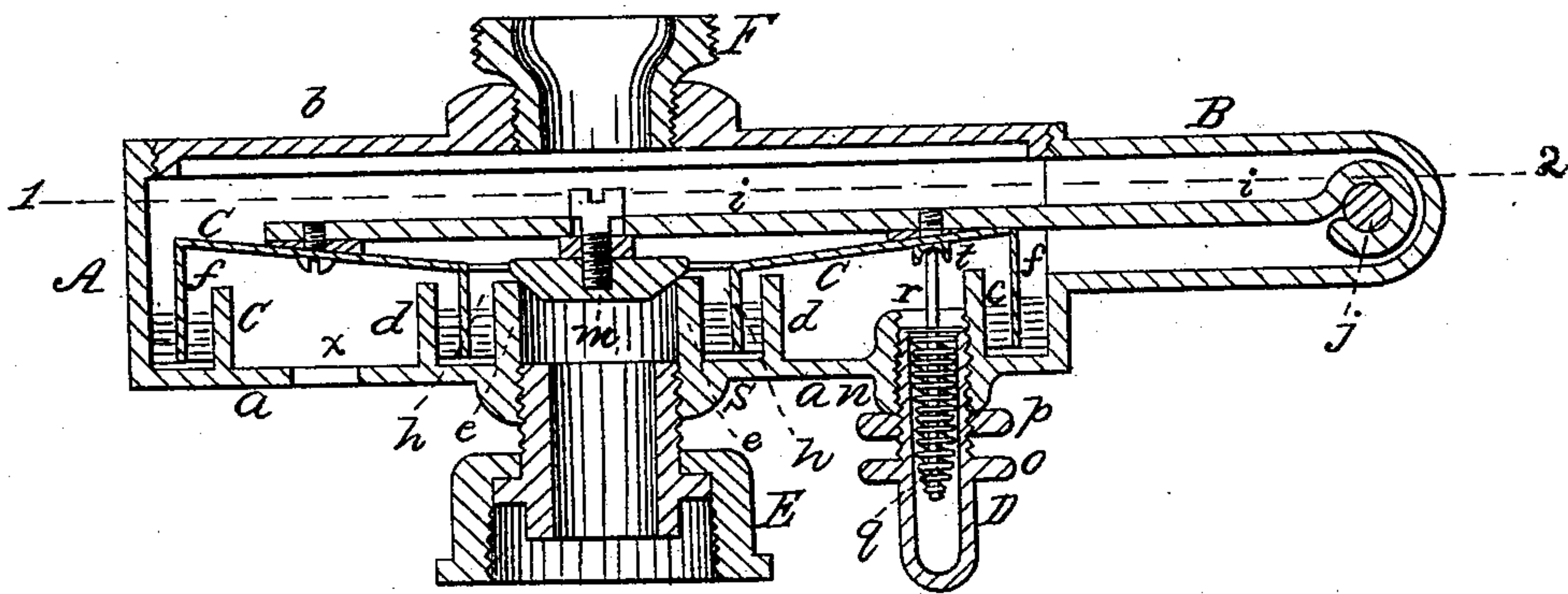


J. H. COOPER.  
Gas Regulator.

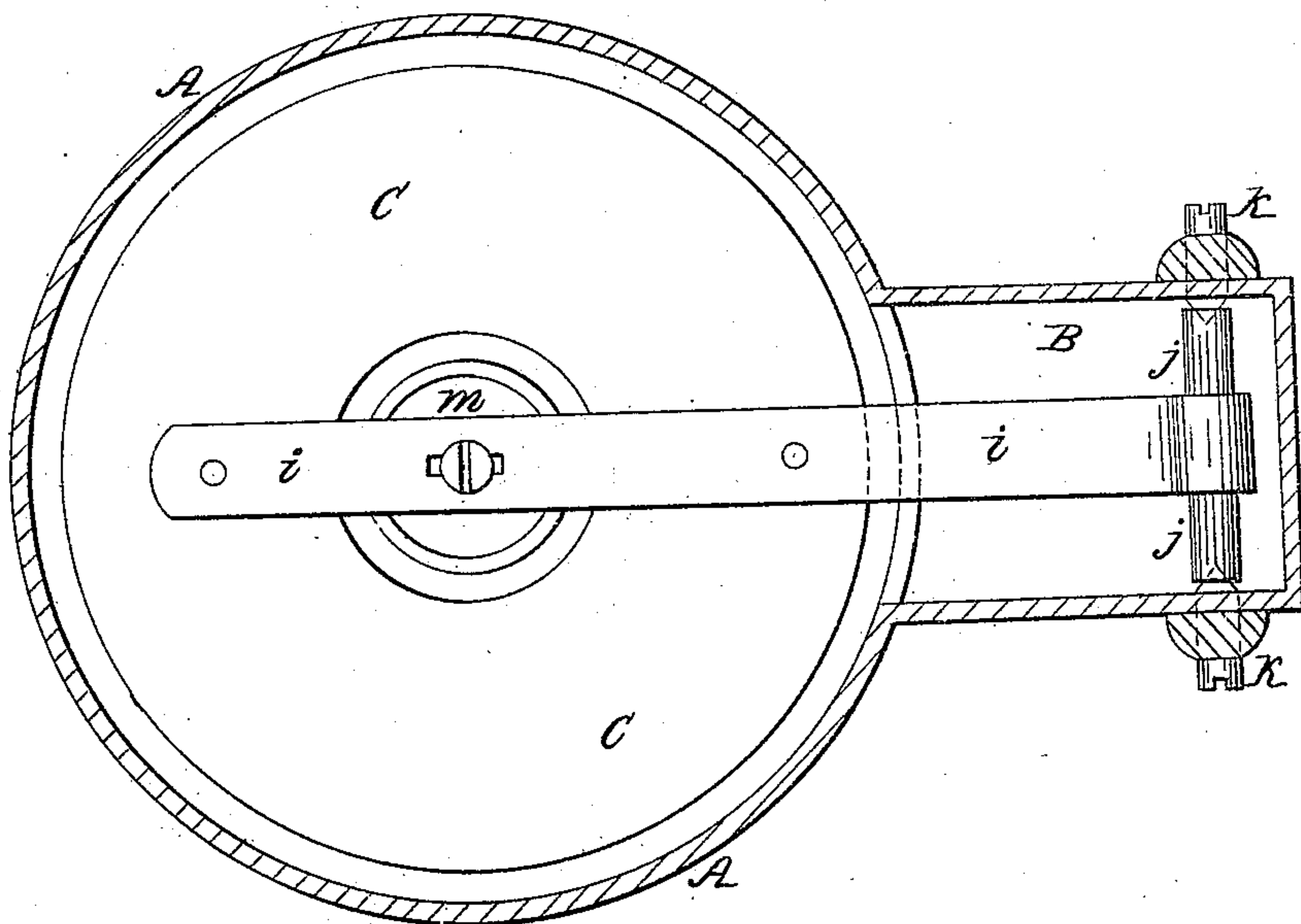
No. 18,008.

Patented Aug. 18, 1857.

*Fig. 1.*



*Fig. 2.*





# UNITED STATES PATENT OFFICE.

JOHN H. COOPER, OF PHILADELPHIA, PENNSYLVANIA.

## GAS-REGULATOR.

Specification of Letters Patent No. 18,008, dated August 18, 1857.

*To all whom it may concern:*

Be it known that I, JOHN H. COOPER, of the city of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Gas-Regulators; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing and to the letters of reference marked thereon.

My invention relates to improvements in gas regulators in which an inverted cup, reservoir, and valve are used, and consists in constructing the inverted cup with two rims dipping into two separate reservoirs containing suitable fluid, an opening being formed direct through the cup, by the inner rim of the same; concentric with the latter, and to the cup is secured the valve arranged to obstruct, more or less, an opening formed by the inner flange of the inner reservoir.

In order to balance and regulate the pressure of gas on the cup I suspend within an adjustable casing a spiral spring containing a rod acting upon the inverted cup.

My invention has for its aim the production of a gas regulator the flow of gas through which shall be direct, and which shall afford a ready means of disposing of the water which accumulates from the distributing pipe.

It has for its further object the balancing of the pressure on the cup with the least amount of friction possible.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation.

On reference to the drawing which forms a part of this specification, Figure 1, is a sectional elevation of my improved gas regulator. Fig. 2, a sectional plan on the line 1—2 Fig. 1.

