US00RE40344E

(19) **United States**
(12) **Reissued Patent**
Perevozchikov et al.
(10) **Patent Number: US RE40,344 E**
(45) **Date of Reissued Patent: May 27, 2008**

(54) **SCROLL MACHINE WITH PORTED ORBITING SCROLL MEMBER**

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(21) Appl. No.: **10/681,353**

(22) Filed: **Oct. 8, 2003**

Related U.S. Patent Documents

Reissue of:
(64) Patent No.: **6,350,111**
Issued: **Feb. 26, 2002**
Appl. No.: **09/639,004**
Filed: **Aug. 15, 2000**

(51) **Int. Cl.**
F04B 23/00 (2006.01)
F04B 41/00 (2006.01)

(52) **U.S. Cl.** **417/440**; 418/55.6; 418/87; 418/99

(58) **Field of Classification Search** 418/55.1–55.6, 418/84, 87, 99; 417/310, 440
See application file for complete search history.

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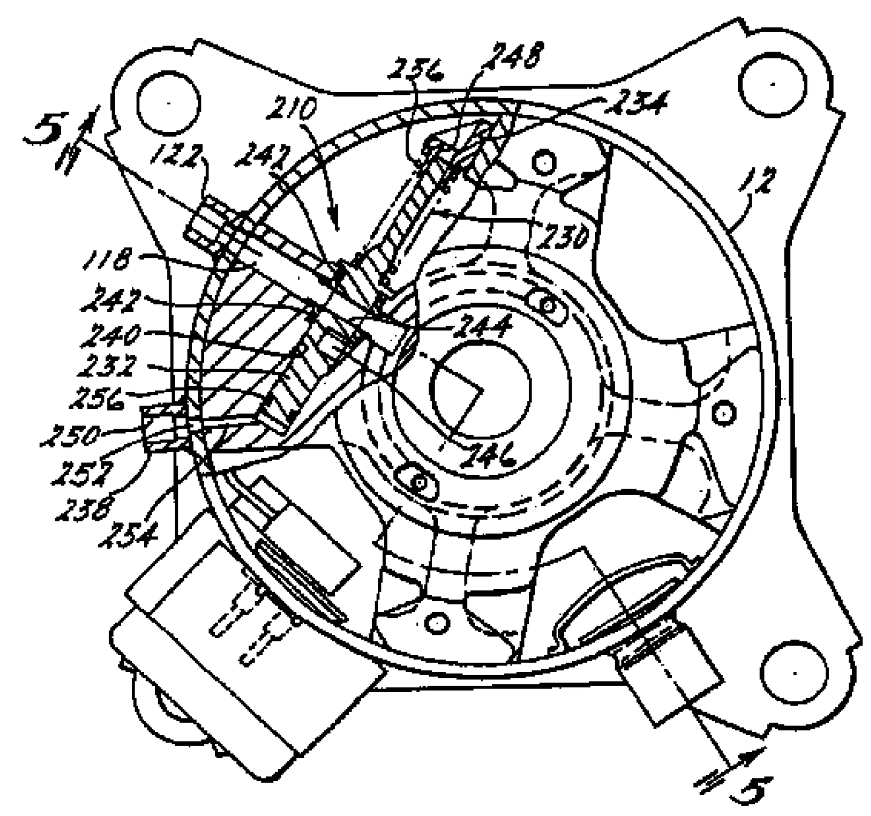
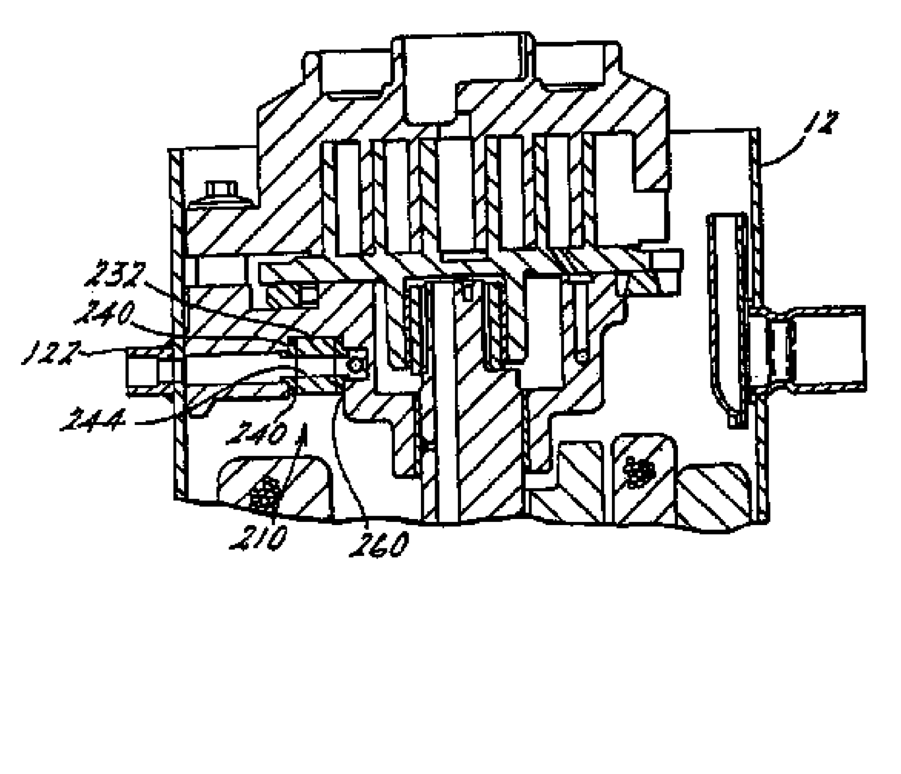
(57) **ABSTRACT**

A scroll compressor includes a fluid injection system. The fluid injection system includes a fluid passage which extends from a position outside of the shell of the compressor to the fluid pockets created by the wraps of the scroll members. The fluid passage extends through the orbiting scroll member. The fluid injection system can be used to inject gaseous or liquid refrigerant, lubricant or the fluid injection system can be used to vent the moving pocket to the suction area of the compressor for capacity modulation.

