

Nov. 2, 1948.

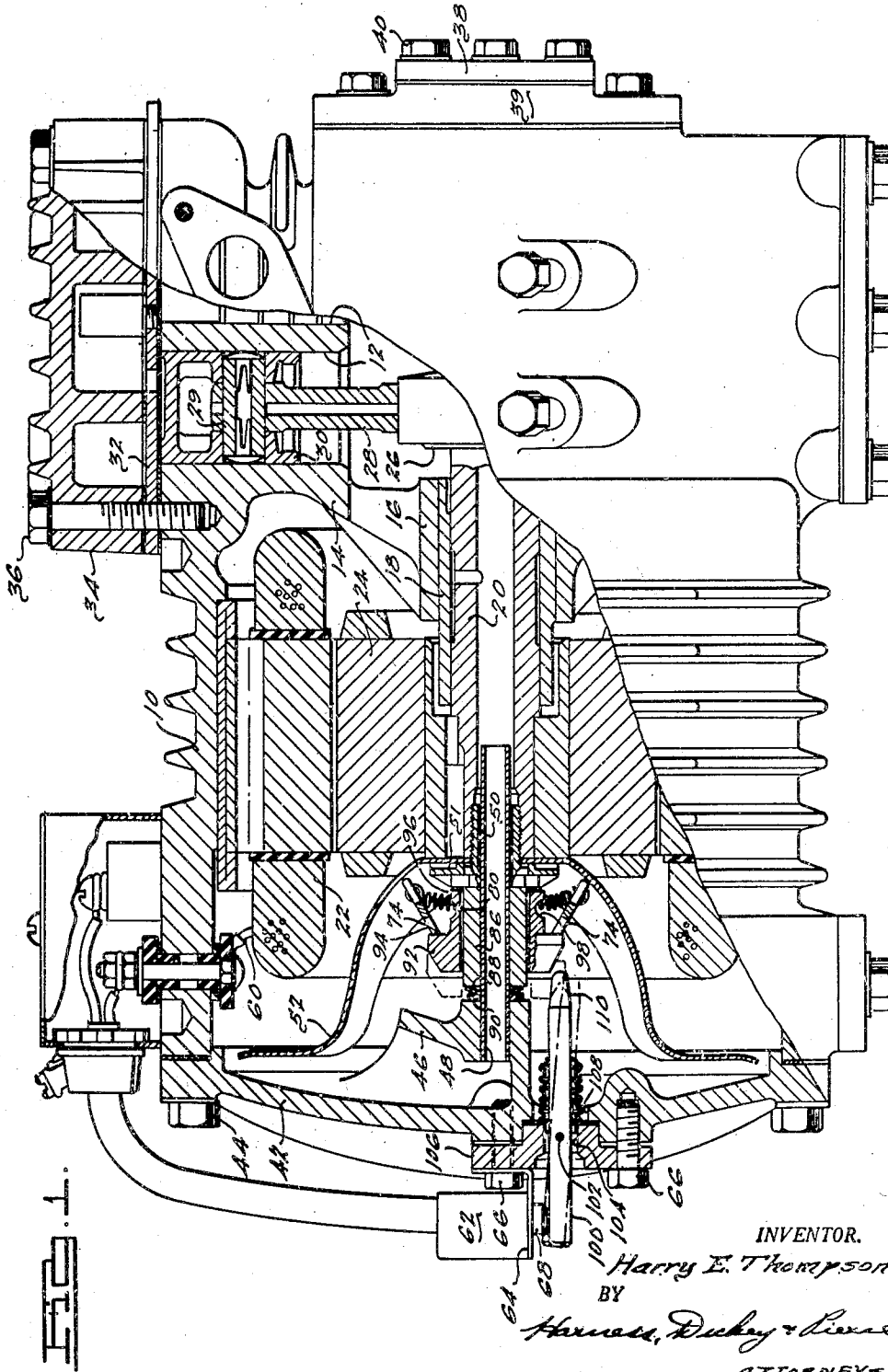
H. E. THOMPSON

2,452,807

SEALED REFRIGERATION UNIT

Filed May 19, 1945

3 Sheets-Sheet 1



Nov. 2, 1948.

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3 Sheets-Sheet 2

FIG. 2.

