

(No Model.)

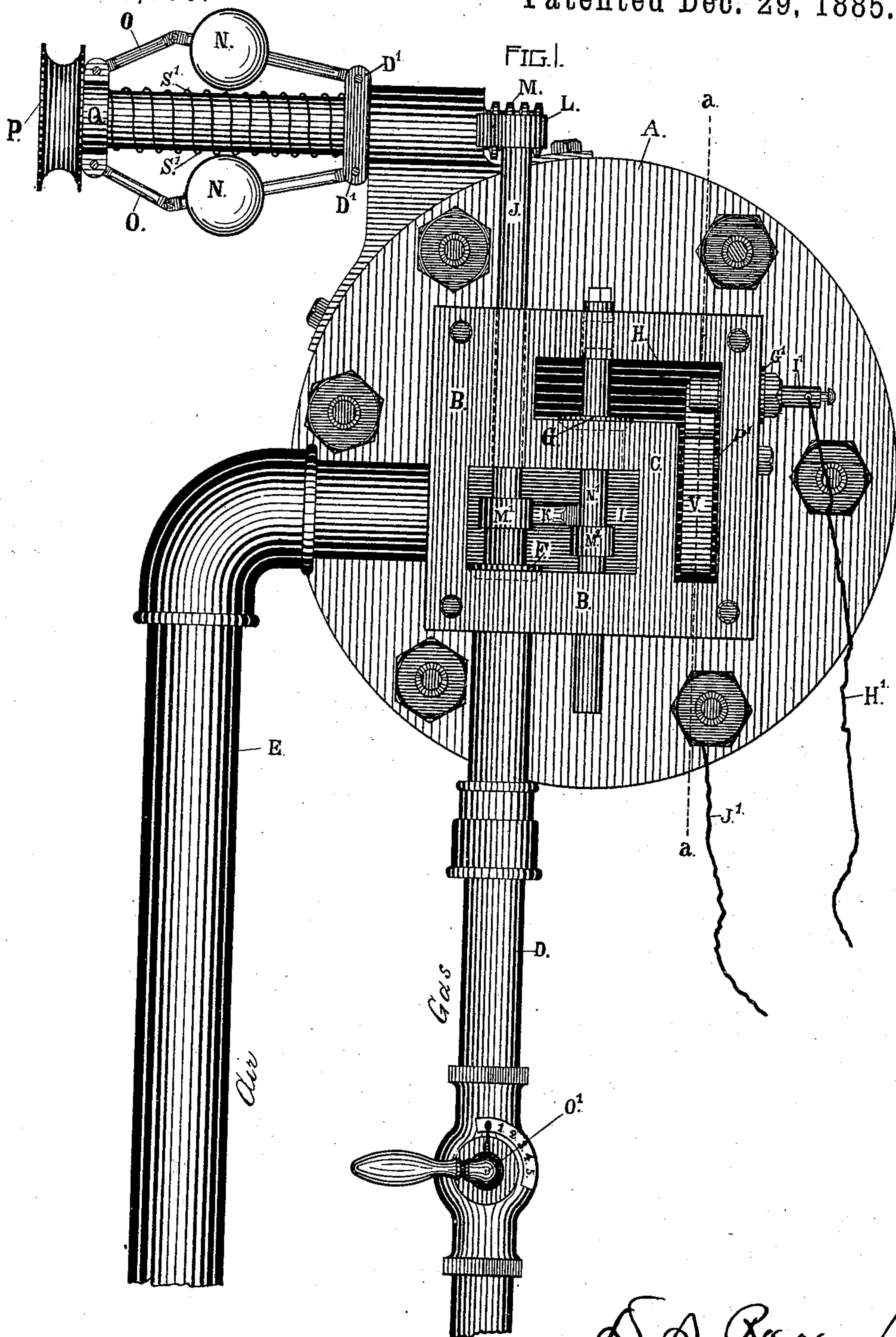
2 Sheets—Sheet 1.

D. S. REGAN.

GAS ENGINE.

No. 333,336.

