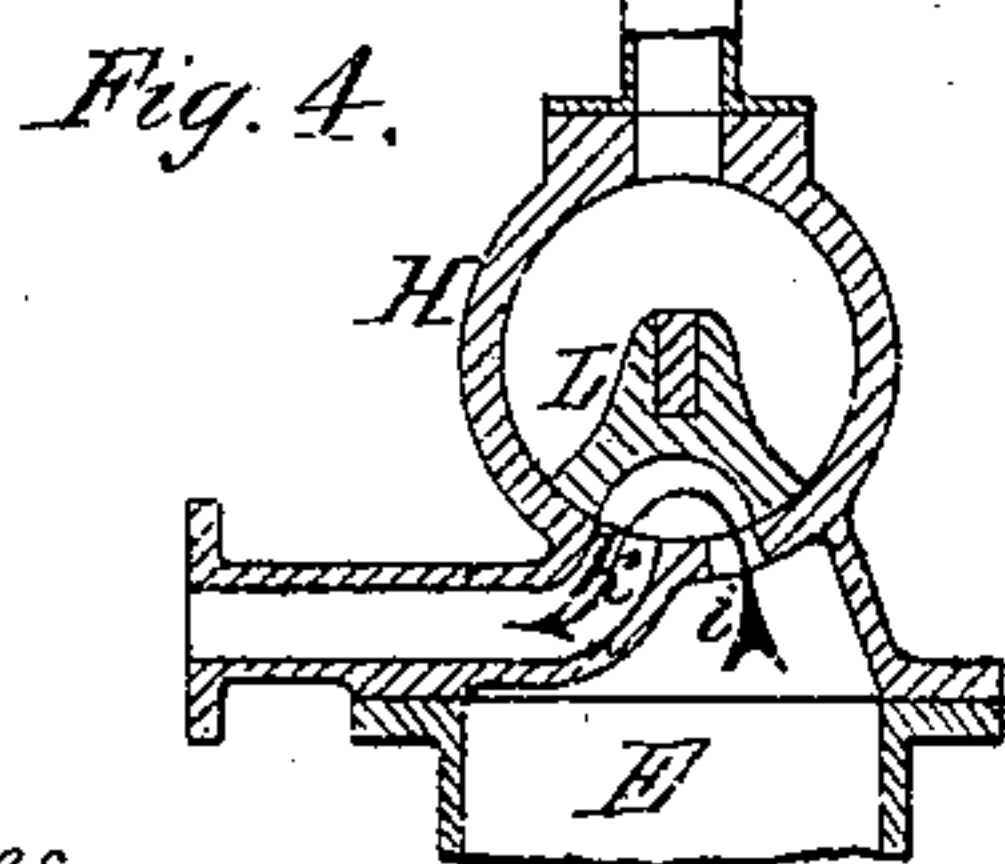
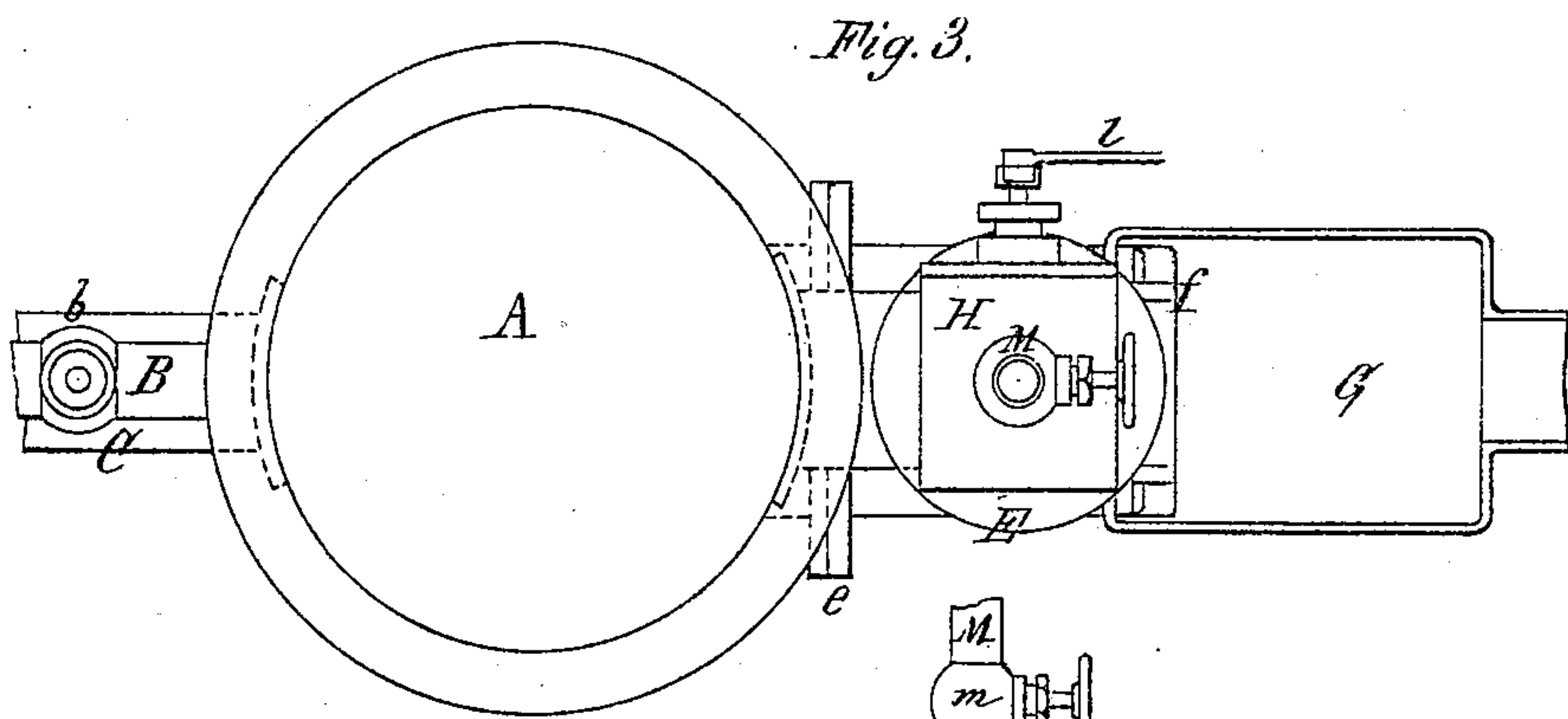
