

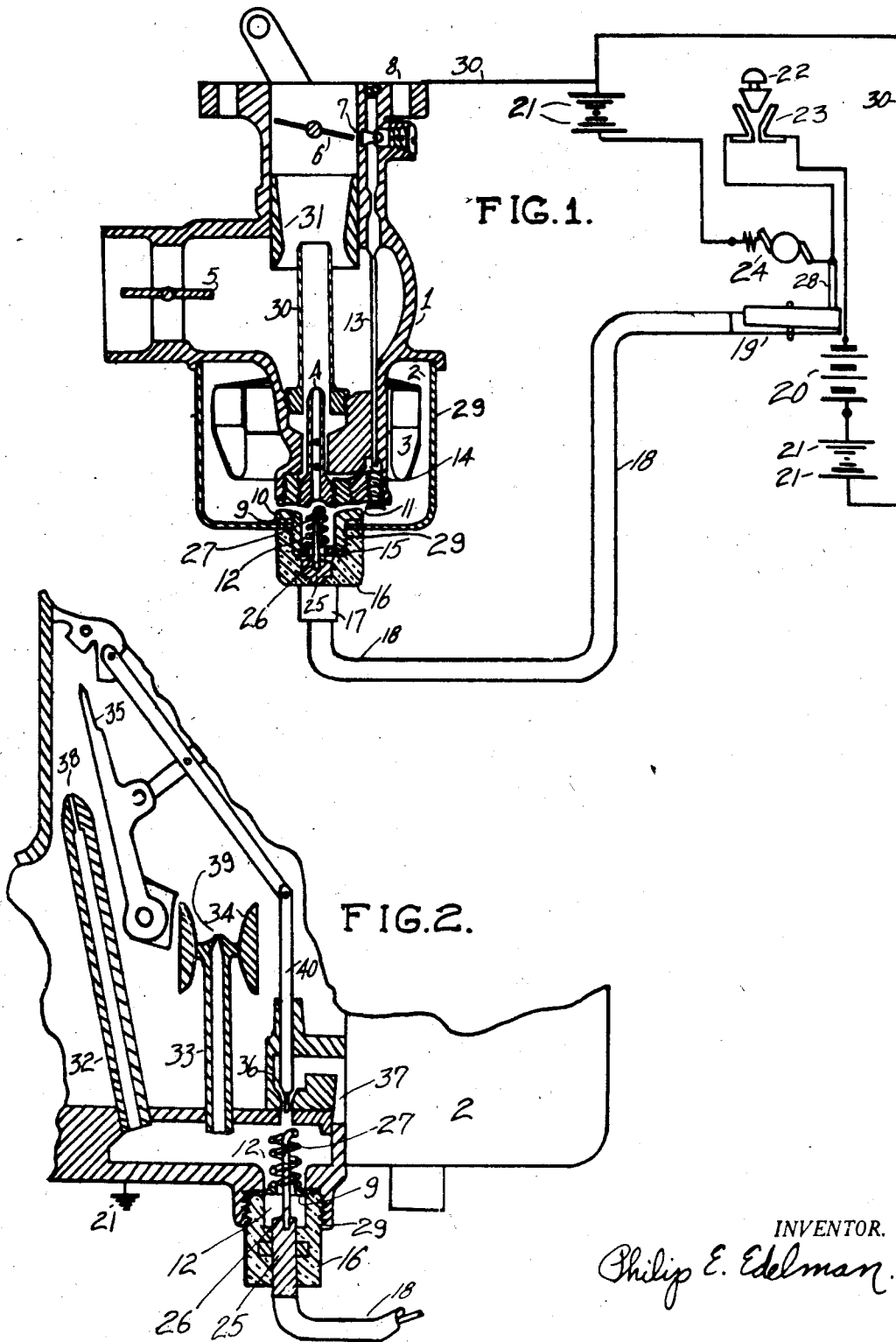
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ELECTRICAL CARBURETOR STARTER

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UNITED STATES PATENT OFFICE

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ELECTRICAL CARBURETOR STARTER

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My present invention relates to an automatic electrical heating system for quickly starting the operation of a cold carburetor. The objects of the improvement are to supply a simple automatic means to initially vaporize a small portion of the carburetor's jet flow, rapid in action and requiring no manual operation by the driver of the car to which the carburetor is attached.

