

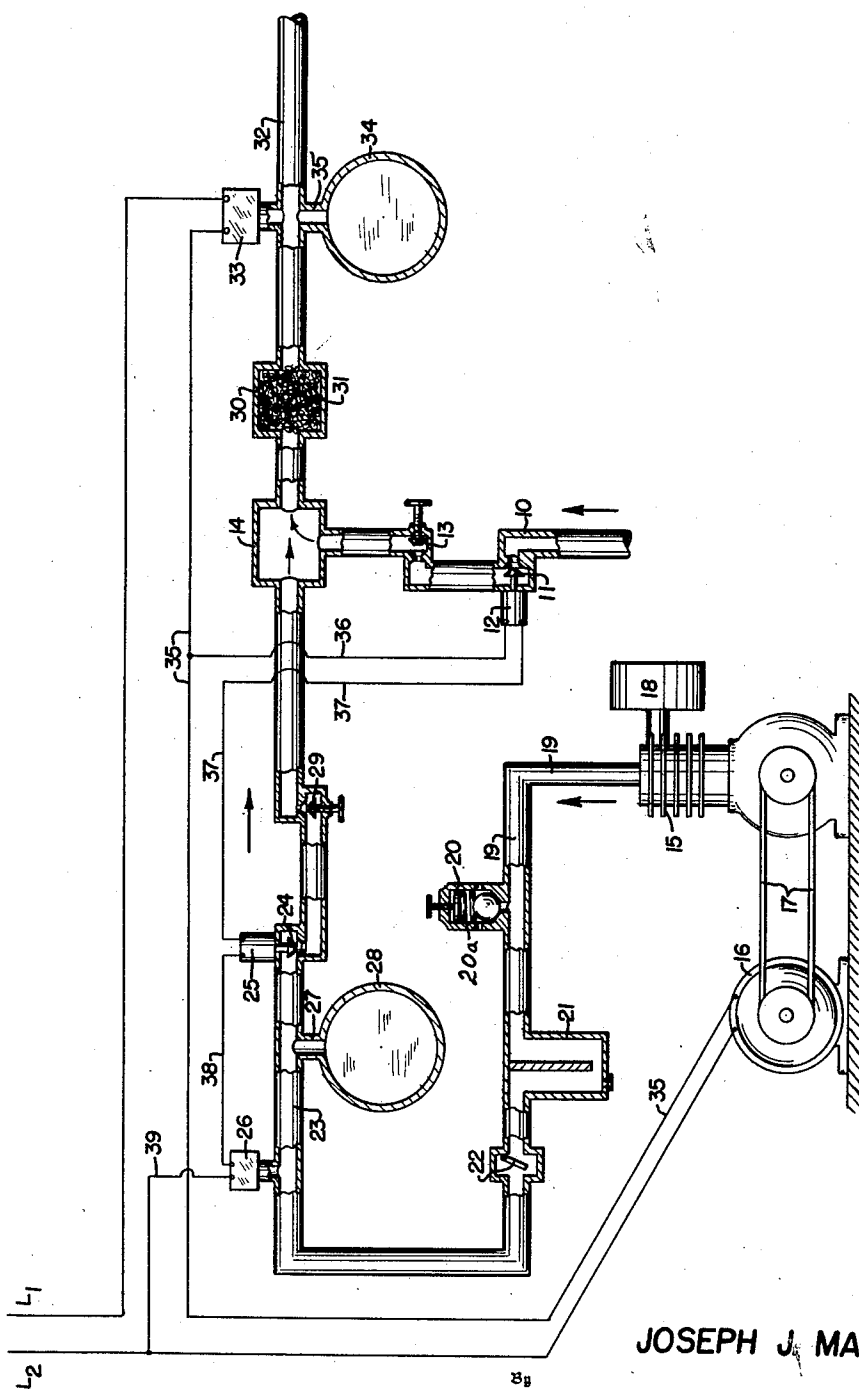
June 30, 1953

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2,643,944

SYSTEM FOR MIXING VAPORIZED HYDROCARBONS WITH AIR

Filed Feb. 8, 1951



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UNITED STATES PATENT OFFICE

2,643,944

SYSTEM FOR MIXING VAPORIZED
HYDROCARBONS WITH AIR

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Application February 8, 1951, Serial No. 210,011

1 Claim. (Cl. 48—180)

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This invention relates to improvements in methods and apparatus for mixing vaporized hydrocarbons with air.

Among the objects of the invention are the provision of improved methods and apparatus for automatically mixing vaporized hydrocarbons with air in accordance with the demands for use of the combustible mixture.

Other objects are to provide an automatic carbureting system which is simple in construction, efficient in operation, and economical of manufacture.

Still further objects, advantages and salient features will become more apparent from the description to follow, the appended claim, and the accompanying drawing in which:

The single figure diagrammatically illustrates apparatus and a system, portions being broken away, with which the method of carbureting hydrocarbons may be practised.