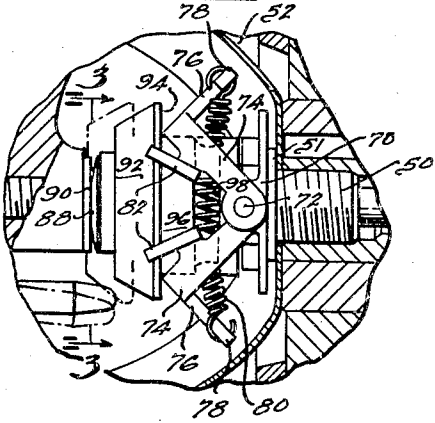


FIG. 3.

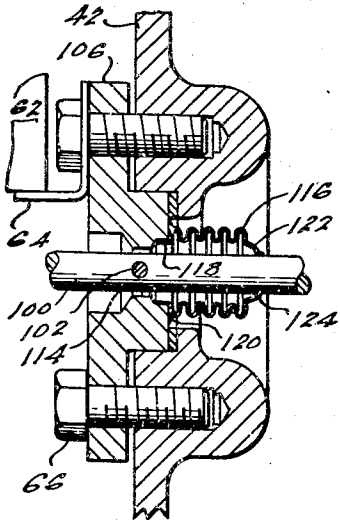
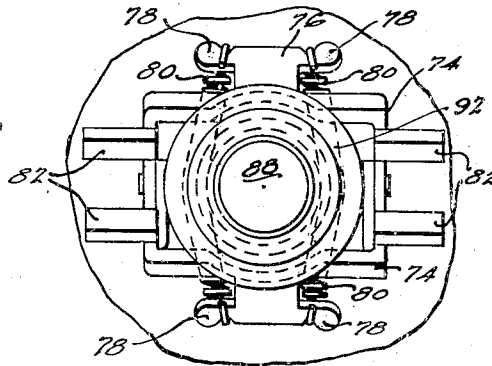


FIG. 4.

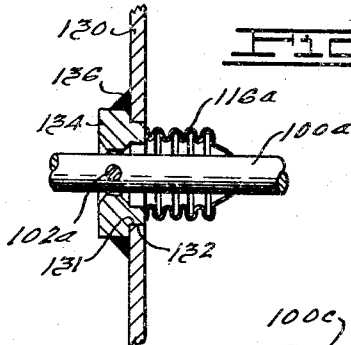


FIG. 5.

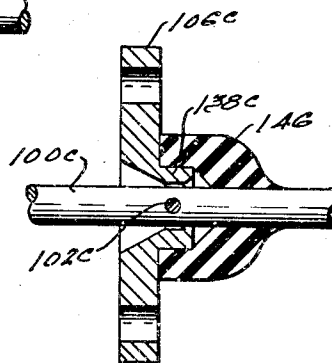
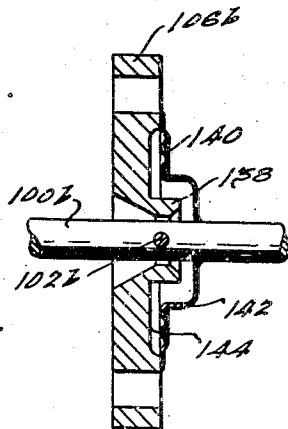


FIG. 7.

FIG. 8.



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UNITED STATES PATENT OFFICE

2,452,807

SEALED REFRIGERATION UNIT

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Application May 19, 1945, Serial No. 594,637

8 Claims. (Cl. 230—58)

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This invention relates to sealed refrigeration units and has for its principal object the provision of a new and novel form of mechanism for controlling the circuit to the starting windings of the electric driving motor thereof.

Objects of the invention include the provision of a sealed motor-compressor unit in which a compressing mechanism and an electric driving motor therefor are sealed within a common casing or housing, a switch is provided exteriorly of the casing and connected with the windings for the starting circuit of the motor, and centrifugally operated means within the casing is mechanically connected by means extending through the casing with the switch for operating the latter; the provision of a construction as above described in which the connecting means between the switch and the centrifugally operated mechanism on opposite sides of the casing includes a movable member projecting through the casing and sealed with respect thereto; the provision of a construction as above described in which the movable member interconnecting the switch and the centrifugal mechanism is mounted for pivotal movement on the casing; the provision of a construction as above described in which the movable member is sealed to the casing by means of a flexible member sealed to both it and to the casing; and the provision of a construction as above described in which the seal between the movable member and the casing comprises a flexible metallic member.

The above being among the objects of the present invention the same consists in certain novel features of construction and combinations of parts to be hereinafter described with reference to the accompanying drawings, and then claimed, having the above and other objects in view.

