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W. L. ECABERT

1,840,940

REFRIGERATION UNIT

Filed Oct. 13, 1927

Fig. 2.

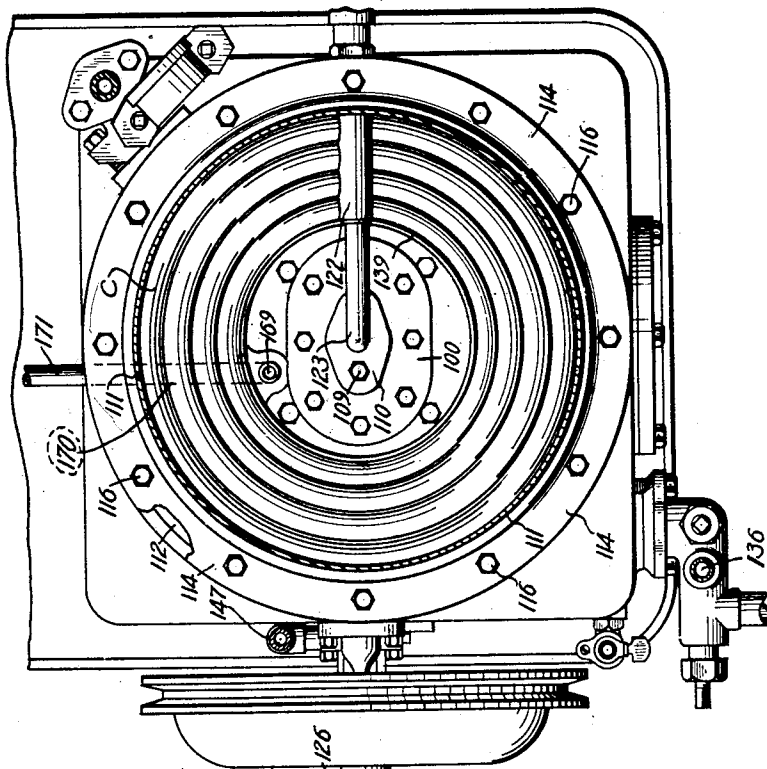


Fig. 1.

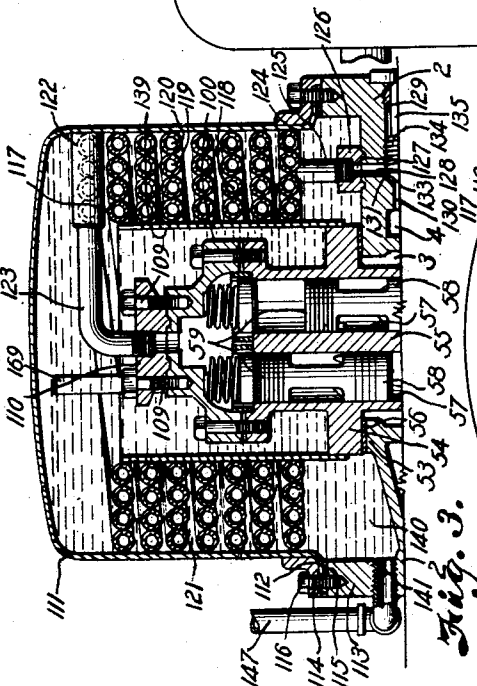
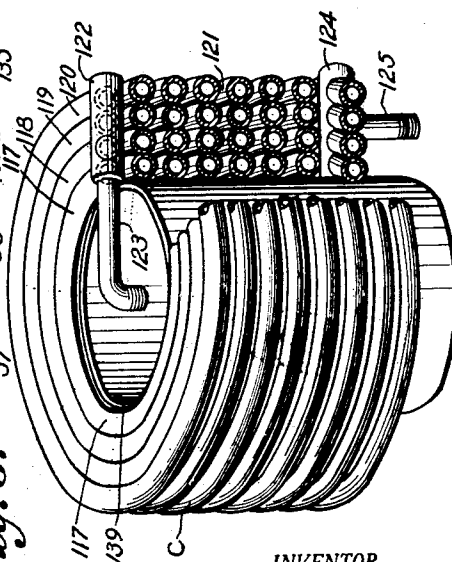


Fig. 3.



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REFRIGERATION UNIT

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My invention relates to refrigerating apparatus and has for its principal object to combine refrigerant-compressing, condensing and receiving elements of improved construction in a compact unit occupying a minimum of space but wherein the various elements are of ready access for inspection or repair.

In accomplishing this object I have provided improved details of structure, the preferred forms of which are illustrated in the accompanying drawings, wherein:

Fig. 1 is a central, vertical section of a condenser unit shown associated with the compressor head of a refrigerating unit.

Fig. 2 is a plan view of the unit, the condenser dome being in horizontal section.

Fig. 3 is an enlarged, detail perspective view of the condenser coil shown partly in section.

