

[54] **EPITROCHOIDAL COMPRESSOR**
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[51] Int. Cl.**F04b 23/00, F01c 1/02, F01c 19/08**
[58] Field of Search ..**417/310, 440; 418/61, 86, 131,**
418/133, 183

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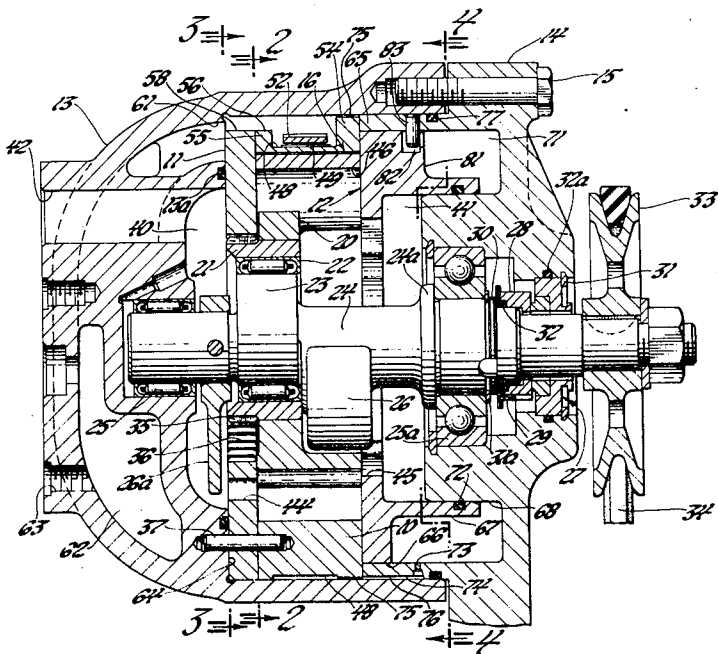
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[57] **ABSTRACT**

A compressor of the epitrochoidal rotor type has a rotor with N hollow lobes and a stator housing with N+1 lobes, a discharge and inlet side plate on one side of the rotor and a piston side plate on the opposite side of the rotor loaded against the rotor by fluid pressure from the discharge cavity of the compressor to effect sealing of the rotor between these side plates, the piston side plate being adapted to be rotated out of engagement with the rotor whereby the piston side plate also operates as a bypass clutching mechanism to control on and off operation of the compressor. The compressor housing also includes a discharge muffler formed therein.

