Jan. 6, 1925. 1,522,177

C. E. CHAPMAN

METHOD AND APPARATUS FOR BURNING HEAVY OILS IN HYDROCARBON ENGINES

Filed Oct. 29, 1920 2 Sheets-Sheet 1

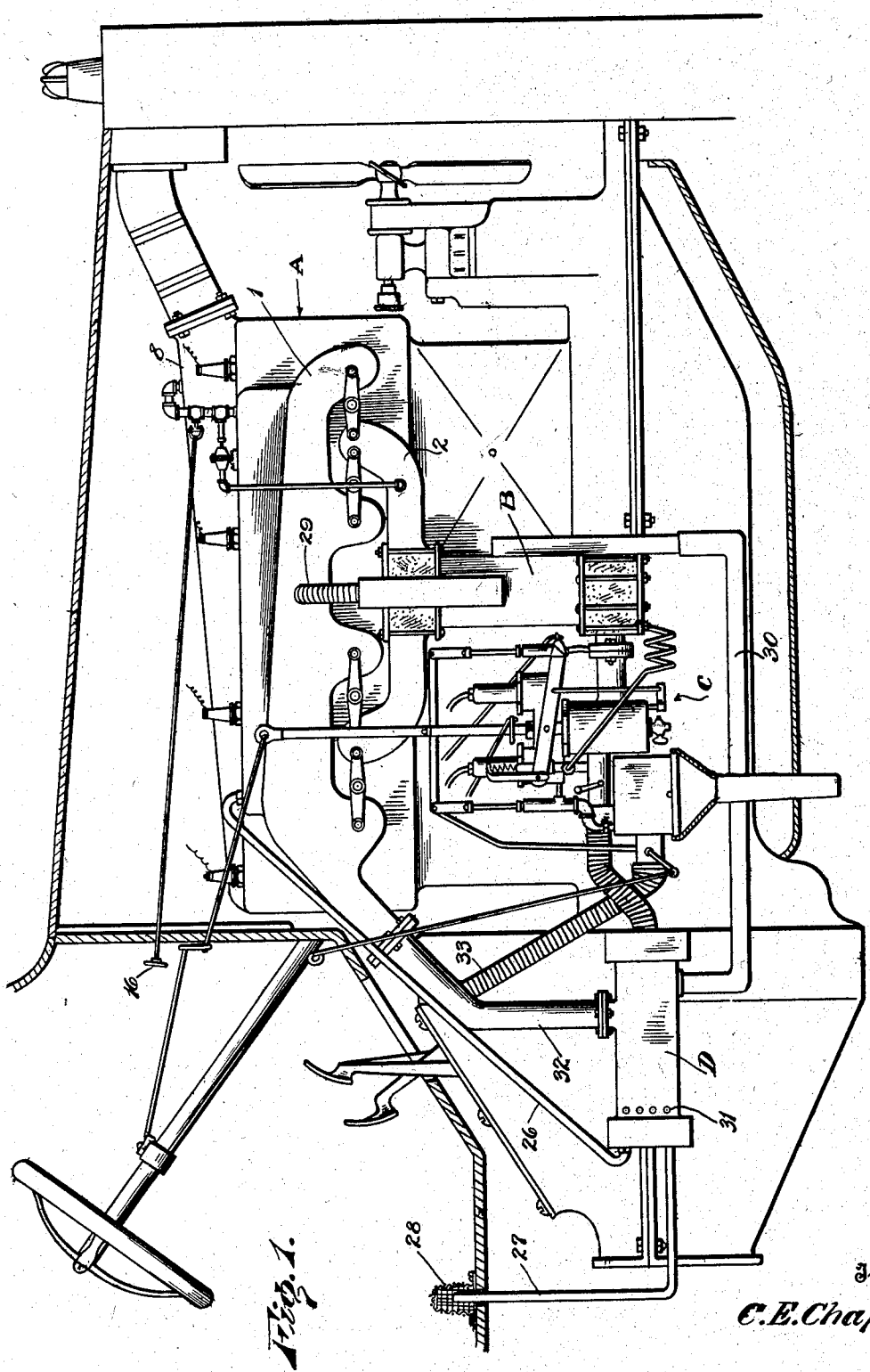


Fig. 1.

