

Nov. 18, 1924.

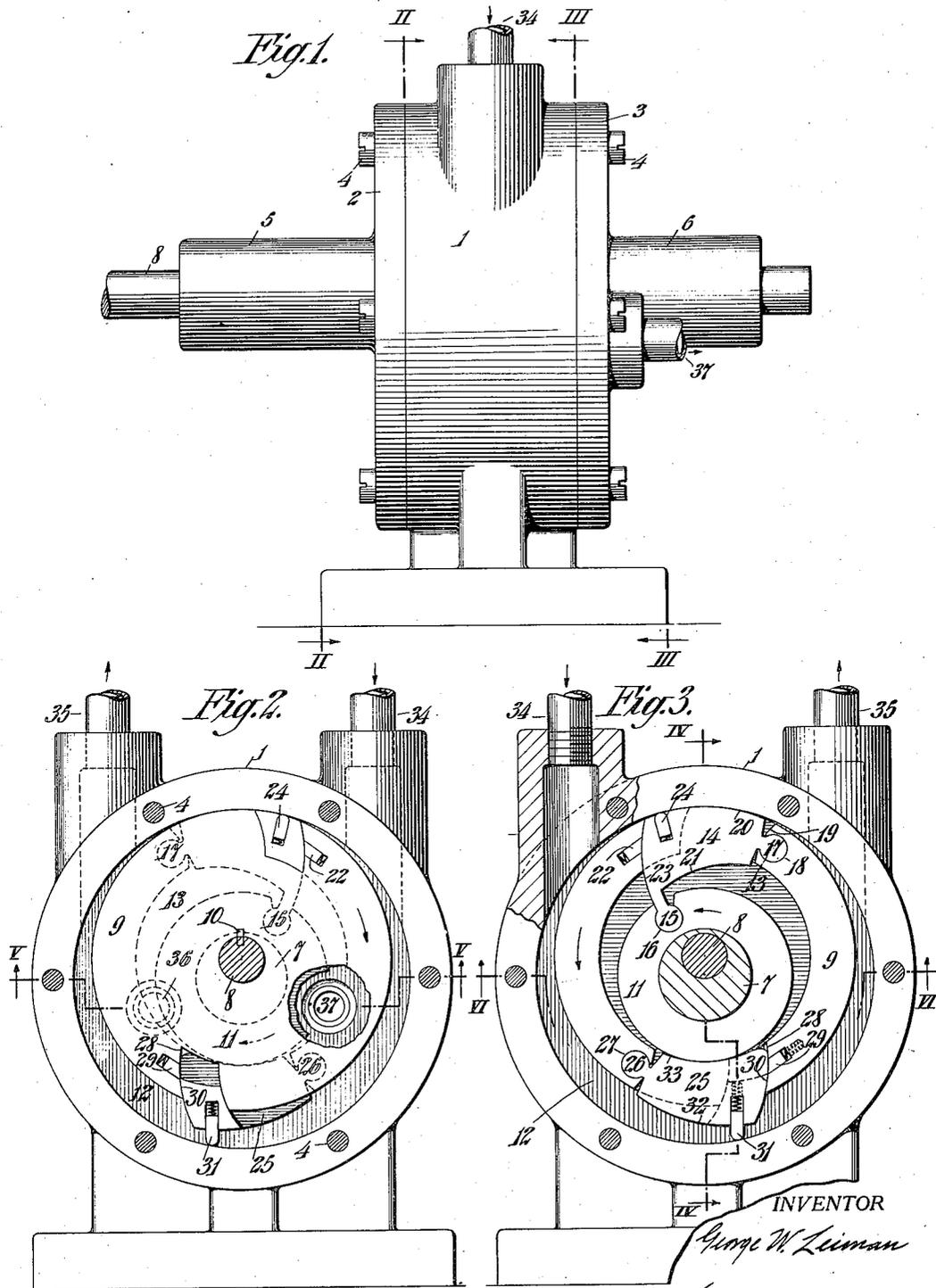
1,516,107

G. W. LEIMAN

PUMP

Filed Feb. 24, 1923

2 Sheets-Sheet 1



Nov. 18, 1924.

