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(54) **SCREW COMPRESSOR WITH INTEGRAL BEARING COVER AND DISCHARGE PLENUM DIVIDER**
SCHRAUBENKOMPRESSOR MIT INTEGRALEM LAGERDECKEL UND ABFÜHRKAMMERTEILER
COMPRESSEUR À VIS AVEC REVÊTEMENT DE PALIER INTÉGRAL ET DIVISEUR DE PLÉNUM
D'ÉVACUATION

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Description**BACKGROUND OF THE INVENTION**

[0001] This application relates to a screw compressor, wherein a divider separates the output of two discharge chambers, and wherein a bearing cover is formed integrally with a discharge case which provides the divider wall.

[0002] Screw compressors are known, and typically include a plurality of rotating rotors each having external screw thread. The screw threads interfit with screw threads on the other rotors to define compression chambers. An entrapped fluid is compressed, and delivered toward a downstream location. One known type of screw compressor includes three rotors, and defines two compression chambers. These two compression chambers have typically delivered compressed fluid into a common discharge plenum. The discharge of fluid into a common chamber can be somewhat out of phase, and can result in increased pulsation and undesirable losses and noise.

[0003] Thus, it is known in the prior art to provide a divider wall that separates an output from the two chambers until they reach a downstream location. Typically, an outlet housing includes two distinct flow passages. The outlet housing is connected to a discharge case which includes a divider wall to define the two flow passages.

[0004] In addition, a bearing cover has typically been provided to cover bearings mounted in the outlet housing for each of the three rotors. In the prior art, such as US 6 976 833 B2, and in US 2006/0065478 A1, the bearing cover is formed separately from the discharge case. A space between the divider wall and bearing cover has allowed cross flow between the two passages.

SUMMARY OF THE INVENTION

[0005] The invention provides a compressor as defined in claim 1.

[0006] In the disclosed embodiment, a screw compressor is formed with three rotors. Each of the three rotors has shafts which are mounted in bearings. The bearings are fixed within an outlet housing. The outlet housing is fixed to a compressor case. A bearing cover is formed integrally with a discharge case, as is a divider wall. The outlet housing provides two separate discharge passages which communicate with two separate compression chambers. The two separate discharge passages allow fluid to flow downstream into two separate plenum chambers or flow passages. The separate plenum chambers are defined by the divider wall and the integral bearing cover in the discharge case. Since the bearing cover and the discharge case are formed as integral parts, there are no complex surfaces which must be sealed between the two and no leakage between the plenum chambers. In a sense, the bearing cover forms a part of the divider wall.

[0007] These and other features can be best understood from the following specification and drawings, the following of which is a brief description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008]

Figure 1 is an exploded view of a prior art compressor.

Figure 2 shows the bearing cover feature of the prior art compressor.

Figure 3 is an end view of an integral cover and compressor discharge case.

Figure 4 is a perspective view of one side of the inventive compressor component.

Figure 5 is a perspective view from the opposed side of the inventive compressor component.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0009] A compressor 20, as known in the prior art, is illustrated in Figure 1. A compressor case 22 carries screw rotors 24, 26 and 28. As known, the screw rotors have threads which interfit to compress and drive a refrigerant toward a discharge chamber 38. Refrigerant enters at an opposed end through an inlet 140. The rotors 24, 26, and 28 all have shafts 30 which are mounted within bearing assemblies 32. The bearing assemblies 32 extend into chambers 34 in a outlet housing 36.

[0010] The outlet housing 36 includes passages 40 which communicate with the discharge chambers 38 and serve to deliver the compressed fluid downstream without allowing fluid from the two chambers 38 to cross flow.

[0011] A discharge case 46 includes chambers 50 which communicate with the passages 40. A divider wall 48 divides the two chambers 50, such that the compressed fluid will not mix until downstream of the discharge case 46. However, the divider wall 48 and the bearing cover 42 have generally not been on the same plane at the end of the outlet housing 36. Thus, a space has existed between the two separate parts, which has allowed leakage. Figure 2 shows the prior art cover 42.

[0012] Figure 3 shows an inventive discharge case 100. As shown, a divider wall 102 still divides and separates the chambers 104. However, the bearing cover 106 is formed integrally with this wall 102.

[0013] Thus, as shown in Figure 4, the bearing cover 106 merges into the divider wall 102. There is no leakage between the wall 102 and the cover 106 as they are formed integrally. The two chambers 104 are thus maintained separate by the relatively simple formation of the integral component. In a sense, the bearing cover forms a portion of the wall.