Patented Dec. 29, 1885.



ATTEST,

W. H. Doe
Hon. J. Little,

D. S. Regan
INVENTOR.

by G. B. Farnsworth
Atty.

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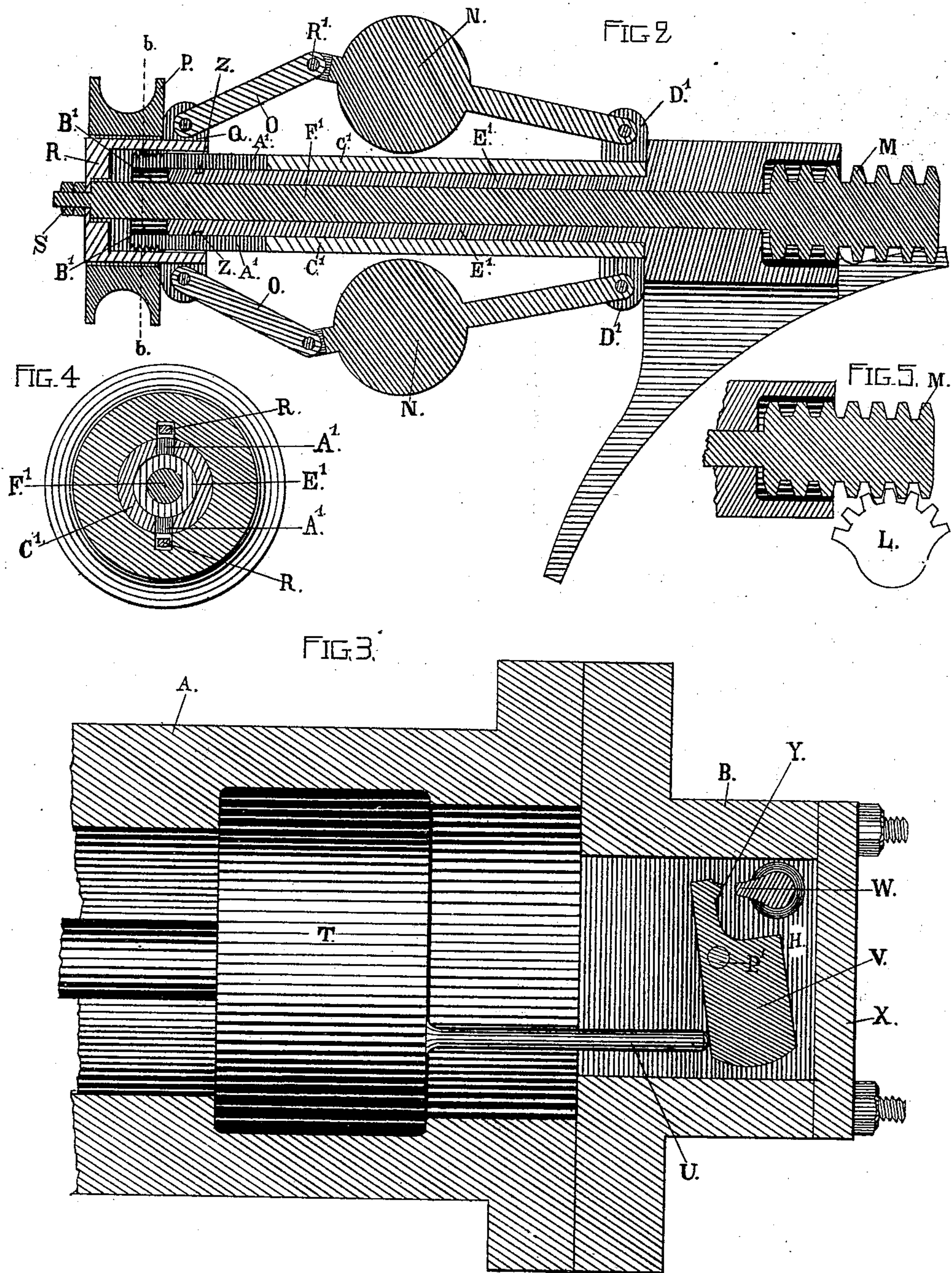
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D. S. Regan
INVENTOR,
by J. B. Harris
attor.

