Aug. 21, 1934. W. WHEELER 1,971,288

CARBURETING MEANS

Filed Sept. 3, 1931 2 Sheets-Sheet 1

Fig. 1

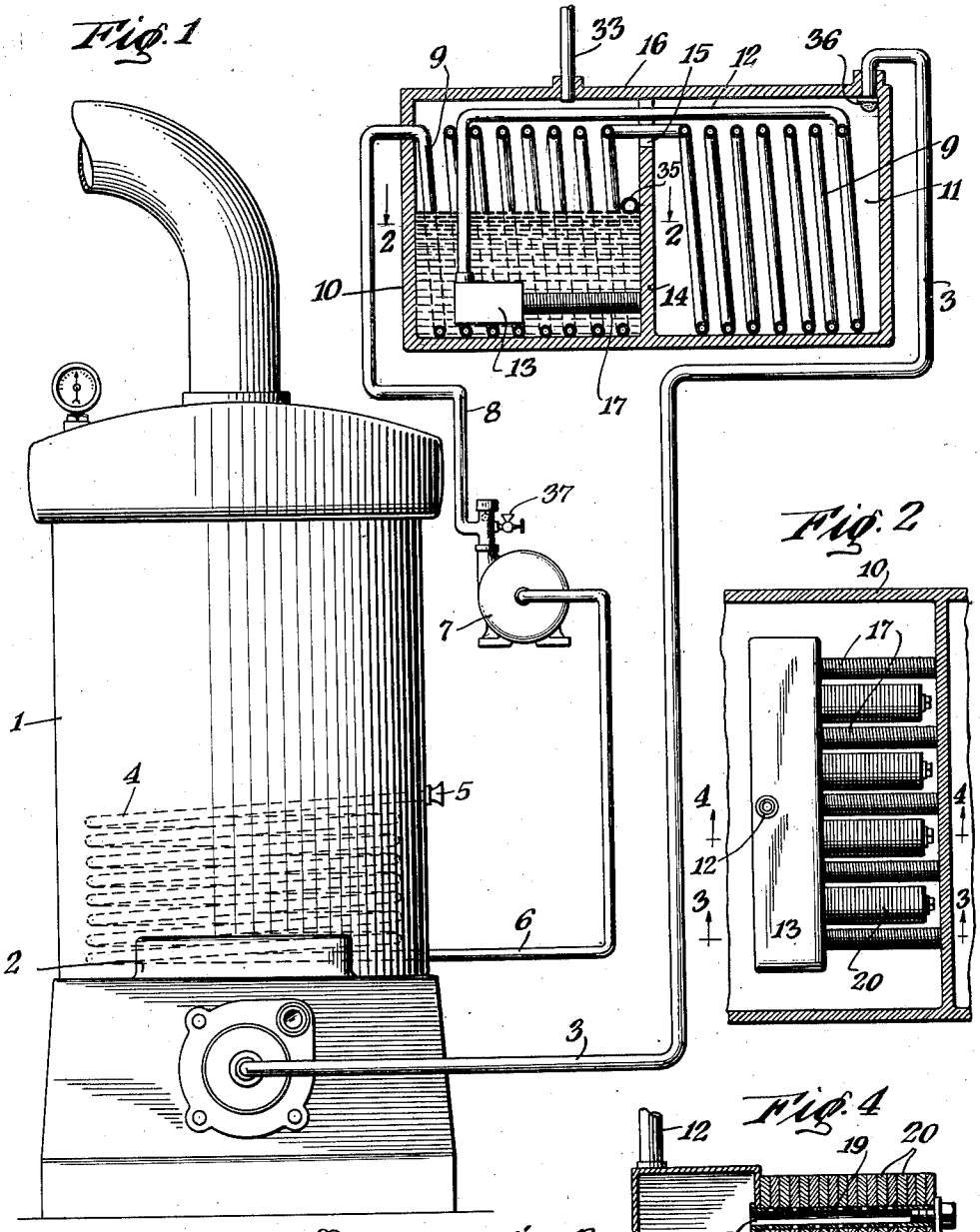
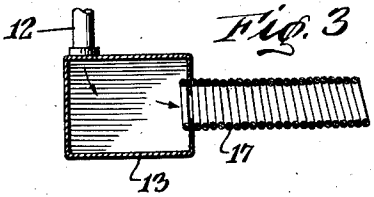


Fig. 2

Fig. 4

Fig. 3



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Filed Sept. 3, 1931 2 Sheets-Sheet 2

