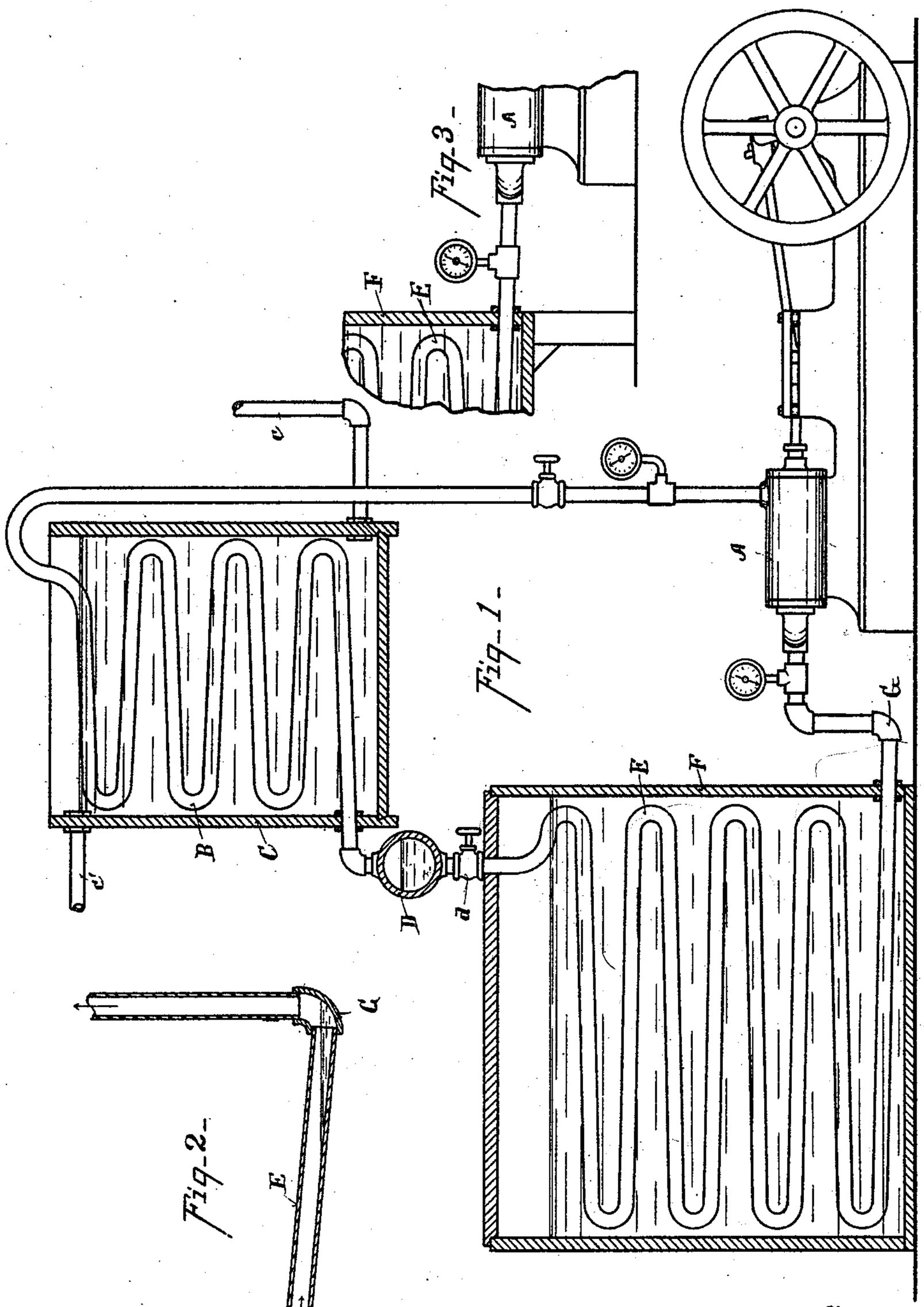
(No Model.)

S. S. & C. W. MILES.

PROCESS OF LUBRICATING REFRIGERATING MACHINES.

No. 525,224. Patented Aug. 28, 1894.



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STEPHEN S. MILES AND CASPER W. MILES, OF CINCINNATI, OHIO.

PROCESS OF LUBRICATING REFRIGERATING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 525,224, dated August 28, 1894.

Application filed August 27, 1892. Serial No. 444,320. (No specimens.)

To all whom it may concern:

Be it known that we, STEPHEN S. MILES and CASPER W. MILES, citizens of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Processes of Lubricating Refrigerating-Machines, of which the following is a specification.

Our invention relates to an improved process of lubricating refrigerating machines. Its object is to secure an automatic circulation and constant feed of oil to the compressor to lubricate the operative parts and seal the valves and stuffing boxes.

