

(No Model.)

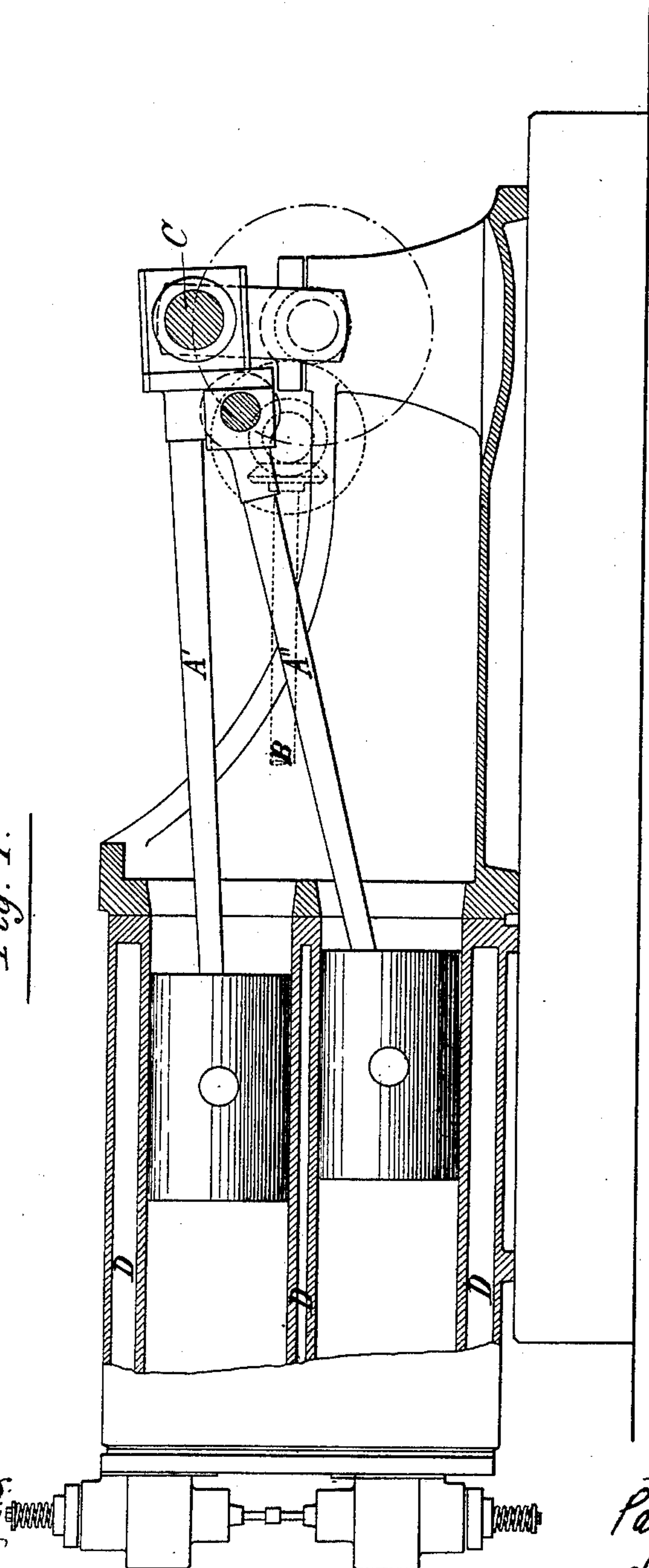
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P. A. N. WINAND & L. V. GOEBBELS.
GAS AND HYDROCARBON ENGINE.

No. 435,637.

Patented Sept. 2, 1890.

Fig. 1.



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2 Sheets—Sheet 2.

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Fig. 3.

