

(No Model.)

H. SCHUMM.
GAS OR OIL MOTOR ENGINE.

No. 458,073.

Patented Aug. 18, 1891.

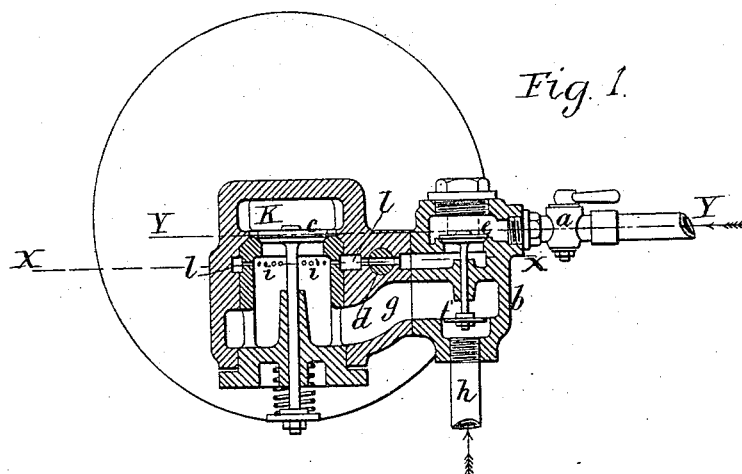


Fig. 1.

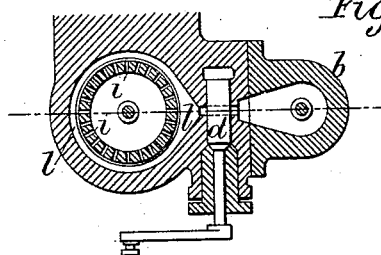


Fig. 2.

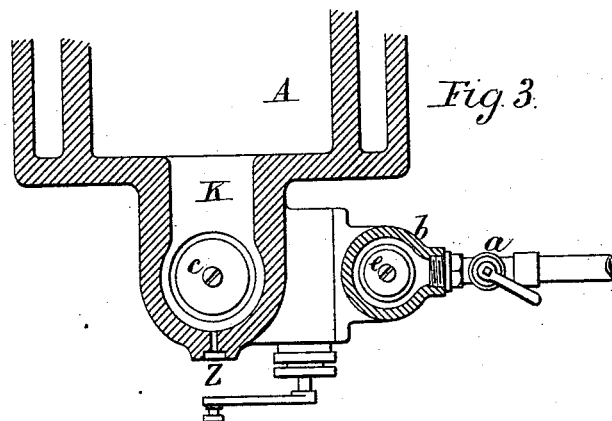


Fig. 3.

Witnesses:
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UNITED STATES PATENT OFFICE.

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

GAS OR OIL MOTOR ENGINE.

SPECIFICATION forming part of Letters Patent No. 458,073, dated August 18, 1891.

Application filed March 6, 1891. Serial No. 384,054. (No model.) Patented in England February 2, 1891, No. 1,903; in Belgium February 16, 1891, No. 93,773, and in Italy March 6, 1891, LVII, 140.

To all whom it may concern:

Be it known that I, HERMANN SCHUMM, a citizen of Germany, residing at Cologne-Deutz, in the Empire of Germany, have invented a new and useful Improvement in Gas or Oil Motor Engines, (for which I have obtained Letters Patent in Belgium, dated February 16, 1891, No. 93,773; in Italy dated March 6, 1891, Vol. LVII, 140, and in Great Britain by an application for patent, which patent, when granted, will bear date February 2, 1891, No. 1,903,) of which the following is a specification.

This invention has for its object to effect the simultaneous opening and closing of the gas and air supply valves of gas or oil motor engines, in order to obtain a uniform explosive mixture during the entire charging stroke.

The invention consists in the features of construction and the combination or arrangement of devices hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a vertical sectional view through the valve apparatus applied, by way of example, to a four-stroke cycle gas-motor engine. Fig. 2 is a horizontal sectional view taken on the line *x x*, Fig. 1; and Fig. 3 is a similar view taken on the line *Y Y*, Fig. 1.

A is the working-cylinder of a four-stroke cycle gas or oil motor engine.

c is the admission-valve for admitting the explosive charges into the cylinder.

e is the gas-supply valve in the valve-chamber *b*, to which the gas passes from the supply-pipe through the cock *a*. The valve *e* carries on its spindle a second valve or disk *f*, by means of which the opening of the air-supply pipe *h* is opened or closed, the chamber above which valve *f* communicates by a passage *g* with the mixing-chamber below the valve *c*.

l is an annular passage surrounding the said valve-chamber and communicating therewith by a number of small radial passages *i*, while it also communicates with the chamber below the gas-valve *e* by a passage, in which is a shut-off-cock valve or slide *d*, which is actuated

in any known manner by a governor, so as to close the gas-supply during one or more suction-strokes when the engine is running too fast.

The mode of action is as follows: At the commencement of the suction-stroke the partial vacuum, formed in cylinder *A*, first causes valve *c* to open, and a corresponding vacuum being then formed below the gas-valve *e* and above the air-valve *f*, the differential pressure thus produced by the gas-supply acting on the upper side of valve *e* and by the atmospheric pressure on the under side of valve *f* will cause both valves to open simultaneously, so that air will pass through *g* into the chamber of valve *c*, and thence into the cylinder, while at the same time gas will pass through the open cock *d* into the annular passage *l*, and thence through the small apertures *i* into the space below valve *c*. By this simultaneous inflow of air through valve *f* and gas through valve *e*, cock *d*, and apertures *i*, only a perfectly-mixed charge of gas and air can pass into the cylinder, and, owing to the perfect control of the supply by the simultaneous action of the valves *e* and *f*, a very uniform explosive mixture will be insured throughout the stroke. The compressing, working, and expelling strokes take place exactly in the same manner as in motor-engines of known construction. On the engine running above normal speed, a governor of any suitable known construction acts upon the shut-off device *d* of the gas-supply, so as to keep it closed during one or more suction-strokes. During this time, although both valves *e* and *f* will open during the suction-stroke, only air will pass in through channel *g* and valve *c*, so that no explosions will occur until by the decrease of the engine's speed the governor is again made to open the cock or other device *d*, so as to again admit the gas-supply to the cylinder. The shut-off device *d* is best placed between the gas-valve *e* and the admission-valve *c*; but it can also be placed beyond the gas-valve on the gas-supply pipe.

It will be readily understood that, although I have described my invention with reference

to four-stroke cycle gas or oil motor engines, it is equally applicable to such engines working with a two-stroke cycle.

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

10 In gas or oil motor engines, the combination of a gas-supply valve and an air-supply valve attached to one and the same stem, controlling, respectively, the gas-supply and
15 the air-supply of the engine, an admission-valve for admitting the explosive charges to the cylinder, an annular passage surrounding the chamber of the said admission-valve, which passage communicates with
20 the space below the gas-supply valve and by small apertures with the chamber below the admission-valve, a passage leading from the space above the air-supply valve to the admission-valve chamber, and a shut-off device on the gas-supply passage, controlled by

a governor, so that when the admission-valve is opened during the charging stroke the differential pressure on the gas and air valves causes these to open and to admit simultaneously gas and air to the admission-valve chamber, where they become intimately mixed on their way to the cylinder or reservoir, while when, owing to the engine running too fast, the shut-off device on the gas-supply is closed by the governor only air is admitted through the air-supply valve during one or more charging strokes, substantially as described.

30 In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 19th day of February, A. D. 1891.

HERMANN SCHUMM.

Witnesses:

PET. LANGEN,
GUSTAVE OELRICHS.