24 Claims, 4 Drawing Sheets





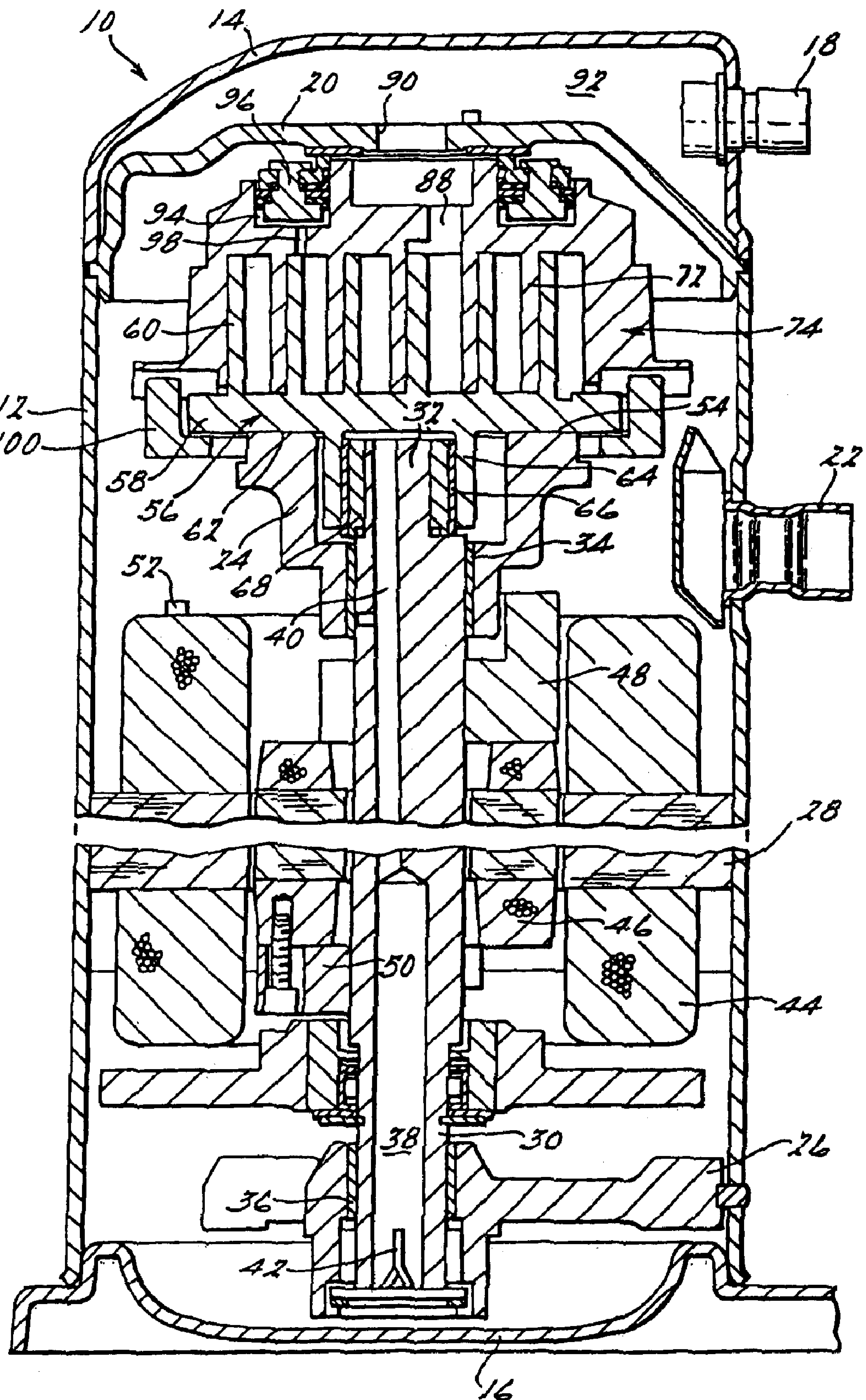

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Fig. 1.

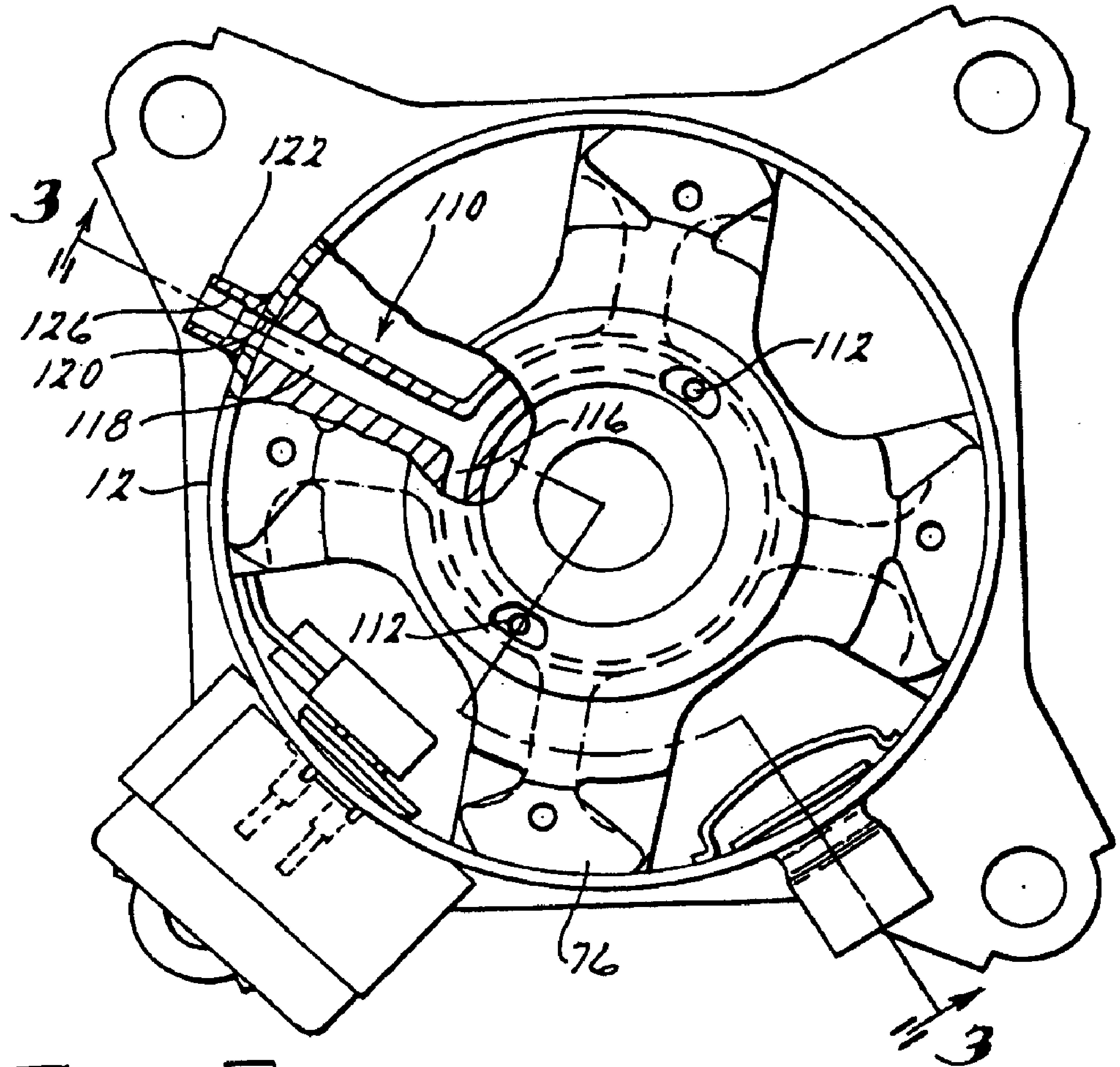
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Fig. 2.

