

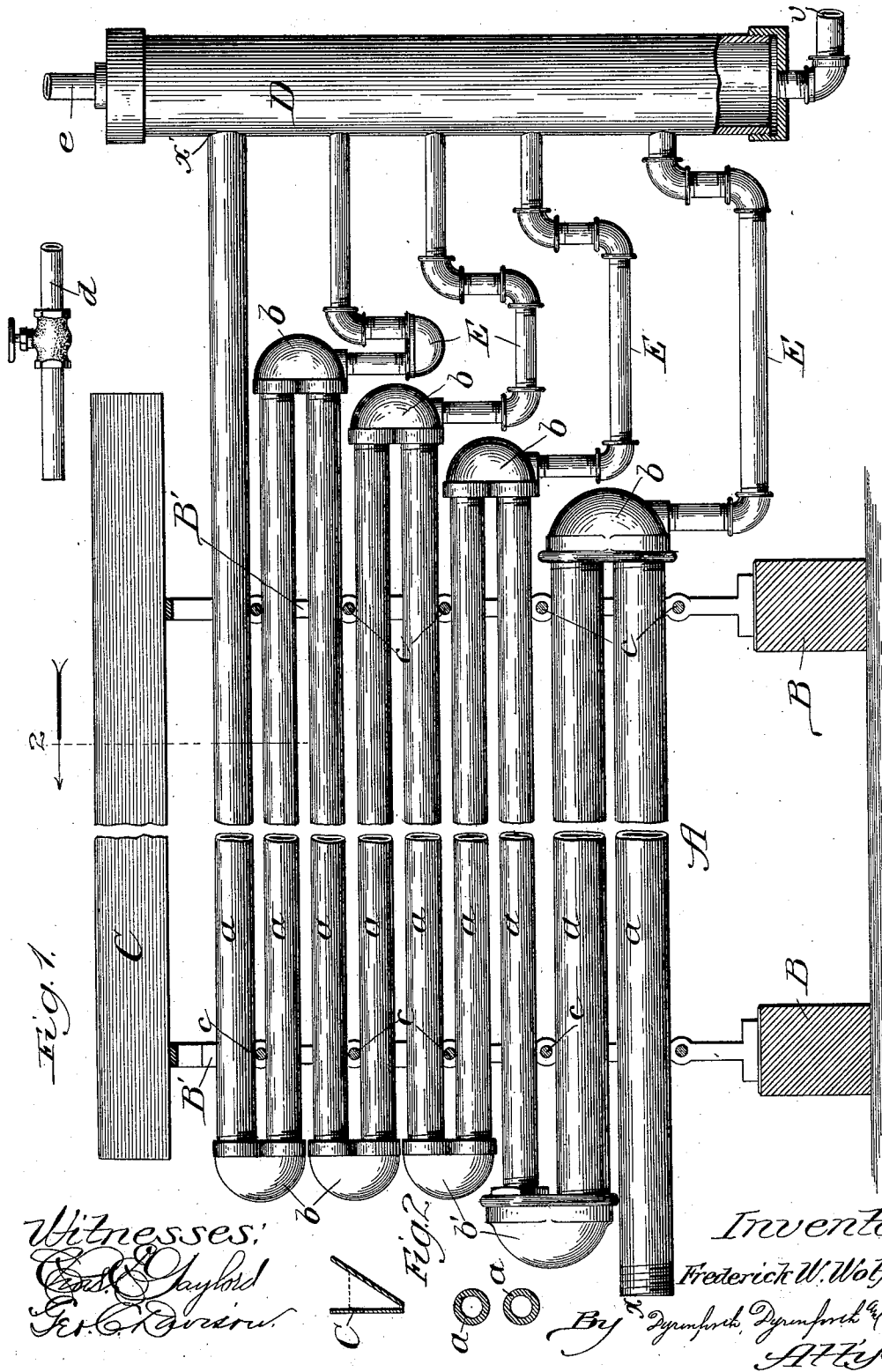
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Patented Nov. 12, 1901.

F. W. WOLF.
STEAM CONDENSER.

(Application filed Aug. 23, 1901.)

(No Model.)



UNITED STATES PATENT OFFICE.

FREDERICK W. WOLF, OF CHICAGO, ILLINOIS.

STEAM-CONDENSER.

SPECIFICATION forming part of Letters Patent No. 686,432, dated November 12, 1901.

Application filed August 23, 1901. Serial No. 73,005. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK W. WOLF, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Steam-Condensers, of which the following is a specification.

My invention relates to an improvement in the class of condensers in which the steam to be condensed flows through a set or sets of pipe-coils while cold water is caused to flow over the coils to effect the condensation.

The primary object of my improvement is to produce the flow of steam in the coils and of the water over the same in relatively contrary directions, thereby to subject the coolest portion of the steam to the water in its coolest condition, thus to attain the well-known advantage of utilizing to the fullest extent the cooling influence of the condensing-water. Accordingly I introduce the steam into the lower end of the pipe-coil, thus causing it to traverse the same in an upward direction, and cause the cooling-water to flow downward over the pipe-coil, and to prevent the water of condensation from clogging the pipes, and thereby obstructing the course of the steam through them, I provide the coils with traps, preferably one trap at an end of each coil-section, to receive therefrom the water of condensation, and thus relieve the coil of the same. This feature of trapping the steam-coils, which constitutes my invention, overcomes the objection hitherto encountered in attempts to utilize the principle of relative counterflow of the steam and cooling-water in steam-condensers by introducing the steam at the lower end of the coil and causing the cooling-water to flow downward over the coil.

