No. 612,383. Patented Oct. 11, 1898.

J. C. DEAN.

COOLING DEVICE FOR STEAM ENGINE CONDENSERS.

(Application filed Sept. 27, 1897.)

(No Model.)

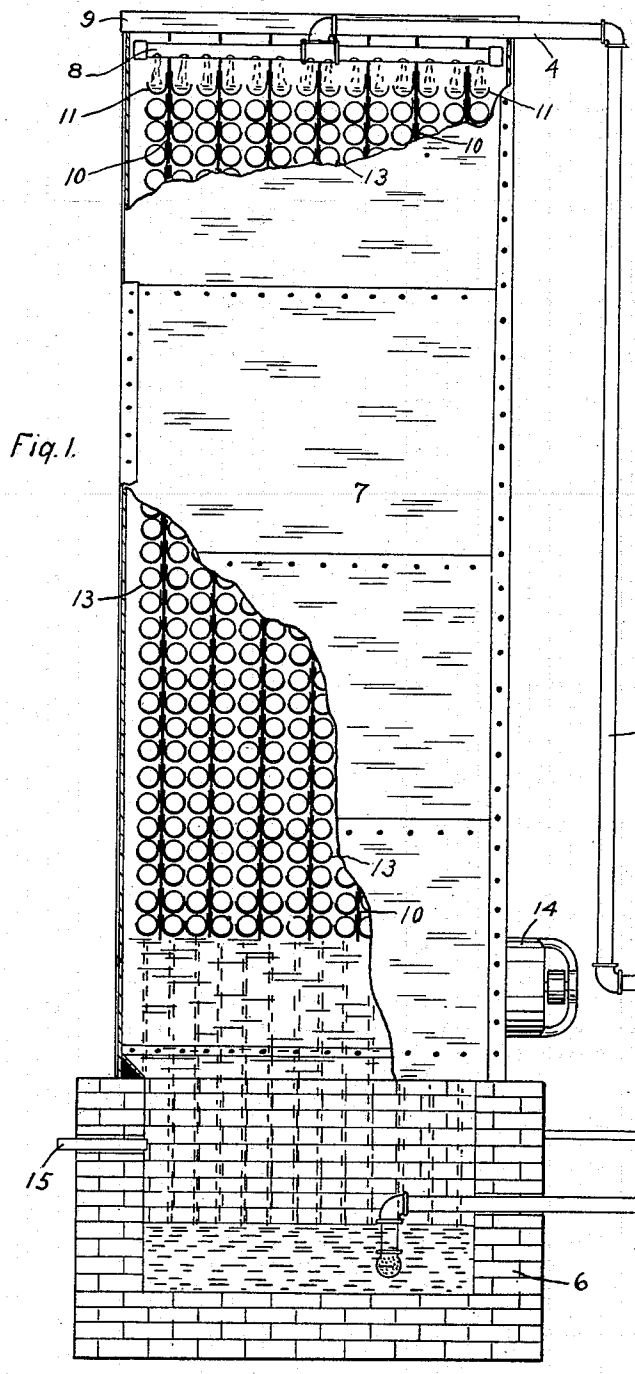


Fig. 1.

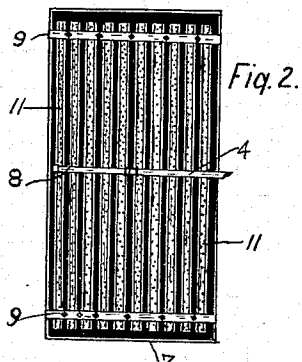


Fig. 2.

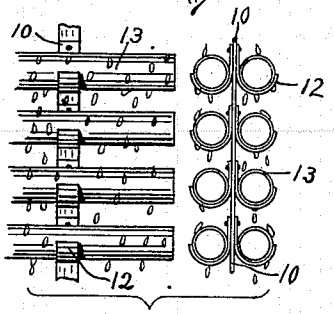


Fig. 3.

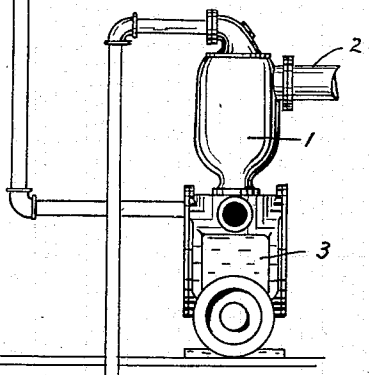
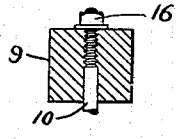


Fig. 4.



Witnesses
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UNITED STATES PATENT OFFICE.

JOHN C. DEAN, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO THE DEAN BROTHERS STEAM PUMP WORKS, OF SAME PLACE.

COOLING DEVICE FOR STEAM-ENGINE CONDENSERS.

SPECIFICATION forming part of Letters Patent No. 612,383, dated October 11, 1898.

Application filed September 27, 1897. Serial No. 653,201. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. DEAN, of Indianapolis, county of Marion, and State of Indiana, have invented a certain new and useful Cooling Device for Steam-Engine Condensers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which like figures refer to like parts.

