Feb. 19, 1946. F. I. RATAICZAK 2,395,065

REFRIGERATING APPARATUS

Filed May 28, 1941 4 Sheets-Sheet 1

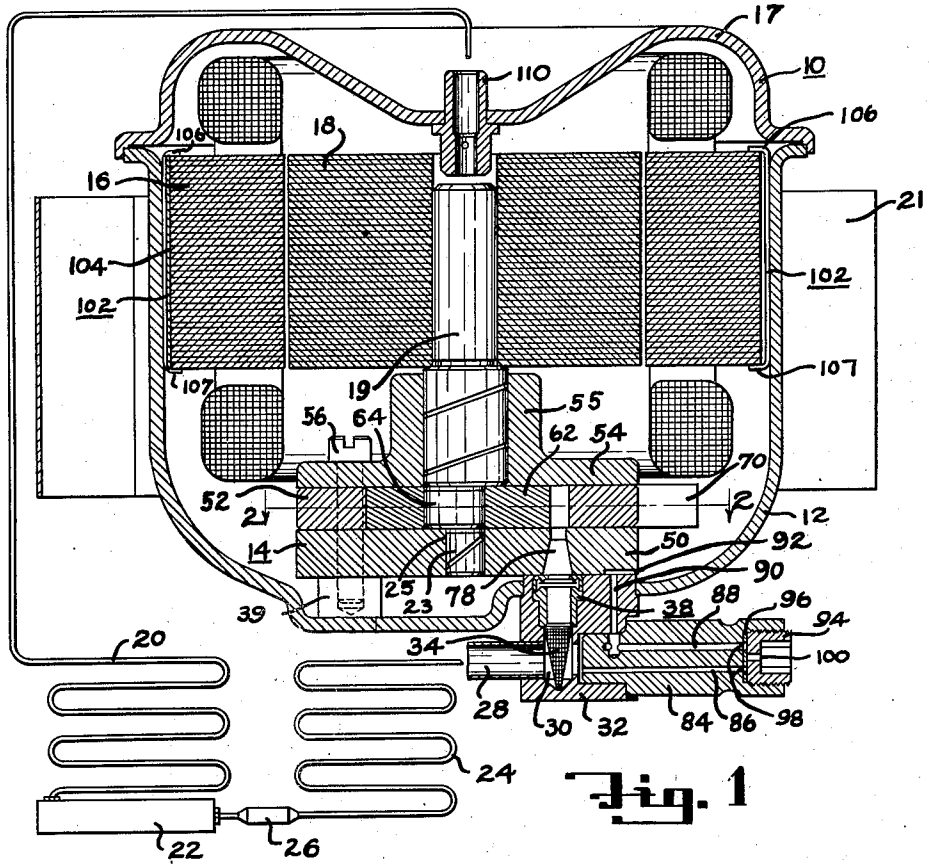


Fig. 1

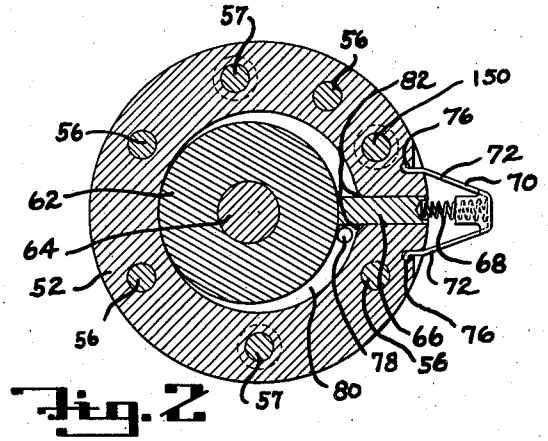


Fig. 2

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REFRIGERATING APPARATUS

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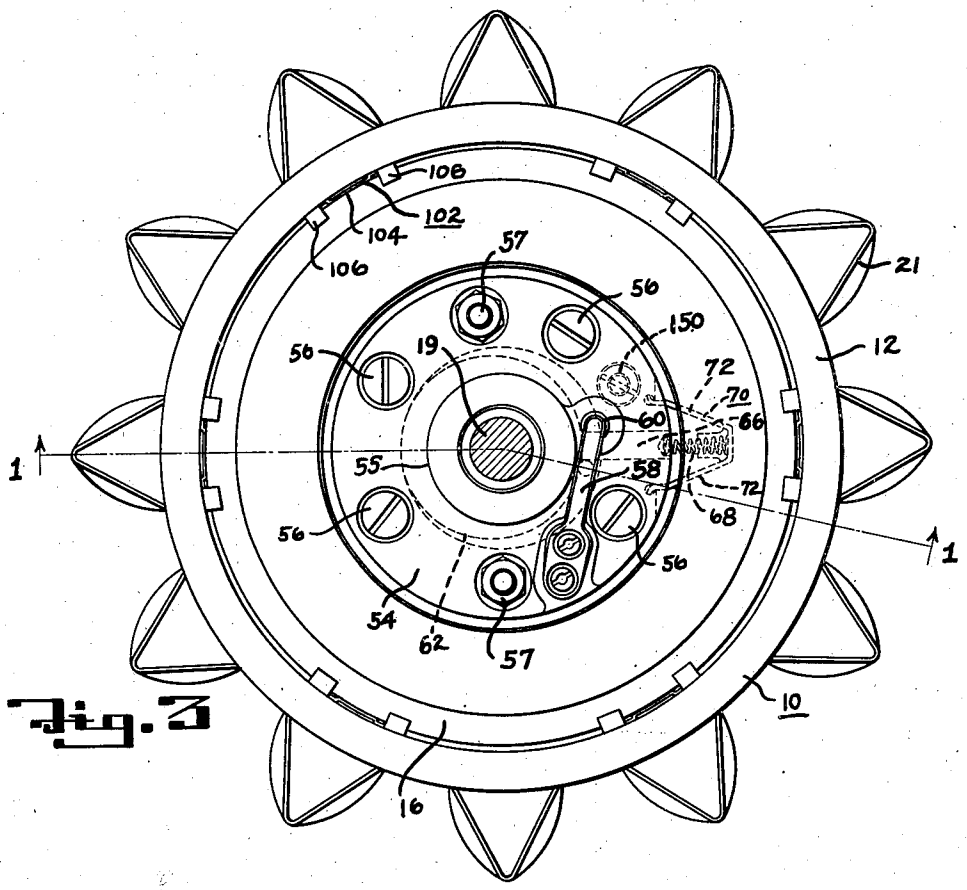


