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E. WISEMAN & J. HOLROYD.

HYDROCARBON MOTOR.

No. 600,107. Patented Mar. 1, 1898.

Fig. 1.

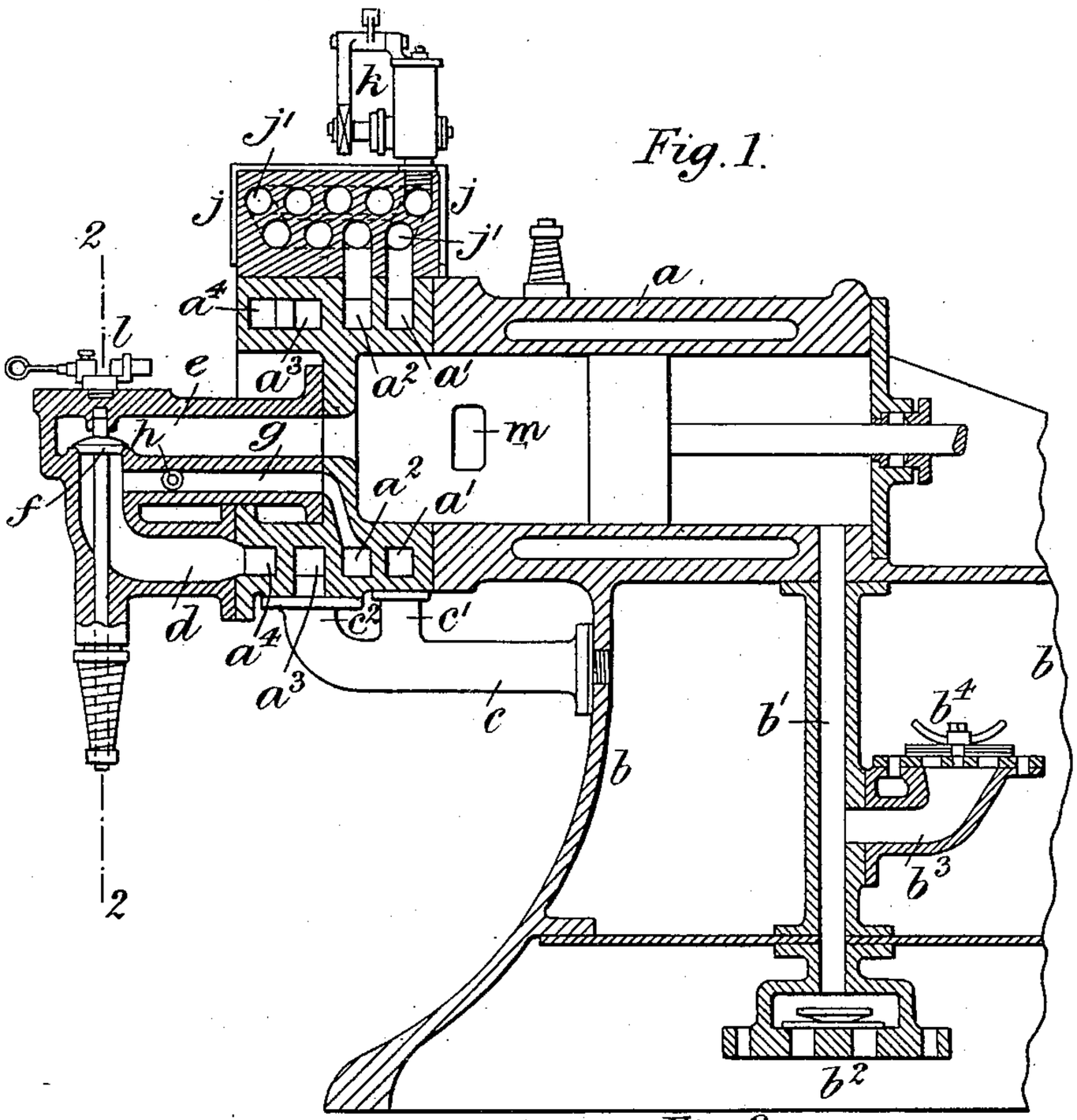

Fig. 3.