7 Claims, 9 Drawing Figures



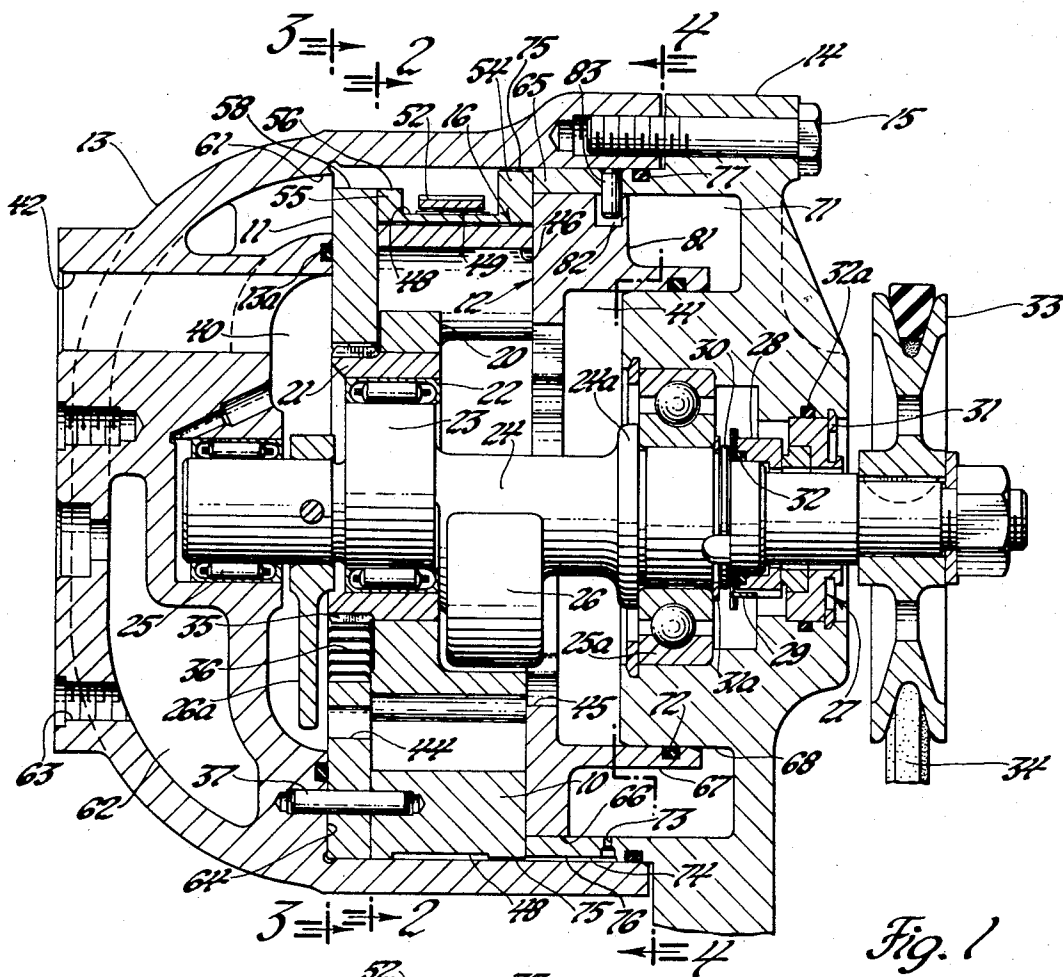


Fig. 1

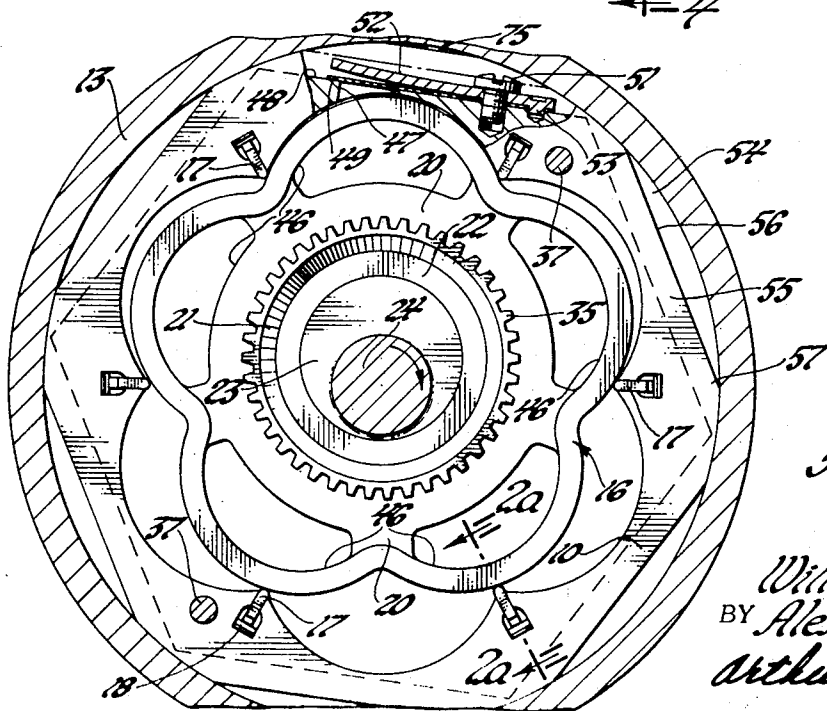
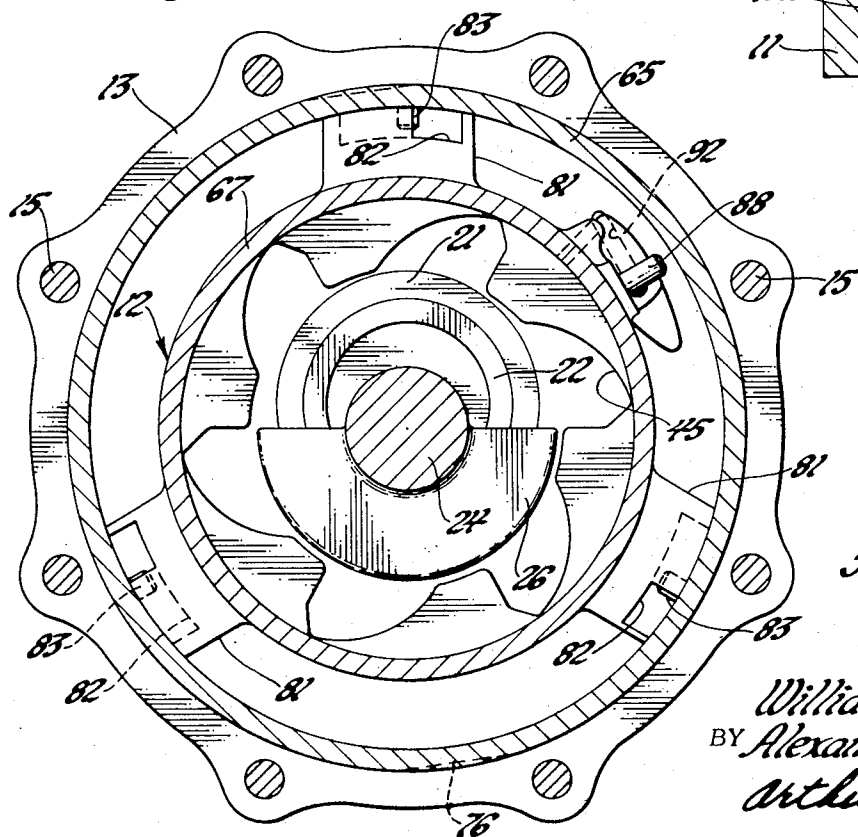
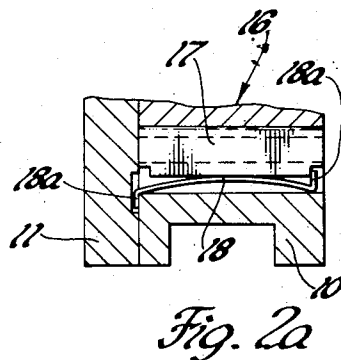
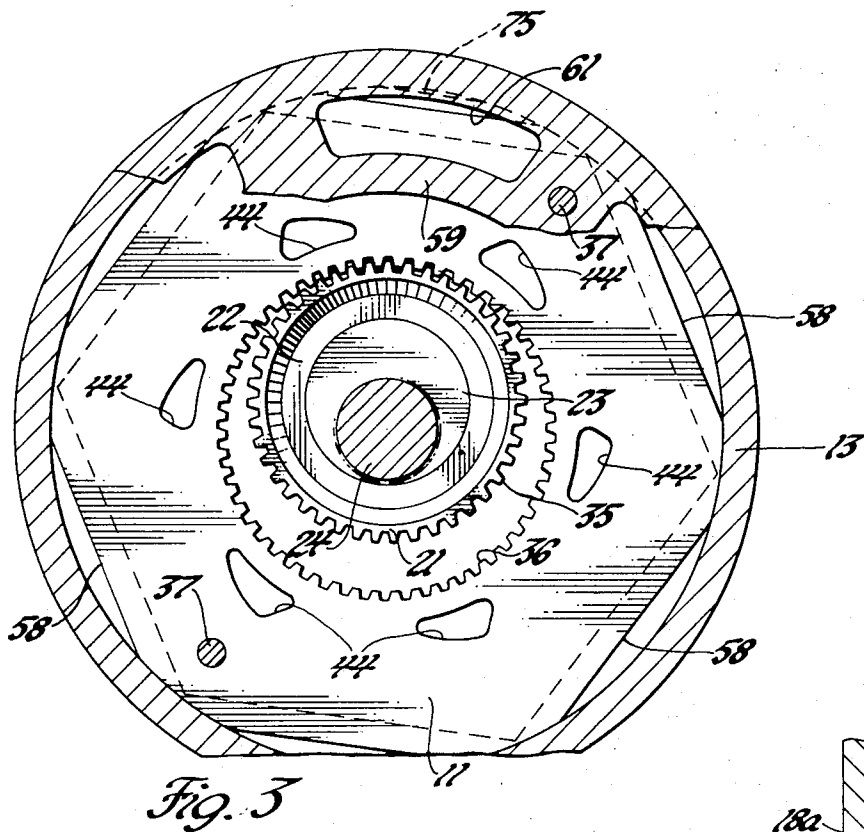


