

(No Model.)

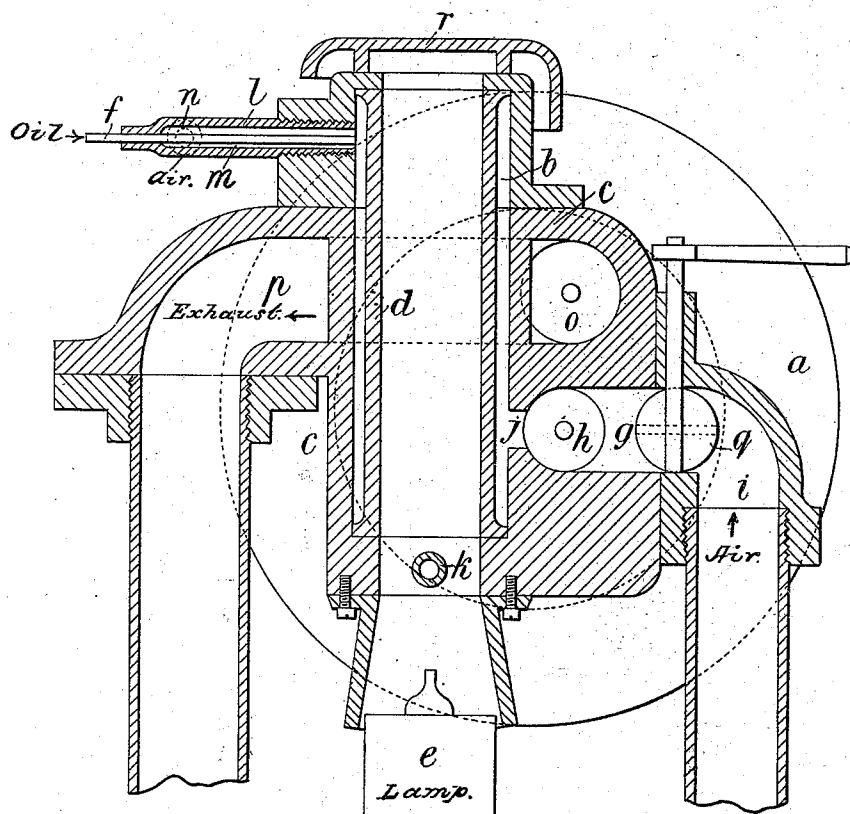
3 Sheets—Sheet 1.

J., S., F. & E. CARTER.
PETROLEUM OIL ENGINE.

No. 552,686.

Patented Jan. 7, 1896.

Fig. 1.



Witnesses.

John E. Bousfield.

