Nov. 18, 1924.

1,516,106

G. W. LEIMAN

PUMP

Filed Feb. 24, 1923

2 Sheets-Sheet 1

Fig. 1.

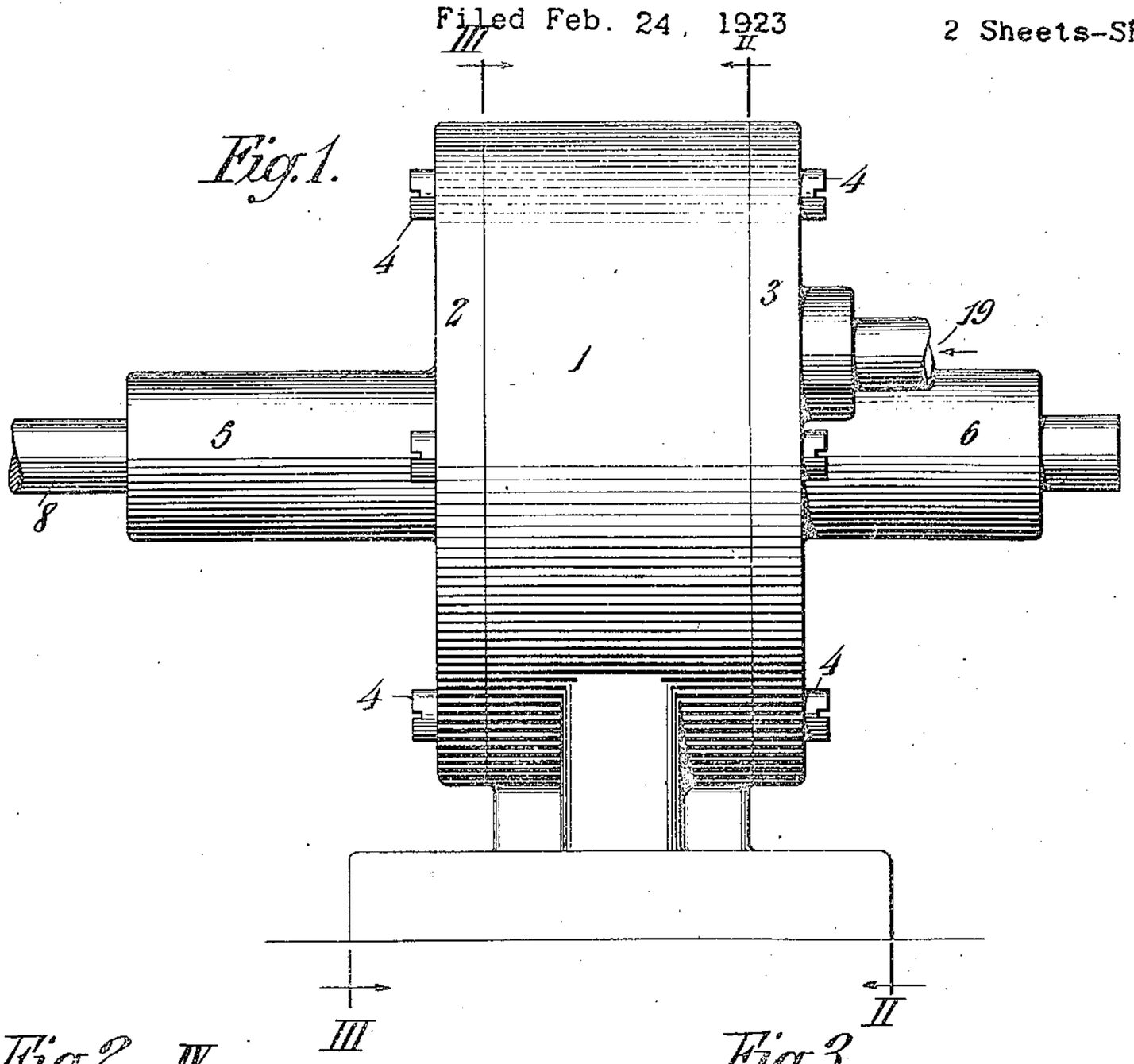


Fig. 2.

