(No Model.) 4 Sheets—Sheet 1.

P. NIEL & A. JANIOT.

GAS MOTOR.

No. 462,447. Patented Nov. 3, 1891.

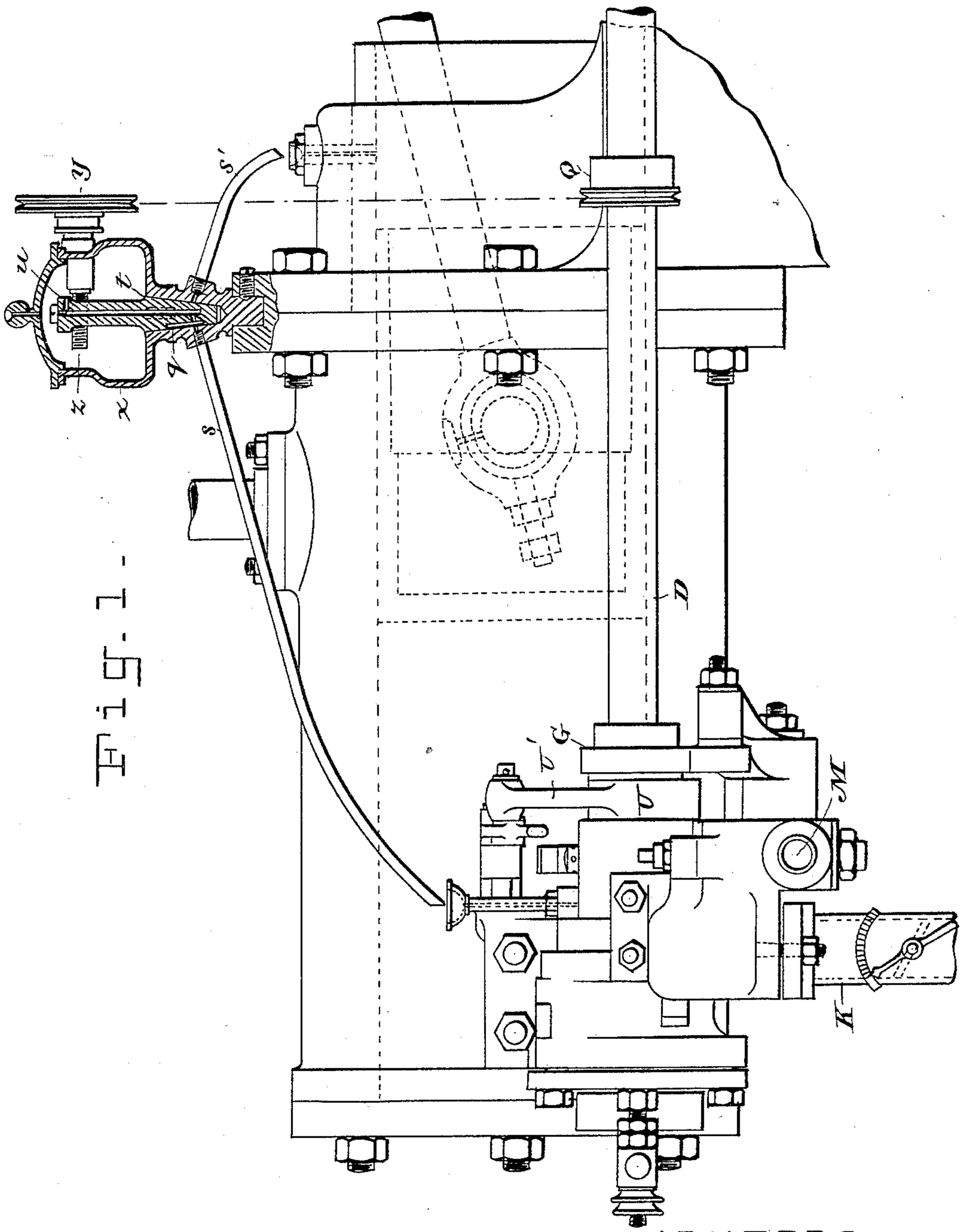

Fig. 1.

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Fig. 2.