In the accompanying drawings which illustrate suitable embodiments of the present invention and in which like numerals refer to like parts throughout the several different views,

Fig. 1 is a partially broken, partially sectioned side elevational view of one form of sealed refrigerant motor compressor unit to which the present invention is applicable;

Fig. 2 is a fragmentary, partially broken, partially sectioned view taken in the same plane as in Fig. 1 and showing the centrifugal actuated mechanism in side elevation, the centrifugal mechanism being shown in full lines in motor operation position;

Fig. 3 is an end elevational view of the cen-

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trifugal mechanism shown in Fig. 2, taken on the line 3—3 of Fig. 2;

Fig. 4 is an enlarged, fragmentary sectional view taken in the same plane as Fig. 1 and illustrating in greater detail the mounting of the connecting member between the centrifugally actuated mechanism and the switch, together with the seal therefor;

Figs. 5, 6, and 7 are views similar to Fig. 4 illustrating modified forms of construction;

Fig. 8 is a partially broken, partially sectioned view of a different form of sealed motor-compressor unit to which a modified form of the present invention is shown applied; and,

Fig. 9 is an enlarged, fragmentary sectional view taken on the line 9—9 of Fig. 8.

The present invention is applicable to substantially any conventional type of sealed motor-compressor unit for refrigerating systems or for other uses but, for the purpose of illustration, in the accompanying drawings it is shown in conjunction with a sealed motor-compressor unit of the general type illustrated in the U. S. Patent No. 2,035,276, issued March 24, 1936, to John R. Replogle on Refrigerant condensing unit, and owned by the assignee of the present invention.

As indicated in Fig. 1 such motor-compressor unit may be briefly described as comprising a generally cylindrical casing or housing 10 one end of which is formed to provide a pair of cylinders 12 integral therewith and arranged with their axes perpendicular to the axis of the casing 10. Intermediate its ends the casing 10 is provided with an integral transverse apertured wall 14 centrally terminating in a hub portion 16 in which a bearing 18 is secured for rotatably supporting the hollow drive shaft 20. Press-fitted concentrically into the main portion of the casing 10 is the field structure, indicated generally at 22, of a conventional electric motor having a rotor indicated generally at 24 suitably fixed to the drive shaft 20 concentrically therewith.

The righthand end of the drive shaft 20, as viewed in Fig. 1, is provided with a pair of axially spaced eccentrics 26 on each of which is mounted the big end of a connecting rod 28. The small or upper end of each connecting rod 28 is connected by means of a piston pin 29 to a piston 30 received in the corresponding cylinder 12. The bores of the cylinders 12 open upon the top face of the casing 10 and are closed by a conventional valve plate 32 and cylinder head 34 fixed thereto in sealed relation as by means of bolts 36. The righthand or crankcase portion of the casing 10 is provided with an aperture therethrough which

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is closed and sealed by means of a pair of plate members 38 and 39, secured in place by means of screws 40.

The lefthand end of the casing 10 is of open construction and is closed and sealed by means of an end plate or cover 42 secured thereto by means of bolts 44.

The cover 42 is formed to provide an upwardly opening trough 46 on its inner face from the bottom of which a tube 48 projects in concentric relation with respect to the drive shaft 20 and centrally into the bore of the same where it is relatively closely but relatively rotatably received within a sleeve 50 which is threaded into the bore of the shaft 20 at the lefthand end of the latter. An oil slinger 52 fixed to the lefthand end of the rotor 24 is adapted to dip into a body of oil in the lower portion of the casing 10 and cause such oil to be thrown about within the casing 10. A portion of such oil finds its way into the trough 46 where it is fed by gravity through the tube 48 into the hollow interior of the drive shaft 20 where it is conducted to the wearing surfaces between the drive shaft 20 and its bearing 18 and the wearing surfaces between the eccentrics 26 and the connecting rods 28, and is conducted through the connecting rods 28 to the piston pins 29 and the bores of the cylinders 12.

The motor, comprising the field structure 22 and the rotor 24, may be of a synchronous or other type of electric motor having a conventional form of starting winding, a portion of which is indicated at 60. It will be understood that in some motors a conventional capacitor (not shown) may be connected in series with the starting windings without in any way affecting the present invention. As in conventional constructions the starting winding for the electric motor is energized when the motor is started and is maintained energized until the motor reaches a predetermined speed, at which time the starting winding is de-energized as it is then not required. The present invention has particular relation to means for controlling the energization and de-energizing of the starting winding.

