

(No Model.)

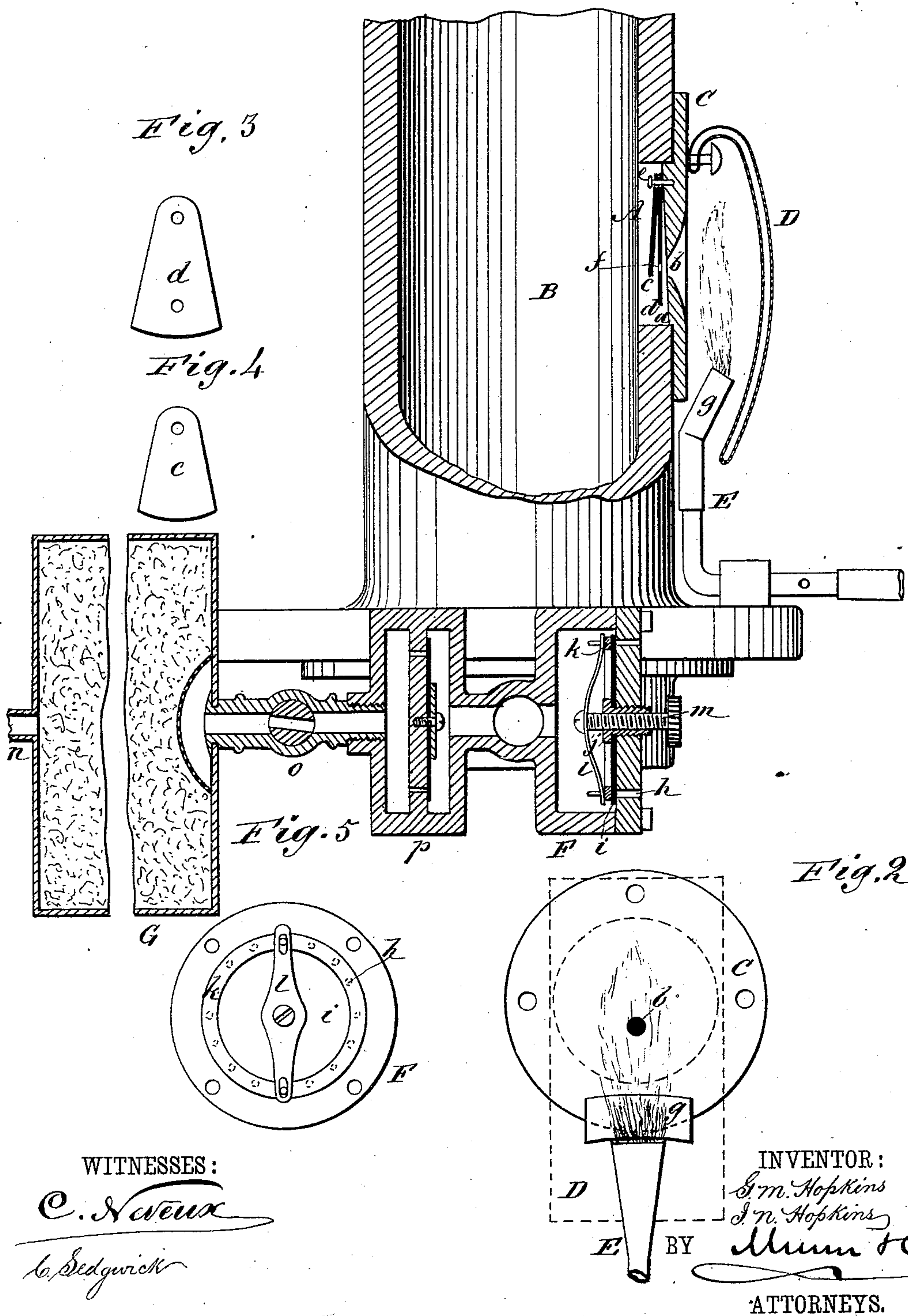
G. M. & I. N. HOPKINS.

GAS ENGINE.

No. 284,851.

Patented Sept. 11, 1883.

*Fig. 1*



WITNESSES:

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# UNITED STATES PATENT OFFICE.

GEORGE M. HOPKINS AND I. NEWTON HOPKINS, OF BROOKLYN, ASSIGNORS  
TO THE ECONOMIC MOTOR COMPANY, OF NEW YORK, N. Y.

