# Craig & Brevoort,

## Condenser.

No. 113,021. Patented Mar. 28, 1871.

Fig. 1.

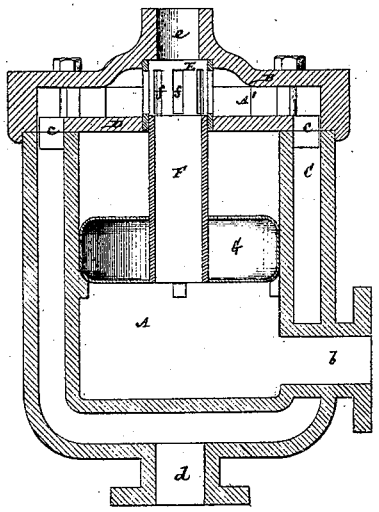



Fig. 2.

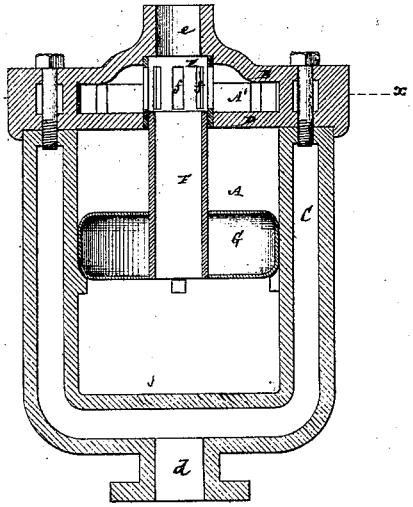



Fig. 3.

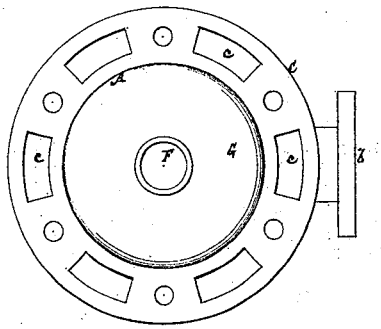
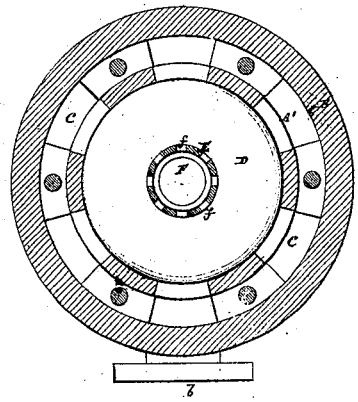



Fig. 4.




Witnesses.

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN CONDENSERS FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **113,021**, dated March 28, 1871.

*To all whom it may concern:*

Be it known that we, WILLIAM CRAIG, of Newark, in the county of Essex and State of New Jersey, and HENRY L. BREVOORT, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Condensers for Steam-Pumps and other purposes; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification, and in which—

Figures 1 and 2 represent vertical sections, at right angles to each other, of a condenser constructed in accordance with our improvement; Fig. 3, a plan of the same, with an upper chamber arranged on top of the condenser removed; and Fig. 4, a horizontal section taken as indicated by the line *x x* in Fig. 2.

Similar letters of reference indicate corresponding parts.

This invention resembles in its leading features or general principle of action the condenser described in Letters Patent (No. 109,113) of the United States granted to us on the 8th day of November, 1870. The same is also applicable for a like purpose, but may be used as a condenser generally for steam-engines and other purposes. It will suffice here, however, to describe it as a condenser for steam-pumps, by means of which a vacuum may be produced on the exhaust side of the steam-piston at each stroke of the pump, and the heat of the exhaust-steam be communicated to the water forced by the pump.

The invention includes a float operating as a valve to control in an automatic manner the ingress of water to the condenser; also, a water-jacket surrounding the body of the condenser, within which said float is arranged; and consists in a combination, with these devices, of an upper chamber and novel arrangement of water-supply passages, whereby the top of the condenser is kept cool, and a more rapid or perfect condensation is effected by the impinging of the water on the steam as it enters the condenser.

Referring to the accompanying drawing, A represents the body of the condenser, designed to be connected by a branch, *b*, with the inlet of the water-cylinder of a steam-pump.

A′ is an upper chamber, formed by a hollow cap-plate, B, arranged on top of the body or main chamber A, and of a surrounding or inclosing water-jacket, C, with which latter said upper chamber, A′, is in communication by openings *c*.

The chambers A A′ are separated from each other by a dividing-plate, D, which makes of them distinct chambers. Connected with the water-jacket C below is the suction pipe or branch *d*, through which water is supplied to the jacket from a well or other suitable source, under control, if desired, by a hand-valve.

E is a perforated tube arranged within the upper chamber, A′, and connecting the exhaust-steam pipe or inlet *e* from the engine or steam-cylinder of the pump with a tube, F, arranged to slide up and down within the perforated tube E, and open at its ends to establish communication between the exhaust-steam inlet *e* and water-space below the float G, that carries said tube F. The float G is free to rise and fall within the chamber A either by its own buoyancy or by the aid of balance-weights, and operates as an automatic valve to control ingress of water to the condenser, accordingly as its tube F, in rising and falling, is made to open or close the perforations *f* in the tube E, which establishes communication with the upper chamber, A′, and, through the opening *c*, with the water-jacket C, thus regulating the supply of water to the condenser, and shutting it off altogether when there is an extreme supply, to prevent flooding of the condenser.

It is desirable to make the perforations *f* in the tube E of a vertical oblong form, and of a greater combined area than the area of such tube, or than that of the suction-inlet *d*.

The exhaust-steam entering the condenser or perforated tube E comes in contact with the water drawn up through the jacket, and passing through the perforations *f* of said tube, which causes a quick or immediate condensation, and under this arrangement not only does the water-jacket take up the heat from the exhaust-steam, but it constitutes a water-course of extensive area or capacity to supply the condenser with water, and its only outlet is through the perforations *f*, which, by their arrangement, produce a direct impinging

action of the water-jacket on the incoming steam, the condensed steam and hotter water falling below the float, from whence it is drawn off by the pump. The upper chamber, A′, receiving the water through it and over the cover of the main body or chamber A, serves to prevent the heating of the condenser at its top, and by it the water in said chamber is made to retain the heat derived from the steam, which, in using said water to feed the boiler of the engine, will be an advantage.

The opening for the introduction of the water among the steam, instead of being in the form of vertical slits *e e*, as represented in the drawing, may consist of a narrow horizontal opening all around the top of the tube or valve E.

What is here claimed, and desired to be secured by Letters Patent, is—

The combination, with the body or main chamber A, of the upper chamber, A′, the perforated tube E, the steam-inlet *e*, the float G, with its tube F, and the jacket C, through which the water is conducted to the upper chamber, A′, substantially as specified.

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Witnesses:
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