Fig. 3

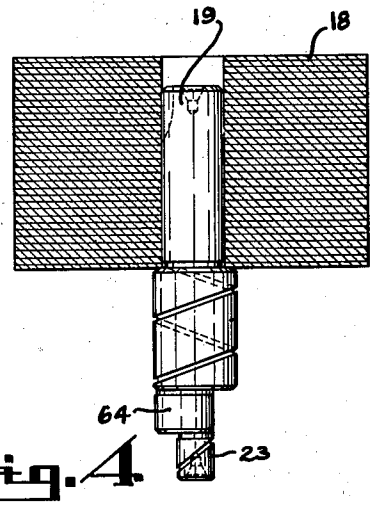


Fig. 4

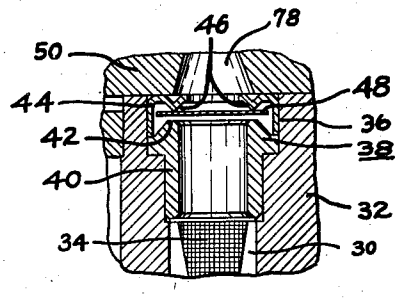


Fig. 5

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REFRIGERATING APPARATUS

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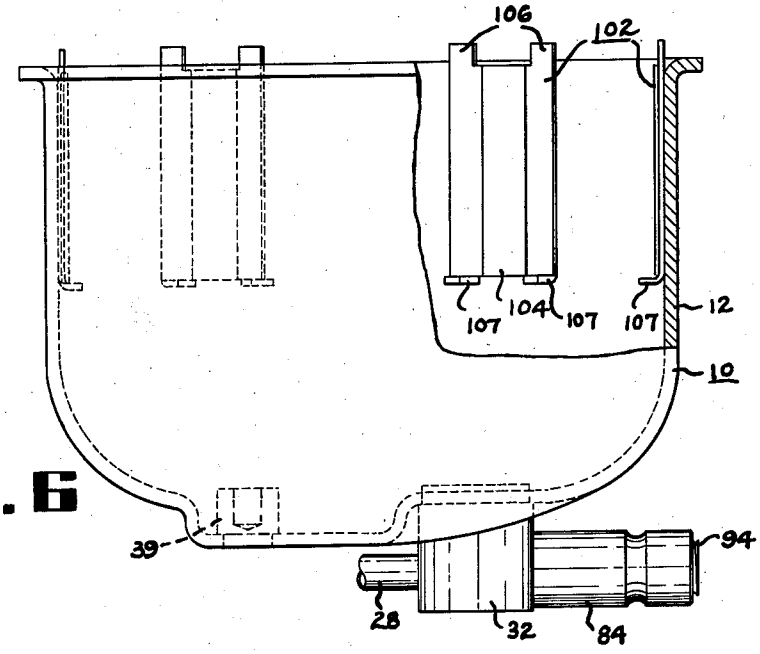


