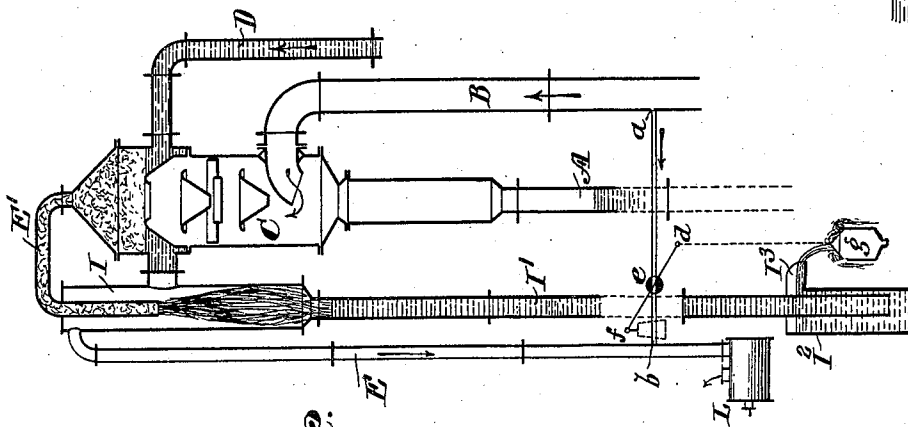
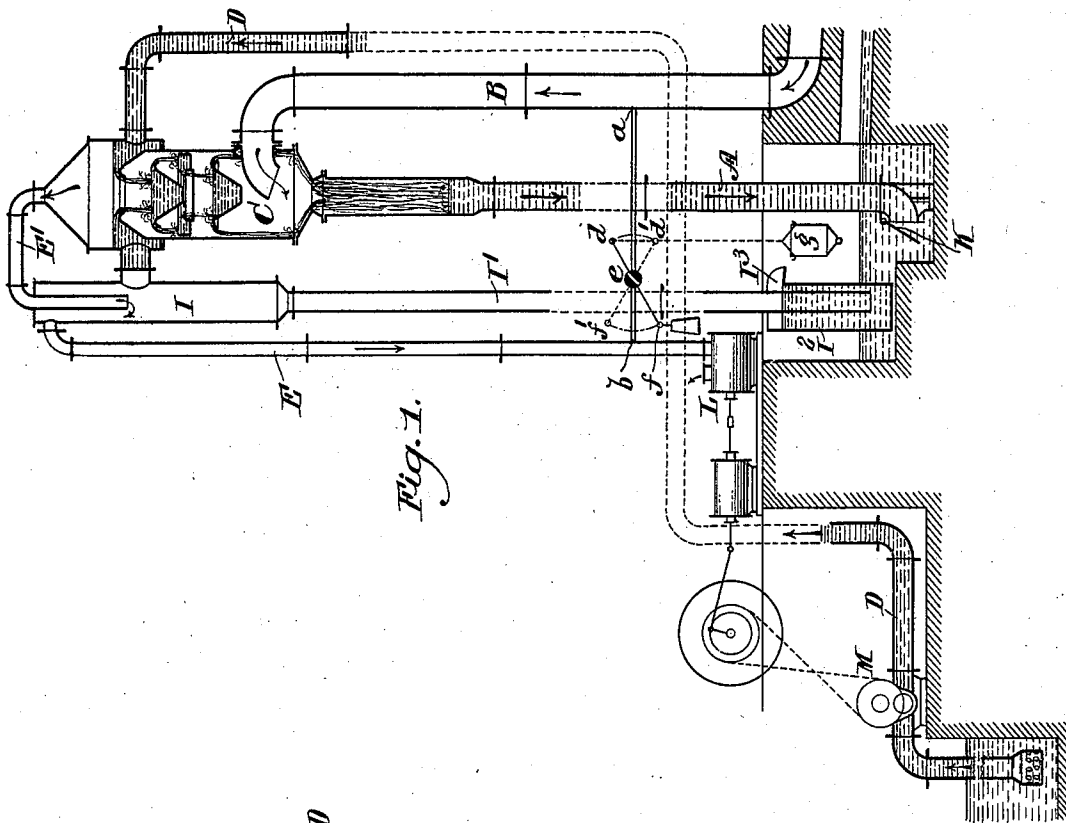


(No Model.)

F. J. WEISS.
CONDENSER.

No. 577,996.

Patented Mar. 2, 1897.



Witnesses.

Harry Drury
Shawnee

Fig. 2.

Inventor.

Franz Joseph Weiss
 by J. Chambers
 his Attorney.

UNITED STATES PATENT OFFICE.

FRANZ JOSEPH WEISS, OF BASLE, SWITZERLAND.

CONDENSER.

SPECIFICATION forming part of Letters Patent No. 577,996, dated March 2, 1897.

Application filed December 5, 1896. Serial No. 614,645. (No model.) Patented in England September 17, 1892, No. 16,670; in Germany March 11, 1893, No. 67,485, and in Austria-Hungary March 23, 1893, No. 41,975 and No. 4,270.