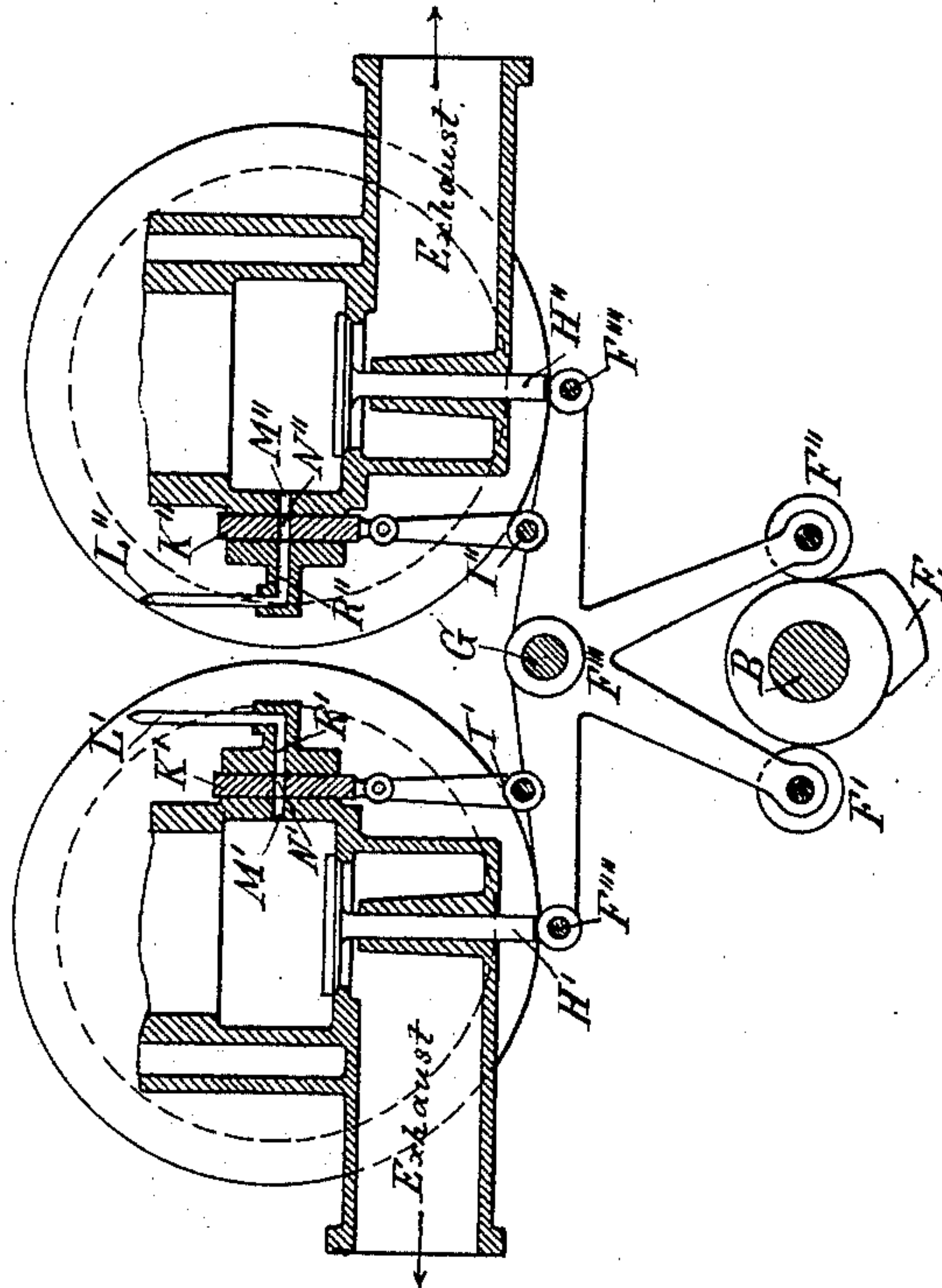
