(No Model.)

E. THEISEN.

CONDENSING APPARATUS.

No. 447,123. Patented Feb. 24, 1891.

Fig. 2.

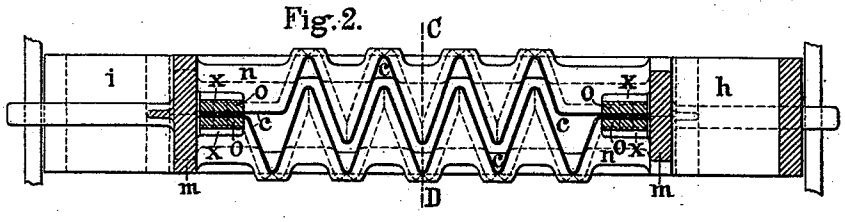


Fig. 3.

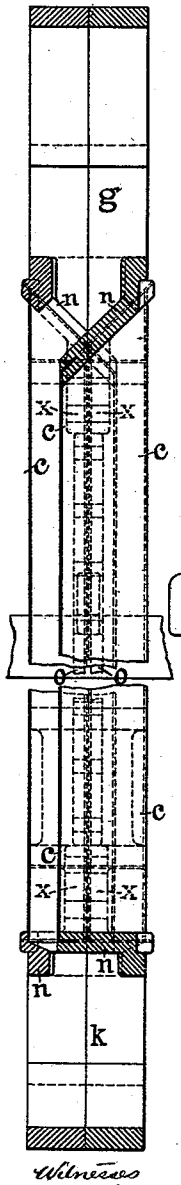
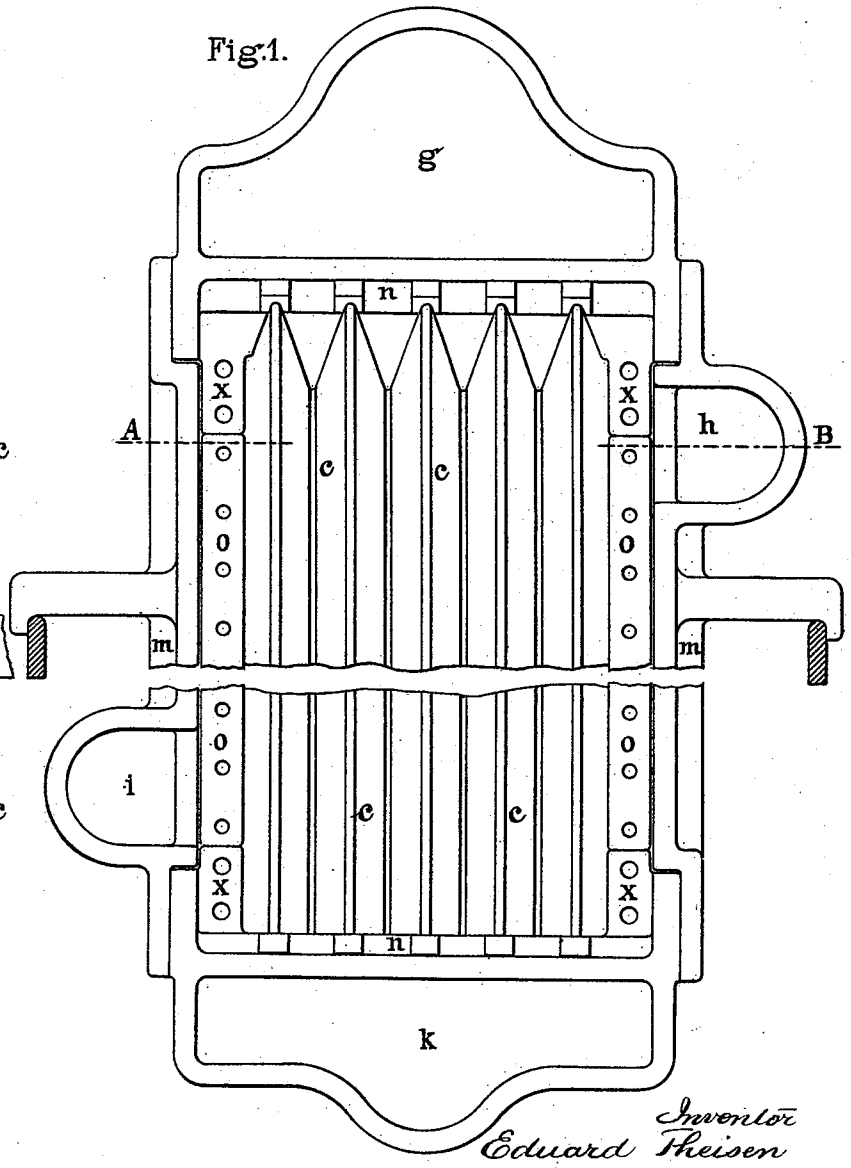


Fig. 1.



