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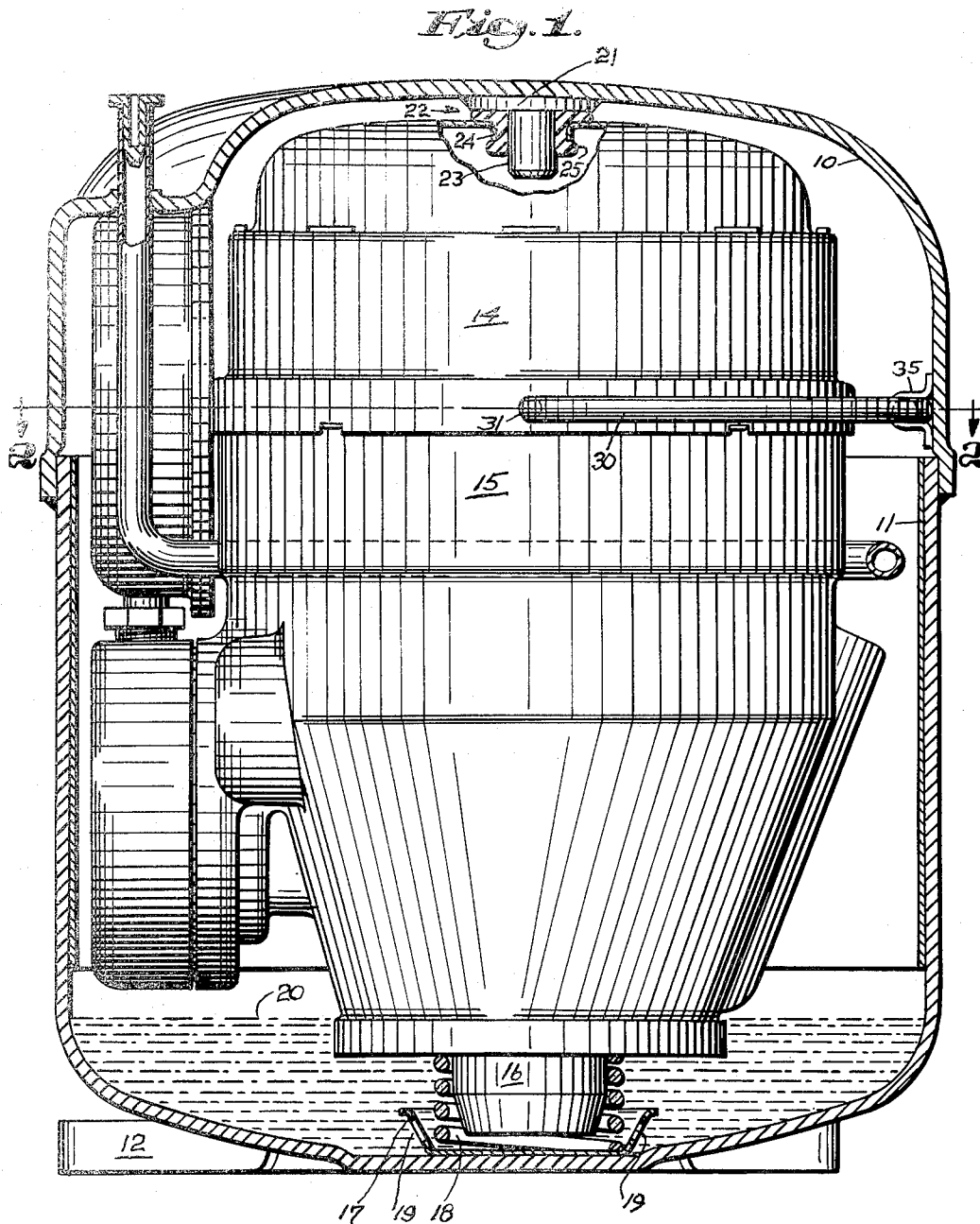
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SPRING SYSTEMS FOR REFRIGERANT COMPRESSORS