To control the energizing and de-energizing of the starting winding a suitable or conventional type of electric switch indicated generally at 62 is mounted in fixed relation on the outer face of the cover 42 by means of a bracket 64 secured in place by one or more screws 66. The particular switch shown by way of illustration has an axially movable operating button or plunger 68 which is spring pressed toward projected position in which position the switch 62 is open and which, when in depressed position, the switch 62 is closed. Any suitable or conventional centrifugally operated mechanism responsive to the speed of the drive shaft and driven therefrom may be employed for the purposes of the present invention and connected to the switch 62, or its equivalent, in accordance with the present invention. The particular centrifugally operated mechanism shown is therefore shown in an illustrative, and not in a limiting sense.

The particular centrifugally operated mechanism shown is mounted on a head 51 integral with the outer end of the sleeve 50. The head 51, as brought out in Fig. 2, is provided with a pair of diametrically opposed, axially outwardly projecting lugs 70 to each of which is secured a radially outwardly extending pivot pin 72. A pair of U or yoke-shaped members 74 have

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their opposite free ends pivotally mounted on the opposite pins 72, the yoke members 74 being offset from one another axially of the pins 72 as brought out in Fig. 3 by a distance substantially equal to the thickness of the material from which the yoke members 74 are formed, so that the yoke members may be identical to each other. The yoke members 74 are disposed on diametrically opposite sides of the tube 48 and, as indicated by dotted lines in Fig. 3, the portion connecting the legs of each member 74 is bowed outwardly for clearance purposes as will hereinafter be more fully appreciated.

Each yoke member 74 midway between its sides is provided with an arm 76, shown formed integrally therewith and projecting upwardly and to the right, as viewed in Figs. 1 and 2, in perpendicular relationship with respect to the length of the side portions of the yoke 74. The free end of each arm 76 is laterally projected to provide hook-like extensions 78, and a coil tension spring 80 is tensioned between the hook-like extensions 78 of both yoke members 74 on the corresponding sides of the tube 48, the springs 80 thus tending to cause the yoke members 74 to pivot toward one another about the pivot pins 72. Additionally, each arm of each yoke member 74 intermediate its opposite ends is provided with an integral outwardly struck portion 82 which portions of both yoke members on the corresponding sides of the tube 48 project toward one another and are arranged for contacting relationship with respect to each other when the yoke members 74 are drawn towards each other under the influence of the springs 80. In this connection it will be understood that the relation of the parts shown in Figs. 1 and 2 are those which they assume in operation and with the starting circuit cut out.

Mounted on the tube 48 between the head 51 of the sleeve 50 and the inner end of the trough 48 is a sleeve 86 held against substantial axial movement by means of a flexible washer 88 and a resilient gasket 90 interposed between it and the opposed wall of the trough 46. Rotatably and axially slideably mounted upon the exterior of the sleeve 86 is a cone member 92 provided with an outwardly facing frusto-conical face concentric to the axis of the tube 48 and the shaft 20 and it is adapted to be moved axially outwardly on the sleeve 86 by the yoke member 74 moving under the influence of the springs 80 when the motor is de-energized. The cone member 92 has a hub 96 which is provided with a relatively deep circumferentially extending groove 98 within which the springs 80 are received. The reception of the springs 80 in the groove 98 serves as a connection between the yoke members 74 and the cone member 92 acting to withdraw the cone member 92 axially inwardly when the yoke members swing away from each other when the motor attains a predetermined speed, and serving to project the cone member 92 axially outwardly when the yoke members are drawn together by the springs 80 when the motor is de-energized.

In order to utilize the axial movement of the cone member 92 to control the switch 62 the following mechanism is provided in accordance with the present invention. A member 100 is pivotally mounted between its ends on a pin 102 fixed with respect to the motor compressor housing for movement in a plane radial to the axis of the shaft 120. It will be understood that the member 100, although shown as and described herein as a pin, may assume any desired form

or shape. The pin 100 projects through the end wall of the motor-compressor housing in approximately parallel relation with respect to the axis of the shaft 20, and radially offset therefrom. In the particular case shown the pin 100 projects through a central aperture 104 in a circular plug member 106 received in the counter-bored outer end of the opening 108 formed in the cover or closure member 42. The plug member 106 is secured in sealed relation to the cover 42 by means of the screws 68, one or more of which also serves to mount the bracket 64 upon the cover 42. The axially inner end of the pin 100 is tapered and rounded off as at 110 and is positioned to be engaged by the frusto-conical surface of the cone member 92 when the latter is moved to its axially outer position under the influence of the springs 80 when the motor is at rest.

