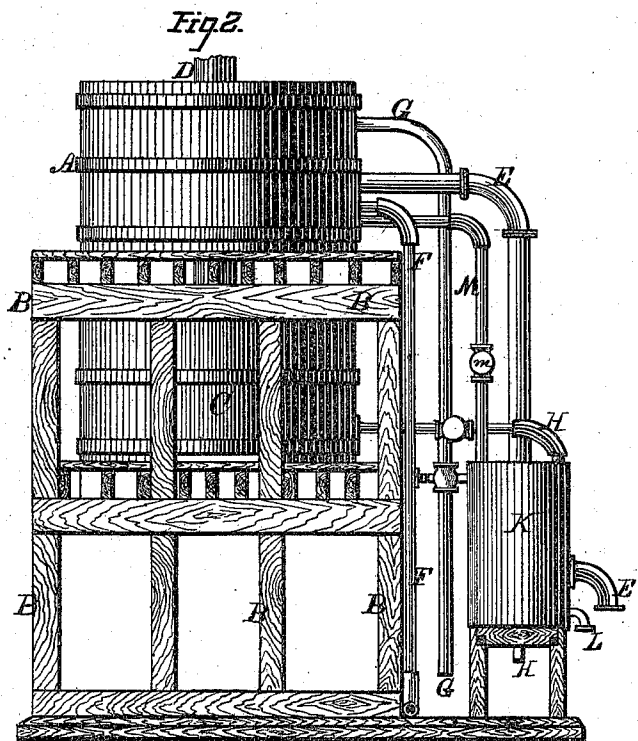
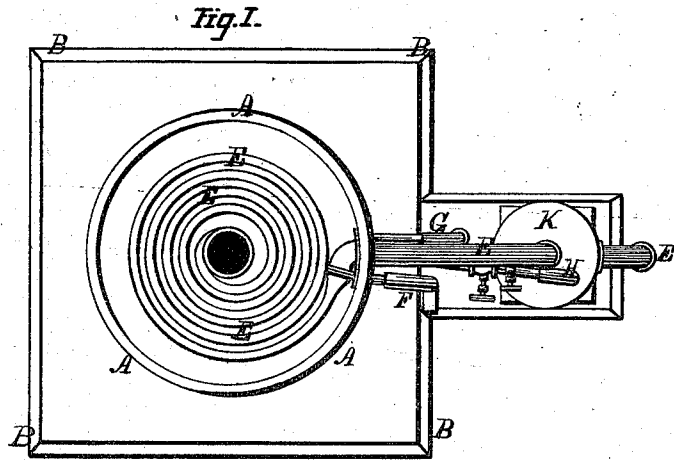


H. A. TOWNE.
Condensers.

No. 142,060.

Patented August 19, 1873.



WITNESSES:

