United States Patent [19]

Pestel

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[54] **METHOD OF COMPRESSOR ASSEMBLY**

[75] Inventor: **Clarence V. Pestel,** Louisville, Ky.

[73] Assignee: **Fedders Corporation,** Edison, N.J.

[22] Filed: **Oct. 15, 1973**

[21] Appl. No.: **406,274**

[52] **U.S. Cl.** ..... **29/156.4 R,** 29/434, 29/464

[51] **Int. Cl.** **B23p 15/00**

[58] **Field of Search** ..... 29/156.4 R, 434, 464; 310/90; 417/417, 902, 410

[56] **References Cited**

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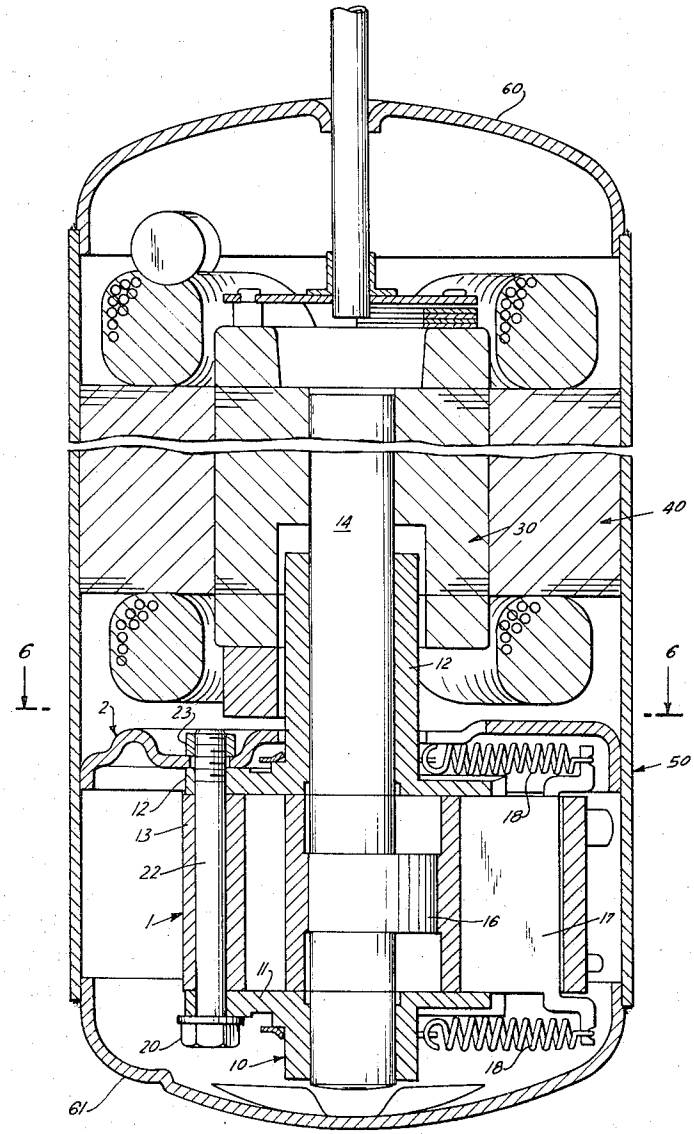
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Primary Examiner—Milton S. Mehr
Assistant Examiner—Dan C. Crane
Attorney, Agent, or Firm—Ryder, McAulay, Fields, Fisher & Goldstein

[57] **ABSTRACT**

A compressor having a mounting plate perpendicular to the walls of the compressor can is assembled by mounting the compressor pump to the mounting plate, and then welding the mounting plate in place within the can into which the stator of the motor assembly has already been placed. The rotor may be placed on the pump shaft prior to placement of the pump-mounting plate assembly within the can, or may be placed on the shaft after the mounting plate has been welded within the can.

