No. 666,414.

Patented Jan. 22, 1901.

S. H. DYER.

VALVE FOR EXPLOSIVE ENGINES.

(Application filed Jan. 26, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 2.

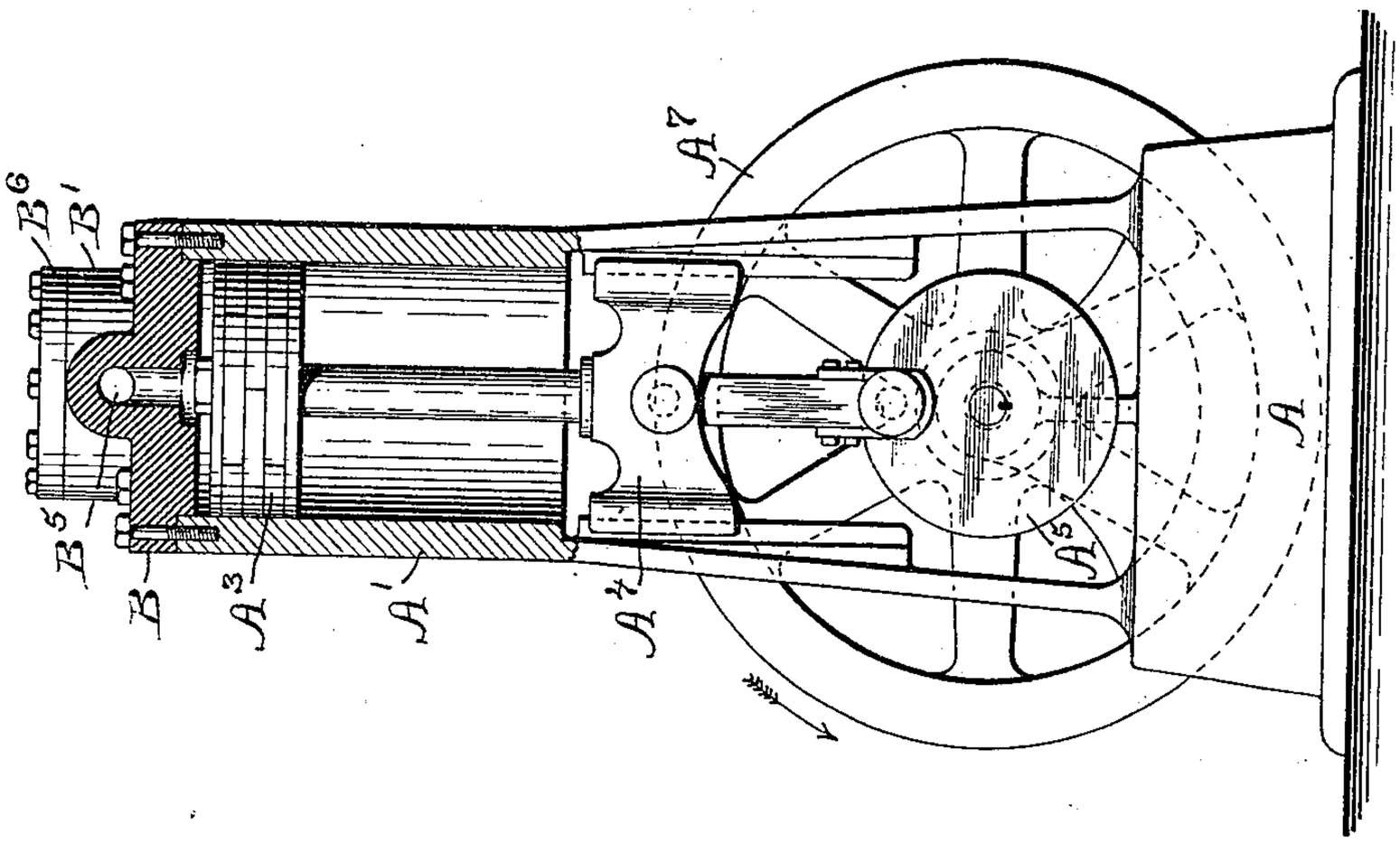
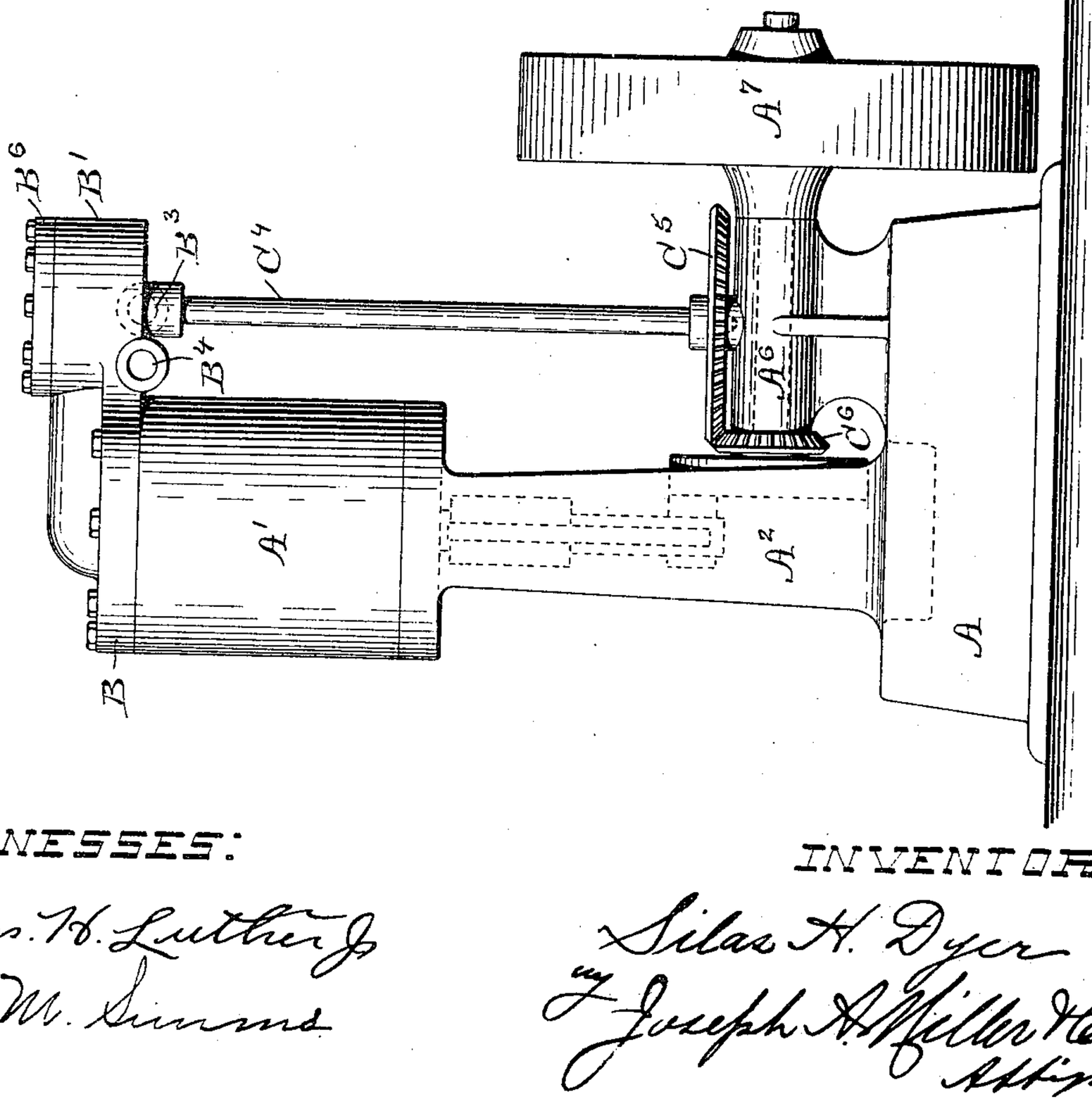


Fig. 1.