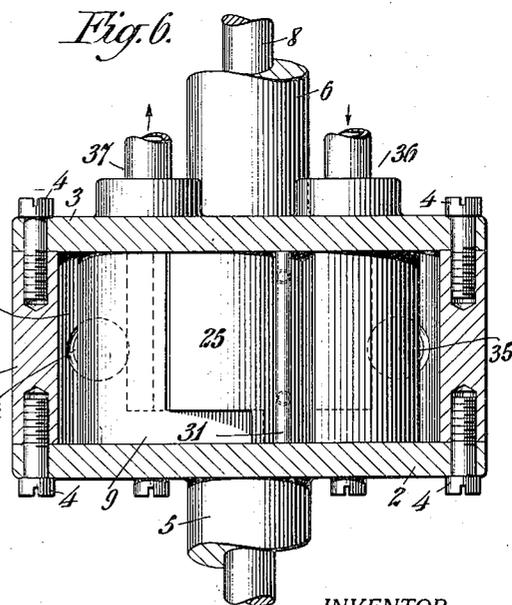
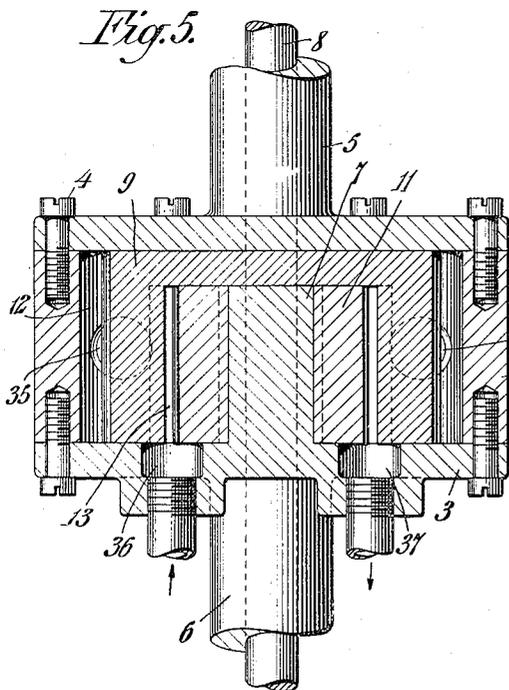
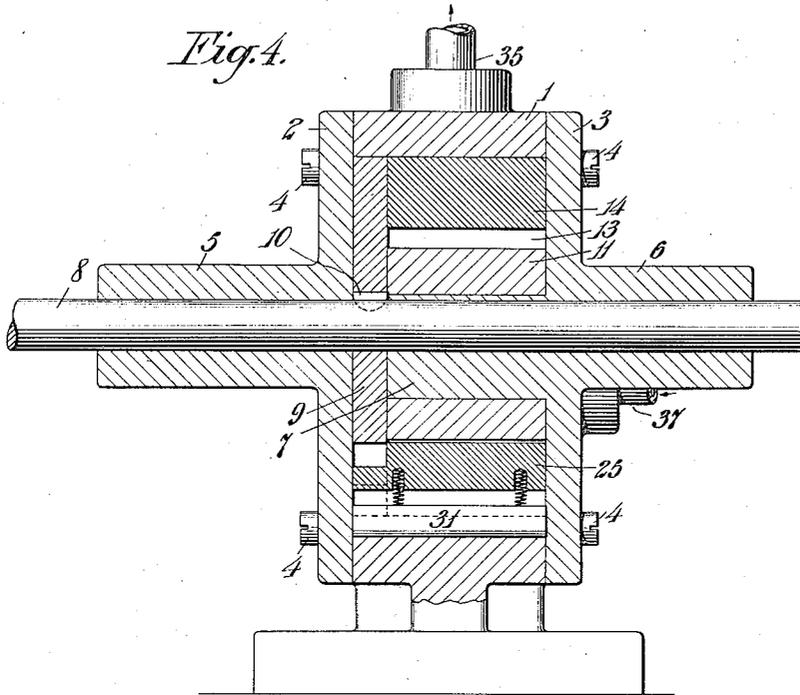
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Filed Feb. 24, 1923

2 Sheets-Sheet 2



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George W. Leiman

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Patented Nov. 18, 1924.