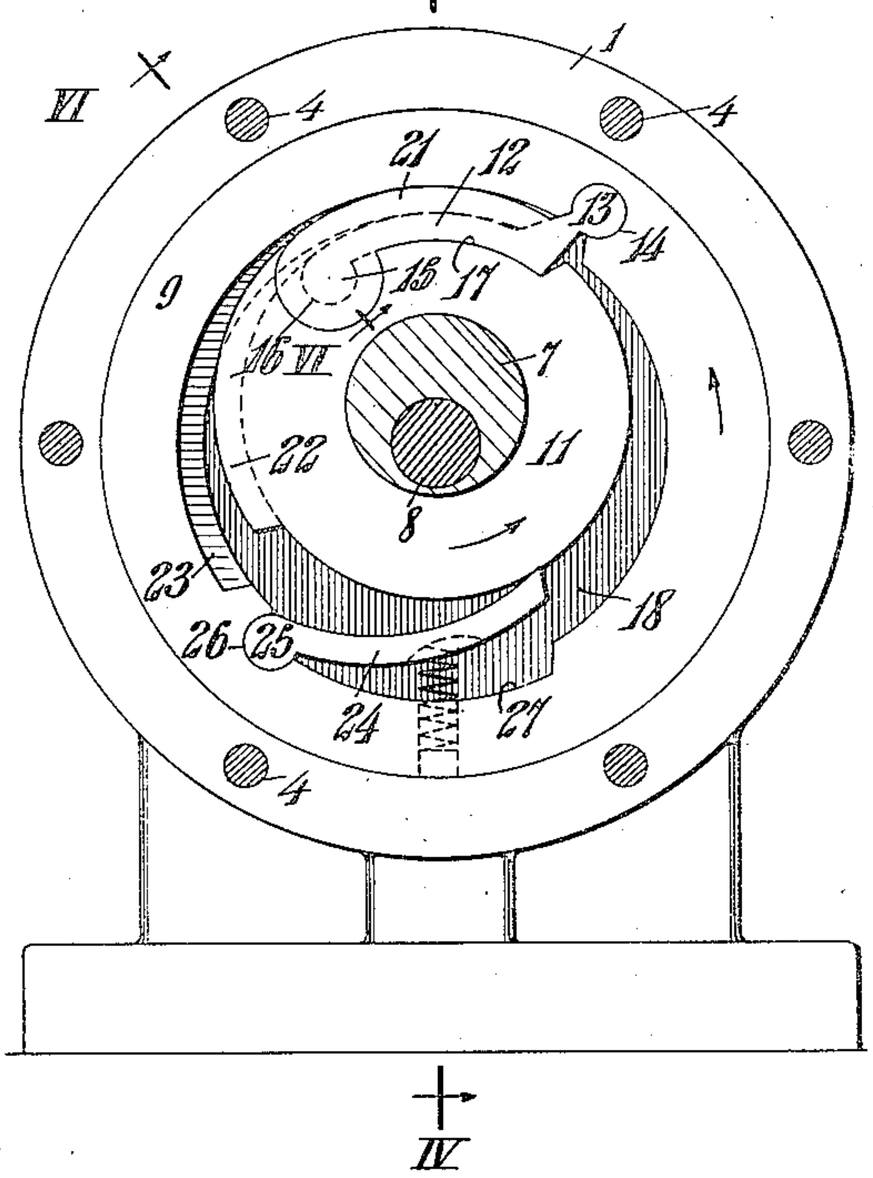
