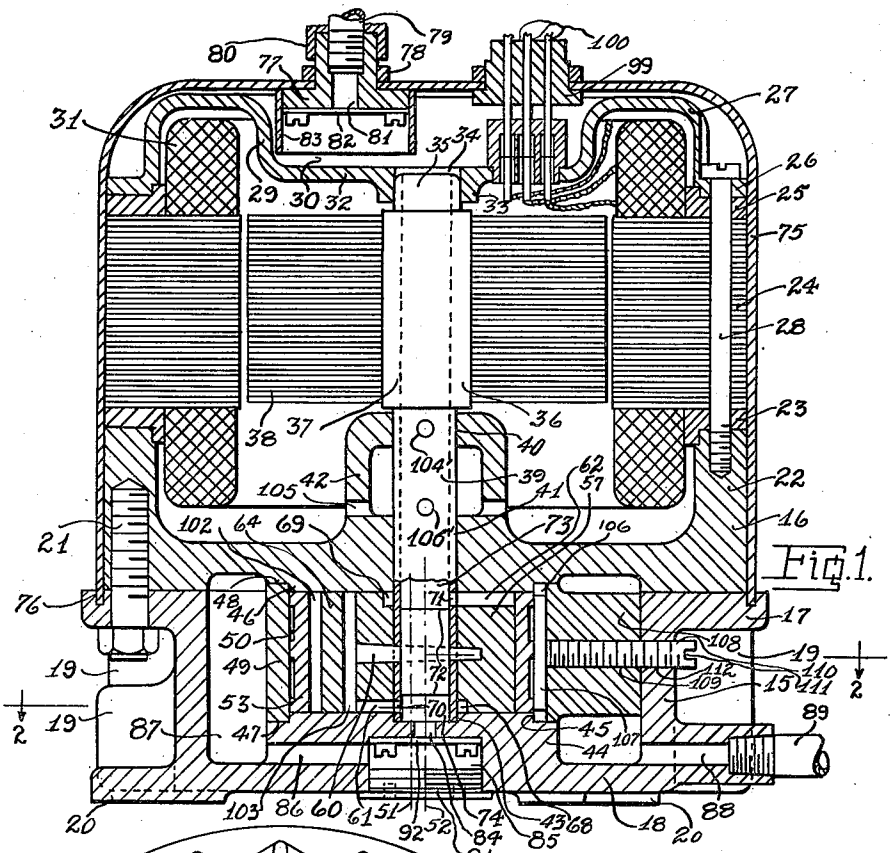
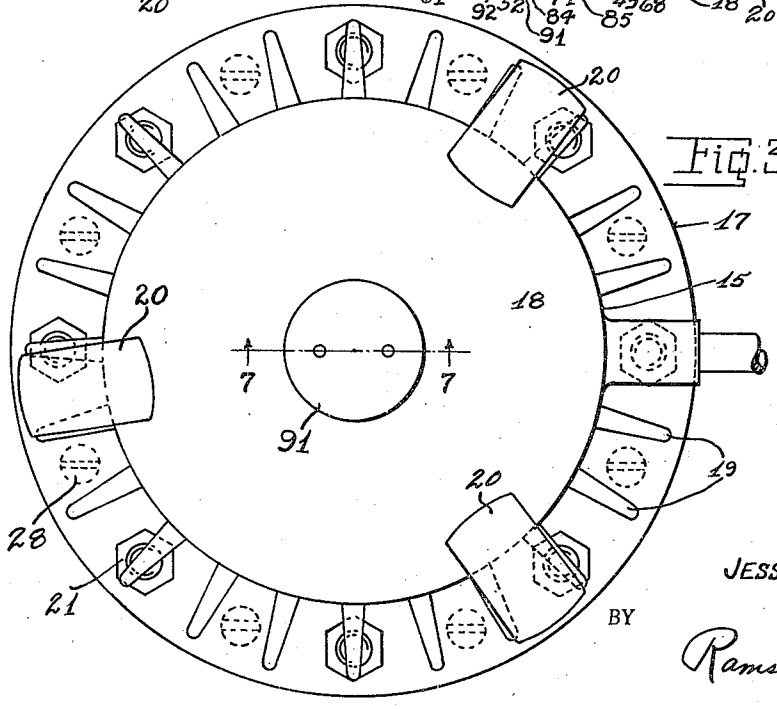
Nov. 8, 1938. J. S. WENTWORTH 2,135,881

ROTARY OSCILLATING WING VANE COMPRESSOR PUMP

Filed March 8, 1935 3 Sheets-Sheet 1





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ROTARY OSCILLATING WING VANE COMPRESSOR PUMP

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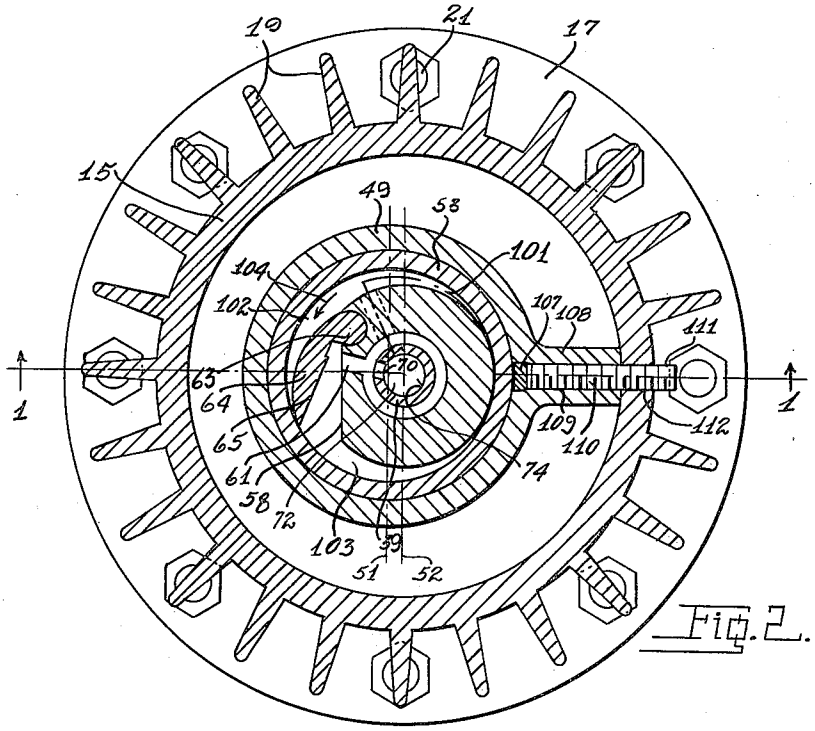


