May 8, 1934. J. ASKIN 1,958,226

CONDENSER FOR REFRIGERATING APPARATUS

Filed April 6, 1932

Fig. 1.

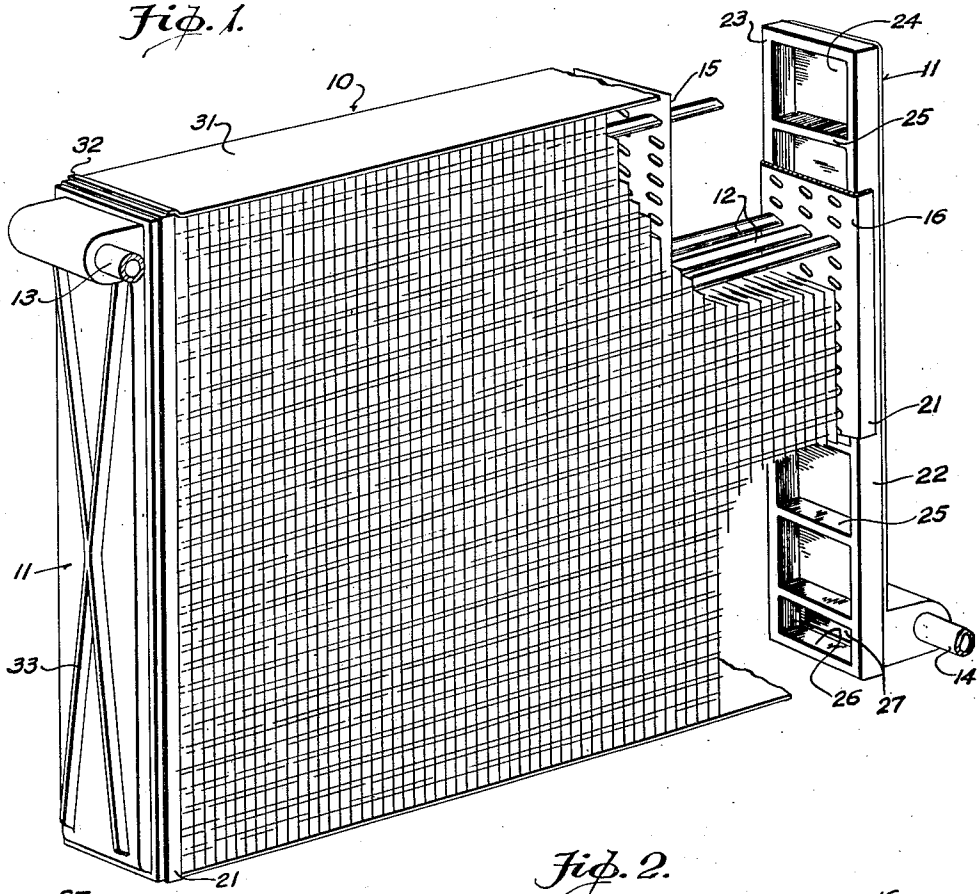
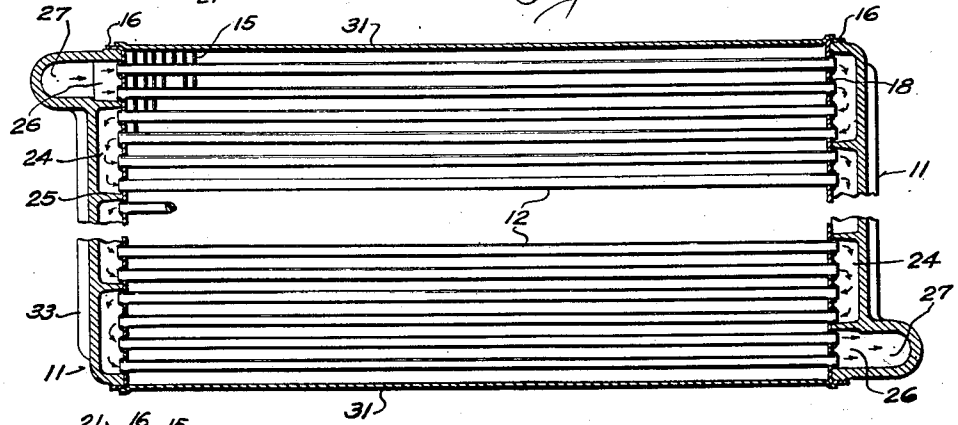


Fig. 2.



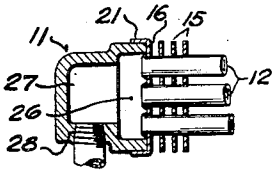


Fig. 3.

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Patented May 8, 1934 1,958,226

UNITED STATES PATENT OFFICE

1,958,226

CONDENSER FOR REFRIGERATING APPARATUS

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Application April 6, 1932, Serial No. 603,549

1 Claim. (Cl. 257—255)

This invention relates to improvements in condensers which are particularly adapted for use in domestic or commercial refrigeration apparatus.

