

No. 607,904.

W. J. WRIGHT.
GAS ENGINE.

Patented July 26, 1898.

(No Model.)

(Application filed May 20, 1897.)

Fig. 1.

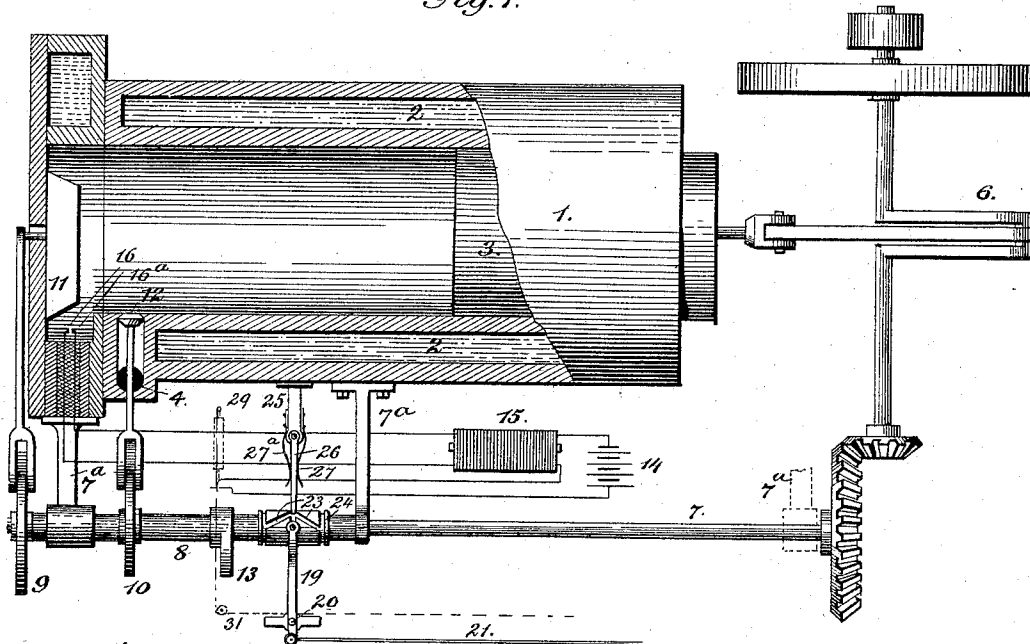


Fig. 2.

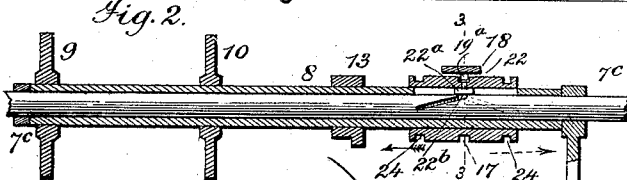


Fig. 3.

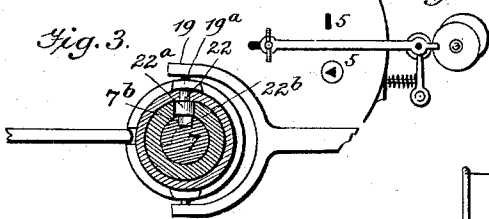
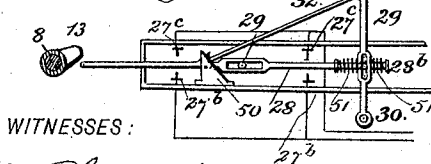


Fig. 4.



WITNESSES:

W. McPherson, Jr.
Thos. L. Gatch.

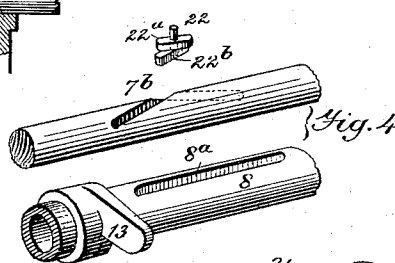
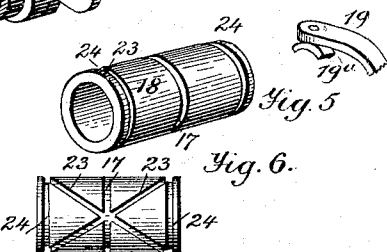


Fig. 6.



INVENTOR

William J. Wright

BY

Fred G. Dieterich & Co.
ATTORNEYS

UNITED STATES PATENT OFFICE.

WILLIAM JAMES WRIGHT, OF PITTSBURG, PENNSYLVANIA.

GAS-ENGINE.

SPECIFICATION forming part of Letters Patent No. 607,904, dated July 26, 1898.

Application filed May 20, 1897. Serial No. 637,450. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM JAMES WRIGHT, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Gas-Engines, of which the following is a specification.