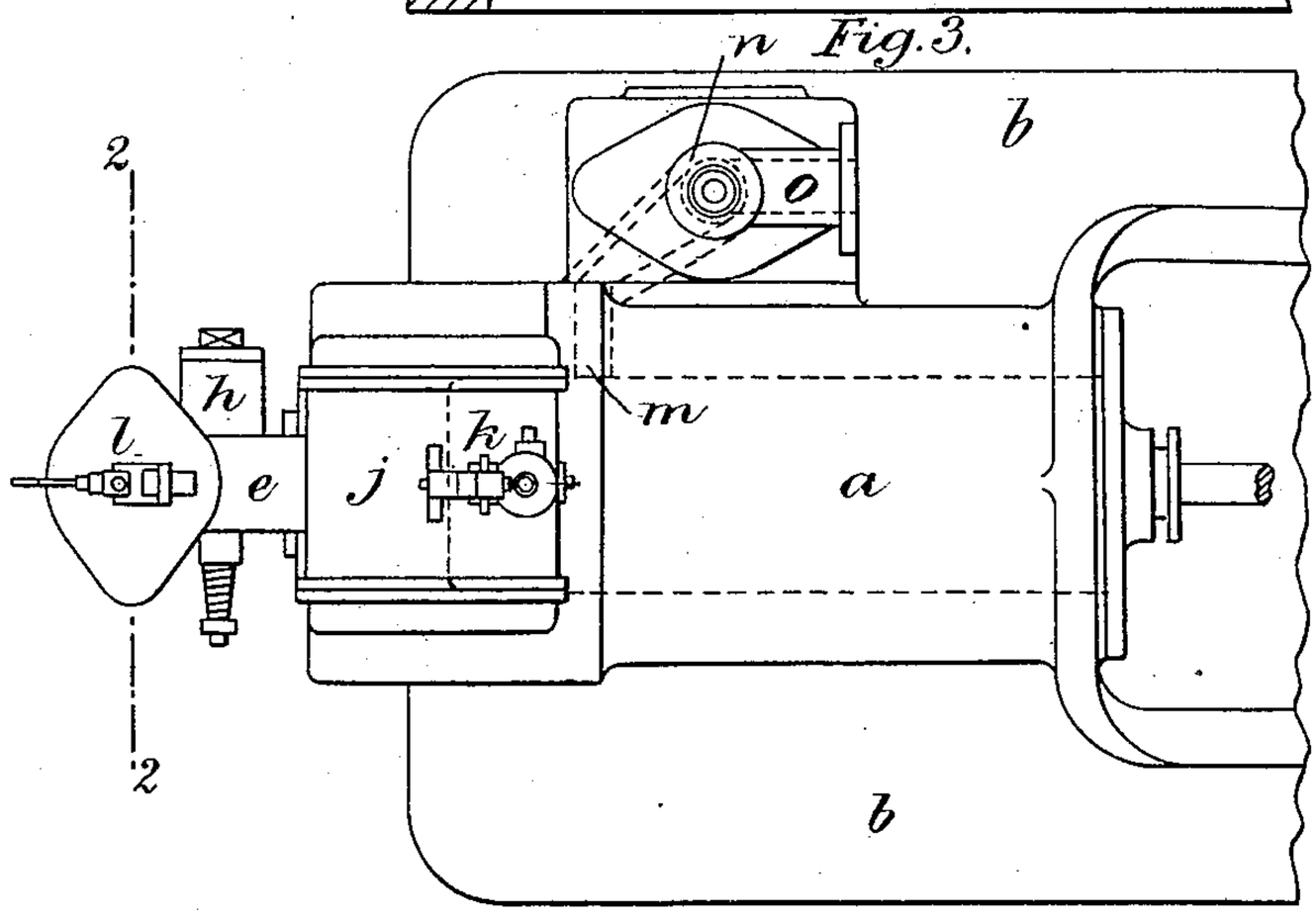

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Fig. 2.

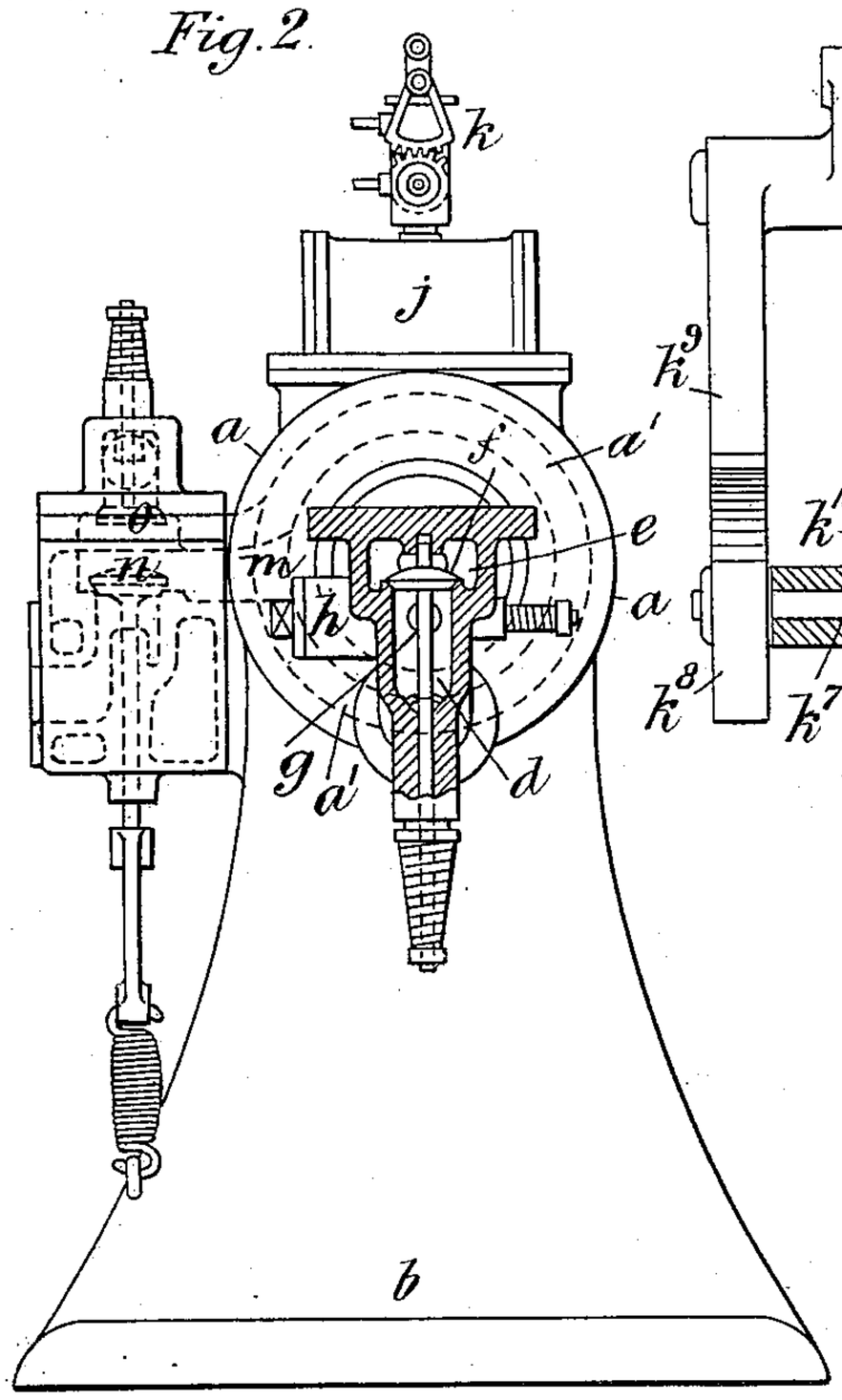

Fig. 4.