6 Claims, 7 Drawing Figures



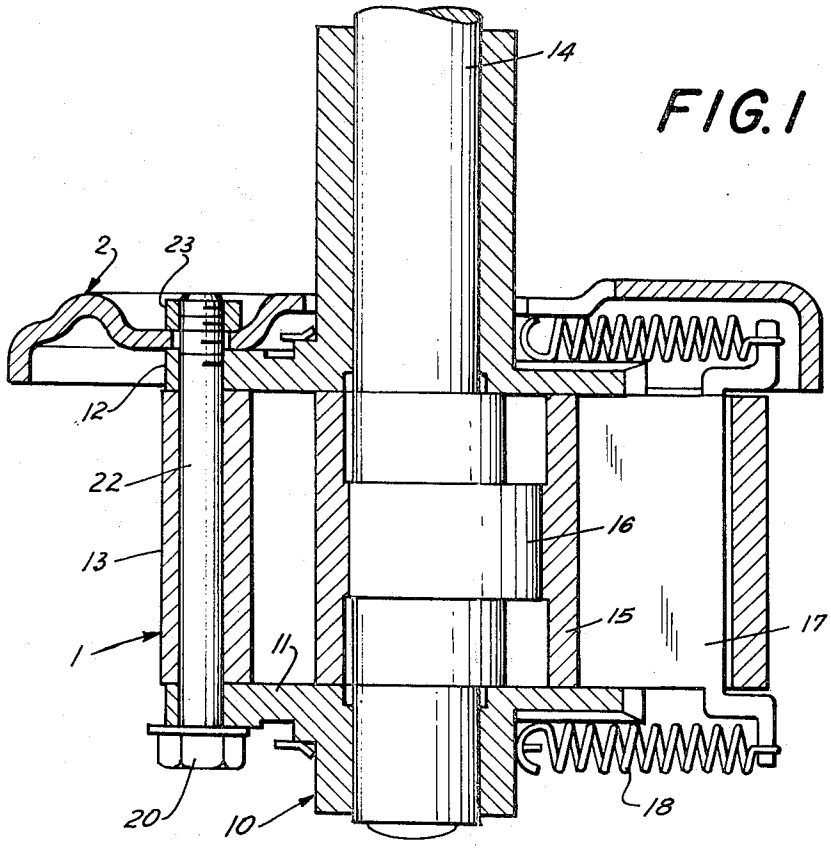


FIG. 1