UNITED STATES PATENT OFFICE.

DANIEL S. REGAN, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO HIMSELF AND JOHN H. EICHLER, OF SAME PLACE.

GAS-ENGINE.

SPECIFICATION forming part of Letters Patent No. 333,336, dated December 29, 1885.

Application filed October 6, 1885. Serial No. 179,101. (No model.)

To all whom it may concern:

Be it known that I, DANIEL S. REGAN, a citizen of the United States, residing in the city and county of San Francisco, and State of California, have invented a new and useful Gas-Engine, of which the following is a specification.

My invention relates to improvements in gas-engines; and it consists in the construction and arrangement of the gas and air chest, and of the governor or regulator, and the device for breaking the electric current and producing the electric spark for the purpose of igniting the gas charge.

The nature of my invention will be more readily understood by reference to the accompanying drawings and the letters referring thereto.

Figure 1 is a front elevation showing the cover removed from the gas-chest, to show the interior construction. Fig. 2 is a longitudinal vertical section of the governor or regulator; Fig. 3, a longitudinal section showing the broken part of the cylinder and the gas-chest cut through the dotted lines *a a*, shown in Fig. 1. Figs. 4 and 5 are details.

A represents the cylinder; B, the outer wall of the gas-chamber; C, the partition of the gas-chamber; D, the gas-pipe; E, the air-pipe; F, the gas-valve; G, the air and gas valve; H, the air and gas igniting chamber; I, the air and gas supply chamber; J, the valve-rod for supplying and cutting off the gas; K, the cut-off and supply lever; L, the gear which connects the valve-rod J with the governor-stem gear; M, the governor-stem gear; N, the governor balls and levers; O, the governor connecting-levers; P, the governor-pulley; Q, the collar and pivot lugs to which the levers O are connected, for the purpose of operating the governor-stem M, by means of the connecting-bar R, which is held to the governor-stem by the nuts S upon the end of the same.

T represents the piston of the engine.

U represents the finger for tripping the connecting and disconnecting lever V, for the purpose of producing the igniting-spark.

W represents the electric point.

X represents the cover of the gas-chamber.

Y represents the lever-point for the electric connection.

Z represents the stop-groove which holds the revolving sleeve of the governor upon the fixed stem-sleeve of the governor.

A' represents the governor guide-grooves.

B' represents the space allowed for the reciprocating motion of the gear-actuating stem which actuates the valve-gear.

C' represents the revolving sleeve to which the balls and lever N are attached by the lugs D'.

D' represents the lugs attached to the revolving sleeves.

E' represents the fixed sleeve-stem of the governor.

F' represents the governor-gear-actuating stem for actuating the valve-stem J and lever K and valve F.

G' represents the insulator for the electrical connection.

H' represents the electrical wire connecting with the electrical point W by the connecting-post I'. The wire J' connects with the engine-cylinder.

S' represents the governor-spring.

M' represents the collar by which the tripping-lever K is attached upon the valve-stem N'.

The indicator O' is designed to regulate the supply of gas.

The following is the construction of my improvement: I form the cylinder A similar in its general features to that of other gas-engines. I generally cast the igniting gas-chamber H and the receiving and mixing gas-chamber I with outer wall, B, and divided by partition C. I connect the two chambers H and I through the valve G, which is upon the stem N'. The chamber H is connected with the cylinder A by means of openings. (Not shown.) The valve F admits the gas into the chamber through the gas-supply pipe D, which has the throttle and gage valve O', to cut off the supply or regulate the required amount of gas. The air-pipe E is always open to admit air freely. I attach the lifting-collar M² upon the valve-rod N', to actuate the valve F by means of the tripper K, which is attached to the collar M' upon the governor and gas-valve rod