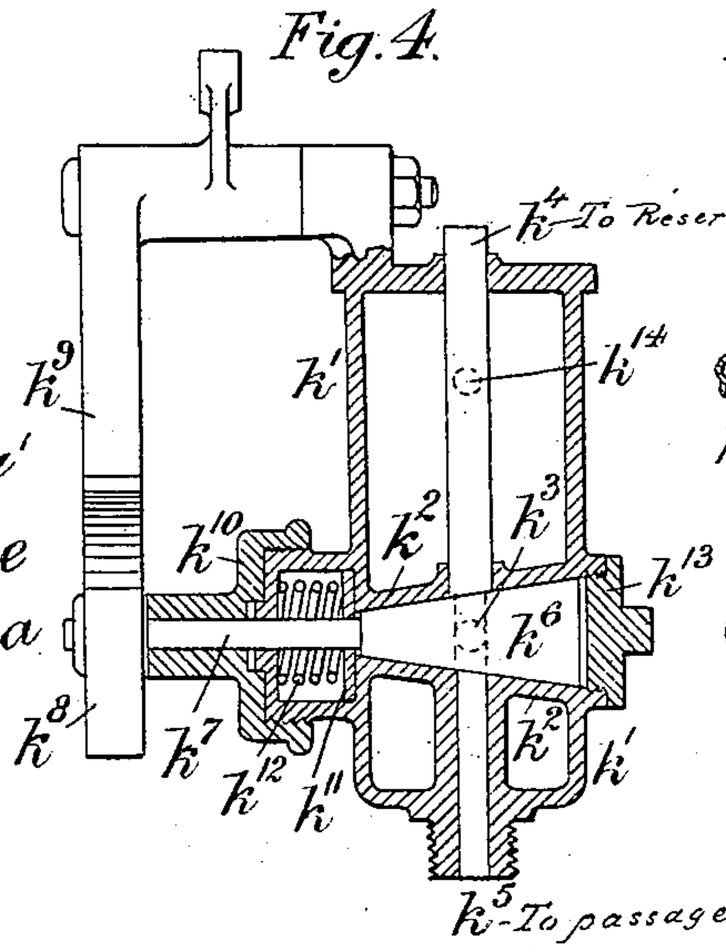

Fig. 5.

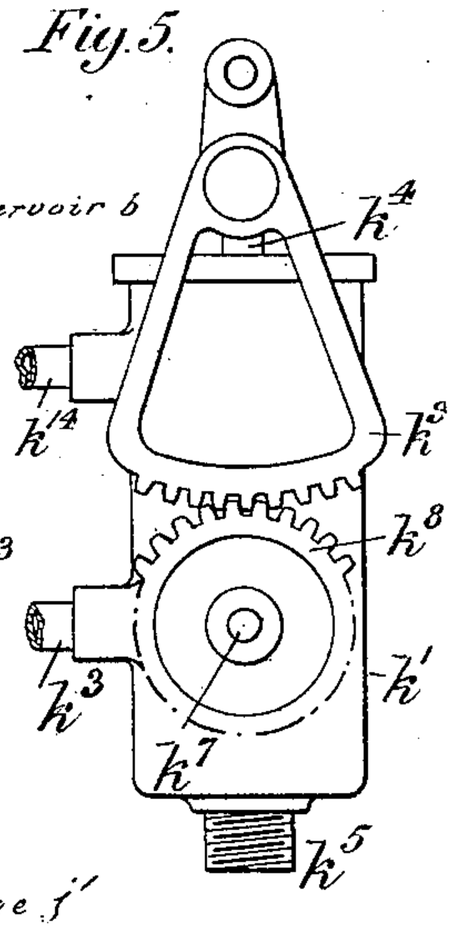

Fig. 6.

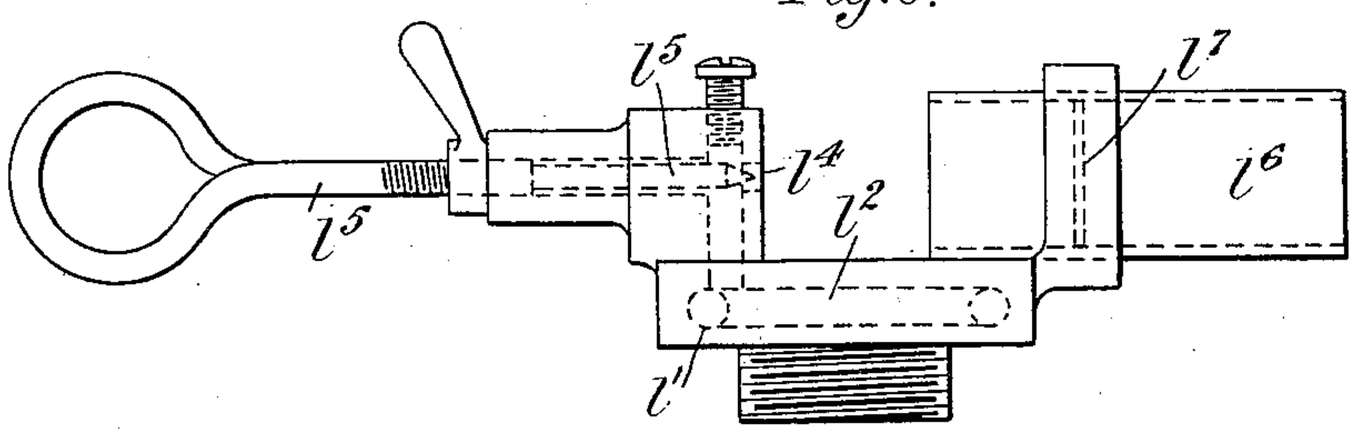

Fig. 7.