[0014] Figure 5 is a perspective view of the opposed side, and shows the chambers 104 separated by the wall 102. As can be appreciated from the several figures, the

divider wall 102 is relatively thin compared to the bearing cover 106. The divider wall 102 also extends over the majority of the axial length of the discharge case 100. Adjacent an end of the discharge case 100 which abuts the outlet housing 20, the discharge divider wall 102 merges to be thicker, and provide the bearing cover 106. **[0015]** Although a preferred embodiment of this invention has been disclosed, a worker of ordinary skill in the art would recognize that certain modifications would come within the scope of this invention. For that reason the following claims should be studied to determine the true scope and content of this invention.

Claims

1. A compressor (20) comprising:

at least three screw rotors (24, 26, and 28), each of said screw rotors having a shaft (30), said compressor (20) for delivering a compressed fluid to each of at least two separate discharge ports (40) in a compressor case (22); bearings received in bearing chambers (34) and supporting each of said three shafts (30) of said at least three screw rotors (24, 26, and 28); and a bearing cover surface (106) closing off said bearing chambers (34) for each of said bearings, a discharge case (100) including a divider wall (102) for providing a separate discharge chamber (104) communicating with each of said discharge ports (40), such that a fluid compressed in the compressor (20) passes the bearing cover (106), and through the separate discharge chambers (104), to a downstream use, **characterized in that** said divider wall (102) and said bearing cover (106) are both formed integrally with the discharge case (100), said divider wall (102) extending over a relatively thin extent compared to said bearing cover (106), and becoming larger to merge into said bearing cover (106).

2. The compressor (20) set forth in Claim 1, wherein said bearings chambers (34) are positioned within an outlet housing (36), said outlet housing (36) abutting said compressor housing (22), and said discharge case (100) being secured to said outlet housing (36).

3. The compressor (20) as set forth in Claim 1, wherein said divider wall (102) extends for the majority of an axial length of the discharge case (100), and the bearing cover (106) is generally formed adjacent an end of the discharge case (100).

4. The compressor (20) of any previous claim wherein said screw rotors (30) interfit to define two compres-

sion chambers, and the compressed fluid is a refrigerant.

5 Patentansprüche

1. Kompressor (20), umfassend:

mindestens drei Schraubenrotoren (24, 26 und 28), wobei jeder der Schraubenrotoren eine Welle (30) aufweist, wobei der Kompressor (20) zum Fördern einer komprimierten Flüssigkeit zu jeder von mindestens zwei separaten Abführöffnungen (40) in einem Kompressorgehäuse (22) dient;

Lager, welche in Lagergehäusen (34) aufgenommen sind und jede der drei Wellen (30) der mindestens drei Schraubenrotoren (24, 26 und 28) stützen; und

eine Lagerdeckeloberfläche (106), welche die Lagergehäuse (34) für jedes der Lager abdeckt, ein Abführgehäuse (100), welches eine Trennwand (102) beinhaltet, zur Bereitstellung einer separaten Abführkammer (104), welche mit jeder der Abführöffnungen (40) derart in Verbindung steht, dass ein Fluid, die im Kompressor (20) komprimiert wurde, den Lagerdeckel (106) passiert und die separaten Abführkammern (104) zu einer nachgelagerten Verwendung durchströmt,

dadurch gekennzeichnet, dass die Trennwand (102) und der Lagerdeckel (106) beide einstückig mit dem Abführgehäuse (100) gebildet sind, wobei sich die Trennwand (102) über einen relativ dünnen Bereich im Vergleich zum Lagerdeckel (106) erstreckt und größer wird, um mit dem Lagerdeckel (106) zu verschmelzen.

2. Kompressor (20) nach Anspruch 1, wobei die Lagergehäuse (34) innerhalb eines Austrittsgehäuses (36) positioniert sind, wobei das Austrittsgehäuse (36) an das Kompressorgehäuse (22) angrenzt und das Abführgehäuse (100) am Austrittsgehäuse (36) befestigt ist.

3. Kompressor (20) nach Anspruch 1, wobei sich die Trennwand (102) über die Mehrheit einer axialen Länge des Abführgehäuses (100) erstreckt und der Lagerdeckel (106) allgemein neben einem Ende des Abführgehäuses (100) gebildet ist.