Fig. 6

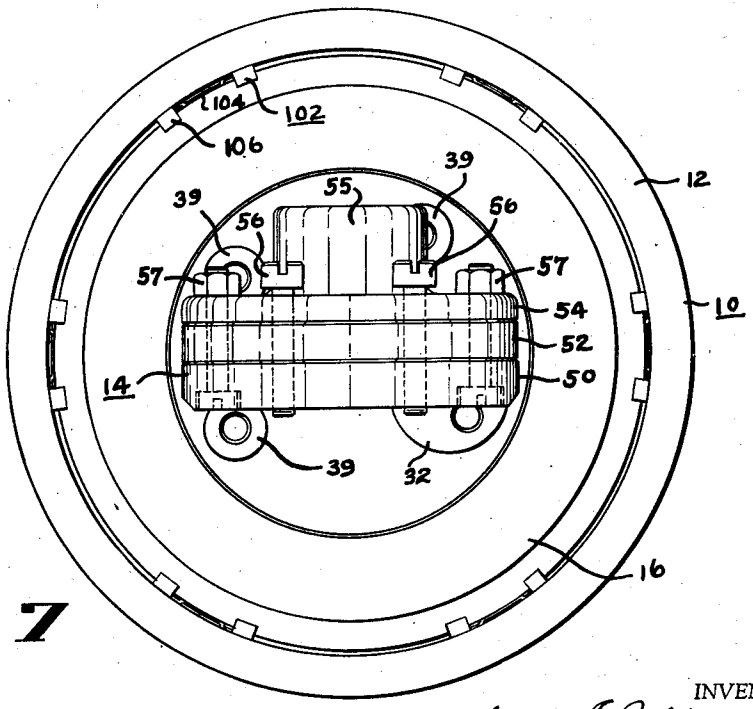


Fig. 7

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REFRIGERATING APPARATUS

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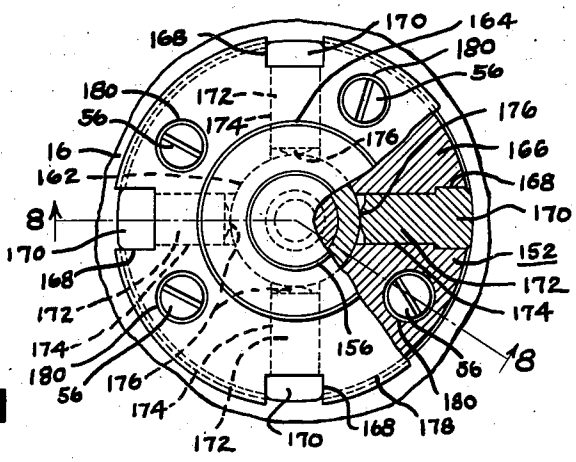


Fig. 9

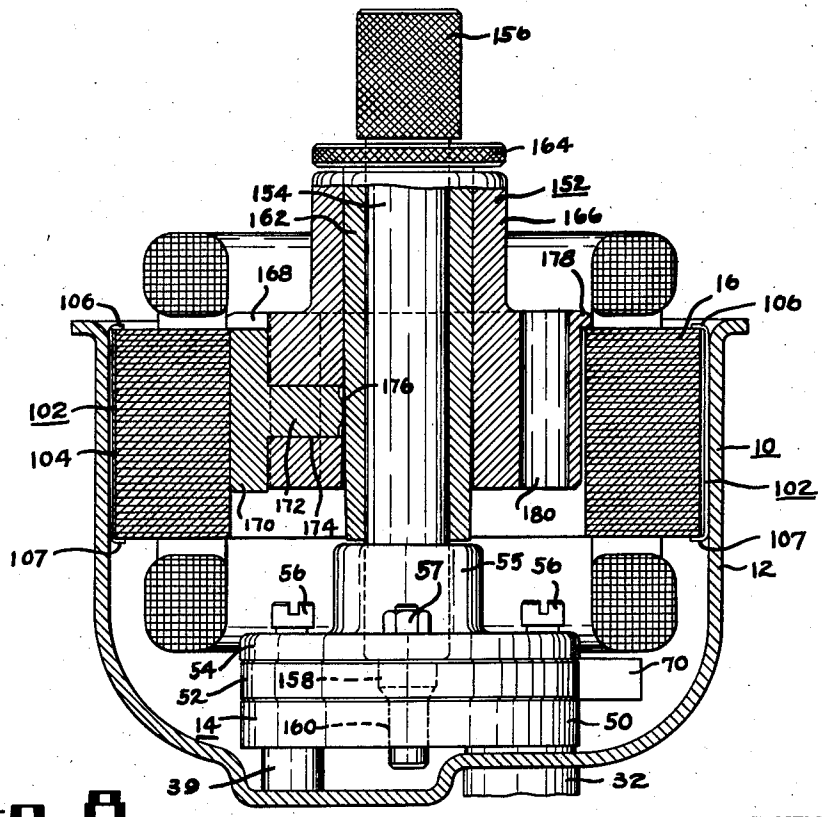


Fig. 8

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Patented Feb. 19, 1946 2,395,065

# UNITED STATES PATENT OFFICE

2,395,065

## REFRIGERATING APPARATUS

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Application May 28, 1941, Serial No. 395,645

21 Claims. (Cl. 62—115)

This invention relates to refrigerating apparatus and more particularly to an improved motor-compressor unit for use in a refrigerating system.

One of the objects of this invention is to provide a motor-compressor unit which lends itself to mass production methods.

Another object of this invention is to provide a motor-compressor unit in which errors in alignment may be detected during assembly of the motor-compressor parts without the use of complicated checking equipment.

Still another object of this invention is to reduce the amount of material used in a motor-compressor unit.

More particularly, it is an object of this invention to eliminate the need for a heavy central metal frame.

Still another object of this invention is to simplify and improve the valve construction.

A further object of this invention is to simplify the assembly of the motor-stator within the motor-compressor housing.

