Sept. 1, 1931. D. F. NEWMAN 1,821,765

CONDENSER FOR REFRIGERATING SYSTEMS

Filed April 22, 1930

Fig. 1.

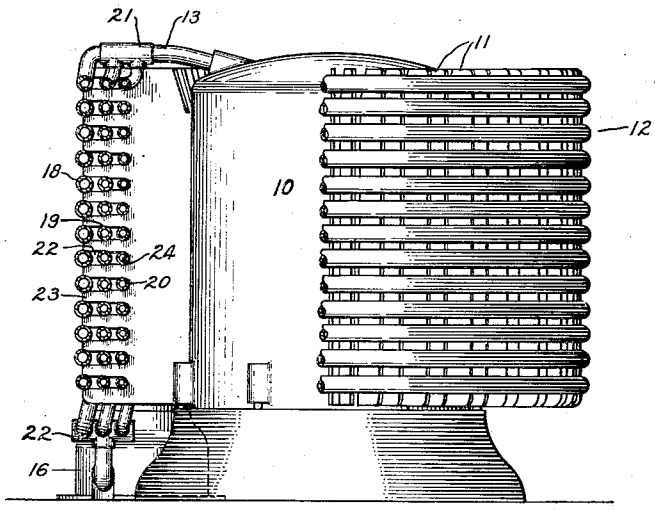



Fig. 2.

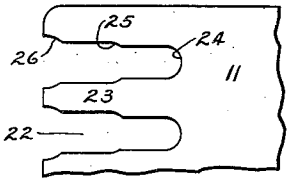
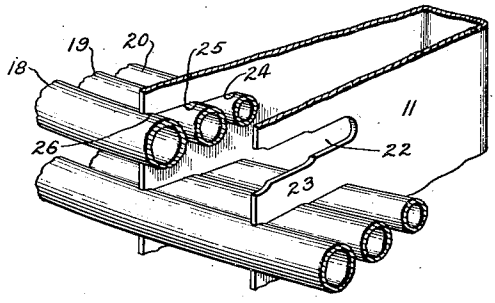



Fig. 3.



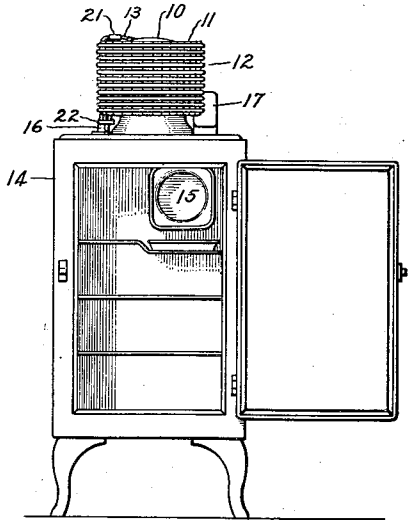




Fig. 4.

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# UNITED STATES PATENT OFFICE

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## CONDENSER FOR REFRIGERATING SYSTEMS

Application filed April 22, 1930. Serial No. 446,388.

My invention relates to condensers for refrigerating systems.

In manufacturing condensers for refrigerating systems it is often desirable to obtain a comparatively large cooling surface for the condenser in a compact space. One way of accomplishing this is to provide several conduits arranged in closely spaced relation, but this has been quite difficult to carry out in prior constructions because the supports for retaining the conduits in the desired relation made it inconvenient to assemble the construction.

The object of my invention is to provide a condenser including a plurality of conduits, in which the refrigerant is condensed, of such construction that the conduits can be readily arranged and supported in the desired spaced relation. I accomplish this by providing a condenser including a plurality of conduits and supports, which are spaced apart throughout their length, and which embrace groups of the conduits and retain them in spaced relation.

My invention will be more fully set forth in the following description referring to the accompanying drawings, and the features of novelty which characterize my invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

In the drawings, Fig. 1 is a front elevation of a compression refrigerating machine, partly broken away, having a condenser constructed in accordance with my invention; Fig. 2 is a detail view showing the construction of the slotted fins which I employ for supporting the condenser; Fig. 3 is a fragmentary perspective view of the fins and condenser conduits, and Fig. 4 is a front elevation of a refrigerator cabinet which is cooled by a refrigerating machine having my improved condenser.