In the accompanying drawings, Figure 1 is a broken view, in side elevation, of a condenser of my improved construction, showing a trap for the water of condensation at one end of each coil-section discharging into a water-holder; and Fig. 2 is a section taken at the line 2 on Fig. 1 and viewed in the direction of the arrow.

A denotes a pipe-coil, that represented being of a common form including a vertical series of parallel horizontal pipes *a a*, coupled together in series by having their adjacent

extremities at one end of the coil connected in pairs or sections by couplings *b* and the opposite end of the coil connected by similar couplings *b'*, as shown, to render the course through the series of pipes continuous. It is preferred that the diameter of the two lower pipes of the series forming one section of the coil A shall be greatest and that the pipes above them (each pair of which forms another section of the coil) shall be of smaller diameter, as represented, by reason of the contraction of the fluid as it becomes more and more condensed in its upward course, hereinafter described. The coil is sustained on supports B B, from which rise standards B' B', having cross-bars *cc* extending transversely between the pipes of the coil to reinforce them. The device for distributing the cooling-water over the coil is shown as a water-trough C, supported on the upper ends of the standards B', and to which is supplied, as from a valve-controlled water-pipe *d*, the cold water to discharge through the open base of the trough and flow downward over the coil, thus against the contrary course of the steam through the coil-pipes, into the lowermost of which the steam enters at *x*, and from the uppermost of which the water of condensation enters a receptacle D, with which the upper pipe of the coil is connected at *x'*.

The sections of the coil A, each composed of two pipes *a*, coupled together by an elbow *b*, are connected, preferably, each from its lowest point and preferably also at a coupling *b* with the receptacle D by a suitable water-trap E, represented as formed of tube-sections coupled together, though they may involve any other suitable construction. Steam entering the coil A at *x* courses upward through the pipes *a* under subjection to the cooling influence of water flowing downward over the coil from the trough C. The water formed by condensation in the uppermost pipe *a* discharges therefrom into the receptacle D, and the water of condensation in the other pipes enters the traps E, whence the surplus discharges into the receptacle, provided at its lower end with an outlet *v*, which may lead to a boiler. (Not shown.) The receptacle D may be interposed between such boiler and its feed-water supply. On the upper end of the receptacle is shown the vent-

pipe *e*. As the traps will always contain water, of which they relieve the pipes *a*, it can never obstruct the steam-passage through the coil, and the water in the traps seals the coil-pipes against the escape of steam from its course through the coil into the traps.

While each pair of the pipes forming a section of the coil is shown to be provided with a trap leading from the coupling *b*, my improvement is not intended to be limited to thus trapping each coil-section nor to providing the trap at the coupling, and while I have described my improvement as applied to a condenser for steam it is also applicable with advantage to condensers for other fluids that expand under the influence of heat and which it is desirable to condense by cooling.

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

1. A condenser comprising, in combination, a coil forming the course for the fluid to be condensed and having the inlet at its lower end and the outlet at its upper end, a water-distributing device supported to direct the flow of condensing-water downward over the coil, and one or more traps for the water of condensation, connected with the coil, substantially as and for the purpose set forth.

2. In combination, a condenser comprising a coil forming the course for the fluid to be condensed and having the inlet at its lower end, a water-distributing device supported to direct the flow of condensing-water downward over the coil, and one or more traps for the water of condensation, connected with the coil, and a receptacle for the water of condensation into which the upper pipe of the coil and said trap or traps discharge, substantially as and for the purpose set forth.

3. A condenser comprising, in combination, a coil formed of pipes coupled together in se-

ries at their ends to form a continuous course through them for the fluid to be condensed and having the inlet at its lower end and the outlet at its upper end, a water-distributing device supported to direct the flow of condensing-water downward over the coil, and traps for the water of condensation, connected with the couplings at one end of the coil, substantially as and for the purpose set forth.

4. In combination, a condenser comprising a coil formed of pipes coupled together in series at their ends to form a continuous course through them for the fluid to be condensed and having the inlet at its lower end, a water-distributing device supported to direct the flow of condensing-water downward over the coil, and traps for the water of condensation connected with the couplings at one end of the coil, and a receptacle for the water of condensation into which the upper pipe of the coil and said traps discharge, substantially as and for the purpose set forth.

5. In combination, a condenser comprising a coil formed of pipes coupled together in series at their ends to form a continuous course through them for the fluid to be condensed and having the inlet at its lower end, a water-distributing trough surmounting the coil, tubular traps for the water of condensation extending from the lowest points of the couplings at one end of the coil, and a receptacle for the water of condensation into which the upper pipe of the coil discharges and with which said traps are connected at their outer ends, substantially as and for the purpose set forth.

FREDERICK W. WOLF.

In presence of—

D. W. LEE,

A. C. KITTLESON.