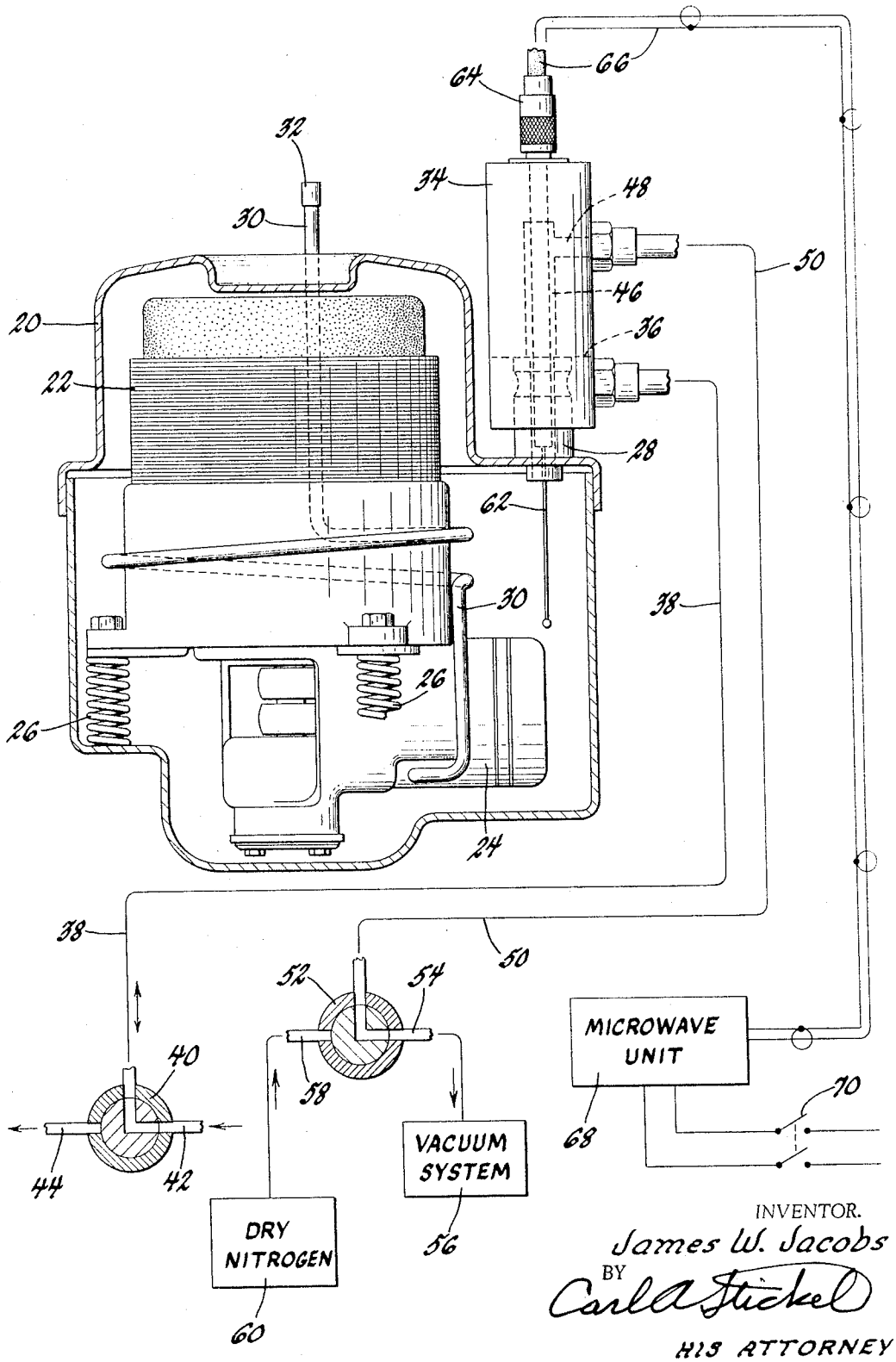
Jan. 24, 1967 J. W. JACOBS 3,299,524

PROCESS FOR DEHYDRATING A SEALED MOTOR COMPRESSOR UNIT

Filed Sept. 30, 1963



INVENTOR.
James W. Jacobs
BY
Carl A. Stickel
HIS ATTORNEY

United States Patent Office 3,299,524
Patented Jan. 24, 1967

3,299,524

PROCESS FOR DEHYDRATING A SEALED MOTOR COMPRESSOR UNIT

James W. Jacobs, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware

Filed Sept. 30, 1963, Ser. No. 312,651
2 Claims. (Cl. 34—1)

This invention pertains to refrigerating apparatus and more particularly to a method of and apparatus for dehydrating parts of a refrigerating system such as a sealed motor compressor unit.

It is well known that even a very small amount of moisture within a refrigerating system will cause serious corrosion eventually. There have also been indications that the presenec of moisture promotes the breakdown of the refrigerant and/or lubricant within the system. Many systems have been devised for removing this moisture and some are reasonably successful. However, further improvement is desirable.

It is an object of this invention to provide a method of and apparatus for more rapidly and more effectively removing moisture from parts of a refrigerating system such as a motor compressor unit.

It is another object of this invention to provide an improved method of and apparatus for vaporizing and removing moisture vapor from parts of a refrigerating system such as a motor compressor unit.

It is another object of this invention to provide a combined microwave generating and evacuating system for removing moisture from parts of a refrigerating system such as a motor compressor unit.