My invention relates to a refrigerating-tower to be used in connection with steam-engine condensers where the available supply of water is insufficient or expensive. It enables the same water to be used repeatedly. The water from the condenser is conveyed by a suitable vacuum-pump or otherwise to the cooling device, wherein it is quickly cooled and is returned to the condenser. With this device an engine may be operated condensing with an excellent vacuum, no matter where it is located. In cities where ground is valuable it may be located on the roof of the building. The cooling-tower may also be used for reducing the temperature of water for any other purpose.

The full nature of my invention will be fully understood from the accompanying drawings and the description and claims following.

In the drawings, Figure 1 is a side elevation of my device with a portion of the cooling-tower and cistern removed to show the interior. Fig. 2 is a plan view of the top. Fig. 3 shows a side elevation of a portion of some of the cooling-tubes with the support and drops of water falling over them, and also an end elevation of the same. Fig. 4 is a cross-section of the attachment of the supporting-bars.

In detail, 1 is a condenser for a steam-engine, and 2 is an exhaust-pipe from the steam-engine.

3 is a vacuum-pump, an end elevation only being shown. The form and construction of the condenser and vacuum-pump are immaterial to this invention. A discharge-pipe 4 leads from the pump to convey the condenser-water, which is warm, to the upper end of the cooling-tower.

5 is an injection-pipe that conveys the water after it is cooled back to the condenser.

The cooling device comprises a cistern 6, upon which the cooling-tower 7 is located. The cistern is made, preferably, of bricks and the cooling-tower of iron. The cooling-tower shown is rectangular in form and open at both the upper and lower ends. In the upper end the discharge-pipe 4 empties its contents into a perforated pipe 8. I show this extending centrally across the upper end of the tower, as seen in Fig. 2. Across the upper end of the tower at each end I place a bar 9, from which I suspend a series of supporting-bars 10, that hang down almost to the bottom of the tower. Near the upper end of said supporting-bars I secure a series of perforated troughs 11, that extend across the upper end of the tower, as seen in Fig. 2. The water passing through the perforations in the pipe 8 falls into these troughs and flows toward the ends thereof, at the same time dropping through the perforations in said troughs.

To the supporting-bars I bolt a series of hangers or brackets 12, being semicircular in form, as seen in Fig. 3. I secure a pair of these brackets by one rivet, one being on each side. Thus there is a series of brackets, one beneath the other, extending from the top to near the bottom of the tower. On these brackets I place light metal tubes 13, that extend horizontally from one end to the other of the tower under the troughs 11. Each series of tubes is beneath one of said troughs. They may be made of light sheet metal of any kind, so that the two series of pipes supported by one of the supporting-bars 10 will, in fact, be very light.

Near the lower end of the tower I place a blast-fan 14, driven by any suitable power, whereby a current of air is forced upward through the tower, passing out at the top.

The warm water drops through the perforations in the series of troughs 11 upon the tubes 13. These tubes are preferably about three inches in diameter, and the drops fall one after the other in a series and roll or slide around one tube and fall upon the next one, and so on to the end. In view of the long period of time required for the drops to pass around the side of one tube and then of the whole series of tubes below it is seen that it will require considerable time for the

water to pass from the top to the bottom of the series of tubes. During this time the blast of cool air is passing up between the tubes and in contact with the drops of water, so that the tubes are kept cool and the drops are for a long period of time kept in contact with the blast of air. By reason of this the water by the time it reaches the lower end of the series of tubes will have become cooled. The water drops from the lower end of the series of tubes into the cistern 6, and from thence is conveyed by the injection-pipe 5 back to the condenser. An overflow-pipe 15 is provided in the cistern to convey the water away if the cistern should become too full.

From the foregoing description it is obvious that I have a very cheap, economical, and simple construction or arrangement of cooling-tower. The tubes 13 are made of any light metal and rest upon the brackets 12, so that they can be readily removed or any change made in the arrangement quickly.

In order to maintain the troughs 11 and tubes 13 in a level position, the supporting-bars 10 are threaded at their upper ends, as seen in Fig. 4, and held by nuts 16, whereby the bars are vertically adjusted, so as to make the troughs and tubes level.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A cooling device for steam-engine condensers including a casing, a vertical series of independent horizontal tubes loosely mounted within the casing short of the sides thereof, and means for discharging the liquid to be cooled over said tubes.

2. A cooling device for steam-engine condensers including a casing, a pair of supporting-bars suspended therein, a series of open brackets secured to said bars, independent tubes carried loosely by said brackets so as to be horizontal and in vertical series short of the sides of the casing, and means for discharging the liquid to be cooled over said tubes.

3. A cooling device for steam-engine condensers including a casing, an inlet-pipe at the upper end having a series of perforations therein for the escape of the liquid to be cooled, a series of transverse troughs under said pipe to receive the liquid from the perforations, said troughs having a series of bottom perforations, open brackets suspended within the casing and a vertical series of independent tubes mounted loosely in said brackets under and parallel with said troughs.

In witness whereof I have hereunto set my hand this 18th day of September, 1897.

JOHN C. DEAN.

Witnesses:
R. D. HAWKINS,
V. H. LOCKWOOD.