Witnesses
Chas. H. Smith
J. Stair

Inventor
Eduard Theisen
per Lemuel W. Serrell
atty

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EDUARD THEISEN, OF COLOGNE, GERMANY.

CONDENSING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 447,123, dated February 24, 1891.

Application filed September 29, 1887. Serial No. 251,000. (No model.) Patented in England March 2, 1887, No. 3,224; in France March 2, 1887, No. 181,912, and in Belgium March 2, 1887, No. 76,547.

To all whom it may concern:

Be it known that I, EDUARD THEISEN, of Cologne, in the Kingdom of Prussia, Germany, have invented certain new and useful Improvements in Condensing Apparatus, of which the following is a specification.

Letters Patent for this invention have been granted to me in Great Britain, dated March 2, 1887, No. 3,224; in France, dated March 2, 1887, No. 181,912, and in Belgium, dated March 2, 1887, No. 76,547.

My invention relates to apparatus for condensing steam and gaseous vapor in which the effect of the cooling-liquid is transmitted by corrugated metal plates.

The condenser is formed of plates of metal corrugated longitudinally. The ends of the sheet are secured into flanges upon the inlet and outlet passages by the metal thereof being cast around the edges of the sheet metal. Each plate has a cast-metal section or open ring at each end, and when a number of these are set together and clamped an entrance-port is formed at one end and an exit-port at the other end, with openings between the pairs of sheets, so that the vapors entering at the inlet end pass between the sheets and lengthwise of the corrugations and the condensed liquid passes out at the exit-port. The pairs of sheets are united at their edges by clamping-bars, and inlet and outlet ports for cooling-water are provided in the form of sections bolted to the pairs of end pieces or ports, so as to form condenser-sections with straight edges, to set one against another and be clamped together. The cooling-water passes across the corrugations from the inlet to the outlet pipe.

In the drawings, Figure 1 is an elevation of one of the divisions or chambers of my condensing apparatus. Fig. 2 is a cross-sectional plan at the line A B of Fig. 1, and Fig. 3 is a vertical section at the line C D of Fig. 2.

The metal sheets or plates *c* are corrugated longitudinally. The ring-shaped sections at one end as set together form a steam or vapor inlet or port *g* and at the other end they form an exit-port *k*. There is one such section at each end to each plate, and the metal thereof adjoining the sheets is cast with zigzag flanges *n*, corresponding to the corrugations of the sheets. Such flanges set tightly together at the water-spaces, but are at a suitable distance apart between the pairs of sheets to admit the vapors to pass between the pairs of sheets from *g* to *k* and longitudinally of the corrugations, and the sheet metal at its ends is bent, as seen in Fig. 2, so that the metal of the end sections is cast around the edges of the sheet metal at the ends, and it is preferable to notch the sheet metal at the inlet ends near the port *g* and cast the flanges at inclinations in opposite directions, as seen in Figs. 1 and 3, to give larger inlet-openings for the vapors to pass in between the pairs of sheets, and the flanges *x* are cast with the respective end sections, and these and the edges of the pairs of sheets come together and are bolted or riveted together, and the side bars *o* are introduced as continuations of the flanges *x*, and they are bolted together. The side plates *m* are between the end sections and bolted to them, and they are of a width corresponding to the pairs of end sections or rings, and with such side plates there are cast the inlet pipe or port *i* and outlet pipe or port *h*, respectively, and these open into the water-spaces between the pairs of plates, so that the cooling-water passes across the corrugated sheets from one side to the other.

Any desired number of condenser-sections may be put together to form one apparatus. I have shown only one of such sections.

I claim as my invention—

1. The combination, with the corrugated metallic sheets *c*, connected together at their straight edges by the bars *o*, of the cast-metal end sections with zigzag flanges receiving the ends of the sheets, such end sections being ring-shaped and setting together to form the inlet vapor-port *g* and exit vapor-port *k* with openings between the pairs of sheets, substantially as specified.

2. The combination, with the corrugated metallic sheets *c*, connected together at their straight edges by the bars *o*, of the cast-metal end sections with zigzag flanges receiving

the ends of the sheets, such end sections being ring-shaped and setting together to form the inlet vapor-port *g* and exit vapor-port *k* with openings between the pairs of sheets, and the side plates *m* and ports or pipes *i k* for the cooling-liquid, substantially as specified.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

EDUARD THEISEN.

Witnesses:

WILHELM WIESENHÜTTER,

MARTIN KÖRNER.