

May 7, 1940.

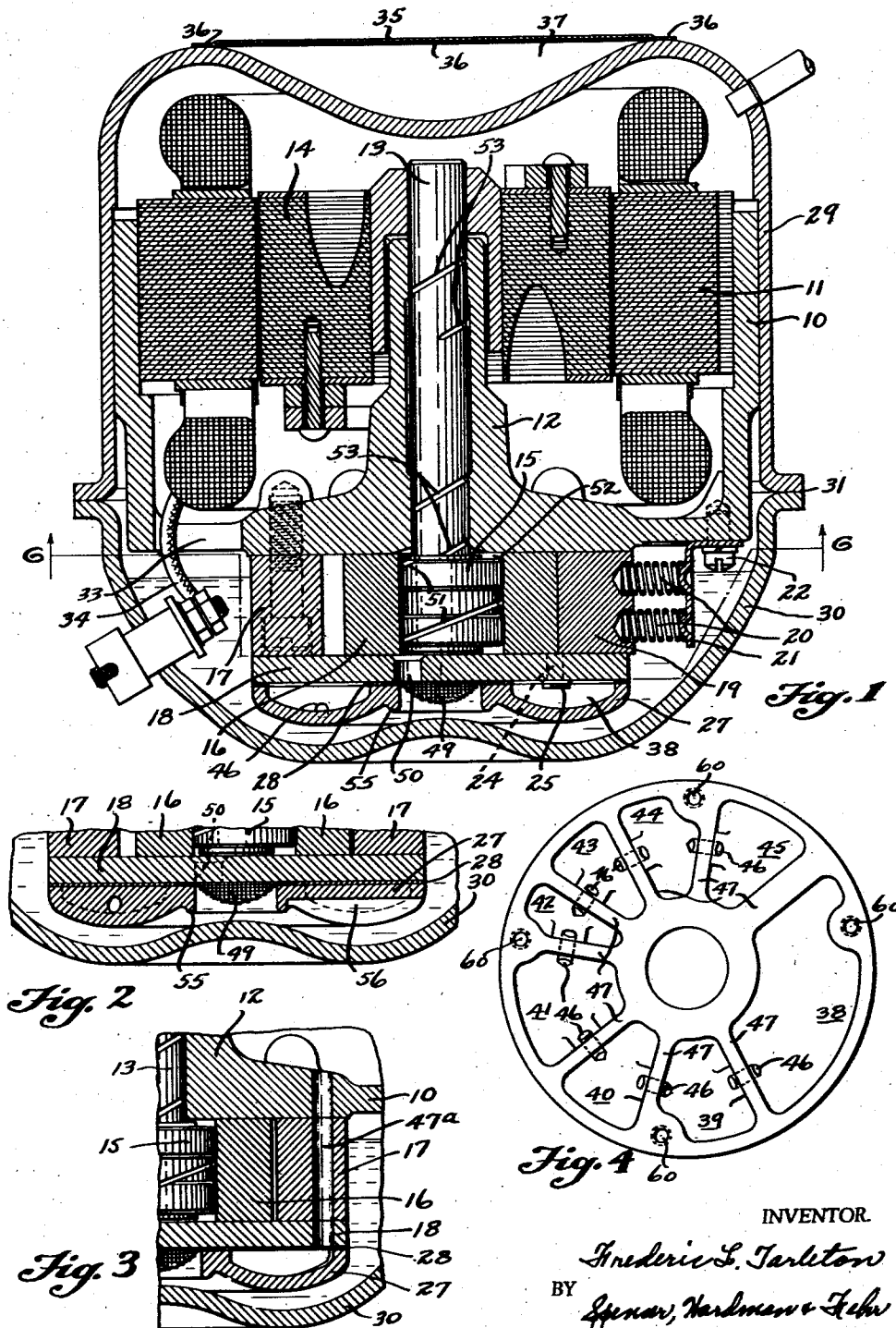
F. L. TARLETON

2,200,222

REFRIGERATING APPARATUS

Filed Dec. 30, 1936

2 Sheets-Sheet 1



INVENTOR.

Frederic L. Tarleton

BY

Spenar, Hardman & Fehr

HIS ATTORNEYS

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2 Sheets-Sheet 2

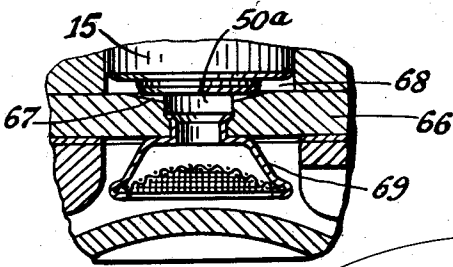


Fig. 8.