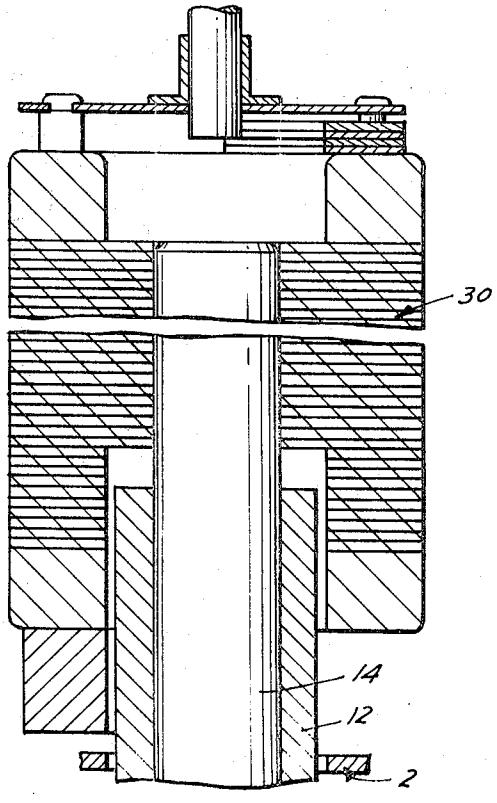


FIG. 2

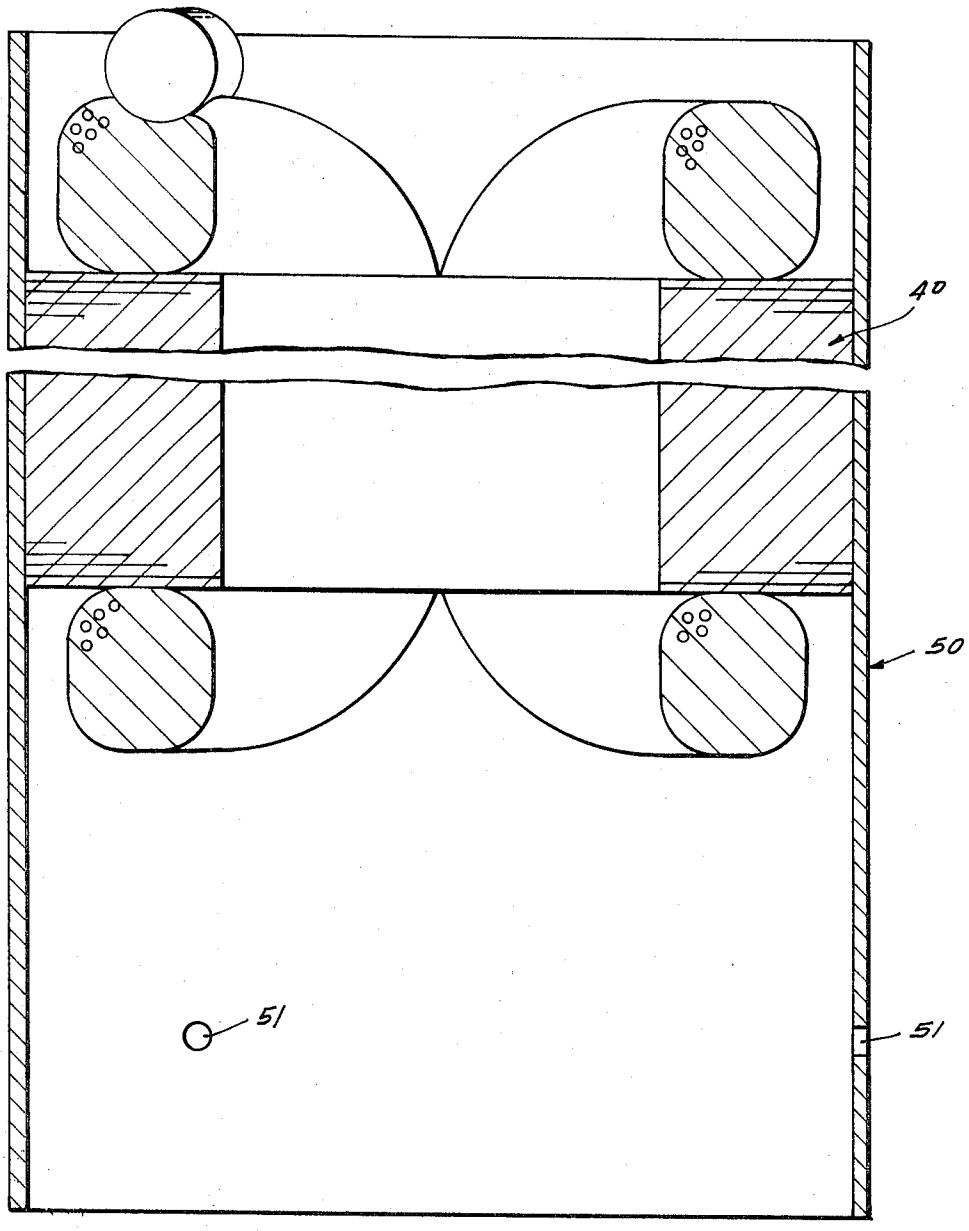


