

Nov. 19, 1940.

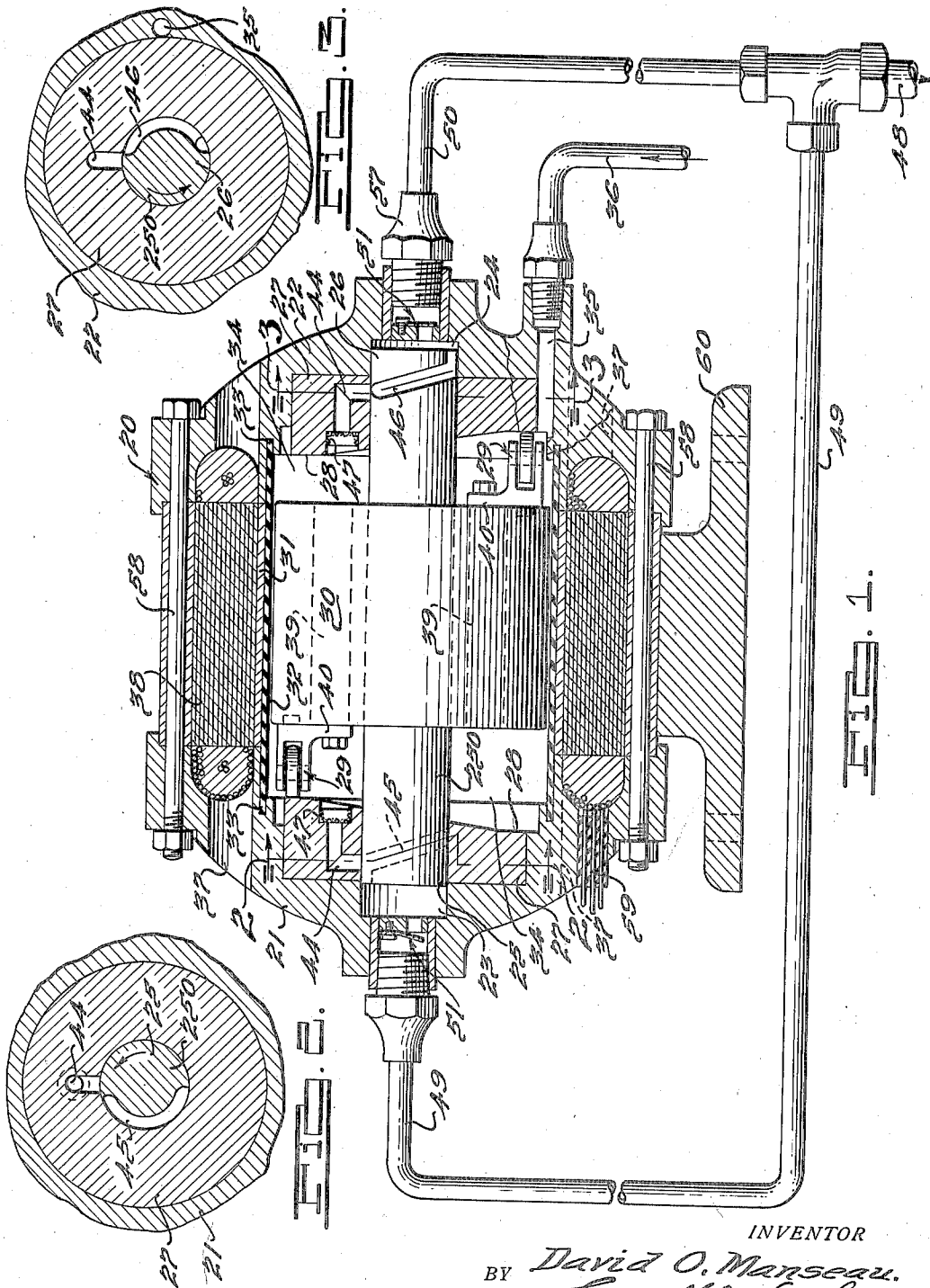
D. O. MANSEAU

2,222,203

COMPRESSOR OR PUMP

Filed Feb. 25, 1938

4 Sheets-Sheet 1



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Nov. 19, 1940.

