

G. GOWARD.  
Gas-Regulators.

No. 156,785.

Patented Nov. 10, 1874.

Fig. 1.

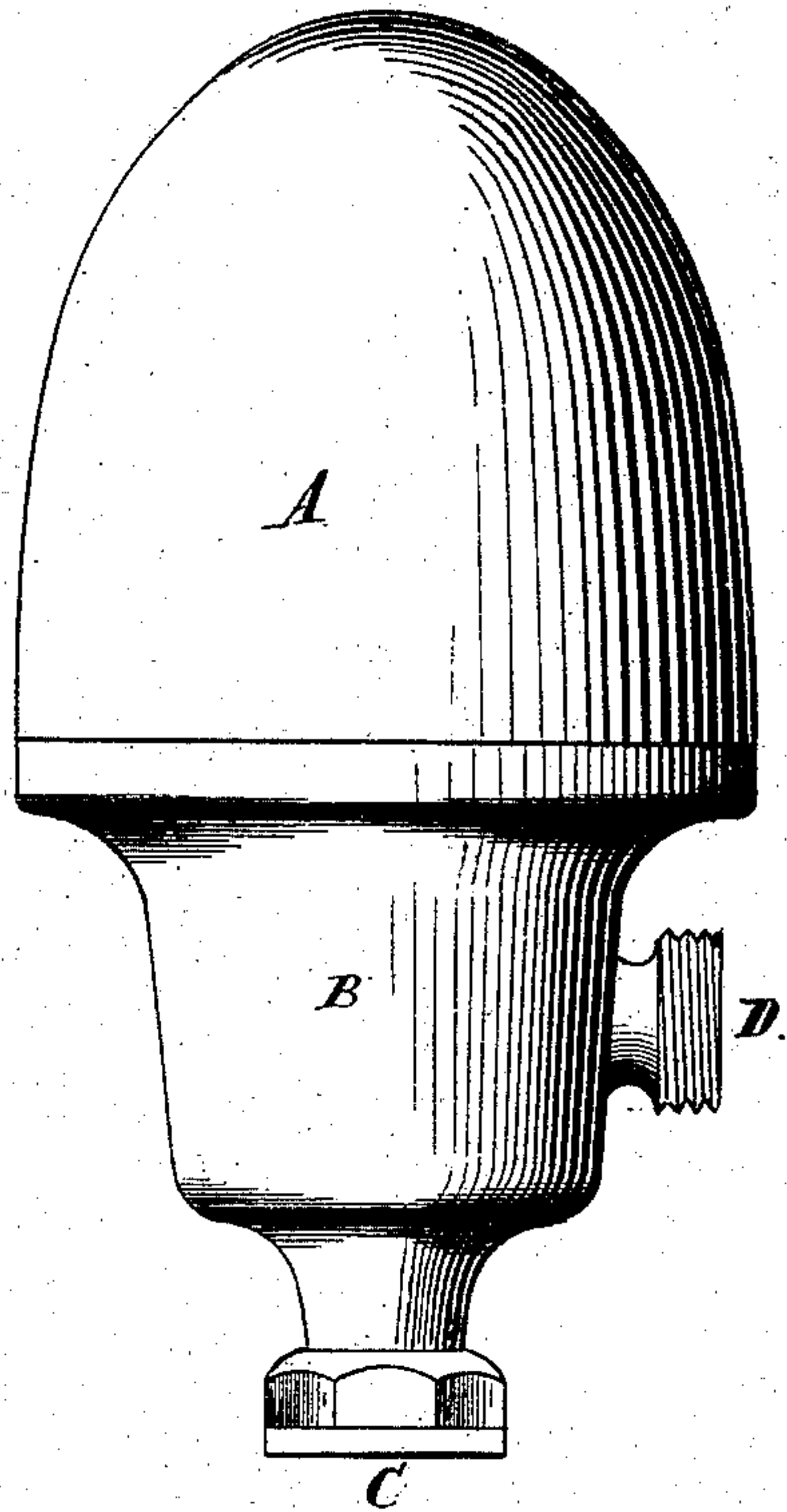


Fig. 2.

