No. 860,608. PATENTED JULY 16, 1907.

P. SCHWEHM.

VALVE FOR GAS ENGINES.

APPLICATION FILED FEB. 23, 1907.

Fig. 3.

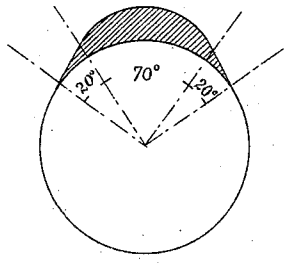


Fig. 2.

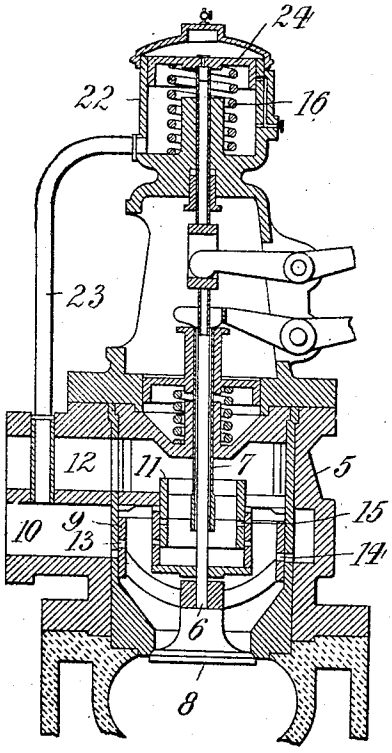
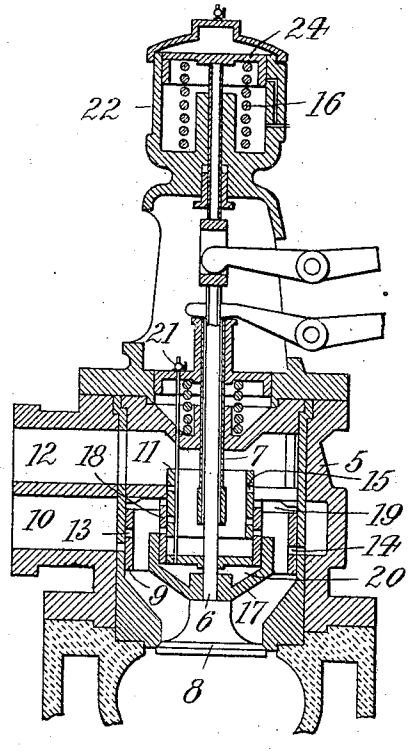


Fig. 1.



Witnesses:
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UNITED STATES PATENT OFFICE.

PETER SCHWEHM, OF HANOVER, GERMANY.

VALVE FOR GAS-ENGINES.

No. 860,608. Specification of Letters Patent. Patented July 16, 1907.

Original application filed March 1, 1906, Serial No. 303,581. Divided and this application filed February 23, 1907. Serial No. 358,785.

To all whom it may concern:

Be it known that I, PETER SCHWEHM, a citizen of Germany, residing at Hanover, Germany, have invented new and useful Improvements in Valves for Gas-Engines, of which the following is a specification.

This invention relates to a valve for gas engines which provides means for effectively controlling the inflow of air and gas independent from the main inlet valve. Further, means are provided for separately admitting charge air and scavenging air into the cylinder, so that low pressure may be used for expelling the dead gases, while the exit ports are open, and that furthermore, the cylinder may be charged under high pressure, after the exit ports have been closed.

This application is a division of an application filed by me March 1, 1906, under Serial No. 303,581.

In the accompanying drawing: Figure 1 is a longitudinal section through my improved valve; Fig. 2 a similar section through a modification thereof, and Fig. 3 a diagrammatic view of the cam for operating the valve.

