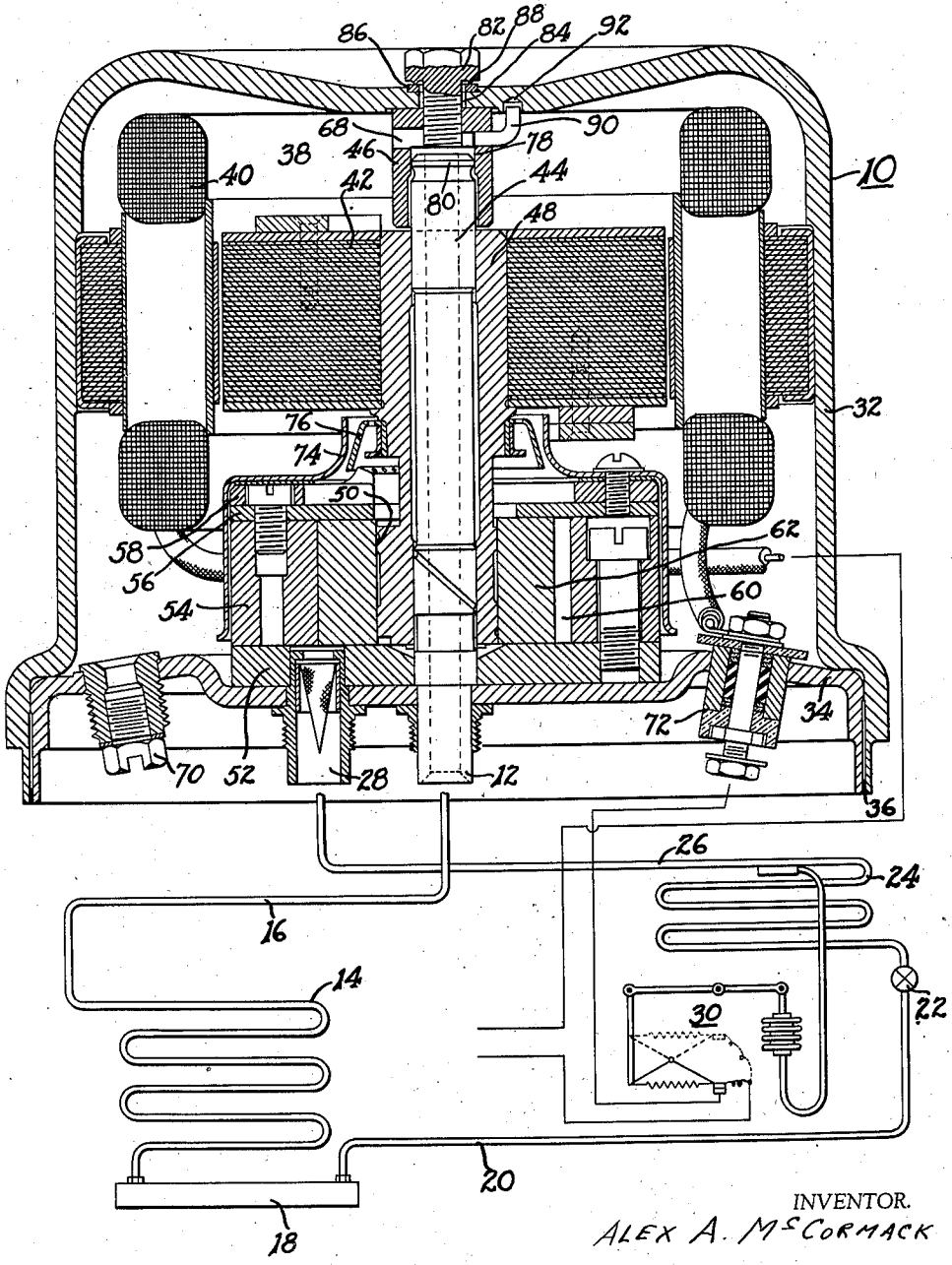
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REFRIGERATING APPARATUS

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REFRIGERATING APPARATUS

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This invention relates to refrigerating apparatus and more particularly to a novel motor-compressor unit for use in a refrigerating apparatus of the compressor-condenser-evaporator type.