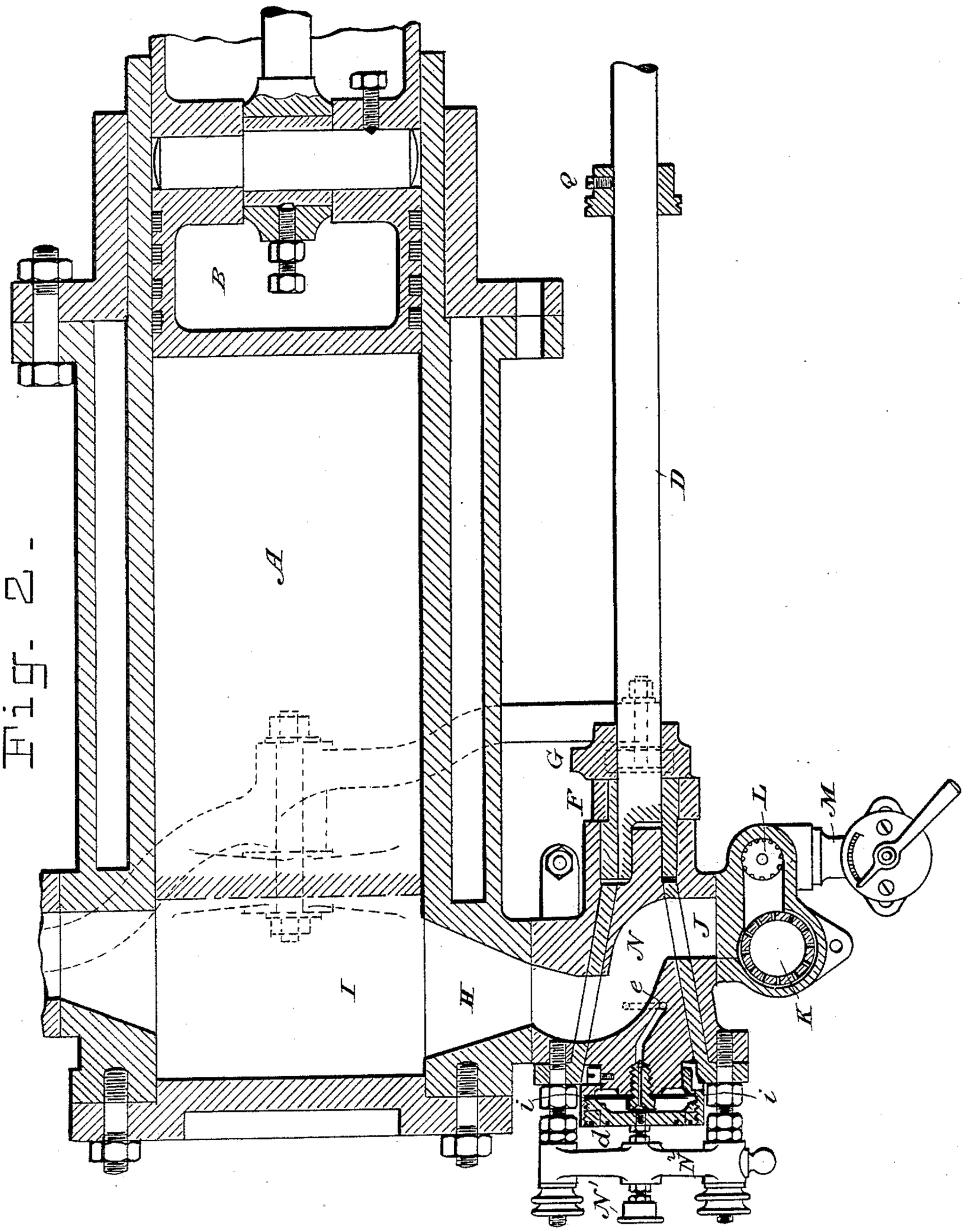

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Fig. 5.

