

No. 625,767.

Patented May 30, 1899.

F. I. HITCHCOCK.
THROTTLE VALVE FOR GAS ENGINES.

(Application filed Nov. 17, 1897.)

(No Model.)

Fig. 1.

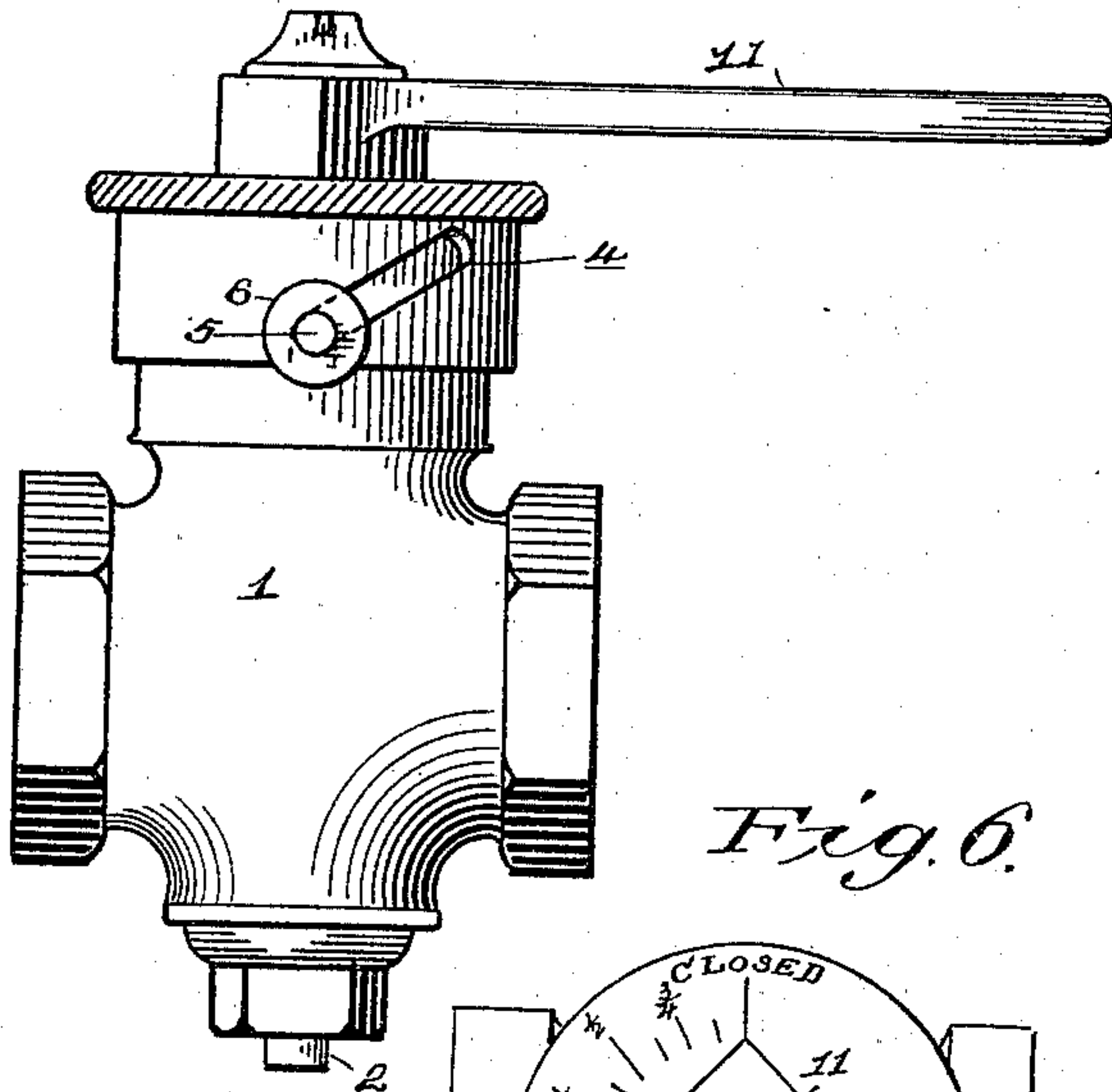


Fig. 2.