It is an object of the invention to provide a motor-compressor unit having adjustable means for locating the main shaft of the unit whereby variations in machining parts of the mechanism occurring in the production as well as warpage caused by welding may be compensated.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing, wherein a preferred form of the present invention is clearly shown.

In the drawing:

There is shown a cross section of a motor-compressor unit embodying the present invention, and illustrating diagrammatically the essential elements of a complete refrigerating system.

Referring now to the drawing, there is shown a motor-compressor unit 10 having an outlet 12 from which compressed refrigerant is adapted to be delivered to a condenser 14 by a conduit 16. The condenser 14 feeds liquefied refrigerant to a receiver 18, whence it is delivered by a conduit 20 to an expansion valve 22 for expanding the refrigerant into an expansion coil 24. A conduit 26 delivers expanded refrigerant to the inlet 28 of the compressor 10. A thermostatic switch 30 controls the motor-compressor unit 10 in accordance with the temperature of the expansion coil 24. The parts thus far described constitute the conventional elements of a refrigerating system and are well known in the art, it being understood the particular form of the elements illustrated is merely representative of but one of the many forms of apparatus of this type with which the invention may be used.

The motor-compressor unit 10 comprises a housing 32 having an open bottom which is closed by a base member 34 which in turn is welded to the housing 32 at 36, to provide a hermetically sealed chamber 38. Within the chamber 38 in the upper portion thereof, there is mounted an electric motor comprising a stator 40 and a rotor 42. A hollow stationary shaft 44 is located centrally of the housing 32 and mounted rigidly, as by welding, in the base 34. A socket member 46 secured to the top of the housing 32 positions the upper end of the shaft 44. A hollow compressor drive shaft 48 is journaled on the shaft 44 carrying at its upper portion the rotor 42, while at the lower end, there is provided an eccentric journal 50. Secured to the base 34 is a compressor body member which may comprise a bottom plate 52, a cylinder member 54, a valve cover plate 56 and a retainer plate 58. The parts 52 through 58 inclusive are rigidly secured together and to the base 54 and provide a cylindrical compression chamber 60 which is concentric to the axis of the shaft 44. The cylinder member 54 is provided with a radial slot, not shown, for receiving a divider block in the well known manner. Mounted within the compression chamber 60 is a cylindrical impeller 62 which is journaled on the eccentric journal 50 and is adapted to revolve in the compression chamber 60 without rotating. The customary divider block, not shown, is provided for dividing the chamber 60 into a compression space and a suction space. The inlet connection 28 communicates with the suction space immediately adjacent one side of the divider block, while a discharge orifice, not shown, communicates with the compression space immediately adjacent the other side of the divider block as is well known in the art. The discharge orifice is provided with a flapper valve to prevent the return of high pressure gas from the chamber 38 to the chamber 60. Communication between the chamber 38 and the outlet connection 12 is provided through the hollow shaft 44 and through one or more apertures 68 provided in the socket 46. A removable plug member 70 is provided in the base for charging the unit with liquid refrigerant and lubricant. Connections to the motor are brought through the base 34 by the sealed lead-in connections 72. Suitable lubricant retaining means 74 and 76 are provided at the top of the compressor to maintain a body of lubricant above the compressor head.

In order to compensate for variations of dimensions occurring in quantity production, and for warpage caused by welding at 36, the socket member 46 is of special construction to provide for lateral adjustment. This socket member 46 is provided with a stepped internal bore 78 for receiving the upper end of the shaft 44. The shaft 44 is in turn formed with a portion 80 of reduced diameter and narrow in width which engages the smaller portion of the bore 78 whereby misalignment between the bore 78 and the shaft 44 may be permitted. The socket member 46 is adjustably anchored to the housing member 32 by means of the bolt 82 passing through an aperture 84 in the housing 32. A rather large clearance is provided between the bolt 82 and the aperture 84 in order to permit the required adjustability. A sealing gasket 86 is located

around the aperture 84 and coacts with an annular protuberance 88 on the under face of the bolt 82 to provide a hermetic seal when the bolt 82 is tight. An anchor member 90 is secured to one side of the socket member 46 and bent upwardly to enter a recess 92 formed in the interior of the housing 32 for the purpose of preventing the socket member 46 from turning when the bolt 82 is tightened. Large clearances are also provided between the anchor member 90 and the recess 92.