My invention can be applied to any standard type of carburetor and does not interfere with its proper functioning. I am aware that various attempts have been made to employ auxiliary electrical heating appliances to primers, intake manifold, air intake, carburetor bowl, main gasoline line to carburetor, auxiliary priming compartments, carburetor drip receptacles, and drip absorbers, usually controlled by a dash mounted switch or switch connected with the air choker control, but my improvement differs therefrom. The new departures are firstly, that the operation is automatic and controlled by the regular car starter switch which actuates the starting motor; secondly that the car operator cannot burn out the heating element by forgetting to shut the electric supply to the heater off, or by operating same without drip gas supply; thirdly that a large ampere hour drain on the car battery is avoided by concentrating the heat on only a tiny volume of the gas supply just before it leaves the carburetor jet instead of heating a large volume in the carburetor bowl or an auxiliary catch basin therefor; fourthly, in that the heater automatically stops acting as soon as the motor stops turning the engine and the latter commences to function in normal manner; and fifthly in that the auxiliary starting heat is applied continuously at the carburetor jet exactly as long as required for affording starting input gas to each cylinder.

Owing to the general use of lower gravity and mixed fuels, the best carburetors are unable to function properly from a cold start, particularly in severe winter weather. Where air choking is used, an excess of cold gasoline droplets is often drawn into the intake manifold and causes loading of the engine. I have conceived that, if the external

starting heat can be applied right at the jet flow, the car driver will not need to resort to excessive choking and repeated starting attempts. Also, a small supply of gasoline is assured in the immediate vicinity of the small heater so that it can rapidly heat the small jet flow as fast as required. A single cable serves for the necessary wiring when clipped on the ungrounded motor terminal as a shunt circuit therefrom thru the heating element, and returning via the car ground to the car battery. Initial installations will have the electrical plug installed, but many existing cars can be equipped by replacing electrically fitted plug in place of regular jet or drip plugs.

I illustrate by way of example, a suitable embodiment of my invention in the accompanying drawings, in which Figure 1 is a schematic partially sectional diagram illustrating the starter on a jet type carburetor, and Figure 2 is a front section showing plug connection to a plural jet type.

From the following description of the drawings it will be evident that suitable means are set forth whereby the gasoline supply is heated substantially only in a very small volume thereof after same has flowed from the main float chamber of the carburetor and before leaving the feed nozzle. In effect the supply in the nozzle reservoir is heated only during starting, as electrical heating is not required after the engine has commenced regular firing. The amount of heat needed to pre-heat the small column of fuel in the nozzle supply is so small that the electric heater can be operated at high temperature safely because it is cut off automatically when the starter switch used for the starting motor is released immediately after the firing commences. No considerable waiting is therefore needed, nor is the heat dissipated, because it is concentrated on the small volume of fuel actually required for starting the motor.

Since the action thereby provided is instantly effective, the brief current consumption of the heater is more than compensated by the shorter duration of the motor starting current required. Also, prolonged choking

of the carburetor's air supply during starting is obviated.

Referring now to Figure 1, a popular type of carburetor, 1, is indicated grounded at 30, 21. The electric starting system includes the usual pedal switch 22 actuating contacts 23 to close a circuit from battery 20 via ground connections 21, 30, thru motor 24, so that motor 24 can start the vehicle engine to which it is attached, as usual.

One terminal of motor 24 is junction 28 which connects to switch 22, 23. A connector clip 19 is provided to connect with terminal 28. A cable 18 has one end thereof attached to clip 19, and connects to plug terminal 17 at its other end.

Terminal 17 includes a stud portion 25 tightly held in a bushing 16 of isolantite or other suitable refractory insulation capable of keeping a thread at 29. Lavite is also suitable for bushing 16. An enlarged pin support wire 26 is imbedded in metal 25 and carries electric heater coil 27 concentrically spaced and supported thereby and cleared from the walls of the tiny gasoline nozzle well 12. Nichrome wire is suitable for heater element 27 and may be proportioned to carry 5 to 10 amperes of operating current taken from battery 20. A brass gasket 15 is secured to one end of heater coil 27 to afford connection therefrom to carburetor 1, as well as a tight seal between bushing 16 and threaded nipple 10. A gasket 9 aids the sealing between nipple 10 and float bowl shell 29. When switch 22, 23 is operated, current flows from battery 20 via cable 18 thru heater wire 27, then via washer 15 thru carburetor 1, returning via ground 30, 21. The connection 30 may comprise the engine frame and vehicle framework.

It will be noticed that bushing 16 is adapted to be threaded in place on carburetor 1 replacing the usual metal nut used to retain bowl 29 in place. The action of the carburetor in other respects is normal.

Carburetor 1 is attachable to the intake manifold of the vehicle engine at flange 8. Fuel is fed to float compartment 2 in customary manner and float 3 maintains the operating level thereof. Float bowl compartment 2 feeds fuel to nozzle well 12 via passage 11. There is always a supply of fuel in well 12 in intimate contact with heater wire 27 so that substantially all of the heat set up in wire 27 may be promptly transferred to the fuel in well 12. The relative thermic masses of the fuel in well 12 and the wire heater 27 are such that instantaneous heat transfer is effected.