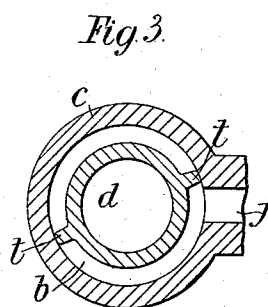
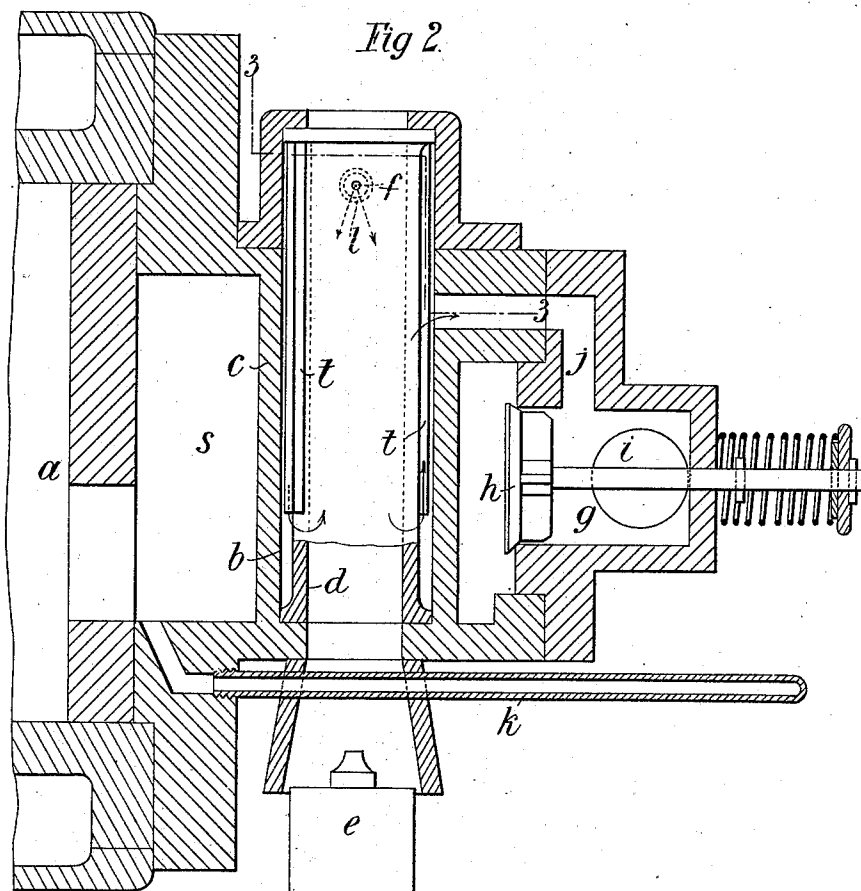
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James Carter
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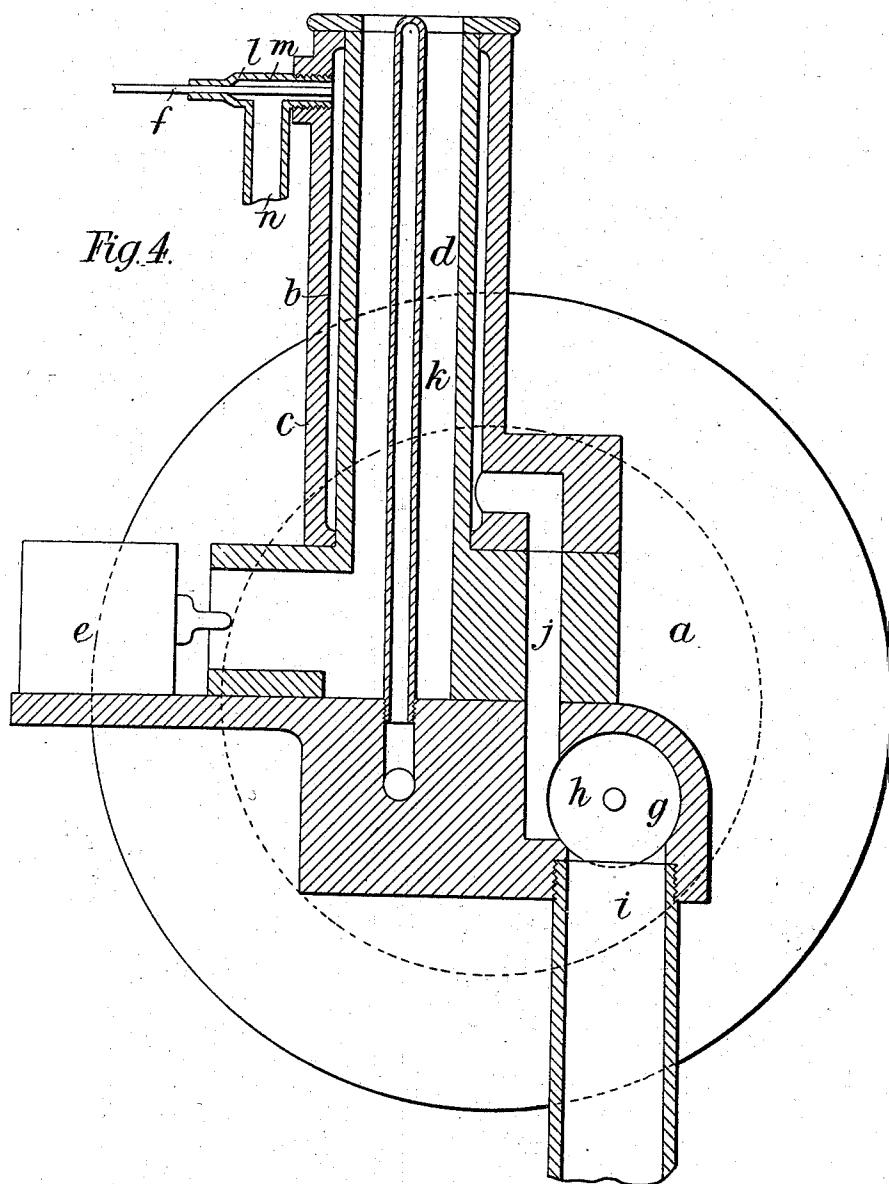
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Inventors:
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UNITED STATES PATENT OFFICE.

JAMES CARTER, SIDNEY CARTER, FRANK CARTER, AND EVERSHERD
CARTER, OF BILLINGSHURST, ENGLAND.

PETROLEUM-OIL ENGINE.

SPECIFICATION forming part of Letters Patent No. 552,686, dated January 7, 1896.

Application filed April 17, 1895. Serial No. 546,138. (No model.)

