

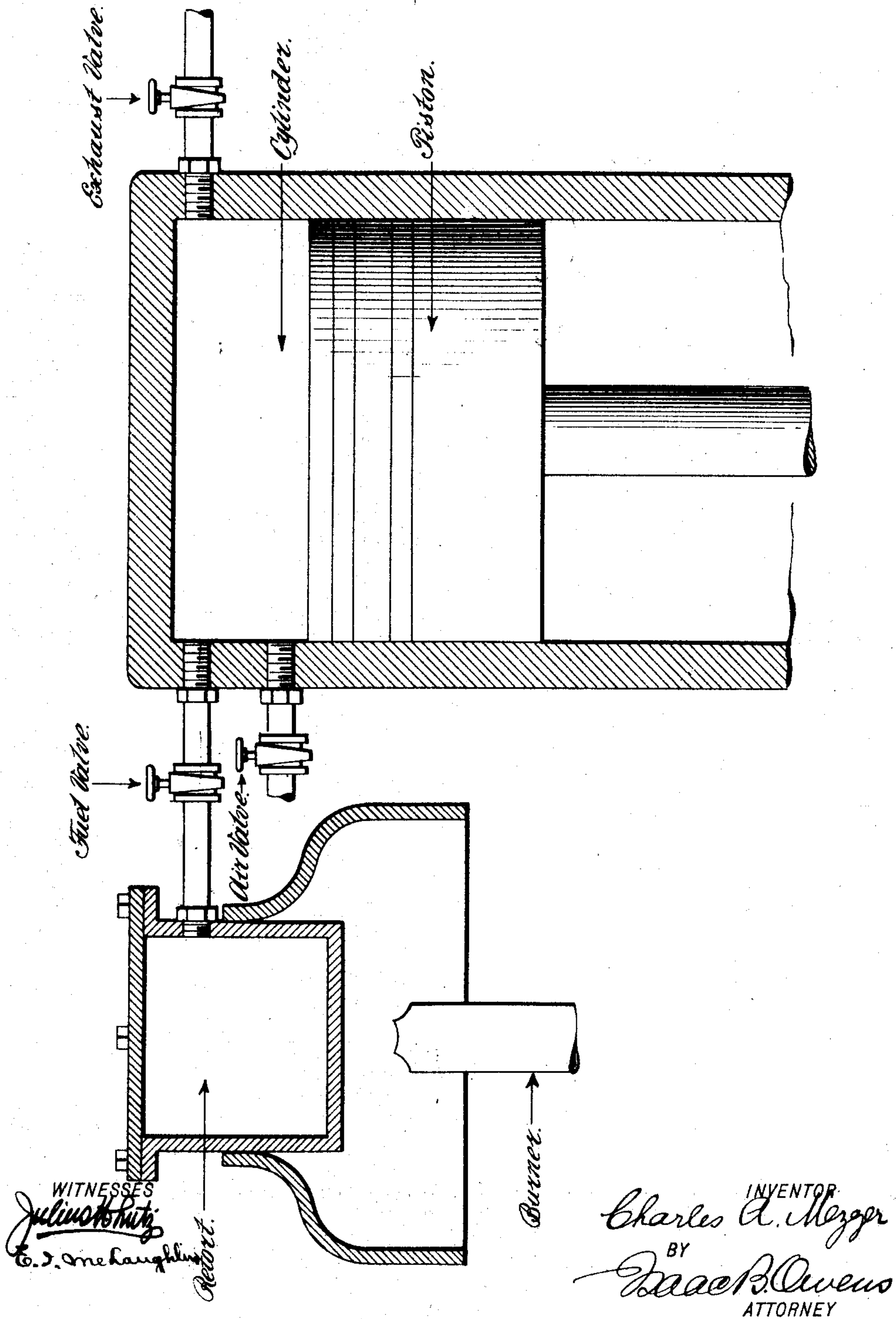
No. 882,261.

PATENTED MAR. 17, 1908.

C. A. MEZGER.

ART OF DERIVING ENERGY FROM THE DIRECT COMBUSTION OF FUEL.

APPLICATION FILED APR. 19, 1902.



UNITED STATES PATENT OFFICE.

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Specification of Letters Patent.

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Application filed April 19, 1902. Serial No. 103,738.

To all whom it may concern:

Be it known that I, CHARLES A. MEZGER, a citizen of the United States, residing at 12 Clinton street, in the county of Kings, city and State of New York, have invented new and useful Improvements in the Art of Deriving Energy from the Direct Combustion of Fuel, of which the following is a specification.

The process is best adapted to the use of hydrocarbon oils as fuel, but other fuels both liquid and solid may be employed.

The invention resides primarily in an improvement in the art of deriving energy directly from the combustion of fuel consisting substantially in the following successive acts, to wit: first, heating a non-gaseous fuel, preferably a liquid fuel, by fire or other means not involving compression, to a degree sufficient to transform such fuel into a gas devoid or substantially devoid of oxygen and carrying the temperature to a point sufficient to cause the gas to burn spontaneously upon supplying oxygen and in maintaining constantly a body of such gas heated to said temperature; second, in withdrawing a portion of said body of gas heated to said temperature and bringing about association thereof with oxygen or air, whereby spontaneously to ignite and burn the gas; and, third, in permitting the gases of combustion to expand thereby deriving energy from the force of expansion.