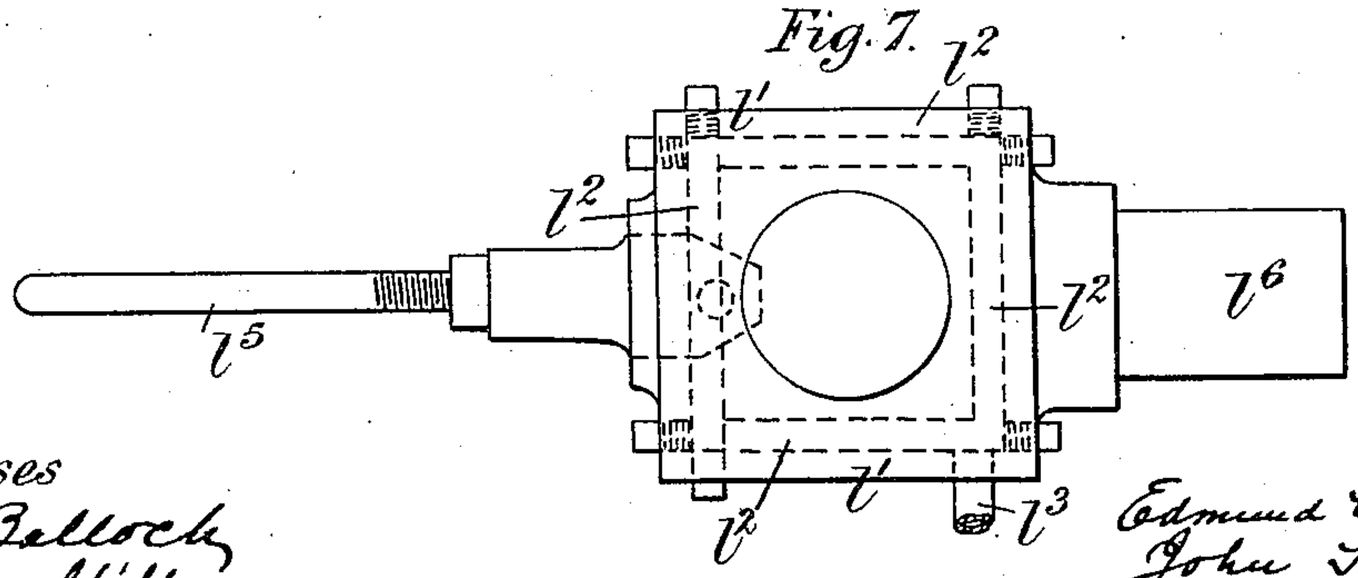

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Fig. 8.

