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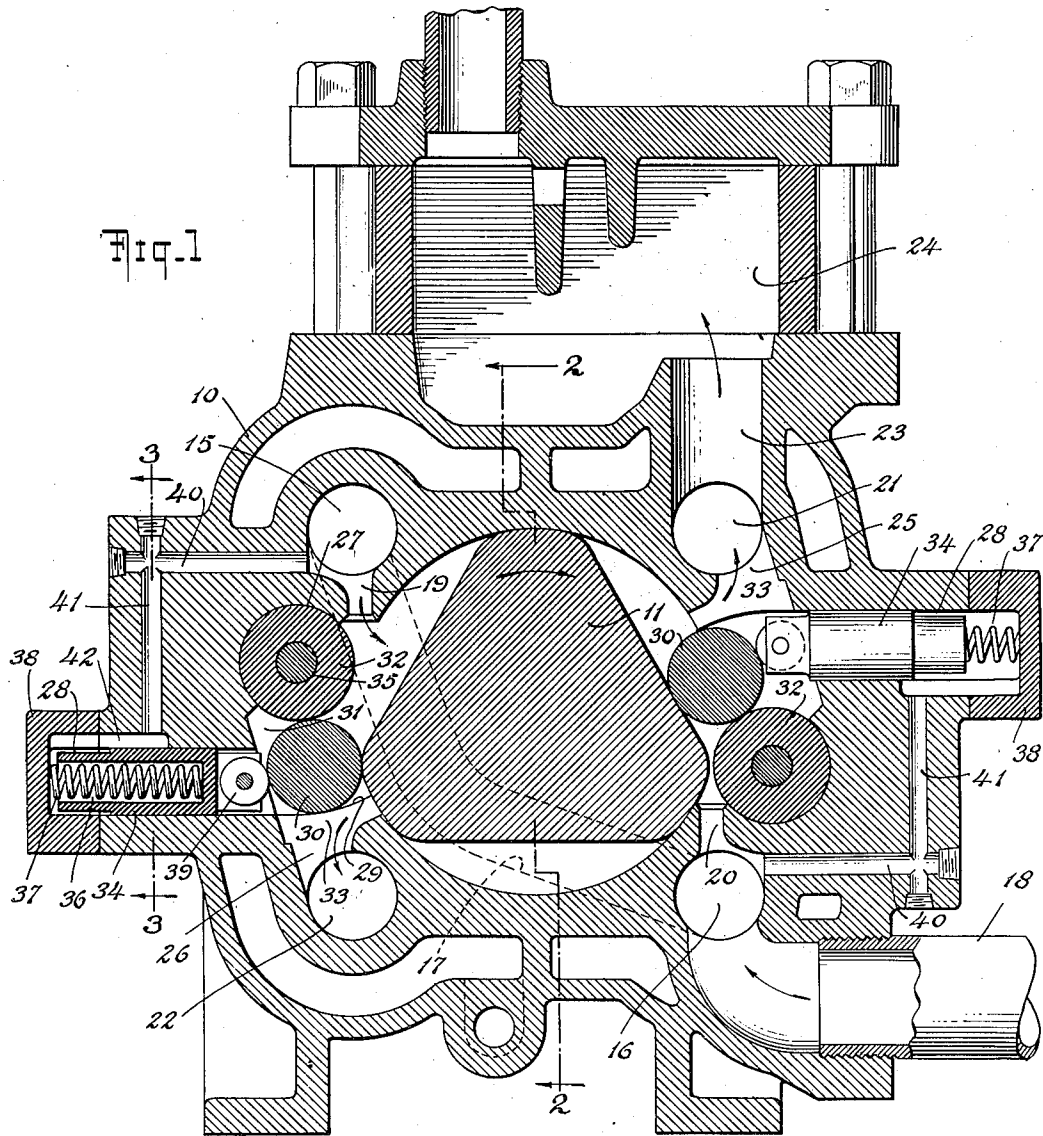
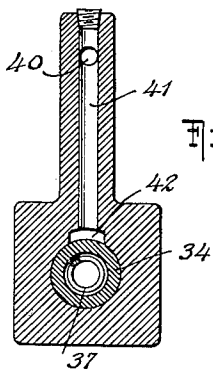
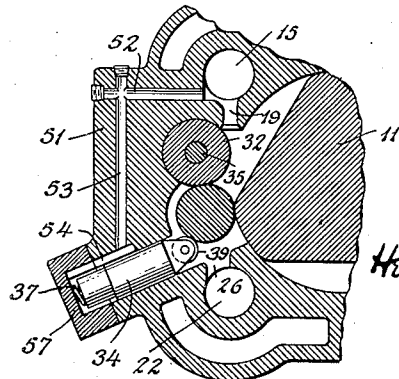
1,471,761

H. A. WEIDENBACH

ROTARY PUMP

Filed Feb. 4, 1922

2 Sheets-Sheet 1



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Fig. 2.