Fig. 2

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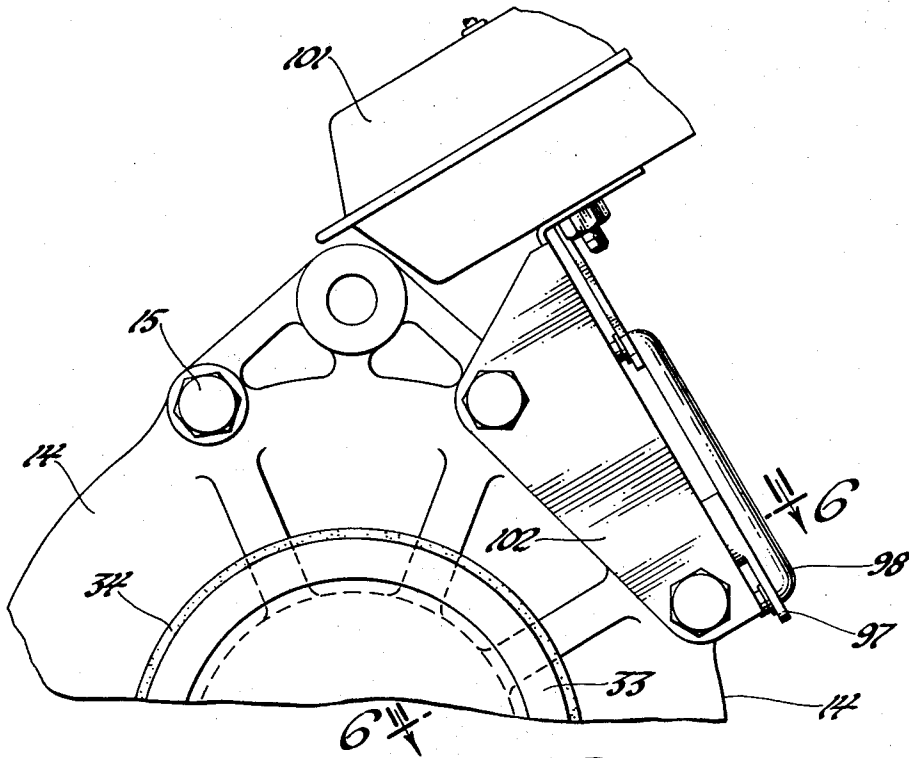


