

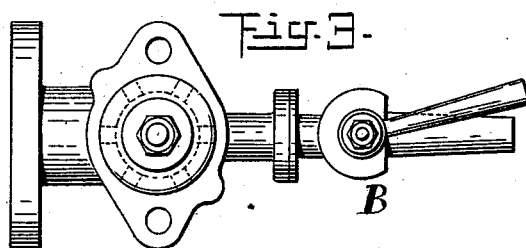
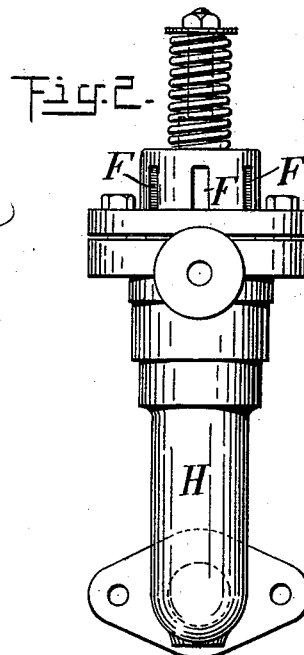
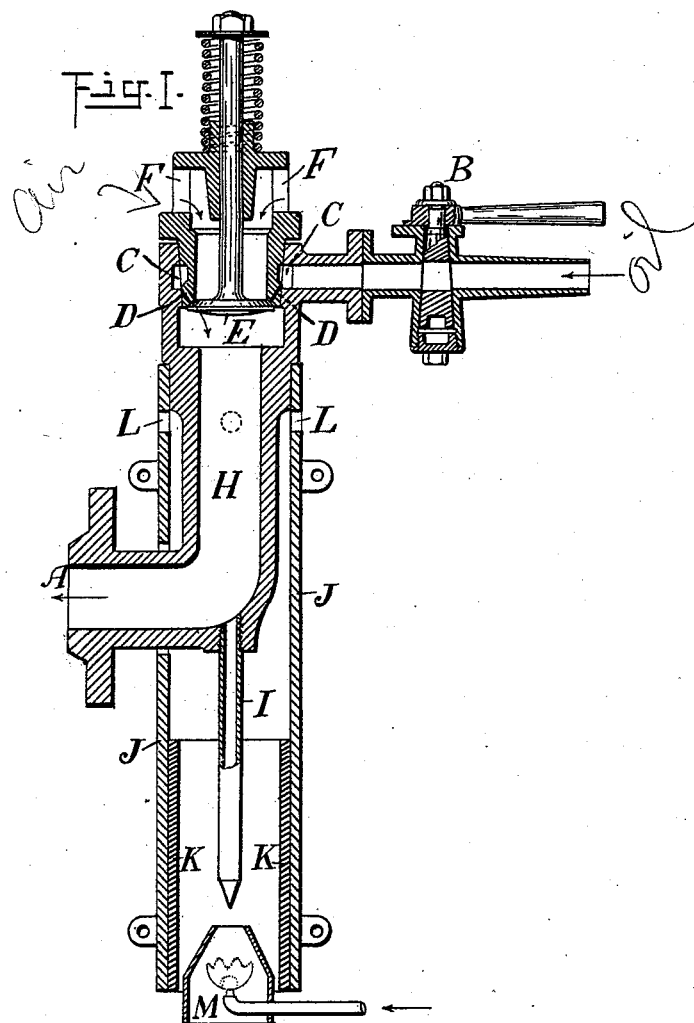
(No Model.)

2 Sheets—Sheet 1.

H. CAMPBELL.
OIL ENGINE.

No. 523,511.

Patented July 24, 1894.



WITNESSES:
George H. Blin
Frank E. Grimes

INVENTOR:
Hugh Campbell
by Herbert W. Jenner Atty.

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Fig. 4.