J, as will be explained in describing the operation. I pivot the lever V at P', so that the heavy side will by its weight bring the contact-point Y against the electric point W, for the purpose of connecting the circuit. The electric point W and connecting-piece I' are insulated in the usual way at G. The governor is operated upon the sleeve-stem E', and is held upon the same by the annular-groove connection Z, which allows it to revolve freely. The operating parts are all connected with the outer revolving sleeve, C'. The revolving pulley P is screwed to the end of the same. The lugs D' are fixed parts of the same, and the balls and levers N are jointed with the levers O, which are pivoted to the lugs and collar Q, which carry the connecting-hanger R, to which the stem F' is attached by means of the nuts S. The pulley P is slotted, to allow the longitudinal motion of the stem F' through the fixed sleeve E'. The slot A' allows the hanger R to move to the outer end of the fixed-stem sleeve E', which is sufficient to allow the required action of the governor upon the cut-off gear, allowing the tripping-lever K to be thrown off of the lifting-block M² on either side. The annular toothed gear M remains in gear with the valve-stem gear L while it revolves concentrically with the stem F'. The finger U is attached to the piston T and passes through the opening L' at each back-stroke of the piston, operating the lever V and breaking the contact of the points W and Y, and producing the electric spark, as is understood.

The following is the operation of my improvements in gas-engines: The piston T, being set in motion in the usual mode of starting gas-engines, at the outward stroke sucks the valve G open, and the tripping-lever K, resting upon the lifting-collar M², raises and opens the gas-valve F, admitting the required proportion of gas, which is regulated in quantity at will by operating the valve and indicator O'. The air is freely admitted through the pipe E, and as soon as the full outward stroke of the piston is made and the cylinder filled with gas and air in proper proportions for combustion, and the valve closed by its own gravity, the piston is returned, compressing the gas, and the finger U, striking the lever V, pushes the same back, breaking the circuit at the points Y and W, and producing the spark and igniting the charge of gas and forcing out the piston T in the usual manner. I employ any of the well-known methods for operating the exhaust of the cylinder after the full outward stroke has been completed. When the speed of the en-

gine is greater than that designed, the governor-balls are thrown out and the stem F' forced in, and the gear L and M partially revolves the stem J and throws the tripping-lever K forward off of the lifting-collar M², and as it is again drawn out the valve G is sucked open; but the stem J is not lifted, and only air is drawn into the cylinder, and consequently no explosion is had in the cylinder until the speed of the governor is reduced and the spring S' draws the stem F' out, revolving the gear, so that the tripping-lever K is again brought over the lifting-collar M², and as the piston T again moves out the valve G is sucked up, raising the stem N', and the collar M² again lifts the tripper K and valve F, admitting the gas for another charge. When the governor ceases to revolve, by the breaking of the belt or otherwise, then the spring S' throws the stem F' out, revolving the stem J until the tripping-lever K is thrown off of the front of the lifting-collar M², thus cutting off the supply of gas, as in the other case.

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

1. The gas-valve F, with stem J, actuated by the gas and air valve G, with stem N', by means of the lifting-collar M² and the tripping-lever K, for the purpose of opening the gas-supply and admitting gas, constructed and operated substantially as and for the purposes set forth.

2. The gas-valve F, with stem J and segmental gear L, to operate in connection with any suitable governor, in combination with the gas and air valve G, stem N', and lifting-collar M², for the purpose of regulating the supply and cut-off, constructed and operated substantially as and for the purposes set forth.

3. The combination and arrangement of the gas-chest, composed of the supply and mixing chamber I and igniting-chamber H, in combination with the air-pipe E, the gas-valve F, with stem J and lever K, the gas and air valve G, with stem N' and lifting-collar M², and the lever V, with electrical connecting-point Y and insulated electric point W, constructed and operated substantially as and for the purposes set forth.

4. The gas-valve F, with stem J, in combination with the stem A', valve G, the collar M², and indicating-valve O, substantially as set forth.

DANIEL S. REGAN.

Witnesses:

JOHN H. REDSTONE,
L. E. REDSTONE.