Fig. 2.

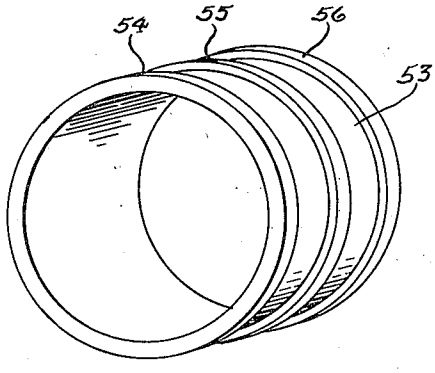


Fig. 5.

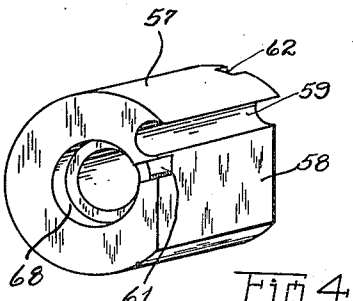


Fig. 4.

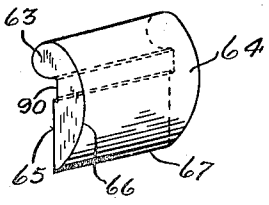


Fig. 6.

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ROTARY OSCILLATING WING VANE COMPRESSOR PUMP

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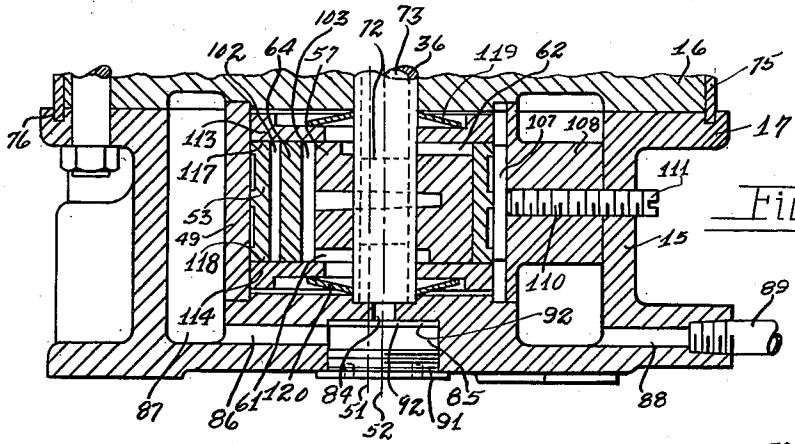


Fig. 9.

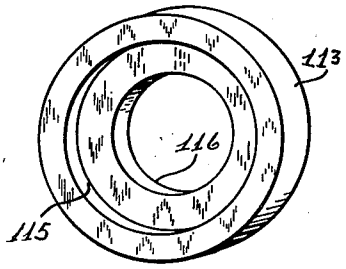


Fig. 10.

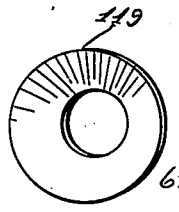


Fig. 11.

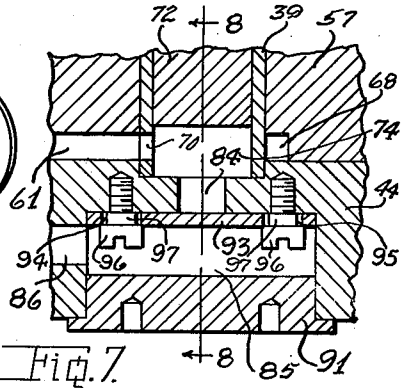


Fig. 7.

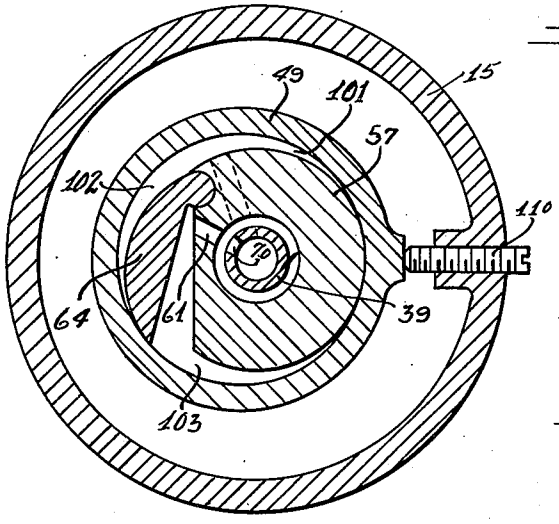


Fig. 12.