Fig. 5

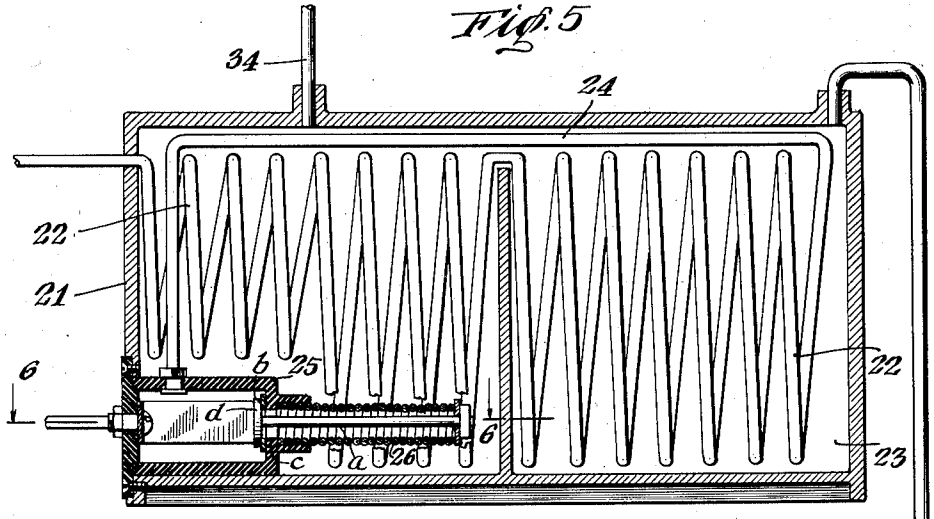


Fig. 6

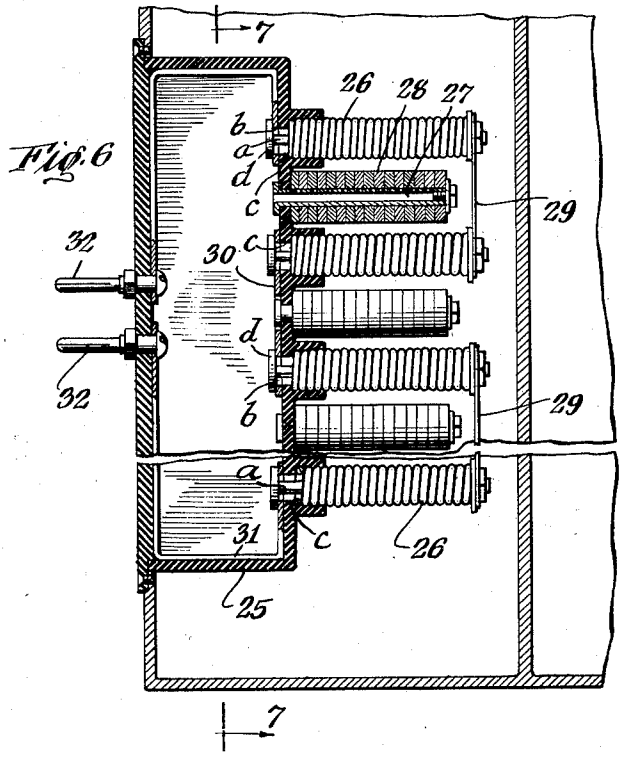
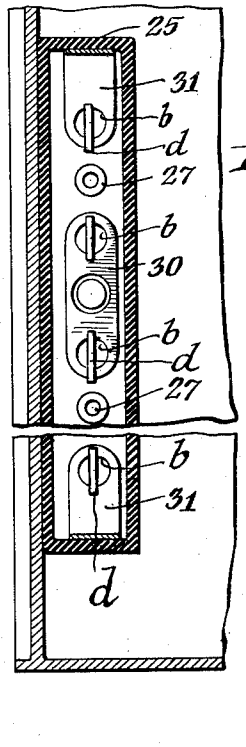


Fig. 7



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CARBURETING MEANS

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4 Claims. (Cl. 261—124)

This invention relates to a new process, and apparatus therefor, for creating a combustible mixture of liquid fuel and air, and my improvements, briefly expressed, comprise the following features and steps:—

(1) The provision of a source of heat for raising the temperature of a supply of air that is to be carbureted.

(2) Employing the heated air in a coil as the means for raising the temperature in a body of liquid fuel.

(3) Forcing the heated air into the body of heated liquid fuel from the interior of a closely coiled wire spring, the air passing into the fuel, in thin films, from between the coils of the spring.

(4) Passing the mixture of liquid fuel and air into a chamber, whence it is delivered to the point of combustion.