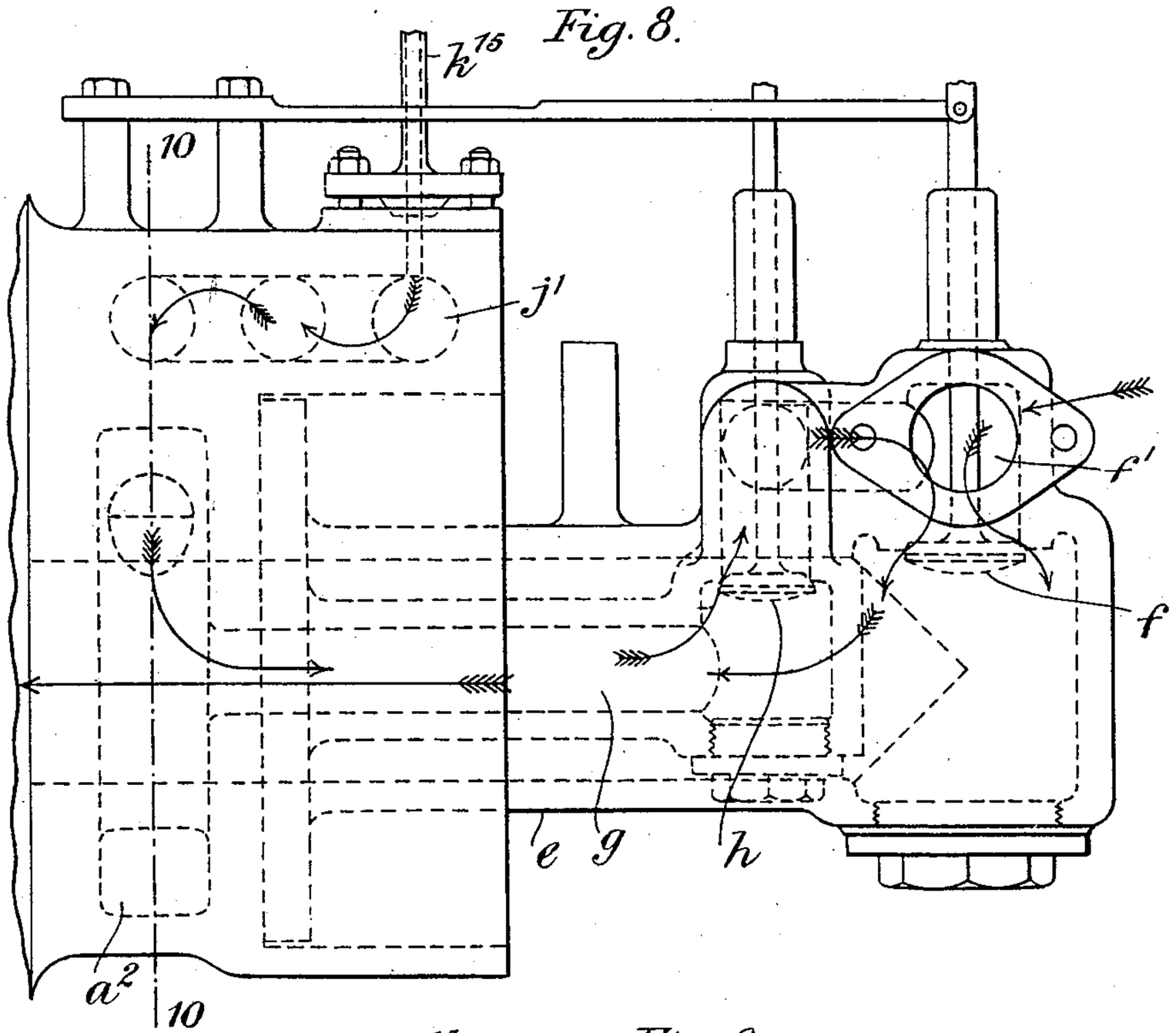

Fig. 9.

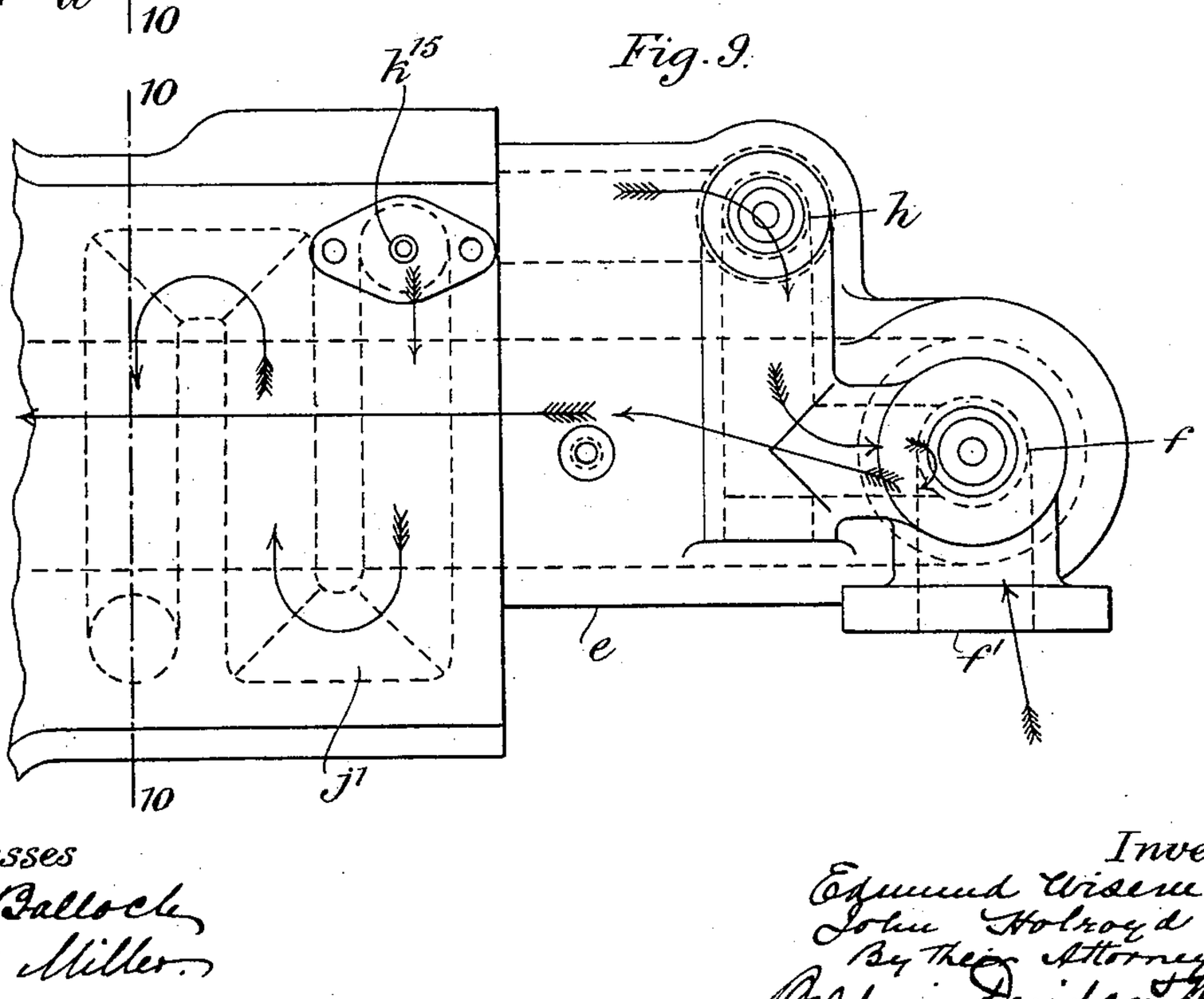

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Fig. 10.