Fig. 5

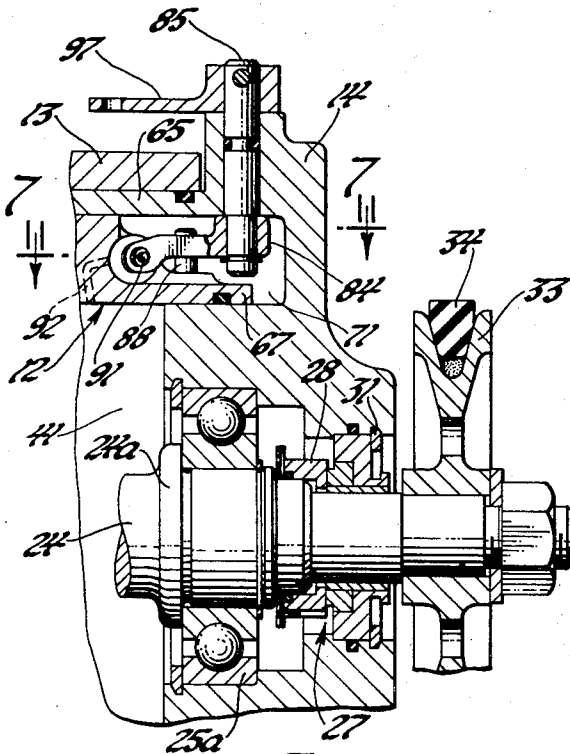


Fig. 6

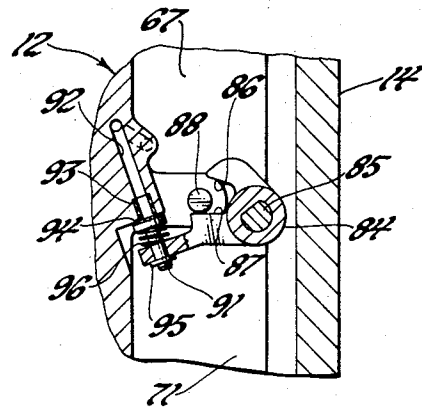


Fig. 7

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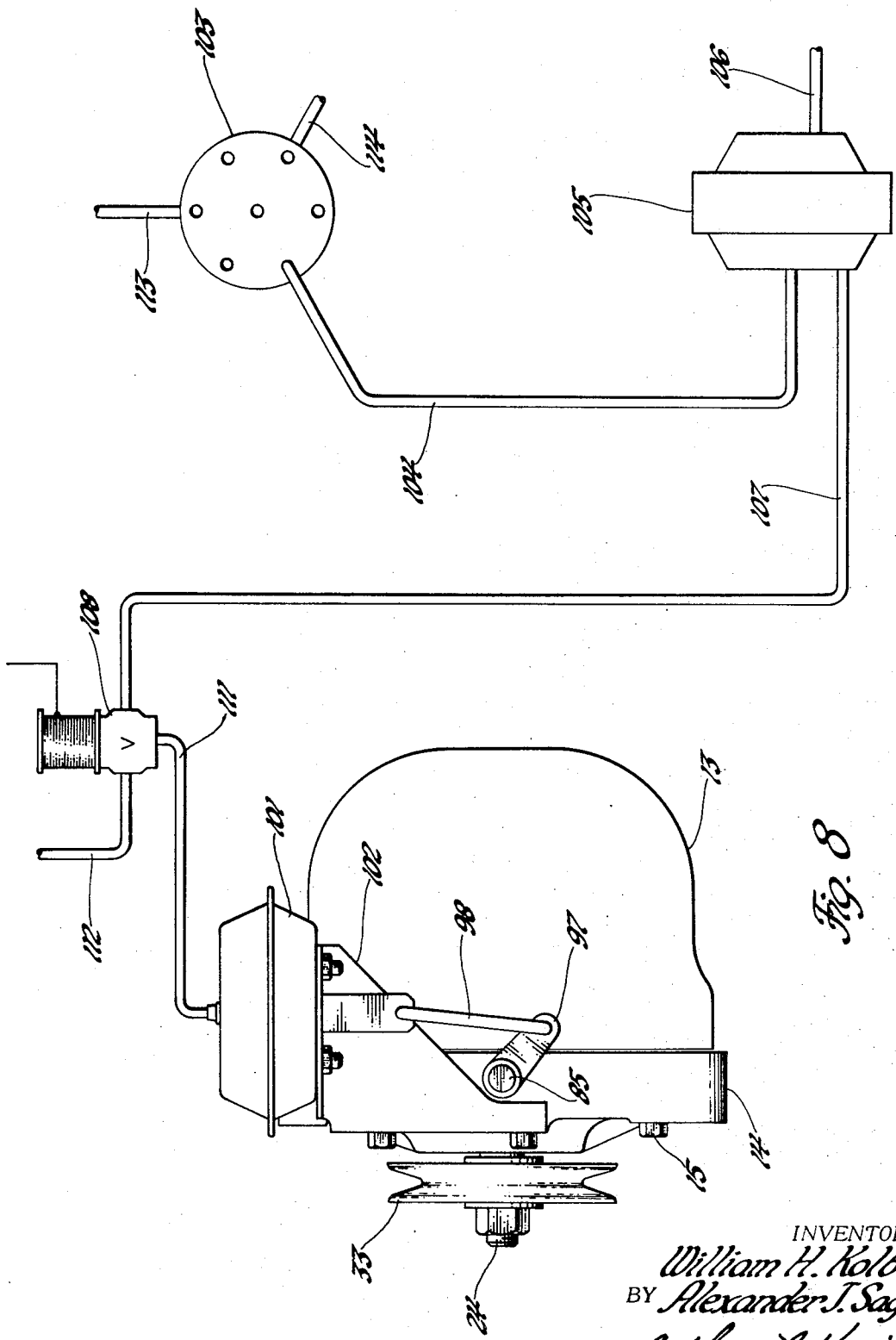


Fig. 8

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EPITROCHOIDAL COMPRESSOR

This application is a continuation-in-part of our copending application Ser. No. 79,194 filed Oct. 8, 1970 now U.S. Pat. No. 3,671,154.

This invention relates to an epitrochoidal compressor, and more particularly to an epitrochoidal rotor type refrigerant compressor for use in automobile air conditioning systems and the like.

A large number of problems present themselves in the design and construction of refrigerant compressors of the types which are adapted to be driven by a car engine either continuously or intermittently through a clutch. These problems result from the fact that the compressor is required to operate throughout a very wide speed range while requiring a low drive input torque throughout this speed range. The problems are multiplied by the fact that the amount of space available for the compressor is very limited and all of the parts must be of lightweight construction and arranged in a small casing. In addition, the operation of current vehicle compressors are controlled through electromagnetic clutches which in themselves are bulky.

It is, therefore, the principal object of this invention to improve a refrigerant compressor for use in air conditioning automobiles wherein the compressor is lightweight and occupies a minimum amount of space.

A further object of the invention is to improve such a refrigerant compressor whereby the compressor has an improved refrigerant inlet and discharge arrangement and an improved seal arrangement for the working chambers of the compressor.

A still further object of this invention is to improve a refrigerant compressor whereby a piston side plate is used to seal the working chambers of the compressor with this piston side seal also being used as part of a bypass clutching mechanism for the compressor so as to eliminate the use of a conventional electromagnetic clutch to control the operation of the compressor.

Another object of this invention is to improve a refrigerant compressor for use in a motor vehicle in which a five-lobed rotor and six cavity housing are used to obtain low torque and pressure pulsations and the compressor housing is formed to provide an integral discharge muffler for the fluid discharged from the compression chambers of the compressor.

These and other objects of the invention are obtained by means of an epitrochoidal compressor, the compressor chambers of which are formed by a five-lobed epitrochoidal rotor, rotatable in a stationary six-lobed inner contoured housing. Stationary vanes are held in slots in the housing and spring loaded against the rotor. A side plate is positioned on one side of the rotor and a piston side plate is positioned on the opposite side of the rotor, the latter being axially movable with respect to the rotor and the compressor chambers formed thereby to a first position to effect declutching of the compressor and to a second position to seal the rotor between it and the side plate. The rotor turns on the eccentric of a drive shaft, and its angular location relative to the vanes is determined by an internal-external timing gear set; the inner gear with external teeth is attached to the rotor, and the outer gear with inner teeth is part of the side plate of the compressor. To insure a tight seal on both sides of the rotor, the piston side plate is loaded against the one side of the rotor by fluid pressure led from the discharge cavity of the com-

pressor, with operator controlled means being provided to unload pressure on the piston side plate and to then move it axially to effect bypass or recirculation of fluid in the compressor cavities to prevent any build-up of pressure in the compressor.