FIG. 3

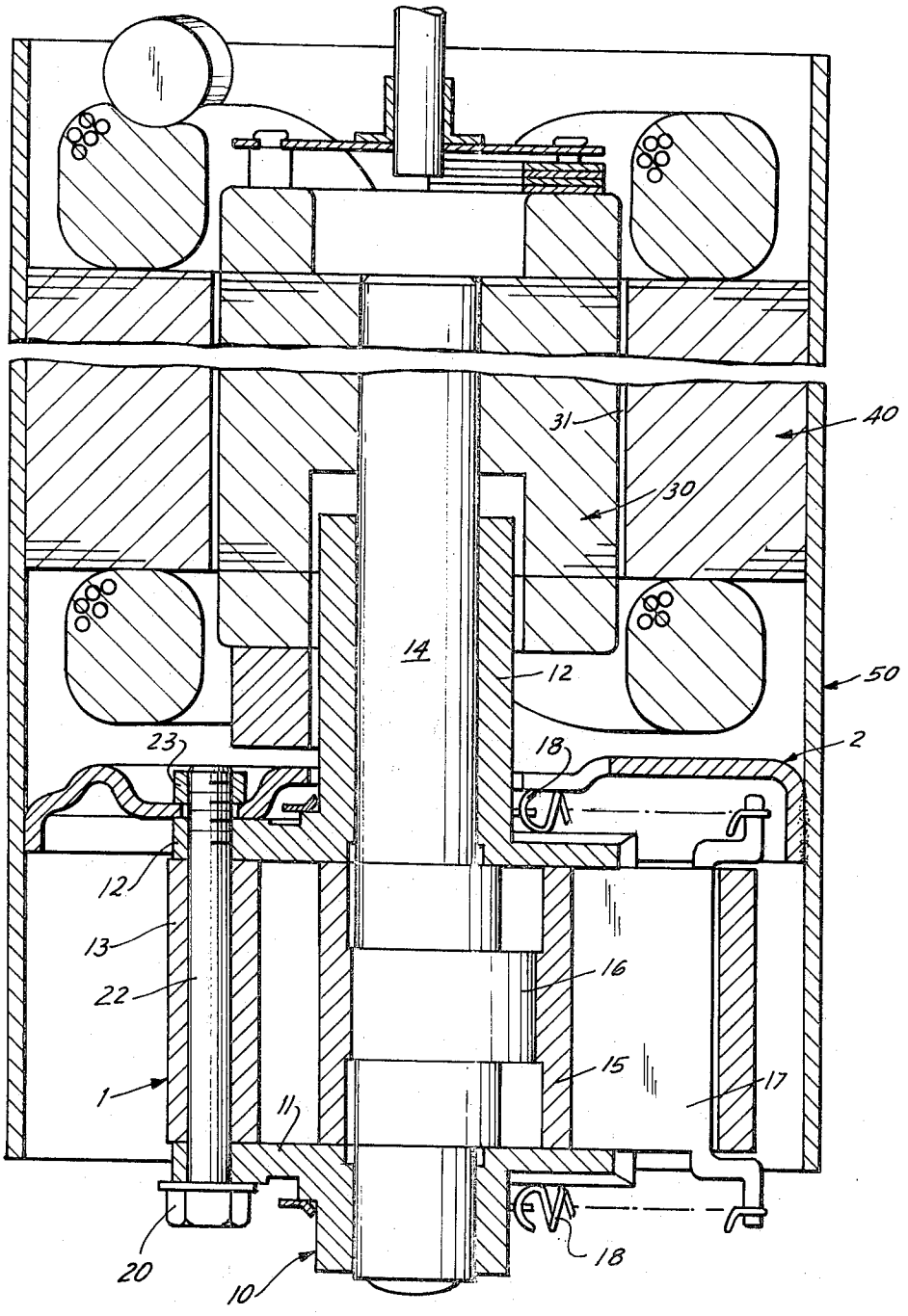


FIG. 4

FIG. 5