In one example of my invention, to be particularly described in this application, air is heated in a furnace that is equipped with a burner for liquid fuel, and this heated air is conveyed, under pressure, to a coil that is enclosed within a fuel containing tank, so that the hot air in the coil may raise the temperature of the fuel. It will be understood that the fuel referred to as requiring the application of heat is of relatively high flashing point, such for instance as fuel oil, for with a hydrocarbon of relatively low flashing point, like gasoline, heating thereof is unnecessary. The heating coil is extended into a compartment adjacent the fuel tank, which compartment is intended to receive the combustible mixture of fuel and air, and this mixture is led from said compartment to the fuel burner.

In order to produce the gaseous mixture referred to, heated air from the coil is caused to flow under pressure into a closed coiled spring, whose convolutions are in contacting relation, said coiled spring being immersed within the fuel in the tank, the pressure flow of the air causing it to issue into the surrounding fuel, from between the spring coils, in the form of thin films, thereby avoiding the creation of bubbles and enabling the air to become thoroughly carbureted in its passage through the fuel.

The fuel and air mixture, thus created, passes from the fuel tank into the adjacent compartment, and thence is conducted, by suitable piping to the fuel burner.

A blower is employed to draw the heated air from the coil in the furnace, and to force it through the coil in the fuel compartment, and into the fuel from between the convolutions of the spring coil.

Where the fuel employed is gasoline the heating coil may be dispensed with, and then the air is forced directly into the coiled springs that are immersed in the fuel.

In addition to the coiled springs, perforated tubes, having a series of flat disks strung thereon, may receive the pressure of air, for issuance from between said disks into the liquid fuel.

Obviously that phase of my invention dealing with the creation of a combustible fuel and air mixture is applicable to other uses than with a burner, as for example the air to be carbureted may be drawn between the convolutions of the coiled spring by the suction of an internal combustion engine and the resultant mixture carried into the engine intake manifold; and, where the liquid fuel is of greater specific gravity, heat from the exhaust can be utilized to raise its temperature, to thereby render the fuel more volatile.

Other features and advantages of my invention will hereinafter appear.

In the drawings:

Figure 1 is an elevation of a boiler that is fired by an oil burner, and including an apparatus, in side section, wherein a mixture of fuel and air is created and supplied to the burner.

Fig. 2 is a section on the line 2—2 of Fig. 1.

Fig. 3 is a section on the line 3—3 of Fig. 2.

Fig. 4 is a section on the line 4—4 of Fig. 2.

Fig. 5 is a sectional elevation of a fuel tank, showing means for electrically heating the air filming devices.

Fig. 6 is a section on the line 6—6 of Fig. 5, and

Fig. 7 is a section on the line 7—7 of Fig. 6.

In said figures let 1 indicate a boiler having a burner 2, which is supplied with a gaseous fuel mixture as through a pipe 3.

A coil of piping 4, located in the heat zone of the burner, is provided at one end with an inlet opening 5 for atmospheric air, whilst the other end of said coil is extended in a pipe 6, outside the boiler, and communicates with a blower 7, which blower forces the air, received from coil 4, and pipe 6, through a pipe 8 and into a coil 9 that is enclosed within a fuel tank 10.

The fuel in the tank is presumed to be of relatively non-volatile character, and the heated air, traversing coil 9, which is in contact with the fuel, is intended to raise the temperature of the fuel, to render it more volatile.

The coil 9 is continued into a compartment 11, adjacent the fuel tank, to heat said compartment, said coil 9 having a continuing pipe 12 that returns into the fuel tank and there communicates with a distributing box 13, located near the bottom of the tank.

The tank 10 and compartment 11 are here shown as divided by a partition 14, whose height exceeds that of the liquid fuel level, but providing a communicating space 15 between the top of the partition and the cover 16, which is common to both tank and compartment.

Extending horizontally from the box 13 and in communication at one end with the interior thereof are a number of coiled springs 17, whose

convolutions are in contacting relation, and whose other ends are closed, as by contact with the partition 14.

The heated air, which enters the coiled springs 17 from the distributor box 13, is caused by the blower pressure to issue, into the surrounding body of fuel, in the form of thin films, that blend freely with the fuel, without the creation of bubbles, and form therewith a mixture which passes from the fuel tank into compartment 11, whence it is conducted, by way of pipe 3, to the burner.

In addition to the coiled springs 17, a series of tubes 18 communicate, at one end, with the distributor box 13, said pipes being closed at their other ends and provided with a series of perforations 19. Also said tubes 18 have a series of disks 20 strung therealong, in contacting relation, and the flow of air under pressure into these tubes, from box 13, is released from between the disks, into the surrounding fuel, in the same manner as from between the convolutions of the coiled springs.

