Jan. 30, 1945. D. L. J. SMITH 2,368,430

CARBURETOR

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Fig. 1.

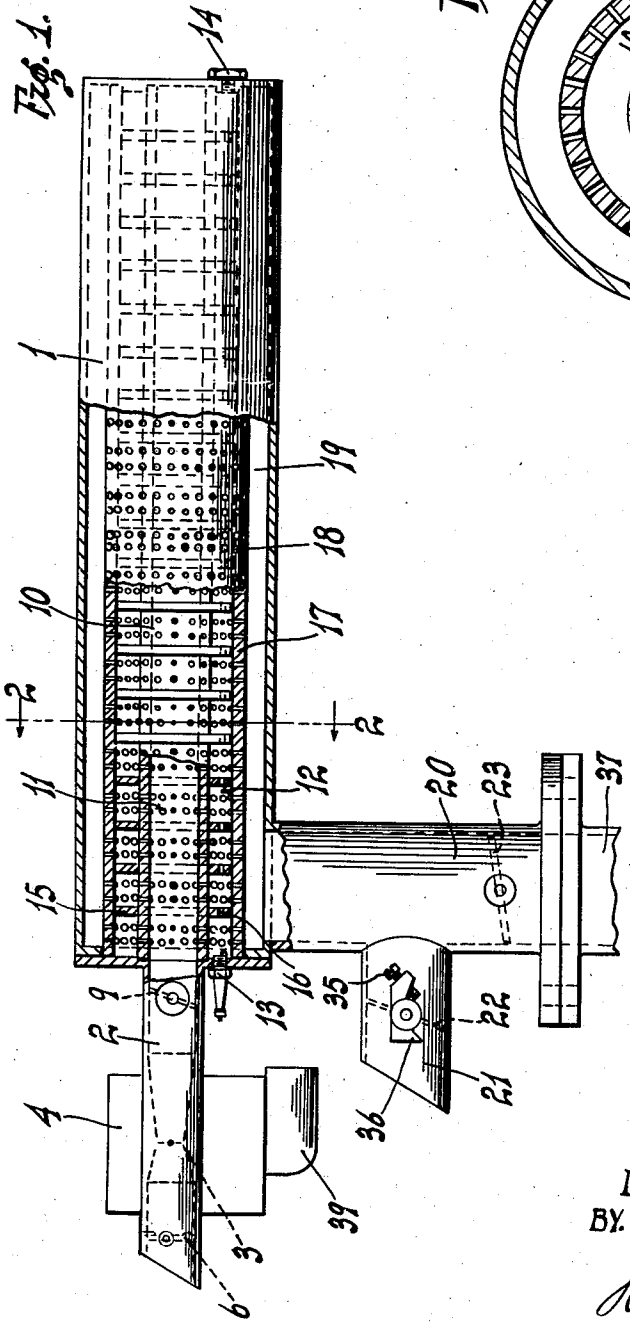


Fig. 2.

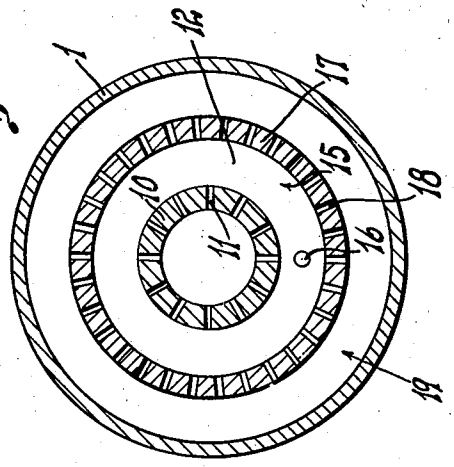
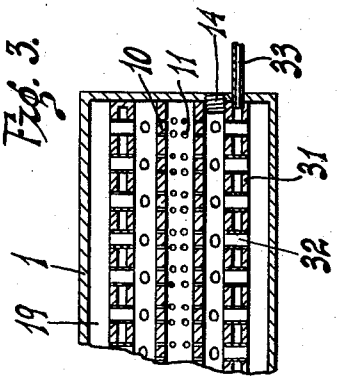


Fig. 3.



