

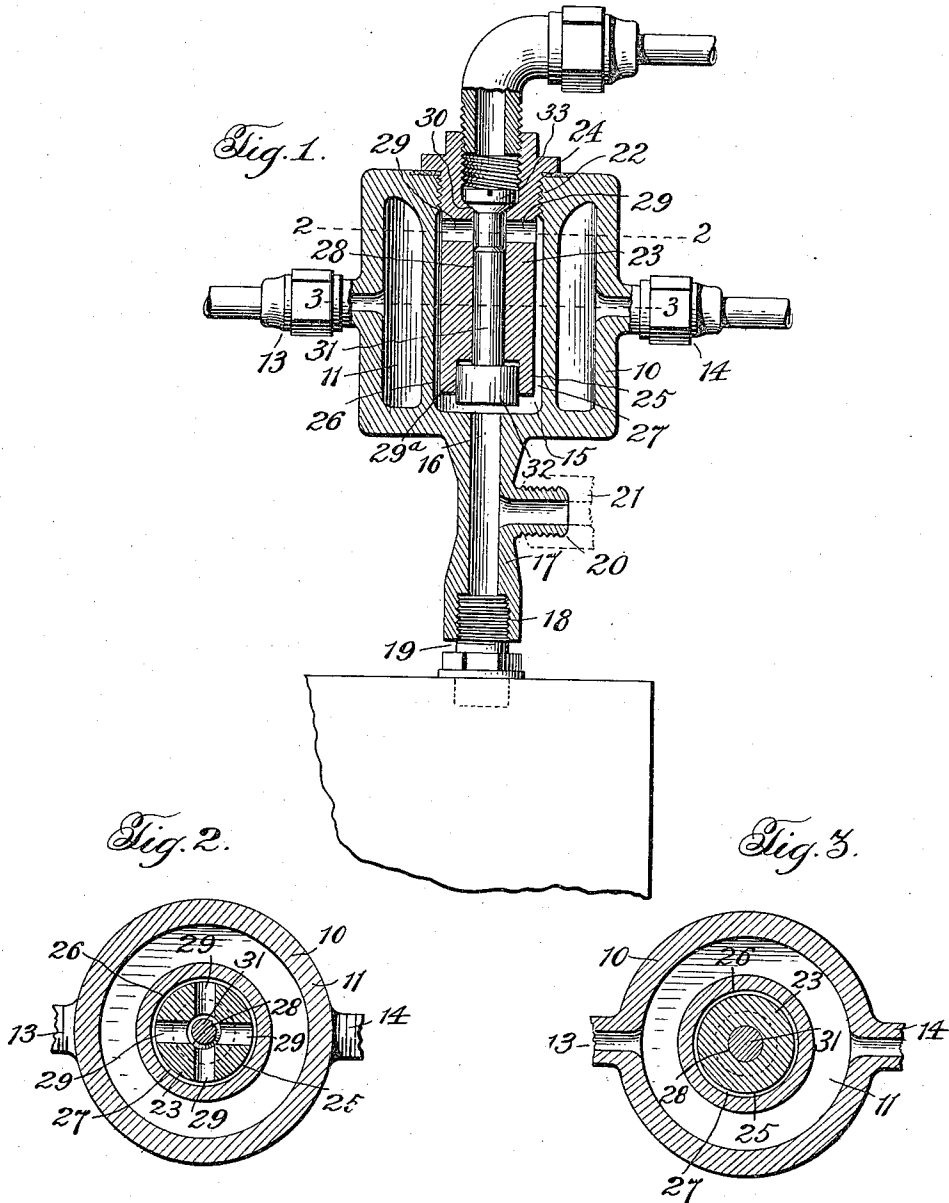
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VALVE.

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1,155,602.

Patented Oct. 5, 1915.



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UNITED STATES PATENT OFFICE.

DON DAVID MILES, JR., OF SAN FRANCISCO, CALIFORNIA.

VALVE.

1,155,602.

Specification of Letters Patent.

Patented Oct. 5, 1915.

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To all whom it may concern:

Be it known that I, DON DAVID MILES, JR., a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented certain new and useful Improvements in Valves, of which the following is a specification.

This invention relates to an improvement in means for taking a portion of the products of combustion from an explosive engine cylinder and transferring the same to a storage reservoir.

