

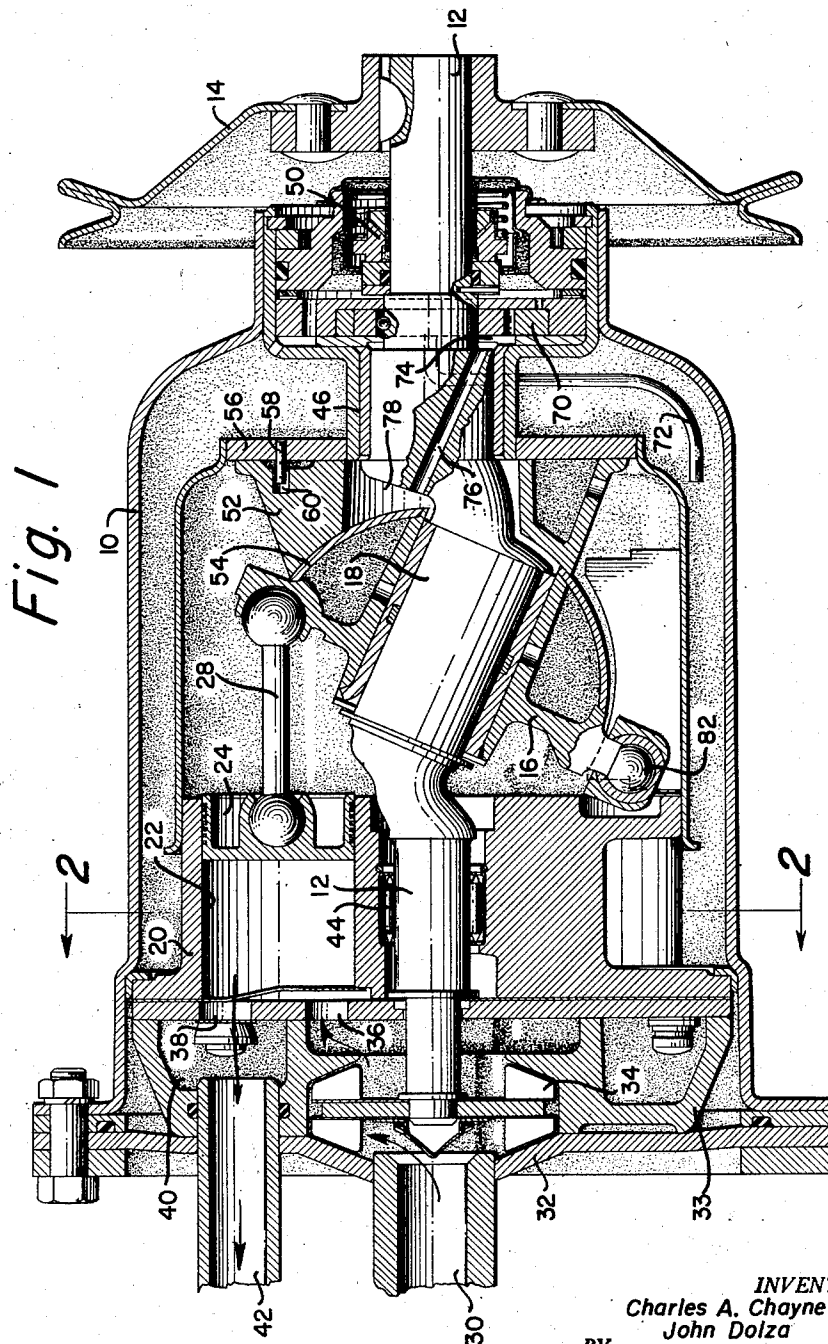
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C. A. CHAYNE ET AL
REFRIGERATING APPARATUS

2,798,663

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2 Sheets-Sheet 1



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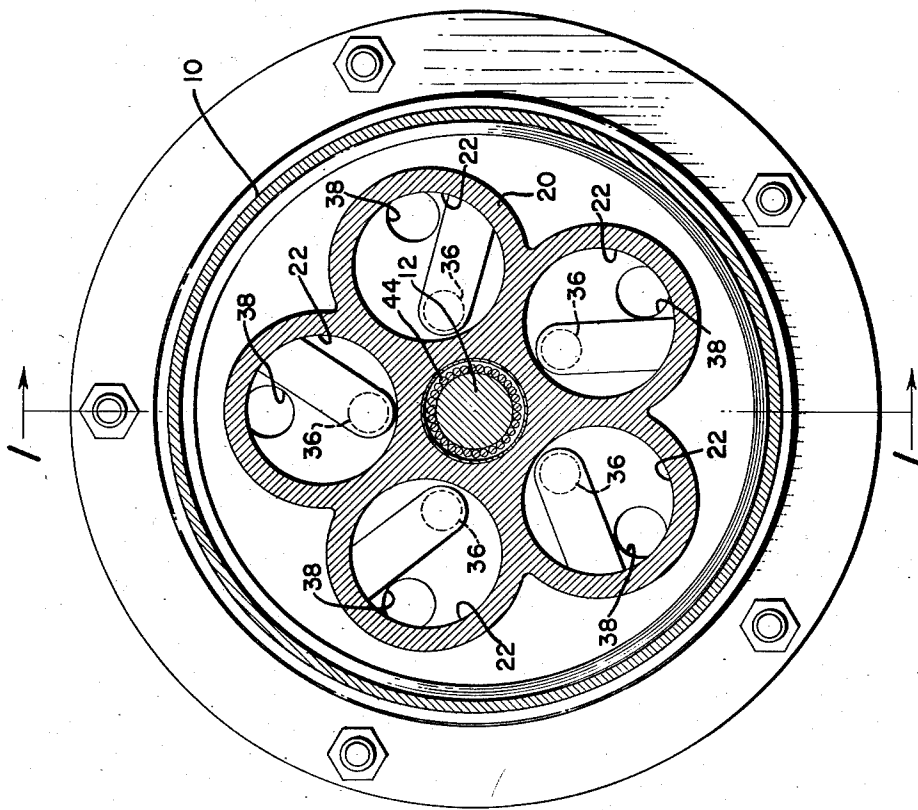


Fig. 2

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REFRIGERATING APPARATUS

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3 Claims. (Cl. 230—186)

This invention relates to refrigerating apparatus and more particularly to an improved type of refrigerant compressor.

