

No. 684,905.

Patented Oct. 22, 1901.

C. A. BOURDON.
EJECTO-CONDENSER.

(Application filed May 15, 1897.)

(No Model.)

FIG. 3.

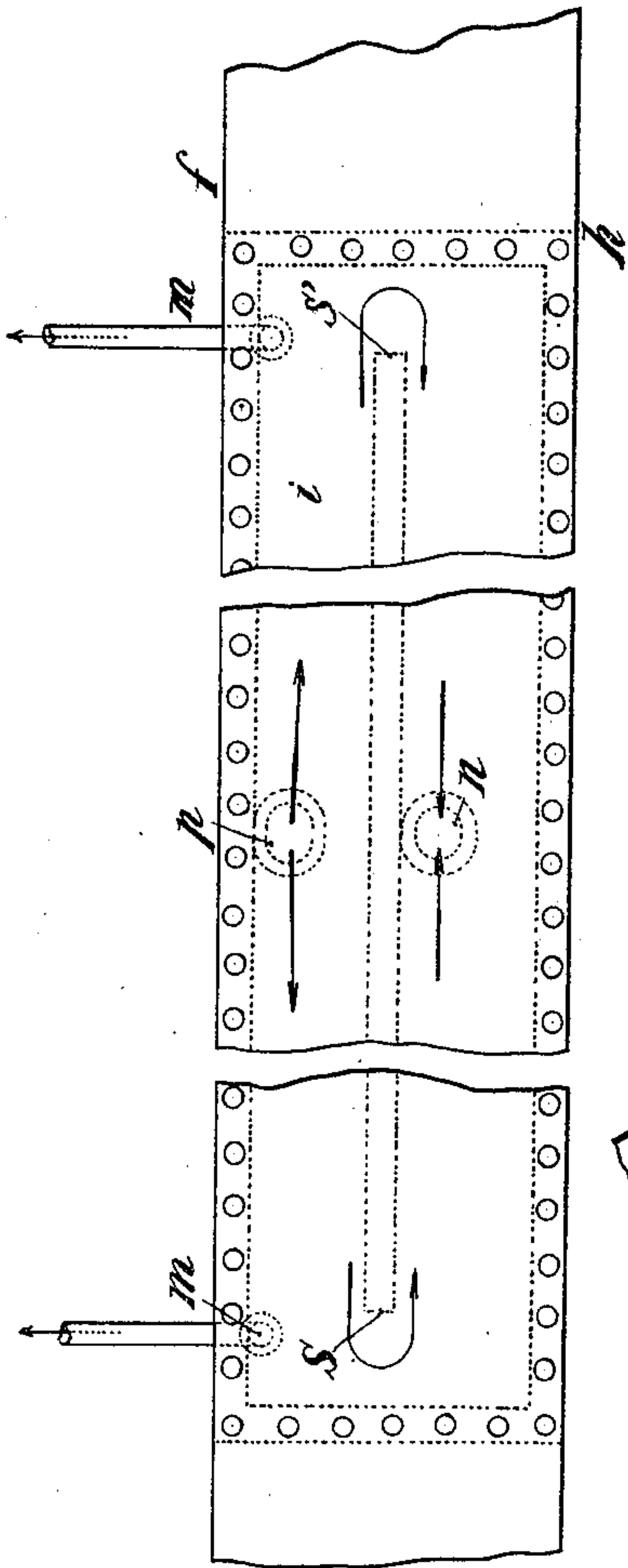
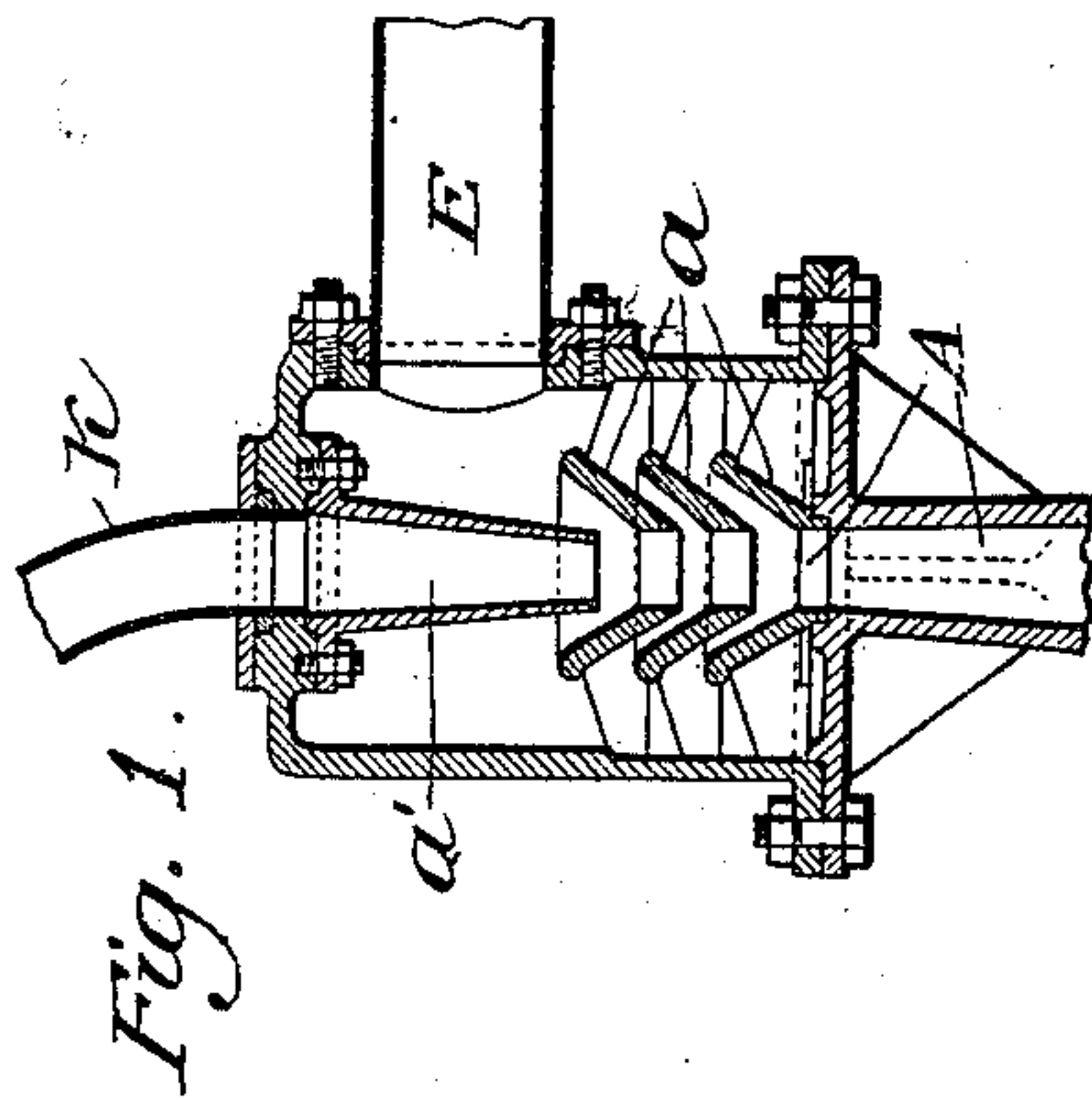
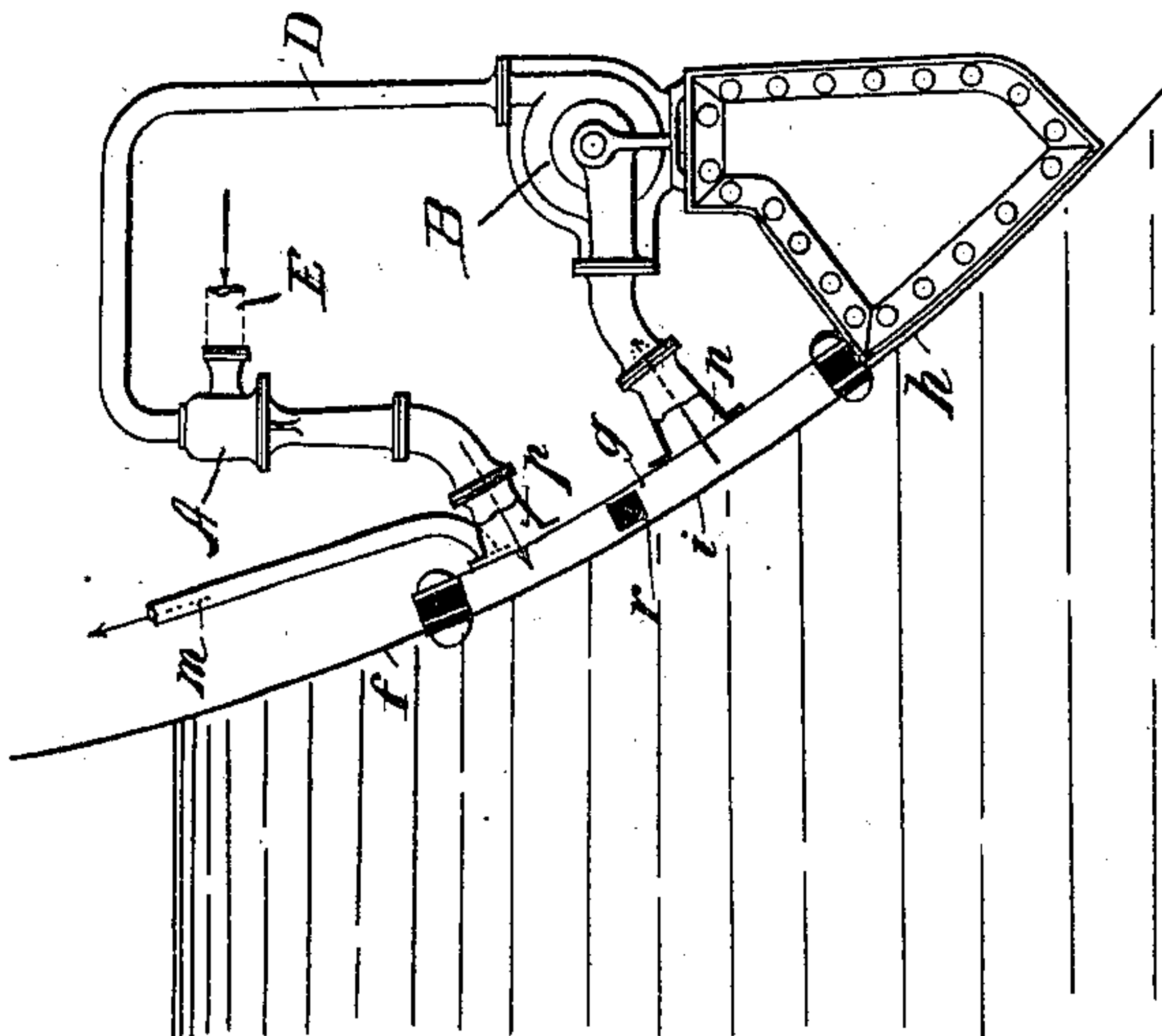