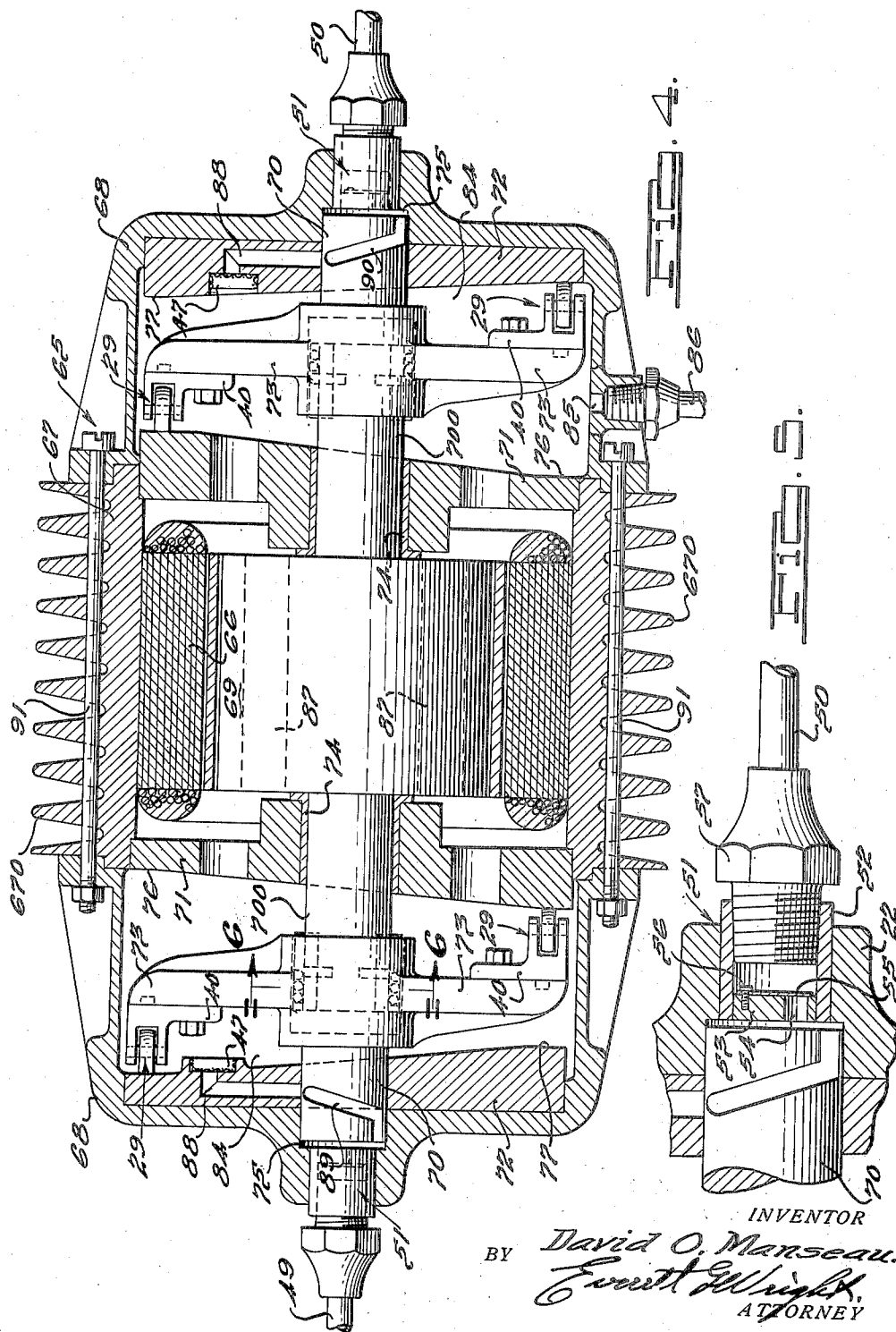
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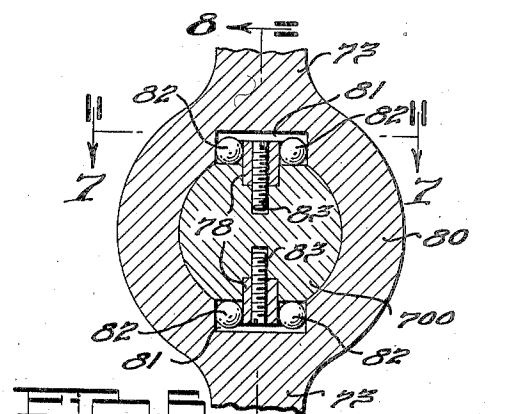


FIG. 6.

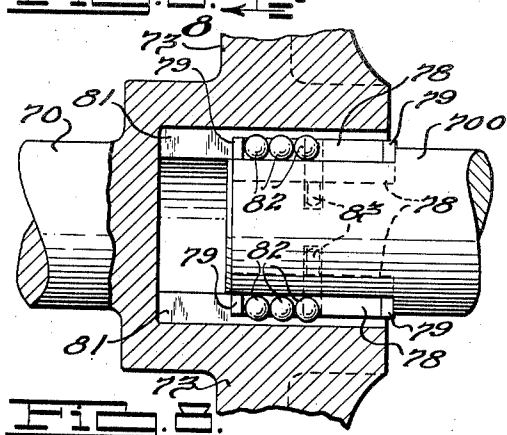


FIG. 8.

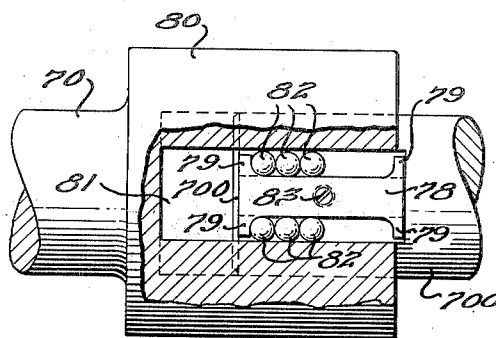


FIG. 7.

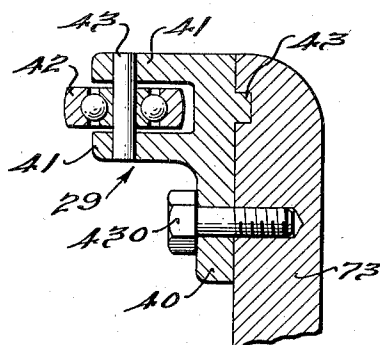


FIG. 9.

