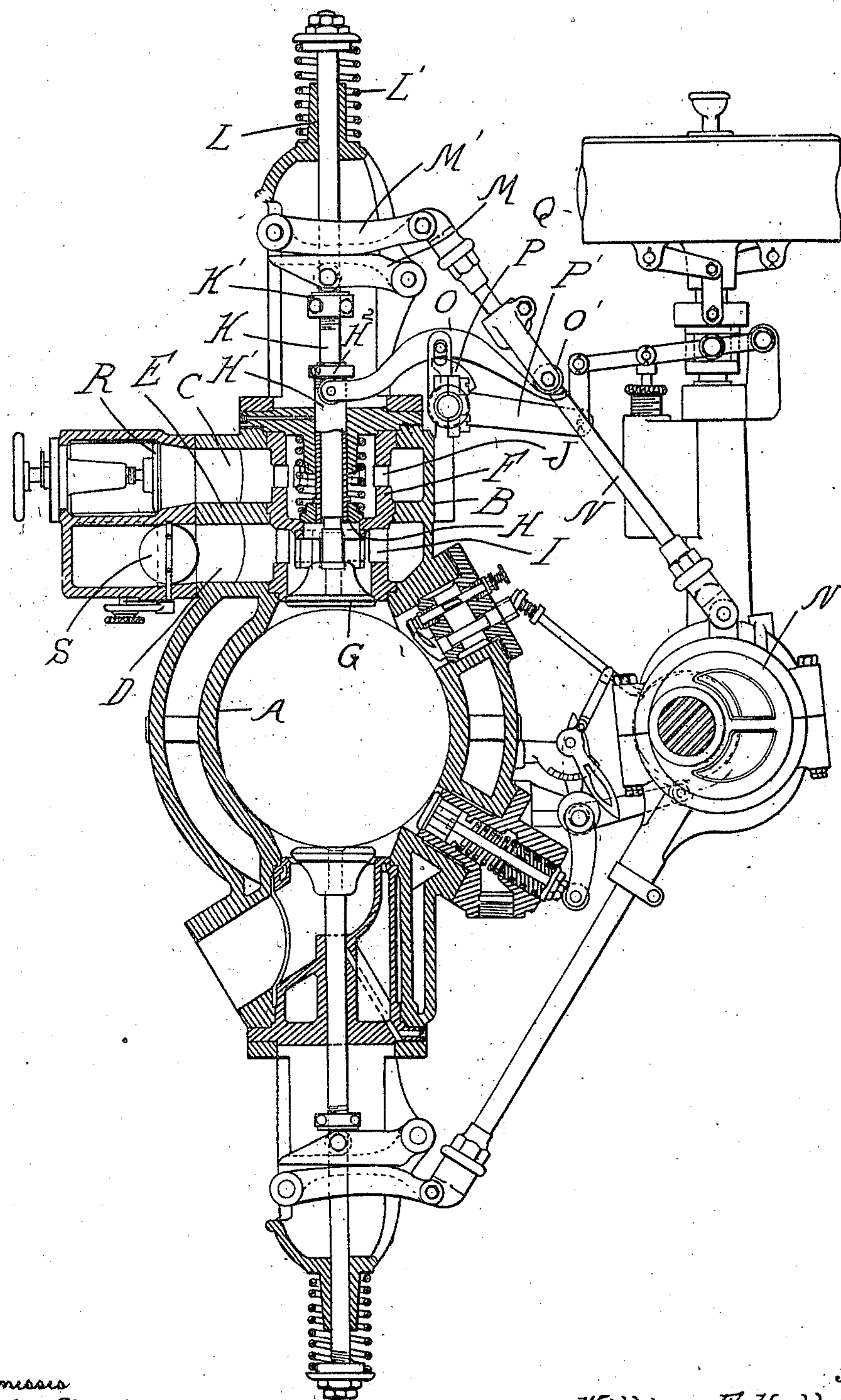
W. E. HALLETT.

GAS ENGINE VALVE.

APPLICATION FILED OCT. 16, 1909.

1,038,878. Patented Sept. 17, 1912.



Witnesses

W. L. Ford.

C. J. Belknap

Inventor

William E. Hallett

By Whittemore, Hulbert & Whittemore

Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM E. HALLETT, OF BUCYRUS, OHIO.

GAS-ENGINE VALVE.

1,038,878. Specification of Letters Patent. Patented Sept. 17, 1912.

Application filed October 16, 1909. Serial No. 523,057.

To all whom it may concern:

Be it known that I, WILLIAM E. HALLETT, a citizen of the United States of America, residing at Bucyrus, in the county of Crawford and State of Ohio, have invented certain new and useful Improvements in Gas-Engine Valves, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to gas engines, and particularly in the means for controlling the engine by variations in the explosive mixture.

To this end, the invention consists in the novel construction and arrangement of valves for controlling the ingredients of the explosive mixture, and in the construction of the operating controlling mechanism of said valves, as hereinafter set forth.