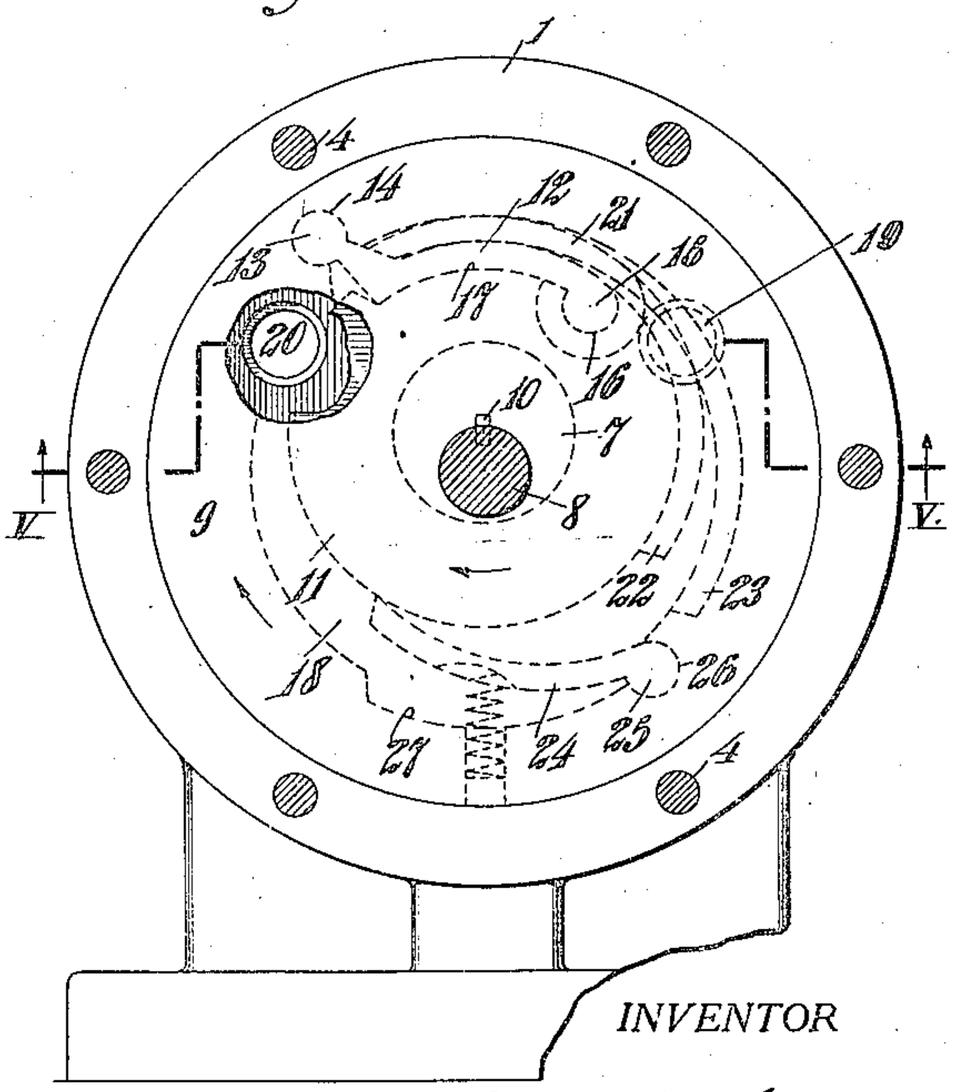