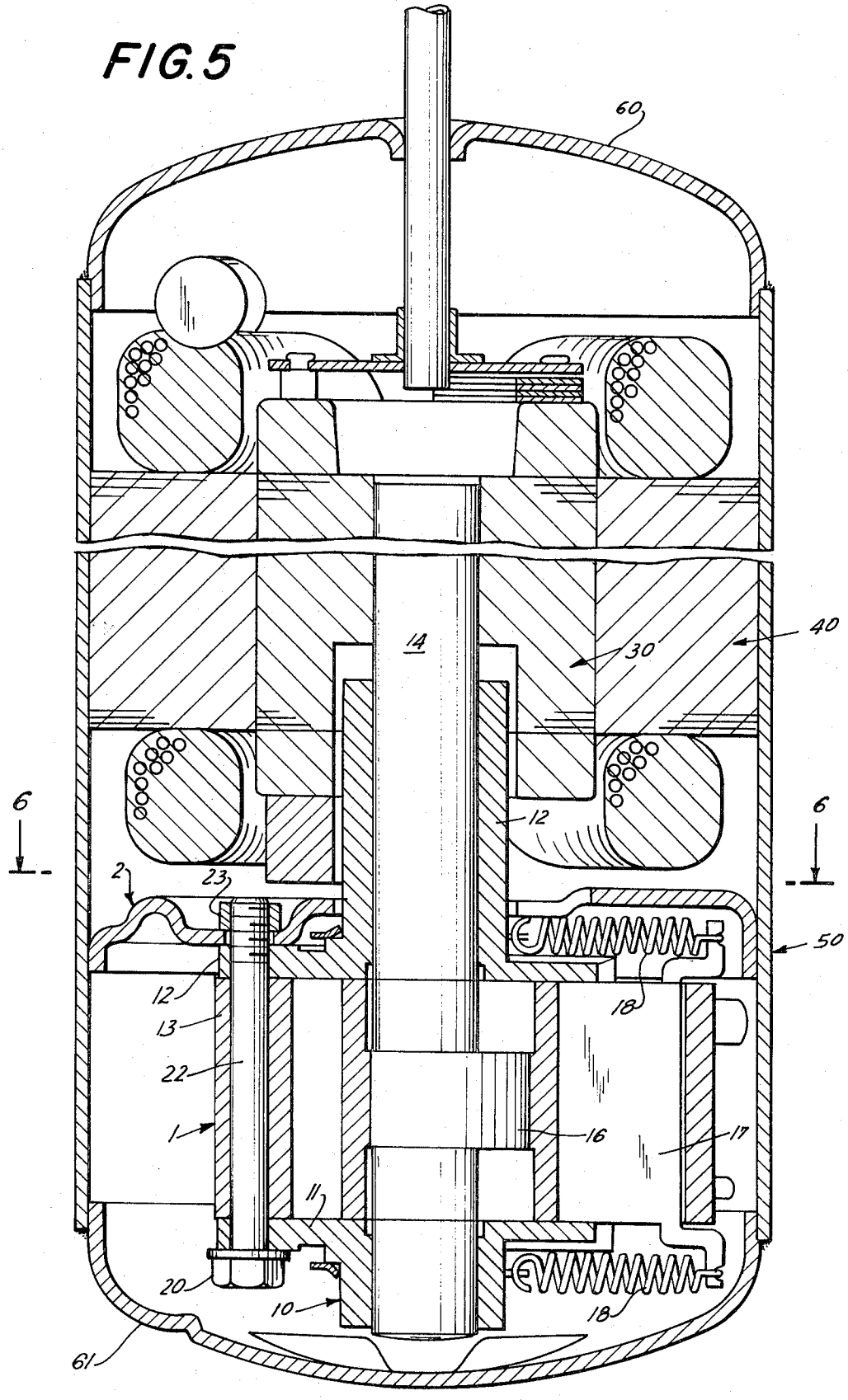
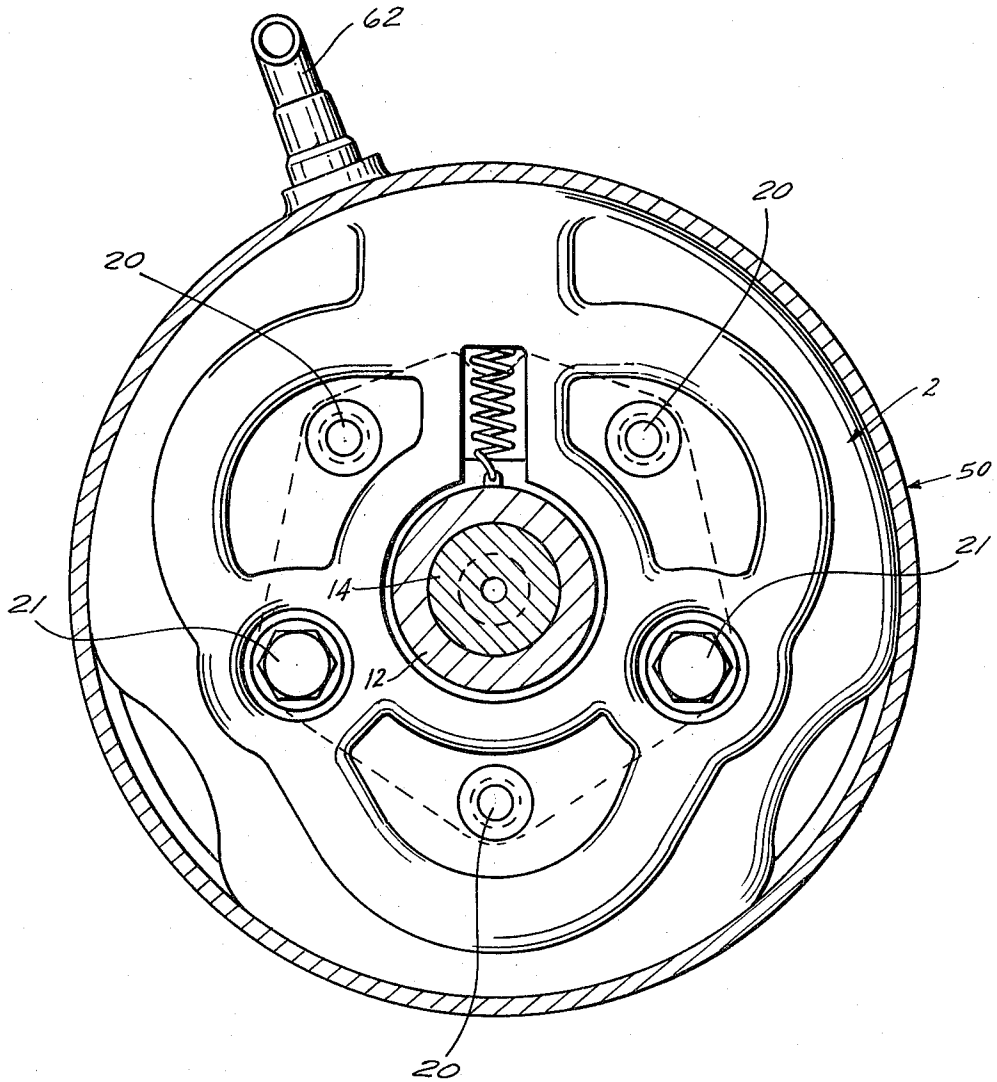