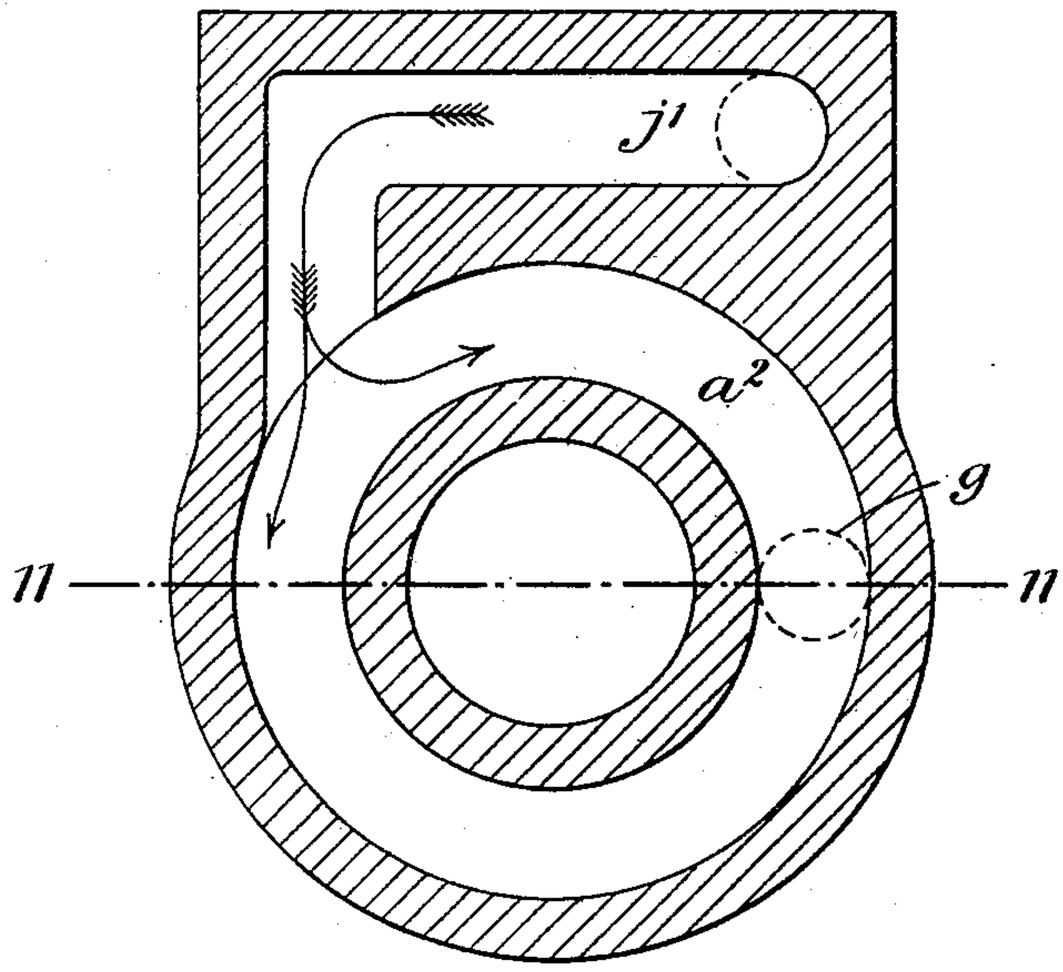
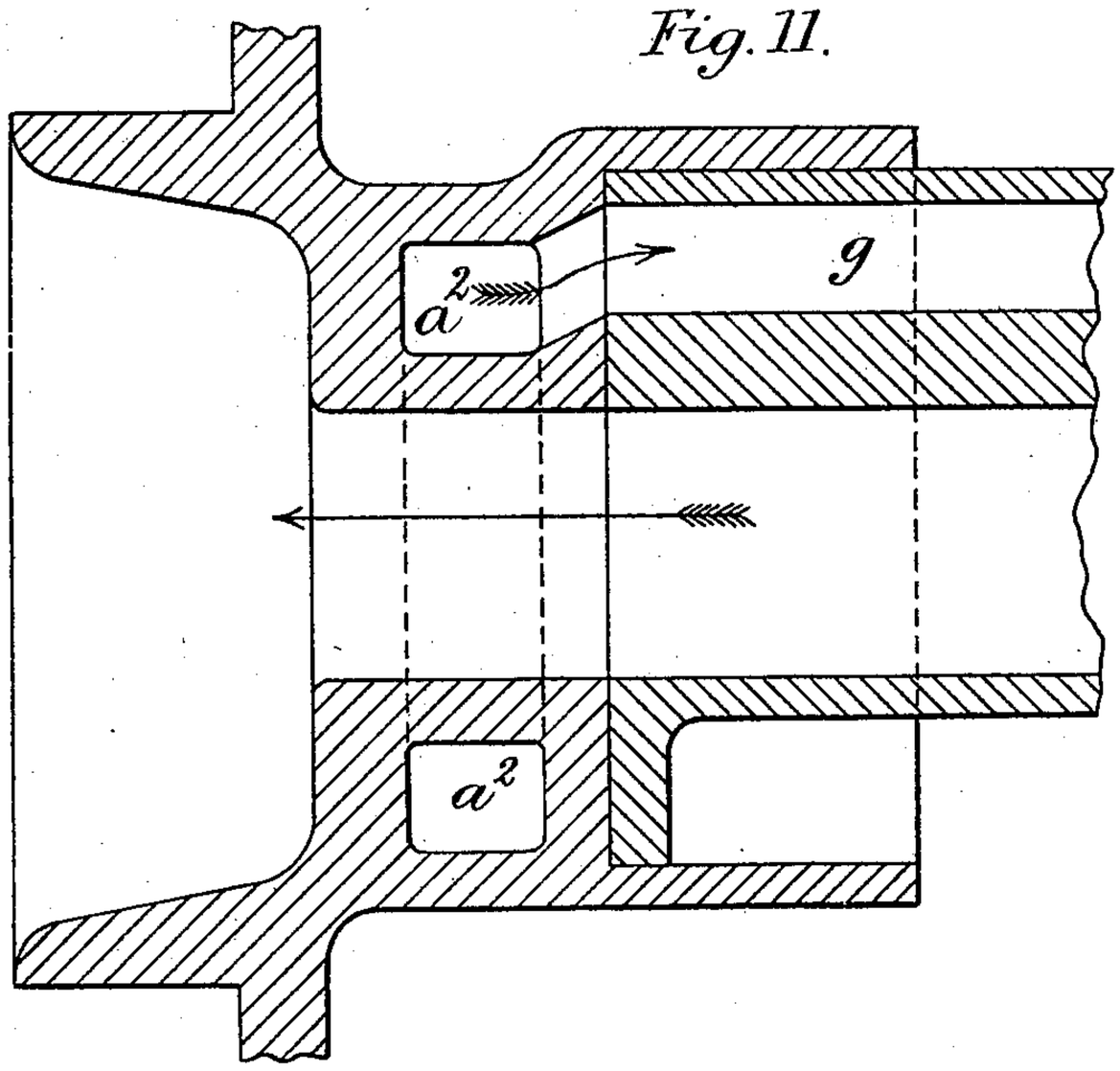


Fig. 11.



