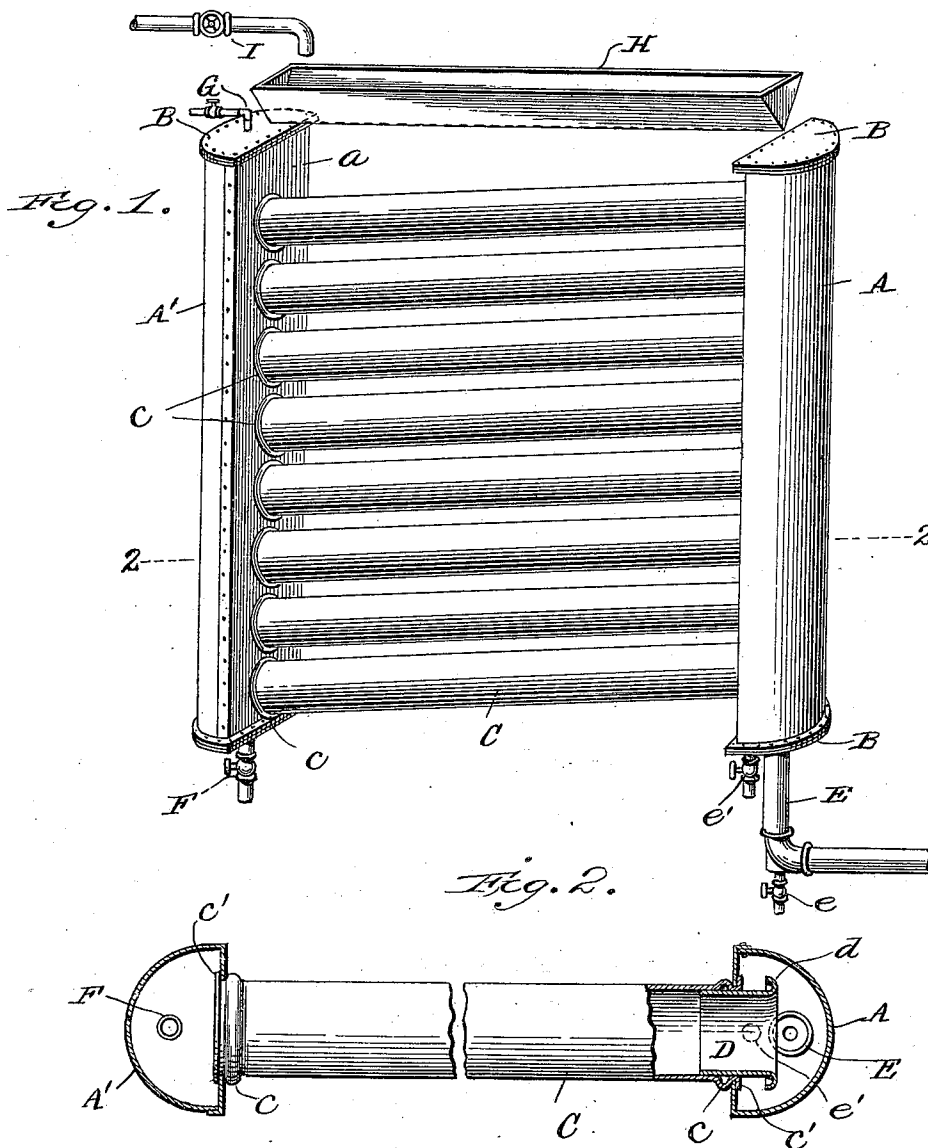


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CONDENSER.
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975,612.

Patented Nov. 15, 1910.



Witnesses
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UNITED STATES PATENT OFFICE.

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CONDENSER.

975,612.

Specification of Letters Patent. Patented Nov. 15, 1910.

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To all whom it may concern:

Be it known that I, DAVID G. GALBRAITH, of Mineral Wells, in the county of Palo Pinto, State of Texas, have invented a certain new and useful Improvement in Condensers; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures and letters of reference marked thereon.

