

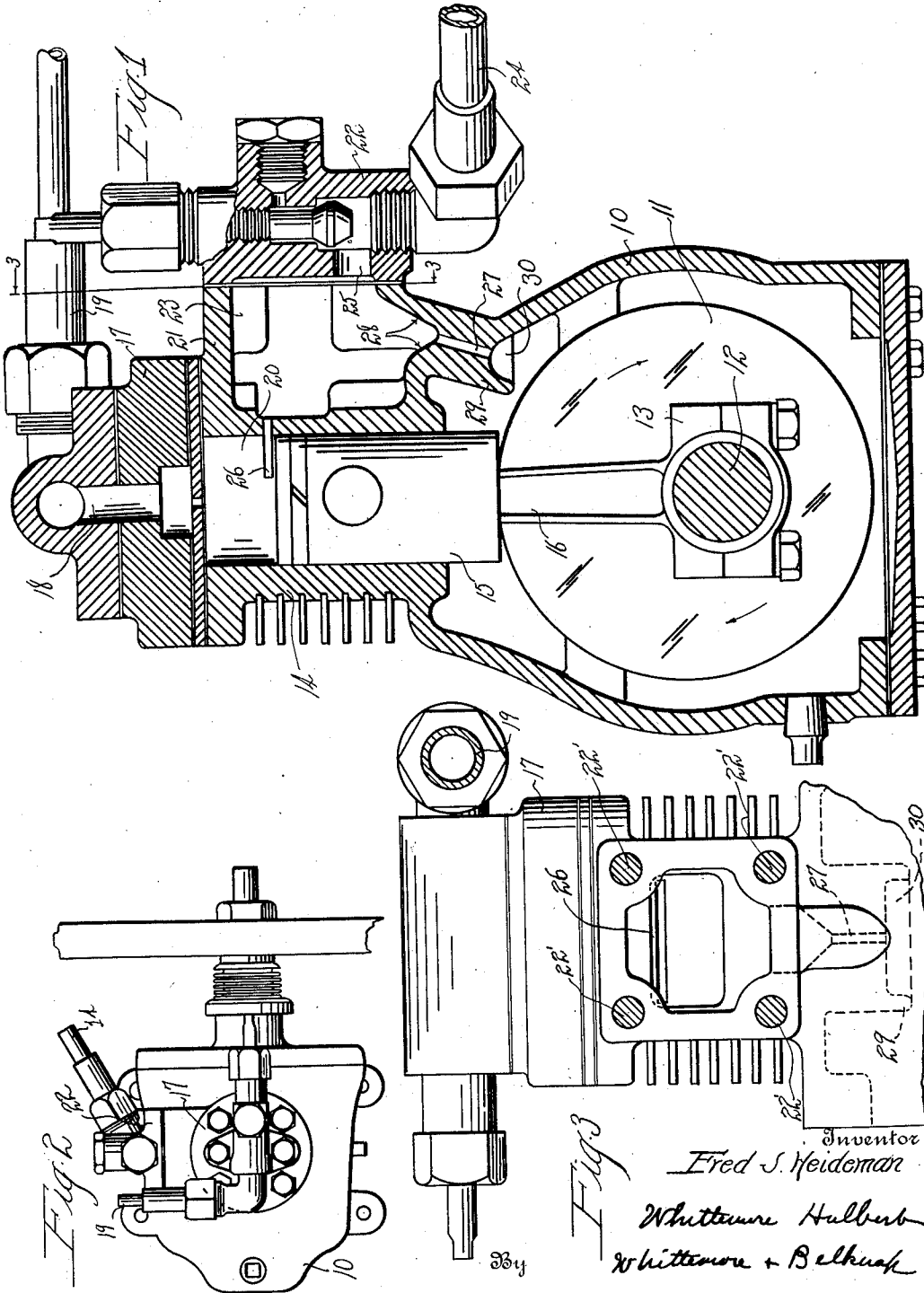
Feb. 14, 1928.

1,659,104

F. J. HEIDEMAN

PUMP CONSTRUCTION

Filed Sept. 28, 1925



Inventor
Fred S. Heideman
Whittemore Hallberg
Whittemore + Belknap
Attorneys

UNITED STATES PATENT OFFICE.

FRED J. HEIDEMAN, OF DETROIT, MICHIGAN, ASSIGNOR OF NINETY PER CENT TO
THOMAS C. WHITEHEAD, OF RIVER ROUGE, MICHIGAN.