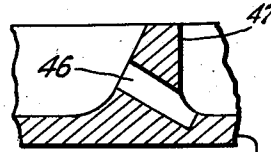


Fig. 9.

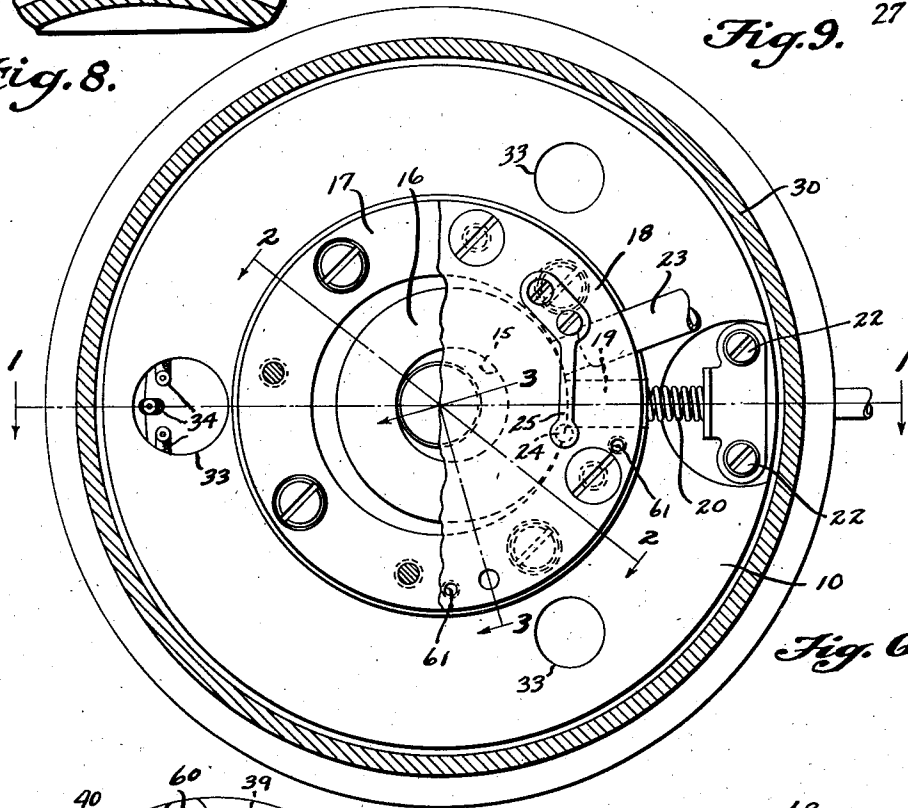


Fig. 6

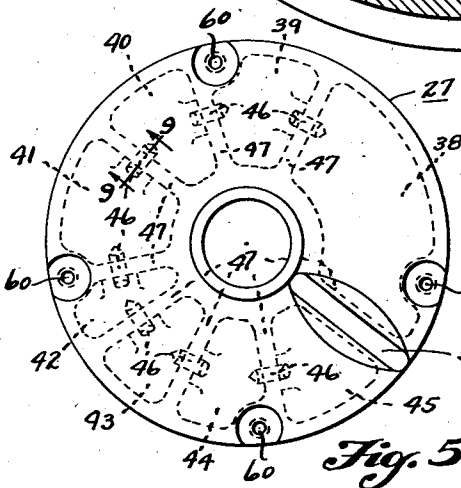


Fig. 5

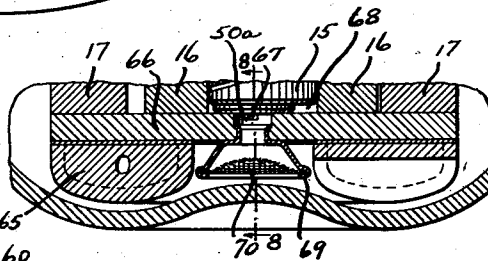


Fig. 7

INVENTOR.
Frederic L. Tarleton
BY Spencer, Hardman & Fehr
HIS ATTORNEYS

UNITED STATES PATENT OFFICE

2,200,222

REFRIGERATING APPARATUS

Frederic L. Tarleton, Dayton, Ohio, assignor to
General Motors Corporation, Dayton, Ohio, a
corporation of Delaware

Application December 30, 1936, Serial No. 118,329

5 Claims. (Cl. 230—139)

This invention relates to refrigerating apparatus and more particularly to rotary compressor units of the self-contained type.