The primary object of the invention is to provide a valve structure in which the valve member and its seat will be maintained in proper condition for closing the connection between the cylinder and reservoir.

Another object of the invention is to provide a structure in which the gases will be treated to remove carbon and in which the gas pressure will not be perceptibly reduced by such treatment.

A further object is to provide a valve structure which will modify the temperature of the hot gases before they reach the valve proper, and which will also provide a surface upon which carbon will be deposited, and so disposed that it may be conveniently removed.

In the drawings: Figure 1 is a vertical sectional view of the valve applied to the cylinder; and Figs. 2 and 3 are horizontal sections on line 2—2 and 3—3 of Fig. 1.

Primarily the present invention contemplates the provision of a valve for use with a motor starting mechanism shown in my co-pending application Serial No. 768,735, filed May 20, 1913, allowed April 16, 1914, in which a valve is fitted in the priming opening in a cylinder and connected to a storage reservoir. It has been found in practice that where the firing charge is passed through a valve passage in communication with a cylinder, after a short period of use the valve member being directly subjected to the gases becomes crusted with carbon and pitted and will not close either under spring pressure or back pressure from the reservoir. The present invention is therefore designed to provide a structure in which the gases do not contact directly with the valve, the same being baffled about a cooled surface prior to being led to the outlet valve mechanism.

The present invention also provides means for utilizing the initial pressure or "kick" of the gas as an opening means for the valve

structure at a point remote from the valve seat whereby the baffled gas will not have to exert opening pressure on the valve and thereby lose power.

In the drawings 10 designates the valve casing which is formed intermediate its inner and outer walls with the cooling chamber 11. The casing is connected by the couplings 13 and 14 with the cooling system. It will be understood that any suitable connection may be made with the cooling system which will cause a circulation of the cooling fluid through the chamber 11.

The casing 10 is formed with the doubled diametered bore 15—16 which opens through both ends of the same the smaller bore 16 continuing through an extension 17 formed integral with the casing and threaded interiorly as at 18 to receive a plug 19 which is screwed into the priming opening of the cylinder. The extension 17 is also formed with a threaded bored extension 20 for the angle cock 21 which is connected to one of the supply tubes of the gas distributor in the manner illustrated in the above entitled application.

The upper and larger portion of the bore 15 is threaded as at 22 and receives a cylinder 23. This cylinder 23 is formed with a collar 24 which abuts the casing 10 when the cylinder is screwed into place. The cylinder is threaded immediately below the collar whereby it may be screwed into the casing and below the threaded portion 24 said cylinder is reduced in diameter to space its outer wall 25 from the wall 26 of the casing. Thus a chamber 27 is produced, which is continued below the cylinder by reason of the fact that the cylinder terminates short of the base of the large upper bore of the casing. Thus it may be noted that gas may be passed through the extension 17 around the cylinder and to a point adjacent its upper threaded portion 23, that is, at the upper end of the chamber 27. The cylinder 23 is provided with a central longitudinally disposed bore 28. A series of openings 29 are formed in the walls of the cylinder adjacent its threaded end, the openings 29 bringing the chamber 27 into communication with the bore 28. In the construction illustrated in the drawings there are four such openings provided but the number of openings may be varied and the same may be of different diameters, the number of openings and the size of the opening determining the

volume of gas admitted to the outlet of the casing which will be hereinafter described. The bore 28 is enlarged adjacent the base of the cylinder to provide the recess 29^a and at its upper end to form the valve seat 30. A
 5 plunger 31 is mounted to reciprocate within the bore of the cylinder, said plunger fitting the cylinder snugly, yet sufficiently loose whereby expansion due to the heating of the casing and plunger will not cause the
 10 same to stick. The plunger at its base receives the nut or head 32 which is of a diameter slightly less than the diameter of the recess 29^a. The plunger is formed at its
 15 other end, that is its end which is received in the recess 30 with a conical valve 33 which when the plunger is in its lower position with the back pressure from the reservoir bearing against the same closes the
 20 outlet through the bore.