It is an object of this invention to provide an improved bearing arrangement for use in a wobble plate type of compressor. More particularly it is an object of this invention to provide an improved type of end thrust bearing arrangement in which an oil film is provided between the bearing surfaces.

Still another object of this invention is to provide an improved wobble plate compressor design wherein the end thrust of the main drive shaft is taken up by means of a ball and socket bearing arrangement wherein oil under pressure is supplied to the central portion of the socket and forced outwardly between the matching surfaces on the ball and socket.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Figure 1 is a vertical sectional view of a compressor embodying our invention; and

Figure 2 is a sectional view taken substantially on line 2—2 of Figure 1.

Referring now to the drawing wherein a preferred embodiment of the invention has been shown, reference numeral 10 designates the main casing which for purposes of illustration has been shown as a stamped sheet metal casing. A main shaft 12 is supported for rotation by the casing 10 as shown in Figure 1 of the drawing. A drive pulley 14 is carried to that portion of the drive shaft 12 which projects through the one end of the casing 10 and a wobble plate 16 is mounted on an offset crank portion 18 within the casing 10. A cylinder block 20 is rigidly fixed within the one end of the casing and is provided with a plurality of cylinder bores 22 which are equally spaced around the central axis of the drive shaft 12 as shown in Figure 2. Pistons 24 are disposed to reciprocate within the cylinder bores 22 and are drivingly connected to the wobble plate 16 by means of the usual connecting rods 28.

The refrigerant or other gas to be compressed enters the casing 10 through a centrally disposed inlet connection 30 which is provided in the end plate 32. The end plate 32 closes the one end of the casing 10 and assists in holding the cylinder head assembly 33 in place. A centrifugal gas separating element fan like device 34 is secured to the one end of the drive shaft 12 so as to assist in separating the lubricant from the refrigerant before the refrigerant enters the inlet ports 36 which lead to the respective cylinder bores.

The compressed refrigerant leaves the compression chambers through outlet ports 38 which communicate with a circular outlet chamber 40 in the cylinder head assembly 33 from whence the compressed refrigerant leaves through the outlet line 42. The shaft 12 is sup-

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ported for rotation by means of bearing units 44 and 46. Suitable shaft seal means 50 is provided for preventing the escape of refrigerant at the point where the shaft 12 enters the casing 10 in accordance with standard practice.

A special end thrust bearing has been provided as shown for the wobble plate assembly 16 and consists of a socket member 52 which is complementary to a semi-spherical or ball like member 54 carried by the wobble plate assembly 16. The socket member 52 is carried by a fixed support 56 carried by the housing 10. The socket member 52 is preferably mounted for limited movement relative to the support 56. Suitable means such as pin 58 which is rigidly fixed to the member 56 limits the amount the socket 52 can shift. The pin 58 has a loose fit within a recess 60 provided in the socket 52.

It is important to maintain the bearing losses at a minimum and for that reason a conventional oil pump 70 has been provided having an inlet 72 connected to the oil sump in the lower portion of the casing 10 and having an outlet 74 which supplies oil under pressure to an oil passage 76 formed in the shaft 12 as shown. The oil passage 76 feeds oil into a cavity 78 within the spherical socket element 52. Some of the oil from the cavity 78 is forced out between the socket 52 and ball element 54 so as to provide an oil film on which the ball element floats.

The wobble plate assembly 16 is prevented from rotating with the shaft by means of the usual guide shoe 82 in accordance with standard practice. For purposes of illustration the ball element 54 has been shown as a stamped sheet metal member which forms a part of the wobble plate assembly. The construction and arrangement of the cylinders and inlet and outlet ports may be varied without departing from the spirit of our invention.

In accordance with the provisions of Rule 78a reference is made to copending application S. N. 347,556, filed April 8, 1953. This co-pending application is related to the instant application in that it shows another version of a wobble plate compressor which is similar in some respects to the compressor shown herein.

While the form of embodiment of the invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted, as may come within the scope of the claims which follow.

What is claimed is as follows:

1. In a wobble plate type of compressor, a housing, a shaft journaled in said housing, a wobble plate carried by said shaft and driven thereby, pumping means operated by said wobble plate, a ball and socket type of end thrust bearing assembly for said wobble plate comprising a socket element supported by said housing and a semispherical ball member complementary to said socket element and carried by said wobble plate, an end thrust bearing element supported in fixed relationship to said housing and surrounding said shaft and having a bearing surface perpendicular to the axis of rotation of said shaft, said socket element being supported on said bearing element in sliding engagement therewith, said socket element and said bearing element having complementary means formed thereon for limiting the extent of sliding movement.

2. A compressor as set forth in claim 1 wherein said socket element has a central recess through which said shaft projects, and an oil pump operated by said shaft and arranged to discharge oil into said recess at a pressure in excess of the pressure surrounding said end thrust bearing assembly.

3. A compressor as set forth in claim 1 wherein said semi-spherical ball member comprises a frustum of a sheet metal sphere wherein the top and bottom edges

of the frustum are arranged in engagement with portions of said wobble plate.

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