The axially outer end of the pin 100 lies in engagement with the push-button 68 of the switch 62, and when the cone member 92 moves to the last-described position, indicated in dotted lines, it causes the pin 100 to pivot about its pivot pin 102 and force the plunger 68 inwardly to move the switch 62 to closed circuit position. When the electric motor is energized the springs 80 maintain the yoke members 74 in their contracted position until the motor approaches a predetermined speed at which time the centrifugal force acting upon the yoke members 74 is sufficient to cause them to pivot outwardly about their pivot pins 72, and in so doing act through the springs 80 to withdraw the cone member 92 from contacting relationship with respect to the pin 100. Under the last-mentioned condition the force of spring within the switch 62 which tends to force the plunger 68 outwardly acts upon the pin 100 to return the pin to its normal running position shown in full lines and in which it is free of contact with the cone member 92. At the same time the switch 62 is moved to open circuit position which breaks the circuit through the starting winding 60. Each time the motor is de-energized, the springs 80 will draw yoke members 74 toward each other and thus force the cone member 92 axially outwardly during which time it will engage the inner end of the pin 100 and pivot the pin 100 in a direction to close the circuit through the starting winding through the switch 62 so as to condition the motor to again start as soon as the control switch for the unit is closed. This construction thus provides means whereby a centrifugal device which operates closely to a given motor speed is employed for controlling the circuit to the starting windings of a sealed motor, through a switch located exteriorly of the motor sealing means.

The construction above described for cutting in and out the starting windings for the electric motor being associated with a sealed motor-compressor unit it is, of course, necessary to seal the pin 100 to the motor housing, and the preferred method of effecting this seal is best brought out in Fig. 4. As there illustrated the pin 100 projects through the opening 114 in the plug 106 which opening is counterbored on either side of the pivot pin 102 to provide clearance for movement of the pin 100 about such pivot pin. A metallic bellows 116 surrounds the pin 100 inwardly of the plug 106 and is provided with a collar extension 118 at its outer end which is received in the corresponding counterbore of the opening 114 so as to center it with respect there-

to and it is then soldered or brazed as at 120 to the plug 106. The inner end of the bellows 116 is reduced as at 122 and soldered or brazed to the pin 100 as at 124. Thus the bellows 116 effectively seals the opening 114 through which the pin 100 projects and, being very flexible, it offers no substantial resistance to pivotal movement of the pin 100 about its pivot pin 102.

The same type of seal as illustrated in Fig. 4 may be applied to a type of housing construction wherein a plug member such as the plug member 106 is welded, instead of being bolted, to the motor housing. In Fig. 5 the housing corresponding to the housing 10 previously described is illustrated at 130 and as being provided with an opening 131 therein for reception of the pilot portion 132 of the mounting member 134. The mounting member 134 is provided with an axial opening there-through for reception of the pin 100a corresponding to the pin 100. In this case the pin 100a is pivotally mounted by means of pivot pin 102a, corresponding to the pivot pin 102 previously described. The collar or mounting member 134 is welded, brazed, soldered or the like as at 136 to the outer face of the housing 130 and thereby sealed thereto. In this case the bellows 116a corresponding to the bellows previously described has its axially outer end sealed to the inner end of the pilot portion 132 by soldering, brazing or the like and its axially inner end sealed to the pin 100a in a similar manner. It will be appreciated that the construction illustrated in Fig. 5 will function in a substantially identical manner to that illustrated in Fig. 4.

In Fig. 6 a construction is shown which employs a flexible diaphragm for sealing the corresponding pin instead of a metallic bellows. In this case the member 106b may be considered as being equivalent to the member 106 previously described and adapted to be secured to the cover member 42 in a similar or mechanically equivalent manner. It is centrally provided with a centrally apertured axial boss or extension 138 through which the pin 100b, corresponding to the pin 100 previously described, projects and in which it is pivoted by means of the pin 102b preferably substantially in the plane of the inner face of the member 106b as shown. A circular diaphragm having a circularly corrugated body portion 140 lying substantially in the plane of the inner face of the member 106b is sealed at its radially outer margin to the member 106b by soldering, welding, brazing or the like and its central portion is provided with an axially offset portion 142 which first extends axially to clear the boss 138, and then radially inwardly to the pin 100b to which it is suitably sealed as by soldering, brazing or the like. Preferably the axially inner face of the member 106b radially inwardly of the periphery of the body 140 of the diaphragm and radially outwardly of the boss 138 is axially relieved as at 144 to provide operating clearance for the corrugated body portion 140 of the diaphragm. It will be appreciated that the construction illustrated in Fig. 6 will provide an effective seal and at the same time will be sufficiently flexible to permit the necessary pivotal movement of the shaft 100b to operate the cooperating switch controlling the starting winding of the motor.