FIG. 6



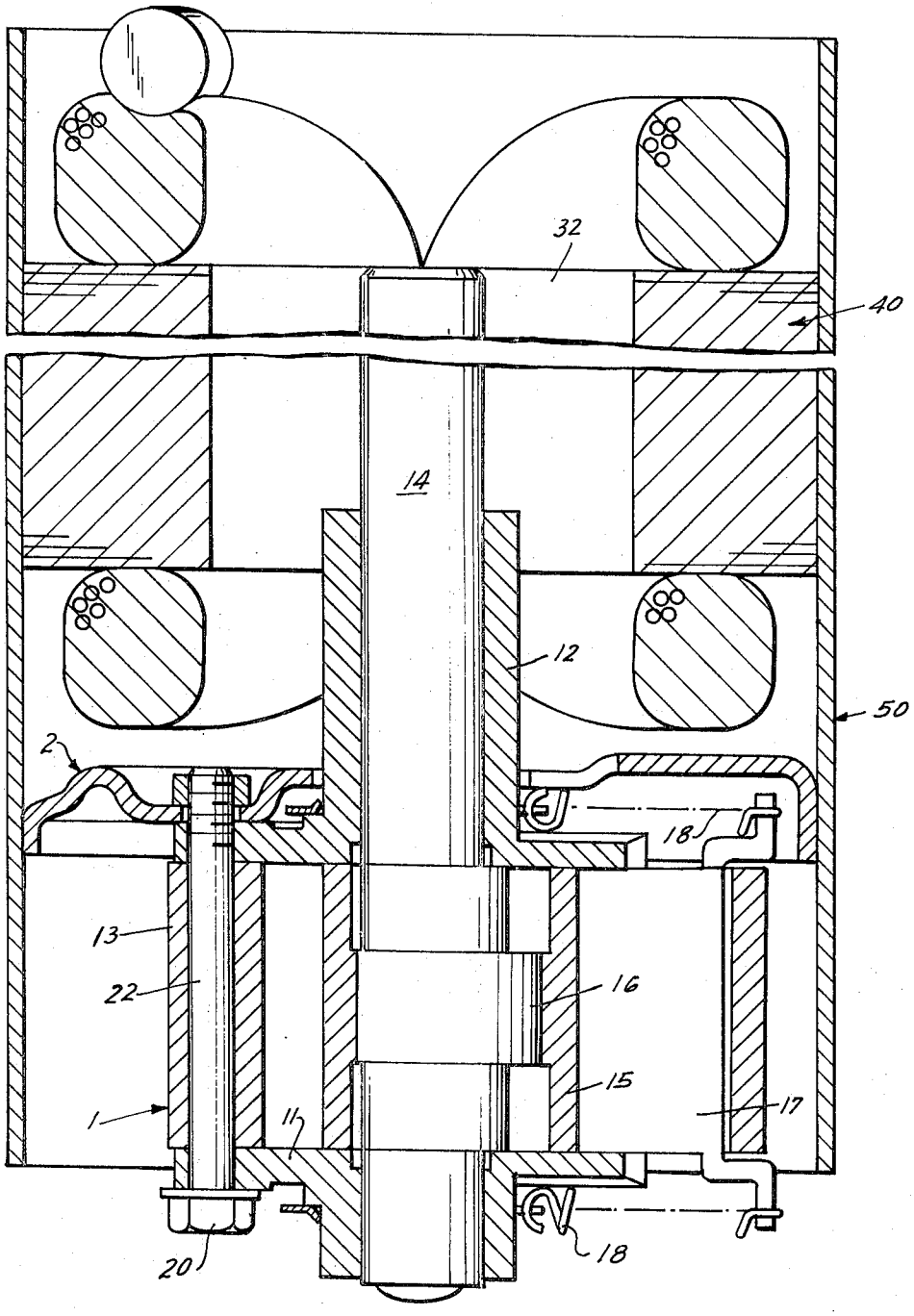


FIG. 7

METHOD OF COMPRESSOR ASSEMBLY

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is directed to new methods of assembly for the structure described and claimed in copending application Ser. No. 363,491, filed May 24, 1973, now U.S. Pat. No. 3,850,551, in the names of Ernest A. Gamache and Milton M. Kosfeld, assigned to the same assignee as the present invention.

FIELD OF THE INVENTION

This invention relates to gas compressors. In a preferred form, it relates to rotary compressors, especially stationary-vane rotary compressors.

BACKGROUND OF THE INVENTION

In manufacturing a compressor, particularly a rotary compressor, it is particularly important that the compressor pump and motor be properly aligned. If alignment is not achieved, then motor efficiency is significantly reduced. Misalignment may, in fact, result in total non-operation of the compressor.

Various solutions have been attempted in the prior art for proper mounting of the motor and pump within the compressor housing. A very desirable structure for accomplishing these various purposes was set forth in the afore-referenced copending application.

An even more efficient method of assembling the necessary parts for the rotary compressor, in order to form a structure according to the previously referenced application, has now been developed in accordance with the present invention. Employing the method of the present invention, weld spatter on the interior of the case is eliminated, and various machining operations are also dispensed with. Should there be a misalignment in forming the compressor according to the present invention, there is greater ease of recovery and reuse of the various parts.

