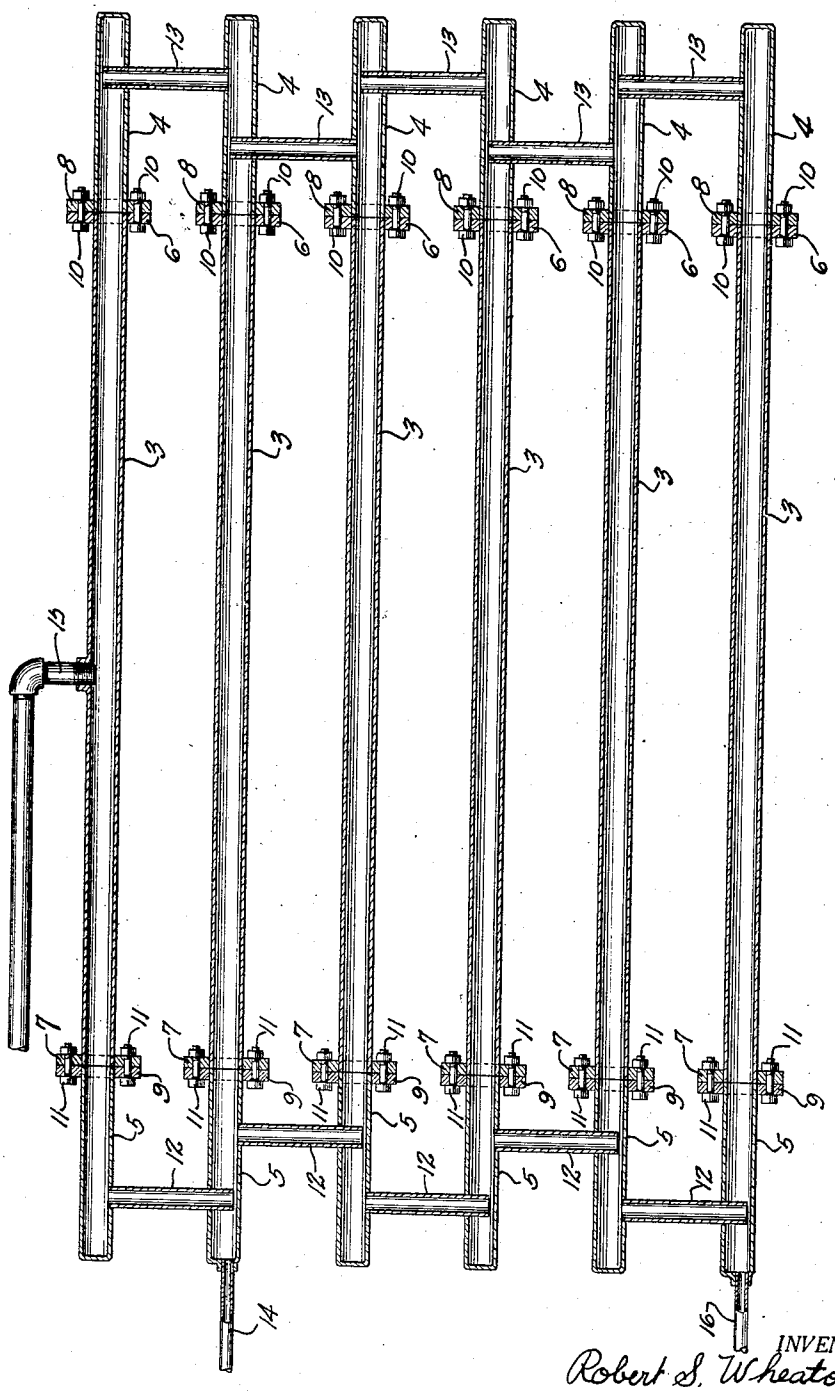
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EVAPORATOR COIL

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EVAPORATOR COIL

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This invention relates to improvements in evaporator coils, and more particularly to evaporator coils used in refrigerating apparatus.

