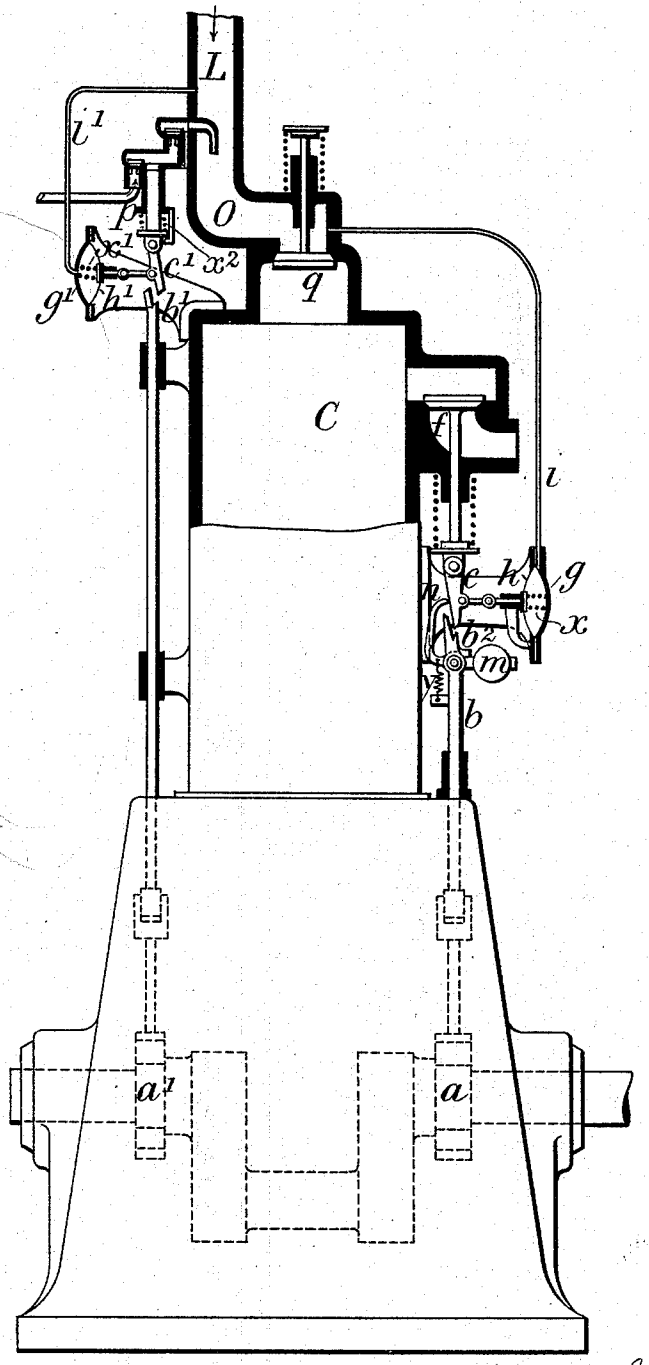
(No Model.)

H. SCHUMM.

GAS OR OIL MOTOR ENGINE.

No. 528,115. Patented Oct. 23, 1894.



Witnesses;
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UNITED STATES PATENT OFFICE.

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

GAS OR OIL MOTOR-ENGINE.

SPECIFICATION forming part of Letters Patent No. 528,115, dated October 23, 1894.

Application filed February 21, 1894. Serial No. 501,026. (No model.) Patented in Switzerland January 3, 1894, No. 7,730; in Belgium January 5, 1894, No. 107,980, and in Italy January 30, 1894, LXIX, 396.

To all whom it may concern:

Be it known that I, HERMANN SCHUMM, a citizen of Switzerland, residing at Cologne-Deutz, in the German Empire, have invented new and useful Improvements in Gas or Oil Motor-Engines, (for which I have obtained Letters Patent in Switzerland, dated January 3, 1894, No. 7,730; in Belgium, dated January 5, 1894, No. 107,980, and in Italy, dated January 30, 1894, Vol. LXIX, 396,) of which the following is a specification.

In the specification to British Patent No. 5,273, of 1890, was described a construction of gas or oil motor engines wherein a diaphragm *h* or piston in a chamber communicating with the gas or air supply passages of the engine or with the engine cylinder itself, was caused, on the suction stroke of the engine piston, to actuate both the discharge valve of the engine and the gas admission valve, so as to properly control the action of these parts without the intervention of a shaft running at half the speed of the engine. My present invention relates to a modified construction of this device, more particularly applicable to oil motor engines, whereby it is rendered applicable for regulating the speed of the engine in a simple manner, which modified construction consists in the employment of one such flexible diaphragm and chamber for controlling the action of the oil supply pump of the engine, and a second such diaphragm and chamber for controlling the action of the discharge valve. By this arrangement a very simple mode of regulating the speed of the engine is obtained whereby, while the discharge valve is prevented from being opened when the engine runs too fast, causing the combustion gases to be retained in the cylinder and alternately compressed and expanded, the oil pump is at the same time thrown out of action so that no combustible charge is introduced into the cylinder. With the use of a simple diaphragm for actuating both devices, as described in the said Patent No. 5,273, this mode of regulation would not be appreciable because when the diaphragm is deflected for preventing the discharge valve from opening, the oil pump connected to such diaphragm would be actuated by the latter, so as to introduce a fresh combustible charge into the cylinder.