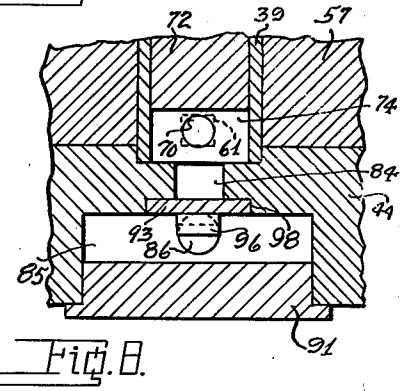


Fig. 8.

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UNITED STATES PATENT OFFICE

2,135,881

ROTARY OSCILLATING WING VANE COMPRESSOR PUMP

Jesse S. Wentworth, Cincinnati, Ohio

Application March 8, 1935, Serial No. 10,010

16 Claims. (Cl. 230—139)

This invention relates to improvements in rotary oscillating wing vane pumps such as used for compressors in connection with mechanical or electrical refrigerators delivering a fluid under pressure, and the like purposes.

The principal object of this invention is the provision of such a pump that is simple in construction, small or compact in form and low in cost of manufacture.

Another object of this invention is the provision of a pump of the above noted type which due to its small size is low in torque resistance, high in efficiency and in which the friction is reduced to a minimum.

A further object of this invention is the provision of a pump as above noted which is driven by an electric motor of a low potential thereby further reducing the cost of the compressor unit as used in mechanical or electrical refrigerators.

It is also an object of this invention to provide as a self-contained unit a combined power plant and compressor pump so designed and related to one another as to form a compact, independent unit.

Other objects and advantages of the present invention should be readily apparent by reference to the following specification considered in conjunction with the accompanying drawings forming a part thereof and it is to be understood that any modifications may be made in the exact structural details there shown and described, within the scope of the appended claims, without departing from or exceeding the spirit of the invention.

In the drawings:

Fig. 1 is a vertical sectional view through the self-contained motor and pump unit as seen from line 1—1 on Fig. 2;

Fig. 2 is a horizontal sectional view as seen substantially from line 2—2 on Fig. 1;

Fig. 3 is a bottom elevational or plan view of Fig. 1;

Fig. 4 is a perspective view of the compressor rotor showing the constructional details thereof;

Fig. 5 is a perspective view of the rotary-stator ring;

Fig. 6 is a perspective view of the oscillating wing vane which forms a detail of the invention;

Fig. 7 is an enlarged fragmentary sectional view through the pressure chamber as seen from line 7—7 on Fig. 3;

Fig. 8 is an enlarged fragmentary sectional view at right angles to Fig. 7 as seen from line 8—8 on Fig. 7;

Fig. 9 is a sectional view, similar to Fig. 1 showing a modification of the pump structure;

Fig. 10 is a perspective view of one of the closure plates for the suction and compression chambers of the modification of Fig. 9;

Fig. 11 is a perspective view of one of the spring plates utilized for completing the suction and compression chambers and for sealing said chambers against undesired losses;

Fig. 12 is a fragmentary sectional view, similar to Fig. 2, with the radiating or cooling vanes removed and illustrating a further modification of the invention.

Throughout the several views of the drawings similar reference characters are employed to denote the same or similar parts.

As was noted above it is one of the chief purposes of this invention to provide a compact compressor unit low in manufacturing cost for use with mechanical or electrical refrigerators and the like. It should be noted that this compressor is not limited in its use to refrigerator compressors but may also be used as a pressure pump and for similar purposes. It is also one of the chief purposes of the present invention to provide a combined motor and pump unit in which the parts are intimately connected and enclosed in a substantially single housing.

Specifically, the mechanism as disclosed in the drawings comprises a lower housing member 15 and an upper housing member 16 which together constitute the housing or casing for the pump itself while the upper housing 16 is also utilized as one of the end plates for the motor. The lower housing member 15 is provided on its upper end with a radial flange 17 and on its lower end with a bottom 18. Projecting from the body portion of the said housing member is a plurality of fins 19 connected at their upper ends with the undersurface of the radial flange 17. Additionally the lower housing member 15 has integral therewith a plurality of lugs or pads 20 which act as feet for the said housing member and the unit as a whole and have their supporting surface disposed below the lower plane of the housing bottom 18.

The upper housing member 16 rests on the upper surface of the radial flange 17 and is secured thereto by means of a plurality of bolts or screws 21 which pass through plane perforations in the flange 17 into threaded perforations in the housing member 16. Disposed between said housing members is a gasket (not shown) to render said joint air and pressure tight. The housing member 16 has projecting therefrom a

sleeve-like flange 22 on which is mounted a ring or plate 23 which contacts on its upper surface with the field cores 24 of the motor proper.

Contacting with the upper end of the said field cores 24 is a ring or plate 25, which is similar to the plate 23, and the said plate 25 is disposed beneath a radial flange 26 of the motor end plate 27. The radial flange 26, rings 25 and 23, and field cores 24 are each provided with a plurality of circumferentially spaced axially aligned plane bores in axial alignment with threaded bores formed in the sleeve flange 22 of the upper housing member 16. Through each of these aligned plane bores extends screw or bolt 28 having its lower end threaded into one of the threaded bores for securing said parts to one another and for securing the field cores 24 in operative position.

The motor end plate 27 is provided within its periphery with a depressed dish-like portion 29 for providing a chamber 30 within the field coils 31. The bottom 32 of the dish-like portion 29 is provided with a lug or boss 33 in which is formed a bore 34 receiving the reduced portion 35 of the hollow motor-drive shaft 36.

The motor-drive shaft 36 is provided adjacent the reduced portion 35 with an enlarged portion 37 to which is secured in the usual manner the armature 38 of the motor which is positioned in operative relation to the field cores 24. Below the enlarged portion 37 the motor shaft 36 is again reduced as at 39 and passes through bores 40 and 41 formed at opposite ends of a cored boss 42 projecting upwardly from the housing member 16. The lowermost end of the motor shaft 36 is seated in a counter bore 43 formed in an upstanding pad or lug 44 of the bottom 18 of lower housing member 15.