1,516,107

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.

PUMP.

Application filed February 24, 1923. Serial No. 620,884.

To all whom it may concern:

Be it known that I, GEORGE W. LEIMAN, a citizen of the United States, and resident of Newark, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in Pumps, of which the following is a specification.

This invention relates to rotary pumps and more particularly to a pump in which a fluid is drawn into or expelled from the pump by oscillatory means, the object being to construct and arrange the parts so that they may be so balanced as to be rotated at a high rate of speed, thereby reducing the friction of the parts to a minimum, and increasing the efficiency in operation.

Another object is to provide a pump constructed and arranged to produce a delivery of the fluid at two points independent of each other.

Another object is to provide certain improvements in the form, construction and arrangement of the parts, whereby the above named and other objects may be effectively attained.

A practical embodiment of my invention 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 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.

Fig. 4 represents a vertical section taken in the plane of the line IV—IV of Fig. 3 looking in the direction of the arrows.

Fig. 5 represents a horizontal section taken in the plane of the line V—V of Fig. 2 looking in the direction of the arrows.

Fig. 6 represents a horizontal section taken in the plane of the line VI—VI of Fig. 3 looking in the direction of the arrows.

The casing of the pump denoted by 1 is of cylindrical construction and provided with heads 2, 3 secured thereto by screws 4. The heads are provided with outwardly extended hubs 5, 6 respectively. The head 3 is also provided with an inwardly extended hub 7, which is disposed eccentrically with respect to the hubs 5, 6 and to the driving shaft 8, which extends through the

hubs. A cup shaped element 9 is mounted to rotate within the casing 1 and is secured to rotate with the shaft 8 by means of a key and spline connection 10, as shown in Figs. 2 and 4.

A rotor 11 is journaled on the eccentrically disposed hub 7 within the cup shaped element 9. The peripheral walls of the rotor are concentric with respect to the interior wall of the casing, and the inner and outer walls of the cup shaped element are eccentric with respect to the walls of the rotor 11 and casing 1. By this construction and arrangement of the element 9 and rotor 11 a chamber 12 of crescent shape is formed between the outer wall of the cup shaped element 9 and the inner wall of the casing 1, while a similar crescent shaped chamber 13 is formed within the cup shaped element 9 between the interior wall of the element and the exterior wall of the rotor 11. The rotor is connected to rotate with the cup shaped element 9 by means of a link 14, one end of which is provided with an enlarged head 15 which oscillates in a socket 16 in the rotor, while the other end has a similar enlarged head 17 which rocks in a socket 18 in the cup shaped element 9. This link 14 is arranged to move radially in a cut-away portion 19 of the cup shaped element 9 so that the outer wall 20 of the link coacts with the inner wall of the casing, while the inner wall 21 is adapted to engage the outer wall of the rotor 11. A spring pressed packing 22 is disposed in the element 9 to engage the curved wall 23 of the link 14 to prevent leakage between the chambers 12 and 13.

A similar packing 24 is arranged in the link to contact with the interior wall of the casing, to prevent any leakage past the link in the chamber 12. A wing 25 having an enlarged head 26 mounted in a socket 27 in the element 9 is arranged to oscillate in a cut-away portion 28 of the element 9. A spring pressed packing 29 engages the curved wall 30 of the wing to prevent leakage between the chambers 12 and 13. A similar packing 31 is mounted in the wing to engage the wall of the casing and prevent leakage past the wing in the chamber 12. The outer wall 32 of the wing 25 and the outer wall 20 of the link are each curved to conform with the curvature of the outer wall of the element 9, while the inner wall 33 of

the wing and the inner wall 21 of the link conform to the curvature of the inner wall of the element, thereby permitting a point of contact between the walls of the rotor, element and casing at all times.

The link 14 and wing 25 are diametrically opposed in the element 9 and operate at times to divide each of the chambers 12 and 13 into two separate compartments so that one compartment in each of the chambers will be receiving and compressing while the companion compartment will be exhausting its compressed charge.