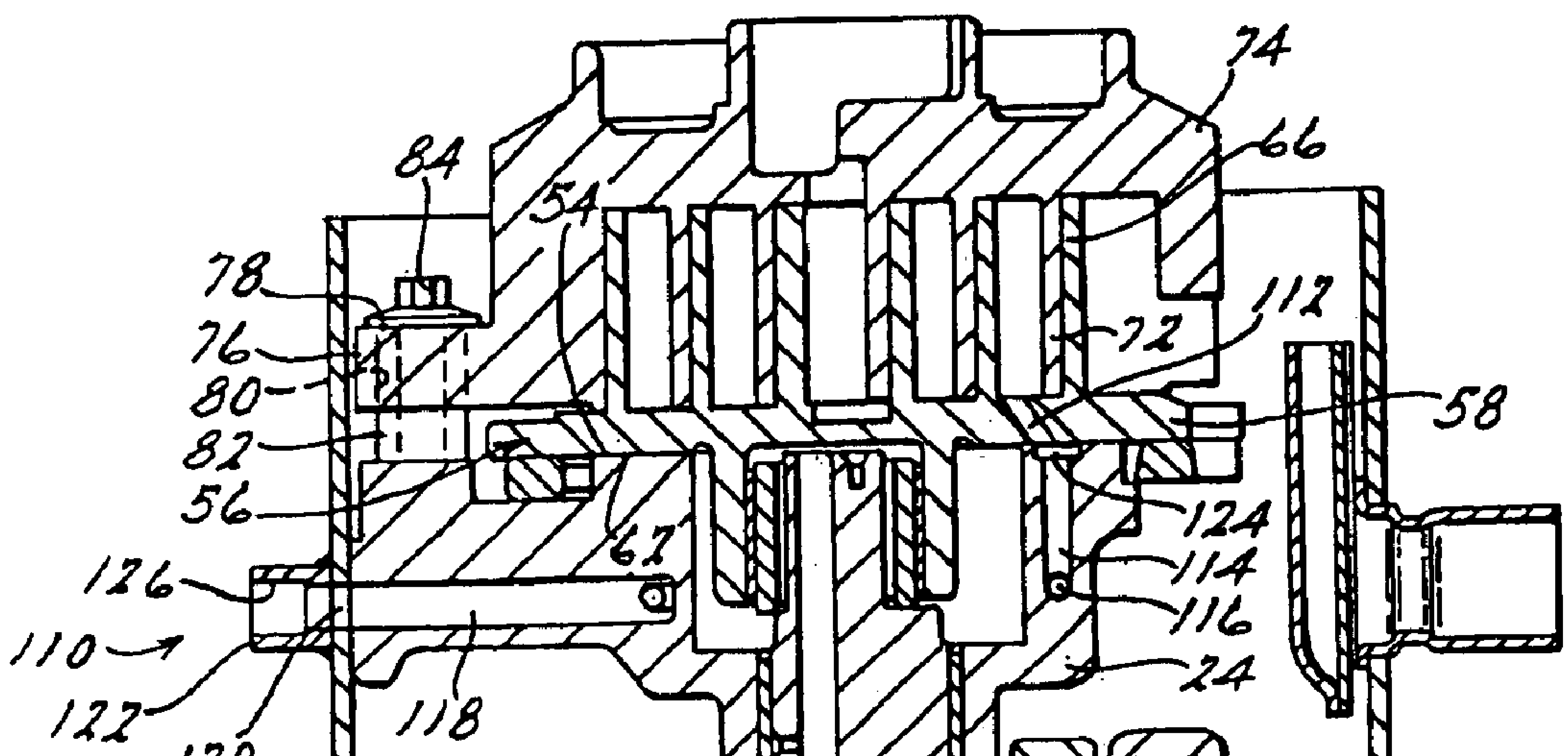
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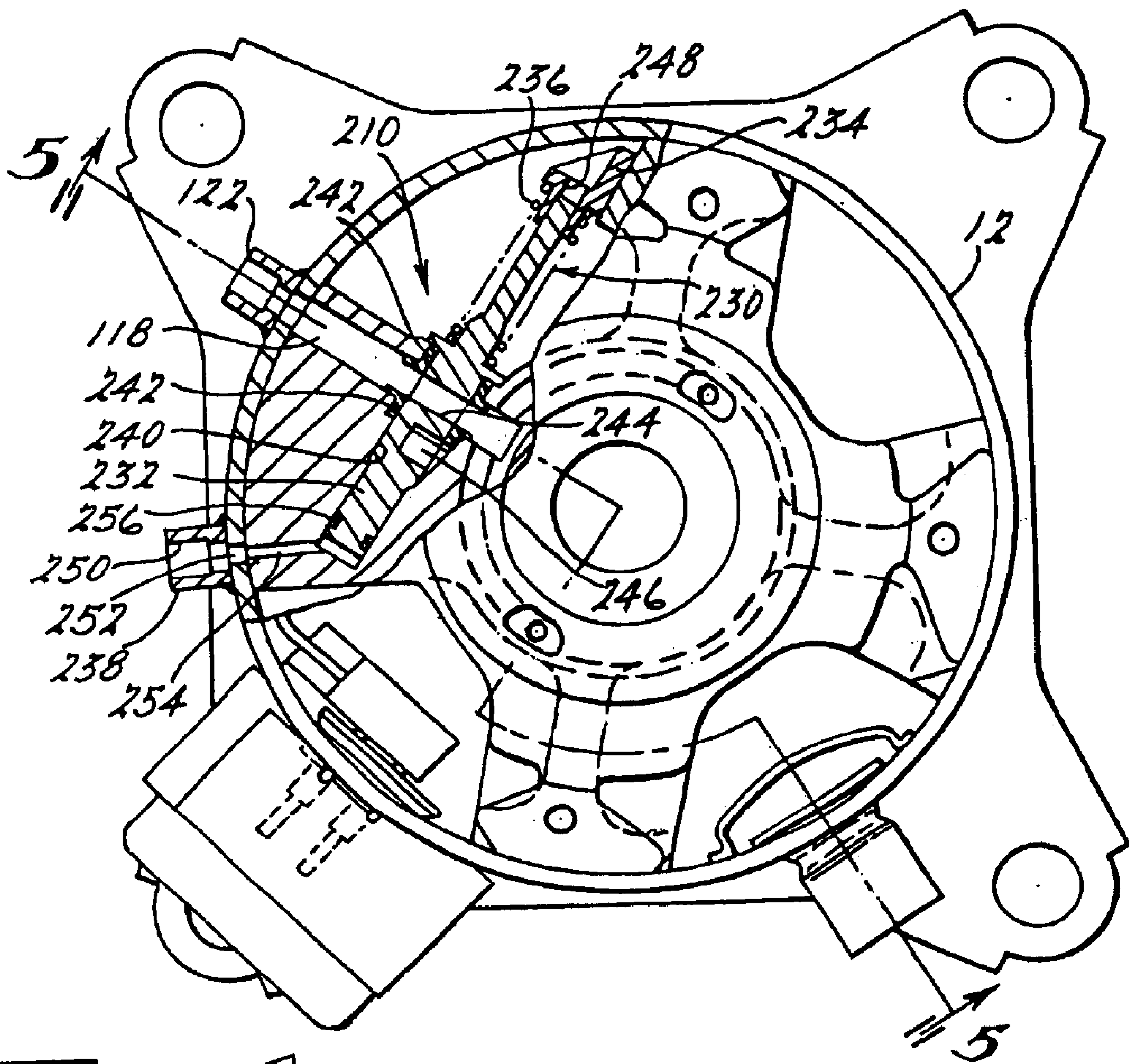
Fig. 3.