It is one of the objects of the present invention to provide an improved type of flooded evaporator coil in which the necessity for the conventional accumulator or suction trap is eliminated.

A further object of the invention is to provide evaporator coils in which the coil units may be easily coupled together in any desired lengths.

A further object of the invention is to provide evaporator coils arranged so that the refrigerant therein is given a percolating effect.

A further object of the invention is to provide a flooded evaporator coil in which the gas reaching each successively higher horizontal unit of the coil is accelerated so that in the uppermost unit the gas travels with great rapidity to reach the gas outlet pipe and its passage into the gas outlet pipe causes its separation from any liquid refrigerant carried with it and such liquid refrigerant again passes through the coil units.

A further object of the invention is to provide evaporator coils which are of very simple construction, are efficient in operation, are strong and durable, are relatively inexpensive to manufacture and install, and are well adapted for the purposes described.

With the above and other objects in view the invention consists of the improved evaporator coils, and their parts and combinations as set forth in the claims, and all equivalents thereof.

In the accompanying drawing, the view is a vertical sectional view of an improved evaporator coil.

Referring now more particularly to the drawing it will appear that the numerals 3 indicate intermediate evaporator tubes which may be of any suitable length, and the numerals 4 and 5 indicate tube end sections, said tube end sections being somewhat shorter than the intermediate tubes. The ends of each intermediate tube 3 are formed with flanges 6 and 7 and the inner ends of the tube end sections 4 and 5 are formed with similar flanges 8 and 9. Each intermediate tube 3 is connected at one end portion with a tube section 4 and at the other end portion with a tube section 5, said connections being effected by abutments of the respective flanges 6, 8, 7 and 9, with bolts 10 and 11 extended therethrough to clamp the pairs of flanges together, thereby coupling the intermediate pipe with a pair of end sections, in longitudinal alinement. The outer ends of all of the tube end sections are closed.

An intermediate tube 3 with a pair of tube end sections connected thereto forms a unit and in the proper disposition in a coil, a plurality of units are positioned one above another as shown. The tube end sections 5 are connected together in staggered relation by short sections of tubes 12, preferably of slightly less diameter than the diameter of the tubes 3 and sections 4 and 5. Each tube 12 extends from the under side of the tube section 5 above through the upper side of the tube section 5 below, terminating just short of the inner surface of the under side of said tube section below.

The tube end sections 4 are also connected together in staggered relation by short sections of tubes 13, similar to the tubes 12, but each tube 13 extends from the upper side of the tube section 4 below to and into the tube section above to a point adjacent the upper inner side portion of said tube section above.

A refrigerant pipe 14 extends into the outer end of a tube end section 5, preferably the second of said tubes from the top, and a gas outlet pipe 15, of greater diameter than the inlet pipe 14, extends outwardly of the uppermost evaporator tube 3 intermediate its ends. Extending outwardly from the outer end of the lowermost tube end section 5 is an oil drain pipe 16.

In the operation of the improved evaporator coil liquid refrigerant enters the second from the top tube 5 through the inlet pipe 14 and flows in said tube to the right in the drawing and also downwardly

through the staggered tubes 12 to successively lower tubes and ultimately to the bottom tube end section 5 and the adjoining unitary tubes 3 and 4. Then, when said unit becomes filled the successive units thereabove will become filled and the supply of liquid refrigerant is regulated so as to maintain the condition mentioned. A circulation will be set up in the liquid refrigerant in each adjacent pair of units and said refrigerant will flow downwardly through the tubes 12 and rise through the tubes 13. As the liquid refrigerant gasifies, the gas bubbles through the liquid to the upper portion of each unit and flows therealong until it reaches the vertical tube 13 and the gas will then rise upwardly therein, joining the rising gas from the units below and accelerating the travel of the gas and so on until it eventually reaches the uppermost unit where it will rush swiftly to the left in said unit to the gas outlet pipe 15 and will then be discharged from the coil through the gas outlet pipe 15. Any liquid refrigerant which may be present and carried up with the gas to the upper tubes will, due to the acceleration pass by the gas outlet pipe and be thereby separated from the gas and flow downwardly to the units below and form part of the refrigerant liquid therein and continue its work. Any oil which may collect in any of the horizontal units will eventually flow downwardly to the lowermost unit and will eventually drain out of the oil drain pipe 16.