A is a cylindrical casing of iron, closed at the bottom *a*, and furnished at the top with a screwed lid *b*, which can be removed and replaced at pleasure. Communicating with the interior of the casing A, and forming part of the same is a hollow projection B. From the bottom *a* of the casing project three annular flanges, namely, the exterior flange *c*, intermediate flange *d*, and inner flange *e*, all concentric with each other and with the casing. The space between the casing and the flange *c* forms a reservoir for

mercury or other suitable fluid into which dips the outer rim *f* of the inverted cup C. Another reservoir for fluid is formed between the intermediate flange *d* and inner flange *e*, and into this fluid dips the inner rim *h* of the inverted cup. It will be seen that the surface of the inverted cup is not flat as in other gas regulators, but inclined downward from the outer edge to the opening formed by the rim *h*, for an object which will be apparent hereafter. To the inverted cup is attached an arm *i*, connected to a spindle *j*, which turns on the points of the studs *k* screwed into the sides of the projection B of the casing. The top of the inner flange *e* forms the seat for the valve *m* which is attached to the arm *i*. On the bottom *a* of the casing A is a boss *n* into which is screwed a hollow casing D furnished with a suitable thumb nut *o* and tightening nut *p*. In the interior of the casing D is situated a spiral spring *q* the top of which rests on the top of the casing, the bottom of the spiral spring being a short distance from the bottom of the casing and being so tapered as to receive the point of the rod *r* situated in the interior of the spring and bearing with its upper end against the countersunk head of the screw *t* on the arm *i*. Into the boss *s* on the bottom *a* of the casing is screwed the ordinary swivel coupling E which serves to secure the instrument direct to the gas meter. In the center and on the top of the cover *b* is screwed the double screw connection F to which is attached the distributing pipe to the burners. In the bottom *a* of the casing, is an opening *x* for the admission of air to the interior. When the pressure of gas from the meter is excessive, that excess of gas acts on the top of the inverted cup so as to depress the same and with it the valve, thereby contracting the opening for the entrance of gas to the interior of the casing. When the pressure of gas in the distributing pipe is diminished the upper surface of the inverted cup is relieved and the spiral spring which in the first was distended now by its recoil forces the rod *r* upward against the cup thereby raising the same and with it the valve *m* and consequently increasing the opening for the flow of gas. It will thus be seen that any increase or diminution of the pressure of gas will in no way affect the uniform supply of gas to the burners.

By the employment of the two separate reservoirs in the casing, and two rims of the



inverted cup; by making the upper surface of the latter inclined downward toward the center; and by making the entrance and exit for the gas central with the opening in the cup as well as with the valve, two important features are obtained which obviate the difficulties common to other gas regulators. First, the circuitous passages of the latter are avoided inasmuch as the flow from the meter to the distributing pipe is direct. Second, the water which collects in the distributing pipes falling on the valve either splashes from the latter onto the surface of the cup and runs down the inclined surface of the same into the reservoir, or falls directly into the latter, and thence over the top of the inner flange *e* down the inlet pipe into the meter, thus keeping the interior of the instrument free from water, which has been hitherto a fruitful source of the inefficiency of gas-regulators.

Great delicacy and sensitiveness of action as well as facility of adjustment are obtained by the arrangement of the spring *g* in the interior of the adjustable casing *D* and rod *r* in the interior of the spring, as the rod bears with a fine point at the top in the countersunk head *t* of the arm *i* and at the bottom with another fine point on the bottom of the spiral spring *g*, thus avoiding

all joints and other appliances involving objectionable friction. At the same time by turning the casing in one direction or the other the amount of pressure of the rod *r* against the arm and cup may be adjusted to the greatest nicety and consequently the instrument regulated to any pressure of gas desired for the burners.

I do not desire to claim exclusively the employment in connection with gas regulators of a double reservoir and double rimmed inverted cup, neither do I claim broadly the employment of an adjustable spring for balancing the pressure on the cup; but

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

The double rimmed inverted cup *C* with an inclined surface, said cup having a valve *m*, and an opening formed by the inner rim *h*, when the said opening and valve are concentric with the inlet formed by the inner flanges *e* of the casing.

In testimony whereof, I have signed my name to this specification before two subscribing witnesses.

JOHN H. COOPER.

Witnesses:

HENRY HOWSON,  
WILLIAM E. WALTON.