Sept. 17, 1935. G. F. ZELLHOEFER 2,014,919

COIL

Filed Aug. 15, 1934

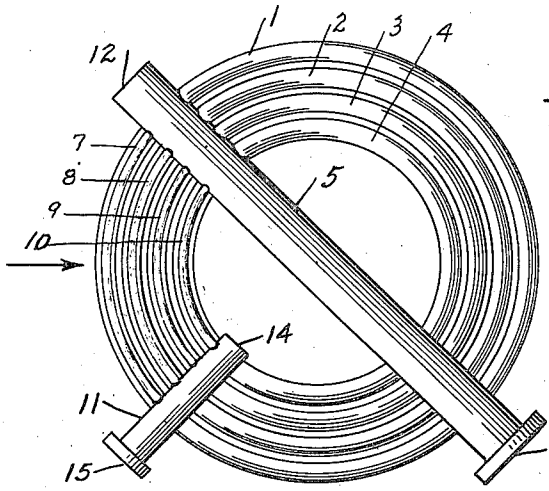


FIG. 1.

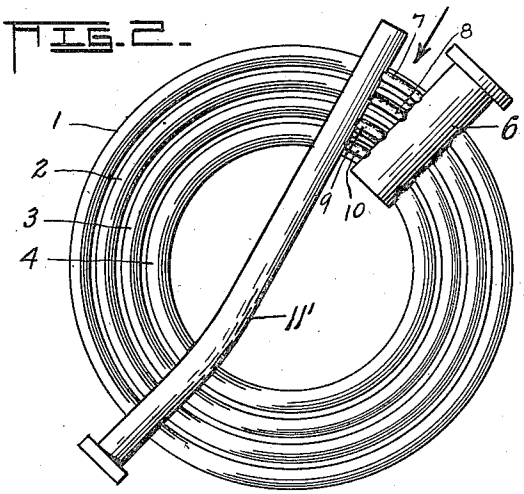


FIG. 2.

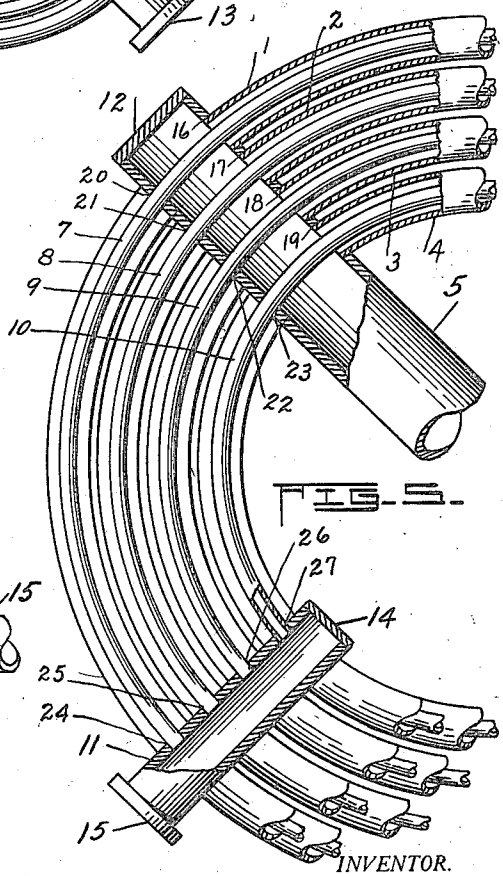


FIG. 5.

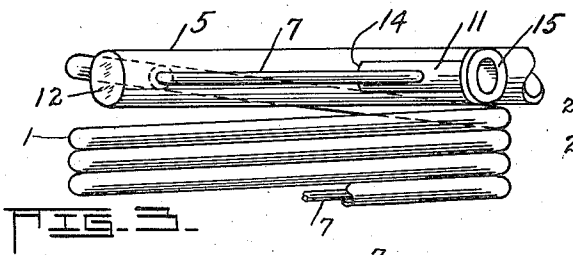


FIG. 3.

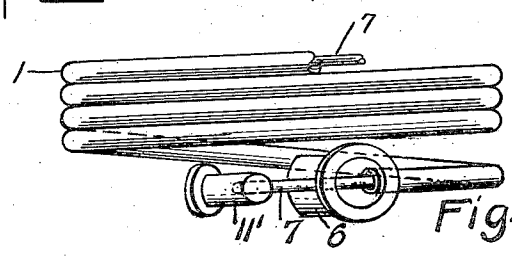


Fig. 4.

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COIL

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4 Claims. (Cl. 257—246)

This invention relates to improvements in coils such as used in condensers or heat exchangers.

It is an object of this invention to provide a device of this character comprising a plurality of double coils nested one within the other with a simple and efficient means for connecting the outer surrounding coils and the smaller inner coils in a simple and efficient manner to independent manifolds.

This type of heat exchanger is particularly adaptable to refrigeration plants of the absorption type such as disclosed in this applicant's prior co-pending application Serial No. 736,232, filed July 20, 1934, in which the solvent from the heater passes downwardly through the smaller inner coil while the solution from the absorber passes upwardly through the larger outer coil, thereby preheating the solution before it enters the heater; and in the same application a similar heat exchanger is employed for cooling the solvent in a residual heat coil by passing the solvent upwardly through the smaller inner coil to the absorber while water is passed downwardly through the outer larger coil.