SUMMARY OF THE INVENTION

In accordance with the present invention a mounting plate, which can be merely stamped or drawn, is attached to a compressor pump. In a separate operation, the stator of a motor assembly is shrunken within a compressor can. Holes are drilled in the side of the can at approximately the position that the mounting plate will occupy when all parts are in position. The mounting plate, with the pump attached, is then inserted into the can and, with an aligning mandrel, the shaft and stator are aligned. The mounting plate is then welded to the can through the previously drilled holes and the rotor is shrunk onto the shaft.

The rotor can be shrunken onto the shaft prior to insertion of the mounting plate-pump assembly into the can or can be shrunken onto the shaft after welding of the plate to the can. In the former case, the rotor and stator are aligned prior to welding of the mounting plate to the walls of the can.

After the mounting plate, pump, stator, and rotor are firmly fixed in place, the various connections can be made to the outside of the compressor can and the end caps welded in place.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings:

FIG. **1** is an elevational view, partially in section, of the mounting plate-compressor pump assembly;

FIG. **2** is an elevational view, partially in section, and partially broken away, of the rotor shrunken onto the shaft of the compressor pump;

FIG. **3** is an elevational view, partially in section, of the stator of the motor assembly shrunk fit into the compressor case;

FIG. **4** is an elevational view, partially in section, with all of the operational parts of the compressor mounted within the case;

FIG. **5** is an elevational view, partially in section, of a fully assembled compressor;

FIG. **6** is a sectional view, along the line **6—6** of FIG. **5** particularly showing the mounting plate; and

FIG. **7** is an elevational view, partially in section, of a compressor assembled within the case prior to insertion of the rotor.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the accompanying drawings, a step-wise method of assembly of a rotary compressor is illustrated. According to a first embodiment, and referring particularly to FIGS. **1** thru **6**, a compressor pump **1** is first attached to a mounting plate **2** as illustrated in FIG. **1**.

The compressor pump includes the standard parts, particularly the casing **10**, including flanges **11** and **12** and a cylinder **13**. The operating parts of the compressor pump include shaft **14**, roller **15**, eccentric **16**, and sliding vane **17**. The sliding vane **17** is urged into contact with roller **15** by springs **18, 18.**

The compressor pump **1** is joined to mounting plate **2**, in the first step of assembly, employing joining means **20.** If desired, for ease of insertion of the plate-pump assembly into the case containing the stator, the joining means **22–23** need not be tightened until there has been a general alignment of the parts. As illustrated, particularly in FIG. **6**, three joining means can be employed. Joining means **21**, also illustrated in FIG. **6**, are employed for holding together the various portions of the compressor pump. The joining means **20**, as illustrated in FIG. **1**, may include a long shanked male-threaded member **22** which mates with a corresponding female-threaded member **23.**

After the compressor pump has been joined to the mounting plate, according to a first embodiment, the rotor portion **30** of the motor assembly is shrunk about the pump shaft. Employing this embodiment, cooling of the rotor is more easily accomplished, as there is nothing surrounding the rotor as it shrinks about the shaft.

In a separate operation the stator **40** of the motor assembly is shrunk fit within case **50** of the compressor. It is important, only, in placing the stator **40** within the case **50** to leave sufficient room for installation and mounting of the plate-pump-rotor assembly. After the case **50** has been shrunken about the stator **40**, a plurality of holes **51** are drilled in the wall of the casing. These holes are provided for the weld flux which will be employed for holding the mounting plate **2** within the casing and, thus, holding of the compressor pump. While preferably three holes **51** are provided, the number is not critical so long as there are a sufficient number to allow for holding of the plate in place.

The holes must obviously be drilled in such a manner that the mounting plate can be properly aligned with

regard to the stator, both from a standpoint of distance from the stator and from a standpoint of axial alignment with the stator.

Following completion of the assemblies as illustrated in FIGS. **1** and **3** the two assemblies are combined, as illustrated in FIG. **4.** The plate-pump-rotor assembly of FIG. **2** is slid into the casing so that the rotor portion **30** fits within the stator portion **40.** In order to provide for proper radial location of the pump body upon welding of the mounting plate to the case, a locking pin (not shown) is passed through the suction tube, entering the suction part of the pump, to hold the pump and mounting plate in the proper location prior to welding. A thin-walled, tubular member (not shown) is inserted in the space **31** between the rotor **30** and stator **40** of the motor assembly, in order to set the air gap. With the thin-walled, tubular member in place, the mounting plate **2** is welded to the can **50** through the holes **51,** previously provided. The thin-walled, tubular member is then removed and the operating parts of the compressor are completely assembled with a proper air gap between the rotor and stator.