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 partly diagrammatic view of a refrigerating system showing the motor-compressor unit in section;

Fig. 2 is a sectional view of the compressor unit taken on the line 2—2 of Fig. 1;

Fig. 3 is a plan view of the motor-compressor unit with the cover of the casing removed and with the motor-rotor broken away;

Fig. 4 shows the construction of the main shaft and the motor-rotor;

Fig. 5 is an enlarged sectional view showing the suction valve assembly;

Fig. 6 is an elevational view of the main casing without the heat radiating fins and with a portion of the casing broken away so as to more clearly show the motor-stator mounting means;

Fig. 7 is a plan view of the main casing and the motor-stator and illustrates the manner in which the main compressor casing is inserted through the motor-stator;

Fig. 8 is an elevational view partly in section showing the apparatus used for aligning the main compressor cylinder with the motor-stator; and

Fig. 9 is a fragmentary elevational view, with parts broken away, illustrating the apparatus for aligning the main compressor bearing with the motor-stator.

In the manufacture of motor-compressor units, it is customary and, in fact, necessary to tolerate small errors in the dimensions and concentricity of various elements. In the ordinary motor-compressor design the accumulation of tolerances materially affects the efficiency of the unit and frequently renders the unit completely inoperative, in which case, it becomes necessary to reoperate some of the parts or to match certain parts with other parts in which the dimensional errors balance out upon assembly. This is especially true in case the compressor and its associated motor-rotor is assembled with a stator which is not perfectly concentric with the main bearing due to tolerances necessary in the manufacture of the stator or due to a slight error in the manufacture of the stator mounting means or due to an accumulation of errors in the motor-stator and its mounting means.

Referring now to Fig. 1 of the drawings, in which I have shown a preferred embodiment of my invention, reference numeral 10 designates generally a hermetically sealed motor-compressor unit. Reference numeral 12 designates a substantially cup-shaped stamped sheet metal casing which forms the main support for the compressor assembly 14 and also the motor-stator 16. Reference numeral 18 designates a conventional motor-rotor. A stamped sheet metal end cap 17 closes the upper end of the cup-shaped casing element 12 and forms therewith a high pressure refrigerant vapor chamber. The end cap 17 is welded or otherwise secured to the main casing 12. Heat conducting fins 21 may be secured to the outside of the casing element 12 to help dissipate the heat. The high pressure gas flows to the condenser 20 in which it is condensed and collects in liquid phase in the receiver 22. The liquid refrigerant flows from the receiver 22 into the evaporator 24 through a conventional refrigerant flow control device 26. The refrigerant flow control device may be of any conventional construction and is preferably of the fixed restrictor type in which the high pressure liquid refrigerant is required to flow through a long narrow capillary passage.

The refrigerant vaporized in the evaporator 24 returns to the compressor through the line 28 which communicates with a passage 30 formed in the adapter block 32. A screen element 34 is arranged directly within the passage 30 and serves to stop the flow of solid particles into the main compressor. As best shown in Fig. 5, the upper side of the adapter block 32 is provided with a recess 36 in which a check valve, generally desig-

nated by the reference numeral 38 is mounted. The check valve 38 comprises an element 40 provided with a valve seat 42 at its upper edge and also comprises a substantially cup-shaped stamping 44 provided with valve stops 46 which restrict the upward movement of the main valve plate 48. As shown in Fig. 5, the stamping 44 is held in place by the compressor end plate element 50 which rests upon the adapter block 32 and one or more mounting blocks 39 which are welded or otherwise secured to the bottom wall of the casing 12. The upper surfaces of the blocks 32 and 39 are machined so as to be perpendicular to the motor-stator support surfaces described hereinafter. The stamping 44, in turn, holds the valve element 40 in place. By virtue of this arrangement no special fastening means is required and in the event of valve failure, the damaged valve part or parts may be replaced with a minimum amount of difficulty.

As best shown in Fig. 1, the compressor assembly 14 comprises a lower end plate 50, a cylinder element 52 and an upper end plate 54 which has formed integrally therewith the main bearing 55. The upper end plate 54, as shown in Fig. 3, carries a conventional discharge valve assembly 58 which controls the flow of refrigerant through the compressor outlet 60 provided in the end plate 54. An impeller 62 is provided within the cylinder 52. The impeller 62 is mounted on the eccentric 64 which causes the impeller to compress the refrigerant in accordance with well-known practice.

A divider block 66 cooperates with the cylinder 52 and the impeller 62 in accordance with well-known practice. A spring 68 biases the divider block into engagement with the impeller 62. The outer end of the spring rests against the spring retainer 70. The retainer 70, as shown in Figs. 2 and 3 is provided with a pair of arms 72 having bent end portions which interlock with the holes or keyways 76 drilled in the cylinder element 52. The spring retainer 70 is slipped into place before the cylinder 52 is clamped between the end plates 50 and 54 and is held in place by the end plates 50 and 54.

The end plate 50 is provided with a tapered passage 78 which conveys the low pressure refrigerant vapor from the inlet valve 36 to the compression chamber 80. By virtue of the taper in the walls of the passage 78, any slight misalignment between the end plate 50 and the inlet valve 38 will not interfere with the free flow of refrigerant from the inlet valve to the compression chamber.