5
210
236
248
234
122
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118
230
242
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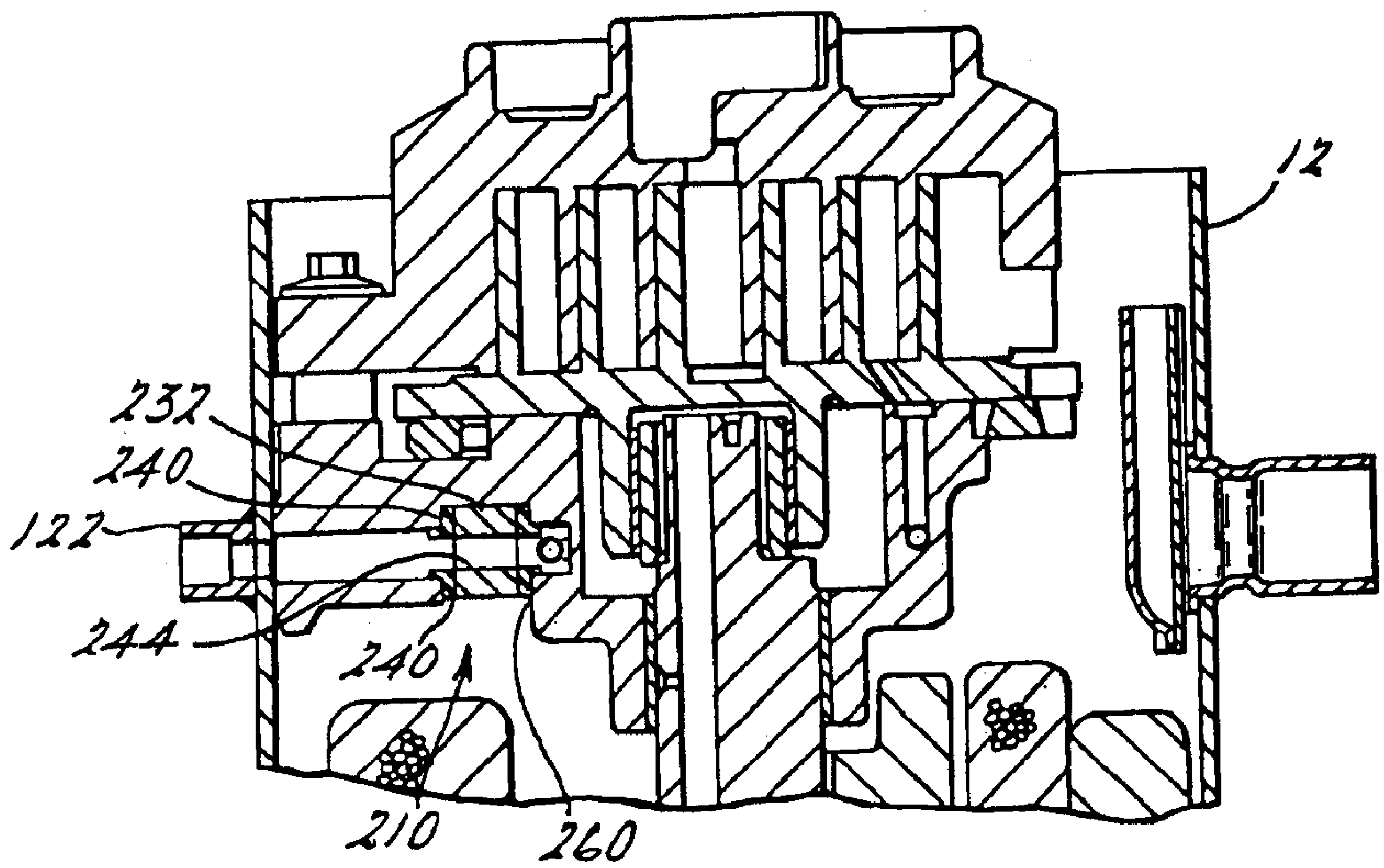
250
246
252
238
254
5

FIG. 4.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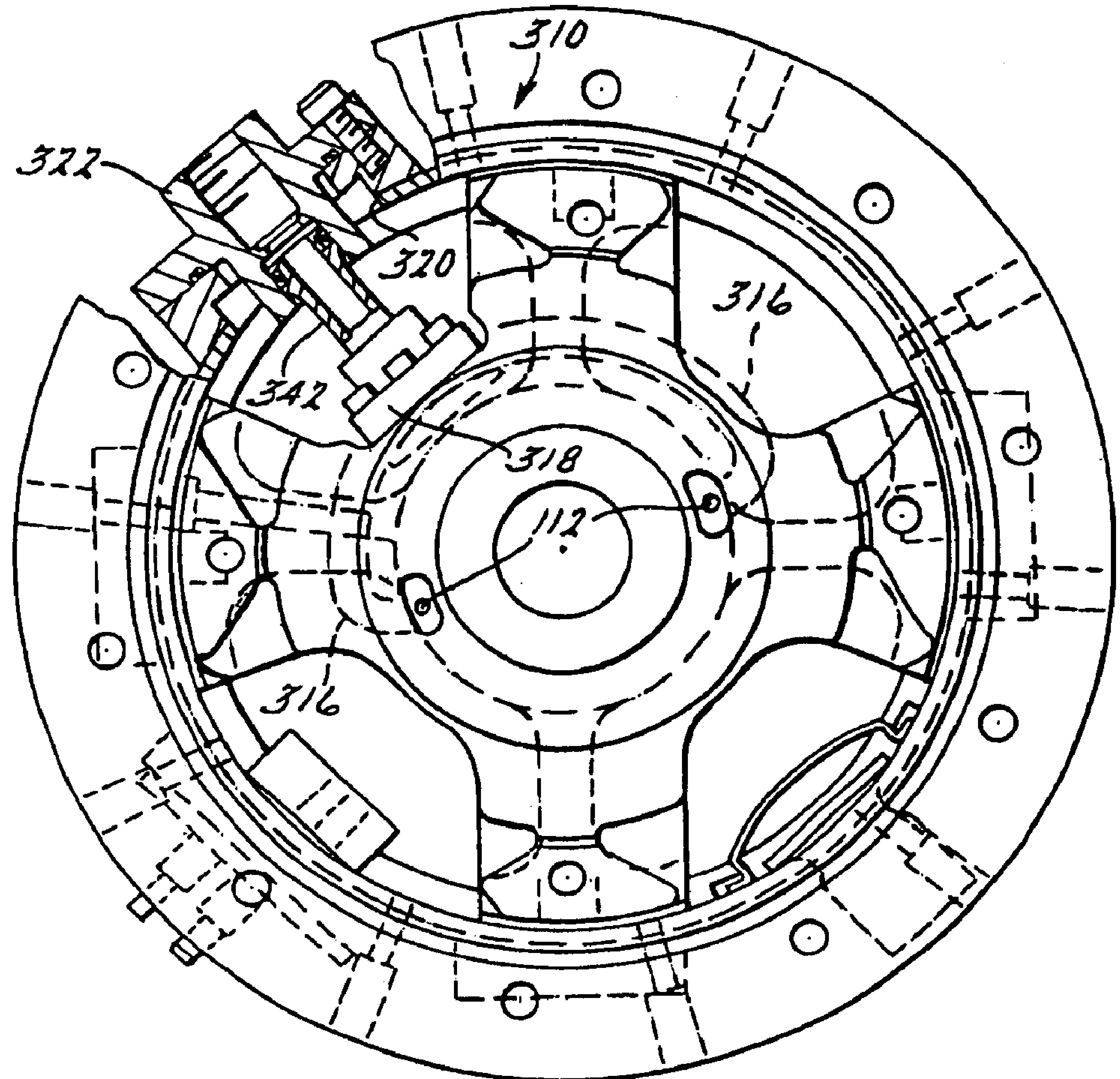
122
244
240
210
260

FIG. 5.


