A. DOBLE.

METHOD AND APPARATUS FOR DRAINING COMBUSTION CHAMBERS.

APPLICATION FILED MAR. 4, 1918.

1,360,506.

Patented Nov. 30, 1920.

2 SHEETS—SHEET 1.

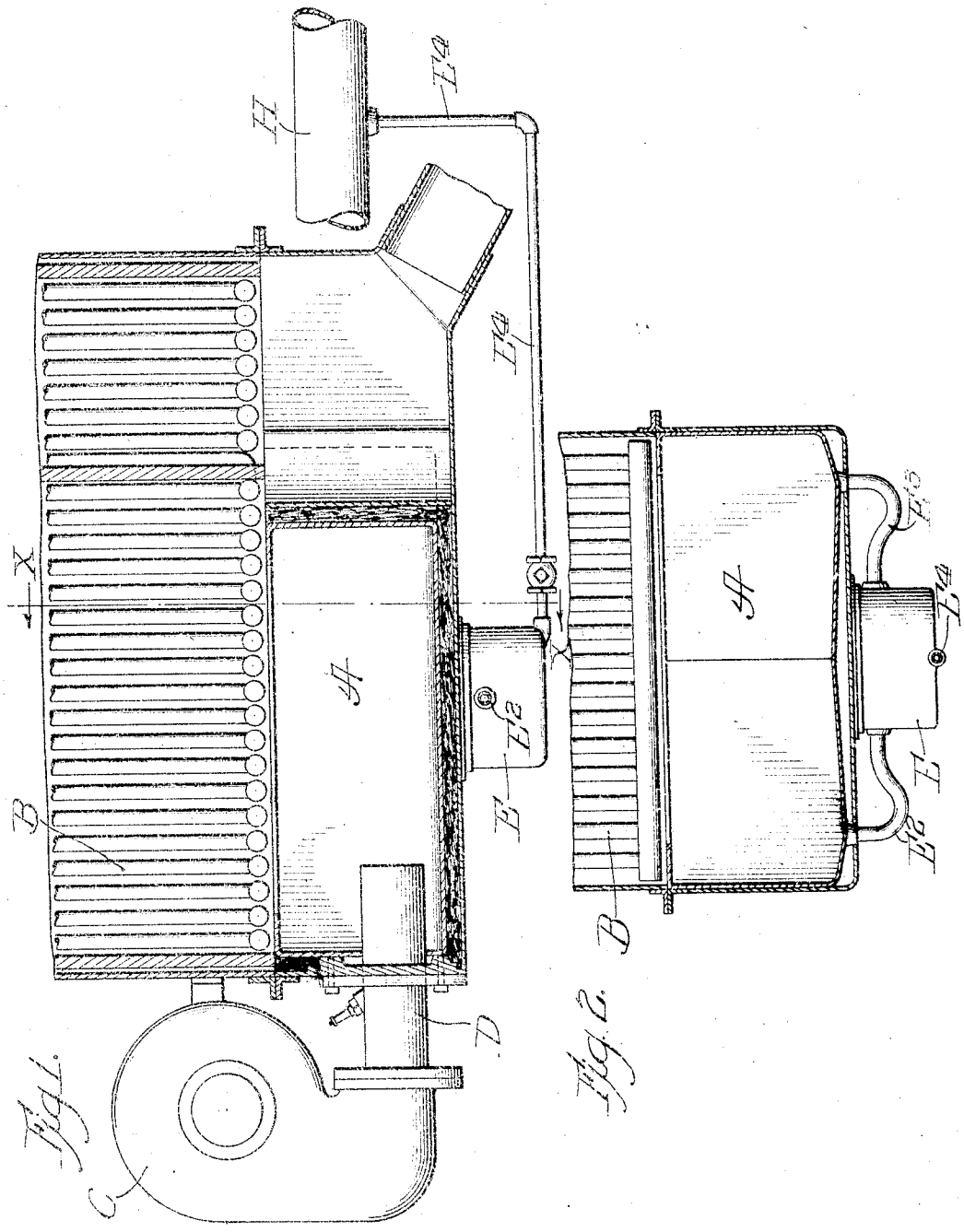


Fig. 1.