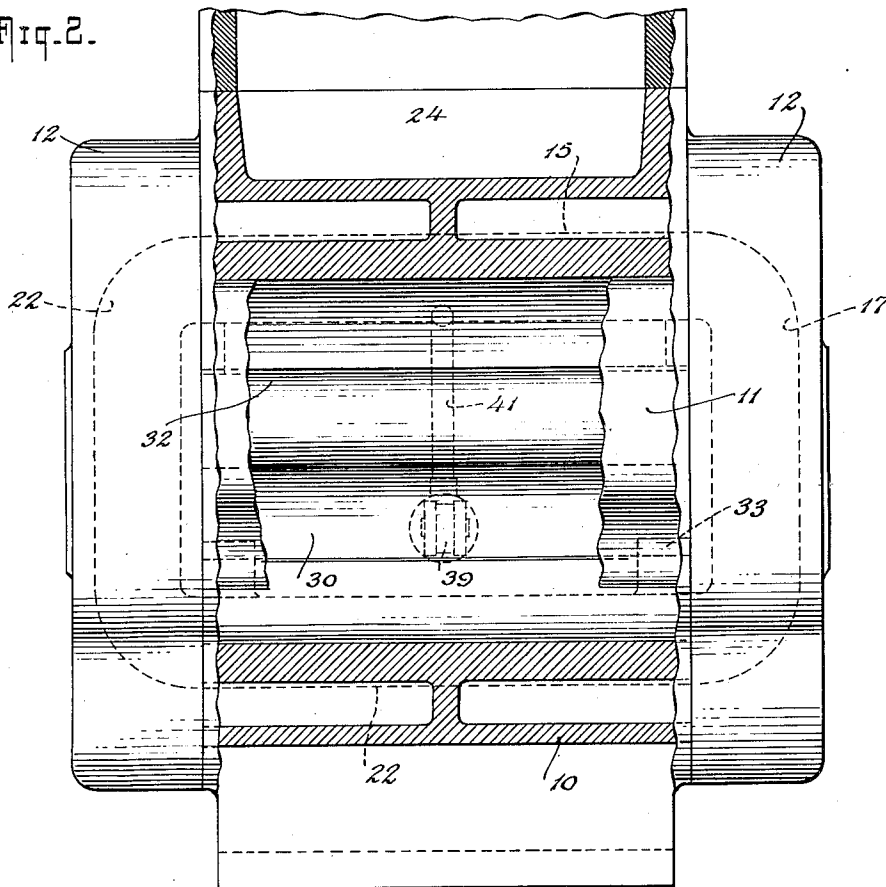
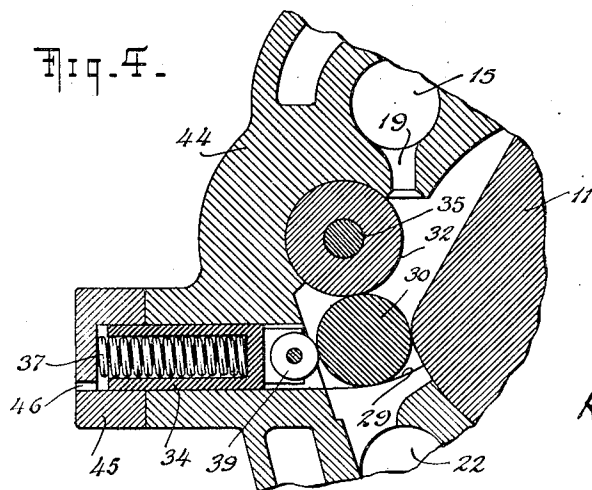


Fig. 4.



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UNITED STATES PATENT OFFICE.

HERMAN A. WEIDENBACH, OF BUFFALO, NEW YORK.

ROTARY PUMP.

Application filed February 4, 1922. Serial No. 534,139.

