

Nov. 27, 1962

E. T. NEUBAUER
COMPRESSOR

3,065,901

Filed Jan. 6, 1958

3 Sheets-Sheet 1

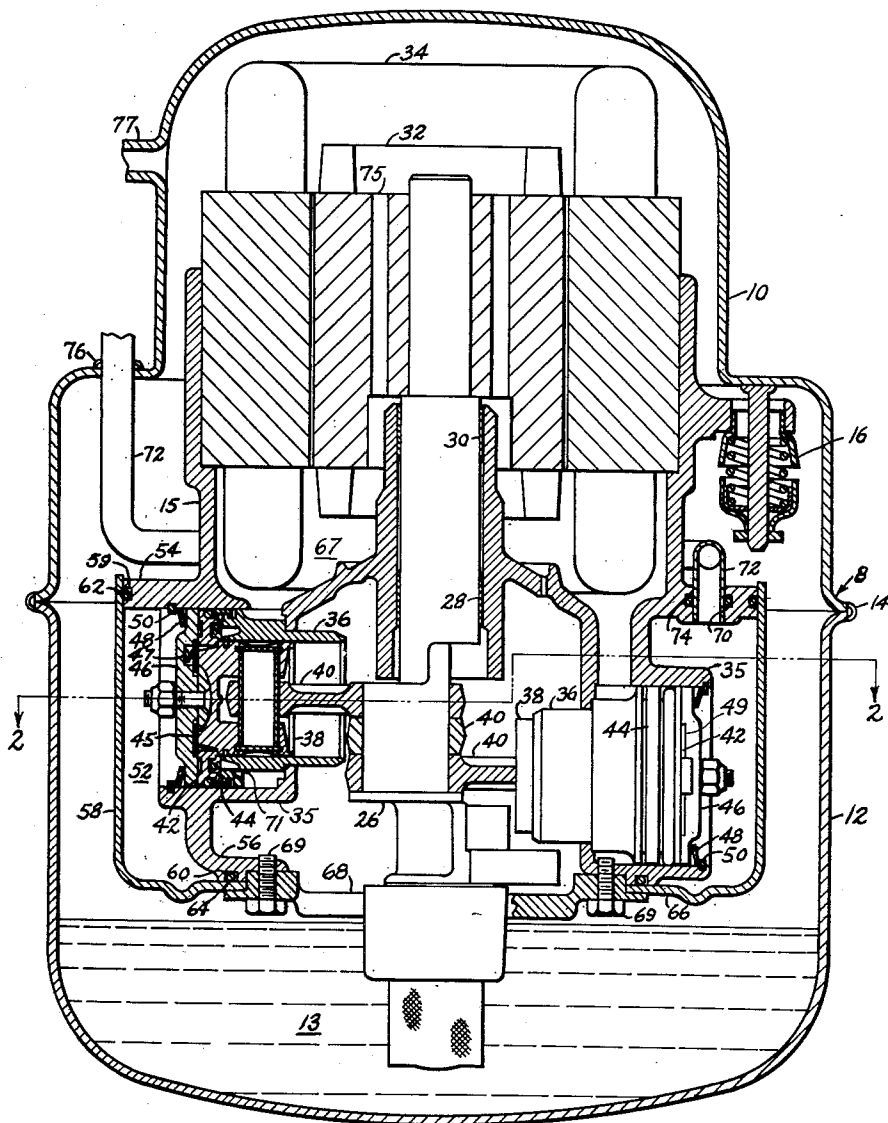


Fig. 1

INVENTOR.
EMIL T. NEUBAUER

BY

Holmes & Anderson
ATTORNEYS

Nov. 27, 1962

E. T. NEUBAUER

3,065,901

COMPRESSOR

Filed Jan. 6, 1958

3 Sheets-Sheet 2

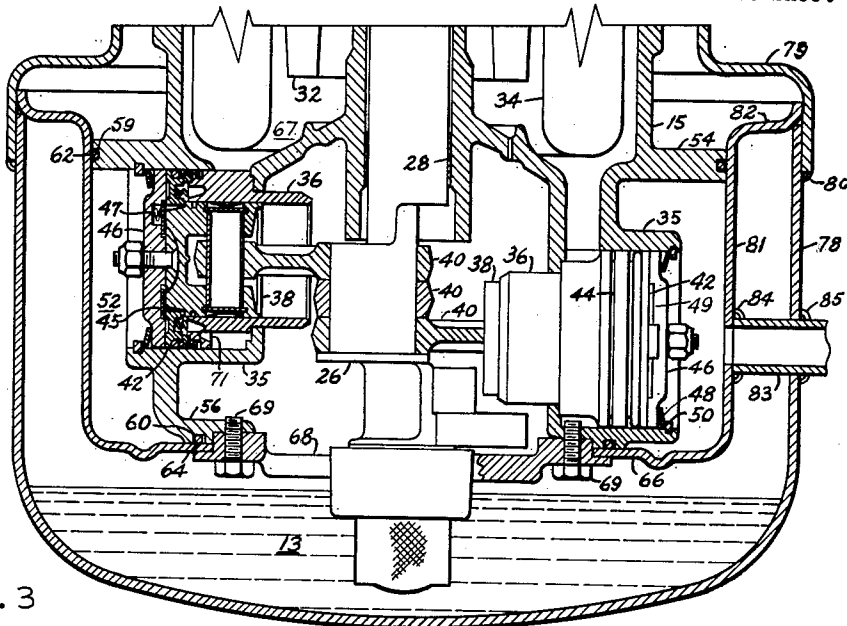


Fig. 3

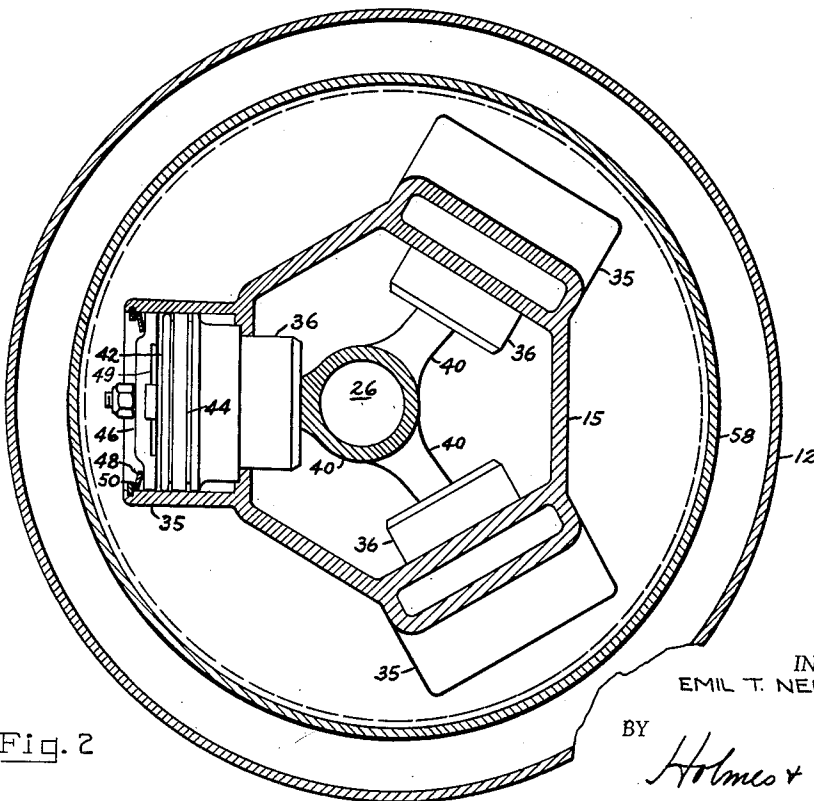


Fig. 2

INVENTOR.
EMIL T. NEUBAUER

BY

Holmes + Anderson
ATTORNEYS

Nov. 27, 1962

E. T. NEUBAUER

3,065,901

COMPRESSOR

Filed Jan. 6, 1958

3 Sheets-Sheet 3

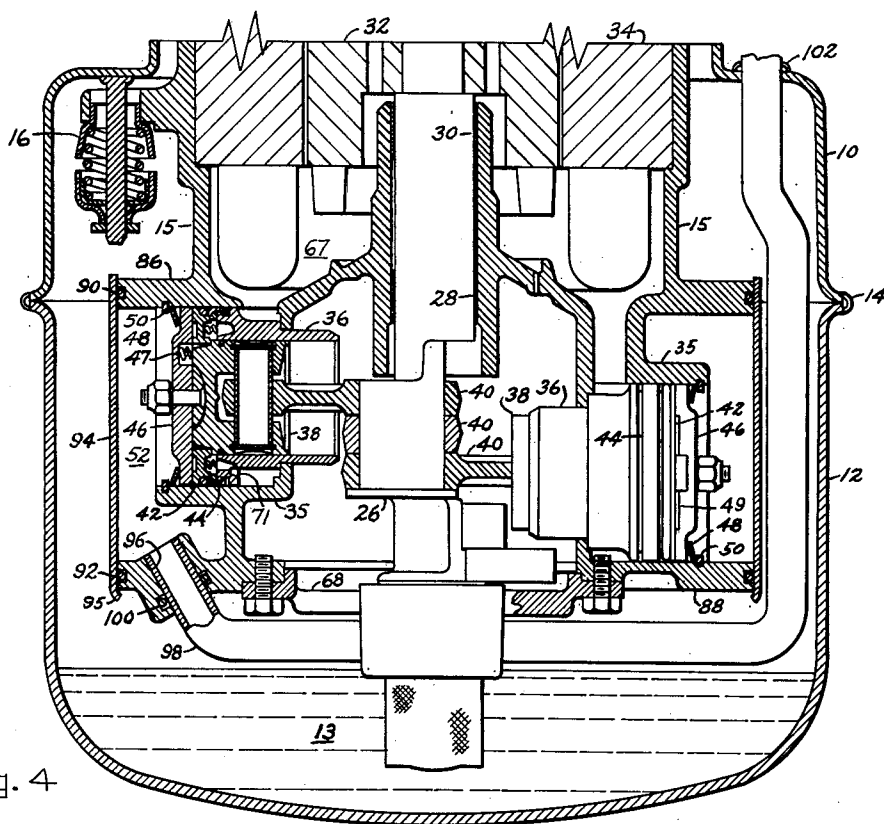
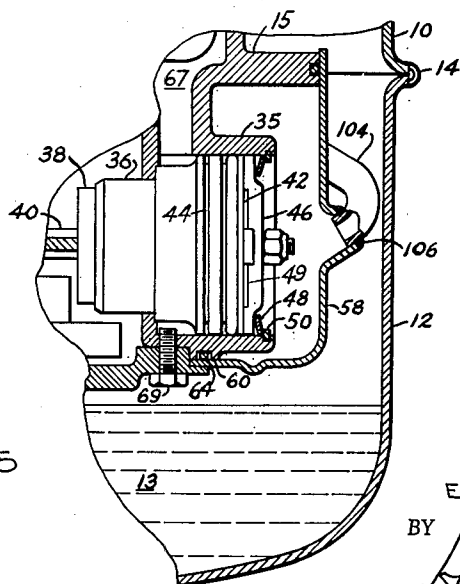


Fig. 5



INVENTOR.
EMIL T. NEUBAUER

BY

Holmes & Anderson
ATTORNEYS

1

3,065,901

COMPRESSOR

Emil T. Neubauer, La Crosse, Wis., assignor to The Trane Company, La Crosse, Wis., a corporation of Wisconsin