Through a housing 5 extends axially a solid stem 6 which is embraced by a sleeve 7. To the lower end of stem 6 is secured inlet valve 8 and a slide valve 9, which controls the admission of air from an air pipe 10. Sleeve 7 carries at its lower end slide valve 11, which controls the admission of gas from gas pipe 12. Slide valve 9 is provided with openings 13, 14, of which the openings 13 admit the air of the explosive charge, while openings 14 control the inflow of the scavenging air both charge air and scavenging air being admitted through pipe 10. Openings 15 in slide valve 11 control the inflow of gas.

It will thus be seen that the commencement and end of the period for admitting charge air and scavenging air into the cylinder does not depend upon the operation of inlet valve 8, but is also controlled by slide valve 9. In this way, by selecting the size, number and relative position of openings 13 and 14 for each individual machine, the pressure of the charge air and scavenging air may be readily controlled. The smaller the combined area of openings 14, the less scavenging air will be admitted into the cylinder, and as the air admitted always occupies the same space, its pressure will be correspondingly reduced.

The stem 6 of valves 8 and 9, is influenced at its upper end by a spring 16 engaging a disk 24 fast on said stem and slidable in a housing 22. At its lower end stem 6 carries a relief plunger 17 engaging a cylinder 18 arranged within mixing chamber 19. Cylinder 18 is closed at the bottom, while the space 20 between said bottom and the conical lower end of plunger 17 communicates by a duct 21 with the open air.

In lieu of arranging the relief plunger 17 within mixing chamber 19, disk 24 may be used for said purpose by connecting housing 22 with one of the pressure pipes 10 or 12 through a branch 23, in which case plunger 17 at the lower end of stem 6 is dispensed with.

By the construction described, two advantages are obtained, viz:—firstly, the pressure of scavenging air and of the inflowing charge may be reduced to any desired minimum (by reducing the area of openings 13, 14 and 15), while the exit ports of the engine cylinder are opened, such pressure being independent from the tank pressure. Secondly, the period during which the inlet valve 8 may be held open, without loss, may be prolonged, for the following reason: With two-cycle gas engines having inlet valve-gear, the inlet valve is usually opened when the piston is at the dead center and is closed when the shaft has been rotated for about 70°. As the valve must have a long stroke to obtain the necessary opening for the admission of the charge, the cam for operating the inlet valve, heretofore received a form which caused much noise and heavy wear. By furnishing a separate control for the inflowing gas and air, the inlet valve 8 may be opened earlier and closed later than with the prior constructions.

If the openings 14 controlling the inflow of the scavenging air are so dimensioned that when valve 8 is opened, the pressure in mixing chamber 19 is equal to that within the tank that furnishes said air, the valve 8 may be opened at the moment when the pressure of the waste gases is equal to the pressure in chamber 19. In this way exploded gases will not be able to enter the mixing chamber.

If the openings controlling the inflow of the cleaning air are properly dimensioned, waste of air may be avoided. After the scavenging period, during which the engine shaft turns through twenty degrees has ceased, the charging period commences, air and gas entering simultaneously through openings 13, 15, respectively. When the shaft of the engine has been further rotated for about 70°, slide valve 11 is closed, while slide valve 9 remains open until the desired charge pressure is obtained, whereupon the air is also cut off. The inlet valve 8 may thus remain open during a further movement through 20°, after the engine-shaft has been rotated for 70°, as above set forth, without any considerable waste. Thus by the construction

described, the angle of rotation during which the inlet valve is held open, may be extended from 70° to about 110°, (Fig. 3), so that shocks are reduced and heavy wear is avoided.

I claim:

In a valve for gas engines, an inlet port, and an inlet valve controlling said port, combined with an air valve carried by the inlet valve and having two sets of openings for the charge air and scavenging air, a gas valve operated independently from the air valve, and a relief plunger secured to the inlet valve, substantially as specified.

Signed by me at Hanover, Germany, this eleventh day of February 1907.

PETER SCHWEHM.

Witnesses:
PAUL R. THOMPSON,
JAMES M. BOUCOCK.