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Fig. 4.

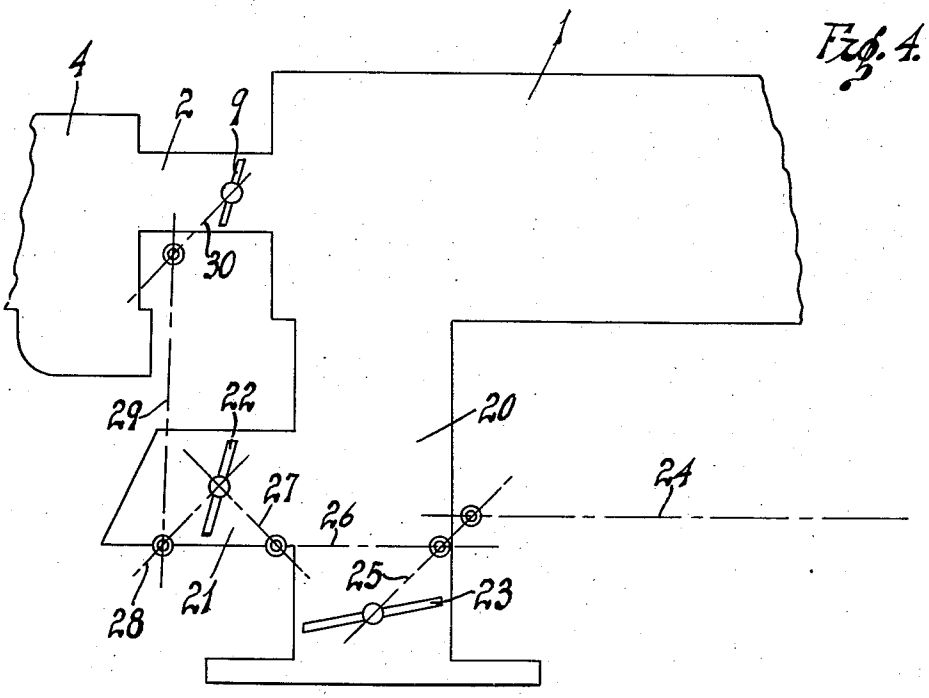


Fig. 5.

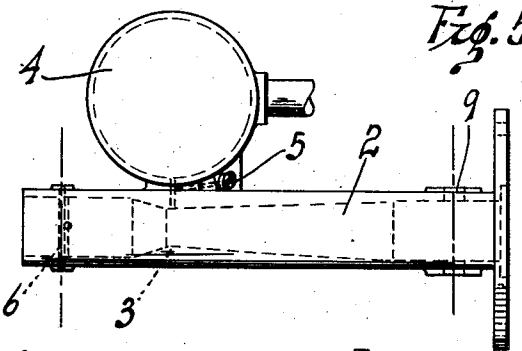
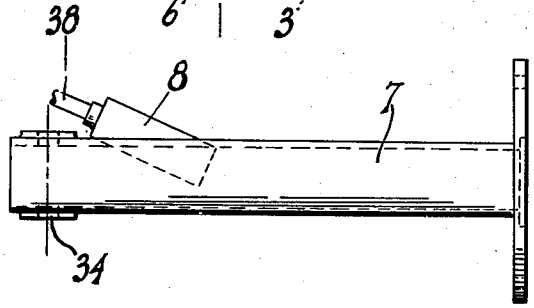


Fig. 6.



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CARBURETOR

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Application October 27, 1941, Serial No. 416,650

9 Claims. (Cl. 48—107)

This invention relates to a carburetor to enhance the combustion of hydrocarbon fuels by rendering the fuel mixtures more reactive. The carburetor is used in combination with the air fuel induction system of internal combustion engines, and is used to activate the mixture and thereby increase the energy of the combustion process.

An object of my invention is to provide a pre-combustion chamber wherein complex liquid or gaseous hydrocarbons are partially burned under controlled conditions of time, pressure, and velocity, to reduce hydrocarbon fuels of high molecular weight to CO plus H_2 and other hydrocarbon fuels of low molecular weight.