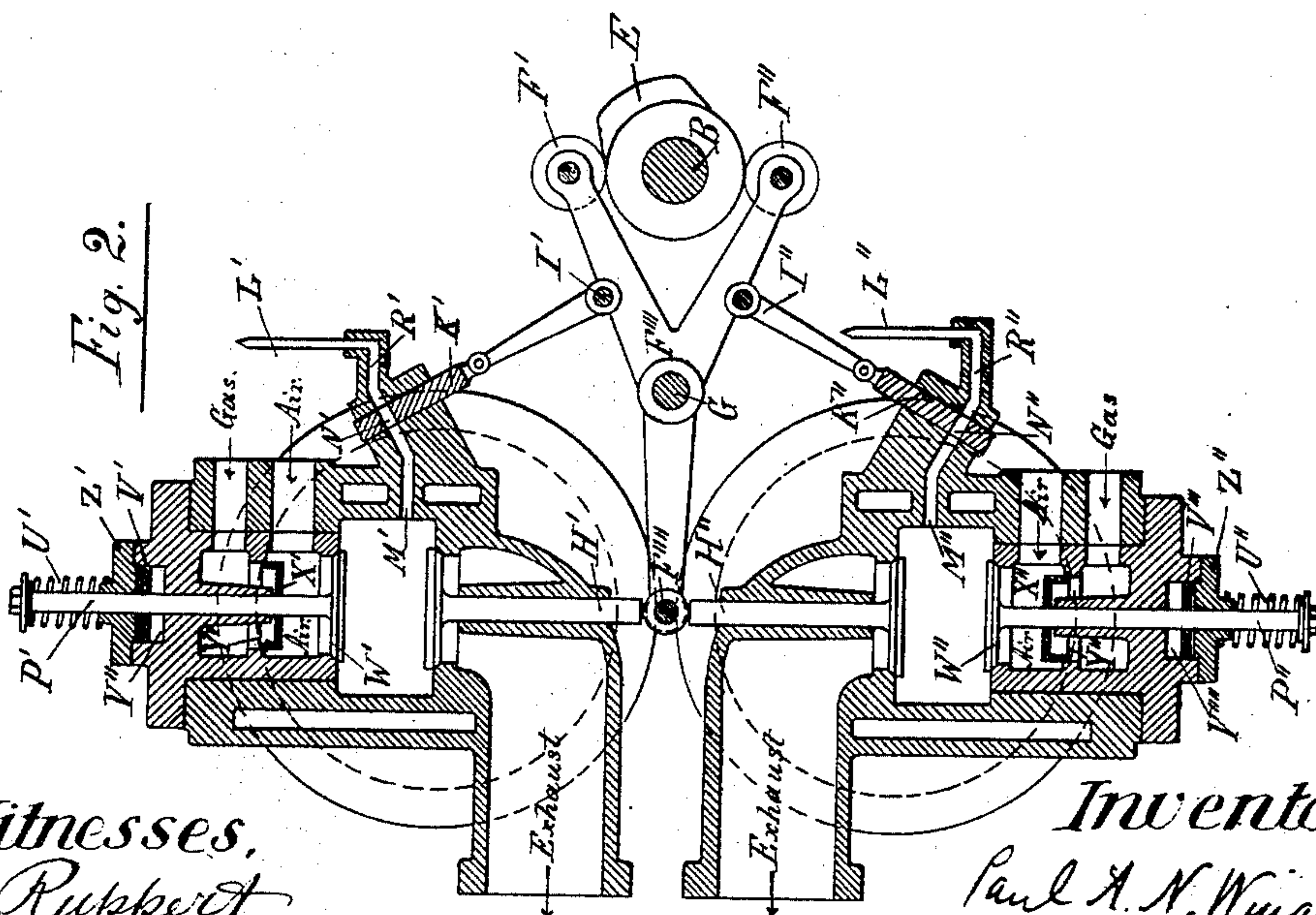