To all whom it may concern:

Be it known that I, HERMAN A. WEIDENBACH, a citizen of the United States of America, residing in the city of Buffalo, county of Erie, and State of New York, have invented certain new and useful Improvements in Rotary Pumps, of which the following is a full, clear, and exact description.

My invention relates generally to rotary pumps, and more particularly to valve mechanism for rotary pumps and the like.

As is well known to those skilled in the art, sliding valves are usually employed in pumps of this type; and, because of the sliding action of the valves in their seats and against the rotor, rapid wear results which greatly decreases the efficiency of the pump.

The principal object of my invention has been to provide a valve for such pumps which shall have a rolling action on all of the surfaces with which it comes in contact. This construction results in providing a pump which is not only high in its initial efficiency, but one which is very durable in operation.

Another object has been to provide a pump having a valve of such construction that it will be held in contact with the rotor of the pump by the suction produced in the pump when the rotor is in operation.

Another object has been to provide spring pressed means for keeping the valve in contact with the rotor when the rotor is not operating, whereby initial contact between the valve and the rotor will be had when the rotor is first put in operation and before a vacuum has been created at its suction side.

Furthermore, my device is such that the spring pressed means are counteracted and drawn away from the valve, during the operation of the rotor, thus eliminating all unnecessary wear by relieving any abnormal pressure upon the valve during such operation.

The above objects and advantages have been accomplished by the device shown in the accompanying drawings of which:—

Fig. 1. is a transverse, sectional view of the rotary pump embodying my invention.

Fig. 2. is a fragmentary, longitudinal, sectional view, taken on line 2—2 of Fig. 1.

Fig. 3. is a sectional view, taken on line 3—3 of Fig. 1.

Fig. 4. is a fragmentary, transverse, sec-

tional view of a modified form of my invention.

Fig. 5. is a similar view of another modified form of my invention.

My device comprises a casing 10 and a rotor 11. The rotor is mounted upon a suitable shaft and journaled in the heads 12 of the pump. The shaft of the rotor and details of the heads are not shown in the drawings since they do not form a part of my invention.

The casing 10 is provided preferably with two suction ports 15 and 16. These ports are preferably arranged diametrically opposite each other and may be connected together by means of a port 17 arranged in one of the heads. 18 is the suction pipe of the pump which is connected preferably to the suction port 16. The suction ports 15 and 16 are connected to the interior of the casing by means of suction passageways 19 and 20, respectively.

Two discharge ports 21 and 22 are also provided in the casing. These ports are preferably arranged diametrically opposite each other and may be connected together by a port 23 in one of the heads (see Fig. 2). A port 23, connects the port 21 with a discharge chamber 24 arranged on top of the casing. The discharge ports 21 and 22 are connected with the interior of the casing preferably by means of discharge passageways 25 and 26, respectively.

My improved valve mechanism is preferably arranged in suitable recesses in each side of the casing and between the adjacent discharge and suction passageways. Each of these valve mechanisms comprises a roller valve 30 which is movable back and forth in a recess 31 formed in the interior of the casing. This valve is in contact with a roller bearing 32 and is held in position by engagement with a shoulder 33 provided at each side of the casing. The radius of the arcuate surface 29 of the shoulder 33 is preferably struck from the same center as that of the roller bearing 32, so that the roller valve 30 will always be held in contact with the roller bearing. The roller bearing 32 is set into a recess 27 formed in the casing and is rotatably mounted upon a shaft 35, held preferably by the heads 12 of the casing, whereby the roller bearing may be revolved about the shaft and within the recess 27.

Arranged adjacent to each of the roller valves 30 is a plunger 34. This plunger is slideably mounted in a suitable recess 28 formed in the casing, which recess is closed at its outer end preferably by means of a cover 38 which is also recessed and forms a continuation of the recess 28. The plunger 34 is provided with a central recess 36 and a spring 37 is disposed in the recess and bears against the cover 38, whereby the plunger will be normally pressed toward the valve 30. The inner end of the plunger is preferably bifurcated and a roller 39 is carried by this end of the plunger. This roller is so arranged that it will have bearing contact with the roller valve 30 when it is pressed inwardly by the spring 37.

Each of the suction ports 15 and 16 is connected with one of the recesses 28 by means of connected passageways 40, 41, and 42. By this means the suction produced by the rotor will cause a vacuum in the recesses 28 and 36, whereby the tension of the spring 37 in the plunger will be counteracted.