310
322
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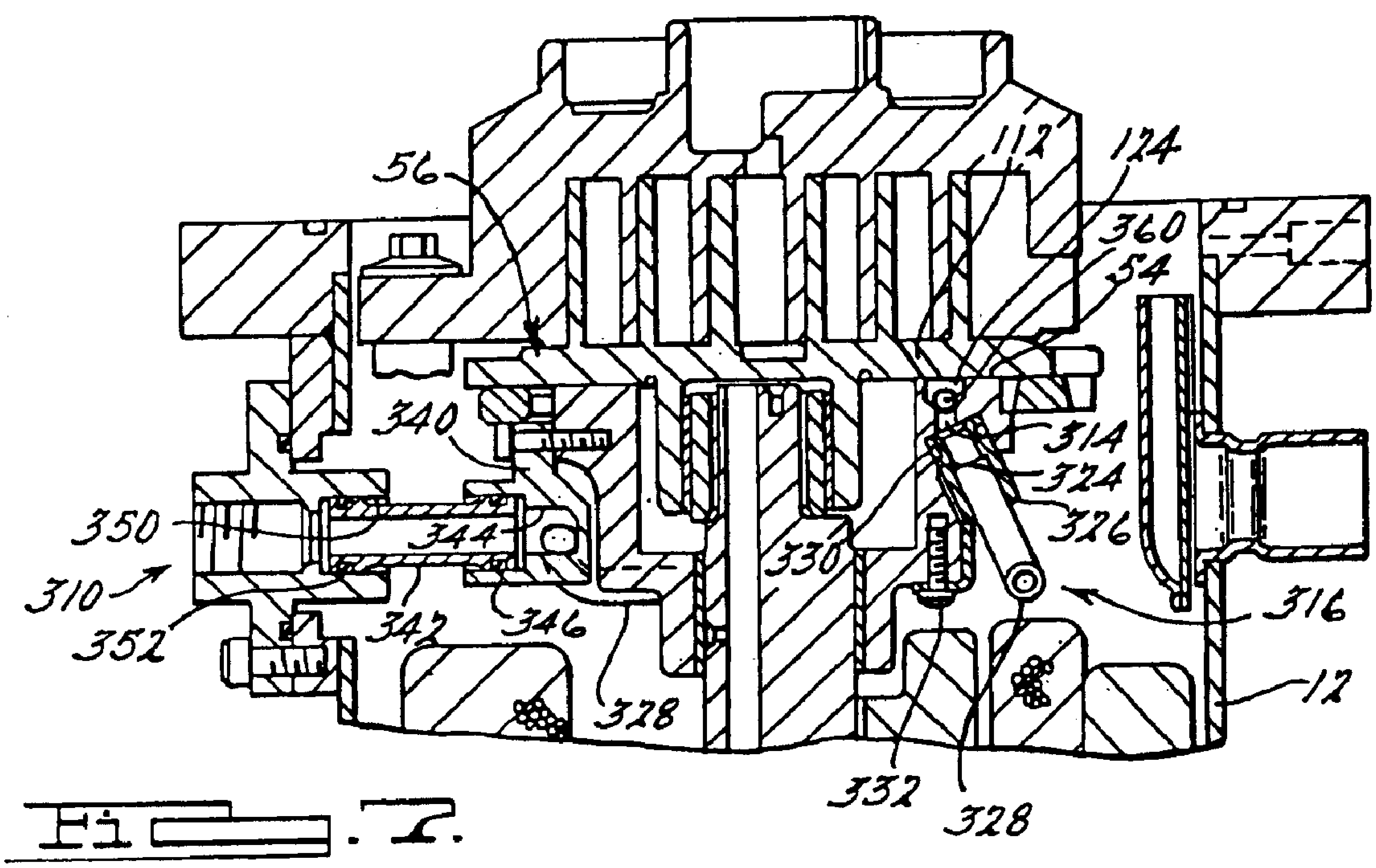
316
342
318
112
316

Fig. 6.


56
112
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310
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12
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332
328

Fig. 7.

SCROLL MACHINE WITH PORTED ORBITING SCROLL MEMBER

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

FIELD OF THE INVENTION

The present invention relates generally to scroll-type machines. More particularly, the present invention relates to hermetic scroll compressors incorporating a fluid injection system where the fluid injection system utilizes a fluid passage extending through the end plate of the orbiting scroll member.

BACKGROUND AND SUMMARY OF THE INVENTION

Refrigeration and air conditioning systems generally include a compressor, a condenser, an expansion valve or an equivalent, and an evaporator. These components are coupled in sequence in a continuous flow path. A working fluid flows through the system and alternates between a liquid phase and a vapor or gaseous phase.

A variety of compressor types have been used in refrigeration systems, including but not limited to reciprocating compressors, screw compressors and rotary compressors. Rotary type compressors can include the various vane type compressors as scroll machines. Scroll compressors are constructed using two scroll members with each scroll member having an end plate and a spiral wrap. The scroll members are mounted so that they may engage in relative orbiting motion with respect to each other. During this orbiting movement, the spiral wraps define a successive series of enclosed spaces or pockets, each of which progressively decrease in size as it moves inwardly from a radial outer position at a relatively low suction pressure to a central position at a relatively high pressure. The compressed gas exists from the enclosed space at the central position through a discharge passage formed through the end plate of one or the scroll members.

The designers for these scroll-type machines need to have access to these enclosed spaces or pockets as they move between suction and discharge for various reasons. One reason for accessing these moving pockets is to inject oil into the pockets in order to lubricate and cool the scroll members as they compress the fluid. Another reason for accessing these moving pockets, for a refrigerant compressor, is to inject liquid refrigerant to provide cooling for the scroll members. Anther reason for accessing these moving pockets is to connect these intermediate pockets to the suction zone of the compressor in order to reduce the capacity of the compressor in a capacity modulation system. Still another reason for accessing these moving pockets is to inject an additional quantity of the fluid being compressed in vapor form in order to increase the compression ratio or capacity of the scroll machine.

Various prior art methods have been utilized to gain access to these moving pockets. When the access to these moving pockets does not require access from outside the hermetic shell of the compressor, such as oil injection and/or capacity modulation, the access can be achieved through either the orbiting scroll or the non-orbiting scroll, depending on the design intent for the injection system. When the access to these moving pockets does require access from outside the hermetic shell, such as liquid injection and vapor

injection systems, the access is provided through the stationary or non-orbiting scroll due to the ease of communicating with a stationary scroll member rather than the moving orbiting scroll member.

The continued development for fluid injection systems include the optimizing of the designs for gaining access to the moving pockets of compressed fluid. The present invention provides the art with a method of accessing the moving fluid pockets from outside the hermetic shell of the compressor through a passage extending through the end plate of the orbiting scroll member. Accessing the moving pockets from outside the hermetic shell through the orbiting scroll provides for less expensive and simpler assembly of the scroll machine as well as less expensive machining requirements for the scroll members.

Other advantages and objects of the present invention will become apparent to those skilled in the art from the subsequent detailed description, appended claims and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings which illustrate the best mode presently contemplated for carrying out the present invention:

FIG. **1** is a vertical cross sectional view of a scroll compressor incorporating a unique fluid injection system in accordance with the present invention;

FIG. **2** is a plan view, partially in cross-section of the scroll compressor shown in FIG. **1**;

FIG. **3** is an enlarged cross-sectional view taken generally along line **3**-**3** in FIG. **2** showing the injection system for the compressor shown in FIG. **1**;

FIG. **4** is a plan view, partially in cross-section, of a unique fluid injection system in accordance with another embodiment of the present invention;

FIG. **5** is an enlarged cross-sectional view taken generally alone line **5**-**5** in FIG. **4** showing the injection system shown in FIG. **4**;

FIG. **6** is a plan view, partially in cross-section, of a unique fluid injection system in accordance with another embodiment of the present invention; and

FIG. **7** is an enlarged cross-sectional view showing the injection system shown in FIG. **6**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings in which like reference numerals designate like or corresponding parts throughout the several views, there is shown in FIG. **1** a hermetic shell compressor incorporating the unique fluid injection system in accordance with the present invention which is identified generally by the reference numeral **10**. Scroll compressor **10** comprises a generally cylindrical hermetic shell **12** having welded at the upper end thereof a cap **14** and at the lower end thereof a base **16** having a plurality of mounting feet (not shown) integrally formed therewith. Cap **14** is provided with a refrigerant discharge fitting **18** which may have the usual discharge valve therein (not shown). Other major elements affixed to shell **12** includes a transversely extending partition **20** which is welded about its periphery at the same point cap **14** is welded to shell **12**, an inlet fitting **22**, a main bearing housing **24** which is suitably secured to shell **12** and a lower bearing housing **26** having a plurality of radially outwardly extending legs each of which is suitably secured to shell **12**. A motor stator **28** which is generally square in cross-section but with the corners rounded off is press fit into shell **12**. The flats between the rounded corners on stator **28** provide passageways between stator **28** and shell **12** which facilitate the return flow of the lubricant from the top of shell **12** to its bottom.