Fig. 3.



INVENTOR

George W. Leiman

by Brown & Brown

ATTORNEYS

Nov. 18, 1924.

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G. W. LEIMAN

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2 Sheets-Sheet 2

Fig. 4.

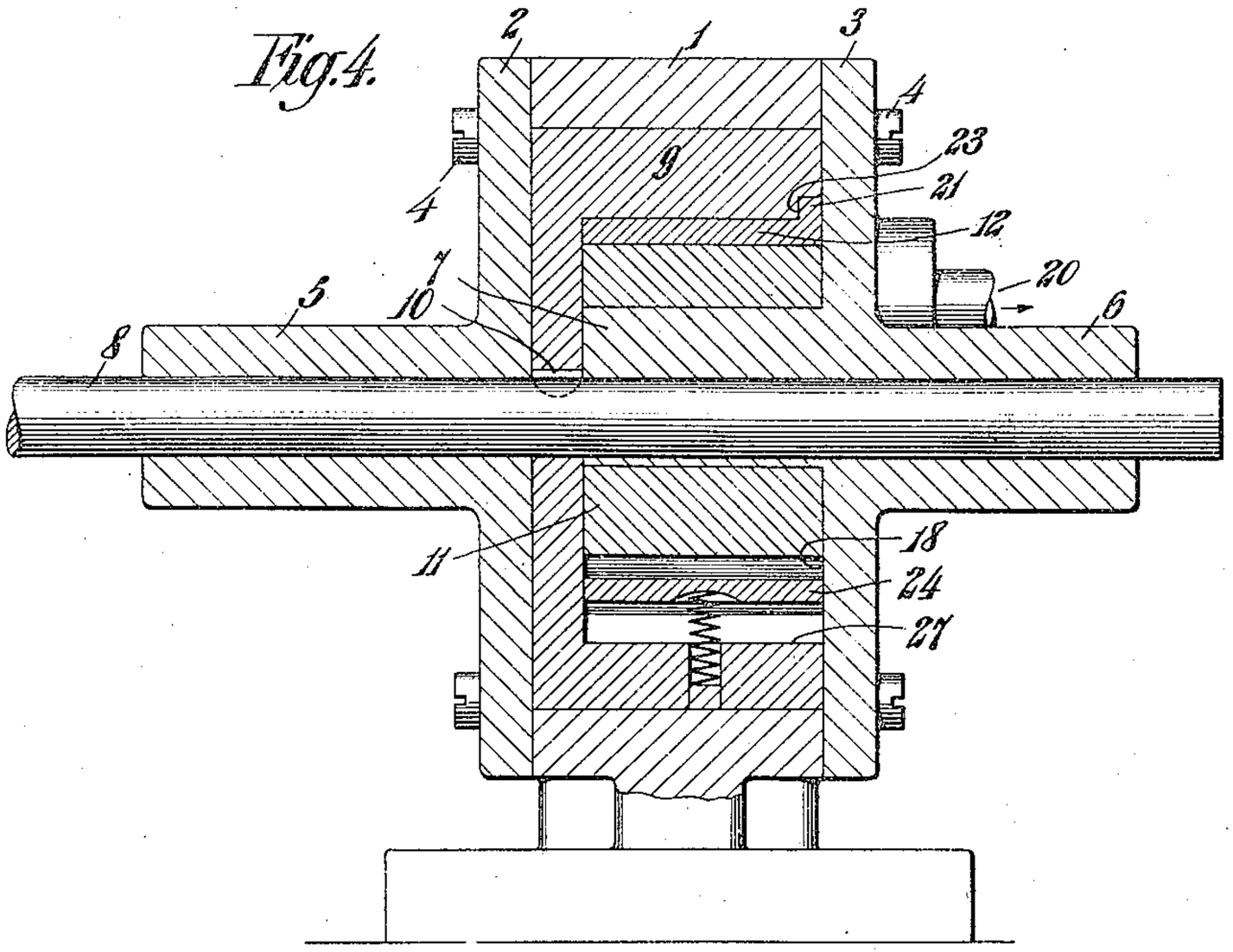


Fig. 5.