To all whom it may concern:

Be it known that I, FRANZ JOSEPH WEISS, a citizen of the Republic of Switzerland, residing at Basle, in the canton of Basle, in the Republic of Switzerland, have invented a certain new and useful Improvement in Condensers, (for which I have obtained a German Patent No. 67,485, dated March 11, 1893, an Austria-Hungarian Patent No. 41,975/4,270, dated March 23, 1893, and a British Patent No. 16,670, dated September 17, 1892,) of which the following is a specification, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to the condensation of steam and other vapors, and particularly to the condensation thereof by counter-currents.

In apparatus heretofore employed for counter-current condensation trouble has been met with owing to the fact that as the temperature of the condensing water rises to what I may call the "ideal point"—viz., a temperature at which the water will pass into vapor at the pressure existing in the condenser—the condensing water is liable, by reason of being wholly or in large part vaporized, to cease to flow down in the opposite direction to the flow of steam and to rise with the steam into the exhaust-air pipe, thus converting the condenser into one working by parallel currents and of course tending to flood the air-pump.

The object of my invention is not to prevent the tendency to change from counter-current to parallel-current condensation, but to provide a method and means of operation by which when the change occurs the condenser can be quickly turned back again to counter-current condensation, and this I accomplish by providing a communicating pipe between the steam-pipe leading to the condenser and the exhaust-air pipe leading therefrom and regulating the opening of said connection so that as soon as the condenser begins to work by parallel currents the steam will be admitted direct to the air-exhaust pipe, in consequence of which the connection between the air-pump and the condenser will be impaired, permitting the vacuum in the condenser to fall, by reason of which the

rapid evolution of vapor from the condensing water will cease and the condenser return to the normal counter-current condensation. In my European patents above mentioned I have shown and described other devices for effecting the same results, and said other devices are intended to be covered by another United States Patent granted to me May 2, 1893, No. 496,761, my present application being limited to the mode of controlling the operation of the condenser by admitting steam to the air-exhaust pipe, as above described.

Reference is now had to the drawings which illustrate my invention, and in which—

Figure 1 is a sectional elevation showing a counter-current condenser provided with my improvement and in normal working order, while Fig. 2 shows the condenser when working by parallel currents.

A is the waste-water barometer-pipe of the condenser; B, the steam-pipe leading to the lower part of the condenser-body C, while D is the water-supply pipe leading to the upper part of C, and E' E the air-exhaust pipe leading from the top of C to the air-pump L.

M is the water-pump; K, the waste-water well; I, a separator into which the pipe E' extends and from the top of which extends the pipe E.

I' is a water barometer-pipe extending from the bottom of separator I and, as shown, running into a tank I², having a spout I³ at its top.

a b is a pipe connecting steam-pipe B and air-exhaust pipe E and having a cock e, to which is attached lever-arms, one, f, carrying a counterweight operating to close the valve, while the other, d, has attached to it a bucket g, hung so that water from spout I³ will run into it and having a hole in its bottom sufficient to permit the ready outflow of such water as will run into the bucket while the condenser is working normally, but insufficient to carry off the great flow of water consequent on the condenser working by parallel currents.

The operation of my device is readily followed. When the condenser is working normally, as shown in Fig. 1, the small amount of water carried through pipe E' is separated

from the air in I, and, passing down through I' into tank I², it runs into and through bucket *g* without adding to its weight or tending to turn cock *e*. When, however, the condenser works by parallel currents, as shown in Fig. 2, the great flow of water into the separator and from it through I' and I² to the bucket fills the bucket and, adding to its weight, overcomes that of the counterweight on lever *f* and turns cock *e*, as shown in Fig. 2, permitting steam from B to flow direct to pipe E and causing such a lowering of the vacuum in C as to bring about a prompt return to normal counter-current condensation.

I do not, save when my claims are expressly so limited, intend to confine myself to special details of the construction shown, but wish to be understood as asserting, broadly, my claims to originality in the means for lowering the vacuum in the condenser by admitting steam to the air-exhaust pipe.

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

1. The method of condensing steam and other vapors, which consists in exhausting or rarefying the air in the condenser, causing the condensing water and steam to pass through the condenser in counter-currents alternating with parallel currents, and temporarily admitting steam to the air-suction pipe to lower the vacuum and bring the condensation that

is effected by the parallel currents back to condensation by counter-currents.

2. The method of condensing steam and other vapors, which consists in exhausting or rarefying the air in the condenser, causing the condensing water and steam to pass through the condenser in counter-currents alternating with parallel currents, and temporarily admitting the exhaust-steam of the engine to the air-suction pipe to lower the vacuum and bring the condensation that is effected by the parallel currents back to condensation by counter-currents.

3. In a counter-current condenser arranged as described to work at intervals as a parallel-current condenser, a pipe *a b* connecting the steam-pipe and the air-suction pipe and a cock to open and close said pipe.

4. In a counter-current condenser arranged as described to work at intervals as a parallel-current condenser, a pipe *a b* connecting the steam-pipe and the air-suction pipe, a cock as *e* whereby said pipe is opened and closed and means as described whereby said cock is opened when the condenser temporarily works as a parallel-current condenser and closed when it resumes normal operation.

FRANZ JOSEPH WEISS.

Witnesses:

GEORGE GIFFORD,
ALFRED NAPFLE.