WITNESSES:

Chas. H. Luther Jr.

E. M. Simms

INVENTOR:

Silas H. Dyer

by Joseph A. Miller & Co.

Attys.

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Fig. 5.

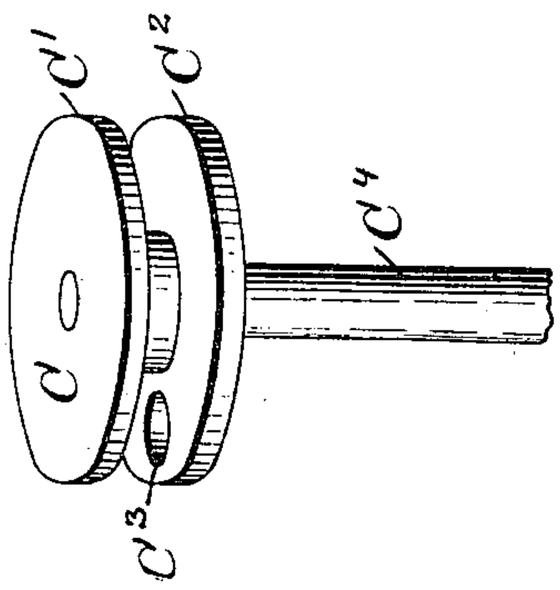


Fig. 6.

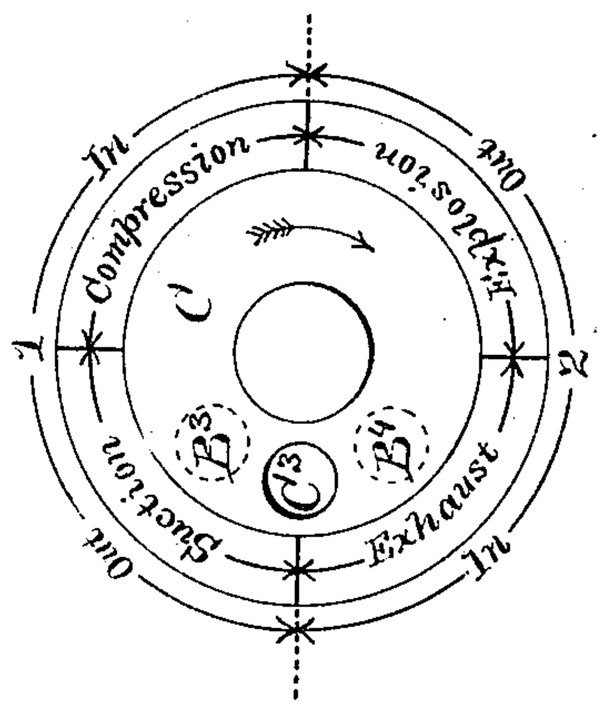


Fig. 3.