The lug or pad 44 of the lower housing 15 has provided thereon a turned circular boss 45 which is opposed to a turned circular boss 46 depending from the housing member 16. The said turned circular bosses 45 and 46 have respectively formed therearound a seating face 47 and 48 on which rest the ends or faces of a sleeve 49 which sleeve is pressed onto the turned bosses 46 and 47 and clamped thereto by the bolts or screws 21. By this construction there is provided interiorly of the sleeve 49 a chamber 50 through which passes the motor-drive shaft 36.

By reference to Fig. 1 it will be seen that the axis about which the bosses 45 and 46 are turned and therefore the axis of the chamber 50 is eccentric to the axis of the motor-drive shaft 36, and these axes are respectively indicated by the reference numerals 51 and 52. Disposed within the chamber 50 is a ring 53, illustrated in detail in Fig. 5, having formed on its outer surface a plurality of bearing rings or lands, shown in the drawings as three in number, and respectively indicated by reference numerals 54, 55 and 56. The purpose of these bearing rings or lands is to reduce the surface contact and therefore the friction between the said ring and inner wall of the sleeve 49 while at the same time maintaining said ring in operative position. As will later be made clear the ring 53 constitutes a rotatable housing member for the pump mechanism. As will be appreciated, the axis of the ring 53 is concentric with that of the sleeve 49 and is therefore eccentric to the axis for the motor-drive shaft 36.

Within the ring 53 is the pump rotor 57, illustrated in detail in Fig. 4, having formed, in the case of a single wing vane pump, along one side thereof a flat 58 and a circular bearing 59 at one end of said flat. The rotor 57 is secured in any desirable manner to the motor-drive shaft 36 such as by a tapered pin 60 shown in Fig. 1. The opposite ends of the rotor 57 are each respectively provided with a passage 61 and 62 the former of which constitutes the exhaust or pressure port while the latter constitutes the intake or suction port.

Received in the circular bearing 59 of the rotor 57 is the trunnion 63 of the wing vane 64, illustrated in detail in Fig. 6, provided on its under side with a flat face 65 adapted to seat on the flat 58 of the rotor 57. The outer surface of the vane is arcuate as at 66 so as to substantially complete the outer periphery of the rotor 57 when in fully closed position. The free end of the wing vane 64 terminates in a feather edge 67 which contacts with the inner surface of the rotatable stator ring 53. The flat face 65 is provided adjacent the trunnion 63 with groove or recessed portion 90, which as will later be made clear, prevents the wing vane from being held closed by suction.

As will be seen from Fig. 2 the discharge port or passage 61 is disposed closely adjacent to the trunnion bearing 63 of the wing vane so as to be substantially closed thereby when the said wing vane is seated on the flat 58. The said discharge passage 61 as well as the suction or intake port 62 respectively terminate at their inner ends in recesses 68 and 69 formed in the end faces of the rotor 57. The said recesses 68 and 69 in turn respectively communicate with the hollow interior of the motor-drive shaft 36 by way of ports 70 and 71 formed through the wall of said motor-drive shaft 36 on opposite sides of a plug 72 which is driven into the said motor-drive shaft for dividing same into a suction or supply conduit 73 on the upper side of the said plug and a discharge or compression conduit 74 on the lower side of said plug.

The motor proper is additionally enclosed within a housing or cover 75 which has its lower ends hermetically sealed in a groove 76 formed in the radial flange 17 of housing member 15. Secured to and interiorly of the cover 75 and terminating within the motor plate dish 29 is a bonnet or ferrule 77 held in place by a nut 78 disposed exteriorly of the said cover 75. Threaded or otherwise secured to the bonnet 77 is a supply pipe 79 around which is provided suitable packing held in place by packing nut 80. The pipe 79 communicates with a port 81 through the bonnet 77 which is controlled by a suitable valve here shown as a substantially flat spring member 82. Depending from the bonnet 77 is a radial flange or skirt 83 which confines the possible spraying of the gas or fluid entering the chamber 30 through the port 81.

The discharge conduit 74 of the motor-drive shaft 36 communicates with a port 84 which in turn empties into a compression recess or chamber 85 formed in the boss or pad 44. The recess 85 in turn communicates with a horizontal port 86 emptying into the chamber 87 formed between the inner surface of the housing member 15 and outer surface of the ring 49. This chamber 87 in turn communicates with a horizontal port 88 having connected with its outer end one end of a pipe or conduit 89 which acts as the final discharge conduit from the pump. The compression or exhaust chamber 85 is closed or completed by a plug 91 threaded into the bottom 18 of the lower housing member 15.

To prevent reverse flow through the port 84 there is provided a one-way check valve 92 which is substantially identical in construction with the check valve 82 and which valves will now be described in detail although, it should be understood, other types of valves could be used in their stead. This detailed description will be given with respect to the valve member 92 which is shown in enlarged and exaggerated form in Figs. 7 and 8 and is formed from a piece of flat spring steel 93. Near its opposite ends the member 93 is provided with apertures 94 and 95 through each of which a bolt or screw 96 passes into the boss or pad 44 of the lower housing. Each of the bolts or screws 96 is provided beneath its head with a circular collar 97 of a diameter less than that of the aperture through which it passes and of a height comparable to the thickness of the valve member in order that said valve member may be held to its seat without binding same. As seen particularly from Fig. 8 each valve member is disposed in groove 98 having a width substantially equal to the width of the valve member. By this construction an effective valve is provided with a seat entirely around the port it controls which will readily give under pressure or suction to permit a flow through its port but be readily held to its seat by the pressure on the outer side thereof.

