

Feb. 20, 1962

E. T. NEUBAUER

3,021,995

COMPRESSOR

Filed Jan. 6, 1958

2 Sheets-Sheet 1

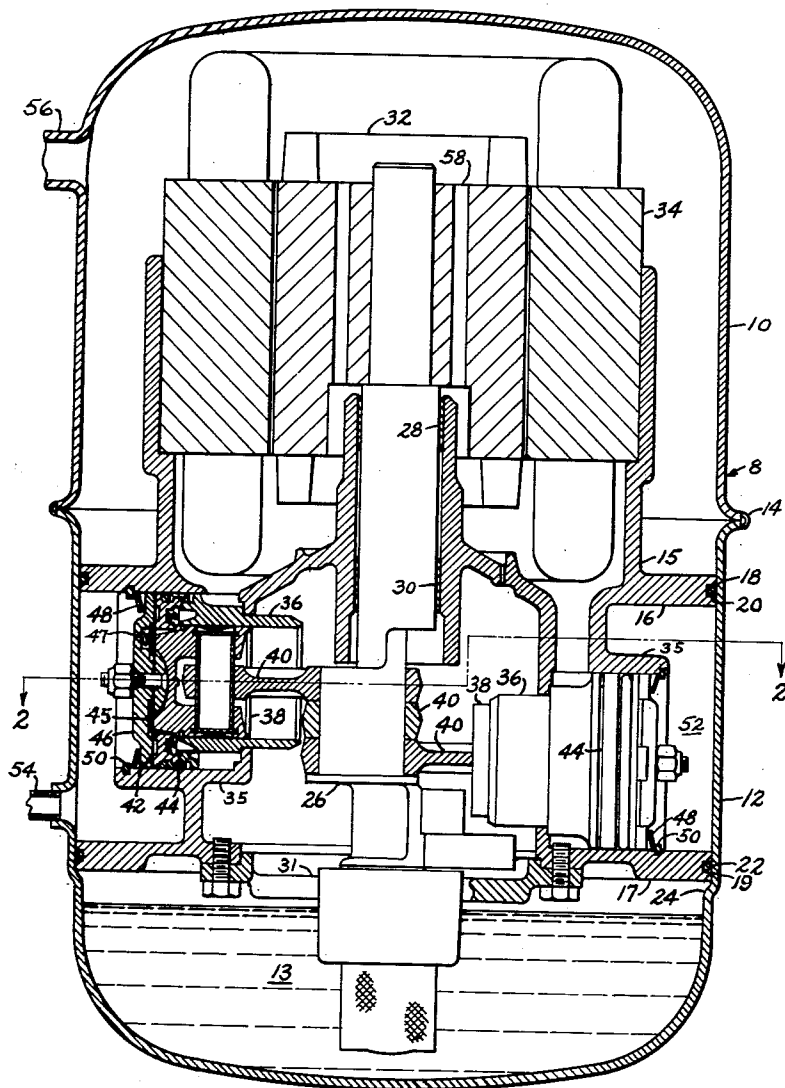


Fig. 1

INVENTOR.

