April 16, 1940.

J. J. MORAN

2,197,243

CONDENSER TUBE

Filed Aug. 8, 1939

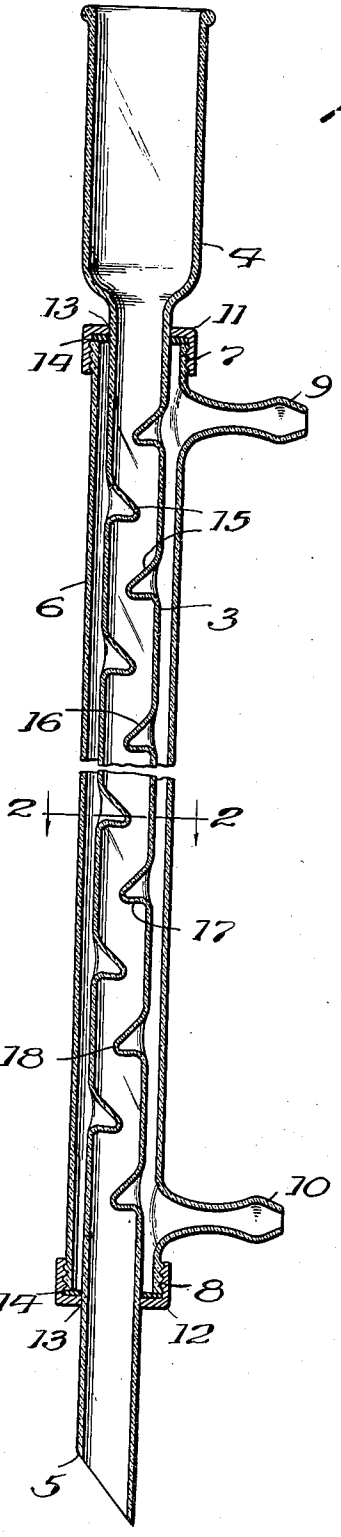


FIG. 1.

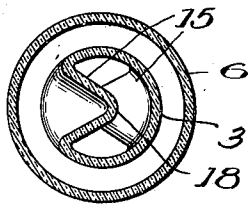


FIG. 2.

Inventor

James J. Moran,

By Charles B. Belknap

Attorney

Patented Apr. 16, 1940 2,197,243

UNITED STATES PATENT OFFICE

2,197,243

CONDENSER TUBE

James J. Moran, Vineland, N. J., assignor to Kimble Glass Company, Vineland, N. J., a corporation of Illinois

Application August 8, 1939, Serial No. 289,047

4 Claims. (Cl. 257—28)

This invention relates to glass condensers, and more particularly to the structure of the inner tube of the condenser.

One type of condenser made from glass comprises an inner glass tube surrounded throughout substantially its length by an outer glass tube closed at its ends by screw caps, the latter being perforated to permit passage of the inner tube therethrough. The outer tube or jacket has suitable inlet and outlet nipples for connection to a source of water or other cooling medium. Usually both tubes are straight and, in some instances, the inner tube is formed with inwardly extending projections.

As gases are condensed within the inner tube, the condensed liquid flows over the inner surface of the condenser tube forming a film thereon which prevents efficient interchange between the gas and the cooling medium within the jacket.

It is one of the objects of the present invention so to form the inner tube that the condensed liquid will be formed into drops which fall along a line substantially coincident with the axis of the inner tube.

The invention will be more fully understood from the following description thereof taken in connection with the accompanying drawing, in which:

Fig. 1 is an elevation in section of a complete condenser embodying the present invention; and

Fig. 2 is an enlarged section taken on line 2—2 of Fig. 1.

Referring to the drawing, it will be seen that the condenser comprises an inner glass tube 3 having an enlarged or thistle portion 4 at one end thereof and having its lower end beveled as at 5. Surrounding the greater portion of the inner tube and concentric therewith is an outer glass tube 6 provided at its ends with threads, as indicated at 7 and 8. The outer tube is also provided with the usual nipples 9 and 10 forming connections to a source of water or other cooling medium.

Cooperating with the ends of the outer tube 6 are caps 11 and 12, each of which is threaded to cooperate with the threaded portions 7 and 8. Each cap is provided with an opening 13 through which the tube 3 passes. Fitting snugly within each cap is a washer 14 having an aperture the diameter of which is somewhat smaller than the diameters of the tube 3 and openings 13. When the caps are screwed onto the ends of tube 6, the washers are compressed so that they fit tightly against the inner tube and form an effective water-tight connection between the inner and outer tubes. It will be seen from this construction that the inner tube may be readily removed from the outer tube and both tubes easily cleaned. Preferably the caps and washers are of the same size so that they are interchangeable with each other.

The inner tube is formed with a plurality of inwardly extending, substantially conical projections 15 which, as will be seen in the drawing, are staggered, some of the projections being vertically aligned on one side of the inner tube and others being also vertically aligned but diametrically opposite the first-mentioned projections.

Each of the projections is formed with its upper face 16 inclined in such a way that it constitutes a steep slope in the wall of the condenser tube. The lower side of the projection, indicated at 17, is substantially horizontal. With this arrangement, liquid condensing on the walls of the condenser tube tends to flow toward the apex 18 of the inward projection to form a drop which will fall from this apex. The several apices of the projections are positioned substantially in line with the axis of the tube so that the drops formed tend to fall in a line coinciding with the axis of the tube. Hence, the condensed liquid, instead of forming a continuous film over the entire inner wall of the condenser tube, falls in the form of drops through the center of the tube. It will, therefore, be seen that by conducting the condensed liquid away from the walls, more wall surface having little or no liquid film thereon is presented to the hot gases which are more readily cooled and hence more quickly condensed.

From the foregoing description it will be apparent that, as the liquid is condensed, drops thereof are formed and these drops fall in a line spaced from the inner surface of the condenser. Furthermore, a greater cooling surface is presented by forming the inwardly extending projections on the inner tube.

While a specific embodiment of the invention has been shown and described, it is to be understood that the same may be modified within the definition set forth in the appended claims. For instance, instead of employing an open end outer tube with caps, the inner and outer tubes may be united by means of rubber connections or a closed seal formed by fusing the ends of the outer tube to the inner tube.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An inner tube for jacketed condensers, said inner tube having inwardly extending projec-

tions formed in the wall thereof, the upper side of said projections being inclined and the lower side of the projections being substantially horizontal.

2. An inner tube for jacketed condensers, said inner tube having inwardly extending, substantially conical projections formed in the wall thereof, the upper side of said projections being inclined and the lower side of the projections being substantially horizontal.

3. An inner tube for jacketed condensers, said inner tube having inwardly extending, substantially conical projections formed in the wall thereof, the upper side of said projections being inclined and the lower side of the projections being substantially horizontal, the apices of said projections being aligned longitudinally of the inner tube.

4. An inner tube for jacketed condensers, said inner tube having a plurality of inwardly extending, substantially conical projections formed in the wall thereof, said projections being aligned longitudinally of the inner tube, said inner tube having another plurality of inwardly extending, substantially conical projections formed in its wall opposite to and in staggered relation to said first-mentioned projections, the upper side of each of said projections being inclined and the lower side of the projections being substantially horizontal.

JAMES J. MORAN.