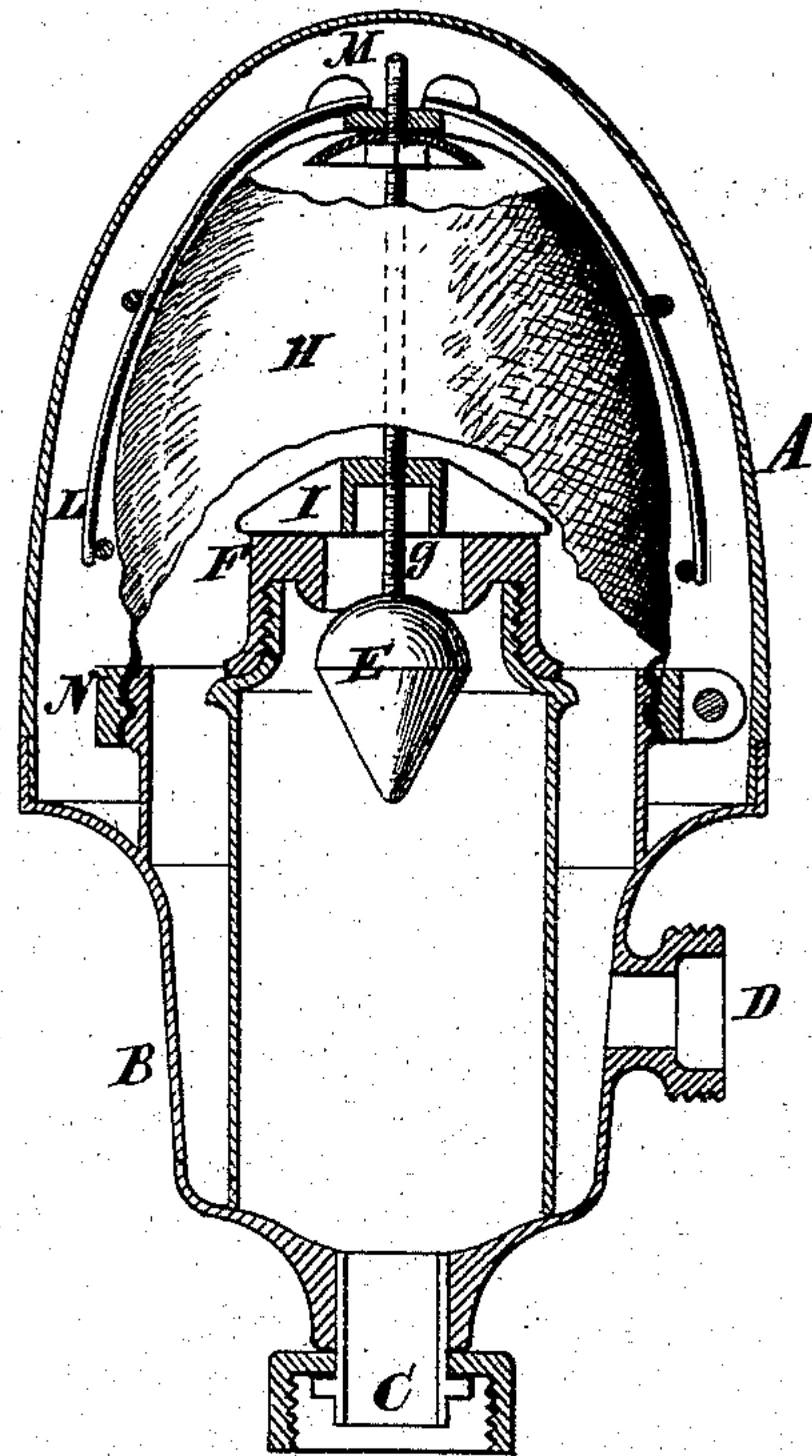


Fig. 3.