4. Kompressor (20) nach einem der vorhergehenden Ansprüche, wobei die Schraubenrotoren (30) zusammenpassen, um zwei Kompressionskammern zu bilden, und das komprimierte Fluid ein Kühlmittel ist.

Revendications

1. Compresseur (20) comprenant :

au moins trois rotors à vis (24, 26 et 28), chacun 5
desdits rotors à vis comportant un arbre (30),
ledit compresseur (20) servant à distribuer un
fluide comprimé à chacun des au moins deux
orifices d'évacuation (40) dans un carter de 10
compresseur (22) ;
des paliers reçus dans des chambres à palier
(34) et supportant chacun desdits trois arbres
(30) desdits au moins trois rotors à vis (24, 26
et 28) ; et
une surface de revêtement de palier (106) fer- 15
mant lesdites chambres à palier (34) pour cha-
cun desdits paliers, un carter d'évacuation (100)
incluant une paroi de division (102) pour fournir
une chambre d'évacuation séparée (104) com- 20
muniquant avec chacun desdits orifices d'éva-
cuation (40), de telle sorte qu'un fluide comprimé
dans le compresseur (20) passe le revêtement
de palier (106), et à travers les chambres d'éva-
cuation séparées (104), jusqu'à une utilisation 25
en aval,
caractérisé en ce que ladite paroi de division
(102) et ledit revêtement de palier (106) sont
tous les deux formés d'un seul tenant avec le
carter d'évacuation (100), ladite paroi de divi- 30
sion (102) s'étendant sur une étendue relative-
ment mince par rapport audit revêtement de pa-
lier (106), et devenant plus grande pour fusion-
ner dans ledit revêtement de palier (106).

2. Compresseur (20) selon la revendication 1, dans le- 35
quel lesdites chambres à palier (34) sont position-
nées dans un boîtier de sortie (36), ledit boîtier de
sortie (36) étant contigu audit boîtier de compresseur
(22), et ledit carter d'évacuation (100) étant fixé audit 40
boîtier de sortie (36).

3. Compresseur (20) selon la revendication 1, dans le- 45
quel ladite paroi de division (102) s'étend sur la ma-
jorité d'une longueur axiale du carter d'évacuation
(100), et le revêtement de palier (106) est générale-
ment formé de manière adjacente à une extrémité
du carter d'évacuation (100).

4. Compresseur (20) selon une quelconque revendica- 50
tion précédente, dans lequel lesdits rotors à vis (30)
s'emboîtent pour définir deux chambres de com-
pression, et le fluide comprimé est un fluide frigori-
gène.

