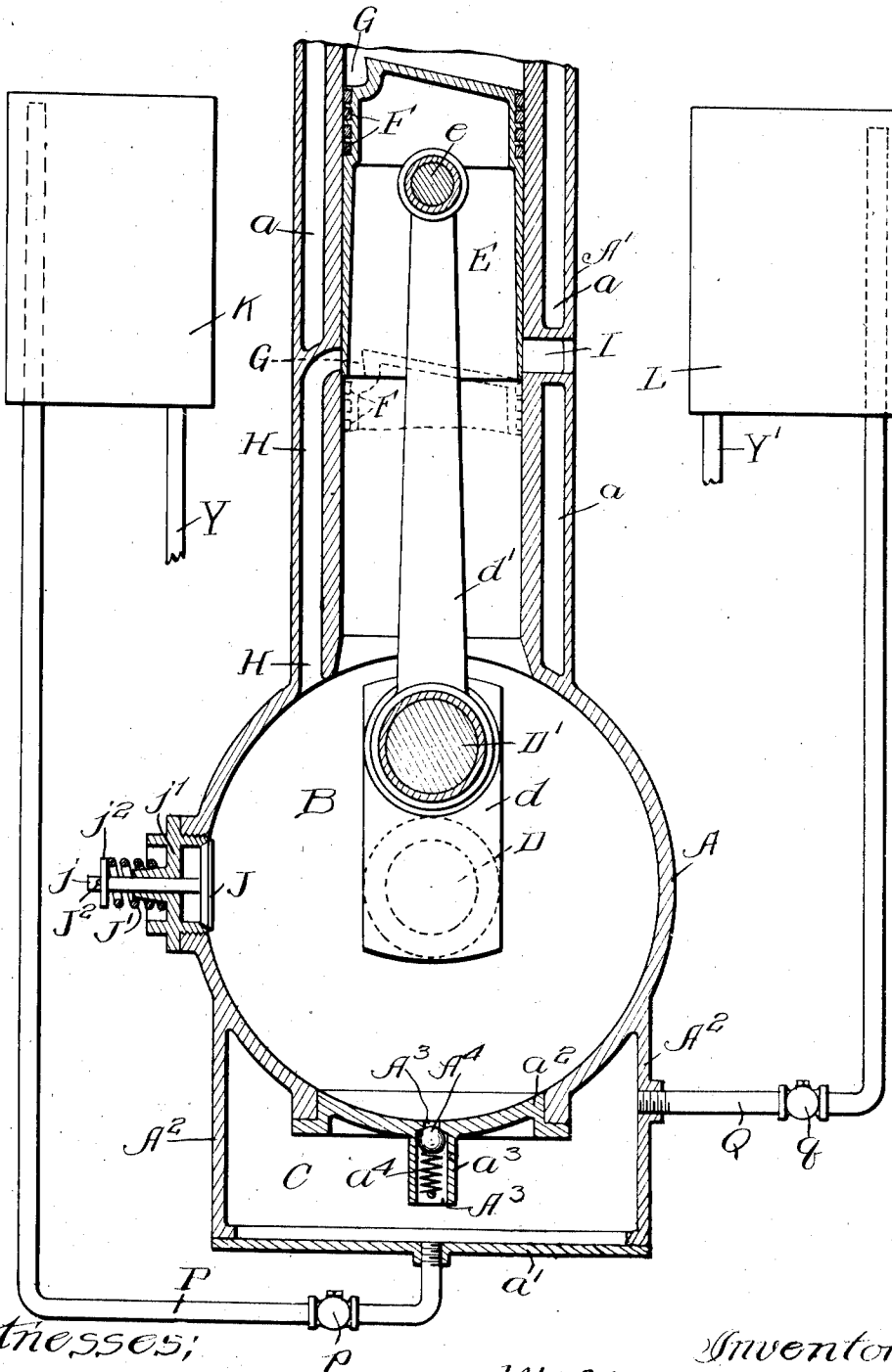


W. G. GERNANDT.
TWO-CYCLE ENGINE.
APPLICATION FILED JULY 29, 1920.

1,385,250.

Patented July 19, 1921.



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UNITED STATES PATENT OFFICE.

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TWO-CYCLE ENGINE.

1,385,250.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WALDO G. GERNANDT, a citizen of the United States, and a resident of South Bend, in the county of St. Joseph and State of Indiana, have invented certain new and useful Improvements in Two-Cycle Engines, of which the following, when taken in connection with the drawings accompanying and forming a part hereof, is a specification.

The invention relates to a two cycle engine which is provided with a fuel pressure tank and a forced feed lubricating system.

Among the objects of the invention are to obtain a two cycle engine of the kind named, wherein the crank chamber is drained of oil without materially reducing the crank chamber compression pressure; and one whereby the oil in the crank chamber is separated from the remainder of the contents of said chamber without materially affecting engine operation; to obtain means whereby a pressure on the oiling system of the engine is automatically maintained; to obtain means whereby a pressure on the fuel supply of the engine is automatically maintained; and to automatically provide a small quantity of air under pressure for use, as desired, in connection with said two cycle engine. Additional objects are to effect the above recited results without the use of a pump or other pressure producing apparatus additional to the reciprocating piston and crank case of the engine.