The cover or housing 75 is provided with a cable or electric wire inlet 99 through which the electrical wires 100 pass to be electrically connected with the field of the motor. This electrical inlet 99 is suitably sealed against the passage of any air or the like which would interfere with the suction of the gases to the compressor pump.

From the foregoing it will be noted that there has been provided a combined or unitary pump and motor mechanism in which use is made of a central housing or plate member which forms on one side thereof the motor chamber and on the other side the pump chamber. The motor chamber is completed by a motor end plate or second housing member while the pump chamber is completed by the base of the unit or a third housing member. It will also be noted that a single shaft or member is employed as the motor shaft, the pump drive shaft and the immediate supply and exhaust conduits for the pump.

The operation of the mechanism is as follows:

The motor armature 38 is started for rotating the shaft 36 and, therefore, the compressor pump rotor 57. As soon as the rotor 57 reaches the desired speed the oscillating vane 64 under centrifugal force swings outwardly to cause the feather edge 67 to engage the wall of the ring 53 thereby dividing the interior or chamber 101 of the ring into a suction chamber 102 and compression chamber 103. It should be noted that the parts are rotating in a counterclockwise direction or in the direction of the arrow 104 in Fig. 2, thereby, with the parts in the relation shown, enlarging the suction chamber 102 and reducing the compression chamber 103.

The enlarging of the suction chamber 102 creates a vacuum therein which is filled by drawing thereto any gas or fluid that may be within the housing 75 and at the same time drawing the check valve 82 from its seat and additional gases and fluid through the supply pipe 79.

The reducing of the compression chamber 103 causes a compression of the gases and fluid trapped therein and a forcing of this gas or fluid while under pressure through the exhaust port 61 of the rotor 57 through the hollow interior of the shaft 36 or exhaust conduit 74, below the plug 72 of course, and port 84 into the cavity or chamber 85, port 86, interior 87 of the housing 15, port 88 and discharge pipe or conduit 89. It will be noted that as the parts are moving in the direction above indicated the chamber 103 is not only being reduced but the wing vane 64 is being urged to its innermost position which acts as a pump member for further compressing the gases and fluid as same are passing through the port 61. The interior 87 of the housing 15 acts as a pressure storage space or reservoir from which the compressed gas or fluid is taken through the discharge pipe or conduit 89.

As the rotor 57 continues to move it reaches the point where the present suction and compression chambers are merged into one which will mean that the wing vane is completely closed and at a point substantially diametrically opposite to that shown in Fig. 2. Continued movement of the rotor beyond this point will again permit the wing vane to engage the inner wall of the rotor for establishing a suction chamber and an exhaust chamber whereupon the circuit flow is again completed as just described.

It should be noted and as was mentioned above that the axis of the hollow motor shaft 36 and therefore the rotor 57 is offset or eccentric to the axis of the rotary-housing ring 53 and therefore to the axis of the sleeve or stator housing 49. As shown in the drawings, particularly Figs. 1 and 2, the axis of the motor shaft 36 and rotor 57 is indicated by the reference numeral 52 while the axis of the ring 53 and sleeve 49 is indicated by the reference numeral 51. By this construction the rotor 57 tangentially contacts with the inner wall of the ring 53 and provides, within the ring 53 on opposite sides of the contact line, the chamber 101 which, as was above noted, is divided by the wing vane 64 into two chambers, a compression chamber 103 and a suction chamber 102. By having the housing 53 as a movable ring it rotates with the rotor 57 but due to the difference in diameters of said parts and the frictional tangential contact thereof they are rotated at different speeds thereby causing the vane to continuously advance in a reverse direction relative to the ring and thereby reducing the frictional resistance of these parts to a minimum.

In order to properly lubricate the bearings of the motor-drive shaft 36 there is introduced into the system along with the gases and fluid, a dehydrated lubricating oil which will enshroud the bearings and the parts and thereby reduce to a minimum any frictional resistance that may exist at these points. This lubricant-impregnated gas or fluid is delivered to the shaft bearings in the several housing members either directly or through a suitable oil hole which is indicated in the drawings by the reference numeral 104'. In the event there is an excess of this oil or lubricant it will be collected within the upper housing 16 and will settle around the cored boss 42. This collection may be drawn off through a suitable bore 105 formed through the boss 42 and communicating with the interior of said boss and a port 106' formed through the shaft 36, and therefore the suction chamber 51.

It will be appreciated that at the end of the compression chamber 103, at the point of tangential engagement between the rotor 57 and inner surface of the rotor-stator ring 53, the maximum compression pressure will take place. This may have a tendency to slightly

spring or compress the wall of said rotor-stator ring and thereby permit a loss of compression. To overcome or prevent this possibility the sleeve 49 is provided at this point of contact with a vertical keyway 106 in which is mounted a key or bar 107. Extending from the outer surface of the sleeve 49, see Figs. 1 and 2, is a web or lug 108 having formed therethrough a threaded aperture 109 in which is disposed a screw 110. The outer, slotted end 111 of this screw passes through a perforation 112 formed in the wall of the housing 15. By this construction suitable counter-acting pressure may be applied to the key or rail 107 against the outer surface of the rotor-stator ring 53 to prevent any springing thereof due to the compression pressure as above mentioned. It should also be noted that this pressure is great enough to insure proper contact of the rotor-housing ring and rotor but does not interfere with its rotation as above explained.

To assist the outward oscillating movement of the wing vane 64 and insure its free end at all times contacting and engaging the inner surface of the rotor-housing ring the said ring has been magnetized and exerts a magnetic pull on the wing vane. By this construction the wing vane is at all times held in its proper position against the inner surface of the rotor-housing ring but is not prevented or in anywise interfered with so far as its actuation toward the rotor is concerned.