Referring more in detail to the drawings:

The invention consists chiefly in a condenser unit adapted to be associated with refrigerating apparatus for delivery of refrigerating fluid to the condenser, the apparatus (not shown in detail) being represented by a body member 2 preferably of cast metal and interiorly partitioned to form separate chambers as indicated at 3 and 4 for the crank of an operating shaft (not shown) and for condensed refrigerating liquid, the chamber 4 serving the purpose of a receiver common to refrigerating systems of this character.

Surrounding the upper end of the crank chamber is a seat 53 supporting the flange 54 of a cylinder block 55, a gasket 56 being interposed between the seat and flange to seal the crank chamber for a purpose presently apparent. The block 55 contains twin piston chambers 57 for the pistons 58, each of conventional double-trunk type having a suction valve (not shown) in its head 59 and connected with the crank shaft in the customary manner; the center of the piston being open to take refrigerant gas through suitable valved passages in the casing and the pistons being operable to discharge the gas into a coupling later described for movement to the condenser coils.

Adjustably mounted on the cylinder head 100 by means of bolts 109 is a fitting 110 for the coupling of a condenser coil housed within the dome 111 constituting the upper portion of the unit housing and preferably formed of drawn metal having an outturned flange 112 at its lower end seated on an extension 113 of the side wall of the body member 2 and held to said extension by a clamping ring 114 and bolts 116 which project through the clamping ring into the extension 113. A gasket 115 is also provided to secure a watertight joint between the housing body and dome.

The condenser coil which I employ is of improved form in that it consists of a series of concentric coils wound one within the other and welded together with the convolutions spaced to provide a helical passageway for cooling liquid from one end of the composite coil to the other, the present drawings illustrating four individual coils numbered 117, 118, 119 and 120, and together making up the composite coil C, with the convolutions of the composite coil spaced to provide the passageway 121. At their upper ends the individual coils terminate in a header 122 which is connected with the coupling 110 by a nipple 123, and at their lower ends in a manifold 124 which is connected with a coupling nipple 125 threaded into a mounting block 126 having a bore 127 communicating with a bore 128 in the top of the housing body and which in turn communicates through an opening 129 with a port 130 which is in open communication with the refrigerant chamber 4 in the housing body 2.

The port 130 has a valve seat 133 for a valve 131 which is threaded into the housing body at 134 and operable by the stem 135 to control flow of refrigerating fluid condensed in the coil C through the port 130 and into the receiver chamber 4.

The receiver chamber has outlet through a line 136 to the expansion coils of the apparatus employed in connection with the unit, but which is not illustrated as it forms no part of the present invention.

In order to restrict flow of the cooling liquid through the spiral passageways between

the convolutions of the condenser coil, I weld the outer individual coil 120 to the wall of the dome and provide the composite coil with a sleeve 139 which may be welded to the inner individual coil of the composite member, and is extended to fit over the flange 54 of the cylinder block and provide an annular chamber 140 for the composite coil.

Cooling liquid is admitted to the annular chamber 140 formed by the wall of the dome 111 and the sleeve 139 below the composite coil through a bore 141 in the extension 113 of the side wall of the housing body from a liquid supply pipe 147 that leads to the annular chamber from any suitable source of cooling liquid supply.

Level of the liquid within the condenser chamber is maintained through a drain pipe 169 having its open upper end located adjacent the top of the chamber to receive overflow from the chamber for outlet through the bore 170 in the top of the housing body and an outlet pipe 171 leading to waste or other disposition.

When a unit constructed and assembled as described is to be placed in operation, the crank chamber is supplied with oil and the valve controlling flow from the suction line opened to admit the refrigerant gas returned from the expansion coil to the compressor. When power is applied to the crank shaft, the pistons are reciprocated, drawing in gas from the suction line and passing it through the suction valves in the heads of the pistons into the cylinder chamber from which it is forced through the discharge valve into the composite condensing coil.

The apparatus may be arranged for control of the supply of cooling liquid, and when the apparatus is started in operation, valves (not shown) may be operated to permit inlet of cooling liquid to the coil chamber 140, so that as gas is pumped into the composite coil and forced downwardly through the convolutions thereof, the cooling liquid passed upwardly in counter flow through the spiral passageway between the convolutions of the coil, cools and condenses the gas so that it escapes from the lower header of the coil into the receiver chamber in liquid form ready for recirculation to the expansion coil.

What I claim and desire to secure by Letters Patent is:

In apparatus of the character described, a coil comprising a plurality of tubes including inner and outer coiled tubes arranged in concentric convolutions spaced to form a helical passageway, adjacent ones of said tubes having adjacent edges sealingly connected to provide an impervious helical track, means including a shell mounted in said coil and sealingly connected with said inner tube to close the inner side of said passageway and form a chamber in said coil having a drain outlet, a shell surrounding said coil and seal-

ingly connected with said outer tube to close the outer side of said passageway, said last named shell being extended to form a chamber above said coil communicating with said coil chamber and with said passageway, and means including extended portions of said shells forming an inlet to said passageway.

In testimony whereof I affix my signature.

WALTER L. ECABERT.