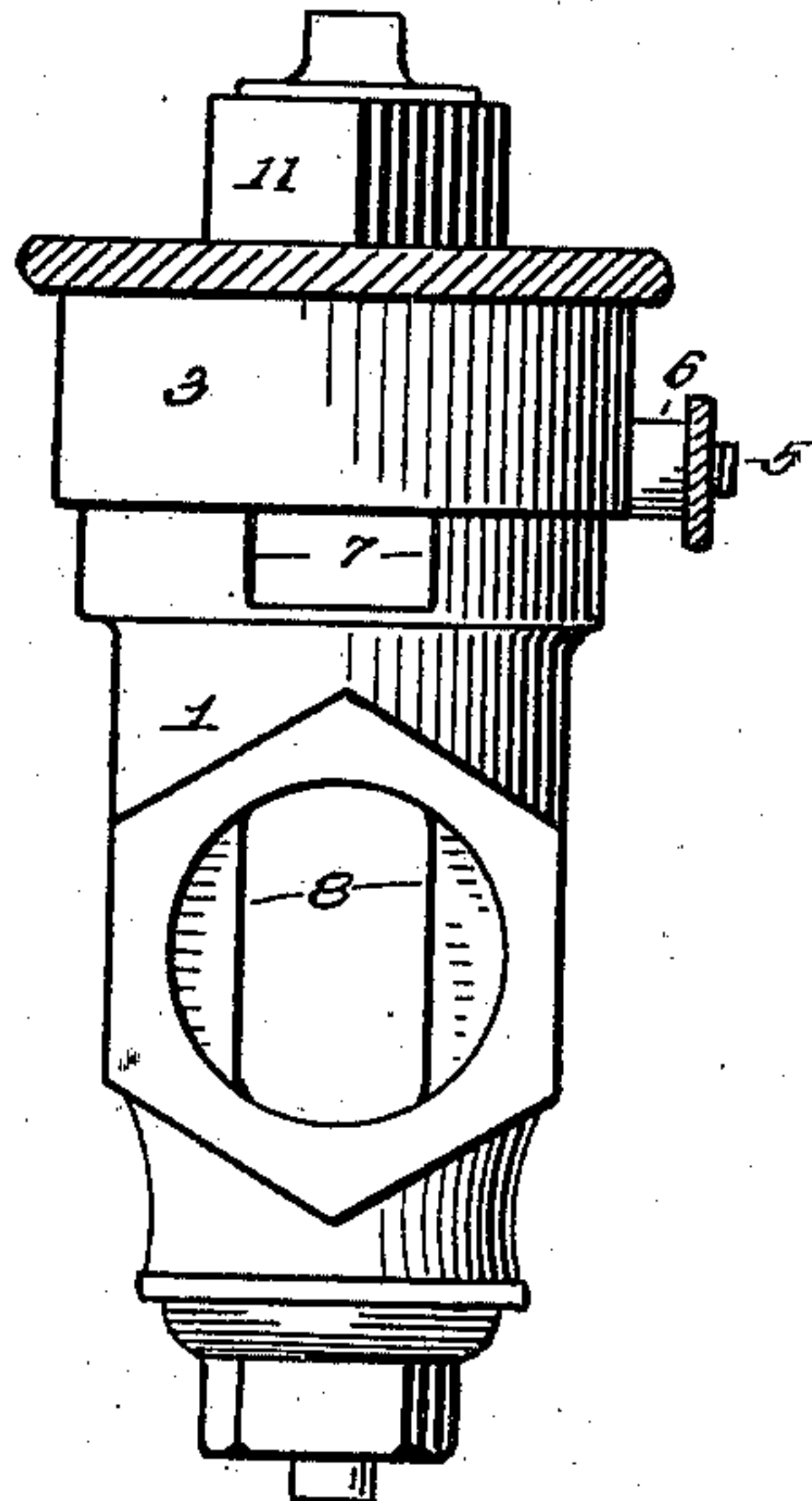


Fig. 6.