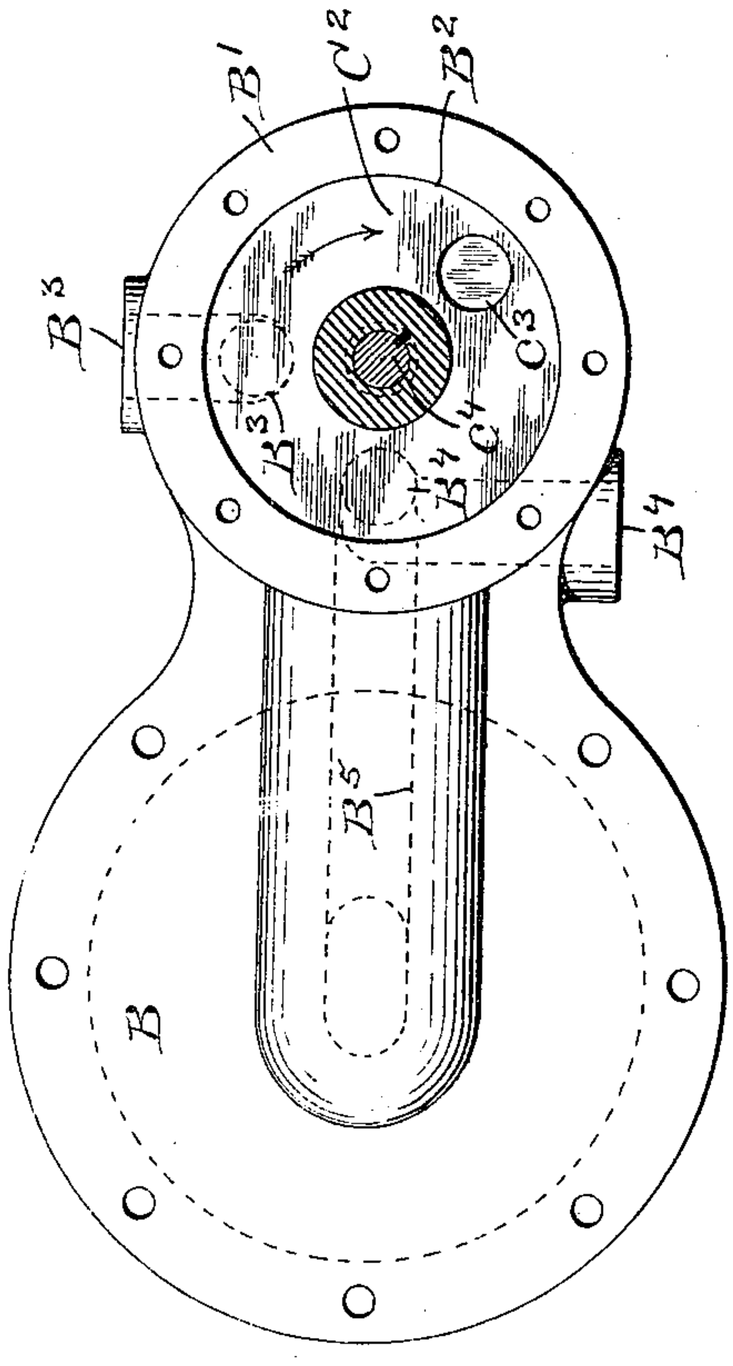
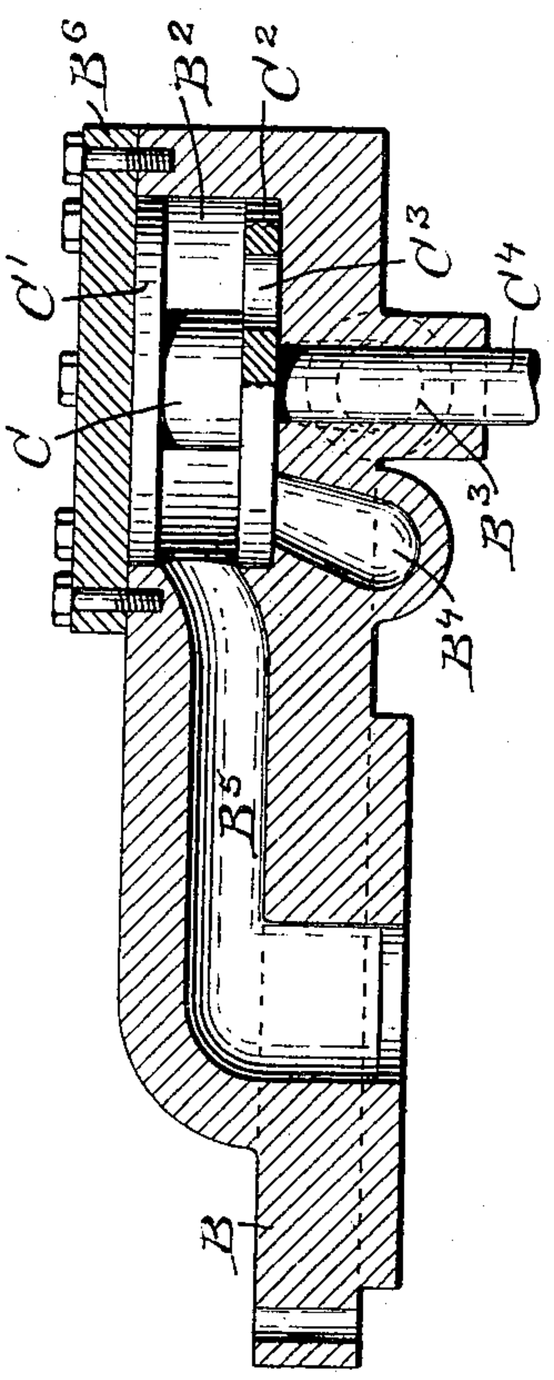