A particular feature of the invention resides in the fact that each horizontal evaporator unit, while filled or partly filled with liquid refrigerant, is so connected to the other horizontal units, by the staggered tubes 12 and 13, as to eliminate the need of an accumulator or suction trap ordinarily required in horizontal tube coils. The percolating travel or effect of the refrigerant in the units is also of advantage in adding to the efficiency of the coil Furthermore, the apparatus is of simple and novel construction, and is well adapted for the purposes described.

What I claim as my invention is:

1. A refrigerating coil, comprising a plurality of spaced, superimposed tubes having closed ends, short tubular connections between one set of end portions of said superimposed tubes, each of said tubular connections extending from the bottom portion of a tube above through and terminating slightly above the lower inner portion of a tube below and adjacent tubular connections being offset one from another, short tubular connections between the other set of end portions of said superimposed tubes, each of said last mentioned tubular connections extending from an upper portion of a tube below through and terminating slightly below the upper inner portion of a tube above and each of said last mentioned tubular connections being offset from an adjacent tubular connection, a fluid inlet pipe entering one of said tubes, and a fluid outlet pipe extending from one of said tubes.

2. A refrigerating coil, comprising a plurality of spaced, superimposed sectional tubes having closed ends, each tube consisting of an elongated intermediate section and shorter end sections detachably connected to opposite ends thereof, short tubular connections between one set of end sections, each of said tubular connections extending from the bottom portion of an end section above through and terminating slightly above the lower inner portion of an end section below and adjacent tubular connections being offset one from another, short tubular connections between the other set of end sections, each of said last mentioned tubular connections extending from an upper portion of an end section below through and terminating slightly below the upper inner portion of an end section above and each of said last mentioned tubular connections being offset from an adjacent tubular connection, a fluid inlet pipe entering one of said superimposed tubes, and a fluid outlet pipe extending from one of said tubes.

3. A refrigerating coil, comprising a plurality of spaced, superimposed tubes having closed ends, short tubular connections between one set of end portions of said superimposed tubes, each of said tubular connections extending from the bottom portion of a tube above through and terminating slightly above the lower inner portion of a tube below, said tubular connections being in staggered relation, short tubular connections between the other set of end portions of said superimposed tubes, each of said last mentioned tubular connections extending from an upper portion of a tube below through and terminating slightly below the upper inner portion of a tube above, said last mentioned tubular connections being in staggered relation, a fluid inlet pipe entering one of said tubes below the uppermost tube, and a fluid outlet pipe extending from the uppermost tube.

4. A refrigerating coil, comprising a plurality of spaced, superimposed, sectional, approximately horizontal tubes, each tube consisting of an elongated intermediate section and relatively shorter end sections detachably connected to opposite ends thereof and forming longitudinal continuations thereof, the outer ends of said end sections being closed, short tubular connections between one set of end sections, each of said tubular connections extending from the bottom portion of an end section above through and terminating slightly above the lower inner

portion of an end section below, said tubular connections being in staggered relation, short tubular connections between the other set of end sections, each of said last mentioned tubular connections extending from an upper portion of an end section below through and terminating slightly below the upper inner portion of an end section above, said last mentioned tubular connections being in staggered relation, a fluid inlet pipe entering an end section of a tube below the uppermost tube, and a fluid outlet pipe extending from the intermediate section of the uppermost tube.

In testimony whereof I affix my signature.

ROBERT S. WHEATON.