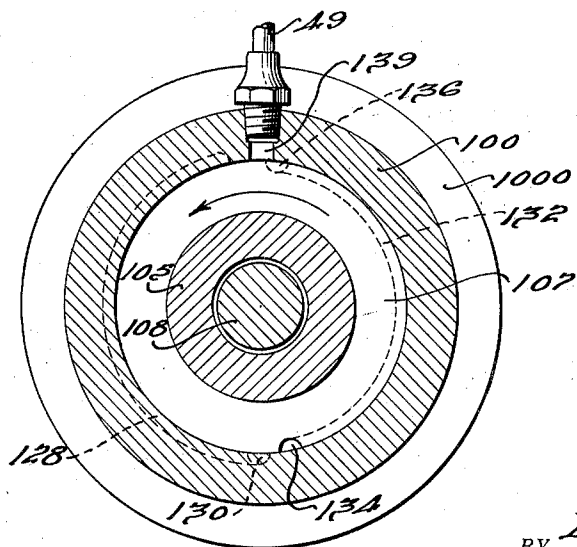


FIG. 11.

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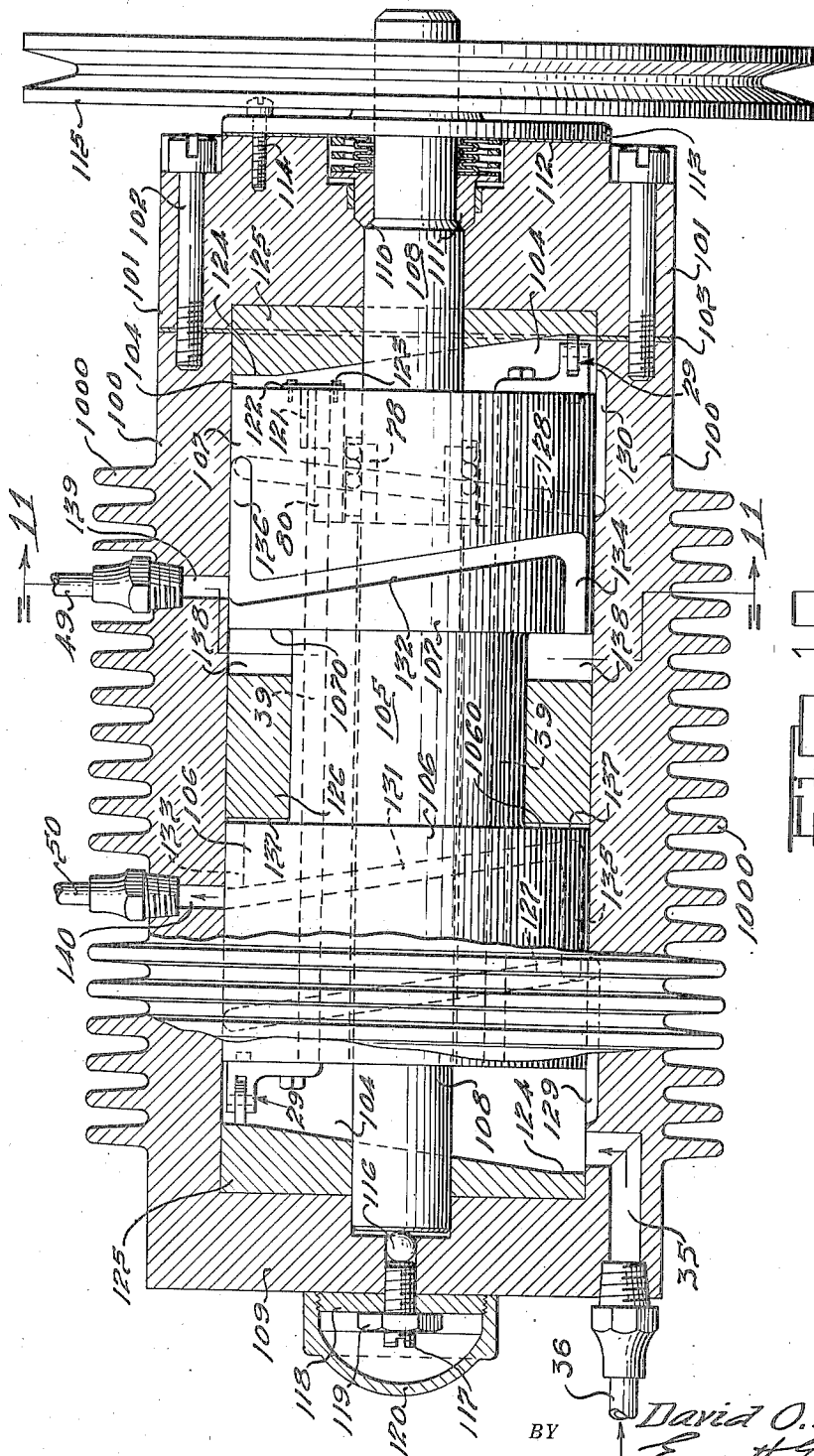
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4 Sheets-Sheet 4



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2,222,203

COMPRESSOR OR PUMP

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Application February 25, 1938, Serial No. 192,608

5 Claims. (Cl. 103—58)

This invention relates to compressors or pumps of a type particularly adapted for use in household refrigeration and the like, however, the invention obviously may be applied to other uses requiring efficient and economical compressor or pumping units. Although the invention is hereinafter described in the terms of compressors, it is to be understood that the novel mechanism disclosed may be readily used for the pumping of fluids as well as for the compression of gases.