Referring in detail to the drawing, pipe 10 is a hydrocarbon supply pipe which conveys vaporized hydrocarbon such as butane, propane, pentane, or any mixture of the foregoing or similar hydrocarbons. Any suitable means may be employed to vaporize the hydrocarbon, one type thereof being disclosed in my copending application, Serial No. 210,012, filed on February 8, 1951, concurrently with this application. Pipe 10 is provided with a valve 11, operated by a solenoid 12, and a valve 13 which may be adjusted to provide a variable metering orifice, pipe 10 communicating with a mixing chamber 14.

An air compressor 15, driven by electric motor 16 through belt 17, or the like, receives ambient air through air filter 18 and delivers it to pipe 19. A blow-off valve 20 communicates with pipe 19 and may be adjusted by varying the urge of spring 20a to relieve pressure in the pipe, if it exceeds a predetermined value. The air passes through an air trap 21, or similar device, to remove any foreign matter such as lubricating oil, and thence through check valve 22 to pipe 23.

Pipe 23 is provided with an air valve 24 operated by a solenoid device 25 between open and closed positions, the solenoid being controlled, in part, by a pressure responsive switch 26 actuated by pressure in pipe 23. A branch pipe 27 communicates pipe 23 with a closed surge chamber 28. An adjustable valve 29, similar to valve 13, provides a variable metering orifice and by suitable adjustment of these two valves, the relative amounts of vaporized hydrocarbon and air may be varied as desired.

The air passes through valve 29 and into cham-

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ber 14 where it is mixed with the vaporized hydrocarbon and the mixture then passes through a chamber 30 having a mass of metal wool therein, such as copper wool. This aids in the intimate mixing of the air and vaporized hydrocarbon and improves the burning characteristics of the combustible mixture.

The mixture discharges through pipe 32 which communicates with any suitable burner (not shown). A pressure responsive switch 33 is actuated by the pressure in pipe 32. A surge and supply chamber 34 communicates with pipe 32 by branch pipe 35.

Assuming that the apparatus is not in operation and sufficient mixture has been supplied by chamber 34 and pipe 32 to permit the pressure therein to fall to a predetermined value, the operation is as follows: Switch 33 closes and electric current passes through line L1, through switch 33, through wire 35, motor 16 and to line L2 which starts the motor, thus driving the compressor and delivering air to pipe 23. When the pressure in pipe 23 reaches a predetermined value, pressure responsive switch 26 closes and current passes through wire 36, solenoid 12, wire 37, solenoid 25, wire 38, pressure switch 26 and wire 39 to L2. This simultaneously opens valves 11 and 24 permitting the vaporized hydrocarbon and air to flow to chamber 14. When the pressure in chamber 34 and pipe 32 increases to another predetermined value, pressure switch 33 opens, and deenergizes both solenoids and the motor, thus discontinuing the supply of compressed air and closing the air valve 24 and vapor valve 11. Any suitable spring means in the solenoid devices may effect closing of the valves when the solenoids are deenergized, valves of this type being well known in the art.

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

A hydrocarbon-air mixing system comprising: a mixing chamber adapted to receive a hydrocarbon vapor and air for mixing therein to produce a combustible mixture, a source of hydrocarbon vapor, a vapor supply conduit communicating the hydrocarbon vapor source with the mixing chamber, a normally closed electrically operated valve in the vapor supply conduit for controlling the flow of vapor therethrough, an air compressor, an electric motor operatively connected therewith, an air conduit communicating the delivery port of the air compressor with the mixing chamber, a normally closed electrically operated valve in the air conduit for controlling the flow of air therethrough, a nor-

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mally open pressure operated switch in operative communication with the air conduit between the compressor and the electrically operated valve, a manually adjustable metering valve in the air conduit between the electrically operated valve and the mixing chamber, a manually adjustable metering valve in the vapor supply conduit between the first mentioned electrically operated valve and the mixing chamber, a combustible mixture discharge pipe in communication with the mixing chamber for conducting the mixture to a burner, a surge chamber in connection therewith, a pressure responsive switch in operative communication with the discharge pipe, arranged to close an electric circuit to the compressor motor when the pressure in the discharge pipe falls below a predetermined value, whereby the pressure in the air conduit will increase to a point where the pressure operated switch in communication therewith closes, said last named switch being connected in series with the electrically operated normally closed valves in the air supply conduit and the vapor supply

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conduit thereby permitting air and hydrocarbon vapor to flow to the mixing chamber in metered volumes thereby increasing the pressure in the discharge pipe to a point where the pressure operated switch in communication therewith opens and stops the compressor motor and deenergizes the electrically openable switches in the air supply and the vapor supply conduit which thereupon close and remain closed until the pressure in the discharge conduit falls sufficiently to permit the pressure controlled switch in communication therewith to close and begin another cycle.

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