The compressor unit is preferably assembled by first mounting the base plate 52 and the shaft 44 on the base member 34 and rigidly securing them together, as by welding, preferably in a furnace having an atmosphere of hydrogen or other reducing gas. The charging plug fitting 70 and the inlet fitting 28 may also be welded to the base at the same time. The top surface of the plate 52 and bearing surfaces of the shaft 44 are then accurately machined, after which the compressor body together with the rotary shaft 48, the rotor 42 and the impeller 62 are assembled to the base plate 52 and the shaft 44. The housing member 32 after the motor stator 40 is pressed therein is then pressed onto the base member 34 and welded at 36. Should there be any variations in the lateral position of the upper end of the shaft 44, the adjustable socket member 46 which is preferably loosely mounted to the housing 32 during assembly of the unit will move to whatever position is necessary so that it will position the upper end of the shaft 44 naturally and without binding any of the parts of the compressor. The effects of any warpage caused by heat of welding at 36 are also permitted to be compensated by leaving the bolt 82 untightened during the welding operation. After this is completed, the bolt 82 is then tightened taking care to avoid laterally displacing the same. The socket member then becomes tightly anchored to the housing member 32 and simultaneously a hermetic seal is formed between the gasket 86 and the protuberance 88 of the bolt 82. There results, therefore, a compressor in which the parts are assembled in their natural relations without the occurrence of warping or binding strains on any portions of the mechanism.

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. An adjustable shaft support for a hermetically sealed motor-compressor unit including a hermetically sealed housing comprising a socket joint forming member to secure a shaft within the housing, adjusting means for securing the socket joint forming member to the housing in any of a plurality of positions of adjustment, said means extending through an aperture in the housing, and means for sealing said securing means to the housing to seal said socket joint forming member and adjusting means to prevent passage of fluid between the interior and exterior of said housing.

2. An adjustable shaft support for a hermetically sealed motor-compressor unit including a hermetically sealed housing comprising a socket joint forming member to secure a shaft within the housing, adjusting means for securing the socket joint forming member to the housing in any of a plurality of positions of adjustment, said means extending through an aperture in the housing, and means for sealing said securing means to the housing to seal said socket joint forming member and adjusting means to prevent passage of fluid between the interior and exterior of said housing, said sealing means and said securing means being rendered effective simultaneously.

3. A hermetically sealed motor-compressor unit comprising in combination a plate-like base member, an upright stationary shaft bonded to said base member, a dome-like housing assembled to said base member to form a hermetically sealed casing, a motor and compressor within said casing and including a hollow rotary shaft journaled on said stationary shaft, said compressor including a cylinder secured to said base member and surrounding said stationary shaft and a laterally adjustable support within said casing for the upper end of said stationary shaft secured to the housing, said support having engagement with the stationary shaft through a limited distance axially of the shaft.

4. A hermetically sealed motor-compressor unit comprising in combination a plate-like base member, an upright stationary shaft rigidly secured to said base member, a dome-like housing assembled to said base member to form a hermetically sealed casing, a motor and compressor within said casing and including a hollow rotary shaft journaled on said stationary shaft, said compressor including a cylinder secured to said base member and surrounding said stationary shaft and a laterally adjustable support within said casing for the upper end of said stationary shaft secured to the housing, said support having engagement with the stationary shaft adjustably to secure said shaft after assembly of said housing and base member.

5. A hermetically sealed motor-compressor unit comprising in combination a relatively flat base member, an upright stationary shaft rigidly secured to said base member, a dome-like housing assembled to said base member to form a hermetically sealed casing, a motor and compressor within said casing and including a hollow rotary shaft journaled on said stationary shaft, said compressor including a cylinder secured to said base member and surrounding said stationary shaft and a laterally adjustable support within said housing for the upper end of said stationary shaft and a threaded bolt extending through said casing into said support and having a head-making seating contact with said casing.

6. A motor-compressor unit having a casing, a stationary shaft within said casing, a laterally adjustable member within said casing making a socket connection with said shaft, a threaded bolt extending through a relatively large opening in said casing into said member for securing said member to the casing, the head of said bolt making sealing engagement with the exterior of said casing and sealing said member to said casing.

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