One of the objects of the invention is to provide a compressor having a minimum of working parts in which the compression of gases may be accomplished with a minimum of friction and less generation of heat than heretofore possible.

Another object of the invention is to provide a compressor in which the compression is accomplished by a novel balanced combined rotary and reciprocating movement.

Another object of the invention is to provide the combination of an electric motor and a compressor composed of an electric motor having a pair of oppositely disposed compression chambers formed in the housing thereof axially with respect to the motor shaft which is adapted to reciprocate during rotation and serve as a double ended piston for the compression of gases in the said compression chambers.

Another object of the invention is to provide the combination of an electric motor and a compressor composed of an electric motor having a pair of oppositely disposed compression chambers formed in the housing thereof axially with respect to the motor shaft which is provided with extensions which are adapted to be reciprocated during rotation by the said motor shaft and serve as pistons for compressing gases in the said combustion chambers.

Another object of the invention is to provide, in combination, a compressor within an electric motor housing wherein the shaft of the motor rotatable with the rotor of the said motor is adapted to reciprocate during rotation and serve as a double acting compressor piston, the said rotor and motor shaft being hermetically sealed within the said motor housing and the stator of the motor being exposed to external cooling whereby the heat of the said stator may be readily dissipated externally of the said motor rather than be absorbed by the gases being compressed by the compressor enclosed within the said motor.

Another object of the invention is to provide a rotary compressor in which the rotor thereof reciprocates to accomplish compression in co-

operation with compression chambers formed axially with respect to the said rotor and in which the rotor is formed to serve as valve means as it rotates and reciprocates with respect to stationary ports formed in the housing of the said compressor.

Another object of the invention is to provide a rotary compressor in which the rotor is adapted to reciprocate in the housing of the said compressor axially during its rotation and serve as a piston for compressing gases in one or more compression chambers formed in the said housing of the said compressor.

Another object of the invention is to provide a substantially vibrationless and practically noiseless compressor having a balanced compressing action subject to a minimum of friction and which provides an extremely high compression effort with a minimum of driving energy.

Another object of the invention is to provide a compact, light weight compressor of high capacity with respect to its weight which has comparatively few moving parts and which can be manufactured at an extremely low cost and which requires a minimum of service and up-keep.

Other objects of the invention will become apparent by reference to the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a longitudinal sectional view of a compressor embodying the invention.

Fig. 2 is a cross sectional view taken on the line 2—2 of Fig. 1 showing the valve of the piston open at the beginning of the compression stroke of the said piston.

Fig. 3 is a cross sectional view taken on the line 3—3 of Fig. 1 showing the valve of the piston closed at the beginning of the intake stroke of the said piston.

Fig. 4 is a longitudinal sectional view of another embodiment of the invention.

Fig. 5 is an enlarged sectional view of a preferred type of back pressure valve used at the exhaust end of the compression chambers of the embodiment of the invention disclosed in Figs. 1 and 4.

Fig. 6 is an enlarged detailed sectional view taken on the line 6—6 of Fig. 4 showing the novel ball bearing key between the motor shaft of the embodiment of the invention disclosed in Fig. 4 and the reciprocating extensions thereof.

Fig. 7 is a detailed horizontal sectional view taken on the line 7—7 of Fig. 6.

Fig. 8 is a detailed vertical sectional view taken on the line 8—8 of Fig. 6.

Fig. 9 is a detailed sectional view of a typical ball bearing contactor which rides the reciprocator plates in the several embodiments of the invention disclosed herein.

Fig. 10 is a longitudinal sectional view of still another embodiment of the invention.

Fig. 11 is a vertical cross sectional view taken on the line 11—11 of Fig. 10.

Referring now to the drawings wherein like numerals refer to like and corresponding parts throughout the several views, the embodiment of the invention disclosed in Figs. 1 to 3 inclusive, Fig. 5 and Fig. 9 comprises, in general, a compressor in which compression is accomplished by a combined rotary and reciprocating movement which may be constructed in combination with an electric motor 20 preferably of the split phase capacitor squirrel cage type. The end caps 21 and 22 of the housing of the motor 20 are formed to provide compression chambers 23 and 24 respectively therein into which the extreme ends 25 and 26 respectively of the motor shaft 250 reciprocate as the said motor shaft 250 revolves in suitable bored reciprocator plates 27 having an annularly beveled track 28 formed on the inwardly disposed face thereof against which a ball bearing contactor 29 carried by the rotor 30 of the said motor 20 rides during the rotation of the said rotor whereby to impart reciprocatory movement to the said motor shaft 250 thereby causing the ends 25 and 26 of the said motor shaft 250 to function as pistons within the said compression chambers 23 and 24 respectively.

The central portion 31 of the housing of the motor 20 is preferably lined with a cylindrical non-magnetic seal 32 which dovetails into inwardly disposed annular grooves 33 in the end caps 21 and 22 whereby to form a hermetically sealed chamber 34 into which gases to be compressed are admitted through the intake aperture 35 from the intake line 36, the said intake aperture 35 preferably being level with the axis of the motor shaft 250 as indicated in Fig. 3.

