

O. S. SLEEPER.

JET CONDENSER.

APPLICATION FILED JUNE 25, 1909.

1,115,980.

Patented Nov. 3, 1914.

FIG. 1.

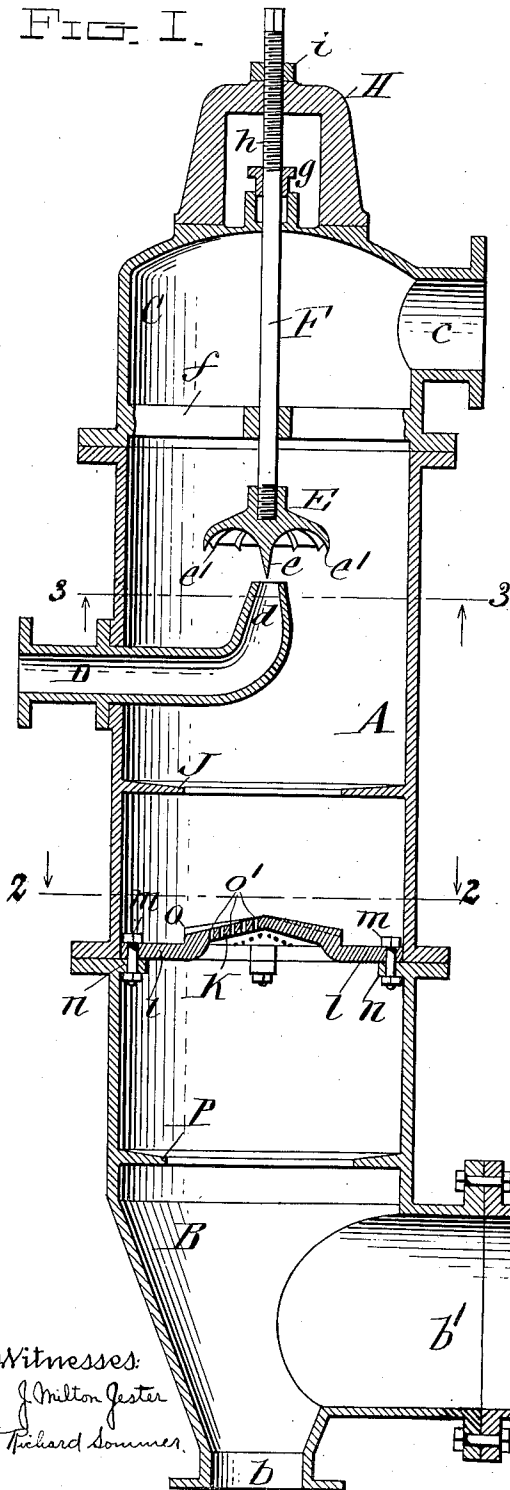


FIG. 3.

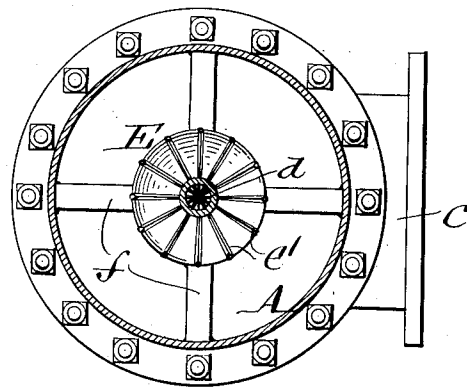
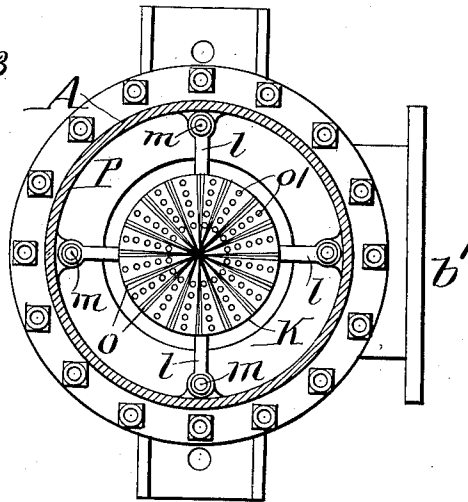


FIG. 2.



