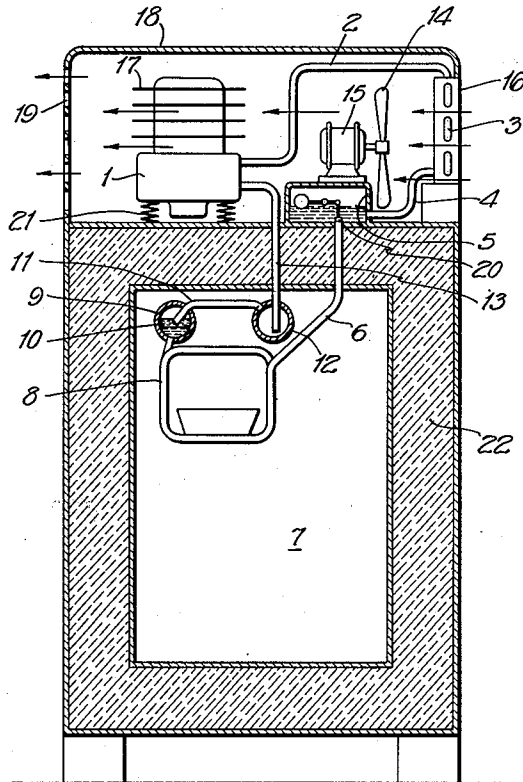


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R. HINTZE

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REFRIGERATING APPARATUS OF THE COMPRESSION TYPE, AND
PARTICULARLY TO AN IMPROVED EVAPORATOR THEREFOR
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RUDOLF HINTZE.
INVENTOR.

BY

Knight Bny

ATTORNEYS.

UNITED STATES PATENT OFFICE

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REFRIGERATING APPARATUS OF THE COMPRESSION TYPE, AND PARTICULARLY TO AN IMPROVED EVAPORATOR THEREFOR

Rudolf Hintze, Berlin-Charlottenburg, Germany,
 assignor to Patentverwertungs-Gesellschaft
 mit beschränkter Haftung "Hermes," Berlin,
 Germany, a corporation of Germany

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The invention relates to improvements in refrigerating apparatus of the compression type, and particularly to an improved evaporator therefor.

5 In evaporators for refrigerating apparatus of the compression type a great number of parallel-connected conduits are often employed, which are flooded by the refrigerant. In this case the outer surface of the individual parallel-connected conduits is in direct heat exchange with the air in the cooling chamber so that the liquid refrigerant evaporates in the parallel-connected conduits and thence passes into one or more collecting tanks or headers which are connected with a suction conduit leading to the compressor. Such a flooded evaporator system does not ensure that all of the parallel-connected conduits operate as desired. The evaporation in some of them may be partly or fully prevented, for instance, as a result of a clogging with particles of the lubricant which reach the evaporator. It therefore is difficult to attain or maintain the desired refrigerating capacity. These difficulties cannot occur in refrigerating apparatus whose evaporator is constructed according to the so-called dry system. Such an evaporator consists substantially of a continuous coil without branches, so that the refrigerant follows only one path in the evaporator and, consequently, the lubricant passing into the evaporator may be collected in a collecting tank communicating with one end of the evaporator coil.

15 The invention concerns itself with refrigerating apparatus of the compression type in which the supply of the liquid refrigerant to the evaporator is regulated by a float-controlled valve arranged at the high-pressure side exteriorly of the cooling chamber. According to the invention a single branchless conduit is employed as an evaporator and is so arranged that it communicates with the float-controlled valve and with the bottom of a collecting container or header to which is connected a suction conduit at such a height that the vaporous refrigerant and the lubricant entrained into the evaporator conduit is drawn off by this suction conduit.

20 The above-mentioned difficulties encountered in the known flooded evaporator systems with a plurality of parallel-connected evaporator conduits, are prevented in refrigerating apparatus according to the invention, since the lubricant entrained into the evaporator coil is constrainedly forced by the refrigerant to flow into the collecting container or header, whence it is drawn

off to the compressor owing to the particular arrangement of the suction conduit. The connection of the evaporator coil with the lowest point of the collecting header is particularly advantageous, since in this manner the evaporator coil may always be supplied with a sufficient reserve of liquid refrigerant from the header. The evaporator system according to the invention thus represents a hybrid of the above-mentioned dry and flooded systems and has the advantages of both without incurring their disadvantages.

