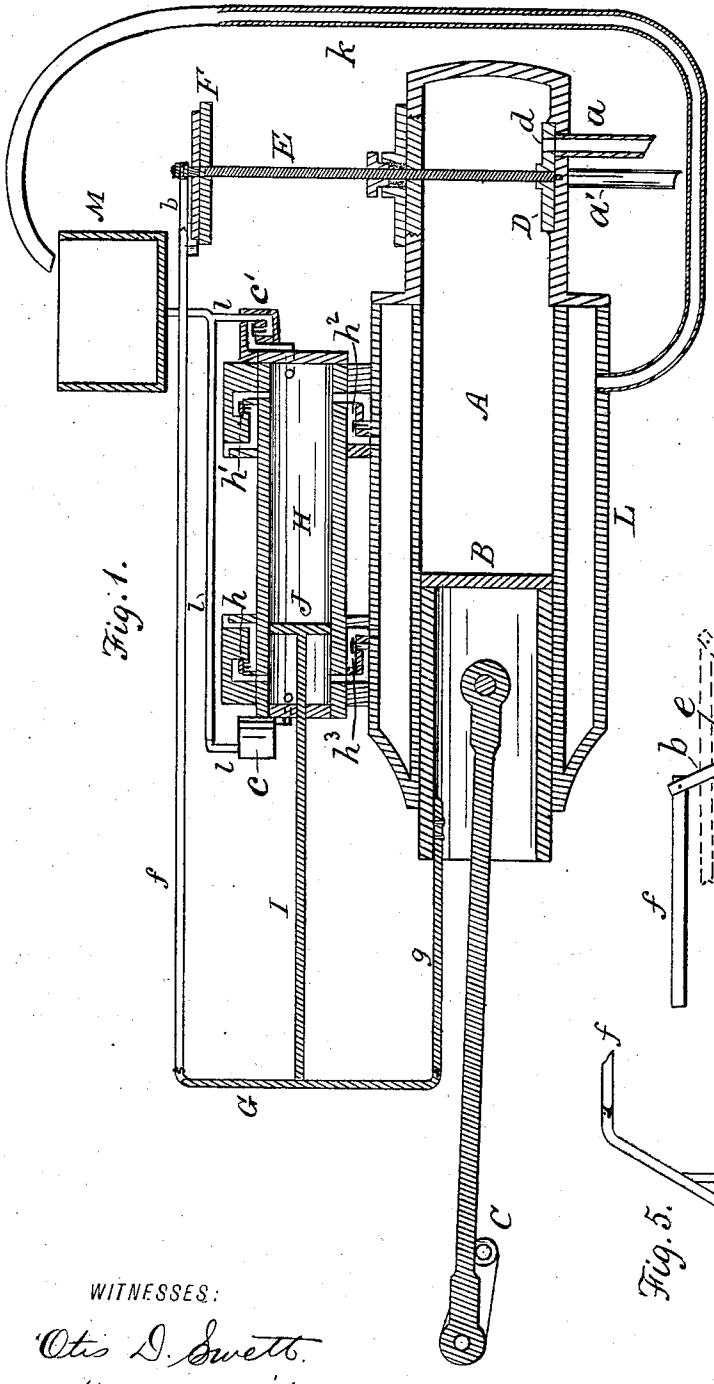
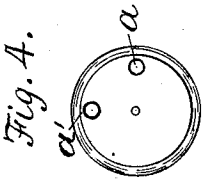
(No Model.)

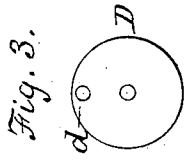
J. C. WILSON.

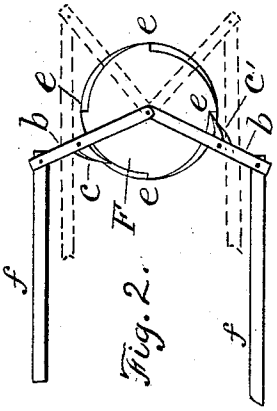
GAS ENGINE.

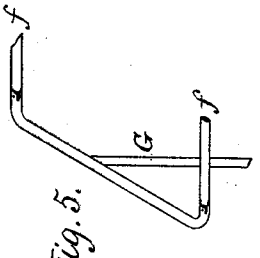
No. 589,150. Patented Aug. 31, 1897.











WITNESSES:

Otis D. Swett.

H. A. Daniels

INVENTOR

John C. Wilson

BY Thomas P. Simpson

ATTORNEY.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN C. WILSON, OF ALLEGHENY, PENNSYLVANIA.

GAS-ENGINE.

SPECIFICATION forming part of Letters Patent No. 589,150, dated August 31, 1897.

Application filed September 11, 1896. Serial No. 605,545. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. WILSON, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Gas-Engines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to engines in which air and gas are used explosively; and the invention consists in the valve mechanism employed for the inlet and outlet of gas and devices for keeping the liquid in a water-jacket surrounding the engine-cylinder sufficiently cool for all practical purposes.

In the accompanying drawings, Figure 1 is a central longitudinal vertical section of an engine embodying my invention. Fig. 2 is a plan view of a ratchet-wheel and connections. Fig. 3 is a plan view of a rotative valve. Fig. 4 is a plan of the valve-seat in the engine-cylinder. Fig. 5 illustrates a vertical stem and connecting-rods.