## GAS-ENGINE.

SPECIFICATION forming part of Letters Patent No. 284,851, dated September 11, 1883.

Application filed May 24, 1883. (No model.)

*To all whom it may concern:*

Be it known that we, GEORGE M. HOPKINS and I. NEWTON HOPKINS, both of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Gas-Engines, of which the following is a full, clear, and exact description.

Our invention consists in a double pendent valve for covering the ignition-opening, one part of the valve being perforated and covered by the other; also, in the combination, with the ignition-valve of a gas-engine, of an igniting-burner having a flared mouth, and provided with an inclined deflector for spreading the flame over the ignition-valve; also, in the combination, with the burner, of a perforated protector for shielding the igniting-flame from blasts of air.

Reference is to be had to the accompanying drawings, in which Figure 1 is a side elevation of the cylinder of a gas-engine, partly in section. Fig. 2 is a front elevation of the explosion-valve and igniting-burner. Figs. 3 and 4 show the parts of the double explosion-valve. Fig. 5 is a rear elevation of the air-supply valve.

Like parts are designated by the same letters of reference in the different figures of the drawings.

Over an opening, A, in the side of the cylinder B is secured the plate C, having the inclined inner surface, *a*, and conical ignition-aperture *b*. In the opening A and over the aperture *b* are suspended two flap-valves, *c* *d*, from the screw *e*, forming the common support of both valves. The valve *d* is longer than the valve *c*, and is perforated with a small hole, *f*, opposite the center of the ignition-aperture *b*. This construction insures a division of the igniting-flame as it enters the cylinder, and secures regular and quiet explosions. This device, which we call the "ignition-valve," is provided with a protector, D, of wire-gauze or perforated sheet metal, which is attached to the plate C near the top, and extends downward below the ignition-valve, leaving a space, in which is placed the upper end of the igniting-burner E. The burner E is of the class known as the "Bunsen burner." Its upper end is made wide and flat, with its

longer diameter parallel with the face of the ignition-valve. Attached to the upper end of the burner is a curved deflector, *g*, which is inclined outward, and spreads the flame so as to cover more or less of the face of the ignition-valve. The deflector *g*, besides spreading the flame, also prevents the flame from being blown out by any blasts from the ignition-valve by receiving such blasts on its back and directing them away from the flame.

To insure an equal supply of air and gas to the engine-cylinder, we have provided the improved air-valve F and the gas-equalizing reservoir G. The valve F is provided with the ordinary openings, *h*, for the admission of air, and with a flexible valve, *i*, covering the said openings. The valve *i* is held in place by the head of a tubular screw, *j*, passing through the seat of the valve *i*. A metal ring, *k*, placed against the back of the valve *i*, is pressed by a bow-spring, *l*, connected with the end of the adjusting-screw *m* by a swivel-joint. The adjusting-screw *m* is fitted to an internal thread in the tubular screw *j*, and is provided with a milled head. By turning the screw *m* in or out the pressure of the valve *i* upon its seat may be varied, and thus the supply of air can be regulated.

A sheet-metal reservoir, G, is connected with the gas-supply pipe *n* and gas-regulating valve *o*, the said valve *o* being in communication with the gas-check valve *p*, through which gas is drawn into the cylinder B. The gas-reservoir G may be employed without any filling; but we have found by experiment that gas may be economized to some extent by filling the reservoir G with wool, hair, or other fibrous material, and when it is thus filled a strainer, *q*, is placed over the discharge-opening of the reservoir to prevent the escape of the filling.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. In a gas-engine, the plate C, having the conical opening *b*, the valve *d*, provided with the aperture *f*, and the valve *c*, in combination, substantially as herein shown and described.

2. In a gas-engine, an igniting-burner con-

sisting of a Bunsen burner, E, having a flared mouth, and provided with the inclined deflector *g*, in combination with the ignition-valve, as herein specified.

5 3. In a gas-engine, the burner E, having the deflector *g* and the perforated protector D, in combination with the ignition-valve, as specified.

4. The igniting-burner E, having a flared

mouth, the inclined deflector *g*, and the per- 10  
forated protector D, in combination with the  
ignition-valve of a gas-engine, as herein speci-  
fied.

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Witnesses:

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