5 An object of this invention is to provide an improved unit which will eliminate numerous manufacturing difficulties.

10 An object of this invention is to provide a main frame to which all of the compressor parts are secured, thereby providing a unitary structure which may be tested before being enclosed within a housing.

15 Another object of this invention is to construct a rotary compressor unit in which the final sealing operation does not change the alignment nor in any other way affect the working parts.

A further object of this invention is to provide a rotary compressor unit which is very silent and efficient in operation.

20 Still another object is to provide an improved arrangement for oiling the moving parts.

25 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:

Fig. 1 is a cross-sectional view taken on the line 1—1 of Fig. 6;

30 Fig. 2 is a fragmentary cross-sectional view taken on the line 2—2 of Fig. 6;

Fig. 3 is also a fragmentary cross-sectional view taken on the line 3—3 of Fig. 6;

Fig. 4 is a plan view of the muffler plate;

Fig. 5 is a bottom view of the muffler plate;

35 Fig. 6 is a cross-sectional view taken on the line 6—6 of Fig. 1; and

Fig. 7 is a view similar to Fig. 2 showing a modified construction.

40 Fig. 8 is a fragmentary sectional view taken on line 8—8 of Fig. 7;

Fig. 9 is a fragmentary sectional view taken on line 9—9 of Fig. 5.

45 In this invention the compressor unit consists of a main frame structure 10 to which all the compressor parts are secured, thereby providing a unitary structure which can be tested before placing the same in a housing. This main frame is a cast member and is arranged to contain the motor stator 11 in the top section thereof. A central boss 12 is provided in the frame structure and serves as the bearing for the compressor and motor rotor shaft 13. The compressor is of the rotary type and is adapted to be bolted to the bottom of the frame structure. The motor
55 rotor 14 is carried by the upper end of the shaft

13 and the eccentric 15 for the compressor unit is carried by the lower end of the shaft. The eccentric imparts movement to the impeller 16 in the usual manner.

As shown in Fig. 1, the impeller engages the under side of frame 10, the wall of the cylindrical number 17, the bottom plate 18 and the usual divider block 19. The divider block is biased into engagement with the impeller 16 by means of a pair of springs 20 which abut against the L-shaped bracket 21 secured to the frame 10 by means of bolts 22.

Low pressure refrigerant enters the compressor through the conduit 23 and leaves through the discharge port 34 which is provided with the usual flap valve 25. Secured to the under side of the plate 18 is a muffler plate 27. A gasket 28 is interposed between the plate 18 and the plate 27. This assembly can be tested as a unit before it is placed into a suitable housing. As shown in Fig. 1, the housing comprises a pair of cup-shaped members 29 and 30, which are welded together at their meeting edges 31. In assembling the device, the frame member 10 is forced up into the cup member 29 and is held in place by frictional engagement. Any other suitable arrangement for holding the frame member in place may be used without departing from the spirit of the invention. The frame member is provided with a plurality of apertures 33, one of which serves as a passage for the electrical leads 34. In order to reduce the over-all height of the unit, and at the same time provide a rigid and silent construction, the end walls have been bulged inwardly.

It has been discovered that the amount of noise produced by the unit may be materially reduced by placing a plate such as 35 over the upper end of the casing. This plate member is out of engagement with the casing except at spaced points such as 36 where the plate is secured to the casing. As shown in Fig. 1, the chamber 37 formed between the casing wall and the plate 35 serves as a noise trap. The presence of the plate 35 also serves to strengthen the casing. The muffler plate 27 is provided with a plurality of chambers 38 to 45 inclusive separated from one another by means of the radial web members 47. Communicating passages 46 are provided between the various chambers as shown in Figs. 4 and 9. These passages are placed at an angle so that the fluid leaving one chamber leaves at one level and enters the adjoining chamber at a higher level. With such an arrangement the oil which is pumped through the compressor along