EMIL T. NEUBAUER

BY

Holmes & Andersen
ATTORNEYS

Feb. 20, 1962

E. T. NEUBAUER
COMPRESSOR

3,021,995

Filed Jan. 6, 1958

2 Sheets-Sheet 2

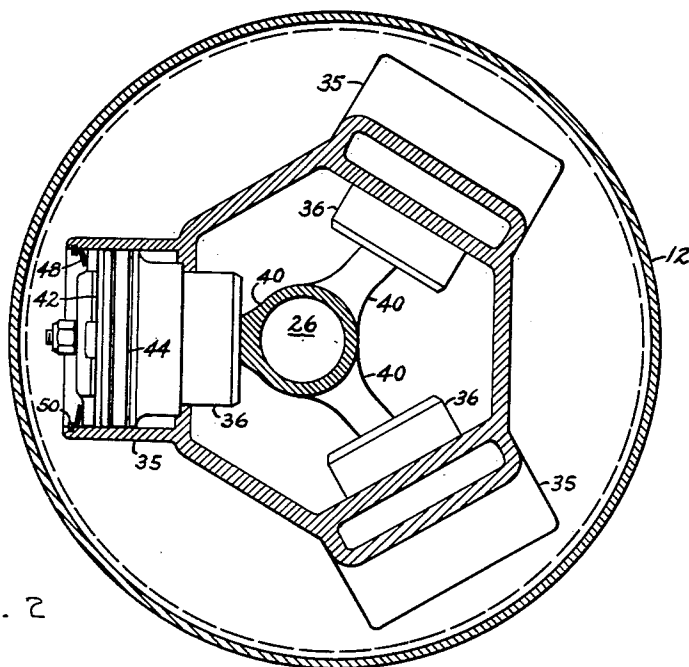


Fig. 2

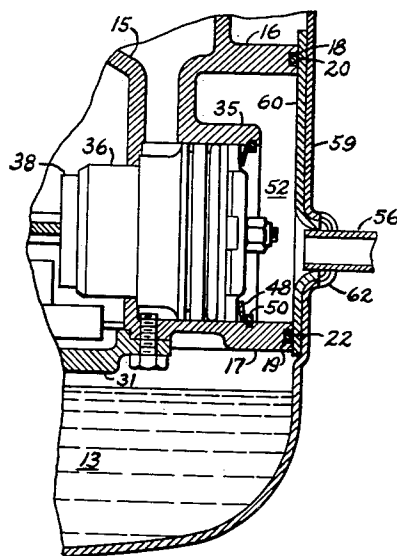


Fig. 3

INVENTOR.
EMIL T. NEUBAUER

BY
Holmes & Andersen
ATTORNEYS

1

3,021,995

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. 707,381
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 gases 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 between the compressor body and the compressor casing.

It is another object of this invention to provide an extra sheet metal layer between the compressor body and the compressor casing to reduce the transmission of noise through the casing.

It is an 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 efficiency.

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 cross sectional view substantially in an axial plane of the compressor of this invention;

FIGURE 2 is a cross sectional view taken on line 2—2 of FIGURE 1.

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

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 in the lower shell 12 and has flanges 16 and 17 which have peripheral grooves 18 and 19. O-rings 20 and 22 of neoprene, rubber or other flexible material are mounted in the grooves 18 and 19 respectively. The flange 17 rests upon the shoulder 24 of the lower shell 12. Other types of stops may be used.

A shaft 26 is rotatably mounted in the compressor body 15 by bearings 28 and 30. The shaft 26 is also supported in a bearing spider 31. 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. 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 toward closed position. The discharge valve cage is mounted upon the suction valve cage 42. A Belleville spring 48 is held in place by a snap ring 50 which is engaged in a groove in the cylinder. This Belleville spring 48 acts upon the discharge valve cage 46 to urge it against the suction valve cage 42 which in turn holds

2

the cylinder liner 36 in place. The discharge gas passing through the discharge valve cage 46 enters the space 52 bounded by the flanges 16 and 17, other portions of the body 15 and the wall of the lower shell 12.

A discharge conduit 54 is secured to the lower shell 12 as by brazing or welding and communicates with the manifold chamber 52. A suction conduit, not shown, is secured to the flanged opening 56 in the upper shell 10. The suction gas flows through passageways 58 in the rotor 32, and thence to the interior of the cylinder liners 36.

Referring now to the modification shown in FIGURE 3, the parts of the compressor are as shown and described in FIGURE 1 except that the lower shell 59 of the casing has an annular member 60, preferably of metal, in frictional contact therewith. The annular member 60 is in sealing contact with the O-rings 20 and 22 and thus with the flanges 16 and 17 of the body 15. A discharge conduit 56 is secured to the annular member 60 and the lower shell 59 by a welding bead 62.

Pulsations of gas to or from the cylinders tend to set up audible vibrations in the casing of a compressor. By providing the annular member 60 audible vibrations are dampened. The member 60 may move toward and away from the wall of the lower shell 59 in the area of the pulsation thus absorbing some of its energy. There is also some friction between annular member 60 and lower shell 59. This friction also removes energy from the pulsations and further dampens audible vibrations.

