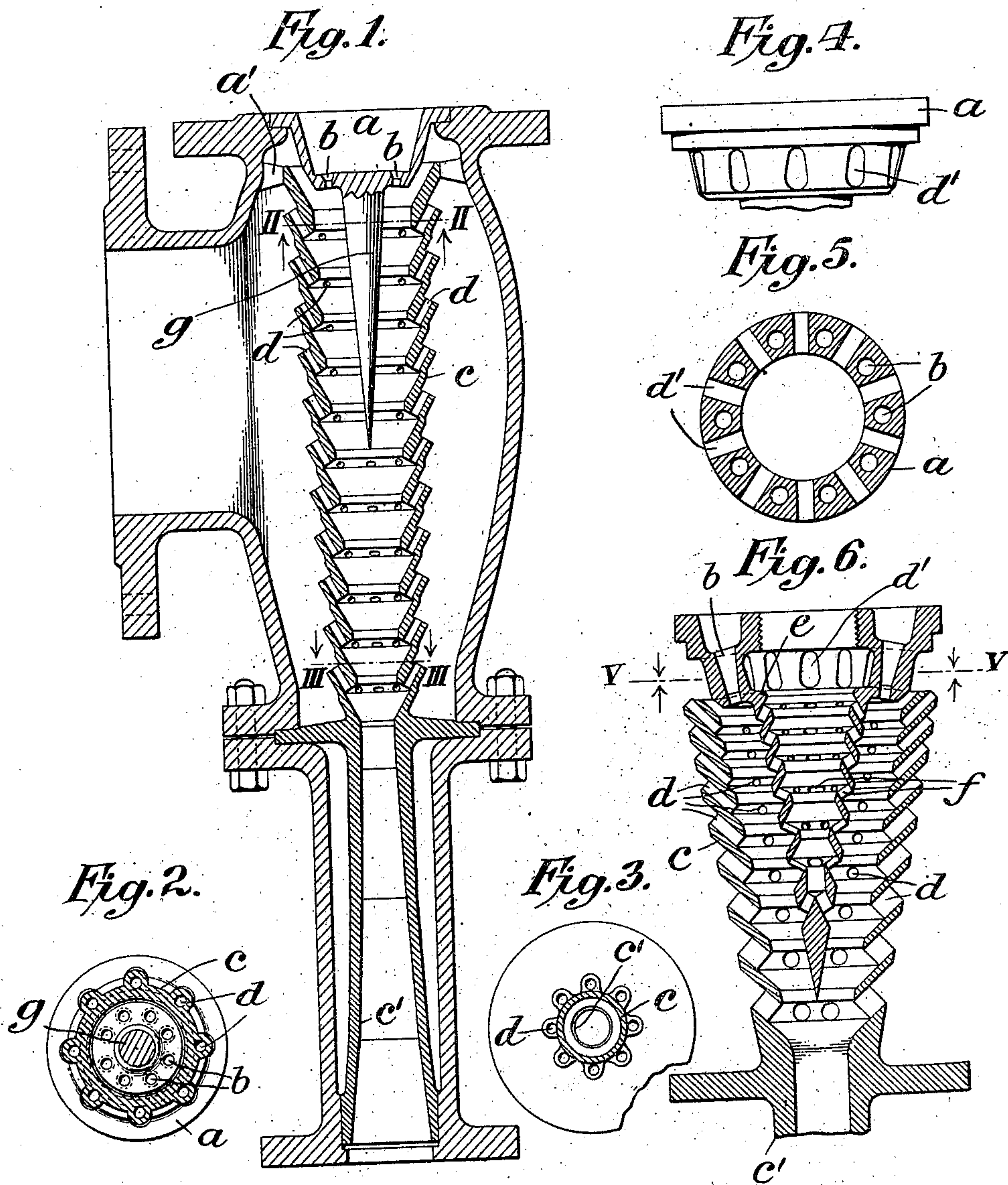


No. 847,010.

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E. KOERTING.
JET CONDENSER.
APPLICATION FILED JUNE 9, 1906.



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UNITED STATES PATENT OFFICE.

ERNST KOERTING, OF PEGLI, ITALY.

JET-CONDENSER.

No. 847,010.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ERNST KOERTING, a subject of the Emperor of Germany, and a resident of Pegli, Italy, have invented certain new and useful Improvements in Jet-Condensers, of which the following, taken in conjunction with the accompanying drawing, is a full and true specification.

The invention herein described relates to jet-condensers, and consists in certain improvements upon previous constructions whereby the vacuum and the cooling capacity is increased and the discharge of the condensed or cooled materials facilitated, as will be presently described in detail and more particularly pointed out in the appended claims.

Referring to the drawing, Figure 1 is a central axial section through a jet-condenser embodying one form of my invention. Figs. 2 and 3 are respectively transverse sections of the condensing-tube on lines II II and III III, respectively, of Fig. 1 and in the direction of the arrows. Fig. 4 is a detail in side elevation of the nozzle of a modified form of condenser. Fig. 5 is a transverse section of said nozzle on line V V on Fig. 6, and Fig. 6 is an axial section through the nozzle and condensing-tubes of said modified form.