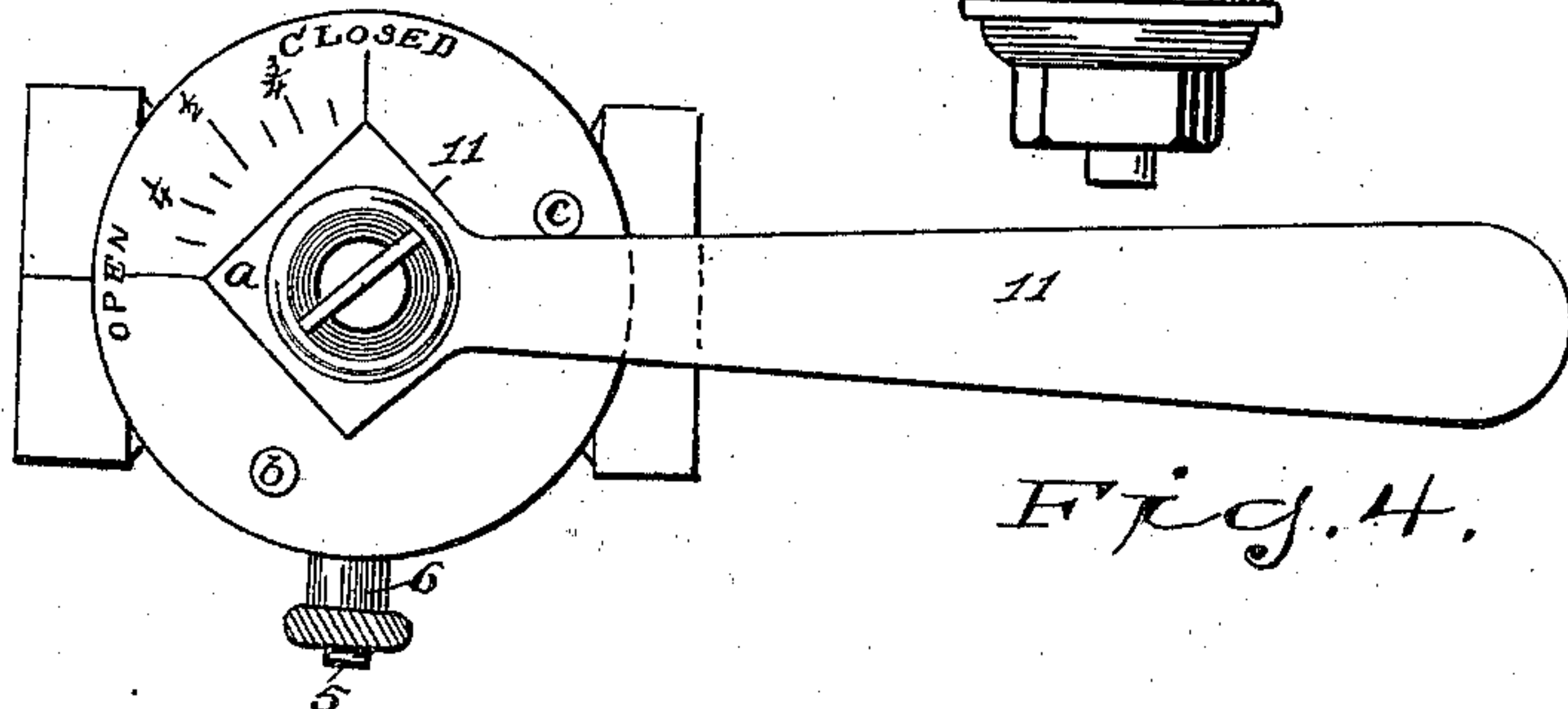


Fig. 3.