In the modified form shown in Fig. 4 the plunger 34 is acted upon only by the spring 37, there being no connection between the suction port 15 of the casing 44 and the recess of the plunger. The cover 45 is preferably provided with a vent 46, through which air may pass as the plunger is moved back and forth and through which fluid may pass in the event of leakage past the plunger.

In the forms of the invention just above described the plungers are preferably arranged in a horizontal plane. In order that the roller valves 30 may be prevented from becoming displaced when the rotor is idle, it is necessary that the shoulders 33 be provided. In the form shown in Fig. 5 the plunger 34 is arranged at such an angle that its spring 37, (which keeps it normally in its upper position), will maintain the roller valve 30 in its proper position when the rotor is idle and thus prevent it from becoming displaced. In this form, the casing 51 is provided with suitable passageways 52, 53, and 54, which connect the recesses of the plunger and the casing with the suction port 15, as in the form shown in Figs. 1 to 3. In Fig. 5, 57 is the cover for closing the recess in which the plunger 34 is located.

From the foregoing, it will be understood that when the pump is idle, the plungers 34 will keep the roller valves 30 pressed against the periphery of the rotor 11 and the periphery of the roller bearing 32, thereby effectively cutting off communication between adjacent suction and discharge ports. When the rotor is operated in the direction indicated by the arrow, suction will be produced in the ports 15 and 16, and the fluid drawn in through the suction port 15 will be forced out through the discharge port 21. Likewise, the fluid drawn in through the suction

port 16 will be forced out through the discharge port 22. Since the suction ports are connected by the passageways 40, 41, and 42, with the recesses 36 and 28, the suction produced in the suction ports will create a vacuum in these passageways and recesses. It will likewise be clear that a portion of the periphery of the roller valve 30 will also be exposed to the suction produced by the revolving rotor. The spring 37 in each of the plungers 34 is so proportioned that when the suction on the exposed surface of the roller valve is sufficient to hold this valve in its operative position, the plunger will be drawn away from the roller valve. When, however, the pump is stopped, the vacuum will be relieved and the plunger will then be forced into contact with the roller valve 30 by its spring, and thereby keep the roller valve in its operative position.

In the form of my invention which is shown in Fig. 4 the spring 37 will exert a constant pressure against the roller 30 and will not be relieved when the pump is in action as is the case with the form shown in Figs. 1, 2, 3, and 5. The spring in this form need not be very much stronger than that which will be required to hold the roller valve in contact with the rotor, the pressure necessary for sealing the bearings between the rotor and roller bearing being derived from the suction acting upon the exposed surface of the roller valve.

The operation of the modified device shown in Fig. 5, in view of the foregoing description of operation of my device as shown in Figs. 1, 2, and 3, will be evident to those skilled in the art, and, therefore, I have omitted a detailed description of the operation of this modified structure. It will be noted that in Figs. 4 and 5 the parts, passageways, and ports, which correspond to those shown and described in relation to Figs. 1 to 3 are given the same numbers as those used in Figs. 1 to 3, and it is to be understood that these parts, passageways, and ports, perform like functions in the several forms shown and described.

While in the description and claims I have shown and claimed my invention as applied to rotary pumps in which it is preferably embodied, yet it is to be understood that the invention may be effectively and advantageously used in other rotary devices, such as steam, air, gas, oil, or other fluid engines. The appended claims, therefore, should not be understood to be limited to the embodiment of my invention in a rotary pump construction.

While I have shown a rotor having three working faces and two valve mechanisms with suitable ports, it is evident that my pump could be advantageously operated if the rotor were provided with more or less working faces and with a single valve mecha-

nism, or more than two valve mechanisms and a number of ports corresponding to the number of valve mechanisms employed.

Obviously, these and other modifications of the details herein shown and described may be made without departing from the spirit of my invention or the scope of the appended claims; and, I do not, therefore, wish to be limited to the exact embodiment herein shown and described, the form described being merely a preferred embodiment thereof.

Having thus described my invention, what I claim is:

1. A rotary pump comprising a casing, a rotor arranged within the casing and provided with working faces, a roller valve mounted within the casing, and a plunger for holding the valve in operative relation with the rotor only when the rotor is at rest.

2. A rotary pump comprising a casing, a rotor arranged within the casing and provided with working faces, a roller valve mounted within the casing, a plunger having rolling contact with the valve for holding it in operative relation with the rotor only when the rotor is at rest, and means controlled by the rotation of the rotor for maintaining the valve in operative relation therewith during such rotation.

