

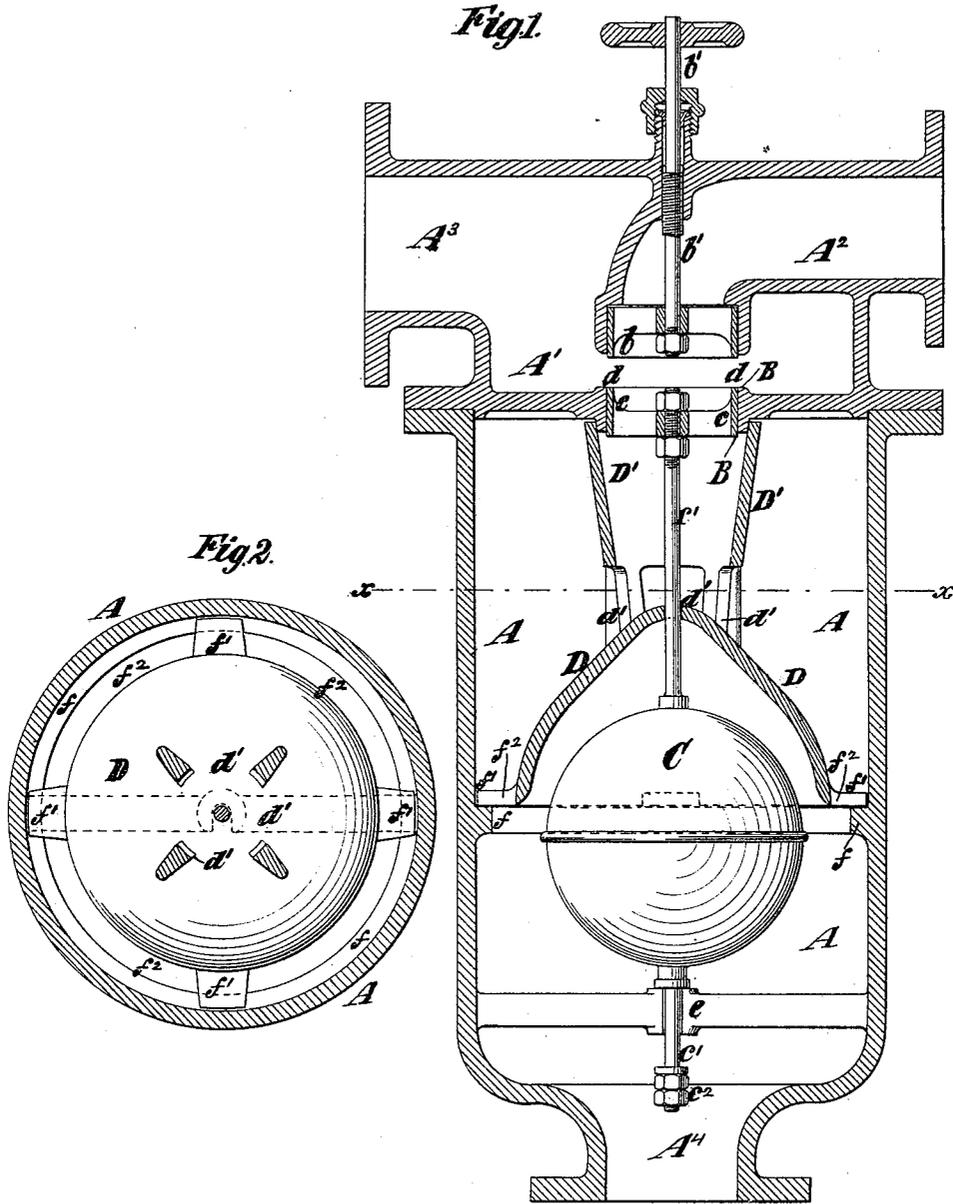
(No Model.)

W. CRAIG.

CONDENSER FOR STEAM PUMPS.

No. 346,195.

Patented July 27, 1886.



Witnesses:

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Emil Heister.

Inventor:

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# UNITED STATES PATENT OFFICE

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## CONDENSER FOR STEAM-PUMPS.

[SPECIFICATION forming part of Letters Patent No. 346,195, dated July 27, 1886.

Application filed March 26, 1886. Serial No. 196,633. (No model.)

### *To all whom it may concern:*

Be it known that I, WILLIAM CRAIG, of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Condensers for Steam-Pumps, &c., of which the following is a specification.

My invention relates to condensers which are arranged in the suction-pipe of a steam-pump, or otherwise supplied with water, and which, by their connection with the steam-cylinder of the pump or with the cylinder of a motive-power engine or with a vacuum-pan, produce a vacuum on the exhaust side of the steam-piston or in the vacuum-pan, the quantity of water entering the condenser being controlled by a float, so as to prevent the condenser from being flooded and the vacuum destroyed. Examples of condensers of this class are shown in United States Letters Patent granted November 8, 1870, and March 28, 1871, to Craig and Brevoort, and numbered, respectively, 109,113 and 113,021.