Fig. 2.

INVENTOR

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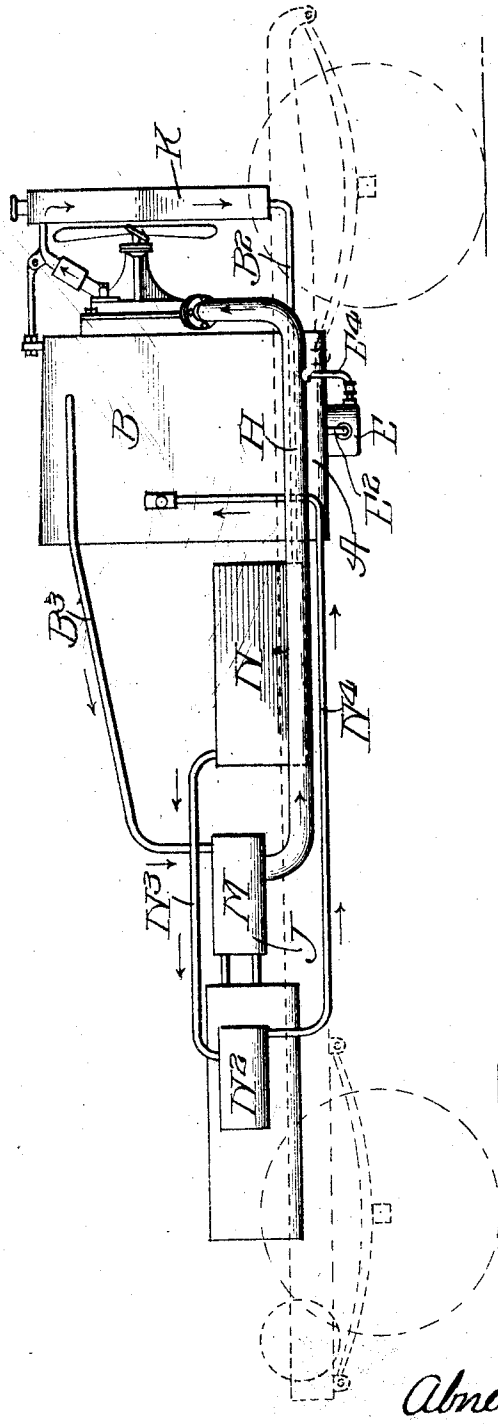


Fig 3.

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UNITED STATES PATENT OFFICE.

ABNER DOBLE, OF DETROIT, MICHIGAN.

METHOD AND APPARATUS FOR DRAINING COMBUSTION-CHAMBERS.

1,360,506. Specification of Letters Patent. Patented Nov. 30, 1920.

Application filed March 4, 1918. Serial No. 220,284.

To all whom it may concern:

Be it known that I, ABNER DOBLE, a citizen of the United States of America, and resident of Detroit, Wayne county, Michigan, have invented a certain new and useful Improvement in Methods of and Apparatus for Draining Combustion-Chambers, of which the following is a specification.

My invention has particular relation to improved means, in connection with the combustion chamber of a steam power plant, employed to propel a vehicle such as an automobile, truck or the like.

When a liquid hydrocarbon fuel is delivered into a combustion chamber and there ignited and burned, a tendency to create smoke exists which is more especially extremely undesirable in vehicles generally referred to as pleasure cars, and which should be overcome as much as possible in the operation of a power plant for driving any type of vehicle.

In an application filed by me May 12, 1917, Serial No. 168,300, I have illustrated, described and claimed, a method of igniting a non-volatile liquid hydrocarbon fuel within a combustion chamber by means of an electric spark, the fuel being delivered to the combustion chamber by means of Venturi tubes. I have learned by experiment that when the walls of the combustion chamber are relatively cool, that is, not sufficiently hot to volatilize a liquid fuel, a small proportion of the liquid fuel is not ignited, but is deposited as liquid fuel upon the bottom of the combustion chamber. When the walls of the combustion chamber become subsequently sufficiently heated, this surplus liquid fuel is volatilized, adding itself to the ignited fuel, which thereupon produces a mixture which is so rich in fuel and lean in air as to result in incomplete combustion and consequent production of smoke.

