Dec. 29, 1931. H. B. HULL 1,838,259

PUMP FOR REFRIGERATING APPARATUS

Filed June 30, 1928 2 Sheets-Sheet 1

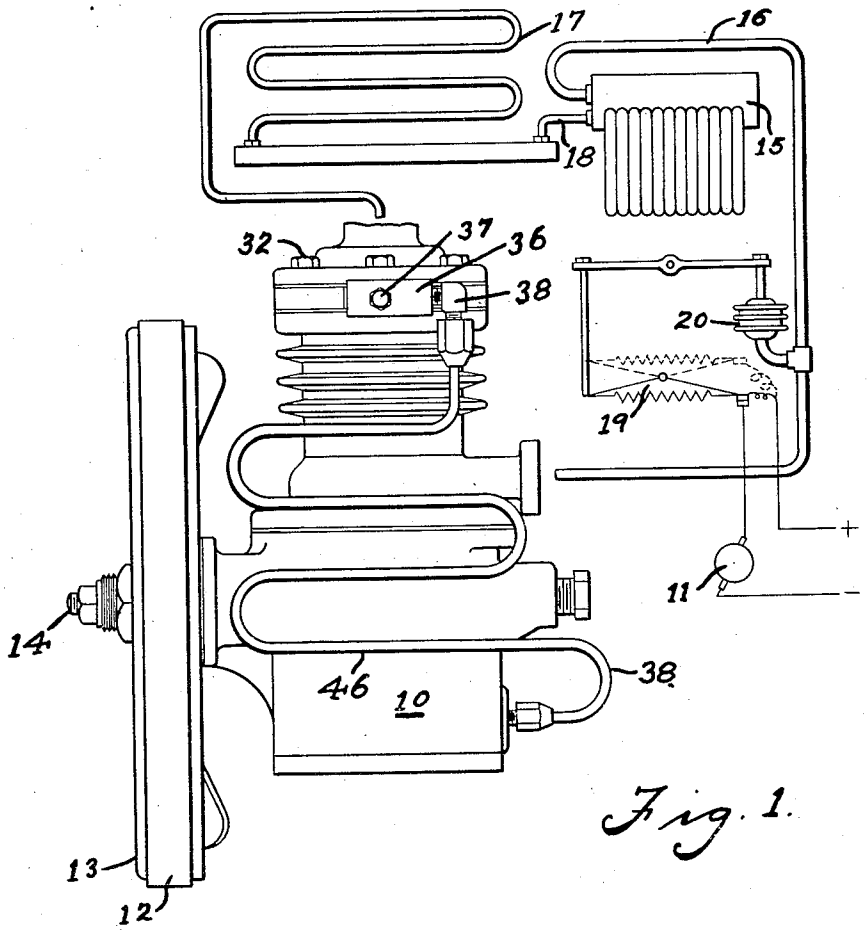


Fig. 1.

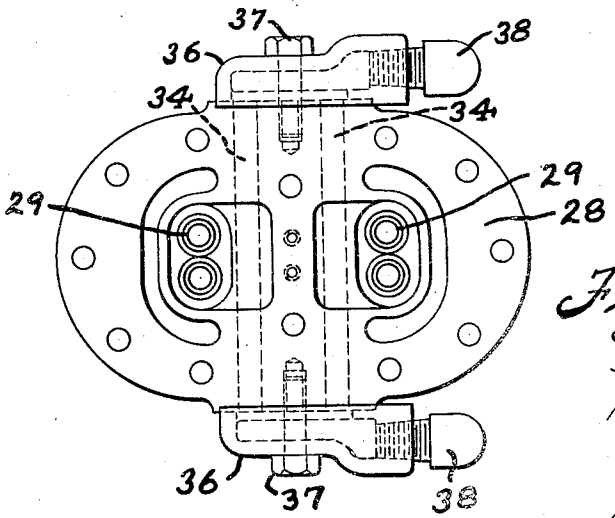


Fig. 3.