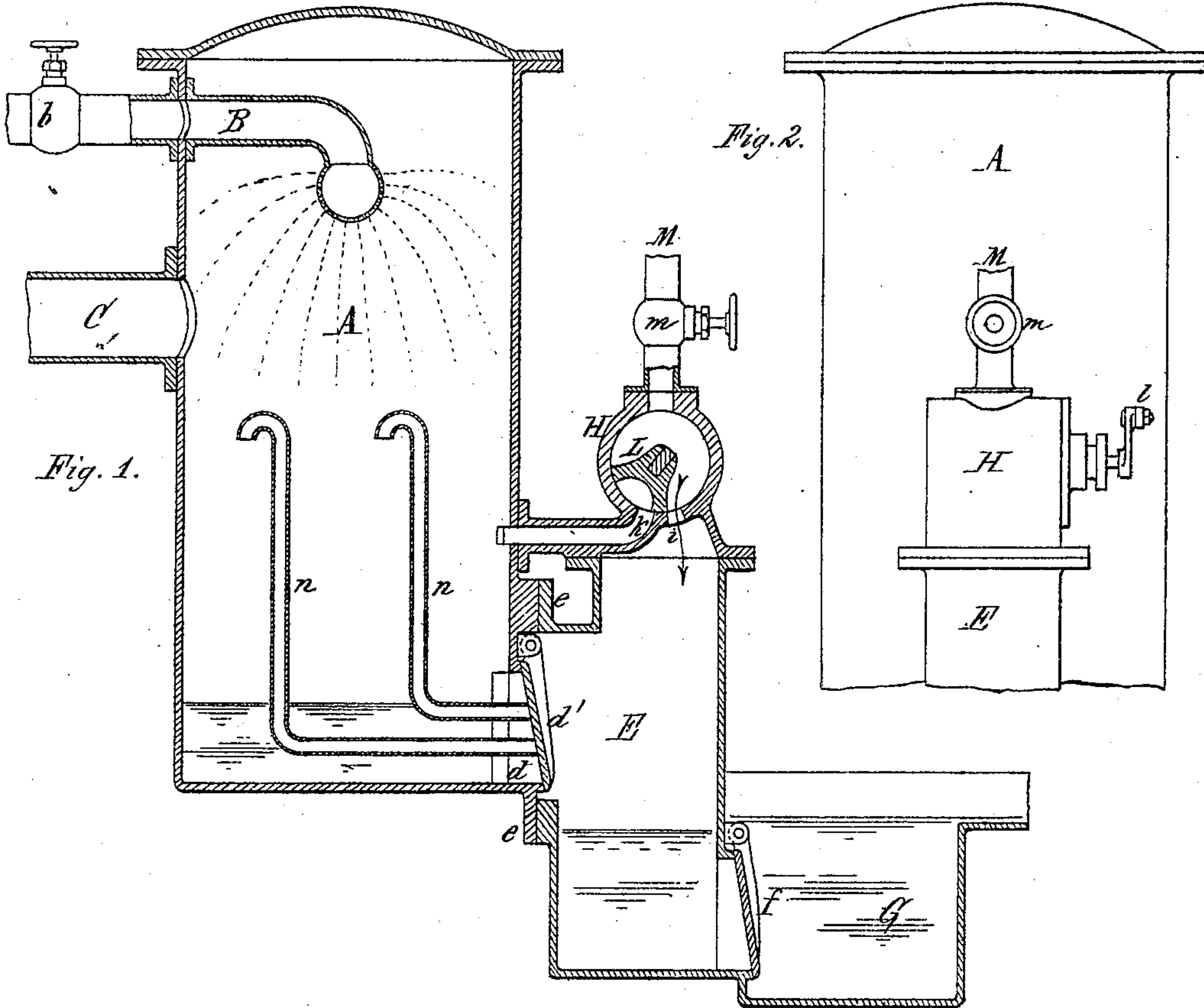