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UNITED STATES PATENT OFFICE.

OLIVER S. SLEEPER, OF BUFFALO, NEW YORK, ASSIGNOR TO BUFFALO FOUNDRY AND MACHINE COMPANY, OF BUFFALO, NEW YORK, A CORPORATION OF NEW YORK.

JET-CONDENSER.

1,115,980.

Specification of Letters Patent.

Patented Nov. 3, 1914.

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To all whom it may concern:

Be it known that I, OLIVER S. SLEEPER, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Jet-Condensers, of which the following is a specification.

The object of this invention is to provide a jet condenser of improved construction which is very efficient in operation and has a comparatively large capacity.

In the accompanying drawings: Figure 1 is a vertical section of my improved condenser. Figs. 2 and 3 are horizontal sections thereof, taken in lines 2—2 and 3—3, Fig. 1, respectively.

Similar letters of reference indicate corresponding parts in the several figures of the drawings.

The body of the condenser comprises an upright cylindrical central portion A forming the condensing chamber, a conical lower portion B and a dome-shaped top C.

The lower end of the conical portion B of the body has a central outlet *b* which is connected with the upper end of a vertical drain pipe which is thirty-five or more feet in height and terminates at its lower end in a hot well or may be provided with other means to form a water seal. This well as usual is provided with an overflow at a point that will not allow water to rise higher than thirty-five feet in said drain pipe. On one side of its outlet *b* and above the same, the lower portion of the body is provided with a vapor inlet *b*¹ which connects by a conduit of any suitable construction with the source from which the vapors or steam to be condensed are drawn.

On one side of the dome-shaped top of the body is arranged an exhaust or outlet nipple *c* which is connected with a vacuum pump or other device whereby a vacuum is produced in the body of the condenser and the vapors are drawn from the lower inlet nipple *b*¹ upwardly through the body toward the outlet nipple.

D represents a pipe which supplies water under pressure and which extends transversely through the central portion of the body of the condenser and is provided axially within the same with an upwardly turned conical jet nozzle *d* from which the water issues upwardly into the chamber in the form of a jet. As the water issues from

the jet nozzle the same strikes against the concave underside of a deflector or baffle E which is arranged centrally in the chamber above the nozzle. This baffle is concaved or dished on its underside and provided centrally with a downwardly tapering stem point *e* which is arranged centrally with reference to the jet nozzle and adjacent thereto and also with a plurality of V-shaped ribs or ridges *e*¹ which radiate equidistant from the central point on the underside of the baffle E toward the periphery thereof. This construction of the baffle causes the water issuing from the jet nozzle to be divided and spread uniformly and also deflected laterally and downward against the inner side of the condensing chamber in the form of an umbrella-shaped spray which is of substantially uniform thickness in all of its parts.

The lower ends of the ribs *e*¹ on the underside of the baffle E terminate below the lower edge of the baffle and also at a distance from the inner side of the same, whereby the water is maintained in a divided state after the same leaves the edge of the baffle, thereby insuring the formation of a complete conical spray of water which intercepts all the vapors and produces the maximum condensing effect on the same.

The baffle or deflector E is supported within the chamber by means of an adjusting device which permits of moving this baffle toward or from the nozzle as may be necessary or desirable to regulate the flow and distribution of the water. The adjusting device for this purpose shown in the drawings comprises an upright adjusting rod F arranged centrally within the condensing chamber and carrying the baffle E at its lower end. Immediately above the baffle the adjusting rod is guided in a cross piece, spider or bridge *f* within the dome of the condenser chamber. The upper part of the adjusting rod passes through a stuffing box *g* in the top or dome of the chamber and is provided above the stuffing box with a threaded portion *h* which works in a threaded opening formed in an arch H secured to the top of the dome. Upon applying a wrench to the flat sided upper end of the adjusting rod and turning the same in one direction or the other, this rod will be raised or lowered and the baffle E moved from or toward the nozzle accordingly.