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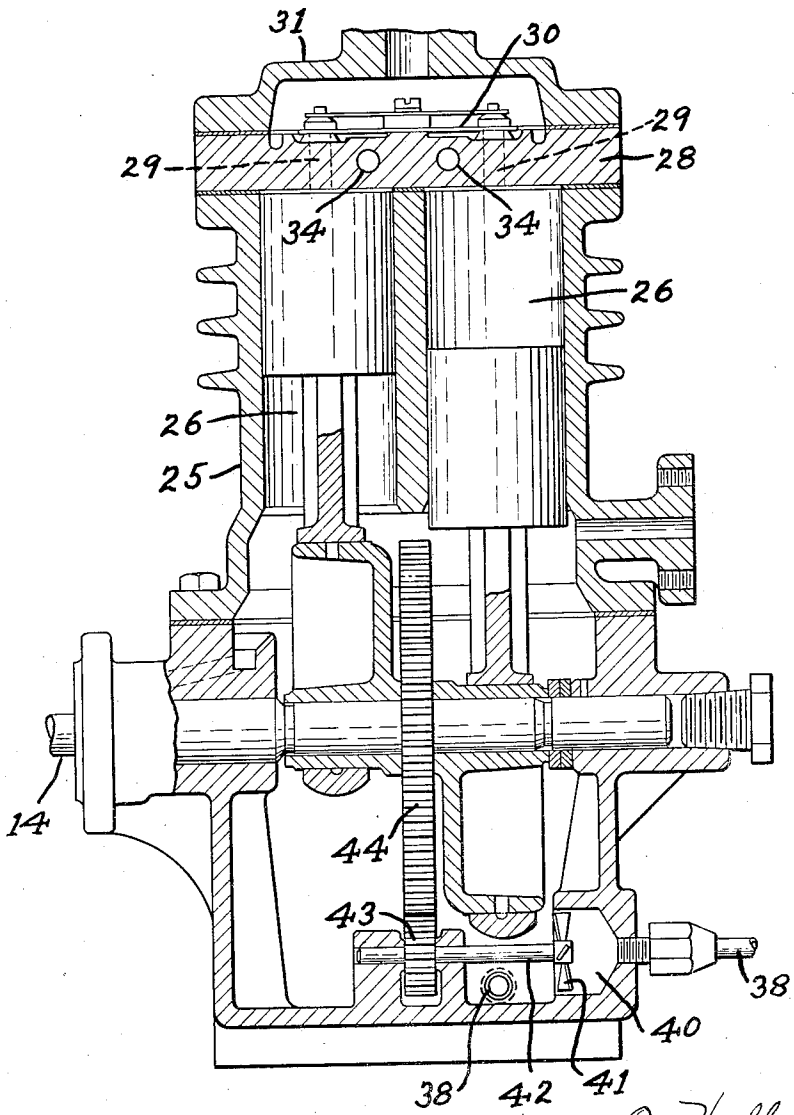


Fig. 2.

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UNITED STATES PATENT OFFICE

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PUMP FOR REFRIGERATING APPARATUS

Application filed June 30, 1928. Serial No. 289,546.

This invention relates to refrigerating apparatus and particularly to a novel construction of compressors and their arrangement in such apparatus.

It is an object of the invention to provide improved means for cooling the working cylinder of the compressor, particularly for cooling the compressor head.

More specifically it is an object to provide a fluid circuit, separate from the refrigerant for cooling the compressor head.

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 shows a side elevation of a compressor embodying the invention, the refrigerating system to which it is attached being indicated diagrammatically;

Fig. 2 is an enlarged sectional view of the compressor; and

Fig. 3 is a top plan of the compressor head.

Refrigerating compressors are commonly provided with a flywheel into which is built a fan for circulating cooling air over the apparatus, particularly the condenser with which the compressor is used, and the body of the compressor itself. Compressors of this type heretofore used are not wholly satisfactory because the parts which need cooling the most are apt to be cooled the least, that is the hottest part is the cylinder head which is inside the compressor structure and cannot be reached by the air which blows over the compressor body. Such compressors are ordinarily lubricated by the splash system, a quantity of oil being placed in the crankcase and splashed over the working parts by their movement.

It is one of the objects of this invention to utilize the oil in the crankcase for cooling parts of the compressor which are not cooled by the circulating air.

Referring to Fig. 1 the compressor 10 is driven by a motor 11 through a belt 12 running over a flywheel fan 13 attached to the crankshaft 14. The compressor withdraws gaseous refrigerant from an evaporator 15 through a vapor conduit 16, compresses the refrigerant and delivers it to a condenser 17, cooled by any suitable means, usually the fan 13 to liquefy the vapor. The liquid flows through a liquid conduit 18 back to the evaporator. The compressor is operated in response to the refrigerating demand of the evaporator by means of a switch 19 actuated by a metal bellows 20 in response to the pressure in the vapor conduit. The apparatus thus far described is well-known in the art and its particular form is immaterial to the present invention.