J. L. ALBERGER.
Steam Condensers.

No. 139,102.

Patented May 20, 1873.



John J. Connor.
George J. Metzger.
 Witnesses

John L. Alberger Inventor
by Jay Hyatt Atty.

UNITED STATES PATENT OFFICE.

JOHN L. ALBERGER, OF BUFFALO, NEW YORK.

IMPROVEMENT IN STEAM-CONDENSERS.

Specification forming part of Letters Patent No. **139,102**, dated May 20, 1873; application filed April 2, 1873.

To all whom it may concern:

Be it known that I, JOHN L. ALBERGER, of the city of Buffalo, in the county of Erie and State of New York, have invented certain Improvements in Steam-Condensers, of which the following is a specification:

My invention relates to a condensing apparatus in which the water and air from the condenser intermittently flow into an auxiliary vessel, from which they are expelled by the direct pressure of steam supplied thereto, whereby the use of the ordinary air-pump for the purpose is dispensed with, and a saving in the cost of the apparatus and in the power required to operate it is effected. The invention consists, first, in the combination, with a condensing-vessel and an auxiliary exhausting or water and air expelling vessel, connecting with the bottom of the condenser and with the hot-water well by two foot-valves, which permit the water to flow from the condenser into the auxiliary vessel and its escape therefrom, but prevent its reflux, of a steam chamber and valve, through and by which steam from the boiler is first let into the auxiliary exhausting-vessel for expelling the water and air therefrom, and then allowed to exhaust through the same into the condensing-vessel, whereby an equilibrium is established or restored between the two vessels, which induces a flow of water and air from the condenser into the auxiliary vessel preparatory to their expulsion therefrom, as first described; second, in the combination, with the condenser and water and air expelling vessel, of one or more air-pipes arranged within the condenser, with their upper ends above the water-level while their lower ends terminate in contact with and are closed by the foot-valve of the condenser, so that, when said valve is opened for the passage of the water and air from the condenser to the expelling-vessel, the air contained in the former will pass through said pipes into the latter, thus providing an outlet for the free escape of the air at all times, irrespective of the height of the water-level in the condenser.

In the accompanying drawing, Figure 1 is a sectional elevation of my improved condensing apparatus. Fig. 2 is a fragmentary end elevation, and Fig. 3 a plan view thereof.

Fig. 4 is a detached sectional elevation of the valve-chamber with the steam-valve in a reversed position.

