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A. FRANK ET AL
HERMETIC COMPRESSOR

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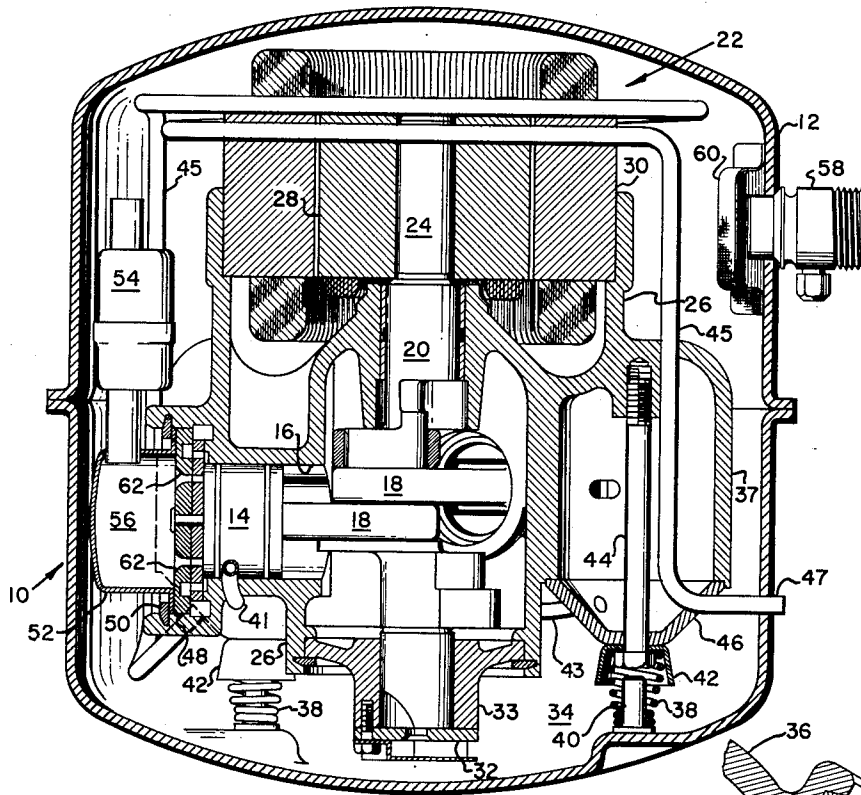


FIG. 1

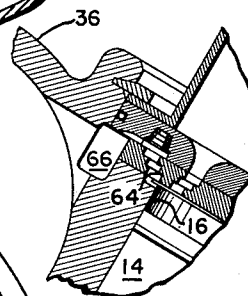


FIG. 3

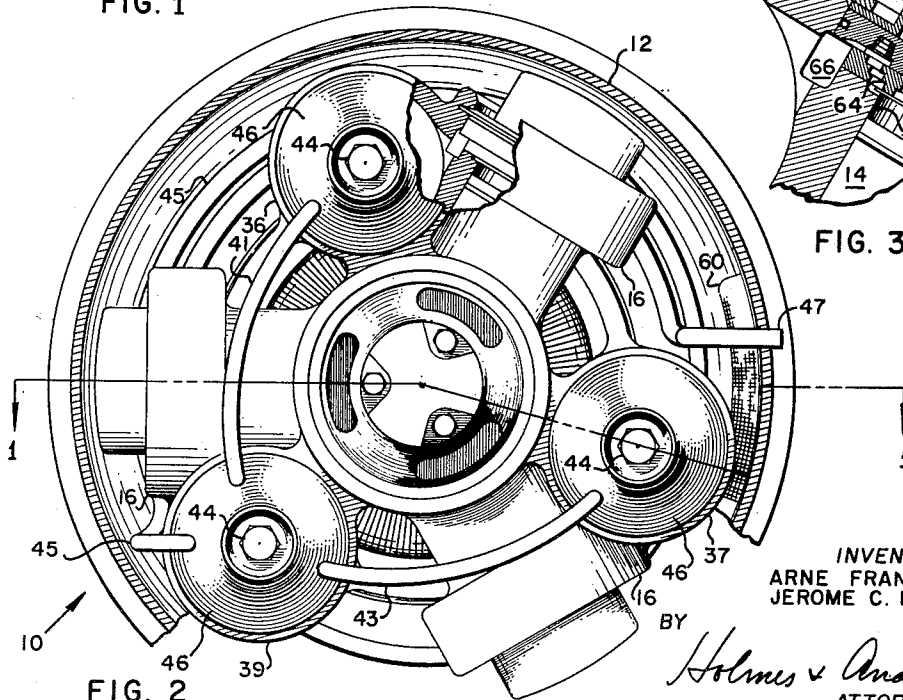


FIG. 2

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HERMETIC COMPRESSOR

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2 Claims. (Cl. 230—232)

This invention relates generally to reciprocating compressors and more specifically to hermetic reciprocating refrigerant compressors with noise suppressors.

An object of the invention is to provide a hermetic reciprocating compressor which is quieter in operation and more inexpensive to manufacture.

Another object of the invention is to provide a hermetic reciprocating compressor which is suction gas cooled, more compact, and quiet in operation.

A third object of the invention is to provide a hermetic reciprocating compressor which has the discharge mufflers integral with the basic crankcase casting to provide a quieter and more compact compressor.

A still further object of the invention is to provide a hermetic reciprocating compressor with integral cast iron discharge mufflers which form support members for the vibration eliminators.

A fifth object of the invention is to provide a hermetic reciprocating compressor with integral cast iron discharge mufflers and individual suction mufflers.

