July 1, 1930. O. A. LABUS 1,769,265

HEAT EXCHANGER

Filed April 21, 1927

Fig. 1.

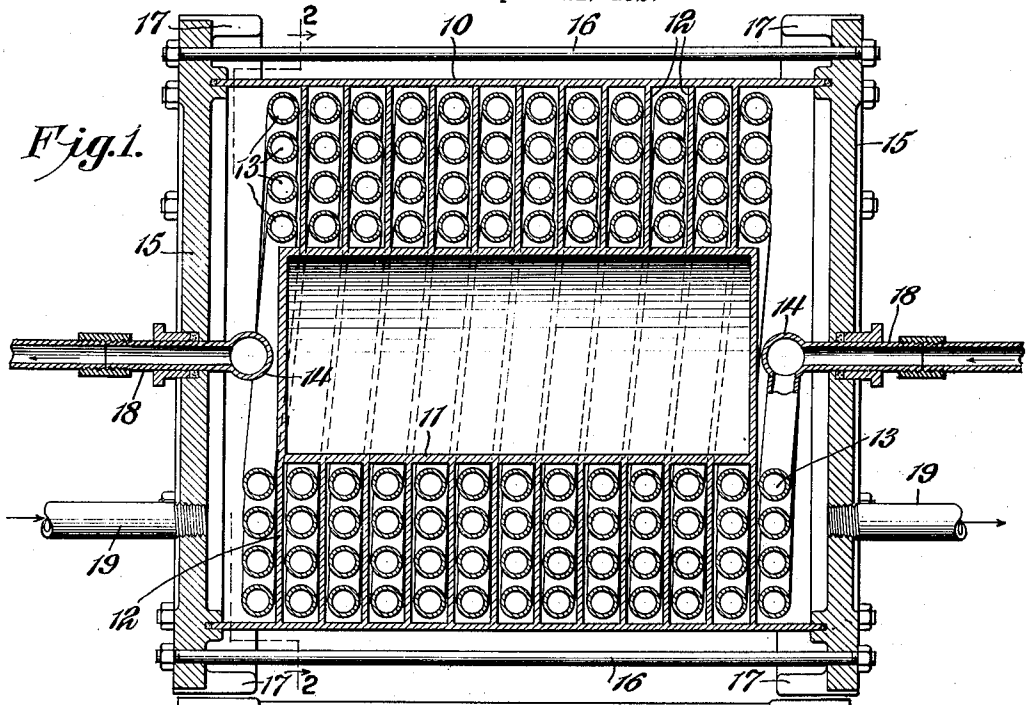
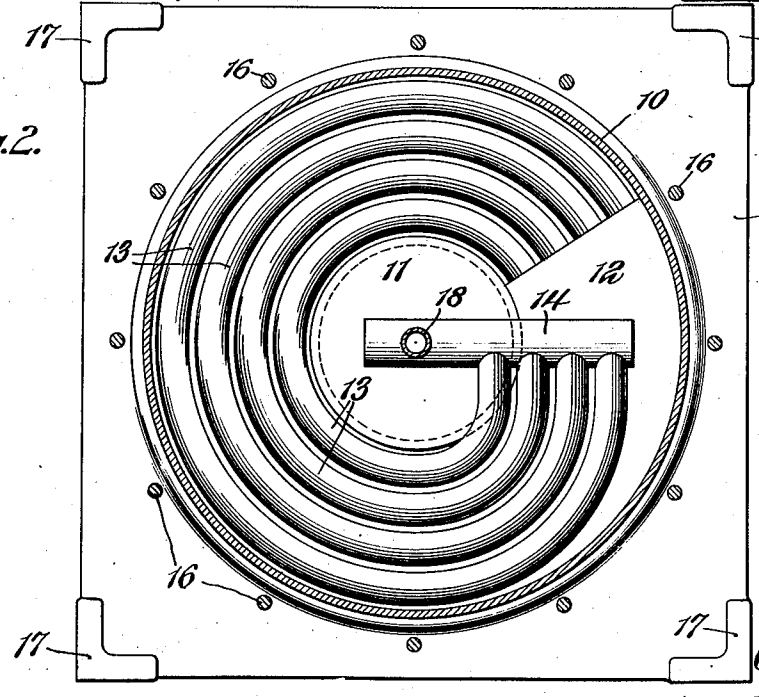


Fig. 2.