To further insure the free movement of the wing vane 64, particularly at the beginning of each rotation of the rotor as it passes the point or line contact thereof with the inner surface of the rotor-housing ring, it is provided on its under surface with a groove 99 which extends the full length thereof. It will be seen from Fig. 2 that this groove overlaps the compression port or passage 61 in the rotor 57 when the said wing vane is in fully closed position. By this construction any possible suction through the said port 61 is broken which would tend to hold the wing vane in a closed position on the rotor seat 58.

In the modification shown in Fig. 9 the chambers 101, 102 and 103 within the rotor-housing ring 53 are not completed by the opposed bosses 45 and 46 but by additional means which in effect mount the whole pump on the motor-drive shaft. As illustrated in Fig. 9 these chambers are completed or closed by a pair of end plates indicated respectively by reference numerals 113 and 114 one of which plates is illustrated in detail in Fig. 10. As shown in Fig. 10 each of these rings is provided with a counter bore or recessed portion 115 and a central bore 116. It will be noted, particularly from Fig. 9, that the bore 116 is relatively large which is to take care of the eccentricity in the axes of the motor-drive shaft 36 and housing ring 53. These end plates 113 and 114 respectively contact the upper and lower surfaces 117 and 118 of the rotary-housing ring 53 with sufficient pressure to form a seal and prevent any escape from the chamber or chambers within the ring. In order to hold the said end plates in sealing engagement, the motor shaft 36 has pressed thereon spring washers 119 and 120 which, as shown in Figs. 9 and 11, are bulged or dish-shaped so that their outer peripheries exert a pressure on the plates for holding them against the said surfaces 117 and 118 of the stator ring. By this construction any wear that may take place due to the frictional contact of the ring and end plates is readily taken up. Additionally, the said spring washers and their end plates would act as safety valves to relieve an excessive amount of pressure within said ring should such an emergency arise.

By the construction just described it will be noted that the entire pump mechanism is substantially carried by the motor-drive shaft 36, the rotor by being pinned or otherwise secured thereto and the rotor-housing ring through the agency of the bulged or cup-shaped spring washers 119 and 120. The spring washers 119 and 120, however, exert only enough pressure to hold the end plates in sealing engagement but permit a slight slippage of said parts as will be effected by the rotation of the rotor-housing ring by the rotor.

In Fig. 12 there is shown a modification of the invention in that the rotary-housing ring 53 is dispensed with and in its stead the inner wall of the sleeve or ring 49 is used as the trackway for the oscillating wing vane. This type of structure would in general be similar to that shown in Fig. 1 in that the end plates 113 and 114 would be dispensed with and use would be made of the base of the motor housing for completing the suction and pressure chambers on the upper end while similarly the upper surface of the lower housing boss or pad 44 would complete said chambers at the lower end.

In prior art structures utilizing an oscillating wing vane the gas or fluid to be compressed was forced outwardly through a peripheral port wherefore the centrifugal action of the rotor did not effect the maximum compression of the said gas or fluid. It will be noted that by the structure disclosed in the present application this gas or fluid is compressed by drawing same toward the axis of rotation of the rotor which will nullify the centrifugal force thereon as effected by the rotation of the rotor. It will, therefore, be noted that the gas or fluid is more solidly compressed by the action of the mechanism disclosed in this application which compressed gas or fluid is further acted on by the wing vane just prior to its complete extrusion through the outlet port to the center of rotation of the rotor.

From the foregoing it is believed now evident that there has been provided a combined electric motor and compressor pump unit in which the parts are of relatively simple construction and may be assembled into a small compact unit. It will also be noted that this mechanism will fully accomplish the objects initially set out above.

What is claimed is:

1. In a mechanism of the class described the combinaiton of a pair of superimposed housing members, said housing members each having an opposed circular boss, a sleeve having its opposite ends disposed on said circular bosses and forming interiorly thereof a pump chamber, means securing the housings to one another and securing the sleeve therebetween, a bored shaft extending through the sleeve and rotatably journaled in said housings and having its axis eccentric to the axis of the sleeve, a rotor secured to said bored shaft within the pump chamber, an oscillatable wing vane oscillatably journaled on said rotor for swinging movement relative thereto into engagement with the walls of the pump chamber and forming ahead of it during its rotation a compression chamber and behind it a suction chamber, a plug within the bore of the shaft for dividing same into a suction con-

duit on one side of the plug and an exhaust conduit on the other side thereof, and means connecting said conduits respectively with the suction and compression chambers.

2. In a mechanism of the class described the combination of a pair of superimposed housing members, said housing members each having an opposed circular boss, a sleeve having its opposite ends disposed on said circular bosses and forming interiorly thereof a pump chamber, means securing said housings to one another and securing the sleeve therebetween and thereby forming a chamber within said housing members around said sleeve, a bored shaft extending through the sleeve and rotatably journaled in said housings and having its axis eccentric to the axis of the sleeve, a rotor secured to said bored shaft within the pump chamber, an oscillatable wing vane oscillatably journaled on said rotor for swinging movement relative thereto into engagement with the walls of the pump chamber and forming ahead of it during its rotation a compression chamber and behind it a suction chamber, a plug within the bore of the shaft dividing same into a suction conduit on one side of the plug and an exhaust conduit on the other side thereof, means connecting said conduits respectively with the suction and compression chambers, a recess formed in one of the housings and communicating with the exhaust conduit of the shaft to receive the compressed gas or fluid, and ports connecting the recess with the interior of the housing whereby said recess and housing are filled with compressed gas or fluid.