A sixth object of the invention is to provide a compact hermetic reciprocating compressor which will operate at 3500–3600 r.p.m. with a minimum amount of noise and vibration.

Other objects and advantages of the invention will become apparent as the specification proceeds to describe the invention with reference to the drawing in which:

FIG. 1 is a view taken on line 1—1 of FIG. 2 with the crankcase casting shown in cross-section. The discharge manifold is shown in full lines and is considered exemplary and not part of the invention.

FIG. 2 is a bottom view of the compressor shown in FIG. 1 with the bottom of the hermetic casing removed.

FIG. 3 is a blown up view of the discharge area cut away in FIG. 2 showing in detail the compressed gas passage from the cylinder to the discharge muffler.

Reference number 10 represents generally a hermetic refrigerant compressor enclosed in a sheet metal casing 12. Pistons 14 slidably mounted in cylinders 16 are connected by connecting rods 18 to vertically positioned crankshaft 20. Crankshaft 20 and motor 22 operably connected to crankshaft extension 24 are secured in basic crankcase casting or housing 26. Motor 22 consists basically of rotor 28 and stator 30. A reversible centrifugal positive displacement oil pump 32 is secured to bearing head 33 and pumps lubricant from crankcase 34 to lubricate the compressor.

Crankcase casting or housing 26 incorporates integral cast iron discharge mufflers 36, 37, and 39 adjacent cylinders 16. In the preferred form of the invention, there is a discharge muffler for each cylinder. It is within the scope of the invention to vary the number of cylinders and the number of integral mufflers. For instance, two mufflers could be placed between the three cylinders 16 to muffle the noise present on the discharge side of the compressor. Any other number of discharge mufflers and cylinders are within the scope of the invention as long as the discharge mufflers are integral with the crankcase casting or housing 26. The discharge mufflers 36, 37, and 39 may be manifolded in any suitable manner. As shown, the discharge gas from mufflers 36 and 37 passes through conduits 41 and 43 to discharge muffler 39. From discharge muffler 39, the hot gas passes through conduit 45 and is discharged out of the casing 12 at 47. It should

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be noted that discharge conduit 45 is coiled at the top of the compressor in order to allow the isolation means 38 to dampen any vibration that is set up by the compressor.

Preferably the compressor is resiliently supported by springs 38 located between studs 40 and spring cups 42. Spring cups 42 are secured in position by a bolt 44 which also maintains caps 46 in sealed relationship with discharge mufflers 36. It is within the scope of the invention to use isolation means such as cork or some other suitable material in place of the spring means 42.

Located at the top of each compressing cylinder 16 is a valve assembly 48 secured in position by a snap ring 50 which forces head member 52 against valve assembly 48. Connected to each head member 52 is a suction muffler 54 to reduce the incoming noise level before the suction gas enters the muffle chamber 56.

In operation, as the piston 14 descends on the suction stroke, refrigerant gas is drawn into casing 12 through suction connection 58 and suction screen 60, around motor 22 to cool same, into suction muffler 54 to dampen the audible vibrations, into muffler chamber 56 to further muffle the audible vibrations, and through valve assembly 48 via suction ports 62 into cylinder 16. As the piston 14 ascends on the compression stroke, hot compressed refrigerant gas is discharged through discharge ports 64 into discharge chamber 66, from discharge chamber 66 to discharge mufflers 36, 37, and 39 to suppress the noise level. As herein described, the hot compressed refrigerant gas is manifolded and discharged from the compressor through hot gas conduit 45. Suction mufflers 54 and discharge mufflers 36, 37, and 39 may be baffled in any suitable manner known to one versed in the art.

The hermetic compressor described herein has many distinct advantages. Casting the mufflers integral with the crankcase housing and nesting them close to the cylinders allows the shell or casing diameter to be kept to a minimum. Further, having the muffler made of cast iron and adjacent the cylinders, dampens many of the audible vibrations as soon as they initiate instead of attempting to dampen them after resonance has developed. Further, cast iron is a much better sound deadener than sheet metal which is normally used in compressor muffling devices. Another advantage of having the discharge mufflers integral with the crankcase housing or casting is that the housing or casing tends to be stronger. Further, with integral mufflers, the compressors can be internally mounted on vibration eliminators with a minimum expenditure of time and material. Note that the bolt 44 which secures the muffler cap 46 also serves to support the spring cups 42. Another advantage of this compressor is the provision of muffling means on both the suction side and the discharge side of each cylinder in the compressor. Obviously, we have provided a hermetic compressor which is new and novel and has many distinct advantages over those known and used commercially today.

Although we have described in detail the preferred embodiments of our invention, we contemplate that many changes may be made without departing from the scope or spirit of our invention, and we desire to be limited only by the claims.

We claim:

1. A hermetic compressor comprising: a sealed casing, a crankcase casting in said casing, means forming a cylinder in said crankcase casting, motor means supported in said crankcase casting, a discharge muffler housing integral with said crankcase casting, a cap member closing one end of said discharge muffler housing, resilient supporting means compressed between said sealed casing and said cap member to isolate said crankcase casting from said sealed casing, support means secured to said dis-

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charge muffler housing and to said cap member securing said cap member on said one end of said muffler housing and retaining said resilient supporting means in position, crankshaft means rotatably supported in said crankcase casting and being driven by said motor means, piston 5 means slidably supported in said cylinder, and means connecting said piston means to said crankshaft means whereby rotation of said crankshaft means will reciprocate said piston means in said cylinder.

2. The structure of claim 1 wherein a stud member is 10 secured to said casing below said cap member, said cap member securing means includes a spring cup, and said resilient support means is a spring member with one end telescoped over said stud member and the other end positioned in said spring cup.

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