These and other objects are attained in the forms shown in the drawings in which a large sealed motor compressor unit is spring mounted within the enclosing metal shell and has a suction inlet connection. A charging fitting is sealed to this suction inlet connection by the use of an air chuck. A charging and evacuating system is connected to this fitting so as to draw a vacuum in the interior of the shell and to alternately charge the interior thereof with dry nitrogen or a dry refrigerant in between evacuations. This fitting is also provided with a microwave radiator such as a single element vertical radiator extending from the fitting into the interior of the shell. This radiator is connected through a coaxial cable to a suitable microwave power supply unit. The microwave power supply unit energizes the radiator during the evacuating and/or charging periods so that the moisture within the shell is vaporized and withdrawn during the evacuation of the shell.

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 embodiment of the present invention is clearly shown.

In the drawing:

The figure is a vertical sectional view of a sealed motor compressor unit for a refrigerating system together with a diagrammatic showing of a charging and evacuating system as well as a microwave system for discharging microwaves within the shell.

Referring now to the drawings, there is shown a shell 20 enclosing an electric motor 22 and a compressor 24 directly driven by this electric motor 22. The motor 22 and the compressor are connected together to form a unit which is spring mounted within the shell 20 upon three springs 26. When in a completed refrigerating system, the shell 20 has its interior connected directly to the suction line by a connecting fitting 28 so that it is maintained substantially at suction pressure. The bottom of the shell

20 will later contain lubricant. When operating in a completed refrigerating system the compressor 24 draws the evaporated refrigerant from the interior of the shell 20 and compresses this refrigerant and discharges the compressed refrigerant through the discharge conduit 30. This discharge conduit extends through a sealed outlet outside the shell and during the moisture removal process is sealed by a cap 32.

According to my invention, I provide a charging fitting 34 having an air operated chuck 36 adapted to be operated into a sealing, clamping arrangement with the suction inlet fitting 28. The air operating mechanism for the chuck 36 is connected by the piping 38 to the two-way valve 40 which is connected to a source of pressure 42. The two-way valve 40 is operated to connect with the air supply 42 to operate the chuck 36 into sealing relation with the fitting 28. This two-way valve 40 is operated to connect with the discharge pipe 44 to release the chuck 36. The charging fitting 34 has a passage 46 connecting with the interior of the shell 20 through the fitting 28. The fitting 34 also has a branch passage 48 connecting the passage 46 with the piping 50 which in turn connects with the two-way valve 52. The two-way valve 52 has a connection 54 connecting with the evacuating system 56. The two-way valve 52 also has an alternate connection 58 connecting with the source 60 of a dry nitrogen or dry refrigerant.

Also according to my invention, the fitting 34 also has extending therefrom into the interior of the shell 20 a microwave radiator 62. This microwave radiator 62 and the fitting 34 have a shielded connection extending through the passage 46 to the connection 64 which connects to the coaxial cable 66 indicated diagrammatically which connects with the microwave unit 68. The microwave unit is controlled by a double pole switch 70. This microwave unit, for example, may generate microwave energy at a frequency of 2450 megacycles and 685 watts available energy.

After the fitting 34 has been applied to the suction inlet fitting 28 and the air chuck 36 operated into sealing relation by positioning the two-way valve 40 as shown in the figure, the two-way valve 52 is operated also to the position shown in the figure and the microwave unit 68 is energized by the closing of the switch 70. The evacuating system 56 will then draw a vacuum upon the interior of the shell 20. At the same time the single element vertical radiator 62 will radiate microwaves within the shell 20 to vaporize any moisture therein. This vapor will be quickly drawn out of the shell 20 through the fitting 28, the passages 46 and 48, the pipe 50, the two-way valve 52 and the connection 54. This evacuating period will continue until the pressure within the shell 20 is reduced to a very low figure such as 299 of mercury vacuum. Thereafter the microwave unit 68 can be deenergized and the two-way valve 52 turned to connect with the connection 58 and the source of dry nitrogen 60 while the vacuum system 56 is disconnected. This changing period allows the flow of dry nitrogen into the interior of the shell 20 until it is filled to the pressure desired. This charging period is followed by the movement of the valve 52 back to the position shown in the figure and the closing of the switch 70 to provide a second evacuating period with concurrent microwave radiation. After this second evacuating period the two-way valve 52 can again be operated to connect the connection 58 with the pipe 50 to again apply nitrogen into the interior of the shell 20. The above described evacuating and charging periods with microwave energy may be repeated as often as is necessary to remove the moisture from the interior of the shell. This thoroughly removes the moisture from the interior of the shell 20 and charges the shell 20 with dry nitrogen. After this

is accomplished, the two-way valve 40 is operated to release the chuck 36 from the fitting 28 after which the fitting 28 is immediately capped. The sealed unit and its shell is then ready to be connected with a refrigerating system.

While the embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. The process of dehydrating a sealed motor compressor unit which includes inserting a microwave radiator into the unit and radiating microwaves from said radiator into the unit while evacuating the unit to remove moisture therefrom and thereafter charging the unit with a dry gas and repeating the radiation of the microwaves from said radiator while again evacuating the unit.

2. The process of dehydrating a sealed motor compressor unit which includes inserting a microwave radiator into the unit and connecting a charging fitting to the unit, alternately connecting a source of vacuum and a source of dry gas to said charging fitting, and while said charging fitting is connected to said source of vacuum radiating microwaves from the radiator into the interior to assist in removing moisture from the unit.

References Cited by the Examiner

UNITED STATES PATENTS

2,223,588	12/1940	Watson et al.	34—15
2,557,621	6/1951	Touborg	62—77 X
3,020,645	2/1962	Copson	34—15

FREDERICK L. MATTESON, JR., *Primary Examiner.*

WILLIAM F. O'DEA, *Examiner.*

D. A. TAMBURRO, *Assistant Examiner.*