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UNITED STATES PATENT OFFICE.

EDMUND WISEMAN AND JOHN HOLROYD, OF LUTON, ENGLAND.

HYDROCARBON-MOTOR.

SPECIFICATION forming part of Letters Patent No. 600,107, dated March 1, 1898.

Application filed May 27, 1897. Serial No. 638,470. (No model.)

To all whom it may concern:

Be it known that we, EDMUND WISEMAN and JOHN HOLROYD, subjects of the Queen of Great Britain, residing at Cheapside, Luton, in the county of Bedford, England, have invented certain new and useful Hydrocarbon-Motors, of which the following is a specification.

The objects of this invention are to obtain a more perfect mixing, heating, and combustion of the charge, the prevention of fouling, a more regular supply of the hydrocarbon, and a ready means for starting the engine.

Figure 1 is a central longitudinal vertical section, Fig. 2 a transverse vertical section on the line 2 2, Figs. 1 and 3, and Fig. 3 a plan, of so much of a motor as is necessary to illustrate this invention. Fig. 4 is a vertical longitudinal section, and Fig. 5 an end elevation, of the oil-supply apparatus. Fig. 6 is a side elevation, and Fig. 7 an under side view, of the lamp or burner *l*. Figs. 8 to 11 show a modification. Fig. 8 is a side elevation, and Fig. 9 a plan. Fig. 10 is a section on the line 10 10, Figs. 8 and 9; and Fig. 11 is a horizontal section on the line 11 11, Fig. 10.

a is the cylinder, carried on the hollow bed *b*, which forms an air-reservoir.

b' is a pipe passing through the reservoir *b*, having an air-admission valve b^2 at its lower end and a branch pipe b^3 near its middle, with an emission-valve b^4 leading into the reservoir *b*.

a' a^2 a^3 a^4 are annular passages formed in the walls of the end of the cylinder.

c is a pipe opening into the reservoir *b* and having two branches c' c^2, leading, respectively, into the annular passages a' and a^3.

d is a pipe leading from the annular passage a^4 to the end of the pipe *c*, whose other end is open to the cylinder, and *f* is a valve between the two pipes.

g is a pipe leading from the annular passage a^2 to the pipe *d*, just below the valve *f*, and *h* is a valve on the pipe *g*.

j is a casting on the top of the cylinder *a* and having within it a circuitous passage *j'*, having its ends connected to the annular passages a' and a^2.

k is the oil-supply apparatus. (Shown to a larger scale at Figs. 4 and 5.)

Air from the reservoir *b* is led by the pipe c' to the annular passage a', in which it becomes heated, and then enters the circuitous passage *j'*, at the commencement of which it meets with the oil delivered by the measurer *k*. The oil and air pass together through the circuitous passage *j'*, the annular passage a^2, and pipe *g* to the valve *f*, the vaporization of the oil being completed in traversing these hot passages. At the valve *f* the hot mixture of air and vapor meets a supply of air led from the reservoir *b* by the pipe c^2 into the annular passages a^3 a^4, in which it becomes heated and from whence it is conducted by the pipe *d* to the valve *f*.

l is the lamp. (Shown to a larger scale at Figs. 6 and 7.)

m is the exhaust-port, leading to a chamber in which there is an exhaust-valve *n* and an air-admission valve *o*. The valve *n* is opened once in every two revolutions of the crank-shaft by any ordinary gearing, which is not shown. The valve *h* is operated by the governor in the usual way, so that the supply of hyrdocarbon vapor is stopped when the engine is running too fast. The valves *f* and *o* are operated by the suction of the piston; but they may also be acted on by the governor to prevent the cooling of the engine when running light.

In Figs. 4 and 5, k' is a reservoir having within it a conical shell k^2, through which are two diametrically opposite horizontal holes, one leading into the reservoir and the other to the air-pipe k^3, and also two vertical holes, one leading to the bottom of the air-pipe k^4, connected to the reservoir *b*, and the other to the top of the pipe k^5, leading into the passage *j'*, Fig. 1. k^6 is a solid conical plug in the shell k^2 and having a hole passing diametrically through it, alternately connecting k' with k^3 when the oil enters it and k^4 with k^5 when the oil is sucked out of it by the outstroke of the piston. k^7 is a spindle fixed to the plug k^6 and carrying a pinion or quadrant k^8, gearing with a pinion or quadrant k^9, to which an oscillating motion is given by means not shown. k^{10} is a collar fixed to the spindle k^7, and k^{11} a collar loose on it. k^{12} is a spring tending to force the collars k^{10} and k^{11} apart, and so keep the plug k^6 tight in the shell k^2. k^{13} is a screw-

cap closing the end of the shell k^2, and k^{14} is a hole admitting air to the top of the reservoir k'.