Jas. E. Hutchinson
 John R. Young

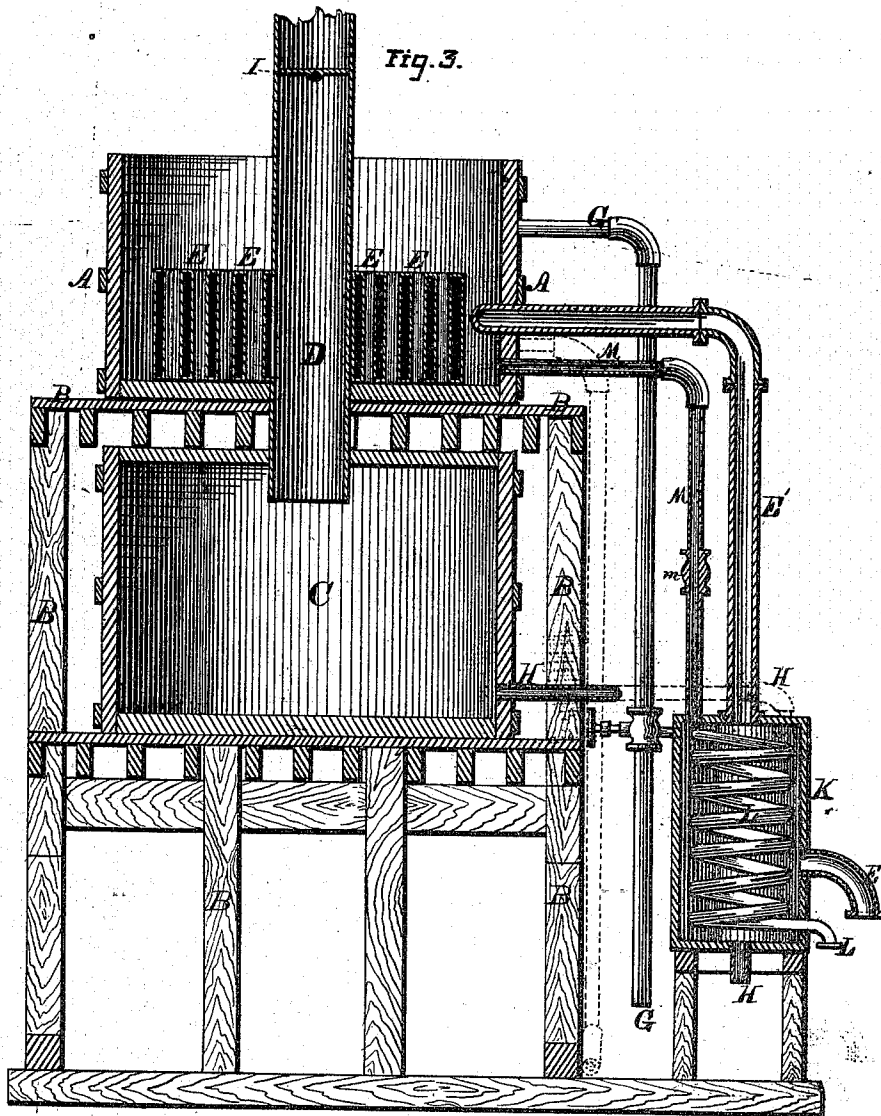
INVENTOR.

H. A. Towne, by
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UNITED STATES PATENT OFFICE.

HORACE A. TOWNE, OF HANNIBAL, MISSOURI.

IMPROVEMENT IN CONDENSERS.

Specification forming part of Letters Patent No. 142,060, dated August 19, 1873; application filed June 24, 1873.

To all whom it may concern:

Be it known that I, HORACE A. TOWNE, of Hannibal, in the county of Marion and in the State of Missouri, have invented certain new and useful Improvements in Condensers; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings making a part of this specification, in which—

Figure 1 is a plan view of the upper side of my apparatus. Fig. 2 is a side elevation of the same, and Fig. 3 is a vertical central section upon line *x x* of Fig. 1.

Letters of like name and kind refer to like parts in each of the figures.

My invention is an improvement upon a condenser for which Letters Patent No. 134,263 were issued to Draper and Covington upon the 24th day of December, 1872; and it consists, principally, in the employment of a condenser composed of a flat pipe coiled spirally around a vertical axis, substantially as and for the purpose hereinafter specified. It consists, further, in the employment of an air-pipe, which extends vertically upward from the condenser, and is uninclosed at its upper end, substantially as and for the purpose hereinafter shown. It consists, further, in the employment of a valve within the upper portion of the air-pipe, substantially as and for the purpose hereinafter set forth. It consists, further, in the relative arrangement of the condenser, pure-water reservoir, and air-pipe, substantially as and for the purpose hereinafter shown and described.