FIG. 2.



Witnesses

Ed. C. House

Wm. E. Smith

Inventor

Chas. Alexander Bourdon

By

Brissau & Thwaites

his Attorneys

UNITED STATES PATENT OFFICE.

CHARLES ALEXANDRE BOURDON, OF PARIS, FRANCE.

EJECTO-CONDENSER.

SPECIFICATION forming part of Letters Patent No. 684,905, dated October 22, 1901.

Application filed May 15, 1897. Serial No. 636,603. (No model.)

To all whom it may concern:

Be it known that I, CHARLES ALEXANDRE BOURDON, of the city of Paris, France, have invented an Ejecto-Condenser, (for which I have obtained Letters Patent in France for fifteen years, dated July 18, 1896, No. 258,173, and in Belgium for fifteen years, dated January 14, 1897, No. 125,732,) of which the following is a full, clear, and exact description.
My invention relates to an exhaustor termed an "ejecto-condenser," principally designed to replace the condenser and air-pump of a steam-engine.

I will describe, as an example, the apparatus as used for marine engines and which is illustrated in the accompanying drawings, wherein—

Figure 1 is a vertical sectional view of the ejector. Fig. 2 is a side elevation, with parts in section, of an apparatus embodying my invention. Fig. 3 is a detail face view of a portion of the same.

In the drawings, A designates the ejector, which is shown in detail in Fig. 1. This ejector is provided with diverging cones *a*, between which steam from an exhaust-pipe E is adapted to pass, whereas the liquid jet issues from the nozzle *a'* and passes through a pipe *p* to a cooler to be hereinafter described. From the cooler water passes through a suitable pump B, which forces it through a pipe D to nozzle *a'*, and in this manner a column of water is maintained in continuous circulation in a closed circuit.

In accordance with my invention a cooler is used of which the cooling-surfaces are formed by the side of the vessel itself. Supposing the plates to be clinker-built and that *f g h*, Figs. 2 and 3, are three successive plates below the water-line, then if on the exterior of the hull parallel to the plate *g* a thin plate *i* be riveted a longitudinally-extending narrow chamber is formed by the skin of the ship, which may, if necessary, extend the entire length of the hull and which being in direct contact with the sea-water acts as a cooler, which is the more effective the greater the speed of the vessel and through which is passed the water expelled by the ejecto-condenser. In order to reduce the piping to what is strictly necessary, the chamber is divided at *r* into two parts communicating at the extremities only by passages *s*

s'. The hot water entering by pipe *p* traverses to right and left the whole length of the chamber and returns by pipe *n* to the ejecto-condenser. *m m* are air-vent pipes, one at each end of the chamber and extending up above the water-line, and through these vent-pipes is carried the surplus water.

The apparatus is characterized by the fact that the same mass of water is made to pass continuously through a biconical ejector-nozzle, so that, first, the water shall absorb all the steam which it can take up; second, provide sufficient energy to carry off through the ejector the gases to be exhausted, and, third, restore by the pump the energy of the water issuing from the biconical ejector, so that the only expenditure is that necessary to compensate for loss of pressure due to the circulation of the liquid in the apparatus.

I am aware that it has previous to my invention been attempted to conduct the exhaust-pipe of the engine into the skin of the ship and to return the water while still warm to the boiler. No such object is sought by my invention, which seeks to utilize the skin of the ship as part of the continuous circuit containing an ejector for rapidly cooling the products of condensation during a series of rotations thereof through the system.

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

In combination with a ship having a hollow skin or wall, a closed system of circulation-pipes connected therewith, said closed system containing a pump and an ejector and an exhaust-supply pipe, the hollow skin or wall of the ship having an air and water discharge pipe or pipes all arranged to produce a continuous circulation of the products of condensation in the closed system of pipes and in the hollow wall of the ship and to utilize said products of condensation as a condensing means substantially as and for the purposes specified.

The foregoing specification of my ejecto-condenser signed by me this 29th day of April, 1897.

CHARLES ALEXANDRE BOURDON.

Witnesses:

EDWARD P. MACLEAN,
MAURICE HENRI PIGNET.