Following completion of assembly of the operating parts, as illustrated in FIG. **4,** end caps **60** and **61** are welded in place, as indicated in FIG. **5,** and the necessary external parts, such as the compressed fluid outlet **62** are attached.

In a preferred embodiment, the rotor is not attached to the pump shaft prior to final assembly of the operating parts. According to this embodiment, the pump and mounting plate are joined in the manner indicated in FIG. **1.** If desired, for ease of insertion of the plate-pump assembly into the case containing the stator, the joining means **22–23** need not be tightened until there has been a general alignment of the parts. Subsequently, or simultaneously the can and stator are assembled in the manner indicated in FIG. **3,** and the necessary holes **51** are drilled in the wall of the case **50.**

The mounting plate-pump assembly is then placed within the casing as illustrated in FIG. **7.** Thus, as illustrated in FIG. **7,** the shaft **14** of the pump is placed within stator **40** of the motor assembly leaving a space **32** between the shaft and the stator. In order to provide for proper radial location of the pump body upon welding of the mounting plate to the case, a locking pin (not shown) is passed through the suction tube, entering the suction part of the pump, to hold the pump and mounting plate in the proper location prior to welding. An expanding mandrel (not illustrated) is placed within this space **32** in order to align the shaft and the stator. With the expanding mandrel in place, mounting plate **2** is welded to case **50** in order to hold the alignment. The expanding mandrel is then removed from the assembly and the rotor is shrunk about the shaft to provide the assembly as illustrated in FIG. **4.** The entire compressor assembly is then completed as illustrated in FIG. **5.**

Employing either of the embodiments for assembling the compressor as just described, several significant advantages are obtained. For example, as welding of the mounting plate **2** to the casing **50** is accomplished through the outside, rather than along the inner rim as described in the previously referenced copending application, weld spatter is eliminated on the interior of the case. Thus, this weld spatter need not be cleaned out, nor will it interfere with the moving parts of the compressor.

Further, and more significantly, employing the method of assembly described in the previously referenced copending application, it was necessary to machine the mounting plate **2** in order to assure proper alignment of the parts. The plate had to be machined prior to assembly of the compressor and, again, after initial assembly. Since more tolerance in the configuration of the mounting plate is possible with the methods described according to the present invention, the plate can be merely stamped or drawn.

A particularly significant advantage of the assembly method of the present invention, when compared with the methods of the prior art, is the ability to reclaim and reuse parts should an off-specification compressor be formed, notwithstanding the care in assembly. If, for any reason, the mounting plate-pump-rotor assembly of the first embodiment or the mounting plate-pump assembly of the second embodiment should be welded to the case off-center, then the entire assembly may be reclaimed for reuse by merely drilling out the welds and sliding the assembly from the case. The stator can, of course, be recovered either by heating the casing and removing it or by cutting the casing from the stator.

Another particular advantage of the method described according to the present invention is that alignment of the various parts and attachment of the parts within the case can be accomplished with the case in a vertical position. Much more simplified fixturing and assembly methods can thus be employed than with methods of compressor assembly of the prior art.

Two embodiments of a simplified method for compressor assembly, providing particular advantages of ease of assembly and the ability to reuse the parts in case of error, have thus been described. The invention should not be considered as limited to the specific illustrations and descriptions, but only as limited by the appended claims.

I claim:

1. A method for assembling a compressor wherein the compressor pump is attached to a mounting plate comprising:

a. attaching a compressor pump to a mounting plate, said mounting plate being adapted for attachment within a compressor can;

b. fitting a stator within the compressor can;

c. providing means on said can aligned with said stator, for attachment of said mounting plate;

d. inserting said mounting plate with said compressor pump attached into said compressor can such that the shaft of said compressor pump is within the opening of said stator;

e. aligning said shaft within said stator with an aligning mandrel; and

f. firmly attaching said mounting plate to said can.

2. The assembly of claim **1** wherein the rotor of said motor assembly is attached to said shaft, within said stator opening, following attachment of said mounting plate to said can.

3. The assembly method of claim **2** wherein end caps are attached to said can following attachment of the rotor.

4. The assembly method of claim **1** wherein the compressor pump is loosely attached to said mounting plate prior to insertion of said mounting plate-pump assembly into said can and said attachment is made firm after alignment of said shaft and said stator.

5. The assembly method of claim 1 wherein said compressor pump is held in place radially prior to alignment of said shaft within said stator.

6. The assembly method of claim 1 wherein the rotor of said motor assembly is attached to said shaft prior to insertion of said mounting plate-compressor pump assembly into said can and said rotor is aligned within said stator opening, thus aligning the shaft.

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