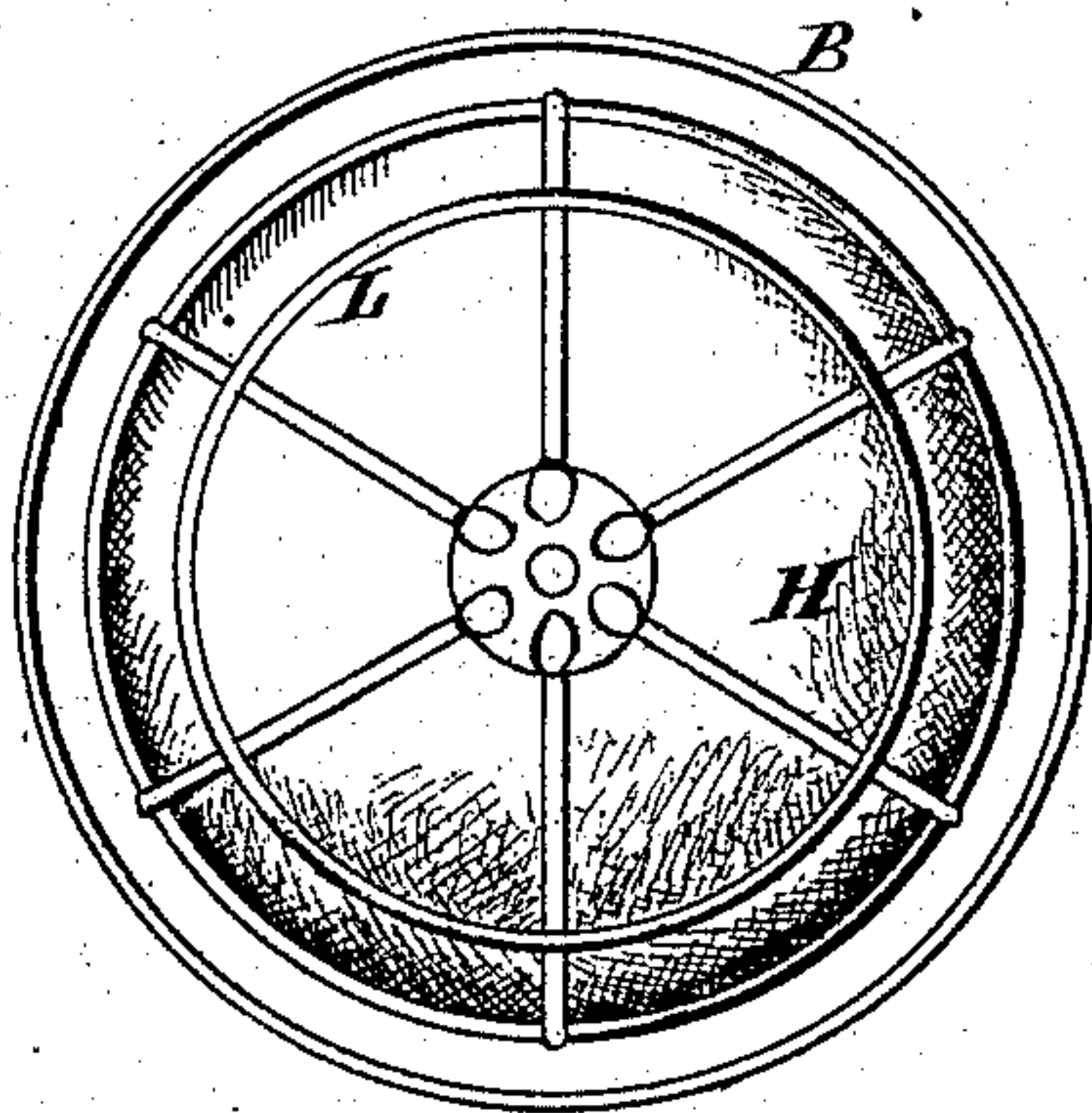