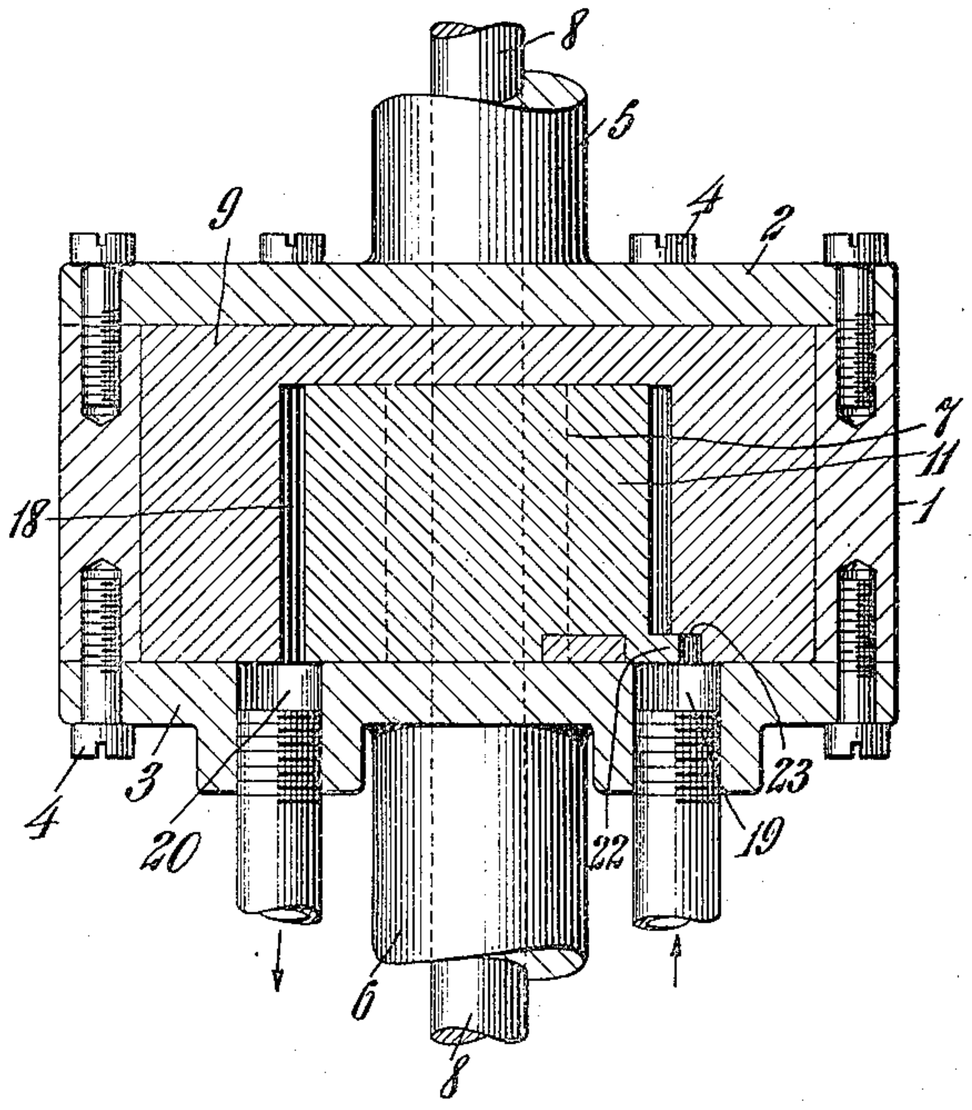


Fig. 6.

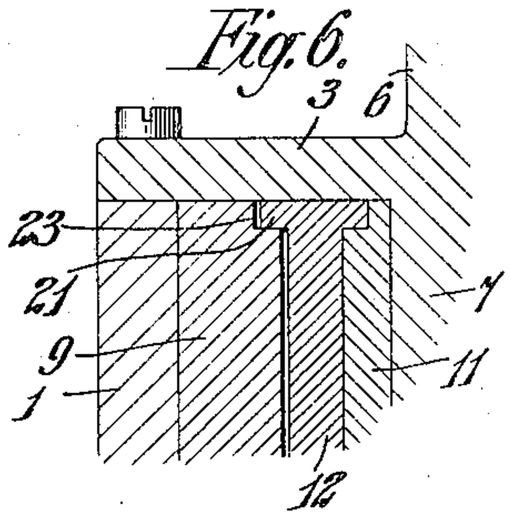


Fig. 7.

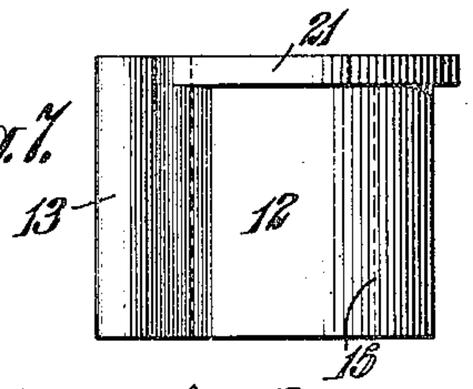
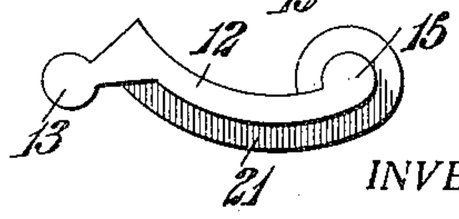


Fig. 8



INVENTOR

George W. Leiman

by Brown & Leiman

ATTORNEYS

Patented Nov. 18, 1924. 1,516,106

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. 620,883.

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 having novel construction and arrangement of the parts, whereby a high rate of speed may be attained, producing a maximum efficiency in operation with the minimum friction of the parts.

Another object is to provide a pump, the moving parts of which are so supported and balanced as to require the least amount of power and produce an efficient result.

Another object is to provide certain improvements in the form, construction and arrangement of the several 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. 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. 3 looking in the direction of the arrows.

Fig. 6 represents a detail section taken in the plane of the line VI—VI of Fig. 2 looking in the direction of the arrows.

Fig. 7 represents a side elevation of the oscillating coupling link, and

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

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 2, 3 are provided with outwardly extended hubs 5, 6 respectively. The head 3 is further provided with an inwardly extended hub 7 disposed eccentrically with respect to the wall of the casing 1.

