

No. 889,267.

PATENTED JUNE 2, 1908.

A. G. SPENCER.  
FOUR CYCLE MOTOR.  
APPLICATION FILED JUNE 28, 1906.

Fig. 1.

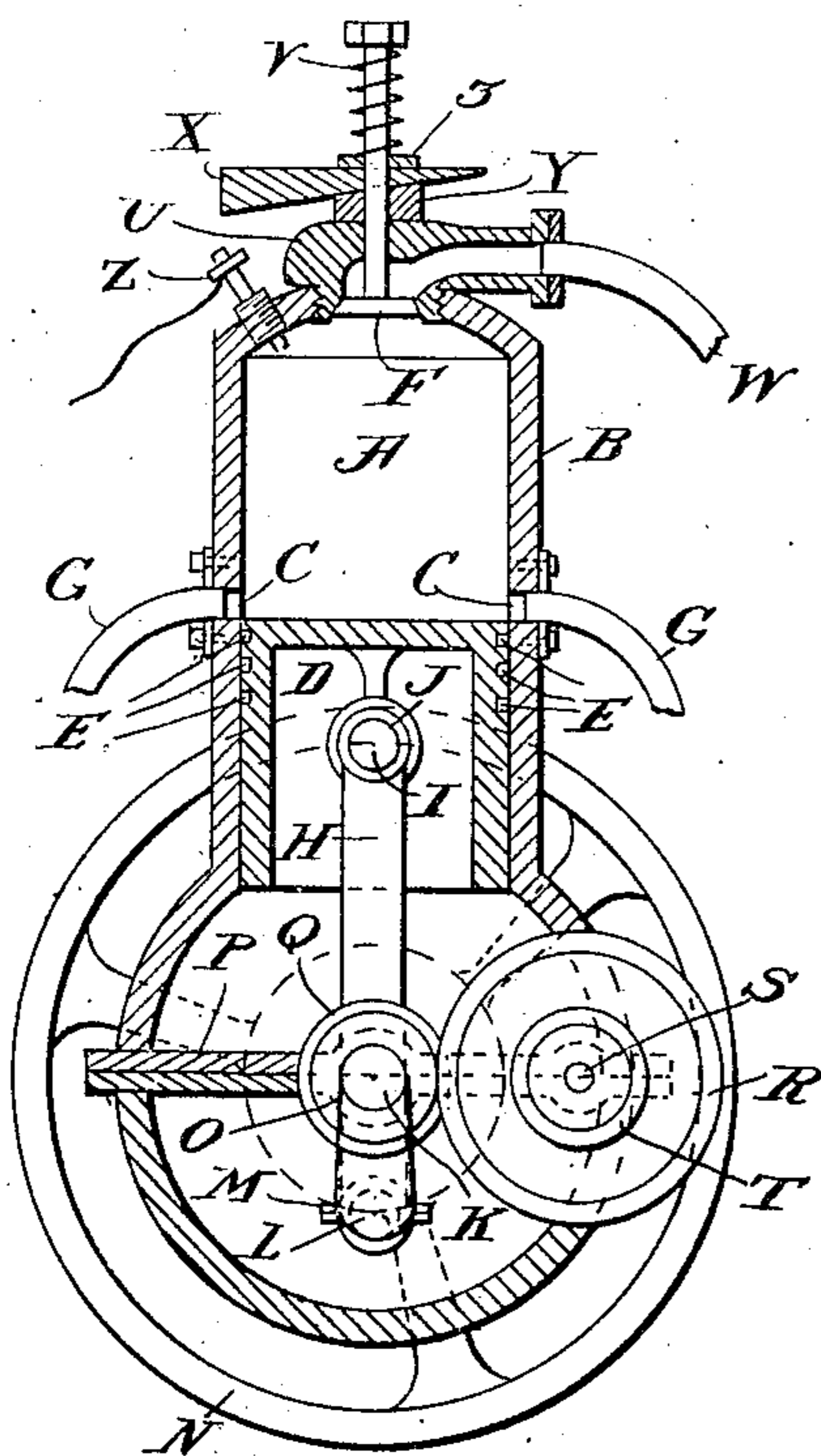
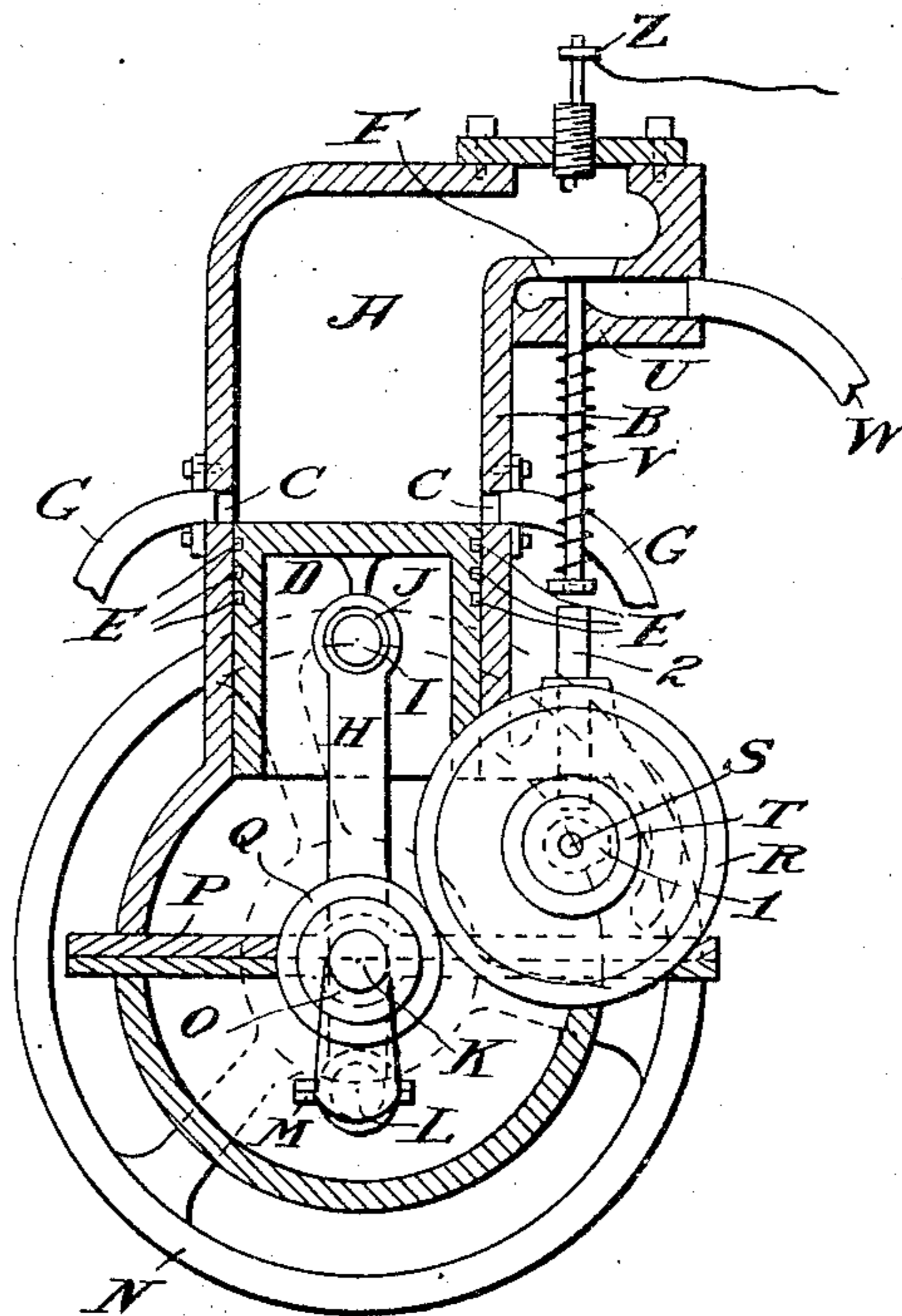