For a better understanding of the invention, as well as other objects and further features thereof, reference is had to the following detailed description of the invention to be read in connection with the accompanying drawings, wherein:

FIG. 1 is a sectional view of the compressor of the invention;

FIG. 2 is a view in vertical section taken along line 2—2 of FIG. 1;

FIG. 2A is a view taken along line 2A—2A of FIG. 2;

FIG. 3 is a view in vertical section taken along line 3—3 of FIG. 1;

FIG. 4 is a sectional view taken along line 4—4 of FIG. 1;

FIG. 5 is a partial front view of the compressor with a vacuum servo-motor attached to the compressor housing for actuation of the internal bypass clutching mechanism of the compressor;

FIG. 6 is a sectional view taken along line 6—6 of FIG. 5;

FIG. 7 is a section view taken along line 7—7 of FIG. 6; and,

FIG. 8 is a schematic view of a control system for the compressor of the invention.

Referring now to the drawings, in which a preferred embodiment of the invention is shown, the compressor includes a stationary housing consisting of a central cylinder rotor housing or stator 10, rear side plate 11 and movable piston side plate or front side plate 12, the latter being described in greater detail hereinafter, compressor rear head or casing 13 and compressor front head or casing 14, the rear head and front head being secured together by bolts 15 to form a compressor housing for enclosing the previously described elements and other elements to be described. A rotor, generally indicated 16, is mounted in the stator between the side plates, as described in detail hereinafter, to form with the stator a number of working or compression chambers.

The rotor 16 has an epitrochoidal profile with N lobes and rotates eccentrically in the stator 10 having N+1 lobed inner contours. Although the number of lobes on the epitrochoidal rotor, which determines the number of compression chambers, can be chosen at will, in the preferred embodiment of the compressor disclosed, six working chambers are used to provide for low drive torque variation during each shaft revolution.

Thus, the rotor 16 is in the form of a five-lobed epitrochoidal rotor while the stator 10 has a six-lobed inner contour with the shape relationship of the rotor and stator being such as to provide facing surfaces that define upon relative movement of the rotor with respect to the stator, six variable volume working or compression chambers.

Sealing vanes 17 are positioned in longitudinal grooves in the stator 10 and are biased into engagement with the peripheral surface of the rotor 16 by vane springs 18 to provide seals between the working chambers. Each of the springs 18 is provided with oppositely extending hook portions 18a, as shown in FIG. 2A, with

one hook portion engaged in a suitable cut-out in a sealing vane and the other portion being hooked over the edge of the stator 10 to axially retain each vane in its groove when the piston side plate is moved away from the stator, as described hereinafter. Although each of the vanes 17 is biased radially inward by a spring 18 there is little or no movement of the vanes in and out of the slots as the rotor 16 rotates due to the geometric configuration of the epitrochoidal rotor. The compressor can thus be operated over a broad operating speed range because of little or no vane movement and no centrifugal force on the vanes to effect contact load.

As shown, rotor 16 includes a rotor body 20, with a gear hub 21 secured thereto in a suitable manner, such as by machining the gear teeth on the gear hub across the full width of this element and then grinding down the gear teeth on the portion inserted into the rotor body 20 so that the ground down teeth serve as a broach during press fitting of these elements together to form corresponding teeth in the rotor body to securely retain the gear hub to the rotor body. This rotor structure is mounted by bearing 22 on the eccentric portion 23 of the shaft 24 and, the shaft is journaled by bearings 25 and 25a housed in the rear head 13 and front head 14, respectively. Shaft 24 is provided with an integral counterweight 26 and a counterweight 26a, suitably secured thereon, on opposite sides of eccentric portion 23.

Shaft 24 is rotatably sealed in front head by a suitable shaft seal which, in the embodiment disclosed, includes a bonded two-piece head seal 27 axially retained in one direction in the front head by a retaining ring 31. The head seal 27 is in sliding engagement with a seal seat 28 which is secured by a seat cup 29, having axially extending tangs on opposite sides thereof engaged in suitable slots in the seal seat 28 and shaft 24, for rotation with shaft 24 and, the seal seat 28 is axially biased against the head seal 27 by spring washer 30 abutting on one side against the seat cup 29 and on the opposite side against the retaining ring 31a seated in an annular groove provided for this purpose in shaft 24, the retaining ring also serving to retain bearing 25 in position between it and the shoulder 24a on shaft 24. "O"-ring seals 32 and 32a are suitably positioned between shaft 24 and seal seat 28 and between the outer periphery of the head seal 28 and the front head 14, respectively, in a well-known manner.

At its free end, the shaft 24 is continually driven through a pulley 33 suitably secured thereto and connected by belt 34, for example, to a drive pulley on an automobile engine, not shown, so that the shaft 24 is rotated whenever the automobile engine is in operation. However, in accordance with the invention, even though the shaft 24 is being continually driven, an operator can control the actual compression work of the compressor, as desired, in a manner to be described.

As the shaft 24 is rotated in the direction of the arrow, as shown in FIG. 2, the rotor 16 turns in the opposite direction on eccentric portion 23 of the shaft 24 and the angular velocity of the rotor relative to the vanes 17 is determined by the inner gear, which is the external gear teeth 35 of gear hub 21, and an outer gear formed by side plate 11 with inner gear teeth 36 pro-

vided therein. The side plate 11 and stator 10 are fixed against rotation with rear head 13 by dowel pins 37, as seen in FIGS. 1 and 2. With this arrangement, in the embodiment shown, shaft 24 rotates at five times the speed of the rotor 16.