with the refrigerant is carried along with the refrigerant and will not have a chance to flow in the reverse direction through the muffler. The compressed refrigerant leaving the discharge port 24 first enters the compartment 38, then passes through the first passage 46 into the adjacent chamber 39 and so on around until finally it reaches the last chamber 45 from whence it is discharged into the opening 47a which passes through the plate 18, cylinder wall 17 and frame 10 as best shown in Fig. 3. The oil which is carried along with the refrigerant is permitted to flow through the apertures 33 in the frame 10 into the lower part of cup-shaped member 38 which serves as an oil chamber. Oil for the moving parts of the compressor is caused to flow from the oil reservoir in the lower part of cup 30 through the screen 49, aperture 50 in plate 18 and from there is carried upwardly between the eccentric 15 and impeller 16 by means of the spiral groove 51 in the impeller and is then discharged into the pocket 52 above the eccentric from whence it is caused to flow upwardly along the shaft by means of the spiral groove 53 on the shaft. Excess oil is discharged between the upper end of the boss 12 and the motor rotor 14 and is permitted to return to the oil reservoir through the apertures 33. As best shown in Fig. 2, the muffler plate 27 is provided with an annular ridge 55 on its under side and is also provided with a vent passage 56. The purpose of this latter construction is to prevent the gas which is formed by boiling refrigerant out of the oil supply, from entering the oil passage 50. By preventing gaseous refrigerant from circulating with the oil to the moving parts, the compressor operates more efficiently. The muffler plate 27 is bolted in place by means of bolts not shown which pass through the holes 60 at its outer edge. The plate 18 is provided with tap recesses 61 into which the bolts securing the plate 27 in place are threaded.

In Figs. 7 and 8, I have shown a modified muffler plate construction together with a modified oil inlet means. The rest of the compressor structure is the same as that shown in the other figures. The muffler plate 65 shown in Fig. 7 is much like the muffler plate 27 shown in Fig. 2, except that the annular ridge 55 has been omitted and the muffler is thicker. The oil inlet 50a corresponding to inlet 50 in Fig. 2 goes up through the central portion of the plate 66 corresponding to plate 18 and is provided with a pair of oppositely directed channels 67 which lead to the open space 68 between the eccentric 15 and the plate 66. The inverted funnel-shaped member 69 is placed in the oil inlet so as to pick up the oil from a point adjacent the outer casing member. With this arrangement a negligible amount of gas will be picked up by the circulating oil. A screen 70 is placed in the mouth of the funnel as shown in the drawings.

Applicant has provided an improved motor-compressor unit which is very simple to manufacture, is inexpensive and at the same time durable, noiseless and efficient.

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, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. In a motor-compressor unit, the combination of a cup-shaped casing member, a frame member telescopically engaging said casing member and forming a cavity therebetween, a motor stator having a press fit within said frame member and mounted within said cavity, a motor rotor cooperating with said stator member, a shaft for said rotor, journal means for said shaft integral with said frame member, a compressor carried by said frame member on the side opposite said motor rotor, means whereby said shaft operates said compressor, a bulged portion in said casing member adjacent said rotor, a plate member substantially closing the open side of said bulged portion and serving to muffle the motor-compressor noises, and a cup-shaped oil reservoir cooperating with said casing to hermetically seal said motor and compressor as a unit, said compressor being substantially submerged in the oil within said reservoir.

2. In combination with a motor-compressor unit, a sheet metal casing hermetically sealing said motor-compressor unit, an inwardly bulged portion on said casing member forming an exterior depression in said casing, and means cooperating with said bulged portion and depression forming a sound deadening pocket.

3. In a circulatory compression refrigeration system, a casing, a motor-compressor unit within said casing, and a muffler into which said compressor discharges, said muffler having a plurality of vertical partitions forming a plurality of horizontally arranged chambers, said partitions having passages leading from a point adjacent the bottom of one chamber to a higher point in an adjacent chamber whereby lubricant which collects in the bottom of a chamber is swept by the gas into the next adjacent chamber and is prevented from flowing back when the compressor stops.

4. In a motor-compressor unit, the combination of a cup-shaped sheet metal casing member, a frame member telescopically engaging said casing member and forming with said casing member a motor cavity, a motor stator having a press fit within said frame member and mounted within said cavity, a motor rotor cooperating with said stator member, a shaft for said rotor, journal means for said shaft integral with said frame member, a compressor carried by said frame member on the side opposite said motor rotor, means whereby said shaft operates said compressor, a bulged portion in said casing member adjacent said rotor and a plate member substantially closing the open side of said bulged portion whereby the motor-compressor noises are muffled.

5. In a hermetically sealed compressor unit, a casing adapted to contain a supply of lubricant, a compressor within said casing having a flap exhaust valve therefor at its bottom side, an oil hole for supplying lubricant to the movable parts of said compressor located on the bottom side thereof, a muffler plate seated against said side, said muffler plate having an annular channel into which said compressor discharges, said channel having spaced apertured baffles extending substantially radially from the axis of said channel, said muffler plate having means whereby gas which separates out from the lubricant is directed away from the entrance to said oil hole.

FREDERIC L. TARLETON.