Another object of my invention is to provide an incandescent surface, utilizing the heat from my partial burning process, over which the fuel mixture must pass prior to the admission of the mixture to the induction system of the engine.

In my carburetor, I obtain a fuel mixture of low ignition lag, high anti-knock value, and with a rapid rate of flame propagation, by causing the fuel mixture to be highly activated as it passes over the incandescent surface. The efficiency of my carburetor may be increased by alloying a radioactive element, such as thorium, with the basic metal from which the surface to be heated is made. The partial burning process expands the fuel mixture to decrease the fuel consumption. The activated fuel burns faster, and more evenly, and this results in a substantial increase in power. Air and fuel may be metered through a carburetor in the conventional manner, or the fuel may be introduced to the air through a spray nozzle. In this latter method, the fuel pump metering means should be interconnected with the air and fuel mixture throttles.

Other objects, advantages and features of invention may appear from the accompanying drawings, the subjoined detailed description and the appended claims.

In the drawings

Figure 1 is a side elevation of my carburetor with parts broken away to show interior construction.

Figure 2 is a sectional view taken on line 2—2 of Figure 1.

Figure 3 is a fragmentary, lonigtudinal, sectional view of the pre-combustion chamber illustrating a liquid-cooled flame arrester.

Figure 4 is a diagrammatic view of the throttle controls.

Figure 5 is a plan view of the primary air intake and float bowl.

Figure 6 is a plan view of a modified form of primary air intake showing an injection nozzle.

Referring more particularly to the drawings, the numeral 1 indicates a gas chamber, preferably tubular in form. A primary air intake pipe 2 extends into one end of the chamber 1, the other end of said chamber being closed. A venturi 3 of usual and well known construction, is provided in the primary air intake pipe 2. A float bowl 4 is mounted adjacent the pipe 2, and the flow of fuel from the float bowl into the pipe 2 is controlled by a suitable needle 5. The construction of the float bowl is usual and well known, and the details of its construction form no part of this invention. An automatic, weighted valve 6 is mounted in the outer end of the pipe 2. For the solid injection of fuels, an arrangement such as is shown in Figure 6 may be employed, wherein the primary air intake pipe 7 has a fuel nozzle 8 extending into it, the fuel being supplied to this nozzle from the usual pump, (not shown). This method of spraying fuel under pressure through a spray nozzle, is usual and well known in the art.

A manually controlled throttle valve 9 is provided in the pipe 2 adjacent the intake end of the housing 1. A primary flame arrester 10 extends axially the length of the housing 1, and is tubular in form. The inside diameter of the flame arrester 10 is substantially the same as the inside diameter of the pipe 2. A large number of circumferentially spaced holes 11 are provided in the flame arrester 10. These holes permit the primary mixture to pass outwardly into an elongated annular chamber 12. The chamber 12 may be termed a combustion chamber, and an igniter 13 projects into one end of this chamber, and constantly ignites the mixture therein. The spark to the igniter may be furnished by a conventional vibrator spark coil, or by a suitable outlet from the distributor, or magneto, of the engine's ignition system.

A window 14 in the other end of the chamber 12 enables the operator to observe the character of the flame therein. To prevent a lateral movement and excessive combustion of the fuel, I provide a plurality of spaced baffle rings 15 in the chamber 12. Each of these rings is provided with one or more holes 16 through which flame passes to ignite the fuel in the adjacent space. A secondary flame arrester 17 extends the length of the housing 1, and closely surrounds the periphery of the rings 15. This secondary flame arrester is also provided with large numbers of circumferentially spaced outlet holes 18. These

holes 18 permit the primary fuel mixture to pass into an elongated annular chamber 19 in the housing 1. This last named chamber extends, substantially, the entire length of the housing 1. An outlet throat 20 extends from the chamber 19, and conducts the fuel mixture to the engine, in that the throat is mounted on, or attached to, the engine's fuel induction system. A secondary air intake pipe 21 extends into the throat 20, and a throttle valve 22 is provided in this last named pipe. A main throttle valve 23 is mounted in the throat 20, preferably below the secondary air intake pipe 21. The throttle valves 9, 22 and 23 are all manually controlled, and are interconnected by means of suitable links which are diagrammatically shown in Figure 4. A link 24 extends to the foot or hand throttle, and this link in turn is connected to an arm 25 which attaches to the throttle 23. A second link 26 connects the arms 25 and 27, the latter arm being connected to the throttle 22. A second arm 28 on the throttle 22 is attached to a third link 29 which is also attached to the arm 30 on the throttle 9.