Ingress and egress of fluid to and from the working chambers during actual operation of the compressor is controlled by movement of the rotor 16 relative to the stator 10 and to the end plates 11 and 12, the latter during compression operation of the compressor being in sealing contact with the side faces of the rotor, the rotor being made slightly wider than stator 10 to insure sealing contact between the rotor 16 and side plates 11 and 12. Both the side plates 11 and 12 are provided with suitable inlet ports adapted to be placed in communication with the working chambers, as described in detail hereinafter.

The rear head 13 and the front head 14 are shaped so as to form with the side plates 11 and 12, respectively, annular inlet chambers 40 and 41, respectively, the chamber 40 being in communication with a common inlet 42 in the rear head 13. Fluid from the inlet chambers 40 and 41 can enter the working chambers during the suction stroke through curved inlet ports 44 and 45 in side plates 11 and 12, respectively. Side plate 12, which is centrally apertured, has its inlet ports 45 formed as a continuation of this central aperture, as seen in FIG. 4. Inlet fluid can flow from inlet chamber 40 to inlet chamber 41 through the inlet ports 44 and 45 which are adapted to be in communication with each other through channels 46 provided in each of the lobes of the rotor 16. As seen most clearly in FIGS. 3 and 4, the contour of the inlet ports 44 and 45 is such as to effect proper inlet port closing timing while maintaining maximum mean port opening area, as these inlet ports are opened and closed by the side walls of the lobes of the rotor 16. With this arrangement each working chamber is provided with a double inlet port, one on each side of the working chamber through side plates 11 and 12 from opposed inlet chambers 40 and 41, respectively, continually in communication with each other by means of the channels 46 in the lobes of rotor 16.

As fluid is compressed in each working chamber, it is discharged therefrom through the discharge ports 47 in the outer peripheral facets 48 of the stator 10. As seen in FIGS. 1 and 2, the discharge ports 47 are positioned to receive fluid from each working chamber as a lobe of the rotor is at top dead center therein, with each discharge port normally closed by a reed valve 49, the reed valve being secured at one end by a fastener 51, with a curved retainer 52 positioned over the reed valve to limit outward deflection of the end of the reed valve. Alignment of each of these assemblies is maintained by a pin 53 of the retainer 52 being engaged in suitable aperture in the facet 48 of the stator 10.

Referring again to FIGS. 1 and 2, the stator 10 is formed with a central outer peripheral portion with facets 48 thereon, one for each stator lobe, these facets being positioned between a front radially extending flange 54 and a rear radially extending flange 55 of the stator, the flange 55 having facets 56 thereon with the apices 57 therebetween in engagement with the inner periphery of the rear head 13. These facets 48 and 56 of the stator are in stepped relation to each other as

seen in FIG. 1 but are aligned with each other and with corresponding facets 58 on the periphery of side plate 11, the latter being seen in FIG. 3, to form with the inner peripheral wall 59 of the rear head, exhaust passages in communication with the internally formed arcuate exhaust channels 61 in the rear head 13. The exhaust channels 61 merge into a muffler cavity 62 in the rear head 13 which is in communication with an exhaust outlet 63 extending through the outer rear wall of the rear head. The exhaust channels 61 are formed to provide equal flow paths for the fluid from the discharge ports 47 through the muffler cavity 62 to the outlet 63. Exhaust channels 61 are effectively sealed from inlet chamber 40 by means of "O"-ring seal 13a positioned in a suitable annular groove in the rear head, as seen in FIG. 1, the seal 13a being sandwiched between the side plate 11 and rear head 13.

As previously mentioned, rotor 16 is preferably made slightly wider than stator 10 so that the sides of the rotor can be effectively sealed between side plates 11 and 12. As seen in FIG. 1, side plate and stator 10 are fixed within the compressor housing in abutting relationship to each other between a shoulder 64 of the rear head 13 and the axially extending annular flange 65 of front head 14.

In accordance with the invention, side plate 12 is made in the form of a piston slidably and rotatably journaled within the front head for axial movement into and out of sealing engagement with the front face or right-hand face of the rotor 16, as seen in FIG. 1. As shown, the side plate 12 is provided with an annular outer peripheral edge portion 66 journaled in the inner peripheral surface of annular flange 65 of the front head and it is provided with an axially extending annular flange 67 encircling a rearwardly extending apertured end boss 68 of the front head, these elements of the side plate forming with the front head 14 the previously described inlet chamber 41 and in addition, an annular pressure chamber 71, these chambers being sealed from each other by means of an "O"-ring seal 72 positioned in a suitable annular groove in the flange 67, the seal 72 being sandwiched between this flange 67 and the boss 68.

To effect pressure loading of the side plate 12 against rotor 16, means are provided to deliver fluid under pressure, during compressor operation, to the pressure chamber 71. For example, as seen in FIG. 1, this is accomplished by providing radial extending orifices 73, only one being shown in this figure, in communication at one end with pressure chamber 71 and at its other end with an axial passage 74 formed by providing the front flange 54 of the stator with facets 75, at least two such oppositely positioned facets being shown in FIGS. 1 and 2, and by providing similar aligned facets 76 on the outer periphery of flange 65 of the front head, these facets being thus spaced from the inner peripheral wall of the rear head 13 to form with it the passage 74. This axial passage is in communication with the adjacent discharge port 47 in the stator 10 and, of course, as previously described, and therefore in direct communication with the muffler cavity 62. To prevent discharge of pressurized fluid from passage 74 to the atmosphere, the front head 14 and rear head 13 are sealed relative to each other by means of an "O"-ring seal 77.

During normal operation of the compressor, with the side plate 12 in the position shown in FIG. 1, as fluid pressure is built up in the muffler cavity 62, as it is discharged through the discharge ports 47 from the working chambers of the compressor, this fluid pressure will be transmitted through the above-described passages to the pressure chamber 71 to act on the front annular wall of the piston side plate 12, to force it to the left, as seen in FIG. 1, into sealing engagement with the side face of the rotor 16 and thereby sealingly sandwich the rotor between the side plates 11 and 12.