A drive shaft or crankshaft **30** having an eccentric pin **32** at the upper end thereof is rotatably journaled in a bearing **34** in main bearing housing **24** and in a bearing **36** in lower bearing housing **26**. Crankshaft **30** has at the lower end thereof a relatively large diameter concentric bore **38** which communicates with a radially outwardly located smaller diameter bore **40** extending upwardly therefrom to the top of crankshaft **30**. Disposed within bore **38** is a stirrer **42**. The lower portion of the interior shell **12** is filled with lubricating oil and bores **38** and **40** act as a pump to pump the lubricating oil up crankshaft **30** and ultimately to all of the various portions of compressor **10** which require lubrication.

Crankshaft **30** is relatively driven by an electric motor which includes motor stator **28** having windings **44** passing therethrough and a motor rotor **46** press fitted onto crankshaft **30** and having upper and lower counterweights **48** and **50**, respectively. A motor protector **52**, of the usual type, is provided in close proximity to motor windings **44** so that if the motor exceeds its normal temperature range, motor protector **52** will de-energize the motor.

The upper surface of main bearing housing **24** is provided with an annular flat thrust bearing surface **54** on which is disposed an orbiting scroll member **56**. Scroll member **56** comprises an end plate **58** having the usual spiral vane or wrap **60** on the upper surface thereof and an annular flat thrust surface **62** on the lower surface thereof. Projecting downwardly from the lower surface is a cylindrical hub **64** having a journal bearing **66** therein and in which is rotatively disposed a drive bushing **68** having an inner bore within which crank pin **32** is drivingly disposed. Crank pin **32** has a flat on one surface (not shown) which drivingly engages a flat surface in a portion of the inner bore of drive bushing **68** to provide a radially complaint drive arrangement such s shown in assignee's U.S. Pat. No. 4,877,382, the disclosure of which is incorporated herein by reference.

Wrap **60** meshes with a non-orbiting scroll wrap **72** forming part of a non-orbiting scroll member **74**. During orbital movement of orbiting scroll member **56** with respect to non-orbiting scroll member **74** creates moving pockets of fluid which are compressed as the pocket moves from a radially outer position to a central position of scroll members **56** and **74**. Non-orbiting scroll member **74** is mounted to main bearing housing **24** in any desired manner which will provide limited axial movement of non-orbiting scroll member **74**. The specific manner of such mounting is not critical to the present invention. However, in the preferred embodiment, non-orbiting scroll member **74** has a plurality of circumferentially spaced mounting bosses **76** (see FIGS. **2** and **3**), each having a flat upper surface **78** and an axial bore **80**. A sleeve **82** is slidably disposed within bore **80** and sleeve **82** is bolted to main bearing housing **24** by a bolt **84**. Bolt **84** has an enlarged head which engages upper surface **78** to limit the axial upper or separating movement of non-orbiting scroll member **74**. Movement of non-orbiting scroll member **74** is the opposite direction is limited by axial enlargement of the lower tip surface of wrap **72** and the flat upper surface of orbiting scroll member **56**.

Non-orbiting scroll member **74** has a centrally disposed discharge port **88** which is in fluid communication via an opening **90** in partition **20** with a discharge muffler **92** defined by cap **14** and partition **20**. Fluid compressed by the moving pockets between scroll wraps **60** and **72** discharges into discharge muffler **92** through port **88** and opening **90**.

Non-orbiting scroll member **74** has in the upper surface thereof an annular recess **94** having parallel coaxial sidewalls within which is sealingly disposed for relative axial movement an annular seal assembly **96** which serves to isolate the bottom of recess **94** so that it can be placed in fluid communication with a source of intermediate fluid pressure by means of a passageway **98**. Non-orbiting scroll member **74** is thus axially biased against orbiting scroll member **56** by the forces created by discharge pressure acting on the central portion of non-orbiting scroll member **74** and the forces created by intermediate fluid pressure acting on the bottom of recess **94**. This axial pressure biasing, as well as the various techniques for supporting non-orbiting scroll member **74** for limited axial movement, are disclosed in much greater detail in assignee's aforementioned U.S. Pat. No. 4,877,382.

Relative rotation of scroll members **56** and **74** is prevented by the usual Oldham Coupling **100** having a pair of keys slidably disposed in diametrically opposing slots in non-orbiting scroll member **74** and a second pair of keys slidably disposed in diametrically opposed slots in orbiting scroll member **56**.

Compressor **10** is preferably of the "low side" type in which suction gas entering shell **12** is allowed, in part, to assist in cooling the motor. So long as there is an adequate flow of returning suction gas, the motor will remain within the desired temperature limits. When this flow ceases, however, the loss of cooling will cause motor protector **52** to trip and shut compressor **10** down.

The scroll compressor, as thus broadly described, is either known in the art or it is the subject matter of other pending applications for patent by Applicant's assignee. The details of construction which incorporate the principles of the present invention are those which deal with a unique fluid injection system identified generally by reference numeral **110**. Fluid injection system **110** can be used to inject liquid refrigerant for cooling purposes, vapor or gaseous refrigerant for capacity increase, oil for lubrication and cooling or fluid injection system **110** can be used for capacity modulation. The present invention, for exemplary purposes, will be described using a vapor injection system as fluid injection system **110** but it is to be understood that other fluids could be injected or fluids can be vented using fluid injection system **110**.

Referring now to FIGS. **1-3**, fluid injection system **110** comprises a pair of fluid injection passages **112** extending through end plate **58** of orbiting scroll member **56**, a pair of generally vertical fluid passages **114** in main bearing housing **24**, a generally circular horizontal fluid passage **116** in main bearing housing **24**, a generally horizontal fluid passage **118** extending through one of the legs of main bearing housing **24**, a fluid injection port **120** extending through shell **12**, and a fluid injection fitting **122** secured to the outside of shell **12**.

Fluid injection passages **112** extend through end plate **58** of orbiting scroll member **56**. The positioning of the opening for passages **112** on the wrap side of the end plate will be determined by the positioning during the compression cycle that fluid is going to be injected or released from a pair of the moving pockets between wraps **60** and **72**. The positioning of the opening for passages **112** on thrust surface **62** of scroll member **56** will be such that the opening of passages **112** will always be adjacent thrust bearing surface **54** of main bearing housing **24** throughout the entire orbital movement of orbiting scroll member **56**. This feature is described below as it relates to fluid passage **114**.

Fluid passages **114** each extend vertically from thrust bearing surface **54** to fluid passage **116**. Each fluid passage **114** comprises a counter bored portion **124** which opens up on thrust bearing surface **54**. Counter bored portions **124** are sized such that fluid communication is always maintaining with its respective fluid injection hole **112** during all orbiting movement of orbiting scroll member **56**.

Generally circular horizontal passage **116** extends between the pair of fluid passages **114** and horizontal fluid passage **118**. Fluid passage **118** extends generally horizontally through one of the legs of main bearing housing **24**. Fluid passage **118** opens to injection port **120** which extends through shell **12**. Fluid injection fitting **122** is secured to shell **12** by welding and it includes a central bore **126** in fluid communication with port **120**.

Thus, access from injection fitting **122** to the moving compression pockets between scroll wraps **60** and **72** is provided through bore **126**, through port **120**, through passage **118**, through passage **116**, through passage **114** and counter bore **124**, and through passages **112**. Fluid can be injected into the moving pockets between scroll wraps **60** and **72** or fluid can be removed from the moving pockets between scroll wraps **72** and **66** through fitting **122**.

Referring now to FIGS. **4** and **5**, a fluid injection system **210** according to another embodiment of the present invention is illustrated. Fluid injection system **210** is similar to fluid injection system **110** except that fluid injection system **210** incorporates an internal valve system **230** which can replace any type of external valve system incorporated with fluid injection system **110**. Internal value system **230** is disposed inside shell **12** as opposed to an external system. Internal valve system **230** comprises a slider valve **232**, a valve guide support **234**, a valve return spring **236** and an activating fitting **238**.

