Dec. 1, 1931. O. M. SUMMERS 1,834,038

REFRIGERATING APPARATUS

Filed Dec. 31, 1929

Fig. 1

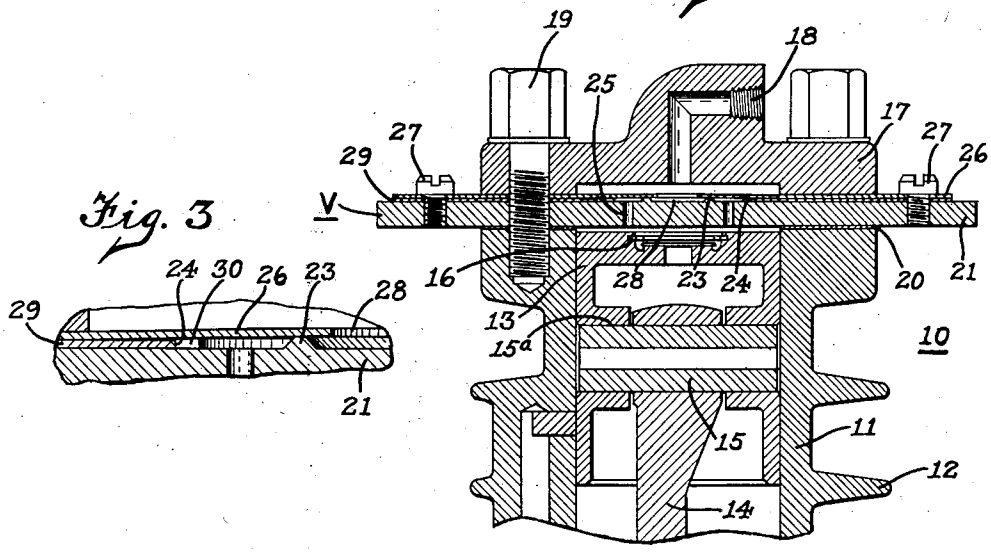


Fig. 3

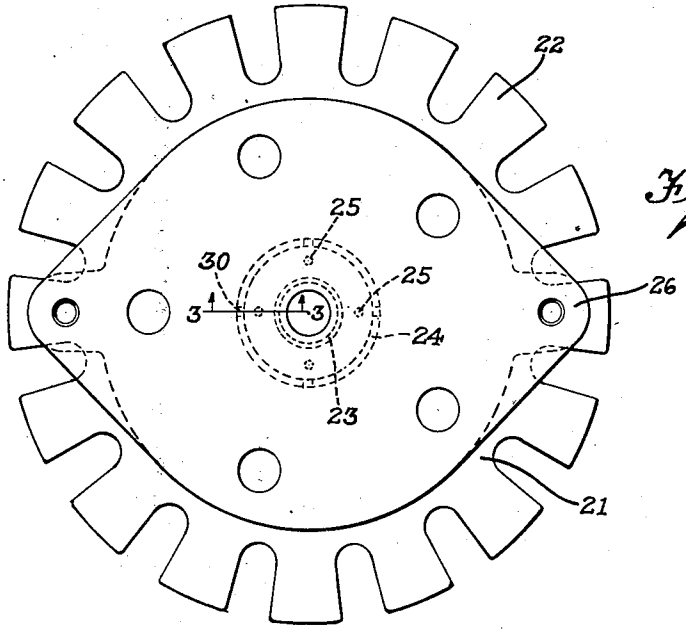


Fig. 2

Otto M. Summers INVENTOR

BY

Spencer, Hardman & Fehr ATTORNEYS

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OTTO M. SUMMERS, OF DAYTON, OHIO, ASSIGNOR TO FRIGIDAIRE CORPORATION, OF DAYTON, OHIO, A CORPORATION OF DELAWARE

REFRIGERATING APPARATUS

Application filed December 31, 1929. Serial No. 417,704.

This invention relates to refrigerating apparatus and more particularly to the construction of valves for compressors used in refrigerating apparatus.

For one of its objects this invention contemplates increasing the efficiency of refrigerating apparatus. More particularly it contemplates increasing the efficiency of compressors used in refrigerating apparatus by providing an improved construction of valves therefor.

A further object of this invention is to provide improved valve structures for compressors, said valve structures comprising but few parts, which may be easily and cheaply assembled, and which are noiseless in operation.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a vertical section through a part of a compressor;

Fig. 2 is a plan view of the valve assembled; and

Fig. 3 is a section on the line 3—3 of Fig. 2.

In the drawings the reference numeral 10 designates generally a part of a refrigerating compressor similar to those now in use in refrigerating apparatus. It comprises the body portion 11 provided with the fins 12, forming a compression chamber in which reciprocates the piston 13 secured to the pitman 14 by the wrist pin 15 journaled in the bearings 15*a*. The pitman 14 is connected in the usual manner to a rotating crank, not shown. The piston 13 is provided with a valve 16 in its head forming an inlet to the compression chamber. The cylinder head 17, provided with the outlet 18, is secured to the body portion 11 at the upper end thereof by means of the bolts 19 with the outlet valve means designated generally by the reference character V securely clamped therebetween. Between the valve means V and the body portion 11 is positioned a gasket 20.

