

UNITED STATES PATENT OFFICE.

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STEAM-CONDENSER.

SPECIFICATION forming part of Letters Patent No. 691,170, dated January 14, 1902.

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To all whom it may concern:

Be it known that I, WILLARD E. PARDRIDGE, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement in Steam-Condensers, of which the following is a specification.

My object is to provide a condenser of improved construction wherein the hot vapor to be liquefied shall be subjected to the cooling influence of expanding air directed thereto from a compressed-air supplier to produce rapid lowering of the temperature of the vapor, and consequently rapid condensation thereof.

My object is more particularly to provide an improved exhaust-steam condenser operating as described which shall be of simple construction and economical and effective in operation.

In the drawings, Figure 1 is a broken sectional view of apparatus which will carry out my invention, and Fig. 2 a broken plan view of the compressed-air discharger shown in Fig. 1.

A is a tank or chamber. Extending through the base *a* of the tank and terminating just above the same is an exhaust-steam pipe B, and leading from the lower end of the chamber is a drain-pipe C. Surrounding the pipe B below the base *a* is an annular head D, forming a chamber communicating through a pipe E with a compressed-air reservoir or supplier F. Extending from the head D is an annular series of outlet tubes or nozzles D', which pass through openings in the base *a* and terminate in a plane at or near the end of the pipe B. At or near the top of the tank is an outlet or vent pipe G.

In operation the exhaust-steam from an engine or the like enters the tank A from the pipe B. At the same time compressed air from the supplier F is caused to pass through the pipe E and head D and be discharged from the nozzles D' about or into the steam as it enters the tank. The expansion of the incoming compressed air causes it to absorb heat from the steam so rapidly and to such an extent that the vapor is immediately cooled

to the condensing-point and falls as liquid to the base of the tank, whence it escapes through the drain-pipe C. The air escapes from the tank through the vent-pipe G.

Certain advantages may be gained, especially where the compressed air retains heat generated by the compression, to cause cold air or water to mingle with it in its passage to the tank. For this purpose I interpose in the pipe E a device H, having a chamber *b*, into which extends the nozzle *c* of a cold air or water supplying pipe *d*, having a regulating-valve *d'*. The device H acts like an injector or insufflator to cause cold air or water to be drawn into the chamber *b* and forced forward by the compressed air.

The water of condensation escaping through the pipe C may be returned to the boiler, and the air escaping through the vent-pipe G may be conducted to the furnace to create a forced draft therein, if desired.

The compressed-air generator may be of any suitable construction, and I prefer to have it discharge into a reservoir, such as F, to equalize the force of the air as it passes to the tank A.

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

1. In a condenser, the combination of a tank having in its upper end a vent and in its lower end an outlet, an exhaust-steam-conducting pipe leading into and extending above the base of the tank, and a compressed-air-supplying conduit having outlets leading into and extending above the base around and adjacent to the end of the steam-pipe.

2. In a condenser, the combination of a tank having in its upper end a vent and in its lower end an outlet, an exhaust-steam-conducting pipe leading into and extending above the base of the tank, a compressed-air-supplying conduit having outlets leading into and extending above the base around and adjacent to the end of the steam-pipe, and a cold-fluid injector interposed in said conduit.

WILLARD E. PARDRIDGE.

In presence of—

ANDREW S. HUNTER,
HENRY BLACKWELL.