3. In a mechanism of the class described the combination of a pair of superimposed housing members, said housing members each having an opposed circular boss, a sleeve having its opposite ends disposed on said circular bosses and forming interiorly thereof a pump chamber, means securing said housings to one another and securing the sleeve therebetween and thereby forming a chamber within said housing members around said sleeve, a bored shaft extending through the sleeve, and rotatably journaled in said housings and having its axis eccentric to the axis of the sleeve, a rotor secured to said bored shaft within the pump chamber, an oscillatable wing vane oscillatably journaled on said rotor for swinging movement relative thereto into engagement with the walls of the pump chamber and forming ahead of it during its rotation a compression chamber and behind it a suction chamber, a plug within the bore of the shaft dividing same into a suction conduit on one side of the plug and an exhaust conduit on the other side thereof, means connecting said conduits respectively with the suction and compression chambers, a recess formed in one of the housings and communicating with the exhaust conduit of the shaft to receive the compressed gas or fluid, ports connecting the recess with the interior of the housing whereby said recess and housing are filled with compressed gas or fluid, and a one-way check valve in said recess to prevent reverse flow through the exhaust conduit.

4. In a mechanism of the class described the combination of a pair of superimposed housing members constituting the pump housing, said housing members each having a circular boss projecting toward one another, a sleeve carried by said bosses and forming a circular pump chamber, a rotary-housing ring within said chamber, a rotor within said ring, a bored drive shaft for said rotor and journaled in bearings provided by the housing members, an oscillating wing vane oscillatably mounted on the rotor, the axis of the shaft and rotor being eccentric to the axis of the ring and pump chamber and the oscillatable wing vane being actuated about its bearings by the centrifugal force, due to rotation of the rotor, into engagement with the inner wall of the rotary-stator ring and forming on opposite sides thereof a compression chamber and an exhaust chamber respectively, a plug dividing the hollow drive shaft into an intake conduit on one side of said plug and an exhaust conduit on the other side of said plug and respectively connected with the suction chamber and compression chamber, and a one-way check valve associated with each of said conduits to prevent reverse flow therein.

5. In a mechanism of the class described the combination of a pair of superimposed housing members constituting the pump housing, said housing members each having a circular boss projecting toward one another, a sleeve carried by said bosses and forming a circular pump chamber, a rotary-housing ring within said chamber, a rotor within said ring, a bored drive shaft for said rotor and journaled in bearings provided by the housing members, an oscillating wing vane oscillatably mounted on the rotor, the axis of the shaft and rotor being eccentric to the axis of the ring and pump chamber and the oscillatable wing vane being actuated about its bearings by the centrifugal force, due to rotation of the rotor, into engagement with the inner wall of the rotary-stator ring and forming on opposite sides thereof a compression chamber and an exhaust chamber respectively, a plug dividing the hollow drive shaft into an intake conduit on one side of said plug and an exhaust conduit on the other side of said plug and respectively connected with the suction chamber and compression chamber, a one-way check valve associated with each of said conduits to prevent reverse flow therein, and a pair of end plates one at each end of the stator and rotary-housing yieldably held in engagement with the ends of the rotor to complete the suction and compression chambers while permitting the rotation of the rotary-housing ring with the rotor.

6. In an oscillating wing vane compression pump the combination of a circular pump housing having a circular cavity therein, a ring within said cavity and constituting a rotary-housing member, a hollow shaft extending through the interior of the housing ring, a rotor attached to said shaft and having on one side thereof a line contact with the interior of the ring to form a pump chamber on opposite sides of said line contact, an oscillatable wing oscillatably mounted on said rotor for swinging movement relative thereto, the axis of the rotor and shaft being eccentric to the axis of the ring whereby rotation of the rotor through centrifugal force causes the wing to swing into contact with the ring and form respectively on opposite sides thereof a suction chamber and compression chamber, said chambers having their other boundary defined by the line contact of the rotor with the rotor housing ring, end plates adjacent the opposite ends of said ring to complete the suction and exhaust chambers therein, said end plates having enlarged apertures through which passes the hollow shaft to permit independent rotation of the rotor and rotary-housing ring and yielding

cup-shaped means carried by the shaft for engagement with the end plates to hold same in sealing contact with the ring, to take up possible wear therebetween and to prevent communication through the enlarged end plates' apertures.

7. In an oscillating wing vane compression pump the combination of a circular pump housing having a circular cavity therein, a ring within said cavity and constituting a rotary-housing member, a hollow shaft extending through the interior of the housing ring, a rotor attached to said shaft and having on one side thereof a line contact with the interior of the ring to form a pump chamber on opposite sides of said line contact, an oscillatable wing oscillatably mounted on said rotor for swinging movement relative thereto, the axis of the rotor and shaft being eccentric to the axis of the ring whereby rotation of the rotor through centrifugal force causes the wing to swing into contact with the ring and form respectively on opposite sides thereof a suction chamber and compression chamber, said chambers having their other boundary defined by the line contact of the rotor with the rotor housing ring, end plates adjacent the opposite ends of said ring to complete the suction and exhaust chambers therein, said end plates having enlarged apertures through which passes the hollow shaft to permit independent rotation of the rotor and rotary-housing ring yielding cup-shaped means carried by the shaft for engagement with the end plates to hold same in sealing contact with the ring, to take up possible wear therebetween and to prevent communication through the enlarged end plates' apertures, a plug disposed in the hollow shaft for dividing some into a suction and an exhaust conduit, and said rotor having a port formed in the opposite faces located respectively on opposite sides of the wing vane for respectively connecting the suction and compression chambers through ports in the shaft with the suction and exhaust conduits of said shaft.