When the cylinder of the engine with which the extension 17 of the casing communicates, is firing a portion of the gases will be propelled through the bore 16 of the
 25 extension. As the gases enter the casing the plunger 31 will be "kicked" violently upward raising the conical valve 33 from its seat, the inrushing gases maintaining the plunger in this position. The gases pass
 30 into the chamber 28 circulating about the same, it being understood that the outer wall of this chamber, is cooled. The gases then pass through the openings 29 in the cylinder around the conical valve 33 of the
 35 plunger and through the outlet 34 to the storage reservoir.

Particular attention is directed to the fact that the gases pass between a cooled and a heated surface and therefore any soot will
 40 adhere to these surfaces. Therefore this soot or carbon will not reach the conical valve of the plunger or its seat and the same at all times remains clean and unobstructed, the back pressure through the outlet 34 readily
 45 seats the plunger to close the outlet opening as soon as the supply of gas under pressure ceases.

It will be understood that but a relatively small quantity of gas is conveyed to the
 50 reservoir on each explosion of the cylinder to which the valve is connected and that the valve does not constitute such a relief as would in any way affect the power of the cylinder. Therefore gas is stored without
 55 materially affecting the power of the motor.

It has been found in practice that a steel cylinder with a brass plunger and casing are most effective although these materials are not essential to the efficient operation of
 60 the device. It will be noted that the cylinder may be removed from the casing and the soot or carbon wiped from the same, its removal being effected in the same manner as a spark plug.

65 It will be understood that the suction

stroke of the piston in the cylinder with which the valve communicates will scavenge the valve and that it will be left practically clean, therefore there will be no carbon or
 70 soot to be forced upward through the chamber 27 on the next firing occurring in the cylinder.

From the foregoing it will be noted that a valve structure is provided in which the carbon and soot are largely prevented from
 75 coming in contact with the valve or its seat and also that the temperature of the gas is so modified that there is little danger of pitting or breaking down the seat or valve surfaces by the action of the gas thereon,
 80 and also direct action of the hot gases on the valve being provided against by the plunger extension.

The volume of gas which passes through the upper portion of the cylinder may be
 85 effectually regulated by varying the diameter of the openings 28 which bring the chamber 27 in communication with the outlet and it will also be understood that various other changes may be made in the struc-
 90 ture to suit varying condition in the distributing system.

The valve casing may be modified whereby the same may be connected to different
 95 types of motors.

What I claim is:

1. In a valve for the purpose described, the combination with an inclosing casing having a fluid inlet end, and means for connecting said end to an engine cylinder, said
 100 inclosing casing having a cooled valve chamber, of a valve casing removably supported in said valve chamber, said inclosing casing having an outlet, and a valve in said valve casing for said outlet arranged at a point
 105 removed from said inlet end.

2. In a valve for the purpose described, the combination of a casing having a chamber with an inlet opening adjacent one end of the casing, a valve casing removably sup-
 110 ported within said chamber and spaced from the wall thereof, said chamber having an outlet opening through the casing upon the end thereof opposite the inlet opening, the valve casing having inlet openings lead-
 115 ing from said chamber through the wall of the valve casing adjacent said outlet whereby the chamber and the outlet of the valve casing may be brought into communication, and means actuated by gas introduced into
 120 the inlet end of the chamber for controlling the passage of gas from the chamber through the outlet of the valve casing.

3. In a valve for the purpose described, the combination of a casing having a cham-
 125 ber open at both ends, a valve casing supported within the chamber and closing one end of the same, there being passages passing transversely through the valve casing whereby the chamber may be brought into
 130

communication with an outlet formed in the valve casing, and means controlling the outlet through the valve casing and operated by gas pressure introduced through the inlet of the chamber and at a point adjacent said inlet.

4. In a valve for the purpose described, the combination of a casing having a chamber open at both ends to form an inlet and an outlet, a valve casing supported within the chamber and closing outlet end of the same, there being passages passing transversely through the valve casing adjacent the outlet whereby the chamber may be brought into communication with an outlet formed in the valve casing, and means movable longitudinally of the valve casing for controlling the outlet through the valve casing and operated by gas pressure introduced through the inlet of the chamber and at a point adjacent said inlet.

5. In a valve for the purpose described, the combination of a casing having a chamber open at both ends, a valve casing supported within the chamber and closing one end of the same there being passages passing transversely through the valve casing whereby the chamber may be brought into communication with an outlet formed in the valve casing, and means carrying a valve at one end for closing the outlet of the valve casing and a disk of relatively larger diameter at the other with which gas introduced at the open end of the chamber acts upon to open the outlet through the valve casing.