My invention seeks to provide certain attachments for gas-engines having electrical igniting means which can be quickly adjusted to cause a reversal of the engine without bringing the engine to a positive stop.

My invention also seeks to provide a simple, economical, and effectively-operating reversing means in which the parts can be set to hold a full charge of gas and air in the cylinder after the engine is stopped and which can be manipulated to explode the said mixture before the drive-shaft piston is set in motion.

With other objects in view, which will hereinafter be referred to, the invention consists in a gas-engine embodying the peculiar combination and novel arrangement of parts, such as will be first described in detail and then be specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a horizontal section, partly in plan, of a gas-engine constructed in accordance with my invention. Fig. 2 is an enlarged sectional view of the reversing devices. Fig. 3 is a cross-section on the line 3 3 of Fig. 2. Fig. 4 is a view illustrating the shaft and cam-holding sleeve in detail. Fig. 5 is a view of the compound shifting-clutch carried by the said sleeve. Fig. 6 is a view illustrating the shifting sleeve and the means for bringing it back to its center position. Fig. 7 is a detail view of the contact devices and the means for closing the circuit irrespective of the movement of the drive-shaft, and Fig. 8 illustrates one of the cam devices.

In the accompanying drawings I have shown an engine having a cylinder 1, provided with a cooling-jacket 2, a piston 3, exhaust 4, air and gas inlets 5, a crank-shaft 6, all of which may be of any well-known construction, of that class of engines having cam devices for setting the air and gas inlet valves mounted on a drive-shaft geared with the crank-axle and having electric sparking means, also governed by a contact member secured on the cam-shaft.

Referring now more particularly to my improvements, 7 indicates a shaft geared with the crank-axle shaft and mounted in suitable bearings 7^a. This shaft at a point in line with the head of the combustion-chamber has a sleeve 8, held for a partial rotary movement on such shaft and to which are fixedly connected the cams 9 and 10, which respectively engage the air and gas inlet shifting valve 11 and the exhaust-valve 12, such sleeve also having connected thereto the contact-maker 13, which is adapted to engage the circuit-controlling devices presently referred to, in which is located the battery 14, induction-coil 15, and which has its sparking-terminals 16 16^a projected into the cylinder, as shown.

The shaft 7 has a diagonally-disposed peripheral groove 7^b, which extends about half-way around it, while the sleeve 8 has a longitudinal slot 8^a of a length slightly greater than the length of the groove in the shaft, and such sleeve is held from lateral movement on the shaft by suitable stops or collars 7^c.

18 indicates a shifting-clutch sleeve, which is mounted on the sleeve 8 and has an annular external groove 17 to receive the pivoted shoes 19^a of a shifting-lever 19, fulcrumed at 20 to a suitable bearing and having a rod 21, extended within convenient reach of the operator. The sleeve 18 has an inwardly-projecting pintle 22, on which is pivotally held a bearing-shoe 22^a to engage the slot 8^a and a similar shoe 22^b to engage the groove 7^b in the shaft. On its face opposite the shifting-lever the sleeve 18 has one or more pairs of diagonally-disposed grooves 23, which at their inner ends communicate with the front part of the annular groove 17 and at the outer ends communicate with annular grooves 24.

25 indicates a fixed arm having a pivoted trip member 26 normally held to its center position by the springs 27 27^a. This trip has its front end normally projected into the annular groove 17 for a purpose presently explained.

27^b 27^c indicate contact-points located in the igniting-circuit, between which is held a contacting-finger 28, which is fulcrumed at 29 between the contacts 27^b 27^c and has longitudinal movement therebetween, the front end of such finger being normally held in the path

of the contact member on the sleeve 8. The end 28^b of the finger 28 is connected with, but has a slight vertical movement on, a lever 29, fulcrumed at 30 to a bearing and having its upper end connected with a rod or cable 31, whereby it can be moved in either direction from a distance. The lever 29 has a pendent pivoted member 32, which engages a shoulder on the finger 28.

By arranging the sparking devices in the manners shown it is obvious that by pulling the finger backward out of the path of the rotary contacting member the engine will be shut off and remain inert during such adjustment of the finger 28, it being obvious that should the combustion-chamber of the cylinder have a charge of mixed air and gas by simply moving the lever 29 forward the finger 28 will be brought in contact with the terminals of the circuit, and thereby energize the circuit, and as the current passes through the parted ends held in the combustion-chamber sparks or arcs are produced, which thereby explodes the gas and sets the engine in operation.