The device comprises a main steam-casing adapted to be connected with the chamber from which the steam or other gas is to be exhausted, and contained within this casing is a condensing-tube *c*, which is perforated by a multiplicity of steam-passages *d*, inclined toward the discharge-opening, as shown in the drawing. At its upper end the said tube is held between lugs *a'* on the casing and in line with an opening in the upper end thereof, at which point there is provided a water-nozzle *a*, and at its lower end the tube is provided with a tail-tube *c'*, passing through a lower opening in the casing, from which the condensed steam and gases may be discharged to atmosphere. The nozzle *a* is formed as a chamber located in the opening of the casing at the end of the tube and is adapted to be connected with a water-supply in any suitable manner. The partition between the chamber and the tube is provided with a number of small jet-holes *b*, which are so arranged that the water-jets emitted therefrom are directed along the wall of the condensing-tube, past the openings *d* thereof, and converge at or near the junction of

the condensing-tube with the tail-tube. A central tapered projection *g* is carried by the water-nozzle, as shown, for guiding the jets. The said jet-holes *b* are preferably arranged in one or more circles concentric with the axis of the tube, so that the water-jets occupy the surface of an imaginary cone, which has its axis coincident with that of the tube. The condensing-tube also is tapered so that its perforated wall is substantially parallel with the convergent jets.

In operation the convergent jets create a partial or comparative vacuum within the condensing-tube, and the steam entering the tube through the inclined passages *d* encounters the water and is thereby cooled and carried out through the tail-tube. By virtue of the multiplicity of jets a maximum water area is provided as a cooling-surface for the steam, and in addition to this increased cooling effect the permanent gases always contained in the steam are attracted into the space inside the bundle of jets, where they become imprisoned in the water at the point of impingement and are from thence carried off with the water in a manner which I find to be superior to the previous method of allowing them to pass between a single solid jet and the wall of the tube. At the same time a greater vacuum is secured.

In the form of condenser shown in Figs. 4-6 means are provided for admitting the steam directly into the space inside the bundle of jets, which means may be employed either with or without the condensing-tube *c*, and comprehends in the present case a series of lateral steam-passages *d'* in the nozzle interlocated between the jet-holes *b* therein and opening centrally of them. For the purpose of conducting the steam from these passages into intimate contact with the water a tapered chamber or tube *e* is formed on the nozzle, which has inclined steam-passages *f*, like those of the tube *c*, and takes the place of the central guide of Fig. 1. The convergent water-jets pass alongside of the wall of this tube and draw the steam out of it in the same manner as in the case of the tube *c*. When this tube is employed in conjunction with the tube *c*, its effect is obviously supplemental thereto. In the case of either tube the inclined steam-passages are interlocated between the water-jets, so that the steam issuing from said passages does not impinge directly upon said jets or distort

them. This relation will be observed in Fig. 2, which shows the steam-passages *d* alternated in position with the jet-holes *b*.

While the tail-tube is shown herein as an integral part of the condensing-tube, it will be understood that this form of construction, though preferable in the form of Fig. 1, is not essential and that other means of exhausting or discharging the condensed materials may be employed.

I claim—

1. In a water-jet condenser, the combination of a perforated tube, means for supplying steam to the perforations thereof and a water-nozzle adapted to emit a number of convergent water-jets past the openings of said perforations.

2. In a water-jet condenser, a steam-chamber and a perforated tube therein having one end connected with a discharge-opening, and a water-nozzle at the other end of said tube adapted to emit a plurality of water-jets through the said tube.

3. In a water-jet condenser, a condensing-tube having a multiplicity of steam-passages through its wall, a discharging-tube at the end of the said tube and means for directing a series of water-jets past the openings of said condensing-tube, convergent at or near the junction of the said tubes.

4. In a water-jet condenser, a perforated tube with one end open to discharge, in combination with a water-chamber at the other end of said tube and a number of jet-holes formed in the partition between said chamber and tube whereby a plurality of converging water-jets may be directed through said tube.

5. In a water-jet condenser, a condensing-tube and a water-nozzle having a number of jet-holes located in a circle concentric with the axis of said tube and adapted to emit water-jets which converge at a point in the axis of said tube.

6. In a water-jet condenser, a steam-cas-

ing and contained therein a tube having steam-passages in its wall, in combination with a water-nozzle at the end of said tube provided with circularly-arranged convergent jet-holes, and a central tapered jet-guide between said holes.

7. In a water-jet condenser, a steam-casing and a water-nozzle adapted to emit a number of converging water-jets within said casing, in combination with means for conducting the steam to the inside and outside of said convergent jets.

8. In a water-jet condenser, a water-nozzle adapted to emit a number of convergent jets and having lateral perforations adapted to admit steam to the space inside of said convergent jets.

9. In a water-jet condenser, a water-nozzle adapted to emit a number of convergent water-jets and a tube having its wall substantially parallel with said jets and perforated to admit steam into contact with said water.

10. In a water-jet condenser, a water-nozzle, adapted to emit a number of water-jets, and a tube or chamber adjacent said water-jets having steam-conducting passages in its wall, said passages being interlocated with respect to said water-jets, whereby the steam is directed through said jets.

11. In a water-jet condenser, a water-nozzle having a circularly-arranged series of jet-holes, a part within said jet-holes having passages therein adapted to conduct steam to the interior of the water-jets and a part surrounding said jet-holes having passages for admitting steam to the exterior of said jets.

In testimony whereof I have signed my name to the specification in the presence of two subscribing witnesses.

ERNST KOERTING.

Witnesses:

AUGUST A. LORZER,
H. G. KIMBALL.