Oct. 7, 1930. E. SEIGNOL 1,777,383

SELF FEEDING CARBURETOR

Filed July 10, 1928 2 Sheets-Sheet 1

Fig. 1

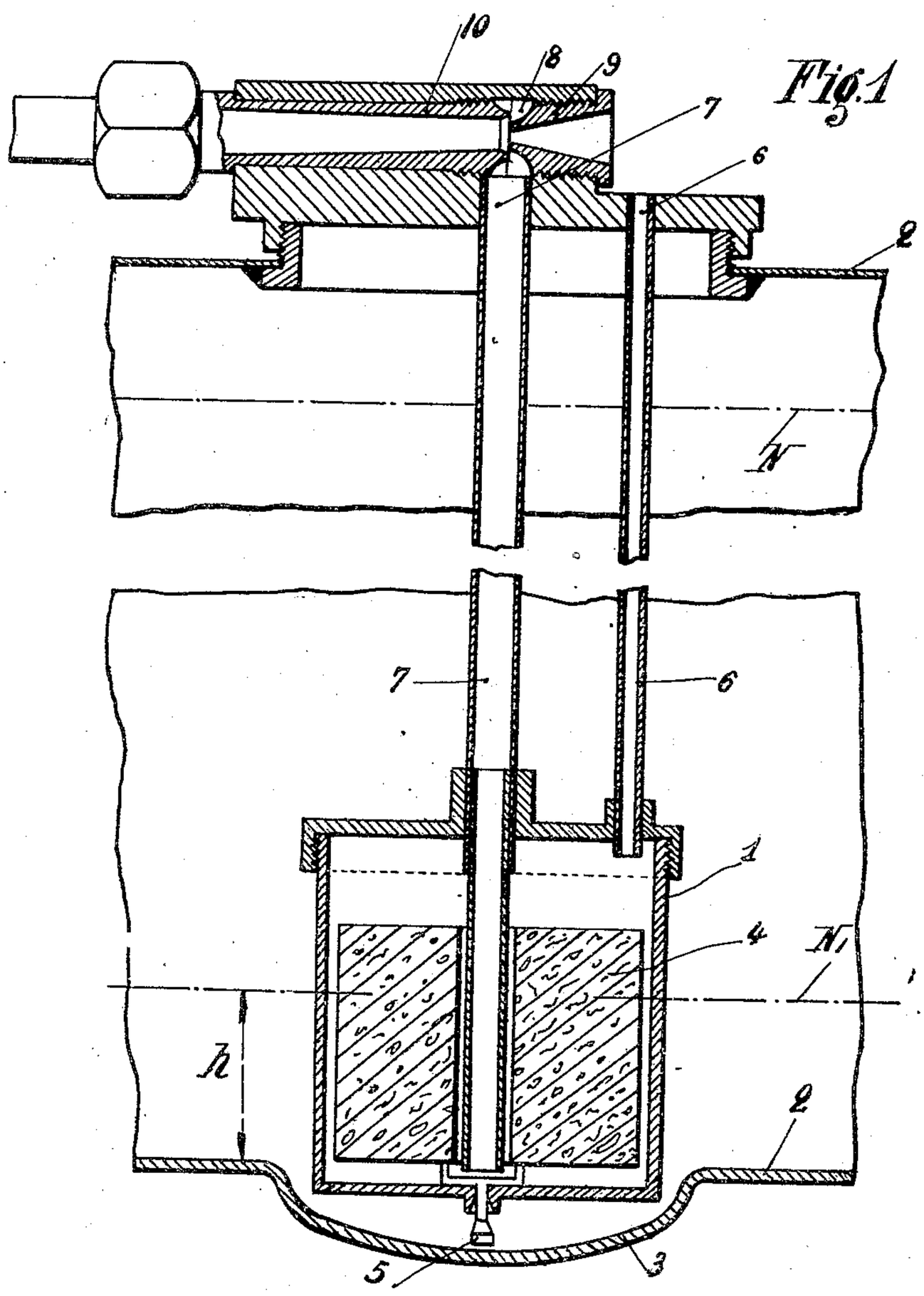

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Fig. 2

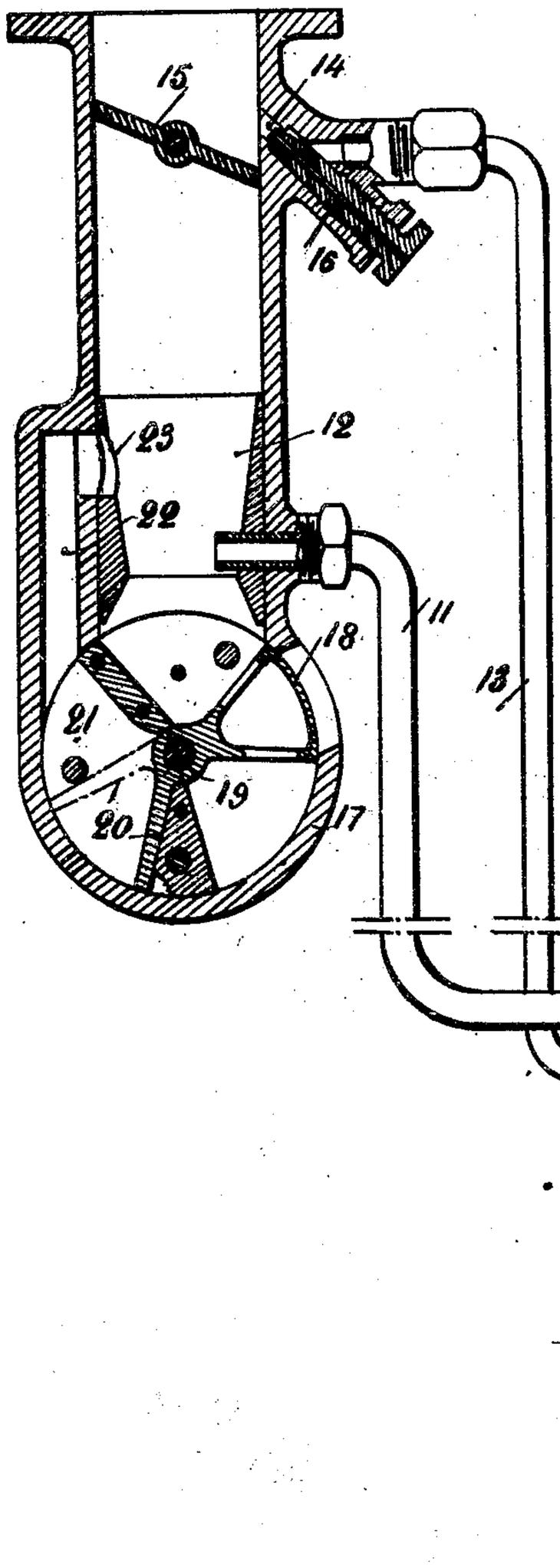