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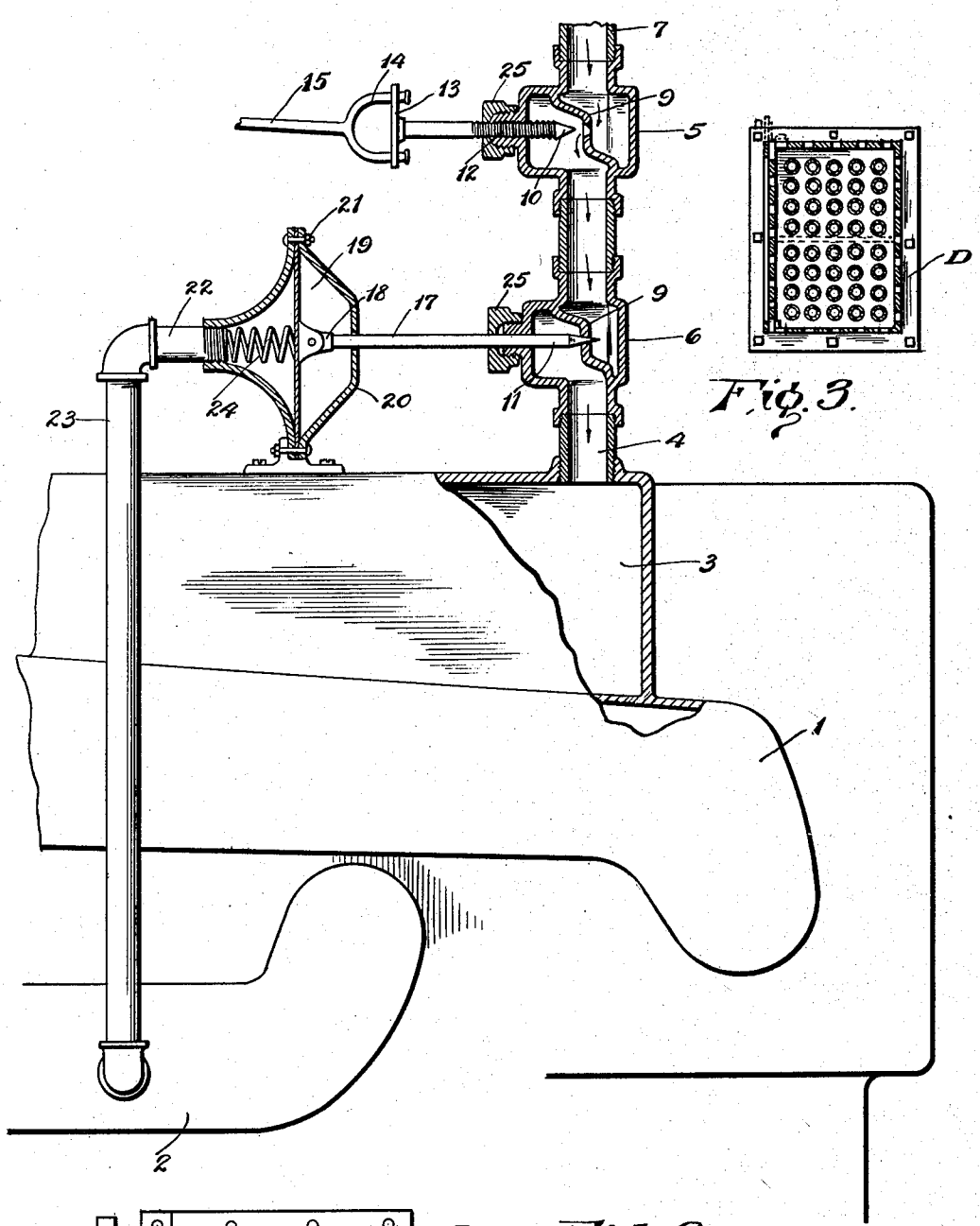


Fig. 2.

Fig. 3.

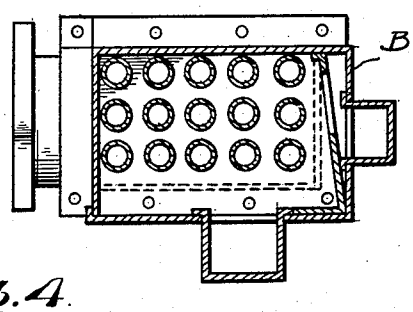


Fig. 4.

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Patented Jan. 6, 1925. 1,522,177

UNITED STATES PATENT OFFICE.

CHARLES E. CHAPMAN, OF FORT EDWARD, NEW YORK, ASSIGNOR OF ONE-HALF TO JOSEPH GOODFELLOW, OF FORT EDWARD, NEW YORK.

METHOD AND APPARATUS FOR BURNING HEAVY OILS IN HYDROCARBON ENGINES.

Application filed October 29, 1920. Serial No. 420,482.

To all whom it may concern:

Be it known that I, CHARLES E. CHAPMAN, citizen of the United States, residing at Fort Edward, in the county of Washington and State of New York, have invented certain new and useful Improvements in Methods and Apparatus for Burning Heavy Oils in Hydrocarbon Engines, of which the following is a specification.

This invention relates to a method and apparatus for burning heavy oils in hydrocarbon burners or internal combustion engines and has particular reference to a system for supplying a carbureted mixture to internal combustion engines.

This application is, a continuation in part, of my copending applications, carbureter, Serial No. 368,192, filed March 23, 1920, superheater, Serial No. 368,191, filed March 23, 1920, and superheater, Serial No. 420,481 filed October 29, 1920.