It may be necessary, under some conditions to liquid-cool the secondary flame arrester in the pre-combustion housing. As shown in Figure 3, the secondary flame arrester 31 is provided with a fluid passage therein, and tubes 32 extend through the flame arrester for the purpose of conducting the mixture therethrough. A suitable cooling liquid is circulated through the flame arrester, and is conducted into the flame arrester through a suitable pipe 33. Usually, there would be an intake pipe at the bottom, on one end, and an outlet pipe at the top, on the other end, to enable the liquid to circulate adequately through the flame arrester.

A manually controlled throttle valve is located at 34 in the pipe 7. When a fuel spray nozzle is used, said valve is so located, and interconnected with the throttle valve 22 by suitable arms and links.

Adjusting screw 35 serves as a stop for arm 27 to limit throttle closings at engine's idling speed. Stop 36 limits the arm 27 to prevent throttle openings beyond full throttle position. 37 is the intake manifold of the engine to which the carburetor is suitably mounted.

Fuel to the spray nozzle 8 is conducted from the high pressure fuel supply pump, (not shown), through conduit 38. Fuel to the float bowl 4 enters said bowl at fitting 39.

When the carburetor is in operation, the primary, or secondary, flame arresters 10 or 17, are heated to incandescence, and these surfaces, or either of them, emit electrons which activate the positive elements of the fuel mixture, that is, the nitrogen and the hydrocarbons. This activation of the fuel mixture creates one having low ignition lag, high anti-knock value, and further, having a rapid rate of flame propagation. The reason for this is that the fuel mixture is highly activated prior to passing into the engine. The activation of the fuel mixture may be increased by alloying a radioactive element and ample thorium with the metal from which either or both of the flame arresters are made.

Having described my invention, I claim:

1. A carburetor comprising a chamber, a primary intake pipe extending into the chamber, fuel intake means extending into the primary air intake pipe, an outlet throat extending from the chamber, a secondary air intake extending into the throat, ignition means in said chamber, a primary flame arrester in the chamber enclosing the primary air intake pipe, a secondary flame arrester surrounding the primary flame arrester, said arresters being spaced apart and said ignition means being positioned between the flame arresters and the outlet throat being located outside the secondary flame arrester.

2. A carburetor comprising a cylindrical chamber having heads at its ends, a primary air intake pipe extending into the chamber through the head at one end of said chamber, fuel intake means communicating with the primary air intake pipe, an outlet throat extending from a side of the chamber, a secondary air intake communicating with the throat, and ignition means in said chamber, tubular primary and a secondary flame arresters in the chamber, said arresters being disposed one within the other and spaced apart with the inner arrester enclosing the primary air intake and said ignition means being positioned between the flame arresters, and baffle rings arranged between the flame arresters and spaced from each other longitudinally thereof.

3. A carburetor comprising a chamber, a primary air intake pipe communicating with the chamber, fuel intake means communicating with the primary air intake pipe, an outlet throat extending from the wall of the chamber, a secondary air intake communicating with the throat, ignition means in said chamber, a primary flame arrester in the chamber enclosing the intake, a secondary flame arrester in said chamber enclosing the primary flame arrester, said arresters being spaced apart and the secondary arrester being spaced from the wall of the chamber, said ignition means being positioned between the flame arresters, and throttle valve means in each of said primary air intake pipe, outlet throat and secondary air intake.