To all whom it may concern:

Be it known that we, JAMES CARTER, SIDNEY CARTER, FRANK CARTER, and EVERSHERD CARTER, trading as CARTER BROS., residing at Billingshurst, in the county of Sussex, England, have invented new and useful Improvements in and Connected with Petroleum-Oil Engines, of which the following is a specification.

Our invention relates to engines operated by the explosion of mixtures of hydrocarbon vapor and air, the said invention consisting in the novel arrangement of the vaporizing apparatus and of the igniting-tube in connection therewith, as hereinafter more particularly described.

In the accompanying drawings, Figure 1 is a sectional elevation of apparatus constructed according to our invention. Fig. 2 is a sectional elevation of a modified form of apparatus. Fig. 3 is a section on the line 3 3, Fig. 2, and Fig. 4 is a view of another modification.

Similar letters of reference indicate corresponding parts in the several figures.

a is the power-cylinder of the engine, and *b* is the vaporizing-chamber which is formed by a casing *c* having passing through it a tube *d* which forms the chimney of the lamp *e*, the space between the casing *c* and the tube *d* being very narrow, so as to afford a very large heating-surface relatively with the contents of the said chamber *b*.

f is the pipe through which the liquid hydrocarbon is injected into the vaporizing-chamber *b*, and *g* is a chamber which we term the "mixing-chamber" in which the air-admission valve *h* is placed, the said mixing-chamber *g* at one end communicating with the atmosphere through the aperture *i* and at the other end with the vaporizing-chamber *b* through the passage *j*.

k is the igniting-tube which communicates with the interior of the cylinder in the usual manner.

l is a tube surrounding the oil-inlet pipe *f* and extending into the vaporizing-chamber *b*, so that a space *m* is formed between the pipe *f* and the tube *l*, which space communicates with the atmosphere through an aperture *n*.

In the operation of our apparatus the re-

quired quantity of oil is injected into the vaporizing-chamber *b*, where it comes into contact with the hot walls of the tube *d* whereby it is vaporized, and on the outstroke of the engine the air-valve *h* opens, so that the hydrocarbon vapor is drawn from the vaporizing-chamber *b*, together with the small quantity of air which enters through the aperture *n*, into the mixing-chamber where it meets the necessary quantity of air drawn through the aperture *i* for forming the explosive charge which thence passes into the cylinder.

In the arrangement of our invention shown in Fig. 1 the exhaust-passage is represented as being formed in the casing *c* and as extending around the vaporizing-chamber *b*, so that the heat of the exhausted products of combustion will tend to raise the heat of the vaporizer. In the said Fig. 1 *o* indicates the exhaust-valve and *p* the passage surrounding the vaporizer through which the products of combustion are exhausted. In this figure also we have represented a valve *q* as being arranged in the mixing-chamber *g* for the purpose of controlling the quantity of air which enters through the aperture *i* to mingle with the hydrocarbon vapor. We have also represented the igniting-tube *k* as extending horizontally through the chimney *d*, and the said chimney as being provided with a cap *r* for retarding to a certain extent the flow of the heat of the lamp through the said chimney.

In the modification of our invention shown in Figs. 2 and 3 the outer casing *c* of the vaporizer is represented as extending through a chamber *s* in direct communication with the interior of the cylinder *a*, whereby the heat of the vaporizing-chamber is largely increased by the heat due to the explosions within the cylinder. In this modification also the inner tube *d* of the vaporizer is represented as provided with ribs *tt*, which cause the hydrocarbon vapor to pass down one side of the vaporizing-chamber and up on the other side on its way to the passage *j* and to the mixing-chamber *g*, as indicated by the arrows in Fig. 2.

In the arrangement shown in Fig. 4 the igniting-tube *k*, instead of extending horizontally across the tube *d*, extends longitudinally through the same, the lamp *e* being

placed at one side of the chimney instead of directly beneath it.

Having now particularly described and ascertained the nature of our said invention and
5 in what manner the same is to be performed, we declare that what we claim is—

10 In an explosive engine, the combination with a heater, and a tube for carrying off the products of combustion, of a sleeve surrounding said tube and forming a vaporizing chamber between it and said tube, said vaporizing
15 chamber being provided with ribs *t, t* for causing the oil to pass over the whole surface of the heater; means for supplying oil to said vaporizing chamber, an air inlet ad-

jacent to the oil inlet to admit air to allow circulation of vapor in the vaporizer so as to empty the vaporizer on out stroke of piston, a mixing chamber in communication with said vaporizing chamber, an air supplying
20 pipe for said mixing chamber and an igniting device passing through the said tube, substantially as described.

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Witnesses:

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