With these objects in view, reference is made to the accompanying sheet of drawing which illustrates a preferred form of this invention with the understanding that minor detail changes may be made without departing from the scope thereof.

In the drawing:

Figure 1 is a top plan view of a heat exchanger constructed in accordance with this invention.

Figure 2 is a bottom plan view of Figure 1.

Figure 3 is a fragmentary view in elevation of the upper portion of the heat exchanger looking in the direction of the arrow indicated on Figure 1.

Figure 4 is a fragmentary view in elevation of the lower part of the heat exchanger looking in the direction of the arrow indicated on Figure 2.

Figure 5 is an enlarged fragmentary plan view partly in section illustrating the connections to the manifolds shown in full lines on Figure 1.

The heat exchanger constructed in accordance with this invention includes a plurality of coils of pipe 1, 2, 3 and 4 which are nested one within the other, as clearly shown in Figures 1 and 2. The upper ends of the respective coils 1, 2, 3, and 4, as shown in Figure 1, are joined to a cylindrical manifold 5 and the lower extremities of said coils are joined to a cylindrical manifold 6, as shown in Figure 2.

Each of the coils 1, 2, 3, and 4 contain a smaller inner coil of pipe spaced apart from the walls thereof and which extends beyond the upper and lower extremities of the surrounding coils 1, 2, 3 and 4. These smaller inner coils 7, 8, 9 and 10 are continued through the manifolds 5 and 6 passing through the walls thereof opposite the juncture with the larger coils 1, 2, 3 and 4. The smaller coils 7, 8, 9 and 10 are each connected to a cylindrical manifold 11 at the top and to a cylindrical manifold 11' at the bottom, as shown on Figures 1, 2, 3 and 4 of the drawing.

As shown in Figure 1, the manifold 5 is arranged with its axis coincident with the diameter of a circle about which the respective coils are formed, and in this instance the manifold extends beyond the circumference of the outer coil 1 with the end of the manifold adjacent the juncture with the larger coils having an end closure 12 with the opposite end 13 provided with a connection to a source of fluid, not shown. The manifold 11 is shown in Figure 1 as having its axis coincident with the radius of the circle of the outer coil 1 arranged at an angle of forty-five degrees from the axis of the manifold 5. The manifold extends slightly beyond the inner circumference of the inner pipe 4 and that end is provided with a closure 14 while the opposite end 15 extends beyond the outer circumference of the outer coil 1 and is provided with a connection to a source of fluid, not shown.

As shown in detail in Figure 5, the upper extremities of the larger pipes 1, 2, 3 and 4 are brought into the same plane. The adjacent side of the manifold is provided with perforations 16, 17, 18 and 19 adapted to receive the ends of these pipes 1, 2, 3 and 4, which are secured to the wall of the manifold by brazing or in any other desirable manner. Diametrically opposite these perforations 16, 17, 18 and 19 the wall of the manifold is provided with perforations 20, 21, 22 and 23 through which the smaller pipes 7, 8, 9 and 10 are continued and are brazed or otherwise formed with a tight joint to the wall of the manifold. The pipes 7, 8, 9 and 10 enter the manifold 11 through apertures 24, 25, 26 and 27 provided in the wall of the manifold and are brazed or otherwise provided with a tight joint.

The manifold 11' at the bottom of the heat exchanger, as illustrated in Figure 2, is bent slightly so that the end connected to the pipes 7, 8, 9 and 10 passes adjacent to the manifold 6. The larger pipes 1, 2, 3 and 4 are connected to the manifold 6 in the manner above described, and the smaller pipes 7, 8, 9 and 10 are connected to the manifold 11' in the same manner as above

described. If desired, the manifolds 5 and 6 may be of the same form as the manifold 11 and may be placed as close together or as far apart as desired.

In a heat exchanger constructed in accordance with this invention, the larger surrounding coils 1, 2, 3 and 4 are simultaneously supplied with fluid from the intake manifold which is simultaneously discharged from the other end through the discharge manifold while fluid is simultaneously supplied to the smaller inner pipes 7, 8, 9 and 10 from the intake manifold, and after having circulated through the coil, is simultaneously discharged through the discharge manifold.

What I claim is:

1. A heat exchanger including a plurality of coils of relatively large pipe nested one within the other, an inlet manifold at one end of said coils and an outlet manifold at the other end, a coil of smaller pipe within each said coils and spaced from the interior wall thereof, the ends of said inner coils projecting through the walls of said outer coil manifolds and connected to an inlet manifold at one end of said inner coils and to an outlet manifold at the other end.

2. The structure of claim 1 wherein the manifolds of both sets of pipes are in the form of cylinders arranged radially of the coils.

3. The structure of claim 1 wherein the manifolds of the larger pipes are cylindrical chambers closed at one end having perforations along one side to receive the ends of the larger pipes and oppositely disposed perforations for the passage of the smaller pipes therethrough.

4. The structure of claim 1 wherein the manifolds of the larger pipes are cylindrical chambers closed at one end having perforations along one side to receive the ends of the larger pipes and oppositely disposed perforations for the passage of the smaller pipes therethrough, and wherein the manifolds of the smaller pipes are cylindrical chambers closed at one end having perforations along one side to receive the ends of the smaller pipes after they have passed through the other manifolds.

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