Oct. 19, 1926.

T. CASSELLA

1,603,660

CHARGE FORMING DEVICE

Filed June 29, 1925

Fig. 1.

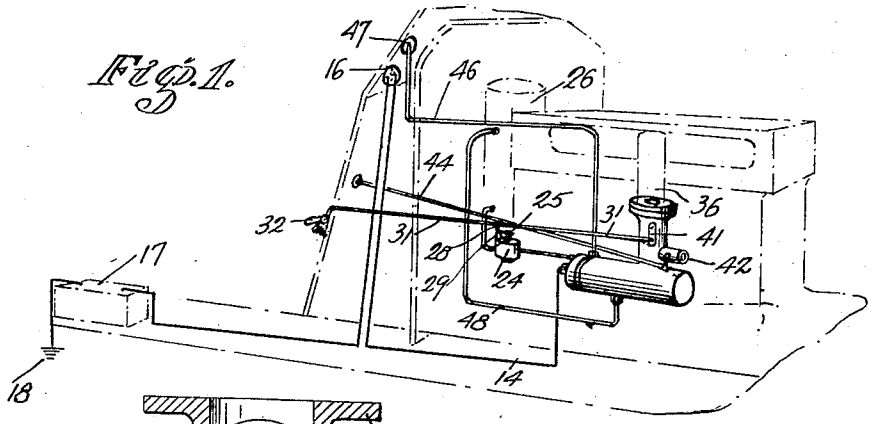


Fig. 2.

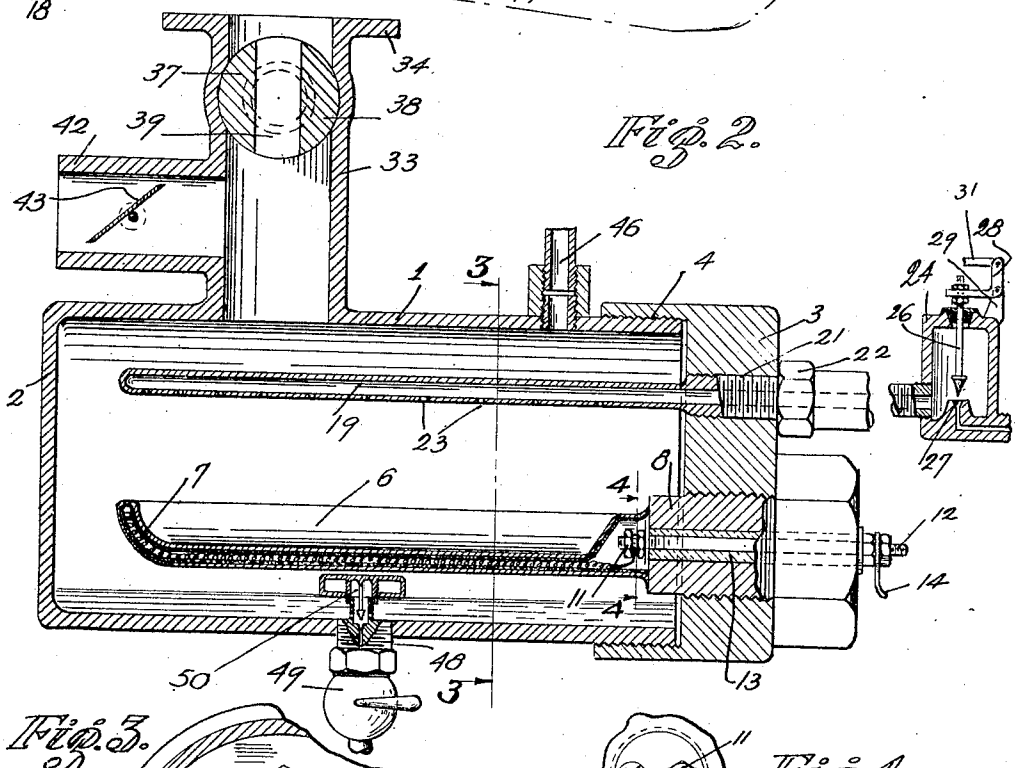
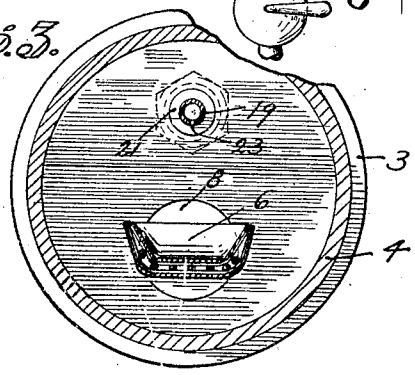


Fig. 3.



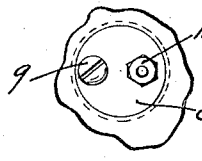


Fig. 4.

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UNITED STATES PATENT OFFICE.

TOY CASSELLA, OF SAN FRANCISCO, CALIFORNIA.

CHARGE-FORMING DEVICE.

Application filed June 29, 1925. Serial No. 40,323.

The present invention relates to improvements in charge forming devices for internal combustion engines, and its particular object is to provide means whereby fuel may be formed into a charge with greater economy and to better advantage.

It is particularly proposed in the present invention to vaporize the fuel by means of heat in the charge forming device before the same is sucked into the combustion chamber by the vacuum created in the engine on the intake strokes.

It is intended for this purpose to spray gasoline or whatever fuel may be used on a heated pan in a closed chamber subject to the suction of the engine.

It is further proposed to provide means for controlling the flow of fuel to be sprayed on the heated pan.

It is further proposed to provide common control means for the fuel to be delivered to the charge forming device and for the charge drawn into the engine.