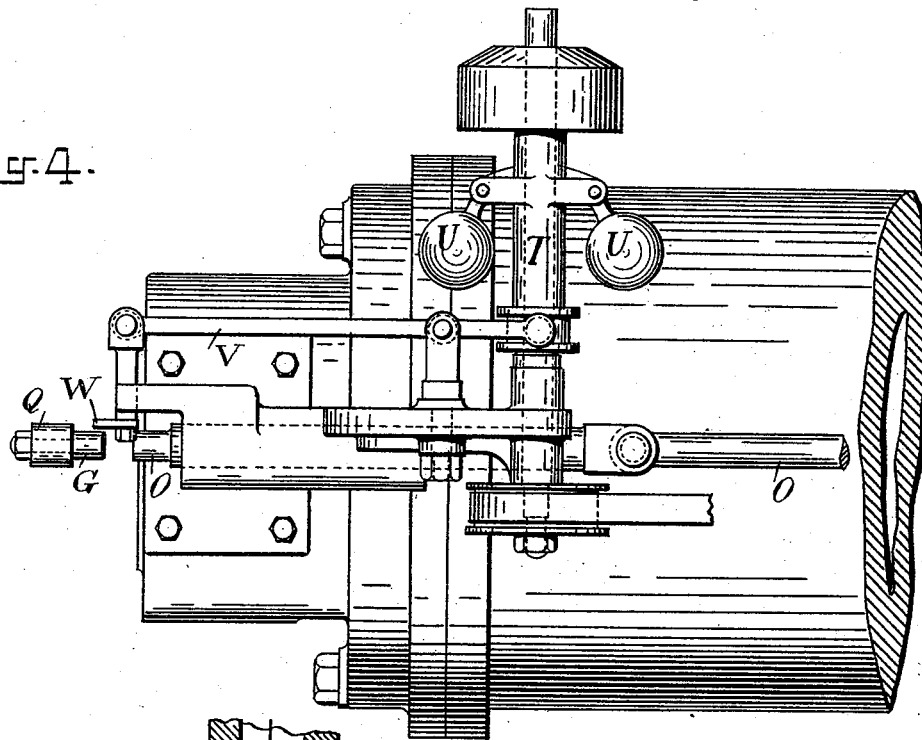
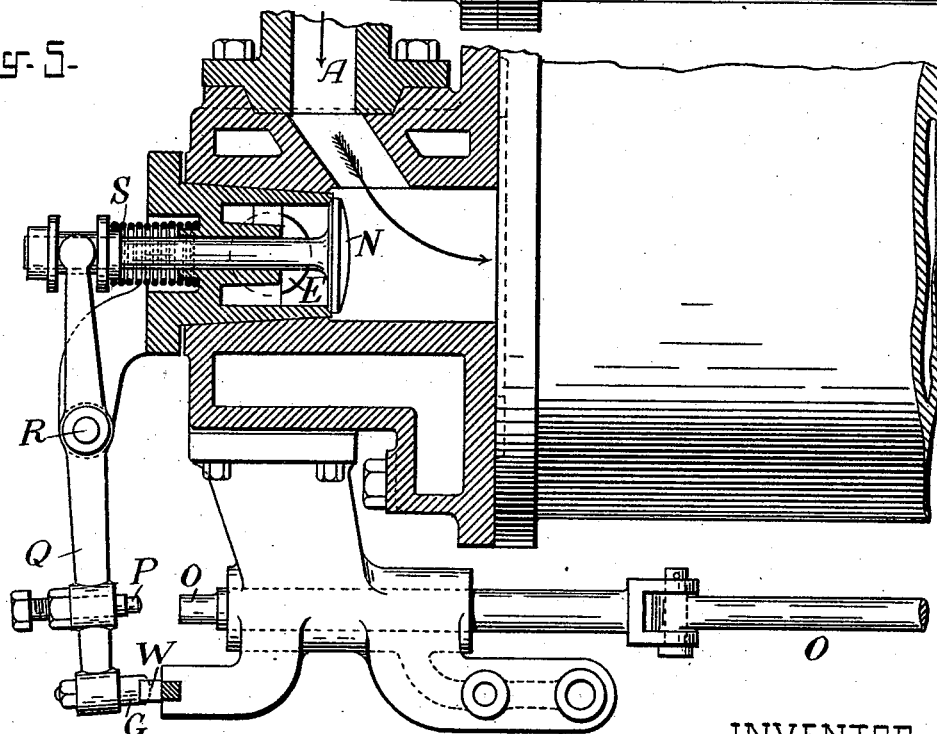


Fig. 5.



WITNESSES:

George H. Bliss
Frank B. Grimes.

INVENTOR

Hugh Campbell.
by Herbert W. Jenner. Atty.

UNITED STATES PATENT OFFICE.

HUGH CAMPBELL, OF HALIFAX, ENGLAND.

OIL-ENGINE.

SPECIFICATION forming part of Letters Patent No. 523,511, dated July 24, 1894.

Application filed January 17, 1894. Serial No. 497,143. (No model.)

To all whom it may concern:

Be it known that I, HUGH CAMPBELL, of the firm of the Campbell Gas Engine Company, Limited, a subject of the Queen of Great Britain, residing at Halifax, in the county of York, England, have invented certain new and useful Improvements in Oil-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention has reference to that construction of engine known as the "Otto" or four stroke cycle.

15 This invention consists in the novel construction and combination of the parts hereinafter fully described and claimed.

In constructing an oil engine according to my invention, the oil, which may be of any suitable kind, is allowed to flow by its own gravity through a suitable form of cock provided with a handle for regulating the supply to a small chamber surrounding the inlet valve which is preferably of the mushroom type, such said valve being opened by the pressure of the atmosphere when the movement of the piston within the cylinder creates a vacuum. The conical seat of the valve is made with one or more openings or perforations to allow the oil to flow or to be drawn into a vaporizer connected to the engine.