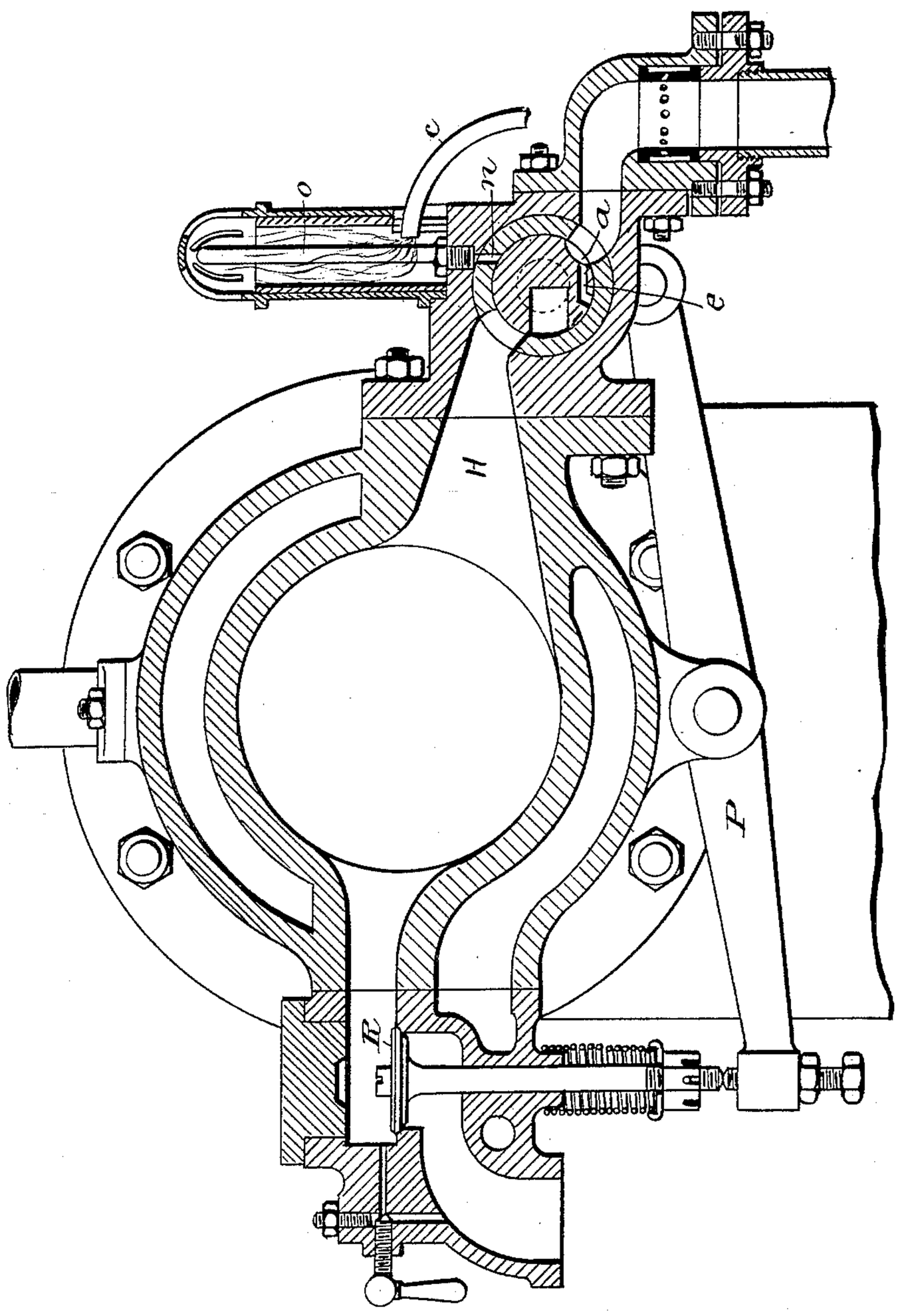

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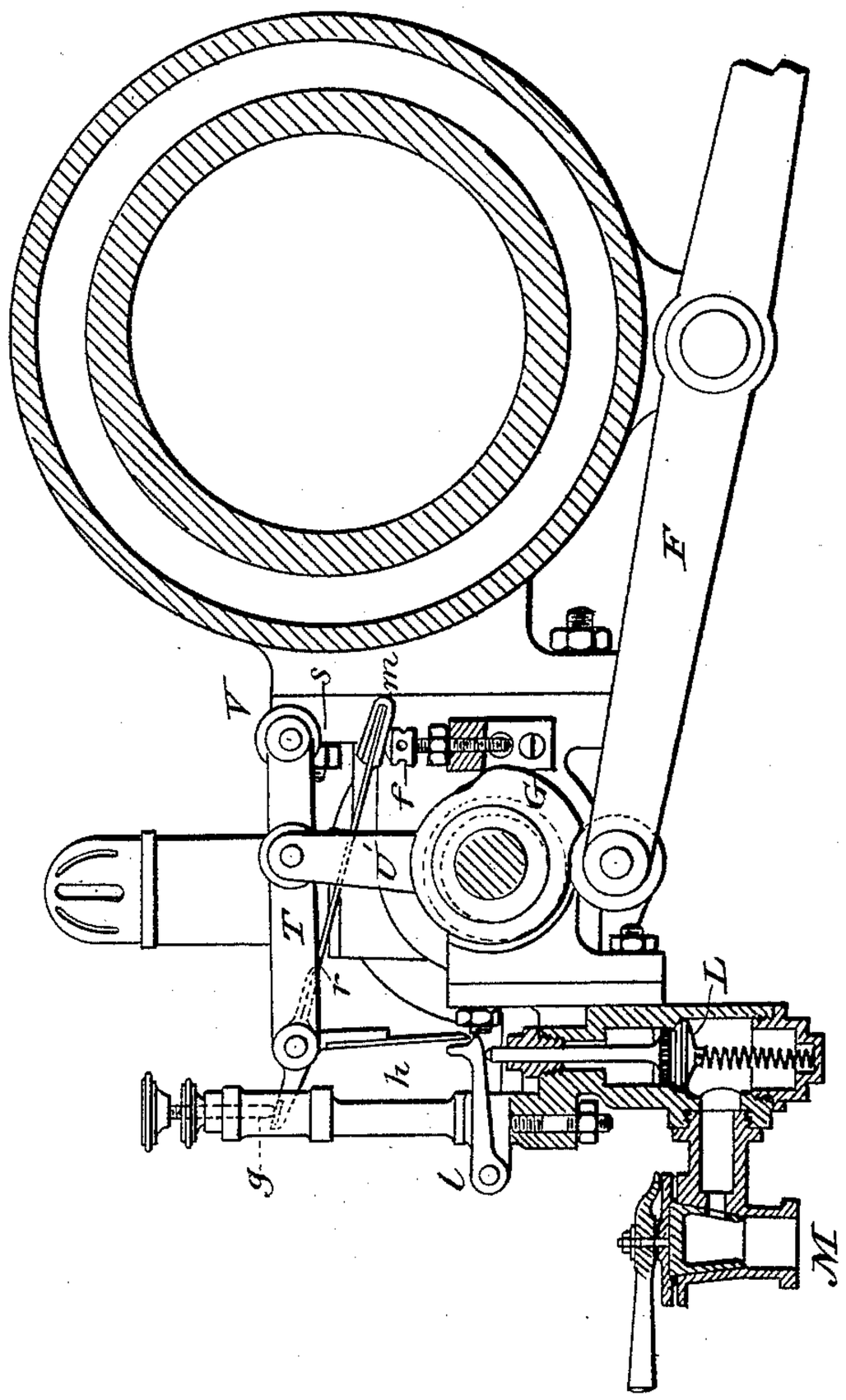
Fig. 4.



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UNITED STATES PATENT OFFICE.

PAUL NIEL AND ALEXANDRINE JANIOT, OF PARIS, FRANCE.

GAS-MOTOR.

SPECIFICATION forming part of Letters Patent No. 462,447, dated November 3, 1891.

Application filed January 29, 1890. Serial No. 338,454. (No model.) Patented in France October 15, 1888, No. 193,542; in Belgium June 14, 1889, No. 86,638; in Spain October 26, 1889, No. 10,137; in Switzerland October 26, 1889, No. 1,524; in England October 31, 1889, No. 17,295; in Italy November 19, 1889, No. 26,508; in Germany December 10, 1889, No. 54,179, and in Austria-Hungary February 17, 1890.

To all whom it may concern:

Be it known that we, PAUL NIEL and ALEXANDRINE JANIOT, citizens of the French Republic, residing at Paris, France, have invented new and useful Improvements in Gas-Motors, (for which we have obtained Letters Patent in Great Britain October 31, 1889, No. 17,295; in Belgium June 14, 1889, No. 86,638; in Germany December 10, 1889, No. 54,179; in Austria-Hungary February 17, 1890, no number; in France October 15, 1888, No. 193,542; in Spain October 26, 1889, No. 10,137; in Italy November 19, 1889, No. 26,508, and in Switzerland October 26, 1889, No. 1,524,) of which the following is a full, clear, and exact description.

Our invention has for its object to improve gas or other hydrocarburet motors wherein the cycle is completed with two revolutions of the driving-shaft; and its chief features are improvements of the distribution, the regulation by means of the arrangements and combinations hereinafter described, reference being had to the drawings which make a part of this specification, and wherein similar letters refer to similar parts throughout the several views.

Figure 1 illustrates the cylinder in elevation. Fig. 2 shows a horizontal section of the cylinder and appurtenances. Fig. 3 is a transverse section of the same. Fig. 4 shows a detail view of the regulator.

A is the cylinder with a jacket of water, and B the piston connected by a rod with the crank. (Not shown on the drawings.)