Slider valve **232** is slidingly disposed within a bore **240** which intersects with generally horizontal fluid passage **118**. A pair of seals **242** seal the fluid within fluid passage **118** from bore **240**. Slider valve **232** defines a vapor injection through hole **244** and a modulation slot **246**. Vapor injection through hole **244** is utilized for providing vapor injection into the fluid pockets between scroll wraps **60** and **72** to increase the capacity of the compressor. Modulation slot **246** is utilized for providing delayed compression by releasing the compressed fluid in the fluid pockets between scroll wraps **60** and **72** to modulate or reduce the capacity of the compressor. The combination of the vapor injection and the delayed compression allows for an increase in the modulation of the compressor when the full capacity of the compressor is with vapor injection. Assuming a compressor without vapor injection operates at 100% capacity and, with capacity modulation due to delayed compression, the capacity is reduced to approximately 60%, the incorporation of vapor injection will increase its capacity to approximately 120%. When valve system **230** switches from vapor injection to modulation, the capacity will reduce to the original 60%. Thus, a 60% capacity modulation (100% to 60%) becomes a 50% capacity modulation (120% to 60%).

Valve guide support **234** is attached to an adjacent leg of main bearing housing **24** and it defines bore **248** which slidingly receives slider valve **232** and guides its movement. Valve return spring **236** is located between valve guide support **234** and slider valve **232** to bias slider valve **232** into its vapor injection position as shown in FIG. **4**. Activating fitting **238** is in communication with one end of bore **240** through a bore **250** in fitting **238**, a port **252** in shell **12** and a passage **254** in the leg of main bearing housing **24**. Bore **250** is connected to a source of pressurized fluid, such as the discharge pressure of the compressor, through a valve such as a solenoid valve. When this pressurized fluid is provided to the end of bore **240**, slider valve **232** moves from its position shown in FIG. **4** to a position where modulation slot **246** aligns with fluid passage **118** to permit modulation of the capacity of the compressor through a port **260** extending through main bearing housing **24**. A seal **256** isolates the pressurized fluid provided through activating fitting **238**. When the vapor injection feature is again desired, the pressurized fluid can be released from fitting **238** allowing valve return spring **236** to again align vapor injection through hole with passage **118** as shown in FIG. **4**.

Referring now to FIGS. **6** and **7**, a fluid injection system **310** according to another recombinant of the present invention is illustrated. Fluid injection system **310** provides an alternative method for accessing the moving pockets defined by wraps **60** and **72**. Fluid injection system **310** comprises the pair of fluid injection passages **112**, a pair of generally vertical fluid passages **314**, a pair of tubing assemblies **316**, a tubing connector assembly **318**, a fluid injection port **320** and a fluid injection fitting **322**.

Fluid passages **314** each extend generally vertical from thrust bearing surface **54** to the internal suction area of shell **12**. Each fluid passage **314** comprises counter bored portion **124** which opens upon on thrust bearing surface **54**. Counter bore portions **124** maintain communication with their respective injection hole **112** during all movement of orbiting scroll member **56**. The lower ends of fluid passages **314** each define an enlarged bore **324** which mates with a respective tubing assembly **316**.

Each tubing assembly **316** extends between tubing connector assembly **318** and a respective enlarged bore **324**. Each tubing assembly **316** includes a fitting **326** which engages a respective bore **324** and a tube **328** which extends between fitting **326** and tubing connector assembly **318**. A seal **330** seals the interface between bore **324** and fitting **326**, and a retainer **332** keeps fitting **326** disposed within bore **324**.

Tubing connector assembly **318** comprises a main bearing housing fitting **340** and a connecting tube **342**. Fitting **340** is secured to main bearing housing **24** by a plurality of bolts. Fitting **340** defines an internal bore **344** which is in communication with the pair of tubes **328**. Connecting tube **342** is disposed within bore **344** of fitting and extends to fluid injection fitting **322**. A seal **346** seals the interface between tube **342** and bore **344**.

Fluid injection fitting **322** extends through port **320** and is secured to shell **12** and it defines an internal bore **350** which receives the opposite end of connecting tube **342**. A seal **352** seals the interface between tube **342** and bore **350**. Thus, fitting **322** is in communication with pockets of compressed moving fluid defined by wraps **60** and **72** through bore **350**, tube **342**, bore **344**, tubes **328**, fitting **326**, fluid passages **314** and injection passages **112**.

Fluid injection system **310** also includes a check valve **360** which allows fluid flow from fitting **322** to injection passages **112** but prohibits fluid flow from injection passages **112** to fitting **322**.

While the above detailed description describes the preferred embodiment of the present invention, it should be understood that the present invention is susceptible to modification, variation and alteration without deviating from the scope and fair meaning of the subjoined claims.

What is claimed is:

1. A scroll-type compressor for handling a working fluid, said compressor comprising:

a shell having a suction zone and a discharge zone;

a first scroll member disposed in said shell and having a first scroll wrap extending from a first end plate;

a second scroll member disposed in said shell and having a second scroll wrap extending from a second end plate, said second scroll wrap being intermeshed with said first scroll wrap to define a plurality of closed pockets;

a drive mechanism for causing said second scroll member to orbit with respect to said first scroll member, said plurality of pockets moving from a radial outer position in said suction zone to a central position in said discharge zone;

a vapor injection system including a fluid circuit in communication with at least one of said plurality of pockets, said fluid circuit including a fluid passage extending from said one pocket to a position outside said shell *for injecting vapor into said one pocket and increasing a capacity of the compressor*, said fluid passage extending through said second scroll member; and

a valve for controlling fluid flow through said fluid passage.

2. The scroll-type compressor according to claim **1**, wherein said valve is disposed within said shell.

3. The scroll-type compressor according to claim **2**, wherein said valve is controlled by a pressurized fluid from outside said shell.

4. A scroll-type compressor for handling a working fluid**[;]**, said compressor comprising:

a shell;

a non-orbiting scroll member disposed within said shell and having a nonorbiting scroll wrap extending from a non-orbiting end plate;

an orbiting scroll member disposed within said shell and having an orbiting scroll wrap extending from an orbiting end plate, said orbiting scroll wrap being intermeshed with said non-orbiting scroll member to define a plurality of closed pockets;

a drive mechanism for causing said orbiting scroll member to orbit with respect to said non-orbiting scroll member, said plurality of closed pockets moving from a radial outer position where said working fluid is at a suction pressure to a radially inner central position where said working fluid is at a higher discharge pressure during said orbital movement;

a vapor injection system including a fluid circuit in communication with at least one of said plurality of moving pockets, said fluid circuit including a fluid passage extending from said one pocket to a position outside of said shell *for injecting vapor into said one pocket and increasing a capacity of the compressor*, said fluid pocket extending through said orbiting scroll member; and

a valve for controlling fluid flow through said fluid passage.

5. The scroll-type compressor according to claim **4**, wherein said valve is disposed within said shell.

6. The scroll-type compressor according to claim **5**, wherein said valve is controlled by a pressurized fluid from outside said shell.

7. A scroll-type compressor for handling a working fluid, said compressor comprising:

a shell having a suction zone and a discharge zone;

a first scroll member disposed in said shell and having a first scroll wrap extending from a first end plate;

a second scroll member disposed in said shell and having a second scroll wrap extending from a second end plate, said second scroll wrap being intermeshed with said first scroll wrap to define a plurality of closed pockets;

a drive mechanism for causing said second scroll member to orbit with respect to said first scroll member, said plurality of pockets moving from a radial outer position in said suction zone to a central position in said discharge zone;

a fluid circuit in communication with at least one of said plurality of pockets, said fluid circuit including a fluid passage extending from said one pocket to a position outside said shell, said fluid passage extending through said second scroll member;

a housing disposed within said shell, said housing supporting said second scroll member, said fluid passage extending through said housing; and

a valve disposed within said housing, said valve controlling fluid flow through said fluid passage.