In Fig. 7 a modified form of seal for the switch operating pin 100c, corresponding to the pin 100 first described, is shown. In this case the mounting member 106c is substantially identical to the mounting member 106b of Fig. 6 except that it is not relieved as the mounting member 106b is re-

lieved at 144, but otherwise it is identical and the pin 100c is similarly mounted thereon by means of the pivot pin 102c. In this case in order to provide a seal between the pin 100c and the member 106c a flexible rubber member 146 is provided in surrounding relationship with respect to the pin 100c and the central boss 138c and is suitably sealed to both thereof as by vulcanizing, by suitable adhesive, or the like. The member 146 may be of any suitable rubber or rubber-like composition impervious to air and to the refrigerant being employed and, of course, to the effects of lubricating oil which may find its way into contact therewith from the interior of the motor-compressor unit.

In Fig. 8 the application of the present invention to a different type of sealed motor-compressor unit is shown, and in this connection it will be understood that any of the forms of seals and pin mountings heretofore shown and described herein may be applied to this different form of unit if desired. In the construction shown in Fig. 8 the motor-compressor unit is contained within a cylindrical housing 150 arranged with its axis vertical and adapted to be supported by means of legs 152. The housing 150 in this case may be of the type which is made in two halves each of cup-like conformation and their meeting edges brought together and welded to form a single one-piece construction. The motor field assembly 154 is mounted in the housing 150 in any suitable or conventional manner and the rotor 156 is fixed to the vertically directed shaft 158 suitably mounted within the housing 150 and the lower end of which is suitably connected to a conventional type of compressor (not shown) which it is adapted to drive. The upper end of the shaft 158 carries a member 160 which is the full equivalent of the head portion 51 of the sleeve member 50 described in connection with Fig. 1, and upon it is mounted a centrifugal mechanism including yoke arms 74 identical to the yoke arms 74 first described and connected by springs 80 identical to the springs 80 first described. This portion of the mechanism, therefore, does not require to be re-described. In place of the cone member 92 employed in the first-described construction, in this case a member 162 having a radially directed annular flange 164 at its upper end is rotatably and slidably mounted upon the upper end of the shaft 158 and is provided with a hub having a groove 198 therein corresponding to the groove 98 in the first-described construction, the groove 198 is adapted to receive the springs 80 therein thereby to control the axial position of the member 162 in accordance with the pivotal position of the yoke members 74 in the same general manner as the cone member 92 is controlled thereby in the first-described construction. In this case, however, the pin member 100d instead of projecting through the housing 150 in parallel relation with respect to the axis of the shaft 158 extends in radial relation with respect to the axis of the shaft 158 with its inner end overlying the upper face of the member 162 and particularly the flange 164 thereof. It is provided on its lower face with a button 166 for engagement with the flange 164. The pin 100d projects out through the casing 150 through a collar member 170 in which it is permitted the necessary movement to operate the button 68d of the cooperating switch 62d which may be identical to the switch 62 of the first-described construction and connected to the starting windings in the field structure 154 in the same general manner as in the first-described construc-

tion. The member 170 has a pilot portion 172 which generally fits an opening provided in the housing 150 for the reception of the same and the member 170 is brazed or soldered to the housing 150 as at 174 to seal and secure it thereto.

In this last-described construction the pilot portion 172 is relatively elongated as compared to the previously described constructions and is flattened off on diametrically opposite sides as at 176. A U-shaped strap member 178 is arranged with the free end portions of its opposed sides embracing the flatted off portions 176 and such free end portions are each pivotally connected to the pilot portion 172 by means of a pin 180, which pins project perpendicularly therethrough centrally of the corresponding faces 176 and through the corresponding side wall of the pilot portion 172. The pins 180 are axially aligned with each other and preferably disposed with their axes in diametric relation with respect to both the pilot portion 172 and the pin 100d.

The base of the strap member 178 is positioned inwardly of the inner end of the pilot portion 172 and the pin 100d projects centrally through it and is secured thereto. In the particular case shown, the pin 100d is made in two parts connected through the base of the strap member 178, this being a convenient way of securing the pin to the strap member. It will be appreciated that in fixing the pin 100d to the strap member 178 the pin is mounted for pivotal movement about the axes of the pins 180. This construction thus permits a sealing bellows 182, corresponding to the bellows 116 and 116a of Figs. 4 and 5, respectively, to be employed but in this case extending in both directions axially of the pivotal axis for the pin 100d. In other words, the bellows 182 surrounds the pin 100d within the member 170 and its pilot extension 172, its outer end being sealed, as by soldering or the like, to the outer end of the member 170, and its inner end being sealed, as by soldering of the like, to the pin 100d at the base of the strap 178. Preferably the inner end of the strap 178 is soldered or the like to the bellows 182 and both parts of the pin 100d so as to fix all of these parts together.