The invention relates to a condenser of the fabricated type, wherein a plurality of tubes having an oval or a flattened cross section are connected to spaced headers which serve as mounting means. The headers are devised with baffle portions which direct the fluid stream through successive groups of tubes and which in general provide a serpentine liquid path through the entire device, wherein the connecting groups of tubes serve as a multiple leg in each of the convolutions forming a part of the condenser.

The invention will also be found to reside in the structural relation between the various parts, which results in economies in material and assembly costs and which is more completely set forth in the accompanying specification and appended claim.

In the drawing:—

Fig. 1 is a perspective view of a typical condenser embodying the principles of the invention with portions broken away to show the header structure.

Fig. 2 is a longitudinal section through the condenser.

Fig. 3 is a fragmentary cross section through one of the headers.

Referring to the drawing, the condenser 10 is formed of a pair of headers 11 of identical construction arranged in opposed and reversed relation and connected for fluid communication by the tubes 12. One of the headers is connected to a source of refrigerant supply through a pipe 13, while the remaining header is connected to an output pipe 14, through which the condensed refrigerant passes to the evaporator of the refrigerating device.

The tubes 12 are preferably oval or flattened members which are assembled with suitable fin members 15 to form a unit. This unit is mounted between the header plates 16 which form part of the headers 11 and contain lateral rows of slots 17 through which the tube ends engage in parallel rows, each row containing a plurality of tubes. As indicated by the numeral 18, the projecting ends of the tubes are brazed to the plates 16 to provide a fluid tight joint. Each header plate is formed with an outwardly extending peripheral flange 21 for connection to the header body 22.

The fins 15 are thin rectangular members which are similar in elevation to the header plates 16, inasmuch as each contains a plurality of slots 20 through which the tubes 12 project. These fins are assembled with the tubes in spaced relation and are finally subjected to a solder bath which substantially unites the tubes and fins in an integral unit. The fins, therefore, provide tension reinforcement for the tubes at regular spaced intervals to resist the fluid pressures to which the tubes are subjected.

The header body 22 is preferably a casting having a face 23, into which is formed a series of similar depressions 24 separated by the walls 25. This series terminates at one extremity in a narrower depression 26 in communication with a fluid connection pasage 27, which is entered by a tapped hole 28 for connection to the pipe 13 or 14. Upon brazing the bodies to the flanges 21 of the plates (Figs. 2 and 3), it will be observed that the depressions 24 in the plates are each formed into fluid diverting compartments entered by an even number of rows of tube ends, and that the narrower depression 26 receives a half of such number of tube ends. This forms a continuous serpentine passage between the input pipe 13 and the output pipe 14, (Fig. 2), since refrigerant, entering the passage 27 in the left hand header is first directed into the narrow depression 26 thereof, thence through the two rows of tubes 12 to the large depression 24 of the opposite header, where it is forced into the two remaining rows of tubes in the same depression and back to the first header.

The fluid follows the above described circuit to the bottom of the device where the liquid finally enters the narrower passage 26 of the right hand header for final disposal through the output pipe 14.

It will also be observed that the major axis of each of the tubes 12 is at a slight angle to the lateral line of the plate. This is to prevent the accumulating and subsequent freezing of drops of precipitated moisture thereon, when the device is mounted vertically as shown.

Plates 31 extend between the headers and protect the enclosed tubes and fins from damage and also serve to protect the tube assembly from damaging stresses. These plates are provided with a flange portion 32 at each extremity, which engage over and are brazed to opposite corners of the holder plate 16.

It will also be noted that enhanced strength and rigidity are obtained by forming ribs 33 in the outer faces of the headers 11.

It will be appreciated that the inventor provides a highly efficient and economical condenser,

in which thermal efficiency is obtained with reasonable cost by providing flat or oval tubes made to communicate with each other through the header members 11. The flat or oval tube has been found more effective than a round tube for the same type of work, and adequate provision is made for communication between the several series of tubes by the relatively large chambers 24, which do not interfere with the rate of flow and which also serve to direct the fluid in a long path.

It is also apparent that various modifications may be made in the specific structure herein described to illustrate the principles of the invention, as set forth in the following claim:

I claim:

A condenser for refrigerating apparatus comprising a plurality of flattened tubes arranged in a plurality of superimposed parallel rows, the tubes in each row being rotated with respect to their longitudinal axes, a plurality of fins disposed perpendicularly to said rows, said fins being formed with apertures to receive said tubes, plane header plates secured to said tubes at the ends thereof, said header plates being formed with apertures through which said tubes project, said plates and tubes being sealed to each other around said apertures, flanges formed along the margins of said plane header plates, and headers positioned in contact with said plate between said flanges, said headers being formed with plane surfaces on their inner portions adapted to contact said plates and angularly disposed surfaces adapted to contact said flanges, recessed portions formed on the inner portions of said headers, cross ribs disposed in said recessed portions to divide the same into a plurality of chambers, the chamber at one end of each of said headers being smaller than the remaining chambers, the cross ribs being disposed between said rows of tubes, and fluid connecting means secured to said smaller chambers.

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