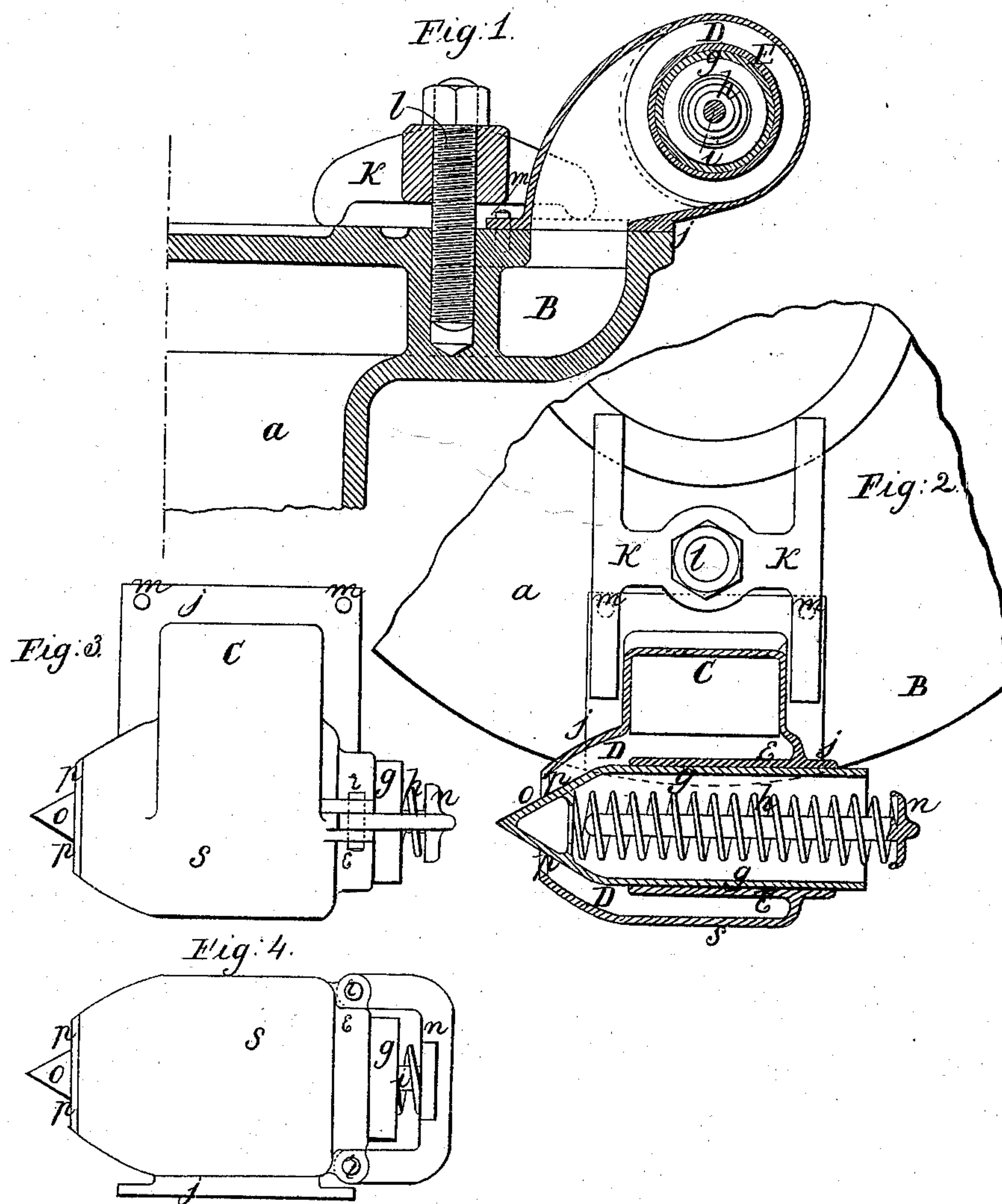


*N. W. Wheeler,*  
*Surface Condenser.*

*No 66, 194,*

*Patented June 25, 1867.*



*Witnesses;*  
*Frank C. Brindle*  
*Charles H. Miller*

*Inventor;*  
*Norman Wheeler*

# United States Patent Office

NORMAN W. WHEELER, OF BROOKLYN, NEW YORK.

