secured to said shaft, said element having a cup shaped 15 chamber, one of said heads being provided with a hub extending into said chamber, said hub being mounted eccentrically with respect to the wall of the chamber, a rotor mounted on the hub, inlet and outlet ports 20 communicating with the chamber, and a link connecting the element and rotor for moving the rotor, said link having an enlarged head and socket connection with the element and rotor.

25 10. A pump comprising a cylindrical casing having heads, a shaft mounted therein, a rotary element in said casing secured to said shaft, said element having a cup shaped chamber, one of said heads being 30 provided with a hub extending into said chamber, said hub being mounted eccen-

the wall of the chamber, a rotor mounted on the hub, inlet and outlet ports communicating with the chamber, a link connecting the element and rotor for moving the rotor, and means on the link and rotor for opening and closing the inlet and outlet ports. 14. A pump comprising a cylindrical casing having heads, a shaft mounted therein, a rotary element in said casing secured to said shaft, said element having a chamber, <sup>8.</sup> one of said heads being provided with a hub extending into said chamber, said hub being mounted eccentrically with respect to the wall of the chamber, a rotor mounted on 90 the hub, inlet and outlet ports communicating with the chamber, a link connecting the element and rotor for moving the rotor, means on the link and rotor for opening and closing the inlet and outlet ports, and  $_{95}$ a recess in the element for the reception of said means.

trically with respect to the wall of the chamber, a rotor mounted on the hub, inlet and outlet ports communicating with 35 the chamber, and a link connecting the element and rotor for moving the rotor, said link having an enlarged head and socket connection with the element and rotor, whereby the link may be oscillated in the 40 chamber.

11. A pump comprising a cylindrical casing having heads, a shaft mounted therein, a rotary element in said casing secured to said shaft, said element having a chamber, 45 one of said heads being provided with a hub extending into said chamber, said hub being mounted eccentrically with respect to the wall of the chamber, a rotor mounted on the hub, inlet and outlet ports communi-50 cating with the chamber, a link connecting the element and rotor for moving the rotor, and means on the link for opening and clos-

15. A pump comprising a cylindrical casing having heads, a shaft mounted therein, a rotary element in said casing secured to 100 said shaft, said element having a chamber, one of said heads being provided with a hub extending into said chamber, said hub being mounted eccentrically with respect to the wall of the chamber, a rotor mounted 105on the hub, inlet and outlet ports communicating with the chamber, a link connecting the element and rotor for moving the rotor, means on the link and rotor for opening and closing the inlet and outlet ports, said 110 means comprising laterally extended flanges arranged to coact with the ports.

16. A pump comprising a cylindrical casing having heads, a shaft mounted therein, a rotary element in said casing secured to 115said shaft, said element having a chamber, one of said heads being provided with a hub extending into said chamber, said hub being mounted eccentrically with respect to the wall of the chamber, a rotor mounted on 120 the hub, inlet and outlet ports communicating with the chamber, a link connecting the element and rotor for moving the rotor, means on the link and rotor for opening and closing the inlet and outlet ports, said means 125 comprising laterally extended flanges arranged to coact with the ports, and a recess in the element for the reception of said flanges. 17. A pump comprising a cylindrical cas- 130

ing the inlet and outlet ports. 12. A pump comprising a cylindrical cas-

55 ing having heads, a shaft mounted therein, a rotary element in said casing secured to said shaft, said element having a chamber, one of said heads being provided with a hub extending into said chamber, said hub 60 being mounted eccentrically with respect to the wall of the chamber, a rotor mounted on the hub, inlet and outlet ports communicating with the chamber, a link connecting the element and rotor for moving 65 the rotor, means on the link for opening

#### 1,516,108

a rotary element in said casing secured to said shaft, said element having a chamber, a rotor mounted in said chamber, inlet and 5 outlet ports communicating with the chamber, a link connecting the element and rotor for moving the rotor, and a device arranged to oscillate in the chamber and contact with the rotor.

ing having heads, a shaft mounted therein, oscillate in the chamber and contact with the rotor. 30

20. A pump comprising a cylindrical casing having heads, a shaft mounted therein, a rotary element in said casing secured to said shaft, said element having a chamber, a rotor mounted in said chamber, inlet and 35 outlet ports communicating with the chamber, a link connecting the element and rotor 18. A pump comprising a cylindrical cas- for moving the rotor, and a wing carried by 40 for moving the rotor, and a device carried a rotor mounted in said chamber, inlet and 45 20 19. A pump comprising a cylindrical cas- for moving the rotor, and a spring actuated ing having heads, a shaft mounted therein, wing carried by the element arranged to a rotary element in said casing secured to oscillate in the chamber and contact with 50 the rotor.

ing having heads, a shaft mounted therein, the element arranged to oscillate in the a rotary element in said casing secured to chamber and contact with the rotor. said shaft, said element having a chamber, a 21. A pump comprising a cylindrical casrotor mounted in said chamber, inlet and ing having heads, a shaft mounted therein, 15 outlet ports communicating with the cham- a rotary element in said casing secured to ber, a link connecting the element and rotor said shaft, said element having a chamber, by the element arranged to oscillate in the outlet ports communicating with the chamchamber and contact with the rotor. ber, a link connecting the element and rotor

said shaft, said element having a chamber, a rotor mounted in said chamber, inlet and <sup>25</sup> outlet ports communicating with the chamber, a link connecting the element and rotor 17th day of February, 1923. for moving the rotor, and a spring actuated device carried by the element arranged to

In testimony, that I claim the foregoing as my invention, I have signed my name this

GEORGE W. LEIMAN.

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