Referring to Fig. 2, it will be observed that the inlet port 78 enters the compression chamber 80 at a point close to but spaced from the divider block 66 and spaced from the inner wall of the cylinder element 52. It will also be observed that pressure relief notches 82 have been provided in the cylinder wall 52 adjacent the divider block 66. By virtue of the inlet port arrangement, the inlet port is completely closed during the final portion of the compression stroke with the result that it is impossible for any of the compressed gas remaining in the pressure relief cavity to reexpand into the intake port 78.

The adapter block 32 is provided with a refrigerant charging plug 84 which has a first passage 86 communicating with the compressor inlet passage 30 and a second passage 88 communicating with a passage 90 in the adapter block 32. The lower end plate 50 of the compressor is cut away as at 92 so as to provide a passage from the high pressure refrigerant chamber to the passage 90 and the passage 88. The outer ends of the passages 86 and 88 are sealed by means of a plug 94 and a lead-plated copper gasket 96. The gasket 95 is provided with apertures 98 in alignment with the passages 86 and 88. The plug 94 is provided with a single passage 100 through which refrigerant and/or lubricant may be added to or removed from the refrigerant system upon partially unscrewing the plug 94. By virtue of this arrangement, both the high side and the low side of the refrigerating system may be very quickly evacuated prior to charging the system with refrigerant and lubricant.

The motor-stator 16 is held in place by means of special clamps such as 102. The clamps 102 are initially formed as shown in Fig. 6, and are spot welded or otherwise secured to the shell 12. In the prior art devices, it is customary to provide a press fit between the outer shell of the compressor and the motor-stator. In such an arrangement, it is very difficult to properly hold the motor-stator in place unless a very heavy cast iron frame or the equivalent is used; and once the motor-stator is in place, it is very difficult to remove it for inspection or repair purposes. By virtue of the clamping arrangement shown, a light weight sheet metal casing may be used and the final sizing operation may be performed merely by forcing a die of proper size into the opened end of the casing so as to deform the projecting portion 104 of each clamp 102 the necessary amount. This arrangement of parts and method of sizing eliminates the necessity for turning the inner surface of the outer shell 12 to size on a lathe. Furthermore, the clamping elements 102 serve to compensate for any taper or irregularity in the walls of the shell 12. It is difficult to form the outer sheet metal casings to any exact dimension since the strains and stresses in the sheet metal casing produced by the drawing operation tend to distort the walls of the casing. The clamps 102, however, sufficiently compensate for such distortions.

After the motor-stator has been inserted in place, the projecting ends 106 of the clamp elements 102 are bent over onto the upper side of the motor-stator so as to hold the motor-stator in a fixed position. This not only reduces the cost of construction and facilitates the assembly of the apparatus, but also facilitates the removal of the motor-stator in the event that it becomes necessary to replace the motor-stator. The lower ends of the clamps 102 are provided with ears 107 which limit the downward movement of the motor-stator.

The cover member 17 is provided with fitting 110, through which the compressed refrigerant leaves the unit 10. The fitting 110 serves as a stop for limiting the axial movement of the motor-rotor 18 and the shaft 19 during shipment, etc. During normal operation, the shaft 19 is spaced from the adapter 110 as shown in Fig. 1.

In order to avoid the harmful accumulation of tolerances in dimensions in assembling the various parts, the various parts of the unit are assembled in the following manner. In assembling the various elements that go to make up the compressor unit, the first step is to position the cylinder 52 with respect to the lower end wall 50. This is done by means of a conventional positioning mandrel (not shown) which holds the member 52 in proper alignment with the member 50 while one or more bolts such as bolt 150 (see Fig. 3) is or are tightened so as to clamp the ele-

ments 50 and 52 together in their proper relationship. After the elements 50 and 52 have been fastened together in proper alignment, the impeller 62, the divider bolck 66, the divider block spring 68 and the spring retainer 70 are inserted in place and the upper end plate 54 is bolted to the cylinder 52 and the lower end plate 50 by means of bolts 57. A positioning mandrel (not shown) is used for holding the end plate 54 in alignment while the bolts 57 are being tightened.

The compressor assembly may then be inserted downwardly through the opening in the motor-stator as shown in Fig. 7. The compressor assembly is of such shape and size that it may readily pass through the opening in the motor-stator. After the compressor assembly has been slipped into place in the bottom of the casing 12, a specially constructed positioning fixture 152 is used for aligning the main compressor bearing with the inner surface of the motor-stator.

The positioning fixture 152 comprises a central shaft 154 provided with a knurled handle 156. The main portion of the central shaft 154 has a diameter corresponding to the internal diameter of the main compressor bearing 55. Another portion 158 of the central shaft 154 has a diameter slightly less than the internal diameter of the impeller 62. The lowermost portion 160 of the central shaft 154 has a diameter corresponding to the internal diameter of the bearing 25 provided in the lower end plate 50 for the lowermost portion 23 of the main compressor shaft 19. The positioning fixture 152 as an intermediate sleeve member 162 which is slidably mounted on the central shaft 154. The intermediate sleeve 162 is provided with a knurled handle portion 164. The lower end of the sleeve 162 is tapered for a purpose explained hereinafter. The main body 166 of the positioning fixture 152 has a central aperture through which the sleeve 162 and the shaft 154 may be inserted. The outer diameter of the main portion of the element 166 is slightly less than the internal diameter of the motor-stator 16.