PUMP CONSTRUCTION.

Application filed September 28, 1925. Serial No. 59,125.

This invention relates to pump constructions and finds particular utility in compressor pumps for use in connection with refrigerating apparatus.

5 An important object of the present invention is to provide a pump construction so designed as to provide for the segregation or separation of the refrigerant from the oil both in the crank case of the pump and in
10 the conduits of the refrigerating system.

The invention has also among its objects to simplify, render more efficient, and improve generally devices of this character, and these as well as other objects, advantages and novel details of construction will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawings, wherein

20 Fig. 1 is a vertical sectional view through a compressor pump constructed in accordance with my invention,

Fig. 2 is a top plan view thereof, and

Fig. 3 is a fragmentary sectional view
25 taken substantially on the plane indicated by line 3—3 in Fig. 1.

In the drawings wherein like reference characters indicate like parts, it will be noted that a pump is illustrated comprising
30 a casing 10 adapted to contain a supply of lubricant and to enclose a fly wheel 11 mounted upon a crank shaft 12 journaled in suitable bearings 13.

Formed preferably, although not necessarily, integrally with casing 10 is a cylinder
35 14 within which a piston 15 is reciprocally mounted. The piston is connected by means of a connecting rod 16 with the crank shaft 12. The head 17 of cylinder 14 is provided
40 with a suitable port 18 which communicates with a conduit 19 by means of which the refrigerant or the fluid compressed in chamber 20 is conducted away. In the present instance conduit 19 is connected to a condenser.

45 Cylinder 14 has a chamber 21 formed at one side thereof to which an intake manifold 22 is secured, preferably by means of bolts 22 engaging in threaded apertures formed in enlargements 23 in the wall of chamber 21. A tube or other conduit 24 is connected to the intake manifold 22 and connects the manifold, when the invention is used as a

part of a refrigerating apparatus, with the expansion coil.

55 Communication between intake manifold 22 and chamber 21 is established by means of an aperture 25 arranged preferably adjacent the lower side of chamber 21, and communication between chamber 21 and
60 chamber 20 of cylinder 14 is established by means of a slot-like aperture 26 in the wall of cylinder 14, near the top of chamber 21 and spaced somewhat above aperture 25. Consequently, on the down or suction stroke
65 of piston 15 the refrigerant or other gas will be drawn in from chamber 21 through opening 26 into chamber 20 and upon a compression stroke will be compressed therein and forced out through conduit 19 to the
70 condenser. Obviously upon the downward or suction stroke of piston 15 the vacuum thus created in chamber 20 will cause a corresponding vacuum to obtain in chamber 21, thus drawing the contents of conduit 24
75 in through the manifold 22 and into chamber 21.

The wall of casing 10 adjacent the lower side of chamber 21 is formed with an inclined restricted opening or passageway 27,
80 the walls 28 of chamber 21 adjacent thereto being inclined and merging into the passageway 27. This passageway affords communication between chamber 21 and the interior of casing 10 wherein lubricating oil is contained. The casing 10
85 is provided, adjacent passageway 27, with a downwardly projecting lug or projection 29 forming a baffle wall which is spaced from the wall of casing 10 around lower end of
90 passage 27 so as to form therearound an inverted cup-like depression 30.

In practice a certain percent of the lubricant contained in casing 10 becomes mixed or intermingles with the refrigerating medium and is pumped by the compressor through the refrigerating system. While
95 this cannot be very easily avoided it has been found to be unobjectionable and in fact desirable, if the amount of lubricant thus distributed around through the refrigerating system can be curtailed or restricted.
100 If, as has heretofore been the practice, no means are provided for separating this lubricant from the refrigerating medium during
105 operation, the lubricant will accumulate in

the system, and particularly in the expansion coil and prove objectionable.

In accordance with this present invention, however, the refrigerant containing a certain per cent of the lubricant which is drawn into chamber 21 upon the suction stroke of the pump is separated from the lubricant suspended therein in the chamber 21. This occurs because of the greater specific gravity of the oil, which upon entering chamber 21 is not sufficiently suspended by the refrigerant to be drawn upwardly and through aperture 26 into chamber 20, but on the other hand, falls in chamber 21, flowing on to and being collected by the inclined walls 28 and passing through passage 27 into crank case 10. This action is accentuated by a miniature intermittent vacuum set up by the agitation of the oil in crank case 10 caused by rotation of fly wheel 11. This fly wheel rotates in the direction of the arrows in Fig. 1 and consequently agitates and displaces the oil in a similar circular movement, throwing the same against baffle wall 29 and across the mouth of recess 30. This action of the oil creates in this recess and in the passage 27 the intermittent vacuum before referred to and assists in causing the oil collected in the bottom of the chamber 21 to flow downwardly and into crank case 10.