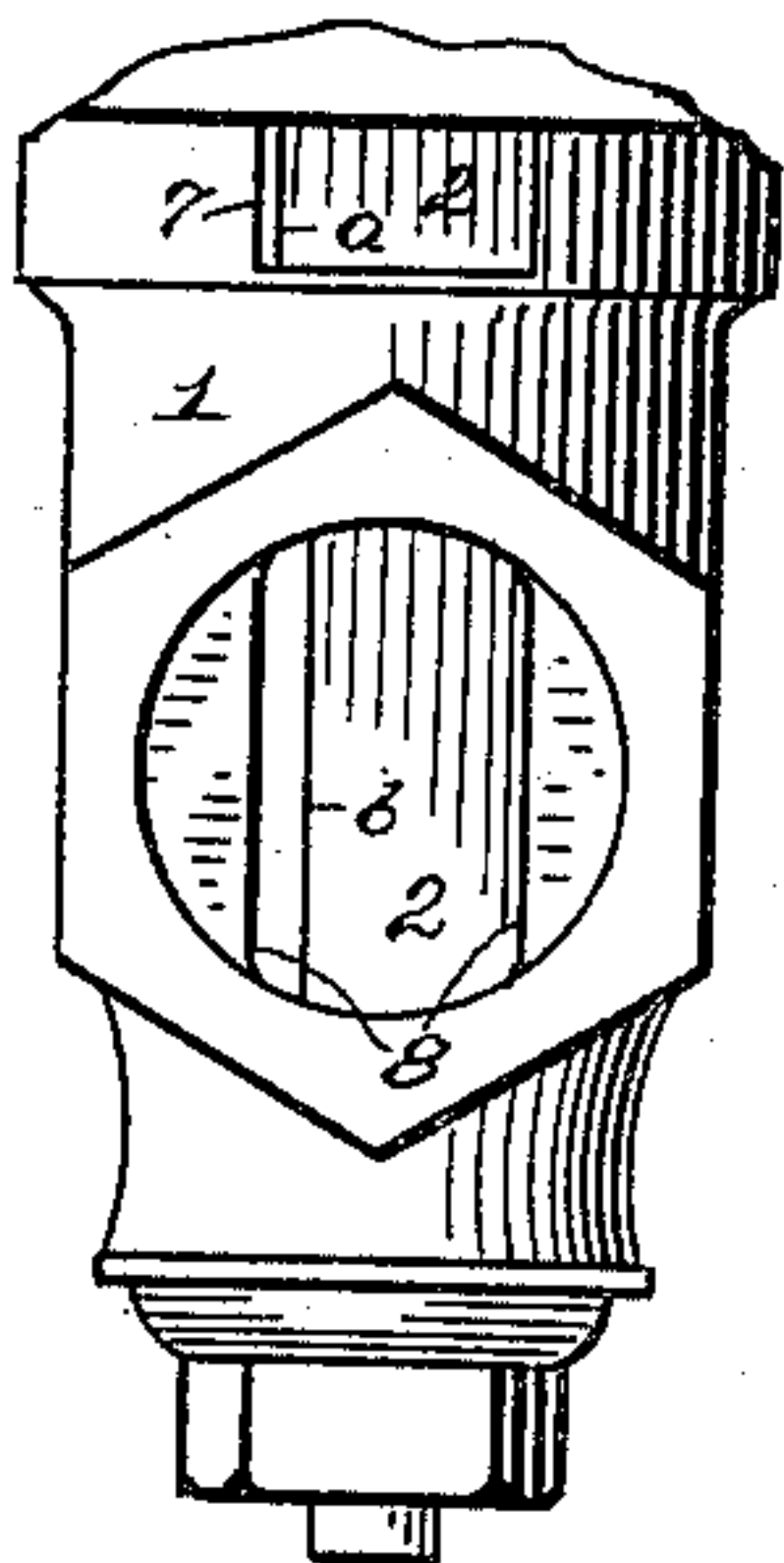


Fig. 4.