Like letters designate like parts in each of the figures.

A represents the condensing-vessel; B, the injection-pipe, provided with a stop-cock, *b*; and C, the steam-exhaust pipe, all constructed and arranged in a common and well-known manner. E is the vertical water and air expelling vessel, arranged side by side with the condensing-vessel A, and secured thereto at the base by flanges *e*. *d* is the opening, closed by a foot-valve, *d'*, through which the condenser A and vessel E communicate at the bottom. The vessel E is provided with an exterior foot-valve, *f*, opening outward into an open water-receptacle or hot well G', and preferably so arranged as to be immersed at all times. H is the steam-chamber, arranged above the vessel E, and provided with two ports, *i* and *k*, the former communicating directly with the vessel E, while the latter leads to the condenser A. L is a rocking or other suitable steam-valve, arranged in the chamber H, and operated by a rod, *l*, connecting with an eccentric on the driving-shaft of the steam-engine, or with any other suitable moving part. M is the steam-pipe leading from the boiler, and provided with a valve or stop-cock, *m*, by which the admission of steam to the chamber H is regulated. An automatic regulating-valve is preferably arranged in the pipe *m*, so that a uniform steam-pressure is always maintained in the expelling-vessel E, irrespective of the varying pressure in the boiler. *n* represents one or more air-pipes, arranged in the condenser A with their upper ends above the water-level, while the lower ends terminate and are secured in one of the bridge-pieces of the seat of the foot-valve *d'*, so as to be closed by the latter, as clearly shown in Fig. 1. The upper ends of these pipes are preferably curved, as shown, or provided with a hood to prevent the injection-water from entering the same.

The operation of my improved apparatus is as follows: The steam-valve L being in the position shown in Fig. 1, steam from the boiler is admitted to the vessel E, the pressure of which closes the valve *d'*, and expels the air

and water contained in the vessel through the valve *f*. The valve *L* being now reversed, as shown in Fig. 4, the supply of steam is cut off, the valve *f* closed by the pressure of the external air, and the steam from the vessel *E* exhausted into the condenser *A* through the ports *i* and *k*, where it is condensed, together with the steam entering through the pipe *C*. An equilibrium is thus established between the two vessels through the ports *i* and *k*, when the water and air in the condenser flows through the valve *d* into the vessel *E*. Steam is now again admitted into the vessel *E* and the air and water contained therein expelled, as above described. The pipes *n*, extending above the usual water-level in the condenser, permit the free escape through them of the air simultaneously with the water into the vessel *E*, which insures a more perfect exhaustion of the air from the condenser, when the water rises above the top of the valve *d*'.

The valve *L* is so connected with a moving part of the engine, either directly or by interposed gear-wheels, that its movements correspond with the accumulation of water and air in the condenser, so that the same is expelled therefrom as fast as it accumulates therein, in the same manner as an ordinary air-pump performs this function.

When my improved condenser is used for exhausting a vacuum-pan or similar apparatus in which no steam-motor is required, a small steam-engine, of sufficient size to operate the valve *L*, may be employed for shifting the same.

Two expelling-vessels, *E*, of lesser size may be used with the condensing-vessel *A*, if preferred, when the two steam-valves *L* thereof are operated alternately, so that the action of the two expelling-vessels corresponds with that of a double-acting air-pump.

It is evident from the foregoing that the cost of construction of an air-tight piston and the power required to overcome its friction, incident to the use of an ordinary air-pump, are entirely saved by the employment of my improved apparatus, which is equally efficient and reliable, and less liable to get out of order.

I claim as my invention—

1. The combination, with a steam-condensing vessel and the auxiliary water and air expelling vessel, communicating therewith at the bottom and provided with water inlet and outlet valves, of the valve-chamber *H* and steam-valve *L*, by which steam from the boiler is admitted to said auxiliary vessel for expelling the water and air therefrom, and thence exhausted into the condenser, substantially as hereinbefore set forth.

2. The combination, with the condenser and auxiliary water and air expelling vessel and foot-valve *d*', of the air pipe or pipes *n*, arranged substantially as hereinbefore set forth.

JOHN L. ALBERGER.

Witnesses:

JOHN J. BONNER,
GEORGE J. METZGER.