8. In a combined motor and pump unit the combination of a plurality of housing plate members secured to one another in spaced-apart relation to form independent non-communicating motor and pump compartments, a single hollow motor-drive shaft rotatably journaled in said housing plate members, a plug within the bore in the hollow motor-driving shaft for dividing same into supply and exhaust ports on opposite sides thereof a supply chamber formed in one of said housing plate members communicating with one end of the hollow motor-drive shaft and the supply port thereof, and an exhaust chamber formed in another of said housing plate members communicating with the other end of the hollow motor-drive shaft and the exhaust port thereof.

9. In a combined motor and pump unit the combination of a plurality of housing plate members secured to one another in spaced-apart relation to form independent non-communicating motor and pump compartments, a single hollow motor-drive shaft rotatably journaled in said housing plate members, a plug within the bore in the hollow motor-drive shaft for dividing same into supply and exhaust ports on opposite sides thereof, a supply chamber formed in one of said housing plate members communicating with one end of the hollow motor-drive shaft and the supply port thereof, and an exhaust chamber formed in another of said housing plate members communicating with the other end of hollow motor-drive shaft and the exhaust port thereof, and valve means preventing two-way flow relative to the supply and exhaust ports of the motor-drive shaft.

10. In a combined motor and pump unit the combination of a plurality of housing plate members each substantially co-extensive in area and secured to one another to form interiorly thereof independent non-communicating motor and pump compartments and including one member completing on one side thereof the motor compartment and on the other side the pump compartment, a single hollow motor-drive shaft rotatably journaled in each of said housing plate members, a motor armature secured to said shaft within the motor compartment, a pump rotor secured to said shaft within the pump compartment, a supply chamber formed in one of the housing plate members at one end of the motor-drive shaft and communicating with the said hollow motor-drive shaft, a pressure chamber formed in another of said housing plate members at the other end of the hollow motor-drive shaft and communicating therewith, and a plug within the bore in the motor-drive shaft for preventing communication between the supply and exhaust chambers through said hollow drive shaft.

11. In a combined motor and pump unit the combination of a plurality of housing plate members each substantially co-extensive in area and secured to one another to form interiorly thereof independent non-communicating motor and pump compartments and including one member completing on one side thereof the motor compartment and on the other side the pump compartment, a single hollow motor-drive shaft rotatably journaled in each of said housing plate members, a motor armature secured to said shaft within the motor compartment, a pump rotor secured to said shaft within the pump compartment, a supply chamber formed in one of the housing plate members at one end of the motor-drive shaft and communicating with the said hollow motor-drive shaft, a pressure chamber formed in another of said housing plate members at the other end of the hollow motor-drive shaft and communicating therewith, a plug within the bore in the motor-drive shaft for preventing communication between the supply and exhaust chambers through said hollow drive shaft, means for supplying fluid to the supply chamber, and discharge means for the discharge chamber.

12. In a combined motor and pump unit the combination of a plurality of housing plate members each substantially co-extensive in area and secured to one another to form interiorly thereof independent non-communicating motor and pump compartments and including one member completing on one side thereof the motor compartment and on the other side the pump compartment, a single hollow motor-drive shaft rotatably journaled in each of said housing plate members, a motor armature secured to said shaft within the motor compartment, a pump rotor secured to said shaft within the pump compartment, a supply chamber formed in one of the housing plate members at one end of the motor-drive shaft and communicating with the said hollow motor-drive shaft, a pressure chamber formed in another of said housing plate members at the other end of the hollow motor-drive shaft and communicating therewith, a plug within the bore in the motor drive shaft for prevent-

ing communication between the supply and exhaust chambers through said hollow drive shaft, means for supplying fluid to the supply chamber, discharge means for the discharge chamber, and valve means associated with the supply and discharge means to prevent reverse flow relative thereto.

13. In a pump mechanism of the class described the combination of a circular pump housing, a rotary-housing ring within said housing, a pump rotor within the ring, said rotor and rotary-housing ring having their axes fixed eccentrically to one another whereby tangential line contact is had between the rotor and stator ring and forming around said rotor on each side of said line contact a chamber, and rigid non-yielding means carried by said housing for backing up the ring at the point of contact with the rotor.

14. In a pump mechanism of the class described the combination of a pump housing, a rotary-housing ring within said pump housing, a rotor disposed within said ring for rotation relative thereto, said ring and rotor having their axes fixed eccentrically to one another whereby line contact is had between the interior of the ring and the exterior of the rotor, a rigid back-up strip carried by the pump housing at the point of contact of the rotor with the ring, and rigid non-yielding means carried by the housing for backing up the backing strip.

15. In a pump mechanism of the class described, the combination of a housing casting, a circular pump housing within the housing casting and having its surface spaced from the inner surfaces of the housing casting to provide a chamber therebetween, means for securing the said housing casting and pump housing in position, a cylindrical rotor within the pump housing journaled in the housing casting and having a vane for compressing fluids during its rotation, said rotor and pump housing having their axes fixed eccentrically to one another whereby tangential line contact is had between the rotor and housing, and rigid non-compressible backing means extending across the chamber between the housing casting and pump housing at the point where the rotor contacts with the pump housing to prevent springing of the pump housing from the rotor.

16. In a pump mechanism of the class described, the combination of a housing casting, a circular pump housing within the housing casting and having its surface spaced from the inner surface of the housing casting to provide a chamber therebetween, means for securing the said housing casting and pump housing in position, a cylindrical rotor within the pump housing journaled in the housing casting and having a vane for compressing fluids during its rotation, said rotor and pump housing having their axes fixed eccentrically to one another whereby tangential line contact is had between the rotor and housing, and rigid non-compressible backing means extending across the chamber between the housing casting and pump housing at the point where the rotor contacts with the pump housing to prevent springing of the pump housing from the rotor, comprising a back-up screw contacting the exterior of the pump housing at the point of line contact with the rotor, and means supporting said screw.

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