In practice it has also been found that refrigerant, particularly during an idle period of the refrigerating unit, accumulates in the crank case 10 and is confined therein because of its being mixed or intermingled with the lubricant therein contained. With the present invention, this refrigerant is liberated when the compressor is again set into operation and is permitted to pass upwardly through passage 27, into chamber 21 and from there through port 26 to chamber 20. The refrigerant is held captive by the lubricant in the form of molecules, which, during the initial operation of the refrigerating unit, after a period of idleness, are broken up and the refrigerant thereby liberated, in which condition it escapes upwardly through the passage 27 in the manner aforesaid. By making the passage way 27 of a restricted cross sectional area the oil is not carried upwardly therethrough but is retarded by engagement with the wall of the passageway, the greater specific gravity of the oil and the frictional resistance set up by the wall of the passageway holding the oil within the crank case 10 while permitting an escape of the refrigerant.

From the foregoing it will be readily apparent that with a pump constructed in accordance with this invention, the greater part of the lubricant suspended in the refrigerant and being pumped through the refrigerating system is arrested as it enters chamber 21 at the pump and is separated from the refrigerant which is permitted to flow on to

the pump cylinder, while the arrested lubricant is collected and conducted back into the crank case of the pump. Furthermore, the refrigerant trapped by the lubricant in the crank case after a period of idleness of the refrigerating unit, is liberated and permitted to escape to join the refrigerant in circulation, while the lubricant which had entrapped the same is retained within the crank case.

Obviously the objects and advantages of this invention will obtain irrespective of the character of the refrigerating apparatus or of the particular design of the compressor pump, and consequently reservation is made to make such changes in the details of construction and in the manner of association as may come within the purview of the accompanying claims.

What I claim as my invention is:

1. The combination with a pump, of a lubricant arresting chamber interposed between the intake manifold and pump cylinder thereof, the wall of said chamber being provided with a relatively restricted passage connecting said chamber with the interior of the crank case of the pump, and a baffle arranged within said crank case adjacent the end of said passage, as and for the purpose set forth.

2. A pump formed with a crank case, a pump cylinder, and a chamber communicating therewith and constituting part of an intake manifold, said chamber communicating with said crank case by means of a passageway, and a baffle wall adjacent the end of said passageway.

3. The combination with a pump having a crank case, cylinder and an intake manifold, of a lubricant arresting chamber interposed between the intake manifold and pump cylinder, the bottom wall of said chamber being provided with a fluid collecting well having oppositely inclined walls communicating with a relatively restricted passageway connecting said chamber with the interior of the crank case, for the purposes set forth.

4. The combination with a pump provided with a crank case, cylinder, and intake manifold, of a lubricant arresting chamber interposed between the intake manifold and cylinder, the wall of said chamber being provided with a relatively restricted passage connecting said chamber with the interior of said crank case, and a baffle projecting downwardly from one wall of said crank case adjacent said passage forming an inverted cup-like depression, for the purposes set forth.

5. The combination with a pump having a crank case, cylinder and an intake manifold, of a lubricant arresting chamber interposed between the intake manifold and the pump cylinder, and means for withdrawing

the lubricant from the said lubricant arresting chamber, said means including a passageway between the lubricant arresting chamber and the crank case, a baffle within
5 the crank case, and means cooperating with the said baffle for establishing an intermittent vacuum in the said passage.

6. The combination with a pump having a crank case, cylinder and an intake manifold,
10 of a lubricant arresting chamber arranged entirely above the said crank case and interposed between the said intake manifold and the pump cylinder, the said lubricant arresting chamber being provided with a depression on the inner face of its bottom wall, and
15 a passage extending from the base of the said

depression to the crank case opening into the crank case at a point adjacent the top thereof.

7. The combination with a pump, of a lubricant arresting chamber interposed between the intake manifold and pump cylinder thereof, one wall of said chamber being provided with a relatively restricted passageway connecting said chamber with the
20 interior of the crank case, and means upon one wall of the chamber and positioned adjacent one end of said passage for preventing the lubricant contained within said case from entering said chamber.
25

In testimony whereof I affix my signature.
30

FRED J. HEIDEMAN.