In operating, the carburetor in starting, it is customary to close air choker 5, but my invention shortens the time required for the choking. Also it is customary to open throttle 6 to the intake manifold connected to carburetor 1 at flange 8. Usual Venturi tube 31 and pipe 30 permit the engine suction to draw fuel thru

jet 4 from nozzle well 12. Also fuel for idling can be drawn by suction at idling jet 7 connected via pipe 13, and passage 14 respectively, to nozzle feed well 12.

The heater wire 27 is thus permitted to pre-heat a tiny portion of fuel just prior to the time it is used, and for starting only, as switch button 22 is customarily released the moment the vehicle engine commences firing. The arrangement is such that the more volatile components of the fuel in well 12 are first driven upwards. The flow of fuel from bowl 2 prevents any appreciable pre-heating of the fuel in bowl 2 or the main gasoline supply. The pre-heating is thereby made effective in an extremely short time and its necessary duration is similarly brief, as controlled by pedal 22. The other operations of the carburetor require no explanation since they are the same after initial starting, as in the prior art.

In Figure 2, an enlarged nozzle section illustrates the application of the heater element to the nozzle fuel well. Fuel from float bowl 2 enters well 12 via passage 37 as metered by pin 40 at orifice 36. Heater coil 27 supported by pin 26 and held in contact with threaded flange 29 by its washer attachment 9, is positioned to thermally influence the fuel flowing thru nozzle well 12. Isolantite plug 16 supports metal plug 25 which holds pin 26, as in Figure 1. Cable 18 extends from metal plug 25 as in Figure 1.

At starting the fuel in nozzle well 12 is pre-heated as explained for Figure 1 so that fuel in jet pipe 33 and jet pipe 32 readily vaporizes and mixes at nozzles 39, 38 respectively. Nozzle 38 operates only when air valve 35 is opened by the engine suction, so the initial pre-heated fuel from well 12 will be mainly effective at small Venturi equipped jet 39. Venturi tube 34 is made integral to jet 39 in customary manner.

Any other type of carburetor may similarly be equipped according to my invention. The wire 27 offers substantially no flow resistance to the fuel passing via well 12, so the normal operation of the carburetor is not interfered with. The wire 27 is also rigidly supported so that it cannot bend out of place or against walls of well 12. Plug 16 can easily be removed for inspection or renewals.

The tendency of modern fuels to separate into volatile and less volatile constituents ordinarily might cause accumulation of less volatile components in well 12, but the action of heater 27 is operative to drive same out, permitting fresh flow of fuel to become promptly effective in well 12.

It is the general experience of motorists that modern carburetors are satisfactory once they are warmed up, and my invention is mainly effective in starting the carburetor in cold weather when starting is difficult. Excessive choking is not required, thus ob-

viating danger of crank case dilution or loading of the engine with excess of cool fuel droplets. In summer, clip 19, Figure 1 may be removed from terminal 28 if desired, though the operation of the heater 27 is beneficial thruout the year when low grade fuels are used in carburetor 1. It appears that the hexane content of the fuel is partially separated by the action of heater 27 along with some of the heptane of the fuel, improving the starting mixture during all seasons of the year. Wire 27 will not burn out as long as there is fuel in well 12, which is substantially secured as long as there is any fuel in carburetor 1. Any tendency for carbonization of deposit on wire 27 is avoided by the flow of fuel thereabout.

I claim:

1. An electric heater plug for a carburetor comprising a threaded insulator having a centrally disposed aperture, a metallic lead-in within the aperture and occupying the lowermost portion thereof, a heater wire connected to and supported by the lead-in thereabove and within and in spaced relation to the walls defining the aperture, thus providing a well for the accumulation of fuel about the wire, and a metallic conducting gasket surrounding the heater wire and electrically connected thereto to seal the plug to the carburetor.

2. An electric heater plug for a carburetor, said carburetor having an opening adjacent the jet portion thereof defined by a nipple, the plug comprising a threaded insulator having a centrally disposed aperture, a metallic lead-in within the aperture and occupying the lowermost portion thereof, a heater wire connected to and supported by the lead-in thereabove and within and in spaced relation to the walls defining the aperture, thus providing a well for the accumulation of fuel about the wire, and a metallic conducting gasket surrounding the heater wire and electrically connected thereto to seal the plug about the nipple.

In witness whereof I have hereunto set my hand this 17th day of March, 1928.

PHILIP E. EDELMAN.

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