3. A rotary pump comprising a casing, a rotor arranged within the casing and provided with working faces, a roller valve mounted within the casing, a spring-pressed plunger having rolling contact with the valve for holding it in operative relation with the rotor only when the rotor is at rest, and means controlled by the rotation of the rotor for maintaining the valve in operative relation therewith during such rotation.

4. A rotary pump comprising a casing, a rotor arranged within the casing and provided with working faces, a roller valve mounted within the casing, a roller bearing for the valve, and a plunger for holding the valve in operative relation with the rotor only when the rotor is at rest.

5. A rotary pump comprising a casing, a rotor arranged within the casing and provided with working faces, a roller valve mounted within the casing, a plunger for holding the valve in operative relation with the rotor when the rotor is at rest, and a roller carried by the end of the plunger for reducing friction between the plunger and the valve.

6. A rotary pump comprising a casing formed with suction and discharge ports, a rotor arranged within the casing and provided with working faces, a roller valve engageable with the rotor and arranged between the suction and discharge ports, a spring-pressed plunger for holding the valve in engagement with the rotor when the rotor is at rest, the casing being formed with

passageways connecting the suction and discharge ports with the interior of the casing, the casing being also formed with passageways connecting the suction port with a space back of the plunger, whereby the plunger will be drawn out of engagement with the roller valve when the rotor is in operation.

7. A rotary pump comprising a casing formed with suction and discharge ports, a rotor arranged within the casing and provided with working faces, a roller valve engageable with the rotor and arranged between the suction and discharge ports, a roller bearing mounted in the casing and in engagement with the valve, a spring-pressed plunger for holding the valve in engagement with the rotor when the rotor is at rest, the casing being formed with passageways connecting the suction and discharge ports with the interior of the casing, the casing being also formed with passageways connecting the suction port with a space back of the plunger, whereby the plunger will be drawn out of engagement with the roller valve when the rotor is in operation.

8. A rotary pump comprising a casing formed with suction and discharge ports, a rotor arranged within the casing and provided with working faces, the casing being formed with passageways connecting the suction and discharge ports with the interior of the casing, and a roller valve engageable with the rotor and arranged between the passageways leading to the suction and discharge ports, whereby the valve will be maintained in sealing contact with the rotor by the action of the fluid passing through the pump.

9. A rotary pump comprising a casing formed with suction and discharge ports, a rotor arranged within the casing and provided with working faces, the casing being formed with passageways connecting the suction and discharge ports with the interior of the casing, a roller valve engageable with the rotor and arranged between the passageways leading to the suction and discharge ports, and a roller bearing mounted in the casing and engageable with the valve, whereby the valve will be maintained in sealing contact with the rotor and the roller bearing by the action of the fluid passing through the pump.

10. A rotary pump comprising a casing formed with suction and discharge ports, a rotor arranged within the casing and provided with working faces, the casing being formed with passageways connecting the suction and discharge ports with the interior of the casing, a roller valve engageable with the rotor and arranged between the passageways leading to the suction and discharge ports, a spring-pressed plunger for holding the valve in engagement with the

rotor when the rotor is at rest, the casing being formed with passageways connecting the suction port with a space back of the plunger, whereby the valve will be maintained in sealing contact with the rotor, and the plunger will be drawn out of engagement with the valve by the action of the fluid passing through the pump.

11. A rotary pump comprising a casing, a rotor arranged within the casing and provided with working faces, a roller valve mounted within the casing, and a spring-pressed plunger slideably mounted within the casing and having rolling contact with the valve, the plunger being arranged at such an angle in relation to the roller valve that it will hold it in sealing contact with the rotor.

12. A rotary pump comprising a casing formed with suction and discharge ports, a

rotor arranged within the casing and provided with working faces, a roller valve engageable with the rotor and arranged between the suction and discharge ports, a spring-pressed plunger slideably mounted within the casing and arranged at such an angle in relation to the roller valve that it will hold it in sealing contact with the rotor when the rotor is at rest, the casing being formed with passageways connecting the suction and discharge ports with the interior of the casing, the casing being also formed with passageways connecting the suction port with a space back of the plunger, whereby the plunger will be drawn out of engagement with the roller valve when the rotor is operating.

In testimony whereof, I have hereunto signed my name.

HERMAN A. WEIDENBACH.