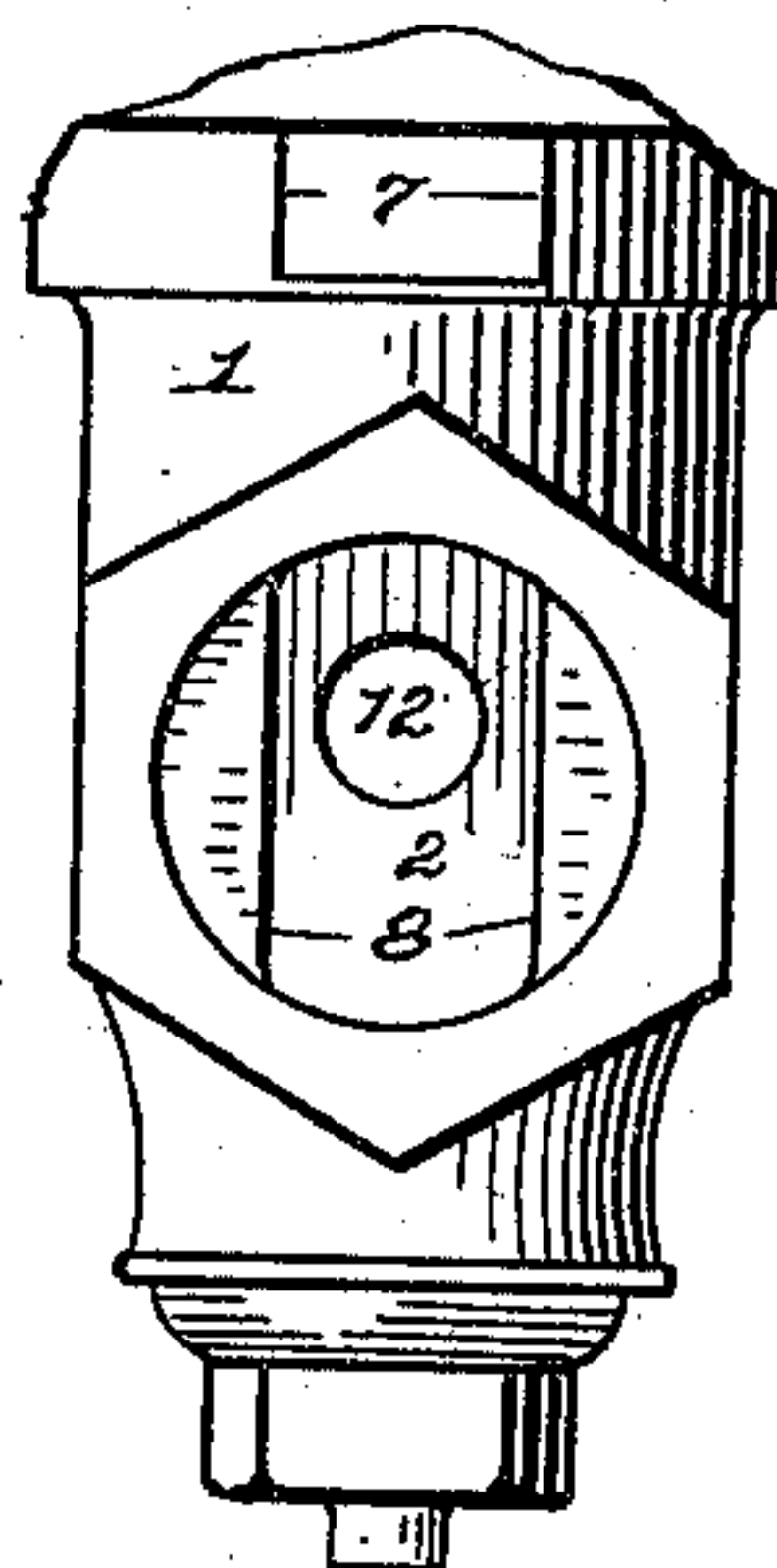
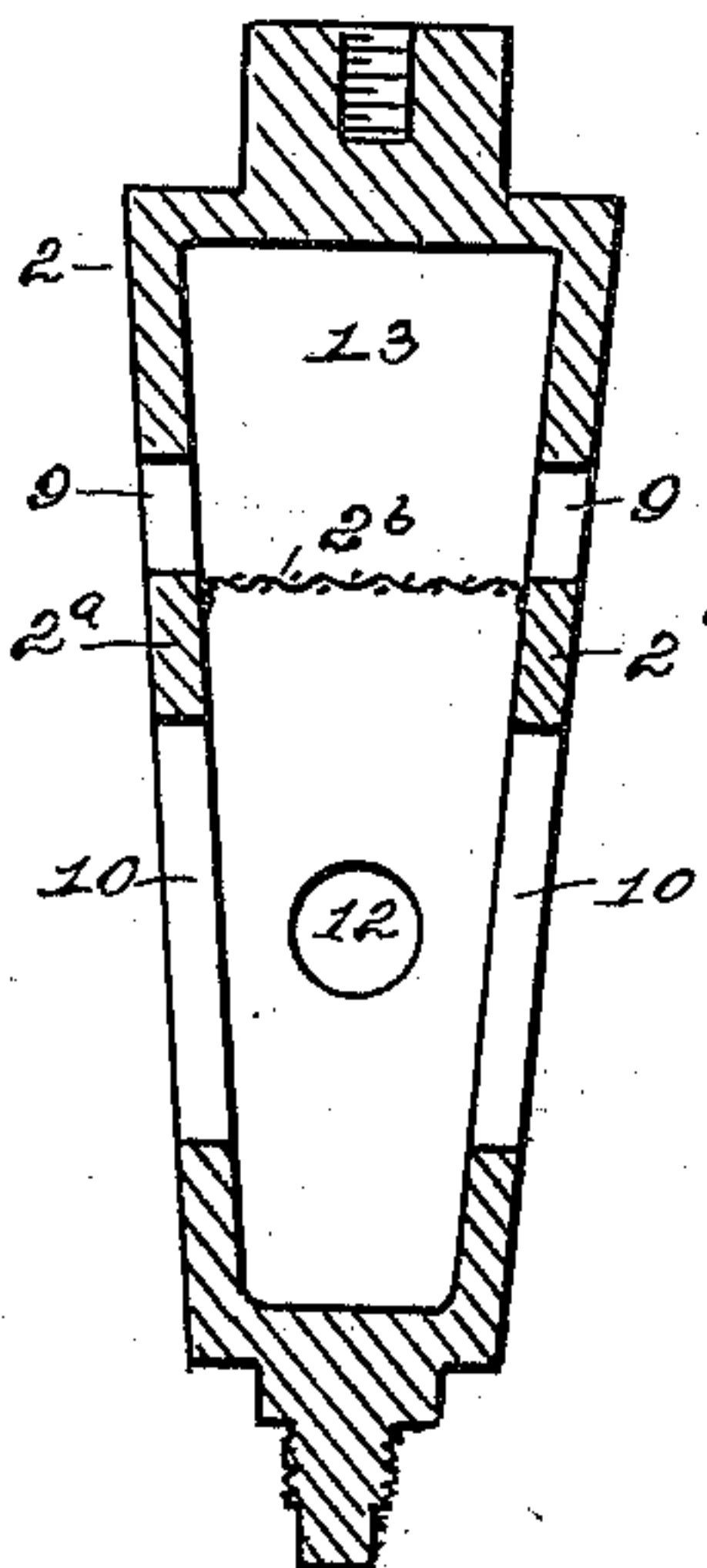