This invention relates to condensers for exhaust steam and particularly to condensers for use in plants producing potable water or pure water for artificial ice making, the objects of the invention being to provide a cheap condenser of large capacity but small size capable of condensing the exhaust steam from ordinary power engines without permitting the oil etc. from the engines to be commingled with the water and without the necessity of employing expensive and complicated apparatus for separating the oil from the steam or from the water condensed from the steam as has heretofore been the common practice.

In carrying the invention into practice advantage is taken of the fact that oil contained in the steam tends to follow the surface of the ducts, pipes or headers through which the steam passes and will deposit thereon before any material condensation of the steam takes place and by the provision of suitable barriers the oil is prevented from following the steam and water and the latter may be conducted away in a pure condition.

The invention consists in certain novel details of construction and combinations and arrangements of parts all as will be now described and pointed out particularly in the appended claim.

In the accompanying drawings: Figure 1 is a perspective view of a condenser for ice making plants embodying the present improvements. Fig. 2 is a sectional view on substantially the line 2—2, Fig. 1.

Like letters of reference indicate the same parts.

The condenser of the present invention is made of sheet iron preferably galvanized to prevent contamination of the water by iron oxid and the headers and condenser pipes are all of large sectional capacity as compared with the steam inlet, the condenser

thus acting as an expansion chamber having a large superficial cooling surface and in no part of which can a rapid flow of steam, water or oil by any possibility take place.

The condenser proper embodies headers A A' preferably of substantially semi-cylindrical form with heads B secured by flange bolts or rivets. The condenser pipes or tubes C which are of large cross section extend between the flat faces *a* of the headers in a slightly inclined position to allow all water of condensation to drain into the water receiving header A'. In the preferred construction the tubes C are preliminarily beaded a short distance from the ends as indicated at *c*, the walls of the headers being seated against the beads and the ends of the tubes flange outwardly on the inside of the headers as at *c'*.

Each tube is provided with an end extension into the headers the said extensions being flanged outwardly and backwardly to form oil barriers to prevent the entry of oil into the tubes, the pure steam being in effect drawn from the center of the header or from points remote from the header walls where there is the least likelihood of oil being present in the steam. In the preferred construction these extensions are in the form of thimbles D, soldered within the ends of the tubes so as to reinforce and strengthen the tubes and having their outer ends within the headers flanged outwardly and backwardly as at *d* to form the barriers.

Exhaust steam from the engine enters the header A at the bottom through an exhaust pipe E of small diameter as compared with the header or condenser tubes and cocks for the withdrawal of oil and water of condensation commingled therewith are preferably located in both the exhaust pipe E and bottom of the header as at *e e'* respectively.

The header A' is provided at the bottom with a valved duct or pipe F for the withdrawal of pure water of condensation and at the top it is provided with an outwardly opening valve G for the escape of gases or pressure should the capacity of the condenser be too small or condensation be interrupted.

For cooling the condenser a water distribution trough H is located above the top tube and cooling water may be supplied through a pipe I.

In operation cooling water is distributed

over the surface of the large top condenser tube and flows to the bottom of the same and onto the second tube along the center line of the latter and thence over the surface of the tube and so on throughout the whole series of tubes.

In practice a convenient and effective size of condenser is made up of standard galvanized sheet metal eight feet in length, each header and each tube being substantially eight feet long and the tubes eight in number each approximately nine inches in diameter but it will be understood that I do not wish to be limited to these particular dimensions.

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

A condenser for the production of potable water from engine exhaust steam, having a

small number of tubes each of large sectional area and embodying headers formed of sheet metal with their proximate faces flat, tubes each of large sectional area, formed of sheet metal and at their ends extending through the flat faces of the headers, said tubes being slightly inclined from the inlet header down to the discharge header and the ends of the tubes in the inlet header being provided with extensions having curved flanges lying in a substantially vertical plane, a steam inlet in one header, a water outlet at the bottom of the other header, and means for supplying cooling water to the exterior of the condenser tubes.

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Witnesses:

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