Filed Jan. 6, 1958, Ser. No. 707,291

4 Claims. (Cl. 230-58)

This invention relates to compressors and particularly to compressors in which the motor and compressor are enclosed in a hermetically sealed casing.

In compressors of this type, the manifolding of the discharge gas has generally been accomplished by providing tubing or piping in fluid connection with each of the cylinder heads. Such manifolds are rather expensive to build and they are subject to damage in assembly.

It is, therefore, an object of this invention to eliminate the usual discharge heads and pipe manifold and to provide a manifold chamber having a sheet metal outer wall in sealed engagement with the compressor body.

It is another object of this invention to provide a hermetically sealed motor compressor unit of improved design which is inexpensive to manufacture and which operates at high efficiencies.

Other objects and advantages of this invention will become apparent as the specification proceeds to describe the apparatus with reference to the accompanying drawings in which:

FIGURE 1 is a sectional view substantially in an axial plane of the compressor of this invention.

FIGURE 2 is a cross section view taken on line 2-2 of FIGURE 1.

FIGURE 3 is a partial sectional view substantially in an axial plane showing a first modification of the invention of FIGURE 1.

FIGURE 4 is a partial sectional view substantially in an axial plane of the compressor showing a second modification of the invention.

FIGURE 5 is a partial sectional view substantially on an axial plane of the compressor showing a third modification of the invention.

