April 10, 1928.

1,665,871

J. J. WOOD

REFRIGERATING MACHINE

Filed Feb. 10, 1926

Fig. 1.

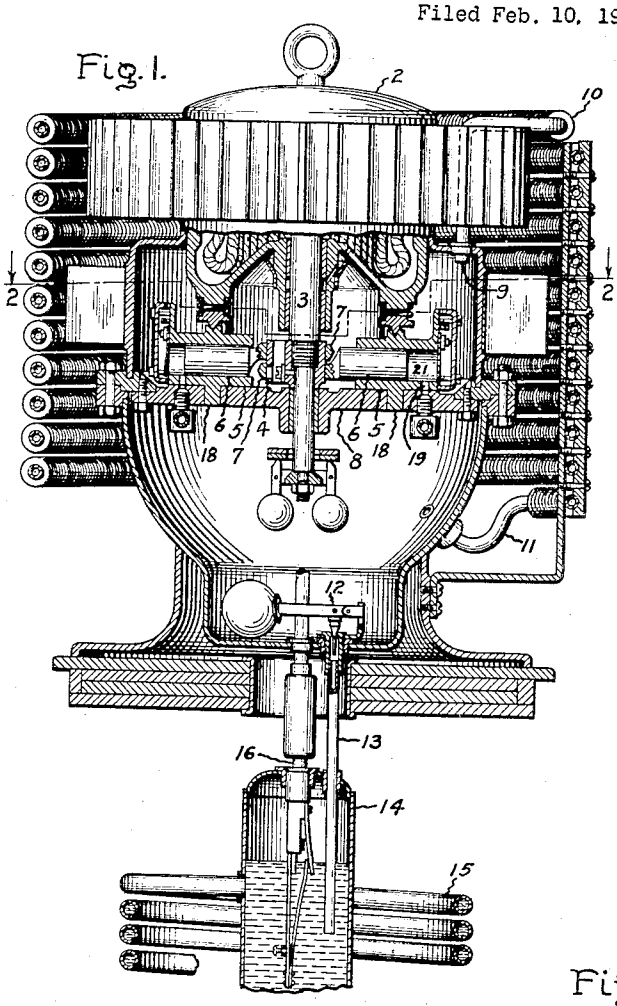


Fig. 3.

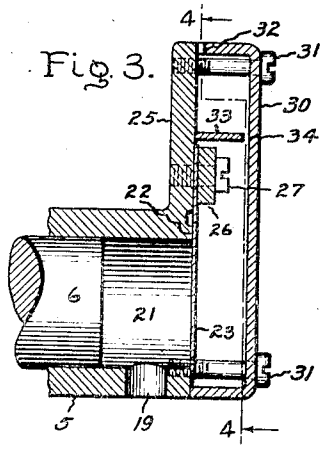


Fig. 4.

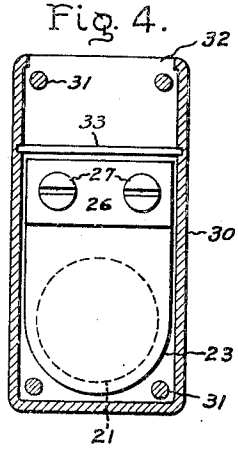
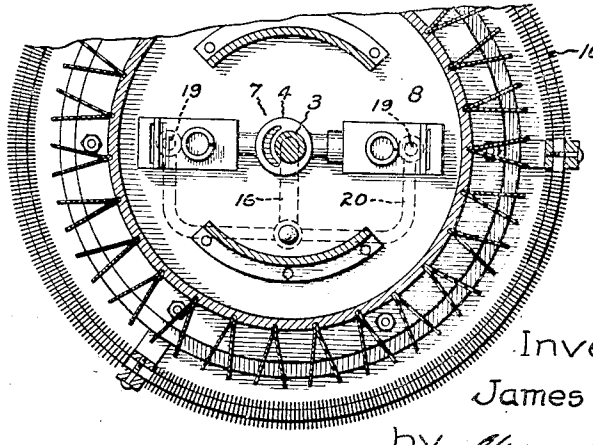


Fig. 2.



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UNITED STATES PATENT OFFICE.

JAMES J. WOOD, OF FORT WAYNE, INDIANA, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

REFRIGERATING MACHINE.

Application filed February 10, 1926. Serial No. 87,400.

My invention relates to refrigerating machines of the type in which in the operation of the machine the refrigerant is caused to undergo a cycle of operations, one of which is the compression of the refrigerant while in the vaporized or gaseous form. More particularly my invention relates to the means by which the compression of the vaporized refrigerant is effected.