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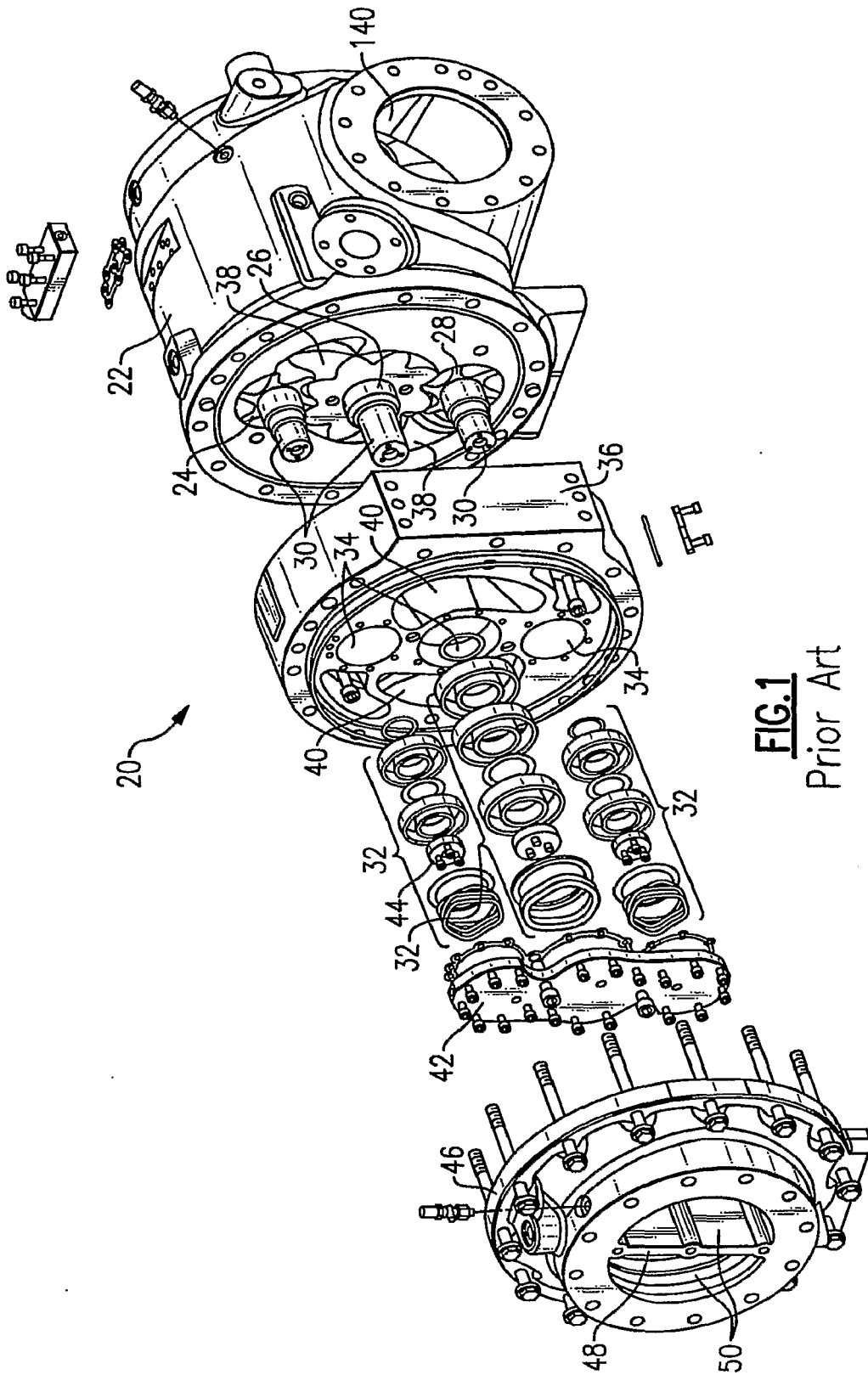