Suitable cooling apertures 37 are provided around the periphery of the end caps 21 and 22 to permit the heat generated in the stator coils 38 to be dissipated outside the motor thereby keeping the gases in the chamber 34 as cool as possible. The rotor 30 is provided with a plurality of axially disposed apertures 39 through which gases admitted to the chamber 34 may find their way to the compression chamber 23 as well as to the compression chamber 24.

The rotor 30 of the motor 20 is preferably adapted to reciprocate as it rotates by means of two ball bearing contactors 29 which are secured in diametrical and axial opposite relationship to each other on the ends of said rotor 30 as indicated in Fig. 1. Fig. 9 shows the preferred construction of a ball bearing contactor 29 which comprises a bracket 40 having a bifurcated bearing support 41 into which a ball bearing 42 is mounted by a pin 43 positioned through the bifurcated bearing support 41 and through the inner race of the said ball bearing 42 while holding the said bearing central with respect to the said bifurcated bearing support 41. The bracket 40 is preferably mounted on the rotor 30 in the desired position by such means as a locating pin 43 and a machine bolt 430 pressed and threaded respectively in the said rotor 30.

Intake ports 44 are formed in the reciprocator plates 27 through which gases from the hermetically sealed chamber 34 enter the compression chambers 23 and 24 through spiral grooves 45

and 46 respectively cut in the face of the motor shaft 250 near the ends 25 and 26 thereof as best indicated in Figs. 1, 2 and 3. It will be noted that the motor shaft 250 normally closes the intake ports 44 during the compression stroke of the end 25 of the said motor shaft 250 acting as a piston in the compression chamber 23 as indicated in Figs. 1 and 2. While the piston 25 is on its compression stroke, the opposite end 26 of the motor shaft 250 acting as a piston in the compression chamber 24 is on its suction stroke and the spiral groove 46 in the motor shaft 250 provides an intake passage between the intake port 44 and the compression chamber 24 as indicated in Figs. 1 and 3. It is readily observed that, as the motor shaft 250 reciprocates and rotates, suction and compression strokes are alternately accomplished by the ends 25 and 26 of the motor shaft 250 functioning as pistons in the compression chambers 23 and 24 respectively. The inner ends of the said intake ports 44 are preferably counterbored as indicated in Fig. 1 to accommodate suitable cup shaped screens 47.

Compressed gases are preferably collected in a common compressed gas line 48 by means of branch compressed gas lines 49 and 50 connected to the compression chambers 23 and 24 respectively with back pressure valves 51 therebetween. A preferred type of back pressure valve 51 is shown in detail in Fig. 5 and comprises a sleeve 52 secured into the end cap 22 of a compressor, a valve disc 53 having an exhaust port 54 formed therein pressed into the said sleeve 52, and a thin spring steel valve 55 normally closing the said exhaust port 54 against back pressure mounted on the exhaust side of the valve disc 53 by one or more machine screws 56 sufficiently distant from the said exhaust port 54 to permit the said spring steel valve 55 to flex and open during the exhausting of gases from the compression chamber 24. The outer end of the said sleeve 52 is preferably threaded to receive a tube connection fitting 57.

The entire compressor and motor is assembled and secured into a compact unit by means of suitable bolts 58 extending through both end caps 21 and 22. A suitable fitting as indicated by the numeral 59 in Fig. 1 is preferably provided to connect the electric motor 20 to a suitable source of electric energy. The unit may be provided with a base 60 or any other suitable mounting means.

The embodiment of the invention disclosed in Figs. 4 to 9 inclusive is similar in many respects to the embodiment of the invention disclosed in Figs. 1, 2 and 3, the major differences being that the motor 65 has its stator coils 66 enclosed within the housing 67 which is hermetically sealed by end caps 68 and cooled by cooling fins 670 and that the rotor 69 and the rotor shaft 700 of the motor 65 does not reciprocate as it rotates, however, a piston shaft 70 is axially mounted on each end of the rotor shaft 700 for rotation therewith and thereby while being reciprocated by means of contact with inner and outer reciprocator plates 71 and 72 by contactors 29 mounted on reciprocator arms 73 preferably formed integral with each piston shaft 70 as hereinafter described.

The inner reciprocator plates 71 are pressed in the housing 67 of the motor 65 and have the rotor shaft 700 of the said motor journaled therein for rotation but not reciprocation by suitable bearings 74. Each outer reciprocator plate 72 is preferably pressed in one of the end caps 68 of

the motor 65 and is centrally bored to serve as a bearing for the outer end of a piston shaft 70. Each piston shaft 70 reciprocates and rotates with respect to the said end cap 68 and acts as a piston in a compression chamber 75 formed in each of the end caps 68 in axial alignment with the said piston shaft 70 and the rotor shaft 700.

The reciprocation of each piston shaft 70 with respect to a compression chamber 75 during rotation thereof by the rotor shaft 700 is accomplished by means of a pair of ball bearing contactors 79 mounted in diametrical and axial opposite relationship to each other on a pair of suitable radially disposed reciprocator arms 73 preferably formed integral with the inner end of each piston shaft 70 as best shown in Fig. 4, which contactors 29 ride on annular complementarily beveled tracks 76 and 77 formed on the faces of the said inner reciprocator plate 71 and the said outer reciprocator plate 72 respectively. Fig. 9 shows a preferred type of contactor 29 hereinbefore described and its mounting on a reciprocator arm 73.