Fig. 4.



WITNESSES:

Chas. H. Luther Jr

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UNITED STATES PATENT OFFICE.

SILAS H. DYER, OF PAWTUCKET, RHODE ISLAND, ASSIGNOR OF ONE-HALF TO EDMUND W. ORSWELL, OF SAME PLACE.

VALVE FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 666,414, dated January 22, 1901.

Application filed January 26, 1900. Serial No. 2,878. (No model.)

To all whom it may concern:

Be it known that I, SILAS H. DYER, a citizen of the United States, residing at Pawtucket, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Gas-Engines, of which the following is a specification.

This invention has reference to an improved valve for controlling the supply, the compression, and the exhaust of gas in a gas-engine; and it consists in the peculiar and novel construction of the valve and the combination of the parts of the engine with the valve, as will be more fully set forth hereinafter.

In a gas-engine the supply and the exhaust of the gas are controlled by valves, more or less injuriously affected by the explosion of the gas.

The main object of this invention is to provide a valve controlling the admission and the exhaust of the gas not injuriously affected by the explosion of the gas, which valve is controlled positively from a moving part of the gas-engine.

In illustrating the invention I have shown my improved valve in connection with a well-known form of vertical gas-engine in the preferred form as a rotary valve; but I do not wish to confine myself to the exact construction of the valve or the connections by which the valve is operated.

Figure 1 is a side view of a gas-engine. Fig. 2 is a view at a right angle to Fig. 1, showing the cylinder in section. Fig. 3 is a top view of the cylinder and the valve-chest of the gas-engine. Fig. 4 is a vertical sectional view of the cylinder-head and valve-chest. Fig. 5 is a perspective view of my improved valve. Fig. 6 is a diagrammatic view illustrating the operation of the valve.

In the drawings, A indicates the base of a vertical gas-engine; A′, the cylinder of the same; A^2, the frame supporting the cylinder and ways on which the cross-head slides; A^3, the piston connected by the piston-rod with the cross-head A^4; A^5, the crank-disk on one end of the crank-shaft, supported in the pillow-block A^6, the fly-wheel A^7 being secured to the other end of the crank-shaft in the usual manner; B, the cylinder-head, and B′ the valve-chest. These are illustrated in the drawings as made in one piece and contain the cylindrical chamber B^2 for the improved rotary valve, the duct B^3, to which the gas-supply is connected, the duct B^4, forming the exhaust-channel, and the duct B^5, connecting the valve with the upper end of the cylinder.

In the preferred form the valve C consists of the two disks C′ and C^2, rigidly secured together by a central boss or formed of one piece of metal. The disk C^2 is provided with the opening C^3, located on the disk, so that in rotating the opening C^3 will at predetermined intervals register with the openings of the ducts B^3 and B^4 and connect these ducts with the annular space between the two disks C′ and C^2.