FIG.1
Prior Art

FIG.2
Prior Art

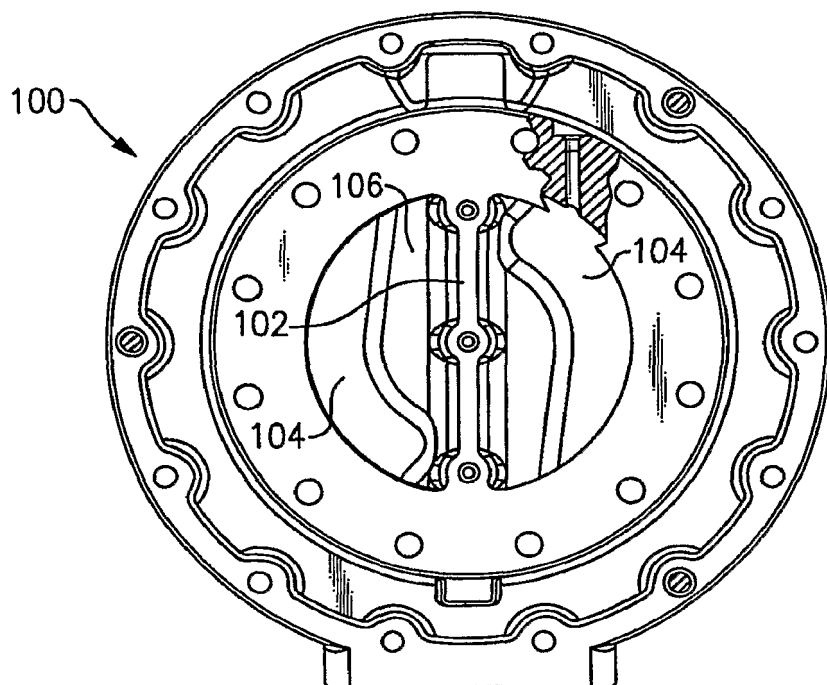
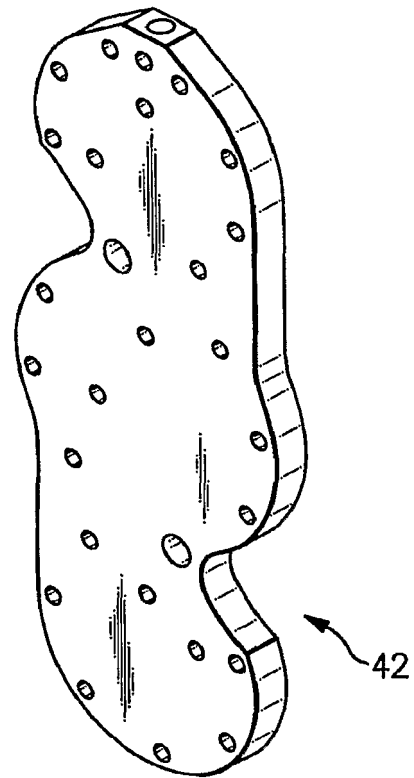
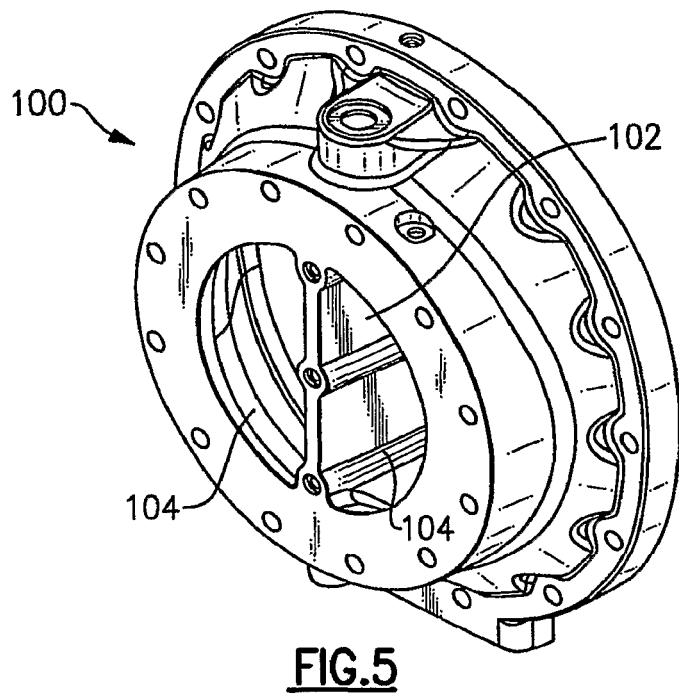
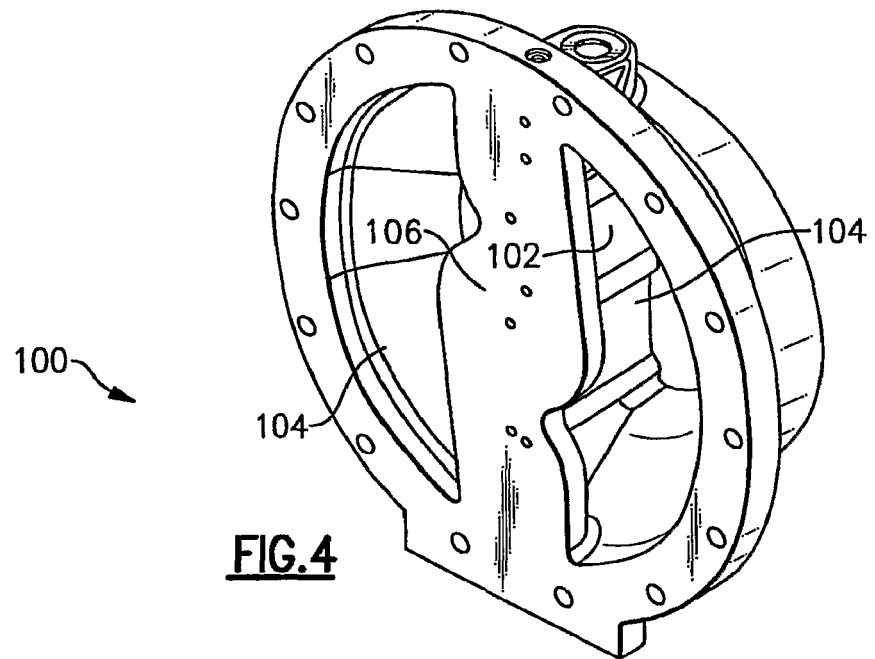


FIG.3



REFERENCES CITED IN THE DESCRIPTION

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