It will be noted, as best brought out in Fig. 9, that in this last-described construction pivotal movement of the pin 100d about the axis of the pins 180 to control the switch 62d is accompanied by bending of the sealing bellows 182 about an axis between its ends. It also permits a longer bellows than in the first-described constructions to be used. As a result the stresses on the bellows 182 during pivotal movement of the pin 100d are very low and the resistance of the bellows 182 to pivotal movement of the pin 100d is negligible.

In a manner similar to the construction first-described, in the construction shown in Fig. 8 when the motor is de-energized the springs 80 draw the yoke arms 74 together and lift the member 162 on the shaft 158, the flange 164 striking the button 166 and causing the pin 100d to pivot upwardly toward the position illustrated by dotted lines, thus causing the outer end of the pin 100d to be depressed and in being depressed it moves the button 68d of the switch 62d downwardly to close the circuit through the switch 62d which is in series with the starting windings for the electric motor described. Thus the construction illustrated in Fig. 8 operates in substantially the same manner as the construction first-described.

Having thus described my invention, what I claim by Letters Patent is:

1. In a motor-compressor unit of the class

wherein a motor and a compressor are sealed within a housing and are provided with a common operating shaft, the motor being of a type provided with a starting winding, the combination with said motor of centrifugally actuated mechanism driven thereby including a member movable axially of said shaft, a switch mounted upon the outside of said housing and connected in the series with said starting winding, a member projecting through an opening in a wall of said housing and mounted for pivotal movement about an axis extending transversely thereof, the outer end of the second-mentioned member lying in operative relation with respect to said switch and the inner end of said second-mentioned member lying in cooperative relationship with respect to said axially movable member, and means sealed to said housing and to said second-mentioned member sealing said opening against the flow of fluid therethrough between the interior and exterior of said housing, the relationship of said parts being such that when said centrifugally actuated mechanism is inactive said switch is in closed position and when said centrifugally actuated mechanism is active and said motor reaches a predetermined speed, said switch is open.

2. In a motor compressor of the class wherein a motor and a compressor are mounted within a gas-tight housing and are provided with a common operating shaft, and the motor is an electric motor provided with a starting winding, the combination with said shaft of centrifugally actuated mechanism driven thereby within the said housing and including a member adapted to be moved axially of said shaft thereby, an electric switch mounted on the exterior of said housing and connected in series with said starting winding, a pin mounted for pivotal movement on said housing projecting through an opening in said housing and operative'y connecting said switch and said member for simultaneous movement in at least one direction of movement of each thereof, and a flexible impervious member sealed to both said pin and to said housing thereby to provide a fluid seal for said opening.

3. A sealed motor-compressor unit of the class wherein an electric motor having a starting winding, and a compressor, are provided with a common housing and a common operating shaft and said housing seals said motor and compressor from the atmosphere exterior to said housing, the combination with said shaft of centrifugally actuated mechanism driven thereby within said housing, said mechanism including a member movable thereby axially of said shaft within said housing, said housing having an opening therethrough, a pin projecting through said opening and pivoted intermediate its ends about an axis fixed with respect to said housing for movement in said opening about a line transverse to the length of said pin, flexible means sealed to said pin and with respect to said housing sealing the interior of said housing against communication with the atmosphere through said opening, the inner end of said pin extending into operative relationship with respect to said member whereby said pin is adapted to be pivoted about its pivotal axis upon movement of said member axially of said shaft in one direction under the influence of said centrifugally actuated mechanism, and a switch mounted on the exterior of said housing and operatively connected with the outer end of said pin, said switch being connected in series with said starting winding of said motor.

4. A sealed motor-compressor unit of the class

wherein an electric motor having a starting winding, and a compressor, are provided with a common housing and a common operating shaft and said housing seals said motor and compressor from the atmosphere exterior to said housing, the combination with said shaft of centrifugally actuated mechanism driven thereby within said housing, said mechanism including a member movable thereby axially of said shaft within said housing, said housing having an opening therethrough, a pin projecting through said opening, and pivoted intermediate its ends with respect to said housing for movement in said opening about a line transverse to the length of said pin, a flexible metallic member surrounding said pin and having its opposite ends sealed to said pin and with respect to said housing, respectively, sealing the interior of said housing against communication with the atmosphere through said opening, the inner end of said pin extending into operative relationship with respect to said member whereby said pin is adapted to be pivoted about its pivotal axis upon movement of said member axially of said shaft in one direction under the influence of said centrifugally actuated mechanism, and a switch mounted on the exterior of said housing and operatively connected with the outer end of said pin, said switch being connected in series with said starting winding of said motor.