Although only preferred embodiments of the 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, drive means on said body and secured to said shaft for rotatably driving said shaft, a wall on said body extending axially of said shaft and being spaced from and surrounding said shaft, spaced radial flanges extending outwardly from said wall and having substantially circular peripheries, cylinders extending from said wall between said radial flanges and having their axes radial of the axis of said shaft, two shells in sealed abutting relationship to each other and enclosing said body and said drive means, an annular member fitting inside of one of said shells, said annular member being in frictional contact at a substantial portion of its outer surface with the inner surface of said one shell whereby vibrations in said annular member are dampened, gasket sealing means in sealing engagement with the substantially circular peripheries of said spaced radial flanges and in sealing engagement with said annular member to form a substantially annular chamber, pistons in said cylinders operating to discharge gas into said substantially annular chamber and connecting rods pivotally secured to said pistons and pivotally secured to said shaft to transmit a driving force from said shaft to said pistons.

2. In a compressor, a body, a crankshaft rotatably mounted in said body, a motor having a stator secured to said body and a rotor secured to said crankshaft, a plurality of cylinders on said body, said cylinders being arranged radially of the axis of said crankshaft, a piston working in each cylinder to discharge gas outwardly from the ends of said cylinders, piston rods pivotally connected to said pistons and to said crankshaft, a first peripheral flange on said body at one side of said cylinders, a second peripheral flange on said body at the other side of said cylinders, said first and second flanges extending outwardly beyond said cylinders, a cup shaped upper shell, an imperforate cup shaped lower shell, means sealing said upper shell to said lower shell to form a casing

3

hermetically enclosing said body and said motor, said lower shell being in sealed engagement with said peripheral flanges to enclose the space therebetween to provide a discharge manifold, and a discharge conduit in fluid communication with the discharge manifold and extending through said lower shell.

3. In a compressor, a body, a shaft rotatably mounted in said body, a motor having a stator secured to said body and a rotor secured to said shaft, a plurality of cylinders on 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 peripheral flange on said body at one side of said cylinders, a second peripheral flange on said body at the other side of said cylinders, said first and second flanges extending outwardly beyond said cylinders, a cup shaped upper shell, an imperforate cup shaped lower shell, means sealing said upper shell to said lower shell to form a casing hermetically enclosing said body and said motor, gasket means on said first and second peripheral flanges, said gasket means being in sealing engagement with said lower shell to provide a discharge manifold between said body and said lower shell, and a discharge conduit in fluid communication with the discharge manifold and extending through said lower shell.

4. In a compressor, a body, a shaft rotatably mounted in said body, means on said body for rotatably driving said shaft, a wall on said body extending axially of said shaft and being spaced from and surrounding said shaft, spaced radial flanges extending outwardly from said wall

4

and having substantially circular peripheries, cylinders extending from said wall between said radial flanges and having their axes radial of the axis of said shaft, a cup shaped upper shell, an imperforate cup shaped lower shell, means sealing said upper shell to said lower shell to form a casing hermetically enclosing said body and said motor, a portion of said lower shell being in sealed engagement with said spaced radial flanges and extending therebetween to form with said spaced radial flanges and with said wall a substantially annular chamber, said portion of said lower shell also serving as an exterior wall portion of said casing, pistons in said cylinders operating to draw gas into said cylinders and to discharge gas into said substantially annular chamber, connecting rods pivotally secured to said pistons and pivotally secured to said shaft to transmit a driving force from said shaft to said pistons, discharge valve cages mounted on said body within said cylinders, discharge valves mounted in said discharge valve cages for controlling the flow of gas from said cylinders to said substantially annular chamber, and conduit means in fluid communication with said substantially annular chamber for conducting fluid through said portion of said lower shell.

References Cited in the file of this patent

UNITED STATES PATENTS

2,053,593	Ziska et al.	Sept. 8, 1936
2,304,999	Gonzalez	Dec. 15, 1942

FOREIGN PATENTS

648,189	France	Dec. 6, 1928
---------	--------------	--------------