Fig. 2.



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UNITED STATES PATENT OFFICE.

PAUL A. N. WINAND AND LEO V. GOEBBELS, OF PHILADELPHIA, PENNSYLVANIA.

GAS AND HYDROCARBON ENGINE.

SPECIFICATION forming part of Letters Patent No. 435,637, dated September 2, 1890.

Application filed August 10, 1889. Serial No. 320,430. (No model.)

To all whom it may concern:

Be it known that we, PAUL A. N. WINAND, a subject of the King of Belgium, and LEO V. GOEBBELS, a subject of the King of Prussia, both residing at the city of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Gas and Hydrocarbon Engines, of which the following is a specification.

Our invention consists in an engine having two cylinders which may be placed side by side upon the same horizontal plane, or one above the other, as preferred, and having a special and novel arrangement for actuating the exhaust-valves and the igniting devices, respectively, and provided also with specially-arranged valves of novel construction for the admission of the charge to the cylinders, respectively. Both cylinders work exactly in the same manner—that is to say, there is in each one one working-stroke to every four strokes. The reciprocations of the respective pistons are in the same direction at one and the same time; but the engine is constructed in such manner that the ignition and consequent expansion of the gas in one cylinder occurs concurrently with the admission of a combustible admixture of air and gas to the other cylinder, and the combustible mixture is being compressed in the one cylinder concurrently with the exhaust of the burned gases from the other cylinder.

Referring to the drawings, Figure 1 represents a side elevation of the engine in section. Fig. 2 represents an end sectional elevation, the cylinders being placed one above the other; and Fig. 3 represents an end sectional elevation, the cylinders being placed side by side upon the same horizontal plane. Similar letters refer to similar parts in the respective figures.

In Fig. 1, as already stated, the cylinders are shown as placed one above the other, one connecting-rod A' acting directly on the crank-pin C, and the other connecting-rod A'' being attached to the former A'. Both cylinders are surrounded by a water-jacket D D. The gear-shaft B, Fig. 2, is driven from the crank-shaft by gear-wheels so proportioned that said gear-shaft B revolves at one-

half the speed of the crank-shaft. It has on its end a sleeve carrying the cam E, which, by passing under roller F' or above roller F'', causes the lever F''' F'''' to oscillate around its center G. The end F'''' of said lever engages between and actuates the two stems of the exhaust puppet-valves H' and H'', thus by its oscillation effecting the opening of the respective exhaust-valves alternately. To the same lever F''' F'''' are attached rods I' and I'', connected with the valves K' and K'', whereby the ignition of the gases in the respective cylinders is effected alternately and according as the cam E on the shaft B, by its engagement alternately with rollers F' and F'', moves the lever upward or downward—that is to say, concurrently with the closing movement of the valve H''—the opening N' of the valve K' is made to coincide with the port M' R', which establishes communication between the tube L', which is kept at a red heat, and the cylinder, thus permitting the combustible gas in the cylinder to come in contact with said tube L', and thus be ignited, though a gas-jet or other means well known may be employed instead of the tube L' for igniting the combustible mixture. At the moment of ignition of the gas in one cylinder the exhaust-valve of the other cylinder is moving toward its seat or is in the act of closing.

Valve W', for the admission of the charge, acts automatically—that is, it opens inwardly as soon as the pressure in the cylinder is sufficiently below atmospheric pressure to overcome the tension of the spring U', surrounding the outer end of the stem P' of valve W'. The valve-stem P' carries a piston V', which fits in a space V'', formed by the valve-casing and inclosed by the cover Z', and which acts as a dash-pot, giving steadiness to the movements of the valves and obviating noises.

The cylindrical opening in which the piston V' works may be cast or bored in the cover Z' instead of in the casing, or may extend into both the casing and its cover. The stem of the inlet-valve W' carries also a hollow piston X', which has its seat in the walls of the casing of the valve W', the said walls being reduced in cross-section, as shown at

Y', to conform to the diameter of said piston X'. The said piston X' serves as a valve to shut off communication when seated between the gas-inlet and the air-inlet, but moves from its seat and establishes communication between the gas-inlet and the air-inlet when the valve W' moves from its seat. Thus the gas intermingles with the air, and both are drawn into the cylinder through the valve W'.

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

1. In a gas-motor engine, twin cylinders, an exhaust-valve for each cylinder, a rocking lever arranged centrally between said cylinders and adapted to alternately operate said exhaust-valves, an igniting device connected by a port with the interior of each cylinder, a valve to control each port and the ignition of the gas, means for connecting each of said last-named valves to the centrally-arranged

rocking lever, and an automatically-operating valve for admitting the charge to each cylinder, substantially as set forth.

2. The combination, in a gas-motor engine, of twin cylinders and means for alternately igniting and exhausting the charge in and from the cylinders, of an inlet puppet-valve applied to each cylinder-opening by the differences of pressure acting upon it, and provided with a piston fastened on its stem and fitting, as described, in a closed chamber, substantially as set forth.

In witness whereof we have hereunto subscribed our names in the presence of two witnesses.

PAUL A. N. WINAND.
LEO V. GOEBBELS.

Witnesses:

AMOS BONSALE,
GEO. W. REED.