*Letters Patent No. 66,194, dated June 25, 1867.*

## IMPROVEMENT IN SURFACE CONDENSERS.

The Schedule referred to in these Letters Patent and making part of the same.

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, NORMAN W. WHEELER, of the city of Brooklyn, E. D., county of Kings, and State of New York, have invented a new and useful Improvement in Surface Condensers; and I hereby declare that the following is a full and exact description of the construction and operation thereof, reference being had to the accompanying drawing, with letters of reference marked thereon, forming a part of this specification, in which—

Figure I represents a transverse section.

Figure II, a sectional plan.

Figure III, a plan; and

Figure IV an elevation—

Like letters indicating the same parts in the several figures.

My invention relates to that class of surface condensers in which the cooling fluid is projected against the condensing surfaces in streams, passing through space not occupied by liquids; and the object is to secure the highest possible velocity of discharge, under a given pressure, whether the quantity of fluid which passes in a given time is more or less. To accomplish this object I provide series of discharging nozzles, so constructed that when no fluid is forced through them the orifice will be closed, or nearly so, through the instrumentality of springs or weights, but so that the fluid seeking passage through the nozzles under pressure will tend to overcome the energy of the springs or weights, and cause the nozzles to open and remain so, to an extent consonant with the volume of the fluid seeking passage and its desired velocity as it issues from the nozzles.

In the drawings, A B is a part of the circulating-head through which the cooling fluid is forced by pumps, or other devices, whence it passes through the channel C to the annular space D D, and out through the nozzle *p p*. E E is a barrel made truly cylindrical upon the inside, and *g g* a cylindrical plunger, fitting as tightly into the barrel E E as is consistent with a free longitudinal movement. *o* is a conical end of the plunger *g g*, which fits into the nozzle *p p* when the plunger is advanced, and closes the nozzle. *h* is a spring, abutting against the bail *n* and against the plunger, tending to force the plunger forward and close the nozzle *p p*; and *i* is a rod placed inside the spring to prevent its buckling. Now, the barrel E E and plunger *g g* having a greater area than the nozzle *p p*, and a pressure of fluid existing in the space D D, the pressure acting over the difference of the areas of *p p* and *g g* will tend to overcome the energy of the spring *h*, or its equivalent weight, and if the pressure be increased the plunger will be forced back until the nozzle is sufficiently opened by the partial withdrawal of the cone *o* to allow the fluid to pass out through the nozzle at a velocity governed by the pressure due to the energy of the spring *h*. As the nozzle *p p* is opened more and more the differential area upon which the pressure acts to force back the plunger *g g* is increased in proportion, but at the same time the spring *h* is more and more compressed, and resists with an increasing energy, so that the two qualities may be adjusted, in practice, to deliver the cooling fluid at a nearly uniform velocity, whether the volume be great or little.

Heretofore, in surface condensers of this class, discharge nozzles of fixed dimensions have been used; and if the circulating-pumps were run at the proper speed the fluid would be discharged at the proper velocity to secure a high grade of efficiency in the condenser; but if the speed of the pump were slackened the velocity of discharge was slackened in the same ratio, and the efficiency of the condenser diminished in a greater ratio, for reasons well known to science; thus rendering such condensers unsatisfactory when it was necessary to run the engines to which the pumps were attached at low speeds.

The clamp *k k*, bolt *l*, and steady-pins *m m*, the uses of which are obvious, form a ready and convenient means of attaching such nozzles to the circulating-head A B.

I do not limit myself to the precise form or proportion of the several parts herein described; but I claim—

The combination of the above-described discharge nozzle with a surface condenser.

NORMAN W. WHEELER.

Witnesses:

FRANK C. PRINDLE,

THEODORE SHEFFLER.