No. 848,607. PATENTED MAR. 26, 1907.

E. THOMSON.

OIL OR GAS ENGINE.

APPLICATION FILED APR. 15, 1899.

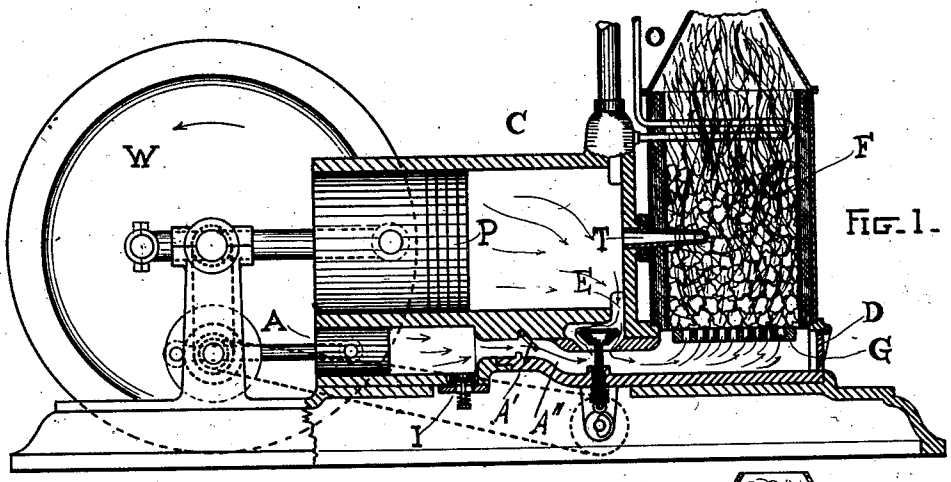

FIG. 1.

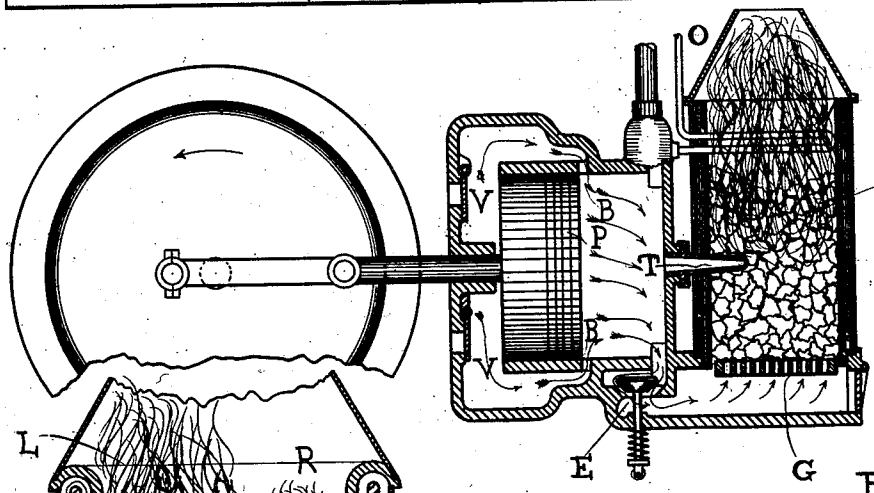

FIG. 2.

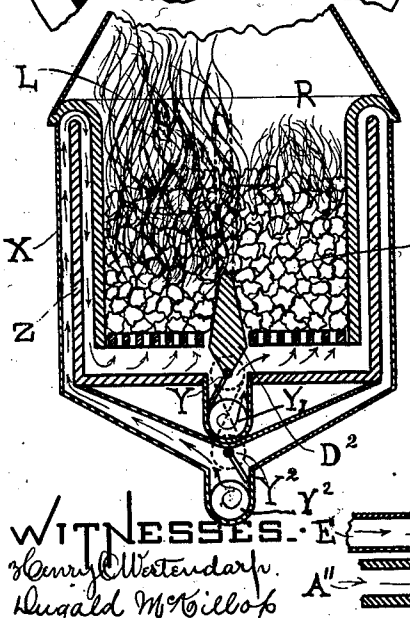

FIG. 3.