I will describe my said invention with reference to the accompanying drawing which shows a vertical section of an oil motor engine in which the oil is supplied by a pump *p* into a vaporizing and mixing chamber *o* where it mixes with the air supply entering through pipe L, the resulting combustible mixture being admitted to the engine cylinder on the suction stroke of the piston, through the automatically opening admission valve *q*. The plunger of the oil pump has for this purpose hinged to it a stem *c'* which is in line with the notched end of a rod *b'* receiving vertical reciprocating motion from a cam or eccentric *a'* on the engine shaft, while to the stem *c'* is pivoted a rod connected to a flexible diaphragm *h'* fixed to a chamber *g'* that communicates by a pipe *i'* with the air supply pipe L, the diaphragm being pressed outward by a spring *x'* so as to tend to keep the stem *c'* out of line with the rod *b'*. The discharge valve *f* of the engine has pivoted to its rod a stem *c* in line with the notched end of a rod *b* receiving vertical reciprocating motion from an eccentric or cam *a* on the engine shaft. To the stem *c* is pivoted a rod connected to a flexible diaphragm *h* fixed on a chamber *g*, which communicates by a pipe *i* with the chamber *o* above the admission valve *q*. To the rod *b* is pivoted a weighted lever *m* acted upon by a spring *y* holding it against a stop b^2, and having a beak *n* that faces the stem *c*.

The action of the engine thus constructed is as follows: On the downward or suction stroke of the engine piston, the resulting decrease of pressure produced in O and L causes a corresponding decrease of pressure in the chamber *g'* causing diaphragm *h'* to be pressed inward by the atmosphere against spring *x'* and consequently to draw the stem *c'* in line with rod *b'* so that on the then ensuing upstroke of the latter, the eccentric *a'* forces up the plunger of the pump *p*, whereby a charge of oil is injected into the vaporizing chamber, mixing with the air and passing into the cylinder through valve *q*. At the same time the partial exhaust produced in the chamber O, pipe *i* and chamber *g* will cause the dia-

phragm h and stem c to be retracted during the whole of the suction or charging stroke, and for an appreciable time after the commencement of the compression stroke, as it will take some time for the full atmospheric pressure to re-enter the chamber O, small pipe i and chamber g, so that when at the commencement of the compression stroke the eccentric rod advances toward c, this will still be sufficiently retracted to escape the notched end of b^2, and the discharge valve f will remain closed, and allow the charge to be compressed. This charge is then compressed by the upstroke of the piston, is then fired and the working down stroke is performed while at the same time as full atmospheric pressure has again entered chamber g', spring x' in pressing h' outward, moves c' out of line with b'. At the completion of the downstroke the eccentric a in forcing the rod b against the stem c of valve f, opens the latter so as to allow the combustion gases to escape. This action continues so long as the speed is normal. When the engine runs too fast, the inertia of the weighted lever m causes it to lag behind during the upstroke of rod b, whereby beak n is made to press stem c to the right-hand, against the action of spring x so as to bring the stem out of line with the rod b, and consequently the valve f is not opened during the return stroke of the piston, which is thus made to compress the combustion gases. On the following outstroke of the piston these gases expand again, and there being no suction action there is no reduction of pressure in O, L, and g' and consequently the spring x' maintains the stem c' in the position out of line with the rod b', so that the oil pump p is not actuated. This action continues until the speed of the engine is reduced to the normal again, when the described action of lever m ceasing, the discharge valve will again be opened by the eccentric a, and a fresh combustible charge will be introduced at the suction stroke. The plunger of the pump p after having been forced upward by the eccentric a' is moved down again to its original position against a stop by a spring x^2.

It is obvious that in place of the flexible diaphragms h h' and chambers g g' small cylinders and pistons may be used, also that in place of a pump p any equivalent device for introducing combustible fluid under pressure into the mixing chamber may be employed.

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

1. In a four stroke cycle gas or oil motor engine the combination of an oil pump or equivalent device for introducing combustible fluid under pressure into the mixing chamber, an eccentric cam or crank on the engine shaft for actuating such device, through the medium of a stem pivoted to such device, a chamber communicating with the mixing chamber or air supply pipe, and containing a flexible diaphragm or equivalent device connected to said stem and acted upon by a spring causing it to move said stem out of line with the eccentric, substantially as and for the purposes described.

2. In a four stroke cycle gas or oil motor engine, the combination of an oil pump or equivalent device for introducing combustible fluid under pressure into the mixing chamber, and controlled by the flexible diaphragm a chamber communicating with the mixing chamber or air supply pipe of the engine, so as to supply combustible fluid to the mixing chamber during the suction stroke, a discharge valve for the combustion gases actuated by an eccentric crank or cam on the engine shaft through the medium of a pivoted stem on the valve spindle, a flexible diaphragm connected to said pivoted stem and fixed on a chamber communicating with the mixing chamber or air supply pipe of the engine, a spring tending to keep the pivoted stem in line with the rod of the eccentric, and a governor device acting upon the said pivoted stem so as to maintain this out of line with the eccentric rod when the engine is running too fast, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 3d day of February, A. D. 1894.

HERMANN SCHUMM.

Witnesses:
FRITZ SCHRÖDER,
SOPHIE NAGEL.