8. The scroll-type compressor according to claim **1**, wherein said valve is controlled by a pressurized fluid from outside said shell.

9. A scroll-type compressor for handling a working fluid; said compressor comprising:

a shell;

a non-orbiting scroll member disposed within said shell and having a nonorbiting scroll wrap extending from a non-orbiting end plate;

an orbiting scroll member disposed within said shell and having an orbiting scroll wrap extending from an orbiting end plate, said orbiting scroll wrap being intermeshed with said non-orbiting scroll member to define a plurality of closed pockets;

a drive mechanism for causing said orbiting scroll member to orbit with respect to said non-orbiting scroll member, said plurality of closed pockets moving from a radial outer position where said working fluid is at a suction pressure to a radially inner central position where said working fluid is at a higher discharge pressure during said orbital movement;

a fluid circuit in communication with at least one of said plurality of moving pockets, said fluid circuit including a fluid passage extending from said one pocket to a position outside of said shell, said fluid pocket extending through said orbiting scroll member;

a housing disposed within said shell, said housing supporting said orbiting scroll member, said fluid passage extending through said housing; and

a valve disposed within said housing, said valve controlling fluid flow through said fluid passage.

10. The scroll-type compressor according to claim **9**, wherein said valve is controlled by a pressurized fluid from outside said shell.

11. A scroll-type compressor for handling a working fluid, said compressor comprising:

a shell having a suction zone and a discharge zone;

a first scroll member disposed in said shell and having a first scroll wrap extending from a first end plate;

a second scroll member disposed in said shell and having a second scroll wrap extending from a second end plate, said second scroll wrap being intermeshed with said first scroll wrap to define a plurality of closed pockets;

a drive mechanism for causing said second scroll member to orbit with respect to said first scroll member, said plurality of pockets moving from a radial outer position in said suction zone to a central position in said discharge zone;

a fluid circuit in communication with at least one of said plurality of pockets, said fluid circuit including a fluid passage extending from said one pocket to a position outside said shell, said fluid passage extending through said second scroll member; and

a housing having a plurality of legs disposed within said shell, said housing supporting said second scroll member, said fluid passage extending through one of said legs of said housing.

12. The scroll-type compressor according to claim **11**, further comprising a valve disposed within said housing, said valve controlling fluid flow through said fluid passage.

13. The scroll-type compressor according to claim **12**, wherein said valve is controlled by a pressurized fluid from outside said shell.

14. A scroll-type compressor for handling a working fluid; said compressor comprising:

a shell;

a non-orbiting scroll member disposed within said shell and having a nonorbiting scroll wrap extending from a non-orbiting end plate;

an orbiting scroll member disposed within said shell and having an orbiting scroll wrap extending from an orbiting end plate, said orbiting scroll wrap being intermeshed with said non-orbiting scroll member to define a plurality of closed pockets;

a drive mechanism for causing said orbiting scroll member to orbit with respect to said non-orbiting scroll member, said plurality of closed pockets moving from a radial outer position where said working fluid is at a suction pressure to a radially inner central position where said working fluid is at a higher discharge pressure during said orbital movement;

a fluid circuit in communication with at least one of said plurality of moving pockets, said fluid circuit including a fluid passage extending from said one pocket to a position outside of said shell, said fluid pocket extending through said orbiting scroll member; and

a housing having a plurality of legs disposed within said shell, said housing supporting said orbiting scroll member, said fluid passage extending through one of said legs of said housing.

15. The scroll-type compressor according to claim **14**, further comprising a valve disposed within said one leg of said housing, said valve controlling fluid flow through said fluid passage.

16. The scroll-type compressor according to claim **15**, wherein said valve is controlled by a pressurized fluid from outside said shell.

17. A scroll-type compressor for handling a working fluid, said compressor comprising:

a shell having a suction zone and a discharge zone;

a first scroll member disposed in said shell and having a first scroll wrap extending from a first end plate;

a second scroll member disposed in said shell and having a second scroll wrap extending from a second end plate, said second scroll wrap being intermeshed with said first scroll wrap to defined a plurality of closed pockets;

a drive mechanism for causing said second scroll member to orbit with respect to said first scroll member, said plurality of pockets moving from a radial outer position in said suction zone to a central position in said discharge zone;

a first circuit in communication with at least one of said plurality of pockets, said fluid circuit including a fluid passage extending from said one pocket to said suction zone of said compressor, said fluid passage extending through said second scroll member; **[**and**]**

a housing disposed within said shell, said housing supporting said second scroll member, said fluid passage extending through said housing*; and*

a valve disposed within said housing, said valve controlling fluid flow through said fluid passage.

[18. The scroll-type compressor according to claim **17**, further comprising a valve disposed within said housing, said valve controlling fluid flow through said fluid passage.**]**

19. The scroll-type compressor according to claim **[18]***17*, wherein said valve is controlled by a pressurized fluid from outside said shell.

20. The scroll-type compressor according to claim **[18]***17*, wherein said fluid passage is in communication with an injection port extending through said shell and said valve is movable between a first position where said one pocket communicates with said suction zone of said compressor and a second position where said one pocket communicates with said injection port extending through said shell.

21. A scroll-type compressor for handling a working fluid, said compressor comprising:

a shell having a suction zone and a discharge zone;

a first scroll member disposed in said shell and having a first scroll wrap extending from a first end plate;

a second scroll member disposed in said shell and having a second scroll wrap extending from a second end plate, said second scroll wrap being intermeshed with said first scroll wrap to define a plurality of closed pockets;

a drive mechanism for causing said second scroll member to orbit with respect to said first scroll member, said plurality of pockets moving from a radial outer position in said suction zone to a central position in said discharge zone;

a fluid circuit in communication with at least one of said plurality of pockets, said fluid circuit including a fluid passage extending from said one pocket to said suction zone of said compressor, said fluid passage extending through said second scroll member; and

a valve for controlling fluid flow through said fluid passage; wherein;

said valve is disposed within said shell; and

said valve is controlled by a pressurized fluid from outside said shell.

22. The scroll-type compressor according to claim **21**, wherein said fluid passage is in communication with an injection port extending through said shell and said valve is movable between a first position where said one pocket communicates with said suction zone of said compressor and a second position where said one pocket communicates with said injection port extending through said shell.

23. A scroll-type compressor for handling a working fluid, said compressor comprising:

a shell having a suction zone and a discharge zone;

a first scroll member disposed in said shell and having a first scroll wrap extending from a first end plate;

a second scroll member disposed in said shell and having a second scroll wrap extending from a second end plate, said second scroll wrap being intermeshed with said first scroll wrap to define a plurality of closed pockets;

a drive mechanism for causing said second scroll member to orbit with respect to said first scroll member, said plurality of pockets moving from a radial outer position in said suction zone to a central position in said discharge zone;

a fluid circuit in communication with at least one of said plurality of pockets, said fluid circuit including a fluid passage extending from said one pocket to said suction zone of said compressor, said fluid passage extending through said second scroll member; and

a housing having a plurality of legs disposed within said shell, said housing supporting said first scroll member, said fluid passage extending through one of said legs of said housing.

24. The scroll-type compressor according to claim **23**, further comprising a valve disposed within said housing, said valve controlling fluid flow through said fluid passage.

25. The scroll-type compressor according to claim **24**, wherein said valve is controlled by a pressurized fluid from outside said shell.

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