35 Such being the nature and object of my invention I will now proceed to describe the same more fully, and for that purpose make reference to the accompanying sheets of drawings, wherein—

Figure 1 is a vertical section of my improved apparatus for supplying and vaporizing the oil. Fig. 2 is a part front elevation, and Fig. 3 a plan of the same. Fig. 4 is a front elevation of certain parts of an oil engine to which the vaporizer is connected, showing also the means for governing the speed of the engine. 45 Fig. 5 is a plan view, partly in section, of the parts shown in Fig. 4.

The vaporizing apparatus shown in Fig. 1 is connected to the engine at A in Fig. 5. The combustible mixture consisting of oil and air enters the engine cylinder as indicated by the arrows in Fig. 5. The supply of oil to the vaporizer, see Fig. 1, comes from a cistern and

passes through the tap or cock B and enters the annular chamber C and passes through small holes or apertures D to the inlet valve 55 E. The necessary supply of atmospheric air reaches the inlet valve through the air holes or openings F, both the said air and oil passing through when the valve E is open, but when the main opening of the valve closes, 60 the admission of air and oil is shut off. After the oil and air pass through the inlet valve E they are drawn down the vaporizer which is composed preferably of a cylindrical pipe H provided with an ignition pipe I. These 65 parts are surrounded by a jacket J lined with asbestos K and having air holes L to create a draft, the bottom and sides of the said vaporizer being heated with an oil lamp M for the purpose of heating the oil and air to a high 70 temperature when it becomes converted into a mixed vapor. After the combustible mixture has been generated it passes into the cylinder of the engine and is compressed by the piston, but on the return stroke of the 75 piston and during the time the crank is turning the dead center the ignition of the combustible mixture takes place by contact with the red hot sides of the ignition tube I. After the mixture has exploded and performed its 80 function in the cylinder of the engine which is timed to take place during the outstroke of the piston, the spent mixture is exhausted to the atmosphere through an exhaust valve N, see Fig. 5. This exhaust valve is operated 85 at every revolution of the engine by a constantly reciprocating rod O which receives its motion by a cam or eccentric driven at half the speed of the crank shaft by the use of spur wheels or other suitable gearing in connection with the crank shaft of the engine, 90 but not shown in the drawings. Each forward motion of the reciprocating rod O strikes against the adjustable set screw P attached to the lever Q having its fulcrum at R, thus 95 when the reciprocating rod O strikes the stud P the lever Q opens the exhaust valve N which is closed through the action of the spiral spring S. When the engine overruns its normal speed the sleeve T in connection 100 with the governors U rises causing one end of the lever V to drop carrying with it the projection or finger W which at this time is placed opposite the stud G so that when the lever Q

has been operated by the point of the reciprocating rod O, the finger W through the increased speed of the governors descends and comes opposite the stud G in lever Q and prevents the spiral spring S closing the exhaust valve, whereby the exhaust valve remains open which prevents a vacuum being formed in the cylinder, consequently the inlet valve E is not opened for the admission of a fresh supply of air and oil; the exhaust valve being thus kept open by the lever Q allows the products of combustion of air and oil to be drawn alternately into the cylinder and expelled therefrom by the action of the piston, and this goes on until the speed of the engine falls to the normal again when the governors and sleeve T will descend and raise the holding lever V from contact with the stud G and permit the inlet valve to act.

It must be understood that the reciprocating rod O during each forward stroke always advances far enough to strike the lever Q and cause it to open the exhaust valve so as to release the pressure from the finger W, on the holding lever V, in order that it may be free to move upward when the governor demands it, which takes place on the engine resuming its normal speed.

I claim as my invention—

1. In an oil engine, the combination, with the vaporizer consisting of an elbow pipe H adapted to have its horizontal end secured to

the engine cylinder, of the ignition tube I depending from the bend in the said pipe, the jacket J surrounding the vertical portion of the said pipe and provided with a hole for its horizontal portion to project through, and lateral draft holes L at its top; a heating device at the lower part of the jacket, an air and oil admission valve at the top of the said vaporizer, and a spring normally holding the said valve closed, substantially as set forth.

2. The combination, with the exhaust valve, and a spring normally holding the said valve closed; of the pivoted lever Q, for opening the exhaust valve, provided with the adjustable set screw P; the reciprocatory rod O for striking the said set screw and opening the exhaust valve periodically, a speed governor, the pivoted lever V connected to the said governor at one end, and the finger W depending from the other end of the lever V, said finger being lowered into the path of the end of the lever Q when the speed becomes too great, thereby preventing the closure of the exhaust valve, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

HUGH CAMPBELL.

Witnesses:

ARTHUR B. CROSSLEY,
WILLIAM H. TEMPEST,

Both of Commercial Street, Halifax.