Referring to the drawings, I have shown my invention in connection with a refrigerating machine of the compression type having a compression casing 10 in which a motor and compressor unit is mounted. A plurality of radially arranged cooling fins 11 are attached to the casing, and a condenser 12 is secured to the fins and arranged in spaced relation to the casing. The casing 10 receives the compressed refrigerant directly from the compressor arranged therein, and the compressed gas passes from the casing to the condenser through a connection 13. Raising the pressure of the refrigerant in the casing 10 raises its temperature and warms the casing, and the arrangement of the condenser 12 is such as to induce sufficient upward flow of air between the condenser and the casing and through the coils of the condenser to cool the condenser and casing. Heat is transmitted from the condenser and the casing to the air flowing adjacent to them by direct contact therewith and by conduction through the fins 11. This refrigerating machine is associated with a refrigerator cabinet 14 having an evaporator 15 therein, and the general construction of the refrigerating machine is like that shown in Patent No. 1,736,635, granted November 19, 1929, on the application of Christian Steenstrup, to the assignee of the present invention. The compressed refrigerant is cooled in the condenser 12, so that it is condensed and flows to a float valve 16 which controls the flow of liquid refrigerant from the condenser to the evaporator 15. The desired temperature is maintained in the cabinet 14 by stopping and starting the motor in the compression casing 10 in response to variations in the temperature of the evaporator 15, and a control device 17 is provided which is connected in the motor circuit and is provided with a thermostatically controlled switch having a thermostatic element in contact with the evaporator 15.

In accordance with my invention the condenser 12 is made of a plurality of conduits having supports spaced apart throughout their length for embracing the groups of conduits and retaining them in spaced relation. In the construction disclosed these conduits are made of three separate coils of pipe 18, 19 and 20 which surround the casing 10 and are spaced therefrom in such relation as to induce sufficient flow of upward air between the coils and the case and

over the coils to cool them. These separate coils are connected together at opposite ends thereof by fittings 21 and 22, so that the compressed gaseous refrigerant flows from the casing and through the coils. In order to provide a simple and convenient construction for supporting these coils in the desired spaced relation, the coils are made of three different sizes of pipe, the outer coil 18 being made of the largest pipe and the inner coil 20 being made of the smallest pipe. The fins 11 are provided with radially arranged slots 22 which form outwardly extending fingers or supports 23 spaced apart throughout their length. The bottoms of the slots are made to fit the smallest pipe 20, as indicated at 24, are widened at 25 at their mid-portion to fit the intermediate pipe 19, and further widened at the mouth thereof to fit the largest pipe 18 at 26. By this arrangement when the pipes 18, 19 and 20 are wound about the case 10 in the slots forming the supports 23, the pipe 20 fits in the bottom of the slot as indicated at 24, the pipe 19 fits the shoulder in the slot at 25, and the pipe 18 fits the shoulder 26 in the mouth of the slot, so that the coils of the pipes 18, 19 and 20 are retained in the desired spaced relation. This construction has the advantage that the three separate coils 18, 19 and 20 can be simultaneously wound upon the fins 11 to complete the condenser. After the coils 18, 19 and 20 are wound in place, it is apparent that they may be connected together at adjacent ends thereof, as above described, or if desired, they may be connected in series to provide for the flow of refrigerant therethrough.

Although I have described a particular form of my invention in connection with a compression refrigerating machine, I do not desire to be limited thereto, and I intend in the appended claims to cover all modifications which do not depart from the spirit and scope of my invention.

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

1. A condenser for refrigerating systems including a support having an open slot varying in width, and coils of different sizes each having a plurality of turns and engaging the side walls of said slot to retain them in spaced relation.

2. A condenser for refrigerating systems including fins having outwardly presented open slots decreasing in width from the open end toward the closed end thereof, and a plurality of coils of pipe of different size arranged in said slots and engaging the sides thereof to retain the coils in spaced relation.

3. A condenser for refrigerating systems including fins having outwardly presented open slots decreasing in width from the open end toward the closed end thereof, and a plurality of coils of pipe of different size arranged in said slots and engaging the sides thereof to retain the coils in spaced relation, said coils of pipe being connected together at the ends thereof to provide for the parallel flow of refrigerant therethrough.

4. A condenser for refrigerating systems including a casing having fins secured thereto, said fins having open slots varying in width, and coils each having a plurality of turns in said slots and engaging the side walls of said slots to retain the turns of each coil in spaced relation.

5. A condenser for refrigerating systems including a cylindrical support having fins secured thereto, said fins having radially extending open slots varying in width, a plurality of coils of pipe of different size arranged about said support, said coils being arranged in the same slots and engaging the sides thereof at different depths to retain the coils in spaced relation.

6. A condenser for refrigerating systems including a cylindrical support having fins secured thereto, said fins having radially extending open slots varying in width, a plurality of coils of pipe of different size arranged about said support, said coils being arranged in the same slots and engaging the sides thereof at different depths to retain the coils in spaced relation, said coils being connected together at the ends thereof to provide for the parallel flow of refrigerant therethrough.

In witness whereof, I have hereunto set my hand this 10th day of April, 1930.

DELBERT F. NEWMAN.