The object of my invention consists in the provision of means whereby to prevent the accumulation of the liquid fuel so deposited upon the floor of the combustion chamber and the subsequent production of smoke.

In the accompanying drawings—

Figure 1 is a vertical sectional view through the combustion chamber and the generator above the same, the lower portion of which latter only is shown, and a portion of the exhaust pipe and its connection being shown;

Fig. 2 is a transverse sectional view on the line X—X of Fig. 1;

Fig. 3 is a side elevation of a complete system mounted upon the frame of a vehicle.

The combustion chamber, into which non-volatile liquid fuel is injected, is designated as A, the generator B being mounted above the combustion chamber A. The mixture of air and liquid fuel is injected into the combustion chamber by the means and method illustrated and described in my hereinbefore-mentioned application, by the blower C through the tube D, and ignited by an electric spark in the manner also illustrated and described in said application.

As has been previously stated, when the walls of the combustion chamber A are relatively cool, some relatively small proportion of the liquid fuel falls upon the bottom of the combustion chamber as liquid fuel. The means constituting my present invention for removing or drawing off such unconsumed liquid fuel consists of the trap or supplemental chamber E mounted centrally of the combustion chamber at the bottom thereof, but closed therefrom except for the two pipes E^2, E^3 (Fig. 2), which afford communication between the bottom of the combustion chamber A and the supplemental chamber or trap E. The bottom wall of the combustion chamber converges from all directions toward the openings of the two pipes E^2 and E^3, so that all of the liquid fuel deposited upon the bottom wall of the combustion chamber E flows to the openings in said pipes and passes through said pipes into the supplemental chamber or trap E. This supplemental chamber or trap is connected by a pipe E^4 to the exhaust pipe H from the engine cylinders J (Fig. 3), one end of the pipe E^4 opening into the supplemental chamber or trap E at the bottom thereof.

In Fig. 3, I have shown what may be termed a closed system through a condenser K, this condenser being connected by a pipe B^2 with the water tank N, which in turn is connected by the pipe N^3 with the pump N^2 from which the pipe N^4 extends to the generator B. The steam pipe B^3 connects the upper part of this generator B with the engine M, and from this engine the exhaust pipe H extends to the condenser K.

It is now apparent that whatever liquid fuel is deposited in the supplemental cham-

ber or trap E is withdrawn therefrom whenever the exhaust steam ceases its passage through the exhaust pipe H, for, as the condenser parts and the exhaust pipe cool down, a vacuum is created in the exhaust pipe H, which draws the unconsumed liquid fuel out of the supplemental chamber E and into the exhaust pipe, and, when that unconsumed fuel is kerosene, it passes with the exhaust steam to and through the condenser, and circulates through the closed system, serving the purpose of cleansing the check valves of the pump, and finally finds its way into the generator, where it is consumed by the exceedingly high temperature of the steam generated. Incidentally, it may be that the velocity of the exhaust streams through the exhaust pipe has a tendency to aspirate the unconsumed fuel from the supplemental chamber or trap into the exhaust pipe from the engine.

I claim:

1. In a steam generating plant having a condenser and connections establishing a closed system, and an engine to which the generated steam is delivered, the method of withdrawing unconsumed liquid fuel from the combustion chamber consisting in first trapping or collecting said fuel and isolating the same from the combustion chamber, and then withdrawing the collected or trapped unconsumed fuel and delivering the same into the water-circulating system by a vacuum created in said closed system.

2. In a steam generating system, and engine to which the generated steam is delivered, a condenser, a source of water supply, means for delivering water to the generator, communicating connections between the source of water supply and the generator and between the condenser and said source, a communication connection between the engine and condenser, a combustion chamber, a supplemental chamber in communication with the combustion chamber for collecting unconsumed fuel, and a communicating connection between the said supplemental chamber and the communicating connection between the engine and the condenser.

Signed by me at Detroit, Mich. this 22 day of Febr., 1918.

ABNER DOBLE.