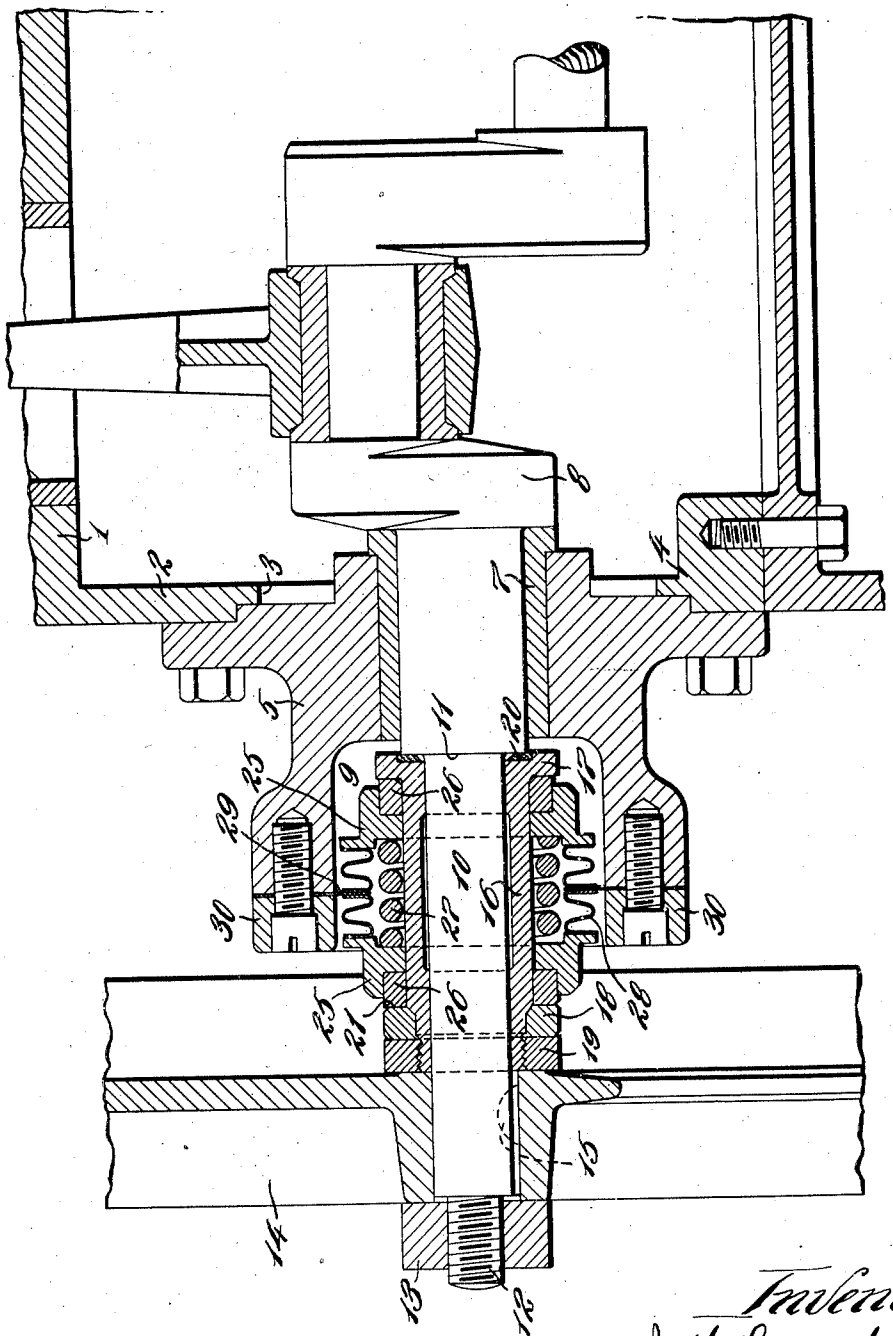
J. H. DENNEDY.

COMPRESSOR FOR REFRIGERATING APPARATUS.

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1,366,879. Patented Jan. 25, 1921.



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COMPRESSOR FOR REFRIGERATING APPARATUS.

1,366,879. Specification of Letters Patent. Patented Jan. 25, 1921.

Application filed August 20, 1920. Serial No. 404,937.