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UNITED STATES PATENT OFFICE

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HEAT EXCHANGER

Application filed April 21, 1927. Serial No. 185,529.

This invention aims to provide an improved heat exchanger adapted to be used as a water cooler, steam condenser, brine cooler and for other purposes.

One of the objects of the invention is to produce an improved compact heat exchanger having a maximum heating or cooling surface.

Other objects and advantages of the invention will appear in the specification, when considered in connection with the accompanying drawing wherein I have shown one illustrative embodiment thereof and, in which,

Fig. 1 is a central sectional view of a heat exchanger embodying the invention; and

Fig. 2 is a cross sectional view taken on the line 2—2 of Fig. 1.

Referring particularly to the drawing and to the embodiment of my invention there shown, my heat exchanger which preferably is of the counter-flow type is carried within a shell 10 which is preferably cylindrical. Within the shell or casing is a concentrically arranged core 11, which, in the present instance, is a closed cylinder although it may be solid if desired. Between the inner core and the shell I secure a spiral vane 12 to provide a passageway or conduit substantially rectangular in cross section, for a cooling or heating medium. Herein, the core and vane are shown as integrally united to the shell either being cast in one piece or fabricated in any manner.

As shown in Fig 1, I provide a plurality of spiral, concentric coils 13 in the spiral conduit between the shell 10 and core 11, each coil being threaded through the conduit and connected at its ends to inlet and outlet manifolds 14 located within the opposite ends of the shell. The coils are preferably concentric and are spaced only a slight distance apart so that they almost fill the spiral passageway and present a large heating or cooling surface to the heating or cooling medium.

To close both ends of the shell, I provide removable heads 15 each preferably having an annular groove to receive the end of the shell and adapted to be clamped against the end of the shell. To make water tight joints some suitable packing material is placed in the grooves.

I have shown the heads square and overhanging the shell. Around the heads on the outside of the shell I provide a plurality of aligned openings for tie rods 16 to clamp the shell between them against the packing or other material in the bottoms of the grooves. At the corners of the heads I provide lugs or feet 17 shaped like angle irons in cross section, which are adapted to rest upon a floor or supporting stand and support my exchanger on any side in a horizontal position. However, it may also be set in a vertical position if desired.

The heads 15 have openings through which extend inlet and outlet pipes 18 connected to the respective manifolds. I provide suitable packing glands around these pipes within the openings to make water tight joints. Also, inlet and outlet pipes 19 for the heating or cooling medium are shown as connected to the heads.

To assemble my exchanger, assuming that the spiral vane is welded or otherwise secured to the shell and core, the coils are screwed into the spiral passage and the manifolds are then preferably welded to them. The heads are slipped on over the inlet and outlet pipes 18 and the tie rods are inserted to clamp them in place.

From the arrows in Fig. 1 it will be seen that the heating or cooling medium enters and flows around the passageway encircling the coils in the opposite direction or counter to the flow of the fluid to be heated or cooled therein. The flow area of the heating or cooling medium is sufficiently large to permit it to pass rapidly through the passageway and the exposed surfaces of the coils will rapidly exchange the heat.

While I have described my improvements as embodied in a compact form of casing including a core, it will be understood by those skilled in the art, that a spiral conduit, as a unit, may be formed in various ways, and my improvements may be embodied therein.

Obviously the present invention is not re-

stricted to the particular embodiment thereof herein shown and described. Moreover, it is not indispensable that all the features of the invention be used conjointly, since they may be employed advantageously in various combinations and sub-combinations.

What I claim is:

1. A heat exchanger comprising, in combination, a shell, a core within the shell, a spiral vane between the core and the shell providing a spiral conduit for a heat exchanging medium, a plurality of concentric coils within the spiral conduit, manifolds for the coils beyond the opposite ends of the core, heads clamped on the ends of the shells, inlet and outlet pipes extending through the heads and connected to the respective manifolds and inlet and outlet pipes for the heat exchanging medium also connected to said heads.

2. A heat exchanger comprising a horizontal cylindrical shell having a spiral conduit formed therein, spiral coils within the conduit, fluid connections for the coils and for the conduit, and substantially square heads secured to and closing the ends of said shell thereby adapting the exchanger to be set in a horizontal position.

3. In a heat exchanger comprising a cylindrical shell having a plurality of pipes therein, substantially square closures clamped on the shell and having lugs providing feet at the corners thereof adapted to support the exchanger in a horizontal position on any of the side edges of the closures.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature.

OTTO A. LABUS.