In the lamp or burner shown at Figs. 6 and 7, l' is the base-plate, screwing onto the top of the pipe e, Fig. 1, and l^2 is a passage formed in it which is connected to an oil-supply pipe l^3 and to the nozzle l^4. l^5 is a regulating-needle in the nozzle. l^6 is a tube fixed to the base-plate, and l^7 is a diaphragm of wire-gauze in it.

In starting the engine the axial pipe or annular chamber, or both, are heated in any convenient manner, and then as soon as the hydrocarbon in the passage l^2 vaporizes the burner l may be ignited to assist in the heating of the engine, so as to obtain an earlier start. It is also used to maintain the heat of the engine when running light or during stoppages. In ordinary work, however, the engine is self-igniting. The lamp l may either be fixed to the top of the axial pipe, as shown, or to the bottom.

The engine shown is designed to work with a four-stroke cycle, the instroke of the piston after an explosion sweeping out the products of combustion through the exhaust-port m and valve n, which is automatically opened at this time. The ensuing outstroke draws in a heated mixture of hydrocarbon vapor and air through the valve f and of air through the valve o. The next instroke compresses the charge, which automatically ignites and so completes the cycle. Some of the improvements are, however, applicable to engines working with other cycles. The reservoir b may also be dispensed with and the engine be made with an open-ended cylinder. In this case the pipe k^4, Fig. 4, is open to the outer air.

In the modification shown at Figs. 8 to 11 the annular passages a', a^3, and a^4 for heating the air are replaced by other ordinary means, and the block or casting j, containing the circuitous passage j', is brought into direct contact with the cylinder. In this case the air heated by the exhaust or otherwise is admitted at f' directly to the valve f, while the oil (and, it may be, some air also) is led by the pipe k^{15} from the nozzle k^5 of the measurer, Figs. 4 and 5, which is not shown, into the circuitous passage j' and from thence passes by the annular passage a^2 into the pipe g, made in one piece with the pipe e, to the valves h and f and so to the cylinder.

What we claim is—

1. The combination of a cylinder, a block heated by conduction from the cylinder, a circuitous passage in the block, an annular passage around the cylinder connected to the circuitous passage, an admission-valve between the annular passage and the cylinder, and means for leading air to the valve and hydrocarbon to the circuitous passage.

2. The combination of a cylinder, an axial pipe open at one end to the cylinder, an admission-valve at the other end of the pipe, a block heated by conduction from the cylinder, a circuitous passage in the block, an annular passage around the cylinder connected to the circuitous passage and to the valve, and means for leading air to the valve and hydrocarbon to the circuitous passage.

3. The combination of a cylinder, an axial pipe open at one end to the cylinder, an admission-valve at the other end of the pipe, a block heated by conduction from the cylinder, a circuitous passage in the block, means for leading hydrocarbon into the passage, an annular passage around the cylinder connected to the circuitous passage and to an air-supply, a second annular passage connected to the circuitous passage and to the valve, and a third annular passage connected to an air-supply and to the valve.

4. The combination of a cylinder having its sides projecting beyond its end, an axial pipe open at one end to the cylinder, an admission-valve at the other end of the pipe, means for supplying the charge to the valve, an annular space between the axial pipe and the projecting sides of the cylinder, and means for directing a flame into the space.

5. The combination of a cylinder having its sides projecting beyond its end, an axial pipe open at one end to the cylinder, an admission-valve at the other end of the pipe, a block heated by conduction from the cylinder, a circuitous passage in the block, an annular passage around the cylinder connected to the circuitous passage and to the valve, means for leading air to the valve and hydrocarbon to the circuitous passage, an annular space between the axial pipe and the projecting sides of the cylinder, and means for directing a flame into the space.

6. The combination of a cylinder having its sides projecting beyond its end, an axial pipe open at one end to the cylinder, an admission-valve at the other end of the pipe, a block heated by conduction from the cylinder, a circuitous passage in the block, means for leading hydrocarbon into the passage, an annular passage around the cylinder connected to the circuitous passage and to an air-supply, a second annular passage connected to the circuitous passage and to the valve, a third annular passage connected to an air-supply and to the valve, an annular space between the axial pipe and the projecting sides of the cylinder, and means for directing a flame into the space.

7. The combination of a cylinder having its sides projecting beyond its end, an axial pipe open at one end to the cylinder, an admission-valve at the other end of the pipe, means for supplying the charge to the valve, an annular space between the axial pipe and the projecting sides of the cylinder, a plate fixed to the axial pipe, a passage in the plate, and an oil-supply and burner connected to the passage.

8. The combination of a cylinder having its sides projecting beyond its end, an axial pipe

open at one end to the cylinder, an admission-valve at the other end of the pipe, a block heated by conduction from the cylinder, a circuitous passage in the block, an annular passage around the cylinder connected to the circuitous passage and to the valve, means for leading air to the valve and hydrocarbon to the circuitous passage, an annular space between the axial pipe and the projecting sides of the cylinder, a plate fixed to the axial pipe, a passage in the plate, and an oil-supply and burner connected to the passage.

9. The combination of a cylinder having its sides projecting beyond its end, an axial pipe open at one end to the cylinder, an admission-valve at the other end of the pipe, a block heated by conduction from the cylinder, a circuitous passage in the block, means for leading hydrocarbon into the passage, an annular passage around the cylinder connected to the circuitous passage and to an air-supply, a second annular passage connected to the circuitous passage and to the valve, a third annular passage connected to an air-supply and to the valve, a space between the axial pipe and the projecting sides of the cylinder, a plate fixed to the axial pipe, an annular passage in the plate, and an oil-supply and burner connected to the passage.

10. The combination of a cylinder, a heater connected to the cylinder, a reservoir, a hollow shell in the reservoir, a plug in the shell, a hole through the plug, means for rotating the plug, two opposite holes through the shell one connected to an air-supply and the other to the heater and a hole through the shell into the reservoir.

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