

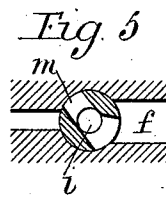
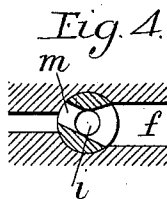
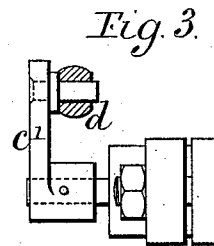
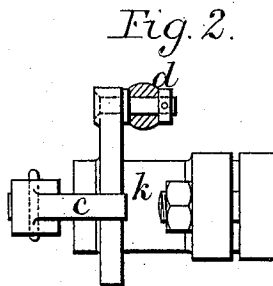
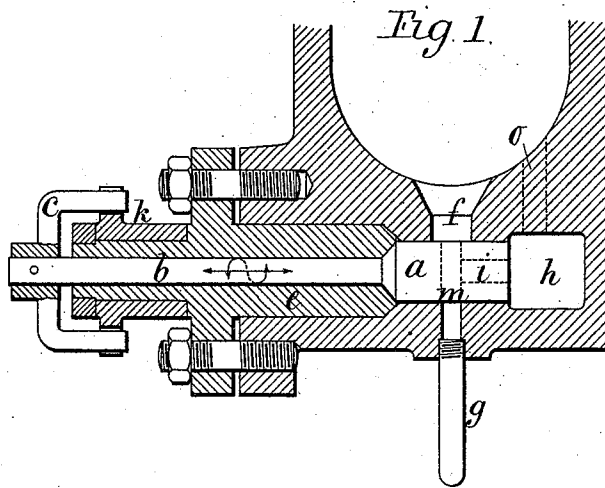
(No Model.)

H. SCHUMM.

VALVE APPARATUS FOR GAS OR PETROLEUM MOTOR ENGINES.

No. 486,301.

Patented Nov. 15, 1892.



Witnesses:
A. C. Norris.
J. H. Daly.

Inventor:
Hermann Schumm
By James L. Norris.
att.

UNITED STATES PATENT OFFICE.

HERMANN SCHUMM, OF COLOGNE, GERMANY, ASSIGNOR TO THE GAS-MOTOREN-FABRIK-DEUTZ, OF SAME PLACE.

VALVE APPARATUS FOR GAS OR PETROLEUM MOTOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 486,301, dated November 15, 1892.

Application filed December 11, 1891. Serial No. 414,724. (No model.) Patented in Germany March 29, 1891, No. 59,793; in England October 16, 1891, No. 17,724, and in Italy January 28, 1892, LXI, 51.

To all whom it may concern:

Be it known that I, HERMANN SCHUMM, a citizen of Switzerland, residing at Cologne-Deutz, in the Empire of Germany, have invented new and useful Improvements in Valve Apparatus for Gas or Petroleum Motor Engines, (for which a patent has been obtained in Germany, dated the 29th day of March, 1891, No. 59,793; in Great Britain, dated October 16, 1891, No. 17,724, and in Italy, dated January 28, 1892, LXI, 51,) of which the following is a specification.

This invention relates to a construction of rotary-valve apparatus for gas and petroleum engines for establishing the communication between the explosion-chamber and the igniting device, wherein the valve is made to receive a longitudinal sliding motion in addition to its reciprocating rotary motion, such longitudinal motion being effected by the agency of the variations of pressure occurring in the explosion-chamber or engine-cylinder, the object being to effect by means of the combined rotary and longitudinal motion the removal of any solid deposits that may occur between the working faces of the valve and its seat. The construction of the apparatus for this purpose is hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 shows a horizontal section; Fig. 2, a part elevation; Fig. 3, a modified arrangement of the driving-gear; Fig. 4, a cross-section of the valve, showing the position of the valve-passage for firing the charge; and Fig. 5, the position of the same for the compressing stroke.

The mode of operating with the arrangement shown at Figs. 1, 2, and 3 is as follows: The cylindrical rotary slide-valve *a*, having a transverse passage *m*, receives a rotary reciprocating motion, of which Figs. 4 and 5^a show the two opposite limits, by means of the rod *d*, actuated by a crank, eccentric, or cam in the engine shaft or way-shaft, and connected either to a sleeve *k*, the motion of which is communicated to the valve-stem *b* by the sliding connection *c*, or the rod *d* may be connected directly to an arm *c'* on the valve-stem, the

connection being such as to permit of a slight longitudinal motion of the valve-stem. The rotary slide-valve *a* has also a longitudinal passage *i*, which serves to connect the cylinder-passage *f* with the space *h* at the inner end of the valve, which serves as receptacle for combustion residues. By this arrangement it will be seen that during the whole of the rotary motion of the valve the pressures in the space *h* will coincide with those in the engine-cylinder, as the passage *m* is always open to the passage *f*, as shown at Figs. 4 and 5^a.

When a partial vacuum is produced in the engine-cylinder during the suction or charging stroke, the outward-directed pressure acting on the inner surfaces of the valve will be less than the inward-directed pressure exerted by the atmosphere, causing the valve to be moved longitudinally inward to an extent limited by the stop afforded by the outer end of the valve-seating piece *e*, with which the head *c* comes in contact. When, on the other hand, the pressure in the cylinder rises above that of the atmosphere during the compression strokes, the excess of pressure acting on the inner end of the valve will force this back again until its coned end bears against the coned seat of *e*, forming a gas-tight closure, so that at the moment of ignition and explosion of the charge the slide will be in the position shown, with the passage *m* establishing a communication between the cylinder-charge and the heated igniting-tube *g*.

When the space *h* is not required to act as a receptacle for combustion residues, as is the case when other igniting devices than the igniting-tube *g* are used, the passage *i* can be dispensed with and in lieu thereof a passage *o* can be made to establish a communication between space *h* and the cylinder, or the space *h* can form part of the explosion-chamber of the cylinder.

With the arrangement shown at Figs. 1 and 2, the arms *c*, fixed on the stem *b*, can slide in notches in the flange of the sleeve *k*, as the valve and stem move inward and outward. In the arrangement at Fig. 3, the connecting-rod *d* is assumed to be sufficiently elastic to allow of such motion.

Having thus described the nature of my invention and the best means I know for carrying the same into practical effect, I claim—

In a gas or petroleum motor engine, a cylindrical rotary valve *a*, with passage *m*, establishing a communication between the explosion-chamber and the igniting device *g* and having freedom to move longitudinally, in combination with a chamber *h* and a port
10 or passage connecting the latter with the cylinder, whereby the inner end of the valve is

subjected to the varying pressures in the cylinder, substantially as and for the purposes set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 9th day of November, A. D. 1891.

HERMANN SCHUMM.

Witnesses:

BILLA LANG,

H. A. MAXWELL.