The casing 1 is provided with an inlet 34 and an outlet 35, which inlet and outlet communicate with the chamber 12. An inlet port 36 and an outlet port 37 disposed in the head 3 are arranged to communicate with the chamber 13. It will therefore be seen that each of the moving parts are mounted to rotate on fixed bearings which are firmly and rigidly supported. Furthermore, the rotating elements are perfectly balanced, since they rotate concentrically on their bearings, while not concentrically with respect to each other, thereby permitting a very high rate of speed, increasing the efficiency in operation and reducing the friction of the contacting surfaces to a minimum.

In operation; as the element 9 is rotated by means of the shaft 8 in the direction indicated by the arrows, the air received through the inlet port 34 into the chamber 12, between the link 14 and the wing 25, will be carried forward to the outlet port 35 and forced out, the operation being repeated as the wing and link succeed each other. Simultaneously the element 9, through the link 14, moves the rotor 11 on the hub 7, so that air admitted through the inlet port 36 into the chamber 13 of the element 9 and between the wing 25 and link 14 will be carried around to the outlet port 37 and exhausted.

It is evident that various changes may be resorted to in the construction, form and arrangement of the several parts without departing from the spirit and scope of my invention; hence, I do not intend to be limited to the specific details herein shown and described, except as they may be included in the claims.

What I claim is:—

1. A pump comprising a cylinder having heads, a shaft eccentrically mounted in said cylinder and heads, inlet and outlet ports for the cylinder, a rotary element in the cylinder secured to said shaft, a cup shaped chamber in said element, inlet and outlet ports for the chamber, a rotor in the chamber, and means connecting the element and rotor.

2. A pump comprising a cylinder having heads, a shaft eccentrically mounted in said

cylinder and heads, inlet and outlet ports for the cylinder, a rotary element in the cylinder secured to said shaft, a cup shaped chamber in said element, inlet and outlet ports for the chamber, one of said heads being provided with a hub extending into the chamber, a rotor mounted on said hub, and means connecting the element and rotor.

3. A pump comprising a cylinder having heads, a shaft eccentrically mounted in said cylinder and heads, inlet and outlet ports for the cylinder, a rotary element in the cylinder secured to said shaft, a cup shaped chamber in said element, inlet and outlet ports for the chamber, one of said heads being provided with a hub extending eccentrically into the chamber, a rotor mounted on said hub, and means connecting the element and rotor.

4. A pump comprising a cylinder having heads, a shaft eccentrically mounted in said cylinder and heads, inlet and outlet ports for the cylinder, a rotary element in the cylinder secured to said shaft, a cup shaped chamber in said element, inlet and outlet ports for the chamber, one of said heads being provided with a hub extending eccentrically into the chamber, a rotor mounted on said hub, and means connecting the element and rotor, said means being arranged to contact with the cylinder.

5. A pump comprising a cylinder having heads, a shaft eccentrically mounted in said cylinder and heads, inlet and outlet ports for the cylinder, a rotary element in the cylinder secured to said shaft, a cup shaped chamber in said element, inlet and outlet ports for the chamber, one of said heads being provided with a hub extending eccentrically into the chamber, a rotor mounted on said hub, and means connecting the element and rotor, said means being movable in the element to contact with the cylinder.

6. A pump comprising a cylinder having heads, a shaft eccentrically mounted in said cylinder and heads, inlet and outlet ports for the cylinder, a rotary element in the cylinder secured to said shaft, a cup shaped chamber in said element, inlet and outlet ports for the chamber, one of said heads being provided with a hub extending eccentrically into the chamber, a rotor mounted on said hub, and means connecting the element and rotor, said means being arranged to oscillate in the element to contact with the cylinder.

7. A pump comprising a cylinder having heads, a shaft eccentrically mounted in said cylinder and heads, inlet and outlet ports for the cylinder, a rotary element in the cylinder secured to said shaft, a chamber in said element, inlet and outlet ports for the chamber, one of said heads being provided with a hub extending eccentrically into the chamber, a rotor mounted on said

hub, and an oscillating means connecting the element and rotor, said element having a cut away portion for the passage of the means therethrough for contacting with the cylinder.