Referring now particularly to Figs. 6, 7 and 8, wherein the novel ball bearing key between the rotor shaft 700 and a piston shaft 70 is shown in detail, it is readily observed how the piston shafts 70 are adapted to be rotated by the rotor shaft 700 and at the same time be free to reciprocate with respect to the said rotor shaft 700. The rotor shaft 700 is preferably machined flat on opposite sides as indicated in Fig. 6 and is provided with a pair of diametrically opposite radially extending keys 78 having ball retainer lugs 79 on the upper corners thereof as best shown in Figs. 7 and 8. The inner end of the piston shaft 70 is provided with a cup shaped end 80 which is axially bored to telescopically receive the end of the rotor shaft 700. In the embodiment of the invention disclosed in Fig. 4, the said cup shaped end 80 of the piston shaft 70 has the radially disposed reciprocator arms 73 formed integral therewith. The said cup 80 is provided with a pair of diametrically opposite inwardly disposed rectangular keyways 81 into which the said keys 78 are telescoped with a plurality of hardened balls 82 disposed on each side of the said keys substantially as shown in Figs. 6, 7 and 8. The keys 78 are secured in the rotor shaft 700 of the motor 65 by suitable set screws 83 to guard against being thrown out of position by centrifugal force.

Referring now to Fig. 4, gases to be compressed are admitted to the hermetically sealed chamber 84 through the intake aperture 85 from the intake line 86. Suitable apertures 87 are provided axially through the rotor 69 to permit gases to be compressed to reach the compression chamber 75 at the end of the compressor opposite the end into which the said gases are admitted.

Intake ports 88 screened by suitable cup shaped screens 47 are formed in the outer reciprocator plates 72 through which gases from the hermetically sealed chamber 84 enter the compression chambers 75 through spiral grooves 89 and 90 cut in the face of the piston shafts 70 near the outer ends thereof as best indicated in Fig. 4. The piston shafts 70 normally close the intake ports 88 during the compression stroke of the said piston shafts 70 which act as pistons in the compression chambers 75. The spiral grooves 89 and 90 in the piston shafts 70 are identical except they are opposite hand to permit the said piston shafts 70 to exert their com-

pression strokes in opposed unison whereby to eliminate unnecessary vibration. During the suction stroke of the piston shafts 70 the spiral grooves 89 and 90 are in registry with the intake ports 88 through the outer reciprocator plates 72 whereby to admit gases from the chamber 84 into the compression chambers 75. The embodiment of the invention disclosed in Fig. 4 is preferably provided with back pressure valves 51 similar to those disclosed in Figs. 1 and 5 and hereinbefore described, which valves close the exhaust ports 54 thereof during the suction stroke of the pistons 70 of the compressor disclosed in Fig. 4 and admit compressed gases during the compression stroke of the said pistons 70 to the branch compressed gas lines 49 and 50 which are preferably connected to a common compressed gas line, not shown in Fig. 4.

The entire compressor and motor is assembled and secured into a compact unit by means of 20 suitable bolts 91 extending through the housing 67 and end caps 68 as best shown in Fig. 4. Although the intake 85 and intake line 86 thereto are shown at the bottom of the compressor in Fig. 4, it is desirable that the intake be placed at the side of the compressor, preferably at least to the height of the rotor shaft 700 of the motor 65 thereof.

In the embodiment of the invention disclosed in Figs. 10 and 11, compression is also accomplished by the combined rotary and reciprocating movement employed in the two embodiments of the invention already described in detail. However, the compressor disclosed in Figs. 10 and 11 is not combined with an electric motor, is arranged to compress a large volume of gas at slow speed, and relies upon a separate source of driving power.

Referring now particularly to Fig. 10, the novel compressor disclosed therein comprises a housing 100 having a removable end 101 secured to the said housing 100 by such means as a plurality of machine bolts 102. A gasket 103 between the said housing 100 and its removable end 101 assures a pressure tight joint therebetween. The said housing 100 is suitably bored to provide a cylindrical chamber 104 therein into which a piston 105 having two heads 106 and 107 is mounted for reciprocation on and rotation by and with a shaft 108 rotatably mounted concentric with the said cylindrical chamber 104 and the double headed piston 105.

The said shaft 108 is journaled at one end in the solid end 109 of the housing 100 and has its other end journaled through the removable end 101 of the said housing 100. The said shaft 108 is suitably shouldered at 110 to cooperate with a gas seal 111 as best indicated in Fig. 10. The said gas seal 111 is made gas tight with respect to the removable end 101 of the housing 100 by a flange 112 from the said gas seal 111 which serves as a gasket under the end cover 113 secured to the removable housing end 101 by suitable machine screws 114. The extending end of the shaft 108 is preferably keyed to a pulley 115 by means of which the said shaft 108 is driven from any suitable source of power.

The shaft 108 is prevented from axial movement by means of a thrust ball 116 held against the inner end of the said shaft 108 by the take-up screw 117 threaded in an axially disposed aperture in the solid end 109 of the housing 100. A pair of lock nuts 118 and 119 maintain the take-up screw 117 in its adjusted position. The larger lock nut 118 may be threaded around the

periphery thereof to receive a cap 120 which covers the take-up screw 117.