25 The collecting container communicating with the evaporator coil is preferably designed in the form of a horizontal cylindrical tank. It is particularly advantageous if the suction conduit connected with this tank does not extend directly to the compressor but if a second container intercepting the conduit is arranged in the cooling chamber. This second container represents an additional evaporator. If, namely, liquid refrigerant is entrained with the lubricant from the first collecting container, this liquid refrigerant is caused in the second container to evaporate and to take up heat from the cooling chamber. This function of the two collecting containers requires that their cross sections be considerably larger than those of the conduits connected therewith.

30 In the accompanying drawing is shown an embodiment of the invention in diagrammatic form. 1 denotes the motor-compressor set consisting of a sealed unit and supported by coil springs 21 on the top of the heat-insulating enclosure 22 of the cooling chamber 7. A pressure conduit 2 extends from the compressor to the air-cooled condenser 3. The liquefied refrigerant flows through a conduit 4 into a container 5 arranged exteriorly of the cooling chamber and enclosing a float-controlled valve 20. An evaporator conduit 8 consisting of a coil formed of a single, branchless conduit is arranged within the cooling chamber 7 and, through an extension 6, communicates with the float valve 20. The coil 8 is connected with the bottom of a container 9. This container consists of a horizontal, cylindric vessel and serves as a collecting tank for the liquid refrigerant as well as for the lubricant entrained into the evaporator. The lubricant 10 which is specifically lighter than the liquid refrigerant collects on the surface of the refrigerant contained in the tank 9. From the interior of the tank 9 extends a connecting conduit 11 to a second container 12 of similar shape and arrangement

serving also as an evaporator. A suction conduit 13 communicating with the second container 12 extends to the compressor. The motor-compressor set 1 and the condenser 3 are cooled by a fan 14 driven by an electric motor 15 mounted on the casing 5 of the float-controlled valve 20. The fan draws the cooling air over the heat-exchange ribs 16 of the condenser and the cooling ribs 17 of the motor-compressor set in the direction as indicated by the arrows.

The liquid refrigerant flowing from the condenser 3 through the float-controlled valve 20 fills up the evaporator coil 8 and also the collecting container 9 to a certain extent. The refrigerant evaporated in the coil 8 collects in the tank 9, whence it is drawn off by the conduits 11 and 13. The liquid refrigerant filling the tank 9, for instance up to the level shown, constitutes a useful refrigerant reserve so that sufficient quantities of liquid refrigerant are always available in the evaporator coil also in cases where great cooling effects are required in the cooling chamber. The refrigerant entrained with the lubricant through the conduit 11 first passes into the container 12 where the liquid refrigerant entrained along with the lubricant is evaporated owing to the heat exchange of this container with the air of the cooling chamber. In this manner unevaporated refrigerant is prevented from being drawn back into the compressor 1.

Instead of employing an evaporator conduit 8 consisting of a pipe as shown in the drawing, the evaporator system may also be constructed in any other suitable manner, for instance, from two sheet metal plates placed flat against each other and having registering indentations or depressions forming a continuous refrigerant conduit.

What is claimed is:

1. In a refrigerator of the compression type having a cooling chamber and a motor-driven compressor, a condenser and a float-controlled valve series-connected by refrigerant conduits and arranged outside of said cooling chamber, the combination of a collecting container arranged in said cooling chamber, a single branch-

less evaporator conduit also arranged in said chamber, said evaporator conduit having one end communicating with said valve and the other end connected with the bottom of said collecting container so as to freely communicate with said container, a second container arranged in said cooling chamber, a connecting conduit disposed between said first and said second container so as to establish a free communication between said containers, said connecting conduit having one end opening into the upper portion of said second container and the opening of its other end above the bottom of said first container so as to draw the vaporous refrigerant and the entrained lubricant from said first to said second container, and a suction conduit extending to said compressor and having its opening in said second container disposed below that of said connecting conduit, the transverse cross sections of said containers being larger than those of said connecting conduit and said suction conduit.

2. In a refrigerator of the compression type having a cooling chamber and a motor-driven compressor, a condenser and a float-controlled valve series-connected by refrigerant conduits and arranged outside of said cooling chamber, the combination of two containers of elongated shape arranged horizontally within said chamber, a single evaporator coil arranged below said containers and having one end communicating with said valve and the other end connected with the bottom of the first one of said containers, a connecting conduit forming a free communication between the upper portions of said containers and having a cross section smaller than those of said containers, said connecting conduit having its opening in said first container arranged at such height above the bottom of said first container as to lead off vaporous refrigerant and entrained lubricant, and a suction conduit extending to said compressor and having its opening in said second container disposed below that of said connecting conduit, said suction conduit having a cross section smaller than those of said containers.

RUDOLF HINTZE.