8. A pump comprising a cylinder having heads, a shaft eccentrically mounted in said cylinder and heads, inlet and outlet ports for the cylinder, a rotary element in the cylinder secured to said shaft, a chamber in said element, inlet and outlet ports for the chamber, one of said heads being provided with a hub extending eccentrically into the chamber, a rotor mounted on said hub, and a link connecting the element and rotor, said link being arranged to oscillate in the element to contact with the cylinder.

9. A pump comprising a cylinder having heads, a shaft eccentrically mounted in said cylinder and heads, inlet and outlet ports for the cylinder, a rotary element in the cylinder secured to said shaft, a chamber in said element, inlet and outlet ports for the chamber, one of said heads being provided with a hub extending eccentrically into the chamber, a rotor mounted on said hub, and a link having an enlarged head and socket connection with the element and rotor, said link being arranged to oscillate in the element to contact with the cylinder.

10. A pump comprising a cylinder having heads, a shaft eccentrically mounted in said cylinder and heads, inlet and outlet ports for the cylinder, a rotary element in the cylinder secured to said shaft, a chamber in said element, inlet and outlet ports for the chamber, one of said heads being provided with a hub extending eccentrically into the chamber, a rotor mounted on said hub, and an oscillating link connecting the element and rotor, said element having a cut away portion for the passage of the link therethrough for contacting with the cylinder.

11. A pump comprising a cylinder having heads, a shaft eccentrically mounted in said cylinder and heads, inlet and outlet ports for the cylinder, a rotary element in the cylinder secured to said shaft, a chamber in said element, inlet and outlet ports for the chamber, one of said heads being provided with a hub extending eccentrically into the chamber, a rotor mounted on said hub, means connecting the element and rotor, and a device for engaging the cylinder and rotor.

12. A pump comprising a cylinder having heads, a shaft eccentrically mounted in said cylinder and heads, inlet and outlet ports for the cylinder, a rotary element in the cylinder secured to said shaft, a chamber in said element, inlet and outlet ports for the chamber, one of said heads being provided with a hub extending eccentrically into the chamber, a rotor mounted on said

hub, means connecting the element and rotor, and a device carried by the element for engaging the cylinder and rotor.

13. A pump comprising a cylinder having heads, a shaft eccentrically mounted in said cylinder and heads, inlet and outlet ports for the cylinder, a rotary element in the cylinder secured to said shaft, a chamber in said element, inlet and outlet ports for the chamber, one of said heads being provided with a hub extending eccentrically into the chamber, a rotor mounted on said hub, means connecting the element and rotor, and an oscillating device carried by the element for engaging the cylinder and rotor.

14. A pump comprising a cylinder having heads, a shaft eccentrically mounted in said cylinder and heads, inlet and outlet ports for the cylinder, a rotary element in the cylinder secured to said shaft, a chamber in said element, inlet and outlet ports for the chamber, one of said heads being provided with a hub extending eccentrically into the chamber, a rotor mounted on said hub, means connecting the element and rotor, and an oscillating device carried by the element, said element being cut away for the passage of the device therethrough for engaging the cylinder and rotor.

15. A pump comprising a cylinder having heads, a shaft eccentrically mounted in said cylinder and heads, inlet and outlet ports for the cylinder, a rotary element in the cylinder secured to said shaft, a chamber in said element, inlet and outlet ports for the chamber, one of said heads being provided with a hub extending eccentrically into the chamber, a rotor mounted on said hub, means connecting the element and rotor, and a device having an enlarged head and socket connection with the element, said element being cut away for the passage of the device therethrough for engaging the cylinder and rotor.

16. A pump comprising a cylinder having heads, a shaft eccentrically mounted in said cylinder and heads, inlet and outlet ports for the cylinder, a rotary element in the cylinder secured to said shaft, a chamber in said element, inlet and outlet ports for the chamber, one of said heads being provided with a hub extending eccentrically into the chamber, a rotor mounted on said hub, means connecting the element and rotor, and a device carried by the element, said device comprising a wing having an enlarged head and screw connection with the element, said element being cut away for the passage of the wing therethrough for engaging the cylinder and rotor.

In testimony, that I claim the foregoing as my invention, I have signed my name this 17th day of February, 1923.

GEORGE W. LEIMAN.