The said piston 105 is caused to rotate by means of a ball bearing key 78 between the rotating shaft 108 and the said piston 105 preferably located in the end of the piston head 107 thereof as best indicated in Fig. 10. The said ball bearing key 78 is substantially the same as disclosed in Figs. 6, 7 and 8 and has the cup 80 thereof fit into a suitable axial bore in the end of the piston head 107 of the piston 105. The said cup 80 is keyed against turning in the piston head 107 by a suitable key 121 as shown in Fig. 10, which key 121 is secured in place by the keeper plate 122 and the machine screws 123. Thus the said piston 105 is rotated by and with the shaft 108 and, at the same time is permitted to reciprocate.

The said piston 105 is reciprocated during rotation by means of two ball bearing contactors 29 hereinbefore described which are secured in diametrical and axial opposite relationship to each other on the extreme ends of the heads 106 and 107 of the said piston 105, which contactors ride on the annularly beveled tracks 124 of the reciprocator plates 125 positioned in each end of the cylindrical chamber 104 against the ends 101 and 109 of the housing 100.

As the compressor disclosed in Fig. 10 is assembled, a split annular compression block 126 fit together around the piston 105 is pressed into the chamber 104 to a central position therein to serve as a compression block against which gases are compressed by the centrally disposed annular faces 1060 and 1070 of the piston heads 106 and 107 respectively as the said piston 105 reciprocates, the said piston 105 being fit to reciprocate and rotate within the said annular compression block 126.

Gases to be compressed are admitted to the cylindrical chamber 104 through the intake aperture 35 and the intake line 36. The piston 105 is provided with a plurality of axially extending bores 39 to permit gases entering the cylindrical chamber 104 to flow freely to both ends thereof.

The wall of the cylinder chamber 104 is preferably provided with spiral intake grooves 127 and 128 connecting at one end to longitudinally disposed grooves 129 and 130 respectively extending axially along the wall of the cylinder chamber 104 a sufficient distance to have one end thereof exposed to the cylinder chamber 104 regardless of the axial position to which the piston 105 and its piston heads 106 and 107 may be reciprocated in the said cylinder chamber. The periphery of the piston heads 106 and 107 are also provided with spiral grooves 131 and 132 respectively connecting at both ends to longitudinally disposed grooves 133 and 134 and longitudinally disposed grooves 135 and 136 both respectively, all as indicated in Figs. 10 and 11. The said grooves in the wall of the cylinder chamber 104 and the grooves in the periphery of the piston heads 106 and 107 are so arranged with respect to each other that, during the rotation and reciprocation of the piston 105, the said grooves 127, 129, 131, 133 and 135 are connected to provide an intake passage from one of the ends of the cylinder chamber 104 to the compression chamber 137 during the suction stroke of the piston head 106 while the grooves 132, 134 and 136 connect the compression chamber 138 to the exhaust port 139 during the compression stroke of the piston head 107. Likewise, as the piston 105 rotates slightly more than 180

degrees, the said grooves 128, 130, 132, 134 and 136 are connected to provide an intake passage from the other end of the cylinder chamber 104 to the compression chamber 138 during the suction stroke of the piston head 107 while the grooves 131, 133 and 135 connect the compression chamber 137 to the exhaust port 140 during the compression stroke of the piston head 106. Figs. 10 and 11 show the piston head 107 at the beginning of its compression stroke.

The exhaust ports 139 and 140 have branch compressed gas lines 49 and 50 leading therefrom to a common compressed gas line not shown.

If the embodiment of the invention disclosed in Figs. 10 and 11 is to be operated with a bath of oil within the cylinder chamber 104 for lubrication, it would be preferable to mount the compressor in such a manner as to locate the intake grooves 129 and 130 level with the axis of the shaft 108.

Although no particular means for lubricating the three embodiments of the invention disclosed herein have been described, it is obvious that the invention may be run in an oil bath or the various bearings may be individually lubricated, all according to the conditions under which the invention is to operate, namely as a compressor or pump.

Although but three embodiments of the invention have been disclosed and described in detail, it is to be understood that many modifications thereof may be had and that many changes in the size, shape, arrangement and detail of the various parts thereof may be made without departing from the spirit of the invention as defined in the appended claims.

I claim:

1. A compressor comprising, in combination, an electric motor including a hermetically sealed housing therefor having oppositely disposed compression chambers formed therein axially with respect to the motor shaft, a pair of inner reciprocator plates having complementary annularly beveled tracks formed on the outwardly disposed surface thereof fixed in the said housing adjacent the rotor of the said motor, the rotor shaft rotated by and with the rotor of the said motor being journaled through the said inner reciprocator plates and held thereby against reciprocation during rotation thereof, a pair of outer reciprocator plates having complementary annularly beveled tracks formed on the inwardly disposed surface thereof fixed in the opposite ends of the said motor housing adjacent the said compression chambers, a pair of piston shafts mounted on the outer ends of the said motor shaft adapted to reciprocate with respect thereto simultaneously with being rotated thereby journaled through the said outer reciprocator plates in alignment with the said compression chambers, and means on the said piston shafts adapted to ride the said reciprocator plates during rotation of the said piston shafts and impart reciprocating motion thereto whereby to cause the said piston shafts to function as pistons in the said compression chambers.