A shaft 8 extends concentrically through the casing 1 passing through the heads 2, 3 and hubs 5, 6 and eccentrically through the hub 7.

A cup shaped element 9 is mounted to rotate in the casing 1, and secured to the shaft 8 by means of a key and spline connection 10 as shown in Figs. 3 and 4.

A rotor 11 is journaled on the hub 7 within the element 9 and mounted to rotate therewith 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 journaled in a socket 14 in the element. The other end of the link is provided with a similarly enlarged head 15 which rocks in a socket 16 in the rotor 11. The rotor is further provided with a recess 17 within which the body of the link 12 recedes when it is brought in intimate contact with the 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 exterior 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 located 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 provided with an offset portion 21, which coacts with the ports in its movement. The rotor is also provided with an arcuate offset portion 22 in alignment with the portion 21, so as to extend the contacting surface and 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 portions, when in close proximity to or contact with the element.

The chamber 18 is arranged, when in certain positions, to be divided into an inlet 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 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 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 19 in the chamber 18 between the link 12 and the wing 24 will be carried forward to the outlet 20, and forced out, the operation being repeated as the wing and link succeed each other. As the element 9 is moved from the position shown in the several figures, the link 12, by its connection, will cause the rotor 11 to travel on the hub 7, so that the link will be caused to move outwardly away from the recess 17, while the wing 24, which is diametrically opposite the link, will by its contact with the rotor be caused to recede towards its recess 17. When the members have moved substantially 180°, the body of the link will be out of its recess 17 and bridge the chamber 18, while the wing 17 will be housed in its recess 27, by its contact with the interior wall of the chamber 18. By reason of the position of the bearings and the movement of the element and the rotor, one with respect to the other, the link and wing will be caused to oscillate toward and away from their recesses as they approach and depart from the upper part of the chamber. Similarly the link and wing will move away from their recesses as they approach the bottom of the chamber and move toward their recesses as they depart from the bottom of the chamber.

It is evident that various changes may be resorted to in the form, construction 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 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, a rotor mounted in said chamber, inlet and outlet ports communicating with the chamber, and means connecting the element and rotor for moving the rotor.

2. 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, a rotor mounted in said chamber, inlet and outlet ports communicating with the chamber, and means connecting the element 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, 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 ports communicating with the chamber, and means connecting the element and rotor for moving the rotor.

4. 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 provided with a hub extending into said chamber, a rotor mounted on said hub, inlet and outlet ports communicating with the chamber, and means connecting the element and rotor for moving the rotor, said means being arranged to oscillate in the chamber.

5. 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 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 communicating with the chamber, and means connecting the element and rotor for moving the rotor.

6. 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 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 communicating with the chamber, and means connecting the element and rotor for moving the rotor, said means being arranged to oscillate in the chamber.

7. 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 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 communicating with the chamber, and a link connecting the element and rotor for moving the rotor.

8. 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 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 communicating with the chamber, and a link connecting the element and rotor for moving the rotor, said link being arranged to oscillate in the chamber.

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 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 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.

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 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 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, whereby the link may be oscillated in the 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, 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 communicating with the chamber, a link connecting the element and rotor for moving the rotor, and means on the link for opening and closing the inlet and outlet ports.

12. 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, 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 communicating with the chamber, a link connecting the element and rotor for moving the rotor, means on the link for opening and closing the inlet and outlet ports, and a recess in the element for the reception of said means.

13. 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, 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 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, 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 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 a recess in the element for the reception of said means.

15. 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, 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 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 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 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 on 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 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-

ing 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 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.

18. 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 outlet ports communicating with the chamber, a link connecting the element and rotor for moving the rotor, and a device carried by the element arranged to oscillate in the chamber and contact with the rotor.

19. 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 outlet ports communicating with the chamber, a link connecting the element and rotor for moving the rotor, and a spring actuated device carried by the element arranged to oscillate in the chamber and contact with the rotor.

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 outlet ports communicating with the chamber, a link connecting the element and rotor for moving the rotor, and a wing carried by the element arranged to oscillate in the chamber and contact with the rotor.

21. 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 outlet ports communicating with the chamber, a link connecting the element and rotor for moving the rotor, and a spring actuated wing carried by the element arranged to oscillate in the chamber and contact with the 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.