In the drawing referred to I have illustrated a two cycle engine embodying the invention in vertical section, and in elevation a fuel tank, a lubricating oil tank, and conduits connecting said engine and tanks.

A represents the shell of the crank case of a two cycle engine, and A¹ the water jacketed cylinder thereof, *a*, *a*, being the water space of chamber. A² represents a cylindrical wall which is illustrated as integral with shell A, and substantially concentric to the axial line of cylinder A¹. *a*¹ represents a head which is secured to the lower end of cylindrical wall A², to obtain a fluid tight joint; and *a*² represents a similar head which is arranged to close an aperture in the shell A, between the crank case chamber B and chamber C thereunder. Head *a*² is provided with neck *a*³, having passage way A³ therethrough, and A⁴ represents a ball

check valve which is yieldingly held to its seat by spring *a*⁴.

D are broken lines which indicate the crank shaft of the engine; *d* a crank arm on said shaft, and D¹ a wrist pin. *d*¹ represents a connection rod, which is connected at its lower end on wrist pin D¹ and at its upper end on pin *e* of piston E. F, F, represent piston rings on piston E, and G represents a recess on the under end of piston E which registers with the discharge end of passage way H, when the piston is at its lower limit of travel, as indicated by broken lines in the drawing. Passageway H is in communication at its inlet end with the chamber B in crank case A. I represents the outlet, or discharge port of cylinder A¹. J represents a check valve, provided with stem *j*, which when unseated, opens an inlet passage way to chamber B. J¹ represents a spring one end of which is seated on the spider *j*¹, and the other end of which presses against washer *j*² on stem *j*, to yieldingly hold valve J to its seat. The valve J is readily removed for grinding by withdrawing the pin J² from stem *j*.

As is common to two cycle engines, when the piston E is near its advance limit of travel, the exhaust or discharge port I is opened, the exhaust gases are discharged therethrough, and the contents of chamber B flow through passage way H into the engine cylinder, recess G directing said inflow upward, to prevent inter-mixing thereof with the outflowing exhaust gases. And on the combined inspiration and compression travel of piston E, the pressure in chamber B is less than atmospheric, and an inflow of air, or fluid mixture (as preferred) through check valve J is produced. On the power cycle travel of said piston E the contents of the chamber B are put under pressure, check valve A⁴ is unseated, and the contents of chamber C are equalized in pressure with the contents of said chamber B.

K represents a lubricating oil tank, and L a fuel tank. P represents a conduit or pipe the inlet end whereof is in communication with chamber C, said pipe being attached to head *a*¹; and the outlet end thereof is in tank K near its upper end, and *p* represents a check valve in conduit or pipe P, to prevent a flow of fluid from said pipe into chamber C, while permitting a flow from

said chamber into said pipe. Q represents a pipe or conduit, the inlet end whereof is in chamber C, above the bottom of said chamber, and the outlet end in chamber L, near the upper end thereof. q represents a check valve in pipe or conduit Q, to prevent a back flow of fluid from said conduit to chamber C, while permitting a flow from said chamber into said pipe or conduit. Y represents a discharge pipe from tank K, and y a discharge pipe from tank L. Pipe Y is connected to the oiling system of the engine; and Y' to the fuel supply system.

The operation of the device is; when oil and air, or oil and fuel mixture is contained in chamber B, on the outward or power travel of piston E pressure is applied to said contents, and some thereof, including said oil, is forced through passage way A³, into chamber C; and pressure in said chamber C forces the contents thereof therefrom and through pipes or conduits P, Q, into tanks K and L.

The inlet to pipe P being in the bottom (head a¹) of chamber C, any lubricating oil therein will be forced into said pipe P. The inlet to pipe Q being above the bottom of chamber C, air, or fuel mixture, will be forced from said chamber into said pipe.

The resiliency of springs a⁴ and J¹, is not required to be greater than to merely seat valves A⁴ and J, respectively.

I claim:

1. In a two cycle engine which is provided with a fuel tank and a lubricating oil tank, the combination of a crank case chamber, a chamber positioned below said crank case chamber, a passage way between said cham-

bers, means to obstruct communication in said passage way between said last chamber and said first chamber, and to yieldingly obstruct communication from said first chamber and said last chamber, a passage way arranged to convey lubricating oil and pressure from said last chamber to said lubricating oil tank, and an additional passage way arranged to convey gases and pressure from said last chamber to said fuel tank.

2. In a two cycle engine provided with an oil supply tank, means to discharge oil and gases from the crank case chamber of said engine, means to separate said oil and gases subsequent to said discharge, means to apply pressure to said oil and gases subsequent to said discharge and separation, said last means comprising a chamber additional to the crank case chamber of the engine, and a communicating passage way yieldingly obstructed to the flow from said crank case chamber to said additional chamber and obstructed to the flow in an opposite direction.

3. In a two cycle engine provided with a fuel tank arranged to have pressure applied to the contents thereof, a crank case chamber and an additional chamber, the combination of means to direct a flow of the contents of said crank case chamber to said additional chamber and to obstruct a flow in the opposite direction, and to direct contents of said additional chamber to said fuel tank and obstruct the flow of the contents of said fuel tank to said additional chamber.

WALDO G. GERNANDT.

In the presence of—

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