In the drawings, the engine is represented in section in the plane of the valves, showing the actuating and controlling mechanism in elevation.

A is the engine cylinder, B a chest preferably integral with said cylinder and containing a gas chamber C and an air chamber D separated by the central partition E.

F is a valve cage inserted in the chest B for forming seats for the main admission valve G and the gas admission valve H. This cage is provided with circumferential series of ports I and J, communicating respectively with the chambers D and C, and the valve F is so located as to control communication between said chambers. The valve G is mounted on a stem K, which extends upward and outward through the chest and through a bearing L, on which the valve-closing spring L′ is seated.

K′ is a collar on the stem, which is engaged by a lever M actuated by the coöperating lever M′ connected to the eccentric rod N operated by the eccentric N′.

The valve H is mounted upon a sleeve H′ slidable upon the stem K, and having a collar H^2 at its upper end.

O is a lever bearing at one end against the collar H^2 and at its opposite end having a bearing for engagement with a collar O′ on the eccentric rod N.

P is a shiftable fulcrum for the lever O, which is operated by a rock arm P′ connected by a lever system to a centrifugal governor Q.

R is an adjustable valve for variably restricting the admission of gas into the chamber C, and S is a butterfly valve for restricting the air admission into the chamber D.

In operation, the valve G controls the admission of the mixture of gas and air into the cylinder, and the valve H controls the admission of gas to the mixture. The timing of the operation of these valves is such that the valve G opens slightly in advance of the valve H, and consequently a volume of air is first admitted to the cylinder before any mixture of gas and air is produced. This, in the continuous operation of the engine, will have the effect of separating successive explosive charges from the gases in the cylinder by a layer of noncombustible gas, thereby preventing danger of preignition. The valve H when opened will admit the gas, so as to mix the same with the air entering through the ports I, and the entire mixture is passed by the valve G into the cylinder. The proportion of the mixture is dependent upon the degree of opening of the valve H, and this is controlled by the adjustment of the fulcrum P. Thus, in one position of adjustment, the valve H is opened to the maximum, and a relatively large volume of gas is admitted to be mixed with the air. When, however, the governor operates to shift the fulcrum, the amplitude of movement of the valve will be diminished, and consequently a small volume of gas will be admitted to the mixing chamber.

It will be noted that, in the construction described, puppet valves are employed, which are less likely to stick, or get out of order, than any construction of slide valve.

What I claim as my invention is:

1. In an explosion engine, the combination with a cylinder, of a chest having an air chamber and a gas chamber, the former communicating through the main admission port with the cylinder, and the latter communicating with said air chamber through a port alined with the admission port, a puppet valve for said main admission port having a stem extending through said alined port, a puppet valve for said gas port sleeved upon the stem of said main valve, timed operating mechanism for the main valve and an operating mechanism for the gas valve comprising a lever engaging the stem of said valve, an operating member engaging the opposite end of said lever, and a shiftable fulcrum for said lever whereby the amplitude of movement imparted to said valve will be varied.

2. In an explosion engine, the combination with a cylinder, of a mixing chamber directly communicating through the main admission port with said cylinder, an air supply chamber in constant communication with the mixing chamber, a gas chamber communicating with said mixing chamber through a port alined with the main admission port, a puppet valve controlling the main admission port and having its stem extending through the gas port, a valve sleeve upon said stem controlling said gas port, means for varying the degree of opening of said gas valve, and means for opening the main admission port valve in advance of the gas valve and for closing the gas valve in advance of the main admission port irrespective of the degree of opening of said gas valve.

3. In an explosion engine, the combination with a cylinder of a mixing chamber communicating through the main admission port with said cylinder, a gas supply connection communicating with said mixing chamber, a valve controlling communication between said chamber and said connection, an air supply connection communicating with the mixing chamber at a point intermediate the main port and the point of communication of the gas supply with the mixing chamber, means for varying the degree of opening of said gas valve, and means for opening the main admission port valve in advance of the gas valve and for closing the gas valve in advance of the main admission port valve irrespective of the degree of opening of said gas valve, said air supply being in all positions of adjustment of the gas valve in communication with the mixing chamber upon both the opening and closing of the gas valve.

4. In an explosion engine, the combination with a cylinder of a mixing chamber communicating through the main admission port with said cylinder, a gas supply connection communicating with said mixing chamber, a valve controlling communication between said chamber and said connection, an air supply connection in constant communication with the mixing chamber at a point intermediate the main admission port and the point of communication of the gas supply with the mixing chamber, means for varying the degree of opening of said gas valve, and means for opening the main admission port valve in advance of the gas valve and for closing the gas valve in advance of the main admission port irrespective of the degree of opening of said gas valve.

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

WILLIAM E. HALLETT.

Witnesses:
W. J. BELKNAP,
JAMES P. BARRY.