4. A carburetor comprising a cylindrical chamber having heads at its ends, a primary air intake pipe extending into the chamber through the head at one end thereof, fuel intake means communicating with the primary air intake pipe extending into the chamber through the head at one end thereof, fuel intake means communicating with the primary air intake pipe, an outlet throat extending from the wall of the chamber, a secondary air intake communicating with the throat, ignition means in said chamber, tubular primary and a secondary flame arrester in the chamber, said arresters being spaced apart with the primary arrester enclosing the primary air intake pipe and the secondary arrester being spaced from the wall of the chamber, said ignition means being positioned between the flame arresters, and spaced baffle rings arranged between the flame arresters about the primary arrester and spaced from each other longitudinally, and throttle valve means in each of said primary air intake pipe, outlet throat and secondary air intake, and means interconnecting the throttle.

5. A carburetor comprising a chamber, a primary air intake pipe communicating with the chamber, fuel intake means extending into the primary air intake pipe, an outlet throat extending from the chamber, a secondary air intake communicating with the throat, ignition means in said chamber, a primary and a secondary flame arrester in the chamber, each arrester being tubular in form and having a plurality of circumferentially spaced holes extending therethrough, said arresters being disposed one within the other in spaced and concentric relation to each other with the inner arrester surrounding

the primary air inlet, said ignition means being arranged between the arresters and the outlet throat communication with space outside the outer arrester.

6. A carburetor comprising a cylindrical chamber, a primary air intake pipe extending into the chamber, fuel intake means extending into the primary air intake pipe, an outlet throat extending from the chamber, a secondary air intake extending into the throat, ignition means in said chamber, a primary and a secondary flame arrester in the chamber, said arresters being tubular in form and arranged one within the other in spaced and concentric relation to the chamber and each other and having a plurality of circumferentially spaced holes formed therethrough, the inner flame arrester surrounding the primary air intake pipe and the outlet throat having communication with the chamber externally of the outer flame arrester, said ignition means being arranged between the arresters, and spaced baffle rings arranged between the flame arresters circumferentially thereof and spaced from each other.

7. A carburetor comprising a chamber, a primary air intake pipe extending into the chamber, fuel intake means extending into the primary air intake pipe, an outlet throat extending from the wall of the chamber, a secondary air intake extending into the throat, ignition means in said chamber, an inner primary flame arrester and an outer secondary flame arrester in the chamber, each arrester being tubular in form and having a plurality of circumferentially spaced holes extending therethrough, the flame arresters being in spaced concentric relation to each other with the inner arrester surrounding the primary air intake and the outer flame arrester spaced from the wall of the chamber, said ignition means being disposed between the arresters, and the outlet throat outwardly of the arresters, and throttle valve means in each of said primary air intake pipe, outlet throat, and secondary air intake.

8. A carburetor comprising a cylindrical chamber, a primary air intake pipe extending into the chamber at one end thereof, fuel intake means extending into the primary air intake pipe, an outlet throat extending from the annular wall of the chamber, a secondary air intake extending into the throat, a tubular primary flame arrester in the chamber about the primary air intake pipe and a tubular secondary flame arrester in the chamber about the primary flame arrester in spaced concentric relation thereto, each arrester being formed with a plurality of circumferentially spaced holes extending therethrough, ignition means arranged between the arresters, and spaced baffle rings arranged between the flame arresters and spaced from each other longitudinally thereof, throttle valve means in each of said primary air intake pipe, outlet throat, and secondary air intake, and means interconnecting the throttles.

9. A carburetor comprising a chamber, a primary air intake pipe extending into the chamber, fuel intake means extending into the primary air intake pipe, an outlet throat extending from the chamber, a secondary air intake extending into the throat, a primary and a secondary flame arrester in the chamber, each arrester being tubular in form and having a plurality of circumferentially spaced holes extending therethrough, the flame arresters being arranged one within the other in spaced and concentric relation to the chamber and each other and the inner arrester being disposed about the primary air intake pipe, ignition means arranged between the arresters, and spaced baffle rings arranged between the flame arresters and spaced from each other longitudinally thereof, throttle valve means in each of said primary air intake pipe, outlet throat, and secondary air intake, and means interconnecting the throttle valves.

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