It is further proposed to provide means allowing the operator to ascertain at any time the pressure prevailing in the charge forming device and to regulate the fuel flow accordingly.

Further objects and advantages of my device will appear as the specification proceeds.

The preferred form of my invention is illustrated in the accompanying drawing, in which—

Figure 1 shows the general arrangement of my charge forming device relative to the power plant of a motor vehicle, in perspective view.

Figure 2 a longitudinal vertical section through the receptacle of my charge forming device.

Figure 3 a transverse section through the same taken along line 3—3 of Figure 2, and

Figure 4 a sectional detail view taken along line 4—4 of Figure 2.

While I have shown only the preferred form of the invention, it should be understood that various changes or modifications may be made within the scope of the claim hereto attached without departing from the spirit of the invention.

In its preferred form my charge forming device comprises a preferably cylindrical receptacle 1 closed permanently at one end as shown at 2 and closed at the other end by means of a cap 3 threaded on the receptacle as shown at 4. In this receptacle is supported, parallel to the axis thereof, a pan 6 preferably made of metal and provided with a hollow wall to commodate the electrical heating elements 7. One end of the pan is connected to a plug 8 adapted to be threaded into the cap 3 and one end of the heating element is grounded to the plug as shown at 9 while the other end is secured by means of nuts 11 to a pin 12 extending through the plug 8 and insulated therefrom by insulating material 13. The pin 12 is electrically connected with the wire 14 which preferably leads to a switch 16 disposed on the dash and back to the battery 17, the second terminal of which is grounded as shown at 18. It is understood, of course, that the heating element may be also connected to the generator of the motor vehicle and that a switch may be provided allowing the driver to connect the heating element to either the battery or the generator in accordance with well known principles.

Above the pan and within the receptacle 2 there is supported a pipe 19 threaded into the cap as shown at 21 with a nut 22 arranged to hold the pipe in place. The latter is preferably in the bottom face thereof as shown at 23 so that a liquid may be sprayed therefrom on the pan. The outer end of the pipe connects through a needle valve 24 with the discharge port of the vacuum tank 25 usually provided in motor vehicles so that gasoline may be delivered from the vacuum tank into the pipe, the rate of flow being controlled by the needle valve 24. The latter includes in its structure the needle 26 seated as shown at 27 and operated by means of a bell crank lever 28 pivoted in the bracket 29 and actuated by means of a rod 31 leading to the dash of the motor vehicle and preferably manipulated by means of a foot pedal 32 in a manner well known in the art. A pipe 33 of large dimensions rises from the top of the cylinder 2 and is flanged at its outer end as shown at 34 for connection with the intake manifold 36 of an internal combustion engine. A valve 37 is provided in this pipe which takes the place of the ordinary throttle and which is preferably made in the form of a rotatably mounted sleeve 38 formed with a port 39 adapted to be moved from the registering position shown in Figure 2 to a non-registering position in which it completely shuts off the supply of charge to the intake mani-

fold. The rotary valve is actuated by means of a crank 41, the free end of which is secured to the end of the rod 31 so that the latter simultaneously operates the throttle valve and the needle valve 24. A second pipe 42 connects with the pipe 33 at right angles thereto and is provided with the well known choke valve 43 adapted to be manipulated on the dash by means of the rod 44. A tube 46 connects the cylinder 2 with a gage 47 disposed on the dash in view of the driver so as to allow the latter to ascertain the pressure prevailing in the receptacle 2. At the bottom of the receptacle is provided a drain pipe 48 with the drain cock 49 which latter pipe may either be open at its bottom end or may connect as shown in the drawing with the suction side of the vacuum tank 26 so as to allow fuel dripping from the pan 6 to be sucked back into the vacuum tank 26 under the influence of the suction of the engine. If the connection is used, a float-controlled needle valve 50 is arranged at the entrance to the pipe, the needle valve opening only after the gasoline within the receptacle has reached a certain height.

The operation of the charge forming device will be readily understood from the foregoing description. The pan 6 is heated by means of the heating elements as soon as the switch is turned on. The cranking of the engine will produce a partial vacuum in the receptacle 2 and cause fuel to be drawn into the pipe 19 and to be sprayed on the pan where it evaporates rapidly. The vapors are drawn into the manifold after they have been mixed with air sucked in through the pipe 42 and enter the combustion chamber of the engine where explosion takes place. While at the beginning of the operation the pan is heated by means of the battery, the current may be taken from the generator as soon as the engine is started. The richness of the mixture of gas vapors and air may be controlled by the choke valve 43 while the fuel supplied to the charge forming device may be directly controlled by means of the needle valve 24 and the rod 31 actuating the same. It may be particularly pointed out that in the device shown in the drawing, the needle valve and the throttle 37 are both controlled by the rod 31 so that on slowing down the motor vehicle, the amount of fuel delivered through the pipe 19 is automatically reduced, whereby a great saving in fuel is effected. The pressure gage gives the driver an opportunity to ascertain the pressure within the receptacle 2 and to control the valves accordingly.

I claim:

A charge forming device for internal combustion motors comprising a closed receptacle having an outlet portion adapted to be connected to the intake manifold of the motor, the said outlet portion having a valve therein, an inlet portion adapted to be connected to the fuel line of the motor and including a perforated spray tube wholly disposed within the receptacle and a valve for controlling passage through the tube, an electrically heated vaporizing tray wholly disposed within the receptacle and positioned to receive fuel discharged from said spray tube, means connecting the said valves and adapted for operating the same simultaneously, a drain cock connected to the receptacle and located below the tray, and a float valve wholly disposed within the receptacle for controlling passage through the drain cock.

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