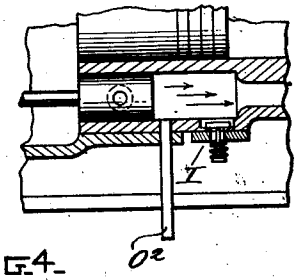

FIG. 4.

FIG. 5.

WITNESSES:-

Henry C. Waterbury.

Dugald McKillop

INVENTOR-

Elihu Thomson.

UNITED STATES PATENT OFFICE.

ELIHU THOMSON, OF SWAMPSCOTT, MASSACHUSETTS.

OIL OR GAS ENGINE.

No. 848,607. Specification of Letters Patent. Patented March 26, 1907.

Application filed April 15, 1899. Serial No. 713,093.

To all whom it may concern:

Be it known that I, ELIHU THOMSON, a citizen of the United States, residing in Swampscott, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Oil or Gas Engines, of which the following is a specification.

The present invention relates to a means and apparatus for deodorizing or destroying the smell of exhaust-gases, such as are produced by gasolene, kerosene-oil, or sometimes in gas engines and ordinarily escape from the exhaust of such engines.

It relates also to means combined with the deodorizer for vaporizing the oil used and for heating the ignition-tube for firing the charge.

The object of my invention is to provide an attachment whereby by a slight expenditure of fuel in addition to that which operates an engine the partially-burned odoriferous gases which may escape from the exhaust and give rise to nuisance and trouble from the odor can be obviated.

My invention is applicable to various types of oil, gas, or gasolene engines, whether stationary or applied to vehicle-work.

Figure 1 is a longitudinal section of an engine embodying my invention. Fig. 2 is a longitudinal section of an engine in which the piston on its forward stroke acts as a pump for compressing a charge of air. Fig. 3 is a vertical section of a modification of the deodorizer. Fig. 4 is a vertical section of a still further modification of the deodorizer, and Fig. 5 is a sectional detail of a modification.

In Fig. 1 is represented the cylinder of an ordinary engine, the piston P of which moves back and forth, turning wheel W by an ordinary crank. The engine is provided with any ordinary admission for air and fuel and for escape of exhaust-gases. It, in fact, represents any ordinary type of explosive-engine. Mounted near the engine is a fire-pot or furnace F, containing either combustible as fuel, such as coke, anthracite coal, or containing refractory material which can be heated by fuel. The exhaust-gases passing through the exhaust port or passage E of the engine pass through the fuel mass in the fire-pot F, being distributed therethrough by a suitable grate G, and when these exhaust-gases are so depleted of air that there is no oxygen for further combustion I provide a small air-pump A, which supplies a quantity of fresh air, taking the air in by its proper inlet-valve I and forcing the said air through a suitable valve A′ and passage A″, so that it mixes with the exhaust-gases passing the port E and passes through the fire in the fire-pot F. This fire in the fire-pot F once lighted continues to burn, and it is originally started in the ordinary way of starting a fire by opening the draft at D and igniting the fuel in the fire-pot F. The heat of the fire-pot F may be made in my invention to keep an ignition-tube T hot for firing the gases in the engine, and it, further, may be made to vaporize oil fed to the engine through an oil-supply O by means of suitable pumps along with air which is sent into the engine. No means are shown for forcing oil and air into the cylinder, as that is understood to be the same as in ordinary engines. The oil-pipe O, however, traverses the heated interior of the fire-pot or furnace F and receives a certain portion of the heat, so that any oil which passes it is thoroughly vaporized before entering the cylinder C. Where the packing in the fire-pot F is in the form of small particles, it acts also as a muffler for the exhaust sound at E, and where it is made of small particles of refractory material, such as pumice-stone or fire-brick, the air-pump A is arranged to supply air mixed with some fuel, such as oil, to the furnace. The oil to be mixed with the air is drawn into the pump through a pipe O^2, (see Fig. 5,) which is connected with a supply of oil when necessary in a manner not shown in the drawings.