6. In a valve for the purpose described, the combination of a casing having a cooling chamber, a valve casing threaded into said chamber and closing one end thereof, said valve casing being provided with an outlet adjacent the closed end of the chamber, and disk-shaped means connected to the valve and actuated at the open end of the chamber by the introduction of gas to the chamber at said open end for establishing communication between said chamber and the outlet of the valve casing.

7. In a valve for the purpose described, the combination of a casing having a cooling chamber both ends of which are open to constitute an inlet and an outlet, means for connecting the inlet end of the casing to an engine cylinder, a valve casing removably supported within the chamber and closing one of the ends of the same, said valve casing having an outlet at its ends adjacent the closed ends of the chamber, and means controlling the passage of gas from said chamber through said outlet, said means being actuated by the gas at a point adjacent the open end of the chamber where the gas is initially supplied to the chamber.

8. In a valve for the purpose described, the combination of a casing having a cool-

ing chamber, a valve casing removably supported within said chamber and spaced throughout the greater portion of its length from the chamber, said valve casing being provided with a central bore and transversely disposed apertures which open through its side wall, the bore of said casing immediately above said aperture being formed with a valve seat, a plunger mounted to reciprocate in said bore and carrying at one end a valve disposed to rest upon the valve seat of the bore and at its other end an enlargement of greater diameter than the valve, the casing being provided with a gas inlet whereby gas is admitted to the chamber, the gas thus admitted raising the plunger to unseat the valve and maintaining the same in raised position whereby the gases may pass through the chamber and the passages formed in the valve casing around the valve to a receiving tank.

9. In a valve for the purpose described, the combination with a cooling casing having a cooling chamber provided with an inlet, means for supporting the inlet end of the casing upon an engine cylinder, a valve casing removably supported in said chamber and having an outlet, a valve mounted in said valve casing, a disk-shaped projection on the valve actuated by gas pressure introduced through the inlet of the chamber, the gas lifting the valve member to open the outlet of the valve casing, and passing about the cooled surface of the casing prior to its passage through said outlet.

10. In a valve for the purpose described, the combination with a cooling casing having a cooling chamber, means for connecting the inlet end of the casing on an engine cylinder, a valve casing removably supported in said chamber, and cooling chamber being provided with a gas inlet and a valve casing with a gas outlet, a valve member controlling said outlet and opened by the pressure of gas introduced through the inlet of the cooling chamber, said gas passing over the cooled surface of the cooling chamber prior to its passage through the outlet of the valve casing.

11. In a valve construction for the described purpose, an inclosing casing having an inclosed annular hollow chamber, said casing having a central bore and adapted to be connected at one end with a storage tank or the like, and at its opposite end with an engine cylinder, said opposite end constituting an inlet for the casing, the first mentioned end an outlet therefor, a valve casing positioned in said bore and spaced from the wall thereof to form a passage, which passage communicates with the inlet end of the inclosing casing, said valve casing having a valve seat adjacent the outlet end of the inclosing casing, a valve to engage said seat, and said passage between the valve

casing and the wall of the bore being in communication with the outlet end of the inclosing casing, and said valve being adapted to be opened upon the admission of fluid
5 pressure into the inlet.

12. In a valve construction for the described purpose, an inclosing casing, having an inclosed annular hollow chamber, said casing having a central bore and adapted
10 to be connected at one end with a storage tank or the like and at its opposite end with an engine cylinder, said opposite end constituting an inlet for the casing, and the first mentioned end an outlet therefor, a
15 valve casing positioned in said bore and spaced from the wall thereof to form a passage, which passage communicates with the inlet end of the inclosing casing, said

valve casing having a valve seat adjacent the outlet end of the inclosing casing, a
20 valve to engage said seat, and said passage between the valve casing and the wall of the bore being in communication with the outlet end of the inclosing casing, said valve
25 being adapted to be held in its seat by fluid pressure and having a disk-shaped projection in the path of the fluid pressure from the cylinder at the inlet end of the inclosing casing whereby the valve is opened.

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

DON DAVID MILES, JR.

Witnesses:

HARRY H. TOTTEN,
D. B. RICHARDS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."