In Figs. 5, 6 and 7 a modification appears with respect to the carbureting means employed.

The fuel tank, here indicated at 21 contains a coil 22 for heated air, that passes into compartment 23, and has a return pipe length 24 which communicates with a distributor box 25, this box having the communicating coiled springs 26, and perforated tubes 27 with disks 28 strung thereon, substantially as shown in Fig. 2.

Axial rods *a*, extended through the coiled springs 26 carry at their outer ends the plates 29 and at their inner ends the members 30, 31, said members 30, 31 being apertured, as at *b* to permit access to the interior of springs 26; the wall of box 25 being similarly apertured, as at *c*, for the same purpose. The heads *d* of rods *a* are adapted to lie across the apertures *b* without closing the latter.

But in this modification means are provided for electrically heating the coiled springs by using them as resistance conductors. Therefore the free ends of two pairs of coiled springs 26 are connected by a conductive plate 29, and similarly a conductive plate 30 engages the ends of an intermediate pair of said coiled springs, where they are connected with the box 25. Thus, by means of conductive members 31, respectively contacting with the inner ends of the two outer coiled springs, said members extending from electrodes 32, of opposite sign, the electrical current being supplied by a suitable source, not shown, said coiled springs will be energized in series, and the heat thus generated will heat the passing air and also tend to volatilize the liquid fuel that surrounds the coiled springs.

Tank 10 is shown as provided with a supply pipe 33, and similarly tank 21 has a supply pipe 34. Also each tank may be provided with an overflow pipe, such as is indicated at 35 in Fig. 1.

To prevent back firing into the mixture compartments, a screen, indicated at 36 in Fig. 1 may be employed.

Pressure of air supplied by the blower to the coil 9 may be moderated by opening a relief valve in the blower, such as indicated at 37.

It will be understood that this means of carbureting air to provide fuel mixtures is applicable for steam generation in the power plants of road vehicles, marine vessels and aircraft, in addition to its use with internal combustion engines for automotive vehicles and aircraft, and, when used with moving vehicles and craft, the pressure generated in motion can be utilized to force or aid in forcing the air from the coils and tubes, between the coil convolutions and the disks, into the body of liquid fuel in which immersed.

Variations within the spirit and scope of my invention are equally comprehended by the foregoing disclosure.

I claim:

1. Carbureting means having, in combination, a heater, a burner therein, a tank to contain liquid fuel, a distributor box in said tank, a chamber adjacent said tank, said tank having means of communication with said chamber above the liquid level, a coil of piping within said tank, said coil being extended into said chamber and returned into said tank, where it connects with said distributor box, pressure means for supplying said coil with heated air from said heater, a closely coiled helical spring immersed in the liquid fuel and stoppered at one end, in communication at its other end with said distributor box, whereby thin films of air, passing between the coils of the helical spring, blend with the fuel and pass from the fuel tank into the chamber, and a pipe to convey the fuel and air mixture from said chamber to the burner.

2. Carbureting means having, in combination, a heater, a burner therein, a tank to contain liquid fuel, a distributor box in said tank, a chamber adjacent said tank, said tank having means of communication with said chamber above the liquid level, a coil of piping within said tank, said coil being extended into said chamber and returned into said tank, where it connects with said distributor box, pressure means for supplying said coil with heated air from said heater, and a perforated tube immersed in the liquid fuel and stoppered at one end, a series of disks composed of sheet material strung along said tube in contacting relation, said tube being in communication at its other end with said distributor box, whereby thin films of air, passing between the disks, blend with the fuel and pass from the fuel tank into the chamber, and fuel and air mixture delivery means extending from said chamber.

3. Carbureting means comprising a tank containing liquid fuel, pressure air supply means, an air distributor box, means for conveying the air supply into said box, a series of coiled springs immersed in the liquid fuel, said springs being closed at one end thereof and in communication with said box at the opposite ends, whereby the pressure supply of air is caused to issue into the surrounding fuel from between convolutions of said springs, and electrical means for heating said coiled springs.

4. Carbureting means comprising, in combination, a tank to contain liquid fuel, a distributor box in said tank, a chamber adjacent said tank, means of communication between said tank and chamber, located above the liquid level in the tank, a coil of piping in said tank, said coil being extended into said chamber and returned into said tank, where it connects with said distributor box, pressure means for passing heated air through said coil, and a closely coiled helical spring immersed in the liquid fuel and stoppered at one end, in communication at its other end with said distributor box, whereby thin films of air, passing between the coils of the helical spring, blend with the fuel and pass from the fuel tank into the chamber, for delivery therefrom.

WILLIAM WHEELER.