Referring particularly to Fig. 2 the main body 25 of the compressor has a crankcase 24 provided with a refrigerant vapor inlet connection 25 and two cylinders 26 which are provided with a member or plate 28 which is removably secured to the cylinder body and forms the head of both cylinders. This plate is provided with a discharge opening 29 for each cylinder and carries a check or discharge valve 30 cooperating with each of the discharge openings. The plate or cylinder head is preferably clamped to the cylinder body by the superposed compressor head 31 which forms the discharge chamber for the compressor, and which in turn is secured to the compressor body by bolts 32. The cylinder head is provided with passageways 34, there being preferably a passageway disposed opposite each cylinder. These passageways may be of any desired shape and may be formed by drilling through the valve plate or by cores inserted during casting or in any other suitable manner. As shown for the sake of illustration herein, the passages are simply holes drilled through the compressor head. When so formed the passages pass through the cylinder head as close to the center of the cylinder as the discharge opening will permit in order to cool the cylinder head as uniformly as possible. A manifold 36 is attached to each edge of the compressor head by a screw 37 to form a connection between the passageways and conduits 38 which are connected to the crankcase.

The crankcase contains any suitable pump operated by the compressor for circulating

oil from the crankcase reservoir. This is illustrated as a cylindrical bore 40 in which is disposed an impeller 41 mounted on a shaft 42 rotated by a gear 43 meshing with a gear 44 keyed to the crankshaft 14. The conduits 38 include one or more coolers 46 placed in the path of air moved by the fan. The coolers may be conveniently formed by forming the tubing into loops of considerable length placed parallel to the direction of the air currents. A cooler is placed between the outlet side of the compressor head, and if desired another may be placed on the intake side in case the oil in the crankcase is too warm to cool the head.

It will be evident that whenever the compressor is running oil is circulated from the crankcase through the compressor head and through the coolers. Thus the apparatus not only cools the compressor head and thus reduces the condensing pressure, or the head against which the compressor operates, but also cools the oil in the crankcase which lubricates the moving parts and prevents this oil from becoming too thin to lubricate properly.

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. A compressor comprising in combination a crankcase, a cylinder, a cylinder head, a fan, a cooling device in the path of air moved by the fan, and means for circulating oil from the crankcase in heat absorbing relation with the cylinder head and through the cooling device.

2. A compressor comprising in combination a cylinder body, a removable member forming a head for the cylinder and having a discharge opening, a discharge valve carried by the member and cooperating with the opening, said member having one or more passages adjacent said discharge opening for circulating cooling medium.

3. A compressor comprising in combination a body having a plurality of cylinders, a removable member forming a head for the cylinders and having a discharge opening for each cylinder, discharge valves cooperating with the openings and carried by the member, said member having a passage disposed opposite each cylinder.

4. A compressor comprising in combination a cylinder body, a removable member forming a head for the cylinder and having a discharge opening, a valve seat surrounding said opening, a discharge valve carried by the member and cooperating with the seat, said member having one or more passages therein disposed adjacent the seat for circulating cooling medium.

5. A compressor comprising in combination a body having a plurality of cylinders, a removable member forming a head for said cylinders and having a discharge opening opposite each cylinder, a valve seat surrounding each opening, discharge valves carried by the member and cooperating with the seats, said member having a passage therein disposed adjacent each seat for circulating cooling medium.

6. In a compressor, a cylinder head having one or more passages therethrough and means for cooling the cylinder head, said means comprising a closed fluid circuit including cooling means connected in series with said passage or passages, and means actuated by the compressor for positively circulating cooling fluid through the circuit.

7. A compressor comprising in combination a cylinder, a crankcase, a cooling device, and means for circulating lubricant from the crankcase in heat absorbing relation with the head of the cylinder and through the device.

8. A compressor comprising in combination a crankcase, a cylinder and a fan, and means for circulating lubricant in a circuit from the crankcase into heat absorbing relation with a wall of the cylinder, said circuit having a portion thereof in the path of air moved by the fan.

9. A compressor comprising in combination a crankcase, a cylinder and means for circulating cooling medium to cool the cylinder, and means for circulating lubricant in a circuit from the crankcase in heat absorbing relation with the interior of the compressor head and with the cooling medium.

In testimony whereof I hereto affix my signature.

HARRY B. HULL.