Referring now to FIGURE 1, the compressor has a casing 8 having an upper shell 10 and a lower shell 12 both of which are preferably of sheet metal and which are welded together by a peripheral weld 14. The lower end of the lower shell 12 serves as a reservoir for oil 13. A compressor body 15 is supported from the upper casing 12 by vibration isolators 16. A shaft 26 is rotatably mounted in the compressor body 15 by bearings 28 and 30. A motor rotor 32 is secured to the shaft 26. A motor stator 34 is secured in any suitable manner to the body 15.

A compressor having three cylinders 35 has been shown in the drawings. There are, therefore, three cylinder liners 36 supported in the cylinders 35 of the body 15. It should be understood that the invention is applicable to compressors having a different number of cylinders.

Pistons 38 operate in cylinder liners 36 and have connecting rods 40 which are mounted for relative rotation on the shaft 26.

A suction valve cage 42 is mounted upon the cylinder liner 36 and is secured thereto by a ring 44. A discharge valve cage 46 contains a ring plate valve 45 which has springs 47 acting to move the valve 45 toward closed position. The discharge valve cage 46 is mounted upon the suction valve cage 42. A Belleville spring 48 is supported by a snap ring 50 and acts upon the discharge valve cage 46 to urge it against the suction valve cage 42 which in turn holds the cylinder liner 36 in place.

The discharge gas passing the discharge valve 45 and through the radial recesses 49 in the discharge valve cage 46 enters the space 52 bounded by the body flanges 54

2

and 56 and by the annular member 58. The flanges 54 and 56 have grooves 59 and 60 respectively which contain O-rings 62 and 64 respectively. O-rings 62 and 64 are made of neoprene or rubber or other flexible material. The annular member 58 has an inwardly extending flange 66 which is clamped against the flange 56 of the body 15 by a bearing spider 68 which rotatably supports the shaft 26. Bearing spider 68 is secured to the body 15 by bolts 69. The force of the bearing spider 68 against the flange 66 of the annular member 58 compresses the O-ring 64 to provide a seal between the annular member 58 and the flange 56 on the body 15. Flange 54 has a hole 70 which receives a discharge pipe 72. An O-ring 74 of neoprene or other flexible material provides a seal between the discharge pipe 72 and the flange 54. The pipe 72 is expanded into the hole 70 to hold it in position. Discharge pipe 72 extends through the upper casing 10 and is secured thereto by a weld 76. A suction conduit, not shown, is secured to the flanged opening 77 in the upper shell 10. The suction gas flows through passageways 75 in the rotor 32 to chamber 67 and thence to the interior of the cylinder liners 36 through passageways 71.

Referring now to FIGURE 3, an upper shell 79 is welded to the lower shell 78 at 80. An annular member 81 is sealed and secured to the body 15 in the manner in which annular member 58 is secured and sealed to the body 15 in the modification of FIGURE 1. The annular member 81 has an outwardly extending flange 82 which is secured between the upper casing 79 and the lower casing 78. A discharge pipe 83 is welded to the annular member 81 at 84 and to the lower shell 78 at 85.

Referring now to FIGURE 4, the body 15 is mounted on the upper casing 10 by vibration isolators 16 in a manner similar to that shown and described with reference to FIGURE 1. The body 15 has flanges 86 and 88 which contain O-rings 90 and 92 respectively to provide a seal between the body 15 and an annular closure member 94. Closure member 94 has an inwardly turned rim 95 which serves to locate it with respect to the body 15. The flange 88 has a hole 96 which receives a discharge pipe 98 which is expanded into contact with the hole 96. An O-ring 100 provides a seal between the discharge pipe 98 and the flange 88. Discharge pipe 98 extends through the upper casing 10 and is secured thereto by a weld 102.

Referring now to the modification shown in FIGURE 5, the construction of this form of the invention is the same as that shown in FIGURE 1 except that the discharge pipe 104 is secured to the annular member 58 by a weld 106.

Although various preferred embodiments of my invention have been shown and described, it will be apparent to those skilled in the art that various modifications may be made therein without departing from the scope of the invention, and I desire to be limited only by the claims.