The invention resides in certain other steps or acts subservient to the primary principle above expressed, and all of which will be fully set forth hereinafter.

I will now proceed to set forth in detail one manner in which my improvement in the art may be practically employed, which is to say to drive the piston of an ordinary cylinder engine, referring meanwhile to the accompanying diagram forming part of this specification.

The diagram shows an engine cylinder, and the piston therein. A retort should be provided in which to heat the fuel by means of a burner, as shown in the diagram, or by the exhaust gases from the cylinder. As will be understood, the retort should be fitted with an air venting device, pump and other necessary or similar accessories (not shown) by which to control the movement of the oil. The cylinder is provided with a fuel inlet valve controlling the retort communication with the cylinder, and also with an air inlet

valve controlling atmospheric communication with the cylinder, and an exhaust valve controlling the outlet for the burned gases.

A liquid fuel is introduced into the retort and heated therein to transform it into a gas, all air being removed from the retort by venting it, or otherwise, and the said heat at the retort is carried to a degree sufficient to cause the gas to ignite and burn spontaneously upon supplying oxygen thereto. A more or less constant body of this fuel should be maintained in the retort devoid of oxygen, and with a temperature sufficient to cause the fuel spontaneously to ignite and burn upon bringing it into association with oxygen. The air valve is then opened and the piston is moved down to draw into the cylinder a body of atmospheric air; the air valve is closed and the piston is moved back to compress the air in the cylinder. This compression may be carried to any desired degree, but it should be to a degree less than the pressure of the highly heated gas in the retort. The fuel inlet valve is next opened, and a minor portion of the highly heated fuel therein is allowed by its inherent pressure to pass into the cylinder against the pressure of the air therein. The fuel inlet valve is then closed and the fuel upon association with the oxygen of the air in the cylinder and aided by the heat of compression therein immediately ignites and burns, and expands against the piston forcing it down and thus doing work. The exhaust valve may then be opened, and the piston moved back to force out the exhaust gases, whereupon the cycle of operation will be completed.

It will be observed from the foregoing description that an apparatus operated as above described to practice my improvement in the art will perform what is technically known as a "four cycle operation." I would point out, however, that this is by no means essential since the air and fuel could be simultaneously entered in the cylinder, nor is it essential to my invention that the air be compressed. The heat necessary to raise the temperature of the fuel may be supplied in any manner. This heat is preferably that of flame, and it may be either the flame of combustion of a separate or specially provided burner or it may be the heat of the flame of the burning exhaust gases from the cylinder. However the heat may be from any source not involving compression. By heating the fuel devoid of oxygen to a tem-

perature to cause it to spontaneously ignite upon association with oxygen, I attain the great commercial advantage of deriving energy from the direct combustion of fuel without the necessity of the great negative action incident, for example, to the well known Diesel cycle. In the practical employment of my process I may derive the necessary heat from the waste heat of the cylinder of the apparatus used to carry out the process, thus not only avoiding the loss of power incident to transforming the engine into a pump, but actually utilizing to the most efficient ends the heat which is otherwise lost by radiation and dissipation into the atmosphere.

Having thus described my invention I claim as new and desire to secure by Letters Patent:—

1. The method of deriving energy directly from the combustion of fuel, which consists, first, in heating by fire a non-gaseous fuel devoid of oxygen to a temperature sufficient to transform the fuel into a gas and raise the temperature of the gas sufficiently to cause the gas to burn spontaneously upon supplying oxygen, and in maintaining constantly a quantity of said gas heated to said temperature, second, in withdrawing a minor portion of said quantity of gas heated to said temperature, third, in bringing said minor portion of said gas heated to said temperature into association with oxygen, whereby spontaneously to ignite and burn the gas, and, fourth, in permitting the gases of combustion to expand thereby deriving energy from the force of expansion.

2. The method of deriving energy directly from the combustion of fuel, which consists,

first, in heating by fire a liquid fuel devoid of oxygen to a temperature sufficient to transform the liquid fuel into a gas, and to raise the temperature of said gas to a degree sufficient to cause the gas to ignite and burn spontaneously upon bringing it into association with oxygen and in maintaining constantly a body of such gas heated to such temperature, second, in withdrawing a minor portion of said body of gas heated to said temperature, and causing it to associate with oxygen, whereby spontaneously to ignite and burn the gas, and, third, in permitting the gases of combustion to expand, thereby deriving energy from the force of expansion.

3. The method of deriving energy directly from the combustion of fuel which consists, first, in heating by fire a liquid fuel devoid of oxygen and separately heating by compression, air devoid of fuel and carrying such heating of fuel and air to a point at which the liquid fuel is transformed into a gas and the combined temperatures of the air and gas are sufficient to cause the fuel spontaneously to ignite and burn upon associating it with the air and in maintaining constantly a body of such gas heated to such temperature, second, in associating a minor portion of the gas with the air to bring about ignition and combustion of the gas, and third, in permitting the gases of combustion to expand thereby deriving energy from the force of expansion.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES A. MEZGER.

Witnesses:

GEORGE W. BARTHOLF,
A. W. CLARKE.