Filed Jan. 10, 1964

2 Sheets-Sheet 1



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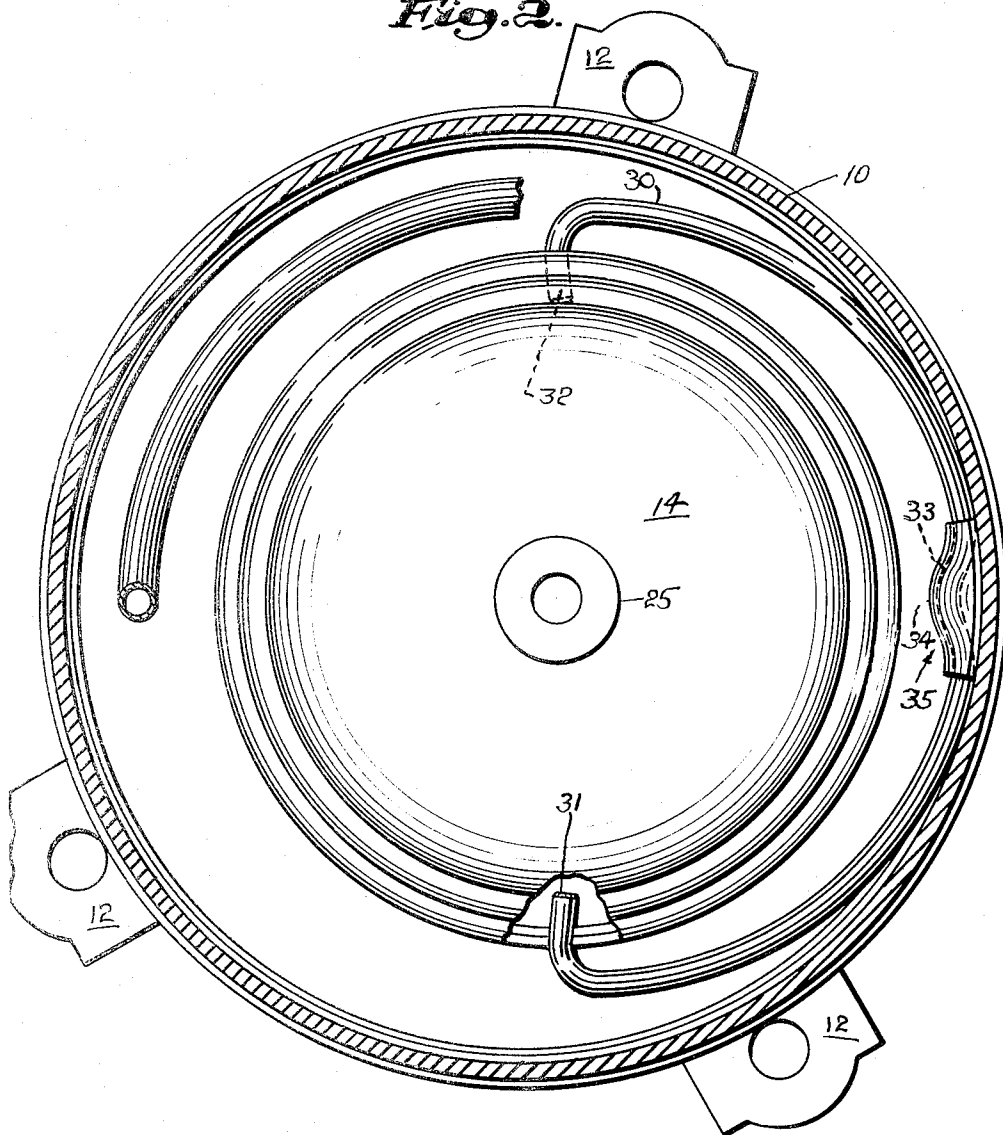
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Fig. 2.



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SPRING SYSTEMS FOR REFRIGERANT COMPRESSORS

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7 Claims. (Cl. 230—235)

This invention relates to spring systems of hermetic refrigerant compressors.

Hermetic refrigerant compressors having enclosed electric motors which are cooled by suction gas, and having the rotors of the motors attached to the ends of crankshafts are widely used. Such a compressor usually has an outer shell, and a smaller inner shell around the internal assembly. The inner shell is usually spring suspended from the outer shell for reducing the transmission of vibrations and noise through the outer shell to the space where the unit is located, and for absorbing start-stop and shipping shocks.

This invention is an improved spring system for such a compressor, which is more effective, simpler, and less expensive than prior spring systems.

For checking starting and stopping torques, the usual spring system employs a pair of coiled springs curved along opposite sides of the inner shell. A feature of this invention is that it more effectively checks starting and stopping torques with a simpler and less expensive spring consisting of a generally semi-circular rod of spring metal attached at its center to the outer shell, and having its ends connected to the inner shell. This spring acting in a plane normal to the axis of the inner shell, resists the starting and stopping torques by snubbing action in addition to its spring action. On start-up, one arm of the spring rod bottoms out against the inner surface of the outer shell in snubbing action while the other arm absorbs force by bending to a smaller curvature. On stopping, the action is reversed, the other arm bottoming out against the inner surface of the outer shell, and the one arm bending to a smaller curvature.

An object of this invention is to improve spring systems of hermetic refrigerant compressors.

Other objects of this invention are to simplify and reduce the costs of spring systems of hermetic refrigerant compressors.

This invention will now be described with reference to the annexed drawings, of which:

FIG. 1 is a side view of a compressor unit embodying this invention, with the outer shell of the unit shown in section, and

FIG. 2 is a plan view looking downwardly on the unit with the outer shell removed above the lines 2—2 of FIG. 1, and shown in section along such lines.