On the driving-shaft is keyed a helicoidal pinion gearing with a wheel having twice the number of teeth and fixed on the end of the axle D, which thus receives a rotary motion and will make one revolution for every two revolutions of the crank. A conical gearing can of course also be employed. The axle D carries along in its rotary motion the conical core of a cock E, the eccentric F, and the cam G. The wall or valve-seat surrounding the conical distributing-cock is provided with the aperture H for the compression-chamber I of the cylinder, and the aperture J, corresponding with the inlet of the mixture of air, which is fed by the pipe K, and of gas, which is admitted by the valve L, opening on the admission gas-pipe M. It is furthermore provided with the small aperture *n*, Fig. 3, corresponding with the tube *o*, closed at its upper end, which serves for the ignition, and is kept incandescent by the Bunsen burner *c*.

The conical core of the distributer is provided with a hole N, which puts into communication the apertures H and J at the moment of the aspiration with the small hole *a*, Fig. 3, which brings into communication the aperture *n* with the aperture H at the moment of the ignition and with the hole *e*, ending in a cavity arranged in the core, and which at the moment of the compression and the explosion brings the cylinder into communication with a small chamber arranged in the upper end of the core in the manner and for the purpose hereinafter described. The upper end of the core is inclosed in a narrow chamber and is provided with a cylindrical cap, wherein the cover *d* is screwed and strongly presses the edges of a very flexible metallic plate *i i*, which is fixed in its middle on the head of the core by means of a hollow screw, which corresponds with the hole *e*. The screw N′ is adjusted so as to abut the back center of said cap and merely keeps the core in its casing without exercising any pressure. When the compression and the ignition occur, the interior pressure will penetrate in the space provided between the lid *d* of the cap and the flexible plate. The pressure then acts upon this plate, and by means of an arrangement of tongues provided in the cap the core is pushed down in its casing, and thus the tightening assured at the moment of greatest pressure in the cylinder. The screw N′ is mounted on a link N^2, which can be rotated on one of its adjusting-bolts, and it is consequently sufficient to loosen and rotate this link for the purpose of taking the core out of its casing and cleaning it.

As shown in Fig. 3, the exhaust is made through an aperture communicating with the compression-chamber and is closed by means

of a valve R, which is opened at the proper moment by the lever P, acted upon by the cam G of the axle D.

The volume of the mixture forming the charge depends on the dimensions of the aperture of the cock.

It will be remarked that the chamber of equilibrium of our conical cock and its metallic membrane are placed and directly acted upon in the upper part of the conical plug. Furthermore, that this plug is placed horizontally and in line with and in combination with the axle, which is directly acted upon by the driving-shaft without any intermediate part of transmission.

The regulator, Fig. 4, is composed of the lever T, pivoted at its end V, and which receives by the medium of the eccentric F and its collar U and arm U′, pivoted in the middle of the lever, an upward and downward oscillating movement. At the free end of this lever is pivoted another two-armed lever, one arm of which abuts at every ascending movement under an adjusting-screw *g*, while the other arm is provided with a rigid metallic blade *h*. To the center piece of these two levers is also fixed a flexible steel blade *r*, the free end of which is provided with a metallic mass *m*, which at every oscillation strikes upward against a stop and downward on the head of an adjusting-screw *f*, deadening the vibration.

When the machine is running at its regular rate of speed, the end of the blade *h* will open the gas-valve L while pushing on the projection at the end of the lever *l*, which rests on the stem of said valve exactly at the moment of the aspiration; but if the machine should run at a greater speed, and consequently the lever T be moved faster, the spring-blade *r* has no time to straighten the blade *h* quickly enough, which latter will thus fail to strike the projection, and consequently pass the end of the lever *l* without moving the valve. The machine will consequently be deprived of gas, and thus come back to its regular rate of speed.

The air-admission pipe K, Fig. 1, and the gas-admission pipe, Fig. 2, carry each a valve provided with hand and dial, which allow of regulating, after some experiments, the relative admission of air and gas to obtain the most suitable proportion. The air and gas flowing out of these pipes pass, as shown in Figs. 2 and 3, through several small holes, which assure a thorough mixture.

Having now fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a gas or other hydrocarburet motor, the combination of a conical horizontal cock, as herein described, provided at its upper end with the equilibrium-chamber, wherein the gas directly effects its pressure at the moment of the compression and the explosion, and the driving-shaft connected directly with said cock, substantially as set forth.

2. In a gas-engine, the regulator formed by the combination of a lever oscillating by the operation of the engine, and which in its lowering motion opens the gas-admission valve, and an elastic weighted steel blade connected with the lever which at an increase of the speed prevents the opening of said valve and consequently decreases the speed of the engine, substantially as set forth.

In witness whereof we have hereunto set our hands in presence of two witnesses.

PAUL NIEL.
ALEXANDRINE JANIOT.

Witnesses:
V. LEVERGNY,
J. L. RATHBONE.