Referring to Figs. 2 and 3, the outlet valve means designated generally in Fig. 1 by the reference character V is shown as comprising an annular valve plate 21. The valve plate 21, being of larger diameter than the compressor housing, extends beyond said housing and is provided with a plurality of heat dissipating elements 22 on its periphery. Within the cylinder or compression chamber, the plate 21 is provided with an annular ridge 23 forming a valve seat. A second ridge 24 of greater diameter than the ridge 23 is also provided on the plate 21 and between these two ridges, the plate 21 is provided with a plurality of passages 25 extending through the plate. A valve reed 26 is secured by screws 27 to that portion of the plate 21 which is outside of the compressor housing. This reed 26 comprises a thin flat piece of metal, preferably Swedish steel, resting on the ridges 23 and 24 and provided with a central opening 28 within the confines of the space bordered by the ridge 23. Between the plate 21 and the reed 26 from the outer edge thereof up to the ridge 24 is located a spacer 29.

Referring to Fig. 3, it will be noted that the ridge 23, forming the valve seat is slightly higher than the ridge 24 and the spacer 26 so that the reed 26 will have a natural tendency to remain seated on the ridge 23 and so that a pressure will be required to unseat the valve reed. Passages 30 are provided in the ridge 24 for the escape of any refrigerant gas that might become otherwise trapped between the reed and the spacer member.

In operation the outlet 18 of the compressor is connected to a condenser, not shown, while the inlet to the compressor from an evaporator (not shown) is through the crank case, also not shown. Refrigerant gas is drawn inwardly through the crank case, passes through the valve 16 in the piston 13 and is compressed on the up stroke of the piston. When the pressure within the compression chamber reaches a predetermined maximum, the gas is forced outwardly through the passages 28 and the reed 26 is bulged upwardly, allowing the gas to pass over the ridge 23 through the opening 28 to the outlet 18 of the compressor. The natural tendency of the valve reed to remain seated together with the

pressure of the gas in the outlet chamber will effectively hold the valve seated and prevent the backward flow of gas on the suction stroke.

It will be noted that by providing the extended surface of the valve plate, the reed may be assembled thereon before the plate is assembled in the pump. Also that there will be a much greater heat dissipating surface whereby the valve may be effectively cooled.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. In combination a discharge valve for a compressor comprising a valve plate provided with one or more openings, a valve reed cooperating with said plate and adapted to close said one or more openings, said reed and plate being secured together and both said reed and said plate extending outwardly beyond the walls of said compressor.

2. In combination a discharge valve for a refrigerating compressor including a valve plate provided with one or more openings, a valve reed cooperating with said plate and adapted to close said opening or openings, said plate and reed extending outwardly beyond and being secured together outwardly beyond the walls of said compressor, the periphery of said plate being provided with heat dissipating means.

3. In combination a valve plate provided with an annular ridge, a plurality of openings in said plate arranged concentrically with said ridge, a valve reed provided with an opening, concentric with said ridge, a spacer between said reed and said plate, said ridge being slightly higher than said spacer, means for securing the plate, spacer and reed together with the reed resting on said ridge, said ridge being positioned between the opening in said reed and the openings in said plate.

4. In combination a valve plate provided with a plurality of annular ridges, a plurality of openings in said plate between said ridges, a valve reed cooperating with said valve plate and resting on said ridges, said reed being provided with an opening separated from the openings in said plate by one of said ridges, a spacer between the reed and the plate and means provided in the other of said ridges for allowing the escape of any gases trapped between the spacer and said reed or said plate.

5. In combination a discharge valve for a compressor including a valve plate provided with one or more openings, a valve reed cooperating with said plate and adapted to close said opening or openings, said plate and said reed extending outwardly beyond and being secured together outwardly beyond the walls of said compressor.

6. In combination a valve plate for a compressor provided with an annular ridge, one or more openings in said plate arranged concentrically with said ridge, a valve reed provided with an opening concentric with said ridge, a spacer between said ridge on said plate, said ridge being slightly higher than said spacer, means for securing the plate, spacer, and reed together with the reed resting on said ridge, said ridge being positioned between the opening in said reed and the one or more openings in said plate, said reed and said plate extending outwardly beyond the walls of said compressor.

7. In combination a discharge valve for a compressor including a valve plate provided with one or more openings, a valve reed cooperating with said plate and adapted to close the opening or openings, a spacer between said plate and said reed, said plate, spacer, and reed extending outwardly beyond and being secured together outwardly beyond the walls of said compressor.

In testimony whereof I hereto affix my signature.

OTTO M. SUMMERS.