As best shown in Fig. 9, the main body 166 of the positioning fixture is provided with four longitudinally extending slots 168 in each of which is mounted a shoe element 170. Each shoe element 170 is provided with a shank 172 which passes through a radially extending hole 174 formed in the body 166. The inner end of each shank is provided with a cam surface 176 which is adapted to engage the tapered portion of the sleeve 162. The element 166 is provided with a shoulder 178 which limits the movement of the element 166 within the motor-stator 16. The arrangement is such that when the positioning fixture is inserted into the motor-stator and the sleeve element 162 is moved into the position in which it is shown in Fig. 8, the sleeve 162 cams the shoes 170 into engagement with the motor-stator, whereby the central shaft 154 of the positioning mandrel may be used for lining up the compressor assembly with respect to the motor-stator.

The main body 166 of the positioning fixture is provided with a plurality of apertures 180 through which access may be had to the cap screws 56 which secure the compressor assembly to the mounting blocks 32 and 39. While the positioning fixture is in place, the cap screws 56 are securely tightened so as to rigidly hold the compressor assembly in position. After having tightened the cap screws 56, the positioning mandrel is removed. By removing the sleeve 164, the shoes 170 release their hold on the walls of the motor-stator whereby the mandrel may be removed without difficulty.

In the event that the upper surfaces of the block 39 and the adapter element 32 are not perpendicular to the inside walls of the motor-stator, the positioning mandrel will bind when the cap screws 56 are tightened. This serves to give notice that the proper perpendicularity is lacking so that the compressor assembly may be immediately removed and the parts reoperated so as to obtain the proper perpendicularity. Atfer removal of the positioning mandrel 152, the motor-rotor 18 and its associated shaft 19 may be dropped into place.

Inasmuch as the above described construction allows the motor-rotor to be secured to the shaft 19 prior to the assembly of the shaft in the main bearing, it is possible to true-up the outer diameter of the motor-rotor after it has been mounted on the shaft, thus eliminating the accumulation of tolerances in the concentricty of the main shaft, the internal bore of the motor-rotor and the external diameter of the motor-rotor.

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. A motor-compressor unit comprising in combination; a stamped sheet metal shell member; motor-stator clamping means secured to the inner wall of said shell member; a motor-stator supported by said clamping means; said clamping means comprising integrally formed motor-stator positioning lugs; compressor mounting means carried by one wall of said shell having one surface arranged perpendicular to the inner surface of said motor-stator; a motor-rotor; a recess in one of said mounting means; valve means within said recess; a compressor assembly secured to said mounting means and serving to hold said valve means in said recess; a refrigerant charging unit carried by said compressor mounting means; said unit including a first passage communicating with the outlet side of said compressor and including a second passage communicating with the inlet side of said compressor; and removable plug means accessible from outside of said shell member sealing said passages; said plug means having a passage formed therein adapted to communicate with both the said passages upon partial removal of said plug.

2. A motor-compressor unit comprising in combination, a stamped sheet metal shell member, sheet metal motor-stator clamping means secured to the inner wall of said shell member, a motor-stator supported by said clamping means, said clamping means having integrally formed motor-stator positioning lugs, compressor mounting means carried by one wall of said shell having one surfce arranged perpendicular to the interior surface of said motor-stator, a recess in one of said mounting means, valve means within said recess, a compressor assembly secured to said mounting means and serving to hold said valve means in said recess, refrigerant charging means provided by said compressor mounting means, said charging means including a first passage communicating with the outlet side of said compressor and including a second passage communicating with

the inlet side of said compressor, removable plug means sealing said passages, said plug means having a passage formed therein adapted to communicate with both the said passages upon partial removal of said plug.

3. In a refrigerant compressor, a cylinder member having a divider block slot, a pair of holes drilled in said cylinder member adjacent said divider block slot, a divider block within said slot, a divider block spring engaging one end of said divider block, spring retaining means engaging said spring for holding said spring in place comprising a substantially U-shaped element having its arms interlocked with said holes, a pair of compressor end plates secured to said cylinder and clamping said U-shaped member in position, a compressor shaft journaled in one of said end plates, an impeller eccentrically mounted on said shaft and having contact at its periphery with the end of the divider block remote from the divider block spring, and inlet and outlet ports on opposite sides of said divider block.

4. In a refrigerant compressor, a cylinder member having a divider block slot, a pair of holes drilled in said cylinder member adjacent said divider block slot, a divider block within said slot, a divider block spring engaging one end of said divider block, spring retaining means engaging said spring for holding said spring in place comprising a substantially U-shaped element having its arms interlocked with said holes, a pair of compressor end plates secured to said cylinder and clamping said U-shaped member in position, a compressor shaft journaled in one of said end plates, an impeller eccentrically mounted on said shaft and having contact at its periphery with the end of the divider block remote from the divider block spring, inlet and outlet ports on opposite sides of said divider block, a casing, mounting means for said end plates and said cylinder carried by one wall of said casing for supporting said cylinder and end plates within said casing, and means for holding said cylinder, end plates and mounting means in assembled relationship comprising a plurality of cap screws engaging said mounting means.