2. A compressor comprising, in combination, an electric motor including a hermetically sealed housing therefor having oppositely disposed compression chambers formed therein axially with respect to the motor shaft, a pair of inner reciprocator plates having complementary annularly beveled tracks formed on the outwardly disposed surface thereof fixed in the said housing

adjacent the rotor of the said motor, the rotor shaft rotated by and with the rotor of the said motor being journaled through the said inner reciprocator plates and held thereby against reciprocation during rotation thereof, a pair of outer reciprocator plates having complementary annularly beveled tracks formed on the inwardly disposed surface thereof fixed in the opposite ends of the said motor housing adjacent the said compression chambers, a pair of piston shafts mounted on the outer ends of the said motor shaft adapted to reciprocate with respect thereto simultaneously with being rotated thereby journaled through the said outer reciprocator plates in alignment with the said compression chambers, a pair of radially disposed reciprocator arms on each piston shaft, and a pair of axially opposed contactors on said reciprocator arms adapted to ride the said reciprocator plates during rotation of the said piston shafts and impart reciprocating motion thereto whereby to cause the said piston shafts to function as pistons in the said compression chambers.

3. A compressor comprising, in combination, an electric motor including a hermetically sealed housing therefor having oppositely disposed compression chambers formed therein axially with respect to the motor shaft, means for mounting the said motor shaft for rotation only within the said motor housing, a piston shaft mounted on each end of the said motor shaft adapted to reciprocate with respect thereto simultaneously with being rotated thereby, the free ends of the said piston shafts being disposed in the said compression chambers, means for reciprocating the said piston shafts during their rotation whereby to cause the same to function as pistons in the said compression chambers, the said housing having an intake through which gases to be compressed are admitted therein, valve means within said housing adapted to admit gases from within said housing to the said compression chambers during the suction stroke of the said piston shafts in the said compression chambers, compressed gas lines connected to the said compression chambers, and back pressure valve means adapted to close the said compression chambers with respect to the compressed gas lines during the suction stroke of a piston shaft in each compression chamber.

4. A compressor comprising, in combination, an electric motor including a hermetically sealed housing therefor having oppositely disposed compression chambers formed therein axially with respect to the motor shaft, a pair of inner reciprocator plates having complementary annularly beveled tracks formed on the outwardly disposed surface thereof fixed in the said housing adjacent the rotor of the said motor, the rotor shaft rotated by and with the rotor of the said motor being journaled through the said inner reciprocator plates and held thereby against reciprocation during rotation thereof, a pair of outer reciprocator plates having complementary annularly beveled tracks formed on the inwardly disposed surface thereof fixed in the opposite ends of the said motor housing adjacent the said compression chambers, a pair of piston shafts mounted on the outer ends of the said motor shaft journaled through the said outer reciprocator plates in alignment with the said com-

pression chambers, means on the said piston shafts adapted to ride the said reciprocator plates during rotation of the said piston shafts and impart reciprocating motion thereto whereby to cause the said piston shafts to function as pistons in the said compression chambers, the said housing having an intake line thereto through which gases to be compressed are admitted therein, intake ports through said reciprocator plates having one end thereof open within the said housing and the other end normally closed by the piston shafts, the said piston shafts having spiral intake grooves formed therein positioned to register with the said intake ports during the suction stroke of the piston shafts in the said compression chambers whereby to admit gases to the said compression chambers from the said motor housing, compressed gas lines connected to the said compression chambers, and back pressure valves adapted to close the compression chambers with respect to the said compressed gas lines during the suction stroke of a piston shaft in each compression chamber.

5. A compressor comprising, in combination, an electric motor including a hermetically sealed housing therefor having oppositely disposed compression chambers formed therein axially with respect to the motor shaft, a pair of inner reciprocator plates having complementary annularly beveled tracks formed on the outwardly disposed surface thereof fixed in the said housing adjacent the rotor of the said motor, the rotor rotated by and with the rotor of the said motor being journaled through the said inner reciprocator plates and held thereby against reciprocation during rotation thereof, a pair of outer reciprocator plates having complementary annularly beveled tracks formed on the inwardly disposed surface thereof fixed in the opposite ends of the said motor housing adjacent the said compression chambers, a pair of piston shafts mounted on the outer ends of the said motor shaft journaled through the said outer reciprocator plates in alignment with the said compression chambers, a pair of radially disposed reciprocator arms on each piston shaft, a pair of axially opposed contactors on said reciprocator arms adapted to ride the said reciprocator plates during rotation of the said piston shafts and impart reciprocating motion thereto whereby to cause the said piston shafts to function as pistons in the said compression chambers, the said housing having an intake line thereto through which gases to be compressed are admitted therein, intake ports through said reciprocator plates having one end thereof open within the said housing and the other end normally closed by the piston shafts, the said piston shafts having spiral intake grooves formed therein positioned to register with the said intake ports during the suction stroke of the piston shafts in the said compression chambers whereby to admit gases to the said compression chambers from the said motor housing, compressed gas lines connected to the said compression chambers, and back pressure valves adapted to close the compression chambers with respect to the said compressed gas lines during the suction stroke of a piston shaft in each compression chamber.