Now, in accordance with the invention in order to eliminate the need for an external clutch mechanism to control the operation of the compressor, that is, to control compressor on operation and compressor off operation, the piston side plate 12 is utilized as the means to effect clutching and declutching of the compressor so that operation of the compressor can be controlled even though the shaft 24 is continuously driven by the vehicle engine during operation of this engine.

As previously described, side plate 12 is used to effect side sealing of the rotor 16 and therefore sealing of the compression chambers formed by rotor 16 and stator 10, when the side plate 12 is in the position shown in FIG. 1. By providing means to effect axial movement of the side plate 12 to the right, as seen in this figure, away from rotor 16 and stator 10, declutching is accomplished by permitting internal free bypassing of fluid between the compression chambers of the compressor and thus, there is no compression of fluid in these chambers. In effect, the compressor is then in a compressor off mode of operation.

To effect this axial displacement of side plate 12, it is provided with a plurality of axially extending peripheral bosses 81, three such bosses being used in the embodiment disclosed, each of the bosses having a helical slot 82 therein to slidably receive a pin 83 fixed to the flange 65 of the front head 14 and extending radially inward thereof. In the embodiment disclosed, the slots are angled so that when the side plate 12 is rotated clockwise, as seen from the front of the compressor, it will be cammed rearwardly, to the left as seen in FIG. 1 to the position shown therein, in sealing engagement with rotor 16 and, when it is rotated counterclockwise, it will then be cammed forward or to the right away from rotor 16 and stator 10. In this latter position, fluid in the compression chambers will be recirculated between these chambers thus preventing any build-up of fluid pressure therein. Thus, little or no work is done at that time on the fluid and, in effect, the compressor is declutched when this occurs. Power input to the compressor is then at a minimum, only sufficient power being required to freely rotate the shaft 24 and the components attached thereto.

Rotation of the side plate 12, to effect axial displacement of it, as seen in FIGS. 6 and 7, is accomplished by means of a forked lever 84 secured to one end of a shaft 85 journaled for rotation in the front head 14. Opposed cam surfaces on the fork portions of the lever 84 are positioned to engage a drive pin 88 extending radially from the side plate 12. Lever 84 is also used to actuate a valve 91 to control venting of fluid between pressure chamber 71 and the inlet chamber 41 through a conduit 92 formed in the side plate 12, a valve seat 93 insert being positioned in the conduit adjacent to pres-

sure chamber 71. Valve 91 is provided with a valve element 94 of suitable material, such as neoprene, bonded to its head portion for engagement with the valve seat 93. The stem of valve 91 extends through a suitable aperture in the arm of lever 84 and is secured thereto by means of a retaining ring 95 positioned in a suitable groove in the end of the stem of the valve. The head portion of valve 91 is normally biased toward the valve seat 93 by a spring 96 encircling the stem of valve 91 between its head portion and the arm of lever 84.

During compressor on operation, high pressure fluid is conducted into the pressure chamber 71 through the orifice 73 so as to load the side plate into sealing engagement with the rotor 16 as previously described. Low pressure fluid, that is, inlet fluid, occupies the inlet chamber 41. In order to move the side plate axially in a direction to effect declutching or compressor off operation, the fluid pressures in the inlet chamber 41 and in the pressure chamber 71 must first be equalized. This is accomplished by actuation of valve 91. When the lever 84 is rotated counterclockwise, as seen in FIG. 7, valve 91 will first be unseated from the valve seat 93 to port high pressure fluid from the chamber 71 to the chamber 41 thus equalizing the pressure in both cavities. Further movement of lever 84 in this counterclockwise direction then allows the forked portion 86 of this lever to contact the pin 88 to rotate the side plate 12 counterclockwise, as seen from the front of the compressor, with the slots 82 therein engaging the pins 83. The side plate 12, in essence, is thus unscrewed from contact with rotor 16 and stator 10 to allow bypassing of fluid between the compression chambers of the compressor.

To actuate the compressor, that is, to put the unit in compressor on operation, the opposite procedure is followed. Clockwise rotation of the lever 84, as seen in FIG. 7, makes the fork portion 87 thereof contact the pin 88 to rotate the side plate 12 so that the engagement of the pins 83 in the slots 82 in the side plate will cause it to, in effect, screw into contact with the rotor 16. When the side plate 12 comes into intimate contact with the rotor 16, valve 91 will close off the passage 92 and as the compressor is now in an operative mode, it will build up pressure within the muffler cavity 62 so that fluid under pressure will be transmitted through the passage 74 and orifice 73 into the pressure chamber 71 to force the side plate into firm sealing engagement against the rotor 16.

When the side plate 12 moves away from the rotor 16, in the manner previously described, interference between the rotor 16 and the counterweight 26 on the shaft 24 will prevent the rotor from following the side plate 12. The vane springs 18, with the hook portions 18a thereon, as shown in FIG. 2A, retain the vanes 17 in their slots within the stator 10 when the side plate 12 moves away from the stator.

An actuating lever 97, fixed to the opposite end of shaft 85, is connected by link 98 to a suitable power source, as for example, a differential fluid pressure operated motor, such as vacuum motor 101, fixed to the compressor by bracket 102, as seen in FIGS. 5 and 8. Preferably, the vacuum motor 101 would be evacuated for compressor on operation and would be vented to atmospheric air for compressor off operation.

An embodiment of a suitable control system to control operation of the compressor through operation of the vacuum motor 101 in the manner described above is illustrated in FIG. 8. As shown, a dashboard mounted vacuum switch 103 is used by the vehicle operator to effect operation of the vacuum motor 101, that is, to either evacuate the variable pressure chamber of the vacuum motor or to vent it to the atmosphere depending on the position of the vacuum switch.