In Fig. 2 the air which reaches the fire-pot F is shown as pumped by the forward motion of the piston P, the front end of the cylinder C being formed by a chamber or space with valves V V opening therein. When the piston P moves outwardly—*i. e.*, toward the valves V V—they shut and the air within the space within which the valves V V are situated is slightly compressed. After the piston has moved full forward it uncovers openings in the sides of the cylinder, as at B B, &c., whereby the air rushes into the cylinder-space back of the piston P and scavenges or washes out the burned charge formed during explosion. This, escaping by a suitable passage, as at E, goes through the grate G of the fire-pot F, as before. In this case the waste gases are naturally mixed with a certain volume of fresh air which conveys enough oxygen to the fire to keep up the combustion; or

if the engine itself is supplied with an excess of oil through the pipe O, more than sufficient to be burned by the air which is admitted for the explosion, this excess of oil will burn in passing through the fire-pot F and be thoroughly deodorized, contributing also to the heat of the fire-pot or maintaining it.

It is unessential to my invention that the exhaust-gas be actually mixed with the fresh air admitted to keep up the heat of the fire-pot F, as by dividing the fire-pot into two sections by the septum or division D^2, Fig. 3, and providing suitable valves and mechanism for exchanging them at intervals, as at Y and Y^2, exhaust-gases may be fed to one side or half of the section of the fire-pot, as that just below R, while fresh air is injected under or through that below L. Suitable passages with openings are provided to feed the two gases—*i. e.*, the air and the waste gases from the engine. For instance, the inlet-passage Y may be connected to the exhaust-port E of the engine, (shown in Fig. 1,) and the inlet Y^2 may be connected to the air-passage A″ of the engine, (shown in Fig. 1.) By shifting the valves Y and Y^2 from side to side at intervals the two parts under R and L receive alternately the air and the waste gases. This shifting should be frequent enough to prevent the loss of high temperature in the materials within the fire-space. To facilitate this, the fire-pot F is double-jacketed, as shown by the outer jacket and septum X Z, providing a passage for the movement of the incoming air, as shown by the arrows, whereby it is heated before it reaches the fire-space by any waste heat which is escaping from the walls of the fire-pot. It is of course understood that in this instance the material placed within the fire-pot is combustible or the air-supply passing valve Y^2 is charged with sufficient combustible to maintain the temperature of said material. The septum which divides the two halves of the fire-space is of course continued so as to divide the passages between the fire-pot and the septum Z, and casing X is constructed so as to divide into the two sections mentioned as working alternately.

In Fig. 4 a modification is shown in which the exhaust-port E of the engine and the air-passage A″ of the engine (shown in Fig. 1) lead to different portions of the grate at the lower end of the fire-pot or furnace F. The exhaust-gases and air passing through the port E and passage A″ are mixed in the fire-pot. In this case also it will of course be understood that the air passing through the passage A″ may be mixed with oil or other fuel, if desirable.

The heated mass in the fire-pot F of my invention serves primarily as a deodorizer; but at the same time it acts as a muffler for the exhaust-gases, diminishing the sound of their escape, and, further, it supplies heat to an oil-vaporizer passing therefrom or receiving heat therefrom and keeps ignition-tube T hot for the firing of the charges, T being entered into the mass of hot material at any suitable point. The oil-vaporizing tube O may of course be made much larger, and, particularly, the feed of the air admitted may be varied. The oil may pass along with the air to the vaporizer, as is commonly done in oil-engines. Also the cylinder of the engine while shown unjacketed may be provided with a water-jacket for keeping it cool, as is ordinarily done. My invention relates more particularly to the employment of a hot mass through which exhaust-gases are passed.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination with an oil-engine and furnace, the heated material in which is traversed by the exhaust-gases in escaping, of a means for supplying air and combustible to said furnace for maintaining its high temperature, an ignition-tube for the engine which is heated by the furnace, and an oil-vaporizer also heated by the heat of the furnace, for the purpose set forth.