Fig. 2.



Witnesses:

Arthur Ingram.  
Herman Gustow.

Inventor:

A. Gibby Spencer.  
By his Attorney,  
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# UNITED STATES PATENT OFFICE.

ALEXANDER GIBBY SPENCER, OF RAHWAY, NEW JERSEY.

## FOUR-CYCLE MOTOR.

No. 889,267.

Specification of Letters Patent.

Patented June 2, 1908.

Application filed June 28, 1906. Serial No. 323,953.

*To all whom it may concern:*

Be it known that I, ALEXANDER GIBBY SPENCER, a citizen of the United States, residing at No. 138 St. George's avenue, Rahway, Union county, New Jersey, have invented a new and useful Four-Cycle Motor, Consisting of One or More Cylinders, of which the following is a specification.

My invention relates to an improvement in four cycle motors, and comprises a motor in which the piston operates in conjunction with an inlet valve, one or more exhaust ports suitably located in the cylinder wall and a suitable ignition device, or means for causing an explosion of the charge, thereby simplifying and performing all the functions of the present type of four cycle motor; the products of combustion in accordance with my invention being caused to discharge wholly through said exhaust port or ports in the side wall of the cylinder.

The object of my improvement is to provide a four cycle motor without any exhaust-valve or other outlet for the products of combustion, except one or more ports suitably located in the cylinder side-wall, as hereinafter described, the head end of the cylinder being entirely closed except for the inlet for the combustion motive fluid.

Referring to the accompanying drawings: Figure 1 represents a vertical section of a motor, with automatic inlet valve, embodying my invention, and Fig. 2 a vertical section of a motor having a mechanically operated inlet valve and also embodying my invention.

A denotes the cylinder and B the cylinder wall having exhaust ports C, C of suitable size and shape and so located in the wall as to be uncovered by the piston D, at or near the end of its power and suction strokes. The piston is provided with rings E and by its reciprocating motion alternately covers and uncovers the ports C, covering said ports during nearly the whole of the suction strokes, whereby the combustion motive fluid is drawn into the cylinder, covering said ports during nearly the whole of the compression strokes, whereby the necessary compression is obtained, and uncovering said ports at or near the end of the power strokes, whereby the products of combustion discharge wholly through said ports.

F denotes the induction or inlet valve; G exhaust pipes leading to a suitable muffler or mufflers; and H the connecting rod, pivotally

connected at its upper end to the piston D by a wrist pin I and suitable box or bearing J, and pivotally connected at its lower end to the crank member L of crank shaft K, by a suitable box or bearing M. • The reciprocating motion of the piston imparts through the rod H a rotary motion to the crank shaft.

N designates a fly wheel, secured to the crank-shaft K, and P a crank-case, supporting the boxes or bearing O for said shaft. The gear Q is secured to the crank-shaft K and drives the gear R, which is secured to the shaft or pinion S, whereby the commutator T, which is also secured to said shaft S, is caused to revolve at suitable speed.

U is the valve-cage supporting the valve F. The valve F may be opened either by the vacuum caused by the suction stroke of the piston D, or otherwise mechanically opened.

V is the inlet valve-spring and W the feed pipe or inlet pipe.

Z is the spark plug or ignition device.

In Fig. 2 the numeral 1 represents a cam secured to shaft S, the rotary motion of which causes the cam 1 to raise the push rod 2, thereby opening the valve F.

What occurs in each cylinder during the operation of the motor, is as follows: The piston being at or near the cylinder head, performs the first stroke, thereby creating a vacuum and drawing in a charge, then performs the second stroke, thereby compressing said charge, at about which time ignition occurs, then performs the third or power stroke, uncovering the port or ports C when at or near the end of said stroke, whereby the exhaust discharges wholly through said port or ports, and then performs the fourth stroke, thereby completing the cycle.

Among the advantages of the motor of my invention, it may be mentioned that it is more simple and durable in construction and less expensive of manufacture than four-cycle motors of the character heretofore known employing exhaust ports and valves at the head end of the cylinder.

I claim:

A four cycle motor comprising a cylinder having in its side an exhaust port and at its head end an inlet for the combustion motive fluid and an inlet valve therefor, said end of the cylinder being permanently closed except for said inlet, a piston within said cylinder, a piston rod pivotally connected with said piston, and a crank-shaft whose crank mem-

ber is pivotally connected with said rod, said exhaust port and piston being in proper relation to each other to enable said piston to cover said port during nearly the whole of the suction and power strokes of the same and to uncover said port at about the end of the suction and power strokes of said piston, whereby on the suction strokes of the piston the said fluid is thereby drawn into said

cylinder and on the conclusion of the power 10 strokes thereof the products of combustion discharge wholly through said exhaust port then uncovered by said piston; substantially as set forth.

A. GIBBY SPENCER.

Witnesses:

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ROBERT D. GIBBY.