The vacuum switch 103 is connected by a conduit 104 to a vacuum relay valve 105 which is used in the system to maintain vacuum for evacuation of vacuum motor 101 under low vacuum conditions, such as during acceleration of the vehicle engine. For this purpose, vacuum relay 105 is connected by a conduit 106 to a source of vacuum, such as the engine manifold vacuum, not shown. Vacuum relay valve 105 is connected by a conduit 107 to a vacuum solenoid valve 108 connected by a conduit 111 to the vacuum motor 101 by a conduit 112 to the atmosphere. The vacuum solenoid valve 108 is preferably used to disconnect the compressor during engine cranking to remove the load of the compressor from the engine.

To effect operation of the compressor, that is, to effect compressor on operation, during engine operation, the vacuum switch 103 is rotated to place the vacuum line 113 in communication with the conduit 104 to evacuate the variable pressure chamber of the vacuum motor 101 which then through the mechanism previously described will effect movement of the side plate 12 into original sealing position relative to rotor 16 and stator 10. To declutch the compressor, that is, to effect compressor off operation, the vacuum switch 103 is rotated to disconnect conduit 104 from vacuum line 113 and place it in communication with vent line 114 thus venting the vacuum motor 101 to atmospheric pressure and thereby effect movement of side plate 12 away from the rotor 16 and stator 10 in the manner previously described.

What is claimed is:

1. A compressor comprising a stator having an inner peripheral wall with $N+1$ lobes disposed about an axis, a casing means including first casing means and second casing means extending on opposite axial sides of said stator and positioned to enclose said stator, an epitrochoidal rotor with N lobes, a shaft rotatably mounted in said casing means along said stator axis, eccentric means carried by said shaft for supporting said rotor for rotation within said stator to form therewith variable volume working chambers, a first side plate and a second side plate positioned on opposite sides of said rotor for sealing engagement with the lateral faces of said rotor, inlet means in said first casing means and said first side plate and in said second casing means and said second side plate for the controlled ingress of fluid into said working chambers, said lobes of said rotor having fluid channels therein for communication with the means in said first side plate and said second side plate for the ingress of fluid into said working chamber, outlet means in said first casing means, said first side plate and said stator for the controlled egress of fluid out of said working chambers, said second side plate being journaled in said second casing means and forming with it a pressure chamber, orifice passage means connecting said outlet means to said pressure chamber

to effect pressure loading of said second side plate in a first axial direction against said rotor.

2. A compressor according to claim 1 including valve controlled passage means connecting said pressure chamber to said inlet means, and lever actuated means 5 connected to said valve controlled passage means and to said second side plate to effect opening and closing of said valve controlled passage means and to effect axial displacement of said second side plate relative to said rotor.

3. A compressor according to claim 2 including gear means comprising an internal gear on said rotor and an external gear on said first side plate to effect, together with said eccentric means on said shaft, planetary rotation of said rotor within said stator.

4. A compressor comprising a stator having an inner peripheral wall with $N + 1$ lobes disposed about an axis, casing means and first and second side plates partly enclosing said stator, an epitrochoidal rotor with N lobes, a shaft rotatably mounted in said casing means and extending through said stator, eccentric drive means carried by said shaft for supporting said rotor for planetary rotation within said stator to form therewith variable volume working chambers sealable on opposite sides by said first side plate and said second side plate positioned for sealing engagement with opposite sides of said rotor, inlet means in said casing means and in said first and second side plates for the controlled ingress of fluid into said working chambers, outlet means in said casing means and in said first and second side plates for the controlled egress of fluid out of said working chambers, said first side plate being slidably received in said casing means for axial movement relative to said rotor and forming with said casing means an inlet chamber and a pressure chamber as parts of said inlet means and said outlet means, respectively, whereby said first side plate is pressure loaded axially against said rotor by fluid under pressure as discharged from said working chambers during operation of the compressor, conduit means with a valve therein connecting said inlet 40 chamber to said pressure chamber and actuator means connected to said first side plate and to said valve to effect the controlled axial movement of said first side plate into and out of sealing engagement with said rotor and to control the operation of said valve.

5. A compressor according to claim 4 wherein said actuator means includes pin and slot means associated

with said casing means and said first side plate to effect positive axial movement of said first side plate relative to said rotor upon rotation of said first side plate and lever means extending through said casing means and connected to said first side plate and to said valve to effect rotation of said first side plate and operation of said valve.

6. A compressor including a casing having a first casing and a second casing, a stator having $N+1$ lobed inner contours positioned in said casing, a rotor having N hollow lobes journaled for planetary rotation in said stator to form therewith variable volume working chambers, a drive shaft journaled in said housing and having eccentric means thereon, said rotor being 15 drivingly connected to said eccentric means, and gear means comprising an internal gear on said rotor and an external gear fixed relative to said stator to effect planetary rotation of said rotor, a first side plate disposed in said first casing means on one side of said stator, said first head and said first side plate having inlet and discharge passages therein for providing communication to and from said working chambers, a second side plate disposed in said second casing on the opposite side of said stator and axially movable with respect to said rotor, said second casing and said second side plate forming an inlet chamber in communication with said working chambers and interconnected to said inlet passages in said first side plate by said hollow lobes of said rotor, seal means positioned between said second casing and said second side plate to form therewith a pressure chamber, passage means connecting said pressure chamber to said discharge chamber whereby said second side plate is pressure loaded into sealing engagement with said rotor, conduit means connecting said pressure chamber to said inlet chamber, valve means positioned to control the flow of fluid through said conduit means and actuator means connected to said valve means and to said second side plate to effect operation of said valve means and to effect axial placement of said second side plate relative to said rotor.

7. A compressor according to claim 6 wherein the width of said rotor is greater than the width of said stator so that the side surfaces of said rotor are positioned relative to said stator for sealing engagement with said first side plate and said second side plate.

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