2. In a gas or oil engine, the combination of a piston and cylinder, means for supplying a mixture of oil and air to the engine in which the oil is in excess beyond the charge normal to the engine, a deodorizer containing a finely-divided mass, an exhaust-passage between the engine and the deodorizer, and means for forcing the unconsumed products from the cylinder into the deodorizer where they are consumed.

3. In combination a gas or oil engine, a deodorizer which is divided into sections, and means whereby at one time one section may receive air and another section exhaust gases and at another time the one exhaust gases and the other air.

4. In combination a gas or oil engine, a deodorizer which is divided into sections, means for admitting air to one section and exhaust-gases to another section, and means for directing the air to the section which has been receiving exhaust-gases and the exhaust-gases to the section which has been receiving air.

5. In combination a gas or oil engine comprising a piston and cylinder, a deodorizer which is divided into sections, an exhaust-passage communicating with the deodorizer and the cylinder, means for supplying air to the deodorizer, and means for directing the exhaust-gases into any of the sections.

6. In combination a gas or oil engine, a vaporizer, an ignition device, a heater maintained at a high temperature wholly or in part by the exhaust-gases for heating the vaporizer and ignition device and means for supplying air to said heater.

7. In a deodorizer, the combination of a

chamber divided into sections and containing fuel, a passage for admitting gases to one of the sections, a passage for admitting air to another of the sections, and valves for controlling the admission of gas and air so arranged that the sections receiving air and gas may be made to alternate.

8. In a deodorizer, the combination of a receptacle which contains fuel, a septum for dividing the receptacle into two or more parts, a jacket surrounding the receptacle and separated therefrom by a space, and a septum for dividing the space between the reseptacle and the jacket into two or more parts.

9. In a deodorizer, the combination of a receptacle filled or partially filled with combustible material, a jacket surrounding the receptacle and separated therefrom by a space, means for supplying gas to the space below the receptacle, a second jacket outside of the first, and means for supplying air to the space between the two jackets.

10. In a deodorizer, the combination of a receptacle divided into two sections, each section being partly or wholly filled with combustible material, a double jacket surrounding the receptacle whereby the air-passage to it is compelled to pass up and down, thereby receiving a certain amount of heat from the receptacle, a source of air-supply communicating with the space formed by the jackets, and means for admitting gas to the space below the receptacle wherein it mingles with air and passes through the fuel in the receptacle.

11. In a gas-engine, the combination of a piston and cylinder, an ignition-tube which is situated in the path of the exhaust-gases from the cylinder, a furnace for heating the tube and burning the unconsumed products in the exhaust, and automatically-acting means for supplying fuel to the furnace for increasing the temperature of the tube and assisting to burn the unconsumed products of the exhaust.

12. In combination a piston and cylinder, a furnace situated in close proximity to the cylinder, means for automatically supplying fuel to the furnace, and an ignition-tube for firing the charge of gas in the cylinder which extends into the furnace, the interior of said tube being in open communication with said cylinder.

13. In combination, a piston and cylinder, a furnace situated in close proximity to the cylinder, a pump for automatically supplying fuel to the furnace, a vaporizer for delivering fuel to the cylinder which is heated by the furnace, and an ignition-tube which opens into the cylinder and extends into the furnace.

14. In an internal-combustion engine, a combustion-chamber, a furnace located in proximity thereto, air-pumping means operated by the engine, and means for causing the air pumped thereby and the exhaust-gases from the combustion-chamber to pass into said furnace.

In witness whereof I have hereunto set my hand this 7th of April, 1899.

ELIHU THOMSON.

Witnesses:
DUGALD MCKILLOP,
HENRY O. WESTENDARP.