To all whom it may concern:

Be it known that I, JAMES H. DENNEDY, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Compressors for Refrigerating Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to compressors for gaseous fluid particularly such as are used in refrigerating apparatus, and has especial reference to refrigerating apparatus of the domestic type although not necessarily limited thereto. While it is well known that the requirements of all refrigerating machinery are severe, owing to the offensive and corrosive nature of the fluids employed, it is a fact that a device for domestic use has peculiarly severe requirements owing to the irregularity of its use, the lack of skilled or constant attention, and the high pressures to which it is occasionally subjected. Such a device is often left unused for long periods of time, such as during the winter months, yet the demand is made that it shall start instantly and operate perfectly at the end of that time; also owing to temporary vacation of premises, discontinuance of electric current, or for accidental reasons, such apparatus is frequently left idle for extended periods in hot weather as a result of which the refrigerant fluid, which under ordinary operating conditions exists largely in the liquefied state, becomes wholly gasified with the production of internal pressure far beyond those which would normally occur. Notwithstanding these extreme drawbacks no leakage must occur, either of air inward or of refrigerant outward, and no corrosion must result for otherwise the machine might not run when called on.

One of the most fruitful sources of trouble in previous refrigerating systems has originated at the point where the main driving shaft of the compressor projects through the wall of the casing in which it revolves, since it is at this point that leakage of refrigerant or lubricant fluid, inlet of air, and corrosion of the parts has most frequently occurred. The objects of the present invention are the provision of a compressor of such construction as to overcome and avoid such leakage without such nicety of fit as will impede operation of the compressor; the provision of a compressor of such nature and construction as always to remain tight under all conditions of temperature and pressure; the provision of a compressor of such design as to be more easily constructed and assembled than previous devices; the provision of a new and improved construction of sealing and bearing means; the provision of a new and improved expedient for maintaining contact between the parts of such a bearing; while further objects and advantages of my invention will become apparent as the description proceeds.

In the drawings accompanying and forming a part of this application I have shown one mechanical construction in which my inventive idea can be embodied although it will be understood that this drawing is intended to be merely illustrative and not limiting upon me. This drawing represents a longitudinally vertical sectional view through a preferred design of compressor embodying my improvements.

The particular compressor shown is of the cylinder type although this is not necessary to my invention. In the present embodiment the cylinder block 1 is cast integral with the hollow crank case 2, whose end is formed with a circular opening 3 surrounded by the seat 4 to which is bolted the bearing member 5. Located in the inner end of this bearing member is a bearing 7 of any suitable type which supports the crank shaft 8. The outer end of the bearing member is formed with an enlarged recess 9 and in the present embodiment the outer end of the crank shaft is reduced in size where it passes through this recess as shown at 10, thereby producing a shoulder 11. The extreme outer end of the shaft is formed with a screw threaded stud 12 for the reception of a nut 13 whereby the drive wheel 14 is held in place, relative rotation between the wheel and shaft being prevented by the key 15.

Slidably mounted upon the reduced portion 10 of the shaft is a sleeve 16 having at one end an enlarged abrupt shoulder 17 and at the other end a removable bearing ring 18 hermetically clamped in place by a suitable nut 19 which is threaded upon a reduced extension of the sleeve. The inner end of the sleeve is provided with a suitable

packing element 20 which is pressed against the shoulder 11 with such firmness as to prevent leakage inside the shaft along the sleeve. In the present embodiment the sleeve is held against the shoulder 11 through the agency of the nut 13, although it is obvious that other expedients could be employed, such for example as a nut between the fly wheel and sleeve. The inner face of the ring 18 constitutes a shoulder 21 opposed to the shoulder 17 and it is immaterial which end of the sleeve is presented to the shoulder 11 provided only that suitable packing means be employed between the sleeve and shaft.

Embracing the sleeve 16 between the shoulders 17 and 21 are two supporting rings 25—25 having secured to their outer faces and preferably in suitable recesses the bearing and sealing rings 26—26 which are made of some anti-friction substance which will run without oil and also resist the corrosive action of the refrigerant. Between the rings 25 there is interposed the expansion spring 27, and connecting these rings outside of the spring is the expansible sheath 28, which is hermetically attached thereto and is formed at some point between its ends with a laterally projecting annular flange 29 which overlies the end of the member 5 and is tightly clamped thereto by means of the ring 30.

With the foregoing construction it will be clear that leakage in either direction will be absolutely prevented; even though a sufficient difference of pressure between the exterior and interior should arise as to overcome the tension of the spring 27 and force gas past one of the rings, its effect upon the rearward face of the other ring would be to increase its tightness and thus prevent the possibility of any leakage. The location of the flange 29 at the point described causes a very flexible connection between the sealing device and the machine frame thus permitting such relative movement such as would be required by slight inaccuracies in workmanship or slight bending of the shaft. The device can be removed as a whole and replaced as a whole without difficulty and without danger of disruption of the parts so long as the nut 19 is not misplaced; and by reason of the design of the parts this will be difficult to accomplish, since the nut and sleeve are preferably made without tool engaging provisions. The rings 26—26 are preferably made of a suitable anti-friction metal, preferably graphite-bronze such as that described in Letters Patent of E. J. Copeland, No. 1,329,348, issued January 27, 1920; although other substances such as a good grade of Babbitt metal, can be employed.