In certain refrigerating machines as heretofore constructed there have been the objections that the volumetric efficiency of the compressor was comparatively low due to the relatively large clearance volume thereof, that the exhaust valves failed to provide a sufficiently free discharge passage for such oil as was drawn up into the compressor cylinder, that the velocity of the discharged gas and the lift of the exhaust valves were relatively great and that the exhaust was noisy. An object of my invention therefore is to provide an improved refrigerating machine in which these objections are to a large extent, if not entirely, removed.

My invention will be better understood from the following description taken in connection with the accompanying drawing, and its scope will be pointed out in the appended claims.

Referring to the drawing, Fig. 1 is a vertical section of a refrigerating machine embodying my invention; Fig. 2 is a transverse section of the same taken on the line 2—2 of Fig. 1; Fig. 3 is a fragmentary view on a large scale of a part of the compressor and the muffler therefor, and Fig. 4 is a section taken on line 4—4 of Fig. 3.

In the drawing, Figs. 1 and 2 show a refrigerating machine of the form disclosed in the copending application of Clark Orr, Serial No. 756,336, filed December 16, 1924, and assigned to the same assignee as the present application. This machine comprises an enclosing casing 1 having in its upper portion an electric motor 2 driving a shaft 3 on which is an eccentric 4. Two oscillatably mounted cylinders 5 comprising the compressor have their pistons 6 operated by straps 7 on the eccentric 4. The cylinders exhaust into the casing 1 above the partition 8 whence the compressed vaporized refrigerant enters the intake 9 of the condensing coil 10 from which liquid refrigerant flows into the lower portion of the casing 1 through pipe 11. The float valve 12 governs the flow of the liquid refrigerant through pipe 13 to the evaporator 14, in the coil 15 of which it is vaporized by the absorption of heat from the surrounding medium. The intake ports of the compressor cylinders 5 are connected with the evaporator 14 by the pipe 16 whereby the vaporized refrigerant is drawn up into the compressor.

Each cylinder 5 is mounted upon a trunnion 18 so as to oscillate and in so doing to open and close the intake ports 19 which ports connect by the branch pipes 20 with the suction pipe 16. Each cylinder has a uniform bore 21 and the outer end of each constitutes an exhaust valve seat 22 which is engaged by the valve 23. This valve comprises a thin flat plate preferably of spring steel having an extension on one side by which it is clamped to the projection 25 on the end of the cylinder by the plate 26 and screws 27. By thus making the exhaust port the full size of the cylinder bore and causing the valve to directly engage the end of the cylinder as a valve seat, the clearance volume is reduced to a minimum, hence raising the volumetric efficiency of the pump; the greatest freedom of discharge is provided for the compressed gas and for any oil that is drawn up with the gas; and there results a minimum velocity of the discharged gas with a minimum movement of the valve.

In order to reduce the noise of the exhaust and of the valve, I have provided a muffler 30 comprising a sheet metal casing which is secured by the screws 31 to the cylinder 5 and its extension 25. The muffler is shown having a cut-away portion 32 at its upper end forming an outlet and at an intermediate portion having a transverse partition 33. This partition divides the casing into two chambers but as illustrated the partition does not extend entirely across the casing, a small opening 34 being left for the passage of gas from the lower to the upper chamber. Under certain circumstances it may be found preferable to have the partition extend entirely across the casing and provide it with a number of holes for the passage of gas. It has been found that relatively small changes in the size of the passage or passages 34 between the chambers and in the size of the outlet passage 32 produce marked changes in the effectiveness of

the muffler, there being a direct relation with a given muffler between these openings and the speed of the driving motor.

While I have described only one embodiment of my invention, I do not wish to be limited to the particular form shown and described as it will be apparent that many modifications therein may be made without departing from the scope of my invention as set forth in the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. A refrigerating machine having a compressor comprising an oscillatable cylinder, an exhaust valve seated on the end of the cylinder, and a combined muffler box and valve enclosing housing secured to the cylinder around the valve, said box having a discharge opening arranged adjacent the cylinder.

2. A refrigerating machine having a compressor comprising an oscillatable cylinder, an exhaust valve seated on the end of the cylinder, a rectangular muffler box enclosing said valve, means at the corners of the box for securing it to the cylinder, said muffler box having a discharge opening adjacent the cylinder.

3. A refrigerating machine having a compressor comprising an oscillatable cylinder, a flap exhaust valve therefor comprising a thin metal plate seated against the end of the cylinder, means for securing the plate to the cylinder and a combined muffler and valve housing comprising a box-like member having a discharge opening adjacent the cylinder and having a partition extending partially thereacross arranged between the valve and the discharge opening.

In witness whereof, I have hereunto set my hand this 8 day of February, 1926.

JAMES J. WOOD.