After adjustment, the baffle E is held in position by a jam nut *i* applied to the threaded portion of the adjusting rod and bearing against the arch.

5 Upon being deflected outwardly by the baffle E, the water strikes the inner side of the condenser chamber and is then intercepted by an annular baffle or flange J arranged on the bore of the condensing chamber below the jet nozzle, whereby the spray
10 is deflected inwardly or toward the center of the condensing chamber and then passes downwardly through the reduced central passage formed in the chamber by this annular flange or baffle J.

15 As the spray passes inwardly and downwardly around the inner edge of the flange-shaped baffle J, it strikes against the top of a circular or disk-shaped baffle K which is arranged centrally within the condensing chamber below the flange baffle J and supported by means of arms *l* projecting outwardly from this disk baffle and secured by bolts *m* to lugs *n* on the adjacent part of the
20 condensing chamber or casing. The upper side of the baffle K slopes downwardly from its center toward its edge at a moderate angle and is provided with a plurality of radial ribs or ridges *o*. These ribs gradually increase in height from their inner ends toward their outer ends, thereby causing the water falling on the same to be divided gradually but definitely so as to insure a
25 uniform division thereof and promote its condensing effect on the vapors. Between its ribs this baffle plate or disk is provided with a plurality of openings *o*¹ leading downwardly through the same. As the water strikes the top of the baffle disk K
30 part of the same passes through the openings thereof in the form of a spray and part of it is deflected laterally and downwardly toward the inner side or bore of the chamber in the form of an annular spray. The ribs
35 on the baffle disk K cause the water striking the same to be divided into uniform parts and directed partly into the openings thereof and partly toward the side of the condensing chamber, thereby effecting an equal
40 distribution of the water spray over the entire area of the condensing chamber.

As the water leaves the margin of the baffle disk K and passes downwardly along the adjacent inner side or bore of the condensing chamber, the same strikes a second
45 annular flange-shaped baffle P which is arranged in the bore of the condensing chamber between the disk baffle K and the vapor inlet *b*¹. This last mentioned baffle again
50 turns the spray of water inwardly and

downwardly toward the center of the condensing chamber and directs the same toward the central outlet *b* at the lower end of the condensing chamber which connects with the upper end of the drain pipe.

65 The vapors entering the condensing chamber through the inlet nipple *b*¹ are first intercepted by the spray of water descending from the inner edge of the lower annular baffle P and through the perforations of the lower baffle disk K, whereby part of the vapors are condensed. The remaining portions of the vapor under the action of the vacuum pump are drawn upwardly through the condensing chamber and pass successively through the spray of water formed
70 around the edge of the disk baffle K and the perforations therein, thence through the inwardly moving spray formed by the upper baffle flange J and are then intercepted by the outwardly moving spray formed by the upper disk baffle E. A portion of the vapors are condensed at each step upon successively engaging the several lower sprays of water and the final portion of the condensable
75 vapors are condensed when the same engage with the spray formed by the uppermost baffle E. The vapors which are condensed by the successive sprays are carried away to the drain with the water while the uncondensable vapors are drawn off from the top
80 of the chamber by the vacuum pump or exhausting device.

It will be noted that in this condenser a plurality of annular sprays are formed
85 which are turned alternately in opposite directions and through which the vapors are compelled to pass successively, thereby increasing the condensing effect or capacity of the apparatus and effecting a saving of
90 water for condensation and of power for driving the vacuum pump.

I claim as my invention:

105 In a device of the character described, the combination of a chamber, and a baffle arranged centrally within said chamber and comprising an upwardly tapering conical body and provided on its downwardly sloping upper side with a plurality of radial ribs each of which terminates at its outer
110 end flush with the periphery thereof, and said body being also provided with a plurality of vertical openings between said ribs.

Witness my hand this 22nd day of June, 1909.

OLIVER S. SLEEPER.

Witnesses:

THEO. L. POPP,
ANNA HEIGIS.