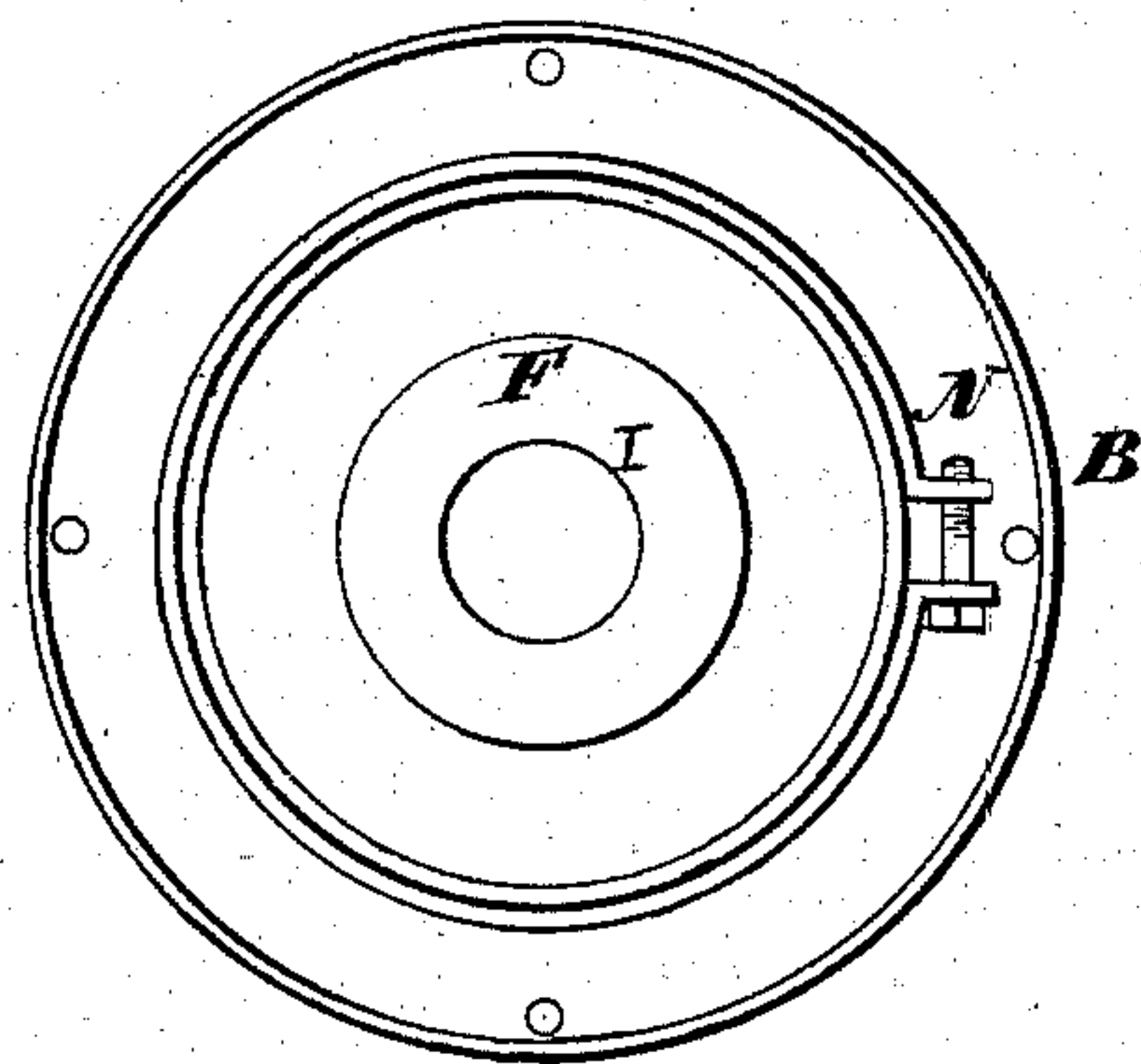