Important objects of my present invention are to enable a float consisting of a simple hollow sphere to be used, as distinguished from an annular float, and to shield the float from the weight of the falling water entering the main body of the condenser through a central passage, and to prevent the float from being affected by the agitation of water in the condenser, and to remain in comparatively still water.

In carrying out my invention I employ, in connection with the body of the condenser and an upper compartment or chamber provided with inlets for steam and water, and communicating with the body by a throat controlled by a vertically-moving valve, a spherical or other float of simple form arranged in the body and connected by a stem with the valve, and a shield arranged in the body of the condenser above the float, and through which the float-stem works, the shield serving to protect the float from the action of the water descending through the aforesaid throat. This shield may with advantage comprise a pipe or tubular casing, formed integral with it, and forming a downward continuation of the throat through which the steam and water descend, and insuring a more complete condensation of the steam, and this pipe or casing has lateral open-

ings near the shield providing for the ready escape of water from the pipe or casing into the body of the condenser. I also prefer to employ a valve arranged opposite the float-controlled valve for more accurately controlling the opening through which water must pass to escape from the upper chamber into the body of the condenser.

The invention will be more fully hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical section of a condenser embodying my invention; and Fig. 2 is a horizontal section on the plane of the dotted line *x x*, Fig. 1.

Similar letters of reference designate corresponding parts in both figures.

A is the body of the condenser, and A' an upper chamber or compartment constructed with an inlet, A<sup>2</sup>, for steam, and an inlet, A<sup>3</sup>, for water. At the bottom of the body A is a water-outlet, A<sup>1</sup>, which may be connected with the suction-pipe of the steam-pump, if the condenser be employed in connection with a steam-pump. The steam-inlet A<sup>2</sup> is presented downward, and is provided with a valve, *b*, which may be adjusted upward and downward by a stem, *b'*, projecting upward to the top of the condenser, and opposite the downwardly-presented steam-inlet A<sup>2</sup> is a throat, B, through which steam and water must pass to the body A of the condenser from the upper chamber, A'. In the throat B is a valve, *c*, controlled by a float, C, through a stem or rod, *c'*, and as the float rises and falls the valve *c* will be adjusted upward or downward. As here represented, the valves *b* and *c* are of ring shape, and the steam and water pass freely through them in an axial direction, the valves serving simply to control the size of the lateral opening *d*, through which water must pass to enter the throat B. The steam passes directly downward from the inlet A<sup>2</sup> through the throat B, and the water pouring inward through the lateral opening *d* and downward upon the steam is very effective in condensing the steam. The float is of spherical or other simple form, and its stem *c'* below may be guided in a bridge, *e*, and have applied to it nuts *e'*, for limiting the upward movement of the float and valve. Before the water rises in the body of the condenser, so as to materially lessen the vacuum-space therein, the rising of

the float raises the valve *c* and reduces the area of the lateral opening *d*, so as to lessen the volume of water entering the body of the condenser. Above the float *C* is a shield, *D*, which is of inverted-cup shape or raised at the center, and is shown as having formed integral with it a pipe or tubular casing, *D'*, which extends upward to the throat *B*, and near the shield has lateral openings *d'*, for the escape of water into the body of the condenser. The steam passing down through and from the throat cannot escape from the pipe or casing *D'* at any point above the openings *d'*, and before it reaches said openings it is condensed by the falling water.

15 By the shield *D* the float *C* is protected against being struck by the falling water, and remains in comparatively still water, so that its operation acts more perfectly to control the valve *c*. The construction described enables me to employ a float of spherical or other simple form, and renders it unnecessary to use an annular float, such as has heretofore been employed in condensers of this class. The shield *D* must be supported, so that water can pass freely downward to the outlet *A'*, and I have here shown the chamber *A* as having an inwardly-projecting flange, *f*, and the shield *D* as provided with lugs or ears *f'*, resting thereon and leaving clear spaces *f''*, as shown in Fig. 2, for the downward flow of water.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with the condenser-body and the upper chamber having inlets for steam and water, and communicating by a throat with the body, of a valve in said throat, a float whereby the valve is controlled, and a shield arranged in the body of the condenser

and above the float to protect the latter from the falling water, substantially as herein described.

2. The combination, with the body and the upper chamber provided with steam and water inlets, and communicating by a throat with the body, of a float in the body and a shield above the float for protecting it from falling water, and the two valves arranged in the steam-inlet and opposite throat, and serving to control the lateral opening *d*, for the admission of water, one valve being adjustable by hand, and the other being connected with and controlled by the float, substantially as herein described.

3. The combination, with the body and the upper chamber provided with steam and water inlets, and communicating by a throat with the body, of a valve in said throat, a float arranged in the body and connected with said valve, a shield above the float, and a pipe or tubular casing extending from the shield upward to the throat, and provided near the shield with lateral openings, substantially as herein described.

4. The combination, with the body and the upper chamber having steam and water inlets, and communicating with the body by a throat, *B*, of the valve *c* in the throat, and the float *C*, connected with the valve, and the shield *D*, having formed integral with it the upwardly-extending pipe or casing *D'*, provided with lateral openings *d'*, substantially as herein described.

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Witnesses:

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