5. In a refrigerant compressor, a cylinder member having a divider block slot, a pair of holes drilled in said cylinder member adjacent said divider block slot, a divider block within said slot, a divider block spring having one end engaging one end of said divider block, spring retaining means engaging the other end of said spring for holding said spring in place comprising a substantially U-shaped element having the arms thereof disposed on opposite sides of said spring and interlocked with said holes, a pair of compressor end plates secured to said cylinder and clamping said U-shaped member in position, inlet and outlet ports on opposite sides of said divider block an impeller within said cylinder, said impeller being arranged in engagement with the other end of said divider block, and a compressor operating shaft drivingly connected to said impeller and removably journaled in said end plate members whereby said shaft may be assembled after said end plates have been secured to said cylinder.

6. In a refrigerant compressor, a cylinder member having a divider block slot, a pair of holes drilled in said cylinder member adjacent said divider block slot, a divider block within said slot, a divider block spring engaging one end of said divider block, spring retaining means comprising a substantially U-shaped element having the arms thereof interlocked with said holes, a pair of compressor end plates secured to said cylinder and clamping said U-shaped member in position, an impeller within said cylinder, a compressor operating shaft removably journaled in said end plate members whereby said shaft may be assembled after said end plates have been secured to said cylinder, a casing, compressor mounting means within said casing, means for securing one of said end plates to said compressor mounting means, said compressor mounting means including one portion projecting through one wall of said casing and having a refrigerant flow passage therein for conveying refrigerant through the wall of said casing, a valve mounted in said refrigerant flow passage for preventing flow of refrigerant through said passage in one direction, said valve being held in place by means of one of said compressor end plates, refrigerant charging passages in said one portion of said compressor mounting means, and one of said passages communicating with the inlet side of the compressor and the other of said passages communicating with the outlet side of the compressor.

7. In combination, a casing, a compressor mounting element projecting through the wall of said casing, a refrigerant compressor supported within said casing on said mounting element, said compressor having an inlet and an outlet, said mounting element having a first passage for conveying refrigerant to be compressed from without the casing to the inlet of said compressor, and means in said element for supplying refrigerant to both the inlet and outlet sides of said compressor simultaneously including a second passage in said element leading to the outlet side of said compressor.

8. A combined refrigerant compressor mounting means and refrigerant charging plug for use with a compressor enclosed within a casing which comprises, an element having one portion disposed outside of the compressor enclosing casing and a second portion disposed within the compressor enclosing casing and serving to hold the compressor in fixed relationship to said casing, a first passage in said element for supplying refrigerant to be compressed to said compressor, and a second passage in said element for adding refrigerant to the compressed refrigerant leaving said compressor.

9. A combined refrigerant compressor mounting means and refrigerant charging plug for use with a compressor enclosed within a casing which comprises, an element having one portion disposed outside of the compressor enclosing casing and a second portion disposed within the compressor enclosing casing and serving to hold the compressor in fixed relationship to said casing, a first passage in said element for supplying refrigerant to be compressed to said compressor, a second passage in said element for adding refrigerant to the compressed refrigerant leaving said compressor, and a check valve disposed within one of said passages.

10. A combined refrigerant compressor mounting means and refrigerant charging plug for use with a compressor enclosed within a casing which comprises, an element having one portion disposed outside of the compressor enclosing casing and a second portion disposed within the compressor enclosing casing and serving to hold the compressor in fixed relationship to said casing, a first passage in said element for supplying refrigerant to be compressed to said compressor, a second passage in said element for adding refrig-

erant to the compressed refrigerant leaving said compressor, and a check valve disposed within one of said passages and clamped in place between the compressor and said element.

11. In a sealed motor-compressor unit, a cup-shaped casing of stamped sheet metal material, a motor including a motor stator supported by said casing in the upper portion thereof and provided with a central opening, a compressor driven by said motor disposed within the lower portion of said casing, compressor mounting block means carried by said casing providing a flat upper surface engaging the bottom side of the compressor, said compressor being adjustable sidewise on said block means relative to said motor stator whereby said compressor may be properly aligned with the central opening of said motor stator after the motor stator has been fixed in place, and means for holding the compressor in alignment with said central opening.

12. In a sealed motor-compressor unit, a cup-shaped casing, a motor including a motor stator supported by said casing and provided with a central opening, a rotary compressor driven by said motor and having a flat end surface, compressor mounting block means carried by said casing providing a flat compressor engaging surface, said compressor being adjustable sidewise on said mounting block means relative to said motor stator whereby said compressor may be properly aligned with the central opening of said motor stator after the motor stator has been fixed in place, and means for holding the compressor in alignment with said central opening.