To reverse the movement of the engine, I have provided the shifting devices shown for imparting an additional rotary movement to the cams and the contact carried by the shaft independent of the shaft, so that the said cams and contact will operate in advance of their normal action during the running of the engine in either direction, and in consequence cause the propelling mixture to explode before the crank-shaft reaches its vertical axial point as the piston proceeds forward, thereby impeding such forward motion and slowing up the piston sufficient that another premature explosion of the mixture will serve to move the piston in a reverse direction. To accomplish this result, assuming the engine to be running forward, the sleeve 18 is shifted in the direction indicated by the arrow as it rotates with the shaft, which movement imparts a forward rotation of the sleeve 8 on the shaft as it rotates with it, and in consequence brings the cams and contact member carried thereby forward to engage the air and gas and the exhaust valves in advance of the ordinary time for which they are normally set and in consequence produces, as it were, a premature explosion of the mixture to impart a reverse impulse to the piston and crank-shaft. As the sleeve 8 is thus rotated the trip member 26 is swung laterally from the central groove 17 into one of the diagonally-disposed grooves 23 until it engages one of the end grooves 24. Now when in this position and the engine-shaft and the shaft 7 have been reversed it is obvious that the spring tension on the member 26 will engage one of the grooves 23, which connects with the annular groove 24, in which it is seated and which as it moves back to its normal position will cause the sleeve 8 to partially rotate reversely to the rotation of the shaft, and thereby cause the parts to assume their central or normal position to admit of a regular

operation of the engine. To again cause the crank-shaft to rotate forwardly after it has been set to operate in a reverse direction, the clutch-sleeve is moved to the right, (see Fig. 2,) which again sets the sleeve 8 and causes the premature explosions in the same manner as before, it being understood that in this operation the trip 26 moves in an opposite lateral direction to engage the opposite grooves 23 and 24.

From the foregoing description, taken in connection with the accompanying drawings, the complete operation and advantages of my invention will be readily understood.

It will be observed means are provided for quickly reversing the engine without coming to a positive stop and the reversing means automatically set by the reverse rotation of the engine-shaft to reset the reversing means to their normal condition to admit of the piston running its full stroke. Furthermore, especial means are provided for starting the engine without giving the fly-wheels and piston an initial inertia to fill the combustion-chamber.

While the construction of engine shown serves to illustrate the principle of my invention, it is manifest the application thereof need not be confined to such a structure, as my improved devices can be applied to any engine having cam-operated exhaust and feed valve devices.

The arm 28 in practice is a spring-arm and is held to its normal position by the encircling springs 51 51, arranged at side of the lever 29.

The pendent member 32 has its lower end of such a width as to project at one side of the shoulder on the arm 28 and engage an incline 50, fixedly secured to the frame, so that by throwing the arm 32 forward it will be slowly raised up as it moves the arms 28 into a contacting position until it finally passes up over the said shoulder, so as to give the snap required to cause the proper sparking of the circuit-terminals within the combustion-chamber.

To provide against an undue pressure on the cylinder-head or walls as the exploded mixture is compressed by the continued forward, but impeded, movement of the piston, the cylinder may be provided with relief exhaust-valves, such as is illustrated in another application, Serial No. 633,951, filed by me April 26, 1897.

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

1. A gas-engine, having cam-operated shifting-valves for feeding and exhausting the combustion-chamber, means for imparting an additional rotary movement to the cam, a contact member movable with the cam, and an electric igniting device rotated by the contact member, all being arranged substantially as shown, whereby the cams and contact member will rotate in advance of their nor-

mal action to cause a premature action of their working agent, substantially as shown and described.

2. The combination with an electric igniting device, having cam-operated feed and exhaust devices, and a circuit-closing member, of the drive-shaft for rotating such devices, the cams and contact member held thereon to rotate therewith, said cams and contact member having a partial independent rotation on such shaft, hand-operated means for imparting a rotary movement to the said cam and contact member, in one direction, and automatic means for returning such members to their normal position as specified.

3. In a gas-engine, having cam-operated feed and exhaust valve devices, a shaft and igniting devices operated from the crank-shaft, a sleeve held on such shaft to turn therewith and having a partial independent rotation thereon, cams secured to the sleeve to operate the feed and exhaust valves and the igniting devices, a clutch member secured to the sleeve to turn same on the shaft when

25 moved endwise on the sleeve, and means governed by the reverse movement of the engine to set the clutch to its central or normal position, as specified.

4. In a gas-engine, the combination with the cylinder, the feed and exhaust valves, the electric igniting devices, and the counter-shaft, said shaft having a diagonal radial groove, the sleeve held therein having a longitudinal slot, the cams and the electric contact member secured to the sleeve, a clutch member movable on the sleeve having pendent shoes to engage the sleeve-slot and the shaft-groove, said clutch member having central and end annular grooves, and diagonal grooves connecting the central and end annular grooves, and the spring-set trip member held to engage the annular and diagonal grooves, all being arranged substantially as shown and described.

WILLIAM JAMES WRIGHT.

Witnesses:

FRED G. DIETERICH,
JOHN L. FLETCHER.