In Figs. 1 and 2 and in the diagrammatic Fig. 6 I have illustrated the connection and operation of my improved valve in a gas-engine in which the gas is drawn into the cylinder at the downward movement of the piston, is compressed at the upward movement of the piston, then exploded to drive the piston down, and exhausted at the return or upward movement of the piston, the valve being rotated once for every two revolutions of the crank-disk A^5 and fly-wheel A^7. To this end the valve C is secured to the valve-stem C^4, to the lower part of which the bevel-gear C^5 is secured. The bevel-gear C^5 engages with the bevel-gear C^6, secured to the crank-shaft, so that at every two revolutions of the crank-shaft the gear C^5 and the valve C are rotated once.

B^6 is a cap secured to the valve-chest, by which access may be had to the valve-chamber B^2.

In the operation of the valve and engine the instant the explosion takes place the opening C^3 in the disk C^2 is in the position shown in Figs. 3 and 4, with the exhaust-duct and the gas-supply duct closed. The space between the two disks C′ and C^2 is in communication with the cylinder through the duct B^5. The force of the explosion acts equally on the two disks C′ and C^2 of the valve and on the piston A^3 to drive it down the full length of the stroke. During the returning stroke of the piston the opening C^3 passes over the exhaust-duct B^4 to allow the spent gases to be forced out of the cylinder. At the next down or out stroke of the piston the gas, mixed with

air, enters the cylinder through the duct B^3, across which the opening C^3 passes, and at the following inward or upward stroke of the piston the gas is compressed to be exploded in the usual manner at the end of or immediately after the end of the inward or upward stroke of the piston.

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

1. In a gas-engine, a valve consisting of two circular disks secured to the rotatable valve-stem a sufficient distance apart to form between the two disks an explosion-chamber, and an opening in one of the two disks registering with a gas supply and an exhaust duct; whereby the gas supply and the exhaust are controlled by the same disk, as described.

2. In a gas-engine, the combination with the cylinder, the piston, a cylindrical valve-chest on one side of the cylinder, a duct connecting the valve-chamber with the cylinder, a gas-supply duct and an exhaust-duct, both connecting with the same end of the valve-chest, of two circular disks secured to the valve-stem a sufficient distance apart to form an explosion-chamber, one of said disks having an opening registering successively with the gas supply and the exhaust ducts; whereby the force of the explosion is exerted on and balanced by the two disks rigidly secured to each other, as described.

3. In a gas-engine, a rotary valve consisting of two circular plates secured together and to the valve-stem, an opening in one of said circular plates registering at predetermined intervals with the gas supply and the exhaust ducts, whereby the force of the explosion exerted on the opposite surfaces of the valve is balanced, as described.

4. In a gas-engine, the combination with the cylinder, the gas-supply duct, and the exhaust-duct, of a rotary valve consisting of two disks secured together and to the rotatable valve-stem a sufficient distance apart to form the explosion-chamber between the two disks, an opening in one of the disks located to register with the gas supply and exhaust ducts, a duct connecting the space between the valve-disks with the cylinder, and means for rotating the valve; whereby the gas supply and exhaust are controlled by one of the two disks of the valve, as described.

5. In a gas-engine, the combination with the cylinder, the piston, the crank-shaft, and connections between the piston and the crank-shaft, of a cylinder-head and valve-casing, a duct connecting the cylinder with the valve-casing, an exhaust-duct, a gas-supply duct terminating in the same end of the valve-casing, a valve consisting of two disks secured together, an opening in one of the disks located so that it may register with the gas-supply and gas-exhaust ducts, means for operating the valve, and a cap secured to the end of the valve-chamber; whereby access to the valve is secured, as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SILAS H. DYER.

Witnesses:
B. M. SIMMS,
J. A. MILLER, Jr.