It will therefore be understood that many changes in detail and construction can be made within the scope of my invention, wherefore I do not limit myself to the particular features of construction or arrangement wherein illustrated or described except as the same are specifically pointed out in the claims hereto annexed.

Having thus described my invention, what I claim is:

1. In a compressor for refrigerating machinery, in combination, a casing having an opening, a shaft projecting through said opening, and having a shoulder, a bearing surrounding the larger portion of said shaft, a sleeve surrounding the smaller portion of said shaft, and itself formed exteriorly with longitudinally-spaced, oppositely-disposed, annular shoulders, means hermetically clamping said sleeve against said first shoulder, a pair of spaced sealing rings surrounding said sleeve between said shoulders, an expansion spring located between said rings and pressing them against said last mentioned shoulders, a longitudinally expansible sheath connecting said rings, and means securing said sheath hermetically to said casing.

2. In a compressor for refrigerating machinery, in combination, a casing having a recessed opening, a rotatable member located in said recess and having a pair of longitudinally-spaced oppositely-disposed, annular shoulders, a pair of space sealing rings surrounding said member between said shoulders, an expansion spring located between said rings and pressing them against said shoulders, a longitudinally expansible sheath connecting said rings, and means securing said sheath hermetically to said casing.

3. In a compressor for refrigerating machinery, in combination, a casing having an opening in its wall, a bearing member secured in said opening, a shaft journaled in said member, a sleeve surrounding said shaft and having a pair of longitudinally spaced opposed annular shoulders, means hermetically securing said sleeve to said shaft, a pair of anti-friction sealing rings surrounding said sleeve between said shoulders, means including a flexible diaphragm whereby each of said rings is hermetically secured to said casing, and an expansion spring between said rings and pressing the same against their respective shoulders.

4. In a compressor for refrigerating machinery, in combination, a casing having a recess in its wall, a rotatable member in said recess, and having a pair of longitudinally-spaced, opposed, annular shoulders, a pair of anti-friction sealing rings surrounding said member between said shoulders, means including a flexible diaphragm whereby each of said rings is hermetically secured to said casing, and an expansion spring between said rings and pressing the same against their respective shoulders.

5. In a compressor for refrigerating machinery, in combination, a casing having an aperture in its wall, a bearing member secured in said aperture, a shaft journaled in said bearing member, a sleeve surrounding said shaft and formed with two oppositely facing exterior annular shoulders, means securing said sleeve hermetically to said shaft, a pair of anti-friction sealing rings surrounding said sleeve, one adjacent to each shoulder, means including a flexible diaphragm whereby each of said rings is flexibly attached to said bearing member, and spring means forcing each of said sealing rings against its shoulder.

6. In a compressor for refrigerating machinery, in combination, a casing having an aperture in its wall, a shaft projecting through said aperture, a sleeve hermetically clamped to said shaft and formed at one end with an external annular shoulder, a ring hermetically secured to the other end of said sleeve and defining a second shoulder, a pair of sealing rings surrounding said sleeve, one adjacent to each shoulder, means including a flexible diaphragm whereby each of said rings is flexibly attached to said casing, and spring means forcing each of said sealing rings against its shoulder.

7. In a compressor for refrigerating machinery, in combination, a casing having an aperture in its wall, a bearing member secured in said aperture, a shaft journaled in said bearing member, a sleeve surrounding said shaft and formed with two oppositely facing exterior annular shoulders, means securing said sleeve hermetically to said shaft, a pair of anti-friction sealing rings surrounding said sleeve, one adjacent to each shoulder, a longitudinally flexible sheath connecting said rings, a flexible flange securing said sheath hermetically to said casing, and spring means forcing each of said rings toward its respective shoulder.

8. In a compressor for refrigerating apparatus, in combination, a casing having a hole in its wall and a seat surrounding said hole, a rotatable member traversing said hole and having adjacent to said seat a pair of oppositely-facing, exterior, annular shoulders, a pair of sealing rings located one adjacent each of said shoulders, means including a flexible diaphragm whereby said rings are secured to said seat, and spring means forcing each of said rings against its respective shoulder.

9. In a compressor for refrigerating apparatus, in combination, a casing having an aperture in its wall, a rotatable member projecting through said aperture and having a pair of oppositely-facing, exterior, annular shoulders, a pair of sealing rings located one adjacent each of said shoulders, means including a longitudinally flexible sheath connecting said rings together, means hermetically connecting said sheath to said casing, and spring means forcing said rings against their respective shoulders.

In testimony whereof I hereunto affix my signature.

JAMES H. DENNEDY.

Witness:
A. H. Goss.