An outer shell has a cylindrical upper portion 10 welded to a lower portion 11, and has a base 12. An inner shell has a cylindrical upper portion 14 attached to a lower portion 15, the upper portion 14 extending around a motor which is not shown, and the lower portion 15 cast integral with the compressor cylinders and extending around the compressor internal assembly as is conventional, and as disclosed in my copending application, Serial No. 196,821, filed May 22, 1962, and which issued as Patent No. 3,171,588 on March 2, 1965. The bottom of the shell portion 15 has a downwardly protruding extension 16, the bottom of which extends into, and is spaced above the bottom of a cup 17 which is attached to the bottom of the shell portion 11. A coiled spring 18 extends around the extension 16 in contact with the inner shell portion 15 and with the bottom of the cup 17. The cup 17 has side openings 19 for admitting the usual lubricant 20.

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Welded to the center of the inner surface of the top of the outer shell portion 10 is cylindrical head 21 of a stud 22 which has a downwardly extending, cylindrical portion 23 having a diameter substantially smaller than that of the head 21. The inner shell portion 14 has a circular opening in the center of its top, and has a downwardly turned annular portion 24 around such opening. A resilient grommet 25 of rubber, nylon or other suitable material, extends around the stud portion 23, with its upper end having the same diameter as the stud head 21, and in contact with the latter. The grommet has a recessed inner portion within and in contact with the annular portion 24 of the shell portion 14.

A generally semi-circular rod 30 of spring metal has inwardly turned ends 31 and 32 extending into diametrically opposed openings in the inner shell portion 14, and has at its center, an inwardly extending humped portion 33 which is held within conformably shaped portion 34 of spring retainer 35 which is welded to the inner surface of the outer shell portion 10.

The weight of the internal assembly is supported by the coiled spring 18 which also centers the bottom of the internal assembly. Clearance ordinarily exists between the bottoms of the extension 16 and the cup 17, but downward movement of the internal assembly as caused by shock during handling or shipment, will cause the bottom of the extension 16 to strike the bottom of the cup 17 thus limiting such downward movement.

The stud 22 and the grommet 25 center the top of the internal assembly, and absorb internal movement of the top of the internal assembly during handling or shipment.

During start-up, one of the arms of the spring rod 30 will increase in radius and will bottom against the inner surface of the outer shell portion 10 in snubbing action, while the other arm of the rod will decrease in radius and stiffen, the combined spring and snubbing actions stopping the rotation of the internal assembly. When the motor of the unit stops, the reverse action takes place, the other arm of the rod increasing in radius and bottoming against the inner surface of the outer shell portion 10 in snubbing action, while the one arm decreases in curvature and stiffens, the combined spring and snubbing actions stopping the rotation of the internal assembly.

Such snubbing and spring actions enable a simple, inexpensive, spring rod to accomplish more effectively what pairs of coiled springs have accomplished in the past.

The humped portions 33 and 34 of the rod 30 and its retainer 35 respectively, permit the rod to flex without sliding within the retainer.

What is claimed is:

1. A spring system for absorbing starting and stopping torques of a hermetic refrigerant compressor having an inner shell with a cylindrical portion; having an outer shell with a cylindrical portion around and spaced from said inner shell portion, and having means at the ends of said shells for supporting said inner shell from said outer shell, comprising a generally semicircular rod of spring metal having an arcual center portion contacting and attached to the interior surface of said outer shell portion, said rod extending substantially half-way around said inner shell portion, and having ends turned inwardly towards said inner shell portion and connected to said inner shell portion at substantially diametrically opposite points thereof.

2. A spring system as claimed in claim 1 in which said inner shell portion has substantially diametrically opposite openings into which said ends of said rod extend.

3. A spring system as claimed in claim 2 in which the longitudinal axis of said rod extends in a plane normal to the axis of said inner shell portion.

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4. A spring system as claimed in claim 1 in which the longitudinal axis of said rod extends in a plane normal to the axis of said inner shell portion.

5. A system for supporting an inner shell of a hermetic refrigerant compressor within and spaced from an outer shell of said compressor and for absorbing starting and stopping torques of said compressor, comprising a curved rod of spring metal having its ends connected to said inner shell, means supporting said rod at its arcual center to said outer shell, said outer shell having a top and said inner shell having a top below and spaced from said top of said outer shell, said inner shell having a downwardly turned portion around a circular opening in the center of its said top, a stud having a head attached to said top of said outer shell above said opening, said stud extending through the center of said opening, a resilient grommet around said stud and having an enlarged portion in contact with said head of said stud, said grommet having an annular recessed portion below and extending outwardly in contact with the bottom of

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said downwardly turned portion, said outer shell having a bottom, said inner shell having a bottom above said bottom of said outer shell, and means including a coiled spring between and in contact with said bottoms.

6. A system as claimed in claim 5 in which said rod is generally semicircular.

7. A system as claimed in claim 6 in which said ends of said rod extend into openings in said inner shell.

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