A designates the engine-cylinder, in which reciprocates the piston B, so as to rotate the crank-shaft C in the usual way. Within the cylinder A is arranged a rotary disk valve D, having a hole *d*, which is located to register with the inlet *a* and outlet *a'* in the bottom of cylinder A. The valve D has a vertical shaft or spindle E, to the upper end of which is made fast a ratchet-wheel F. The gas-inlet hole *a* and the exhaust-hole *a'*, being on a circle, are distant about ninety degrees from each other in one direction and two hundred and seventy degrees in the opposite direction.

b indicates two arms, the inner ends of which are pivoted to the upper end of the valve-spindle E. Connected with the arms *b* are the spring-pawls *c* and *c'*, which are adapted to connect alternately with the ratchet-teeth *e* of the wheel F, and thus the latter is rotated. The outer ends of the arms *b* are connected by rods *f* with a vertical stem G, which is connected by a rod *g* with the piston B in the cylinder A. For each reciprocatory movement of the piston B a quarter-revolution of the rotative valve D is produced by the action of the arms *b*.

The wheel F has four teeth, and when the pivoted arms *b* are turned in one direction by the movement of the piston B and the rods *f* (see Fig. 2) one of the pawls *c c'* engages the wheel F, turning it one-quarter of a revolution, and when the arms *b* are turned in the opposite direction the opposite pawl engages the wheel F, turning it another quarter-revolution.

When the piston B moves in one direction, the hole *d* in the rotative valve will register with the exhaust-port *a'*, and when said piston goes in the opposite direction it will register with the inlet-port *a*. During the next two reciprocations of the piston B the aperture *d* does not register with either of the ports *a a'*, but said piston in its forward movement compresses the gas in the cylinder B, and when the piston starts to move in the opposite direction the gas is exploded, driving the piston to the point where the exhaust-port must be opened to let out the exploded gas; otherwise it would stop at that point. When the burned gas is discharged the cylinder is ready for another charge of gas. By this arrangement it takes one forward movement of the piston and one backward movement to exhaust and to give a supply of gas. The next two movements are first to compress and then to explode the gas.

By the mechanism described I dispense entirely with cams and gear-wheels, so that much expense is avoided and the engine is rendered less liable to get out of order.

H indicates a cylinder, within which moves a piston J, which is connected by a rod I with the stem G. The cylinder H has inwardly-opening air-valves *h h'*, through which air from the outside is admitted, and also has valves h^2 and h^3, through which air and water are driven from said cylinder into a chamber formed by a water-jacket L, which surrounds the cylinder A.

M indicates a superposed water-tank, which is connected by piping *l* with the cylinder H at each end of said cylinder. Check-valves *c* and *c'* are provided for the piping *l*, one being located near each connection of said

piping with the cylinder H. A pipe k is connected with the lower part of the water-jacket L, and said pipe, extending upward, is adapted to discharge into the tank M. The said tank may be supplied with water by any suitable means.

By the action of the piston J in cylinder H air and water are drawn into said cylinder and then driven therefrom into the water-chamber which surrounds the cylinder A.

When the piston J moves forward, air passes into the cylinder H through the valve h and water is drawn from the tank through the piping l and check-valve c into said cylinder, and by such forward movement of the piston J mingled air and water are driven through the valve h^2 into the chamber formed by the water-jacket L, the valve h^2 being open during such forward movement of the piston and the valve h^3 being closed. On the backward movement of the piston J air is drawn into the cylinder H through the valve h' and air and water pass into said cylinder through the piping l and check-valve c', the valves h and c being closed, and by said backward movement the mingled air and water are driven through the valve h^3 into the water-chamber formed by the jacket L, and from thence the water passes through the pipe k and is discharged into the tank M. A steady stream of water is thus kept passing continuously from the tank M into the cylinder H, from thence to the water-chamber surrounding the cylinder A, and from thence through the pipe k to the tank M.

By the frequent injections of air with the water the latter is cooled and kept at a low temperature, and consequently a less frequent supply of water to the tank is required. The movement of the piston B in the cylinder A may be assisted by fly-wheels, (not shown,) and the explosions of gas may be regulated by a governor of ordinary construction.

In operation the rotary valve in each revolution makes four movements of one-quarter of a revolution each, there being an explosion on each revolution of the valve—say the first movement is to exhaust, the second to refill the engine with explosive matter, the third to compress such explosive matter, and the fourth to produce an explosion.

I claim—

1. The combination, with an engine-cylinder and piston, of a rotative valve seated in said cylinder, a ratchet-wheel secured to the spindle of said valve, two arms pivotally connected with said spindle, two pawls connected with said pivoted arms and adapted to engage said ratchet-wheel alternately, rods connected with said pivoted arms and also having connection with said piston, substantially as set forth and described.

2. In a gas-engine, the combination with an engine-cylinder and piston, said cylinder being provided with a water-jacket, of a cylinder H and piston therein, said cylinder H being provided with air-valves and also having valve connections with a water-chamber formed by said water-jacket, a water-tank and pipes connecting said tank with said cylinder H at different points, said pipes being provided with check-valves, and a pipe extending from said water-chamber and adapted to discharge water into said tank, substantially as and for the purposes described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN C. WILSON.

Witnesses:

SOLON C. KEMON,

OTIS D. SWETT.