Fig. 4.



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# UNITED STATES PATENT OFFICE.

GUSTAVUS GOWARD, OF CHICAGO, ILLINOIS.

## IMPROVEMENT IN GAS-REGULATORS.

Specification forming part of Letters Patent No. **156,785**, dated November 10, 1874; application filed September 3, 1874.

*To all whom it may concern :*

Be it known that I, GUSTAVUS GOWARD, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Gas-Regulators, of which the following is a specification:

The object of my invention is to regulate the flow and pressure of illuminating-gas, so as to prevent waste at the burner, overcoming the blowing, hissing, and flickering, and causing the light to be uniform, full, and steady.

My invention consists in an air-balloon or bag-shaped diaphragm, acting by an upward pressure, on a wire frame-work attached above to a rod, which is connected below with a combined inverted cone-shaped and hemispheric valve in the supply pipe or tube.

The balloon or bag-shaped diaphragm consists of animal bladder, which material has these peculiar advantages over materials heretofore used for this purpose—namely, it possesses the greatest comparative strength combined with a high degree of flexibility, and, consequently, sensitiveness, and its use enables me to make a seamless balloon. The latter is encircled by the wire frame or cage, reaching from the apex of the balloon, when inflated, to near its base, and the cage being somewhat smaller in cross-section than the inflated balloon, the latter will bulge through between the bars of its cage, and through acting upon it raise the valve toward its seat under increase of gas-pressure. In this way the action of the diaphragm is made exceedingly sensitive, it having little or no friction to overcome; and, as the pressure is evenly distributed over a large area, the effect will be powerful and uniform, even in case of slight imperfections in the diaphragm or balloon, such as hardened or dried-up portions. The increased sensitiveness and power of such a balloon-shaped diaphragm acting upon an encircling wire frame or cage as compared with bellows-like diaphragms, where the pressure is exerted against a solid head, is due, mainly, to the bellowing of the balloon through the cage, its action in this respect being in manner like that of the wind upon the sail of a vessel.

In the accompanying drawings, Figure I is

a side elevation of my gas-regulator. Fig. II is a longitudinal vertical section. Fig. III is a plan view of upper casing A, having been removed, showing air-balloon diaphragm H extended, and wire net-work L; also, holes in lower casing B, for fastening A with a ring-lock. Fig. IV are plan views of interior apartments, showing removable valve-seat F, support L, service and drip chamber.

A is upper removable casing, sugar-loaf shape; B, lower fixed casing, inverted-bell shape; C, for attaching supply-pipe; D, outlet for attaching service-pipe. E is a combined inverted cone-shaped and hemispheric valve. F is removable valve-seat. *g* is connecting-rod; *i*, removable connecting-rod support. H is air-balloon or bag-shaped diaphragm. L is wire frame or net-work, upon which the diaphragm acts; M, end of rod for loading to increase pressure; N, beaded or ribbed rings for fastening diaphragms gas-tight. The result of the action of this diaphragm H upon the surrounding wire net-work L, which, together, amounts in fact to a compound diaphragm, is, under pressure, upon the slightest increase, to raise the valve in the supply-pipe.

The bladders of animals are used especially prepared, and saturated with a gas-proof composition.

The contraction or hardening of the diaphragm H is thus prevented; or even, if not, the combination H and L above described is a sufficient remedy.

The object of the inverted cone-shaped valve E is to divert the direct pressure of the gas as much as possible from the valve E to the diaphragm H.

In some regulators, with peculiarly-constructed valves, the sudden pressure is so great as to keep the valve closed for a time, extinguishing thereby the light at the burner with the attendant evils.

The hemispheric shape of the upper part of the valve E is essential, to make a complete shut off in whatever position the diaphragm H may be thrown.

The valve-seat F is attached to the supply-chamber by screw-threads.

The diaphragm H is securely attached to the lower casing B, and, by means of a beaded

clamping-ring N, forcing it into grooves in the casing, a suitable packing and composition being used to make a gas-tight joint.

The support *i*, which is fixed on the valve-stem *g*, is simply a contrivance for keeping the parts H, L, and E in position, when the valve is open to its fullest desired extent.

The mechanism of this regulator I claim to be superior to others in use.

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

1. In a gas-regulator, such as described, a

seamless balloon-shaped diaphragm made of animal bladder, substantially as and for the purpose specified.

2. The combination of the valve, the balloon-shaped diaphragm H, and the encircling dome-shaped cage L, fixed to and operating with the valve-stem, substantially as specified.

In testimony that I claim the foregoing as my invention I hereunto affix my signature.

GUSTAVUS GOWARD.

Witnesses:

A. N. LAMARTE,  
MILLER P. PETERS.