Fig. 5.



WITNESSES

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FRANK I. HITCHCOCK, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE PENNSYLVANIA IRON WORKS COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

THROTTLE-VALVE FOR GAS-ENGINES.

SPECIFICATION forming part of Letters Patent No. 625,767, dated May 30, 1899.

Application filed November 17, 1897. Serial No. 658,779. (No model.)

To all whom it may concern:

Be it known that I, FRANK I. HITCHCOCK, a citizen of the United States, and a resident of Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Throttle-Valves for Gas-Engines, of which the following is a specification.

My invention relates to an improvement in throttle-valves for gas-engines; and it consists in combining in one device an air-valve and a throttle-valve so that the manipulation of the one will affect the other and maintain at all times the proper proportion of gas and air necessary for combustion under all circumstances.

To enable others to fully understand my invention, reference is had to the accompanying drawings, in which—

Figure 1 represents a side elevation of my combined air and gas throttle-valve with the air-regulating device raised to its full limit. Fig. 2 is a front elevation of the valve as shown at Fig. 1, with the gas and air ports full open. Fig. 3 is a detail broken front elevation of the valve with the gas and air ports nearly closed and the adjustable device for regulating the size of the air-port removed. Fig. 4 is a view similar to Fig. 3, showing the gas and air ports closed, except a small circular hole to serve as a by-pass for the admission of a small quantity of air-mixed vapor from the vapor-pipe. Fig. 5 is a detail central sectioned view of the valve-plug. Fig. 6 is an upper plan view of the valve, showing a scale on the upper surface of the adjustable cap to indicate the position of the valve-plug.

Its construction and operation are as follows:

1 represents the valve-body, and 2 the rotatable valve-plug, made hollow, as shown at Fig. 5.

3 is a cap whose skirt embraces the upper portion of the valve-body and whose closed top is adapted to rest thereon when in its lowest position. 4 is an angular groove formed in this skirt to receive the stud 5, projecting from the valve-body, and 6 is a tightening-nut to secure said cap in any of its vertical adjustments.