I claim:

1. In a compressor, a body, a shaft rotatably mounted in said body, a motor stator secured to the upper portion of said body, a motor rotor secured to said shaft, a plurality of cylinders in said body, said cylinders being arranged radially of the axis of said shaft, a piston working in each cylinder, piston rods pivotally connected to said pistons and to said shaft, a first flange on said body at one side of and extending outwardly beyond said cylinders, a second flange on said body at the other side of said cylinders, an annular member in sealed engagement with said first flange and said second flange to provide an annular discharge manifold in fluid communication with said cylinders, a sealed casing enclosing said body, said motor and said annular member, resilient means on said sealed casing resiliently supporting said body, said motor, and said annular member spaced from the walls of said

3

sealed casing, and a discharge conduit connected in fluid communication with the discharge manifold through one of said flanges and being connected with and extending through said sealed casing, the length of the discharge conduit between its connection with said discharge manifold and its connection with said sealed casing being considerably greater than the major cross-sectional dimension of the discharge conduit to provide flexibility to accommodate relative movement between said body and said sealed casing

2. In a compressor, a body, a substantially vertical shaft rotatably mounted in said body, a motor stator secured to the upper portion of said body, a motor rotor secured to the upper portion of said shaft, a plurality of cylinders in said body, said cylinders being below said motor stator and being arranged radially of the axis of said shaft, a piston working in each cylinder, piston rods pivotally connected to said pistons and to said shaft, a first flange on said body at one side of and extending outwardly beyond said cylinders, a second flange on said body at the other side of said cylinders, an annular member in sealed engagement with said first flange and said second flange to provide an annular discharge manifold in fluid communication with said cylinders, a sealed casing enclosing said body, said motor and said annular member, resilient means on said sealed casing resiliently supporting said body, said motor and said annular member spaced from the walls of said sealed casing, and a discharge conduit connected in fluid communication with said discharge manifold and being connected with and extending through said sealed casing in an area above the discharge manifold, the length of the discharge conduit between its connection with said discharge manifold and its connection with said sealed casing being considerably greater than the major cross-sectional dimension of the discharge conduit to provide flexibility to accommodate relative movement between said body and said sealed casing.

3. In a compressor, a body, a substantially vertical shaft rotatably mounted in said body, a motor stator secured to the upper portion of said body, a motor rotor secured to the upper portion of said shaft, a plurality of cylinders in said body, said cylinders being below said motor stator and being arranged radially of the axis of said shaft, a piston working in each cylinder, piston rods pivotally connected to said pistons and to said shaft, a first flange on said body at one side of and extending outwardly beyond said cylinders, a second flange on said body at the other side of said cylinders, an annular member in sealed engagement with said first flange and said

4

second flange to provide an annular discharge manifold in fluid communication with said cylinders, a sealed casing enclosing said body, said motor and said annular member, resilient means on said sealed casing resiliently supporting said body, said motor and said annular member spaced from the walls of said sealed casing, and a discharge conduit connected in fluid communication with said discharge manifold through one of said flanges and being connected with and extending through said sealed casing in an area above the discharge manifold, the length of the discharge conduit between its connection with said discharge manifold and its connection with said sealed casing being considerably greater than the major cross-sectional dimension of the discharge conduit to provide flexibility to accommodate relative movement between said body and said sealed casing.

4. In a compressor, a casing, a body mounted in said casing, a shaft rotatably mounted in said body about a vertical axis, a motor stator in said casing and secured to said body, a motor rotor secured to said shaft, a wall on said body extending axially of said shaft and being spaced from and surrounding said shaft, flanges extending from said wall substantially radially with respect to the axis of said shaft, cylinders extending from said wall between said flanges and having axes substantially radial with respect to said shaft, pistons in said cylinders, piston rods pivotally connected to said pistons and to said shaft, an annular member in sealed engagement with said flanges to provide an annular discharge manifold in fluid communication with said cylinders, said annular member having a flange extending inwardly toward the axis of said shaft, and means secured to said body and rotatably supporting said shaft, said means engaging the inwardly extending flange of said annular member to hold said annular member in position on said body, a discharge conduit secured to and being in fluid communication with the annular discharge manifold and extending through said casing.

References Cited in the file of this patent

UNITED STATES PATENTS

1,964,515	Hodsdon	June 26, 1934
2,053,593	Ziska et al.	Sept. 8, 1936
2,500,751	Halfvarson	Mar. 14, 1950
2,587,246	Touborg	Feb. 26, 1952

FOREIGN PATENTS

761,045	Germany	Aug. 16, 1951
---------	---------	---------------