13. In a sealed motor-compressor unit, a cup-shaped casing section formed of stamped sheet metal material, a motor stator disposed substantially within said section, embossed sheet metal motor stator mounting means between said casing section and said motor stator compensating for irregularities in said casing section, compressor mounting block means secured to said casing section having a flat compressor mounting surface, a compressor assembly adjustable sidewise on said surface and having a removable drive shaft, a motor rotor carried on said drive shaft, said compressor assembly comprising a cylinder member and a pair of end plates held together as a removable unit by means of a plurality of bolts, and additional bolts for adjustably securing said assembly in proper alignment with said motor stator.

14. In a sealed motor-compressor unit, the combination of a cup shaped casing of stamped sheet metal material, a motor including a motor stator supported in the upper portion of said casing and having a central opening, a compressor driven by said motor having a flat bottom surface and having shaft bearing surfaces arranged perpendicular to the bottom surface, compressor mounting block means secured to the bottom wall of said casing and providing a flat upper surface for engagement with the bottom surface of said compressor without limiting sidewise movement of said compressor on said mounting block means, and means accessible after the motor stator has been mounted in place for adjustably securing the compressor in place on said mounting block means with the shaft bearing surfaces arranged concentric to the central opening in said motor stator, said casing serving as the main support for holding the motor stator and the compressor in fixed relationship.

15. In a sealed motor-compressor unit; a cup-shaped casing formed of stamped sheet metal material; a motor including a motor stator supported by said casing; compressor mounting means secured to the bottom wall of said casing; a compressor assembly comprising a cylinder, top and bottom end plates for said cylinder having shaft bearing apertures therein, a shaft driven by said motor, an impeller between said end plates driven by said shaft, first bolt means holding one end plate and said cylinder together as a unit in proper alignment, second bolt means holding the cylinder, the impeller, and the two end plates together as a unit with said bearing apertures in alignment with one another; and third bolt means for adjustably holding said last named unit in place on said compressor mounting means whereby said compressor assembly may be adjusted sideways on said compressor mounting means independently of said motor stator.

16. In a motor compressor unit, an outer shell having a lower cup-shaped portion formed of stamped sheet metal and an upper lid portion secured to said lower cup-shaped portion, a plurality of compressor mounting blocks secured to one wall of said lower portion, a motor stator, means for mounting said motor stator in said lower shell portion, a compressor assembly and a motor rotor adjustably mounted on said mounting blocks whereby said compressor assembly may be adjusted on said mounting blocks so as to be in alignment with the motor stator surfaces, embossed sheet metal spacer means between said motor stator means and said shell compensating for irregularities in said stamped sheet metal, said spacer means including means for preventing endwise movement of said motor stator, said compressor assembly including a removable compressor operating shaft which may be inserted after the main compressor assembly has been fixed in place on said mounting blocks.

17. In a motor compressor unit, an outer shell formed of stamped sheet metal material, a compressor, means for mounting said compressor within said shell, a motor in driving engagement with said compressor including a motor stator, embossed sheet metal spacer means between said motor stator and said shell compensating for irregularities in said stamped sheet metal shell and serving to convey motor heat to the outer shell, said compressor mounting means including means for adjusting the position of said compressor relative to said motor stator after said motor stator has been fixed in place.

18. In a motor compressor unit, an outer shell formed of stamped sheet metal material, a compressor, means for mounting said compressor within said shell, a motor in driving engagement with said compressor including a motor stator, embossed sheet metal spacer means between said motor stator and said shell compensating for irregularities in said stamped sheet metal shell, said spacer means including integral lugs for preventing endwise movement of said motor stator in said shell.

19. In combination, a casing, a compressor supported within said casing, said compressor having an inlet and an outlet, adapter means projecting through said casing and having a first passage communicating with the inlet to said compressor and a second passage communicating with the outlet of said compressor, and a plug accessible from outside of said casing sealing both of said passages, said plug having a passage formed therein adapted to communicate with both said passages upon partial removal of said plug.

20. In combination, means forming a compressor cylinder, end plates for closing the ends of said cylinder, a divider block slot in said cylinder, a divider block slidably mounted within said slot, spring means biasing said divider block inwardly, keyways formed in the outer wall of said cylinder and arranged substantially parallel to the axis of said cylinder, spring abutment means in engagement with the outer end of said spring means and including arms slidable downwardly through the keyways provided in said cylinder wall, said keyways and said arms being so constructed and arranged that the arms are locked in place by said end plates, a drive shaft rotatably mounted within the compressor cylinder, an impeller eccentrically mounted on said shaft and having contact at its periphery with the end of the divider block remote from the spring means, and fluid inlet and outlet ports in the compressor cylinder on opposite sides of the divider block.

21. In combination, means forming a compressor cylinder, end plates for closing the ends of said cylinder, a divider block slot in said cylinder, a divider block slidably mounted within said slot, spring means biasing said divider block inwardly, keyways formed in the outer wall of said cylinder, spring abutment means in engagement with the outer end of said spring means and including arms insertable into the keyways provided in said cylinder wall, said keyways and said arms being so constructed and arranged that the arms are interlocked within said keyways, a drive shaft rotatably mounted within the compressor cylinder, an impeller eccentrically mounted on said shaft and having contact at its periphery with the end of the divider block remote from the spring means, and fluid inlet and outlet ports in the compressor cylinder on opposite sides of the divider block.

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