In the annexed drawings, A represents a tub or reservoir, constructed, preferably, of wood, open at its upper side, and supported in an elevated position upon or by means of a suitable frame, B. Directly beneath said tub A is a reservoir, C, inclosed at all points, and connected with the former by means of a metal pipe, D, which extends upward from the center of the upper side of said reservoir through the center of said tub A, and at its upper end is uninclosed, so as to afford free admission of air. Within the lower side of the tub A is placed a pipe, E, which has, preferably, a rectangular form in cross-section, and is coiled spirally around the pipe D, with its inner end communicating with the latter and

its outer end passing outward through the side of said tub. The tub A is supplied with cool water by means of a pipe, F, that enters near the lower end of the same, which water afterward escapes from said tub through a second pipe, G, that passes outward from or near the upper end of the latter.

As thus arranged, the exhaust steam from an engine is caused to pass into and through the pipe E, where it loses temperature and becomes condensed in consequence of the cooling influence of the cold water upon the outside of said pipe, the water produced by such condensation passing downward into the reservoir C, from whence it is drawn through a pipe, H, by a feed-pump, and forced into the boiler. Should the temperature of the water surrounding the pipe E be too high to entirely condense the exhaust steam, the air-pipe D will permit the residue of the latter to pass freely outward, and thus prevent any back pressure upon the engine. By extending said air-pipe to a sufficient height the cooling effect of the air can be utilized so as to condense such steam as would otherwise pass into the open air.

A valve, I, is placed within the pipe D, just above the tub A, for the purpose of regulating the pressure within the condenser, and for controlling the admission of air thereto, when desired. In order that the surplus heat of the exhaust steam may be utilized for the purpose of warming a building, said steam, before entering the condenser, is caused to pass through a metal cylinder, K, in which is contained a spiral coil of water-pipe, L, the upper end of which communicates with the waste-water pipe of said condenser, while its lower end is connected with the usual heater-pipes that extend around a room. By this arrangement the waste water, which has become considerably heated before leaving the condenser, receives a large increase of temperature while passing through the cylinder K, so as to better fit it for the office to be performed, while the exhaust steam has its temperature correspondingly lowered, as is thereby more easily condensed.

The discharge-pipe H of the reservoir C is connected with the upper end of the cylinder K so as to cause the condensed water to pass

into the same, and, in falling, to come into contact with the exhaust steam and have a portion of its lost temperature restored, after which said water is taken from the lower end of said cylinder and conveyed to the boiler.

As it is necessary to make up for the loss of water occasioned by leakage of the boiler and engine, escape of steam from the safety-valve, &c., a pipe, M, is extended from the tub A downward to the upper end of the cylinder K, and supplied with a suitable valve, *m*, by means of which the quantity of fresh water permitted to pass into the latter may be regulated at will.

The apparatus is now complete, and possesses the following advantages; First, from the peculiar construction of the condenser-coil a very large extent of surface is exposed to the action of cold water, while but little space is occupied by said coil, and it is thereby rendered capable of use in places where it would be impracticable to employ other forms of condenser. Second, by the use of the air-pipe all liability to back pressure upon the engine, or to a collapse of the condenser, is avoided, and, at the same time, a better result is produced than would be practicable without said pipe. Third, by use of the heater-cylinder the condensation of the steam is hastened, the feed-water is caused to enter the boiler at nearly the boiling-point, and a large percentage of otherwise waste heat is rendered available for the purpose of warming a

building. Fourth, the entire apparatus is simple in construction, efficient in operation, is compact, and can be furnished at a comparatively small cost.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. A condenser composed of a flat pipe coiled spirally around a vertical axis within a water-reservoir, substantially as and for the purpose specified.

2. In combination with the steam-pipe of a condenser, a vertical air-pipe, connected therewith at its lower end and unclosed at its upper end, substantially as and for the purpose shown.

3. In combination with the air-pipe D, communicating with and extending upward from the condenser-pipe E, the valve I, pivoted within said air-pipe, substantially as and for the purpose set forth.

4. The relative arrangement of the condenser A and E, the reservoir C, and the air-pipe D, substantially as and for the purpose shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 18th day of June, 1873.

H. A. TOWNE.

Witnesses:

NAT. COVINGTON,
E. D. MURPHY.