5. A sealed motor-compressor unit of the class wherein an electric motor having a starting winding, and a compressor, are provided with a common housing and a common operating shaft and said housing seals said motor and compressor from the atmosphere exterior to said housing, the combination with said shaft of centrifugally actuated mechanism driven thereby within said housing, said mechanism including a member movable thereby axially of said shaft within said housing, said housing having an opening therethrough, a pin projecting through said opening and pivoted intermediate its ends with respect to said housing for movement in said opening about a line transverse to the length of said pin, a flexible metallic bellows surrounding said pin within said housing and having one end thereof sealed with respect to said housing and the opposite end thereof sealed to said pin and sealing the interior of said housing against communication with the atmosphere through said opening, the inner end of said pin extending into operative relationship with respect to said member whereby said pin is adapted to be pivoted about its pivotal axis upon movement of said member axially of said shaft in one direction under the influence of said centrifugally actuated mechanism, and a switch mounted on the exterior of said housing and operatively connected with the outer end of said pin, said switch being connected in series with said starting winding of said motor.

6. A sealed motor-compressor unit of the class wherein an electric motor having a starting winding, and a compressor, are provided with a common housing and a common operating shaft and said housing seals said motor and compressor from the atmosphere exterior to said housing, the combination with said shaft of centrifugally actuated mechanism driven thereby within said housing, said mechanism including a member movable thereby axially of said shaft within said housing, said housing having an opening therethrough, a pin projecting through said opening and pivoted intermediate its ends with respect to said housing for movement in said opening

about a line transverse to the length of said pin, a flexible diaphragm having a central opening therethrough through which said pin projects and being otherwise imperforate, said flexible diaphragm being sealed with respect to said housing at its outer periphery and sealed to said pin at its inner periphery with the plane of its body substantially including the pivotal axis of said pin and sealing the interior of said housing against communication with the atmosphere through said opening, the inner end of said pin extending into operative relationship with respect to said member whereby said pin is adapted to be pivoted about its pivotal axis upon movement of said member axially of said shaft in one direction under the influence of said centrifugally actuated mechanism, and a switch mounted on the exterior of said housing and operatively connected with the outer end of said pin, said switch being connected in series with said starting winding of said motor.

7. A sealed motor-compressor unit of the class wherein an electric motor having a starting winding, and a compressor, are provided with a common housing and a common operating shaft and said housing seals said motor and compressor from the atmosphere exterior to said housing, the combination with said shaft of centrifugally actuated mechanism driven thereby within said housing, said mechanism including a member movable thereby axially of said shaft within said housing, said housing having an opening therethrough, a pin projecting through said opening in approximate parallel relation with respect to the axis of said shaft and pivoted intermediate its ends with respect to said housing for movement in said opening about a line transverse to the length of said pin, flexible means sealed to said pin and to said housing sealing the interior of said housing against communication with the atmosphere through said opening, the inner end of said pin extending into operative relationship with respect to said member whereby said pin is adapted to be pivoted about its pivotal axis upon movement of said member axially of said shaft in one direction under the influence of said centrifugally actuated mechanism, and a switch mounted on the exterior of said housing and operatively connected with the

outer end of said pin, said switch being connected in series with said starting winding of said motor.

8. A sealed motor-compressor unit of the class wherein an electric motor having a starting winding, and a compressor, are provided with a common housing and a common operating shaft and said housing seals said motor and compressor from the atmosphere exterior to said housing, the combination with said shaft of centrifugally actuated mechanism driven thereby within said housing, said mechanism including a member movable thereby axially of said shaft within said housing, said housing having an opening therethrough, a pin projecting through said opening in approximately radial relation with respect to the axis of said shaft and pivoted intermediate its ends with respect to said housing for movement in said opening about a line transverse to the length of said pin, flexible means sealed to said pin and with respect to said housing sealing the interior of said housing against communication with the atmosphere through said opening, the inner end of said pin extending into operative relationship with respect to said member whereby said pin is adapted to be pivoted about its pivotal axis upon movement of said member axially of said shaft in one direction under the influence of said centrifugally actuated mechanism, and a switch mounted on the exterior of said housing and operatively connected with the outer end of said pin, said switch being connected in series with said starting winding of said motor.

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