In the present invention, one of the important features resides in the combination with the carbureter set forth in my application Ser. No. 368,192, and the superheater set forth in my application Ser. No. 368,191, of means for separately superheating and finally mixing air and steam and supplying the same to the carbureter while at the same time admitting, from the cooling system of the engine, a supply of water which is led to a steam generator from which the steam thus formed is fed to the said means.

Another feature of the present invention resides in the arrangement whereby all of the exhaust gases from the engine are utilized, thus avoiding waste of thermal energy.

In the drawings:

Figure 1 is a side elevation of the system as applied to a motor vehicle,

Figure 2 is a side elevation, partly in section, of the automatic water feeding means,

Figure 3 is a transverse sectional view through the combined superheater and mixer supplying the carbureter, and

Figure 4 is a transverse sectional view through the superheater employed between the carbureter and the engine.

The invention is combined with the usual internal combustion engine A of the water jacketed type having the exhaust and intake manifolds 1 and 2 respectively, with which are connected the superheater B and carbureting system C described and claimed in the applications previously identified and which, therefore, need not be set forth in detail in the present specification. However, it should be observed that the superheater B constitutes a means for heating the carbureted product delivered thereto from the carbureter C.

The exhaust pipe 1 has cast integral therewith a generating chamber 3 which is coextensive with the length of the exhaust pipe from the first to the last cylinder and receives water from an admission pipe 4 which carries valves 5 and 6 placed in alinement and connected by the pipe 7 with the water jacket 8 of the cylinders. The valves 5 and 6 each comprise a seat 9 cooperating with a needle valve, said needle valves being numbered 10 and 11, and the former having a threaded stem as indicated at 12, provided with a head 13 engaging with a fork 14 having a spindle 15 leading to the dash button adjustment as indicated at 16, while the spindle 17 of the needle valve 11 is connected at 18 with a diaphragm 19 carried in the housing 20 bolted together at 21 and connected by a nipple 22 and pipe 23 with the intake manifold 2, as shown; a spring 24 normally holding the valve 11 on its seat. Stuffing boxes 25 pack the respective valve stems so as to prevent leakage.

In operation, the needle valve 10 is adjusted to permit a constant flow of the required amount of water for maximum conditions and the needle valve 11 is adjusted by the suction on the diaphragm 19 so that the required amount is fed to the steam generator 3 dependent on the suction in the inlet manifold 2.

The steam thus generated by contact with the exhaust pipe is then led to the superheater D by the pipe 26 while air is taken into the superheater by the pipe 27 through the screened opening 28, the superheater D being of the character shown in my pending application filed March 29, 1920, Serial No. 420,481. A portion of the exhaust from the engine is taken off at 29 and fed through the superheater B, thence passing through the pipe 30 to the superheater D and finally out through the holes 31, while the major portion of the exhaust is taken directly from the exhaust manifold by a pipe 32 and led into the superheater D, finally exhausting also through the holes 31, a small portion of the exhaust being led off at 33 for heating a

coil such as is described in my copending application, Ser. No. 368,192, filed March 23, 1920, for a carburetor. The combined area of the exhaust outlets above referred to is the equivalent of the outlet area of the original exhaust passage and thus amply provides for taking care of all of the exhaust gases, the outlet holes 31 being properly proportioned for this purpose.

It will be seen from the foregoing description, that the heavy hydrocarbons such as kerosene and the like, fed through the carbureting system C, receive a combined mixture of steam and air from the superheater D, thus supplying the necessary oxygen and heat for perfect combustion of the carbureted mixture.

Having thus described the invention, what is claimed as new is:

1. An apparatus of the character described including an engine exhaust manifold having a steam generating chamber integrally formed thereon to extend throughout the major portion of the length of said manifold and closed to the atmosphere, a water inlet pipe connected to the chamber near its forward end, a steam outlet pipe connected to the chamber near its rear end, a valve casing interposed in the water pipe, a housing mounted on said chamber, a diaphragm in said housing, a valve connected to the diaphragm at one side thereof to extend into said casing for controlling the flow of water through the water pipe into said chamber, a suction pipe for attachment to an engine intake manifold and connected to said housing at the opposite side of the diaphragm, and a second manually operated valve interposed in said water pipe for controlling the flow of water to said first mentioned valve.

2. The combination with an internal combustion engine, of a carbureter supplying carburetted gas to the engine, a combined superheater and mixer connected to the primary air intake of the carbureter for heating all of the primary air supply of the carbureter prior to the delivery of such supply to the carbureter and mixing said supply with steam, a steam generator heated by the exhaust manifold of the engine and supplying the superheater with steam, and a superheater connected with the outlet of the carbureter between the carbureter and engine for heating carburetted product.

In testimony whereof I affix my signature.

CHARLES E. CHAPMAN. [L. S.]