In the accompanying drawings forming part of this specification, Figure 1, represents a diagram of the compressor and system of condensing and refrigerating pipes. Fig. 2, is a detail of a section of the pipe. Fig. 3, is a detail modification of Fig. 1.

A represents the compressor pump, which may be of any approved pattern.

B represents a system of condensing pipes submerged in tank C of cooling water.

c represents the water supply pipe, and *c'* the overflow.

D represents a receiver into which the liquefied gas flows from the condenser.

d is the expansion valve.

E represents the system of refrigerating pipes, preferably submerged in a tank of brine F.

The system of pipes B, E, are arranged preferably so as to present a continuous incline so that the pipes B drain the products of condensation into the receptacle D, and the pipes E drain any liquid to a point G near the pump intake.

The condenser is preferably raised above the level of the refrigerating tank; this is not necessary however as the pressure in the condensing coil will force the liquefied gas from the receiver D to a sufficient height to discharge it at the top of the refrigerating tank, when they are both set upon the same level.

The process of lubricating the compressor consists in charging the receiver D with a mixture of liquefied gas, preferably sulphurous oxide and a light hydro-carbon oil, say from one half per cent. to five per-cent. of oil. The proportions may be varied however according to the demands of different compressors. The oil used is preferably a pure petroleum oil sufficiently light so that it will not congeal at the temperature of the expanding gas in the refrigerator pipes. In practice we have found an oil of specific gravity 0.860 to answer the purpose.

The operation is as follows: The receiver D is charged with the mixed liquefied gas and oil in the proper proportions (a small percentage of oil readily forming a mechanical mixture with the liquefied gas), the pump is started and the expansion valve opened. As the mixture of gas and oil is discharged into the refrigerating pipes, the gas vaporizes while the oil is deposited in a liquid form upon the inside of the pipe. The oil slowly flows, or is forced by the current of vaporized gas down the incline of the pipe, and accumulates at a point G, as indicated in Fig. 2, from whence it is forced on to the pump by the rapid current of the vapor or gas on its way to the compressor.

In practice we have found the current of expanded vapor or gas sufficient to carry the oil through the refrigerating pipes whether constructed on an incline or not, but the form shown is preferable where, by reason of a number of separate pipes E being employed, the force of the current is not sufficient to carry the oil along the pipes. If preferred the incline of the refrigerating pipes E may be maintained all the way to the intake of the compressor either by raising the refrigerating tank to the level of the pump intake, or by placing the pump on a lower level as indicated in Fig. 3.

The oil and gas pass into the compressor, one as a liquid and the other a gas, and at a very low temperature. Under the action of the compressor, however, the temperature of the gas is raised, and being gradually imparted to the small body of oil accumulated upon the pressure side of the pump vaporizes a portion of it at each stroke of the pump, while fresh cool oil from the opposite end of the pump takes its place, thus sufficient oil is maintained in the pump to lubricate it and for sealing purposes, while the excess is vaporized and passes with the compressed gas to the condenser where both oil and gas are condensed to a combined liquid and pass to

the receiver to be again used in the refrigerator.

The process herein described is distinguished from that in which a non-volatile liquid is used in connection with a volatile liquid, such as glycerine in connection with ammonia in which the glycerine is used to absorb and condense the refrigerant.

We use sulphurous oxide and a volatile oil which are refrigerating liquids of different densities, the hydrocarbon condensing in the refrigerator at the working temperature and passing through the refrigerating coils without congealing or interfering with the passage of the gas, entering the pump while at a low temperature, and yet vaporizing and passing to the condenser with the gas. Thus only a small percentage of lubricant is employed, and it entirely obviates the necessity of traps as its presence does not interfere with the process of refrigeration while the machine may be run continuously without over heating the pump, or obstructing the passage of the gas.

The advantages of oil in compressor are two fold, first it lubricates the plunger and piston rods, second it seals the valves and stuffing boxes.

By means of our process a steady flow of a small amount of oil is automatically obtained, depending upon the work done by the compressor, and requiring no care or attention.

We claim—

1. The process of lubricating refrigerating compressors, which consists in mixing sulphurous oxide with a light non-congealing hydrocarbon oil, passing the mixture through a suitable expansion chamber, and then using the chilled oil as a lubricant in the compressor until it becomes heated, volatilized and carried with the oxide to the condenser and used again, substantially as specified.

2. The process of lubricating refrigerating machines, which consists in mixing with the refrigerant a sufficient quantity of light hydrocarbon oil to serve the purpose of lubrication, passing said mixture to a suitable expanding chamber, utilizing the oil at low temperature as a lubricant in the compressor, and then as it volatilizes passing the same together with the refrigerant to the condenser where the two are recondensed to be used again, substantially as specified.

In testimony whereof we have hereunto set our hands.

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Witnesses:
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