7 is the air-port, and 8 is the gas or vapor port in the side of the valve-body, it being understood, but not shown, that similar ports are on the opposite side of said valve-body. 55

9 are the corresponding air-ports in the plug, and 10 the corresponding vapor-ports therein.

The cap 3 is vertically adjusted, so as to regulate the size of the air-port 7 to suit the atmospheric conditions and the capacity of the engine, and when once set it may not be necessary to disturb it for a long time, and it will be secured in its adjusted position by the nut 6. When, therefore, it is necessary to slow or throttle down the engine, the valve-plug is turned by means of its handle 11, reducing the size of the vapor and air ports to any degree that may be required, and no matter what position the valve-plug may occupy with respect to those ports the same proportion of air and vapor is always maintained, as the same plug operates both ports, so that when the size of the port 7 is once established by means of the vertically-adjustable cap 3 and the plug is turned to throttle down the engine it will also throttle the air, so that the size of the air-port will always be proportionally maintained with respect to the vapor-port. 80

As a greater portion of the air required to make the proper combination of air and vapor is furnished by the vapor-pipe, the lap of the air-port will be in advance of the vapor-port, or, in other words, the lead *a* on the plug which operates the air-port is slightly in advance of the lead *b* on said plug for the vapor-port, as shown at Fig. 3. When, therefore, both ports are nearly closed, as shown, but little vapor will be required to maintain the engine at the slow rate of speed at which it must now of necessity be running. 90

It will of course be readily understood that any suitable means may be employed to indicate the position of the valve-plug with respect to the gas and air ports by means of the handle. For this purpose marks or other devices may be used on the top of the valve or adjustable cap 3, as shown at Fig. 6, so that when the corner *a* of the handle is turned to one of these marks the exact position of the valve-plug may be known. As such an 95 100

arrangement is only available in the daytime, I have arranged the small by-pass 12, Fig. 4, in the valve-plug 2, so that when desired to run the engine very slow the handle may be
 5 thrown around to a stop *b*, (shown at Fig. 6,) which will close both the air and vapor ports, before described, and bring this small circular opening 12 to the front, which will admit sufficient vapor and what air is mixed
 10 therewith in the vapor-pipe to run the engine at a very slow speed. This is necessary in making a dock at night. The other stop *c*, which may also project from the cap 3, will serve as a stop for the handle to indicate full-
 15 open air and vapor ports.

The advantage of construction of my improvement will readily be seen when comparison is made with the devices now employed. At present the air-valve is separate
 20 from the throttle-valve, so that both have to be independently operated, and this is extremely difficult and well-nigh impossible to do and maintain the proper proportion of air and vapor. In my device they are combined
 25 in one, so that the manipulation of one will operate the other and always maintain the proper proportion between the two. The narrow shell portion 2^a, Fig. 5, forms a division between the air and vapor ports, so that all
 30 communication between said ports must be through the perforated strainer or muffler 2^b, as shown.

I do not wish to be confined to the exact construction of the vertically-operating cap
 35 that regulates the size of the air-port in the shell of the valve-body, as this construction may be substituted by one having a lateral instead of a vertical movement or, in fact,

any suitable construction that will regulate the opening of the air-port.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The herein-described combined gas and air throttle-valve, consisting of a valve-body
 45 independent air and vapor ports therein, means for regulating the size of the said air-ports a valve adapted to rotate in said body having an interior chamber corresponding
 50 air and vapor ports in the side walls thereof the lead of the air-ports of said plug set slightly in advance of the vapor-ports therein so that said air-ports will be closed in advance of the vapor-ports, for the purpose set
 forth.

2. The herein-described combined gas and air throttle-valve, consisting of a valve-body
 55 independent air and vapor ports therein a valve-plug having an interior chamber adapted to rotate in said body, corresponding air
 60 and vapor ports in the side walls of said plug the lead of the air-port being slightly in advance of the vapor-port a small by-pass in the side wall of said plug so that, when the
 65 air and vapor ports are both closed, the engine will receive sufficient impulse through said by-pass to run it at a slow rate of speed, for the purpose set forth.

Signed at Bridgeport, in the county of Fairfield and State of Connecticut, this 16th day
 70 of November, A. D: 1897.

FRANK I. HITCHCOCK.

Witnesses:

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THOMAS ARNOLD, Jr.