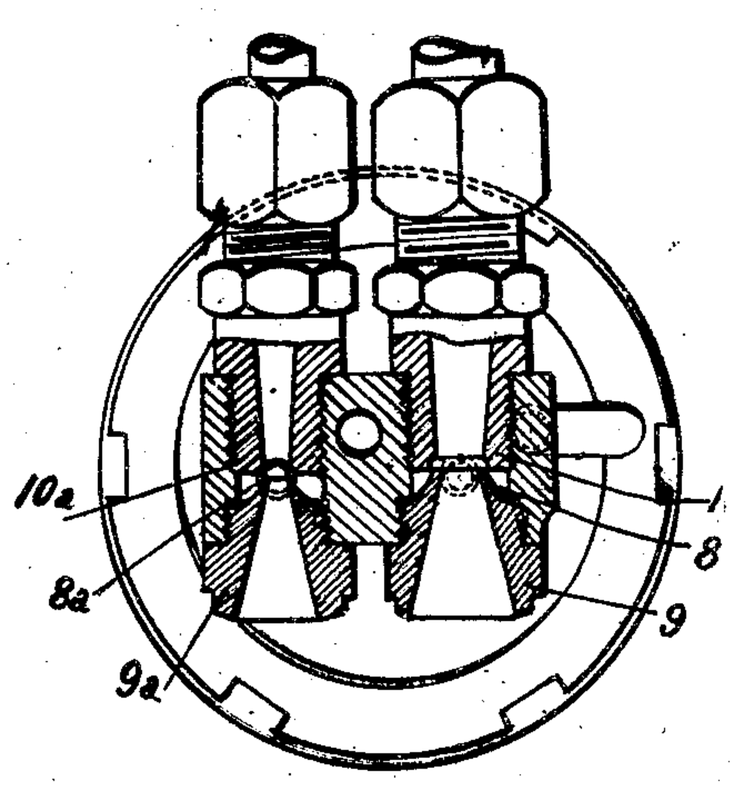
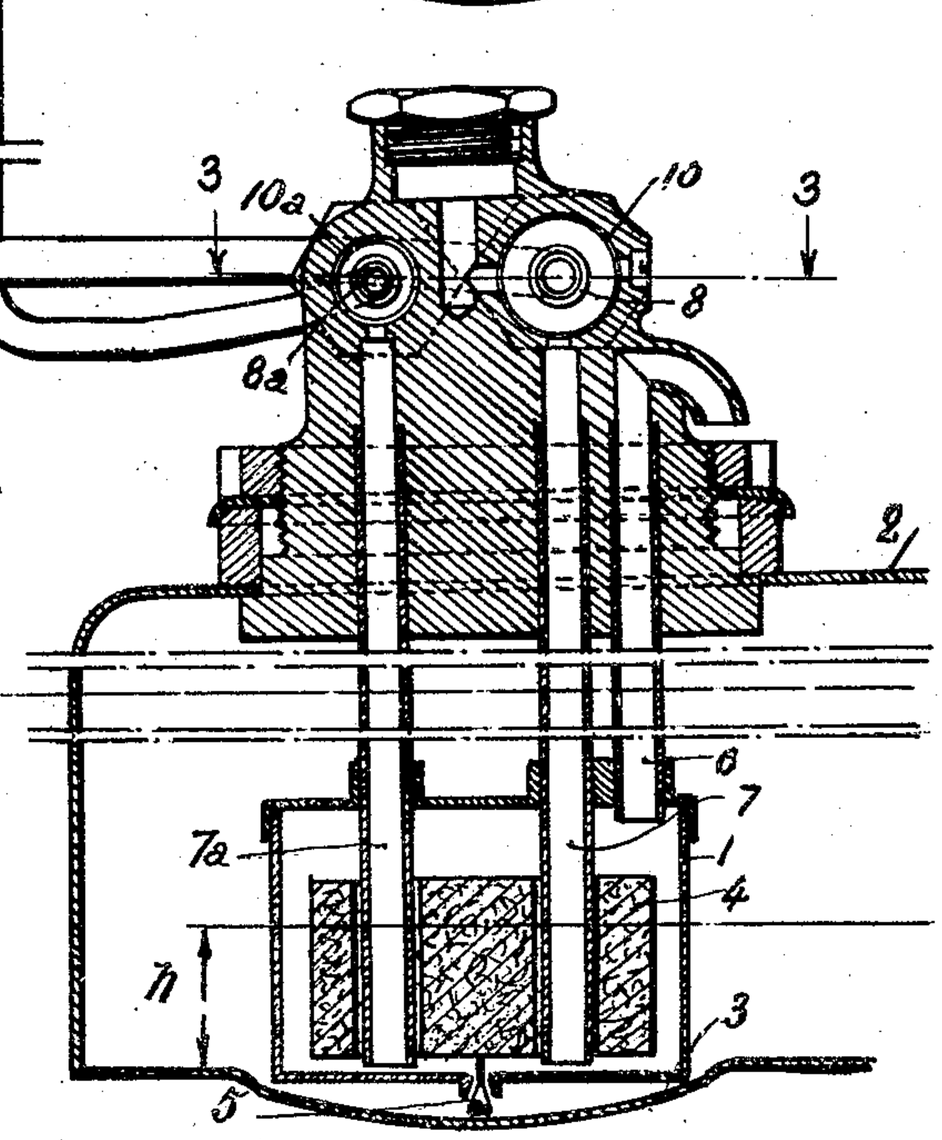


Fig. 3





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UNITED STATES PATENT OFFICE

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SELF-FEEDING CARBURETOR

Application filed July 10, 1928, Serial No. 291,591, and in France July 21, 1927.

In order that the carburation of a carburetor and liquid fuel elevator should maintain a practically constant value it is necessary that the head of fuel on the vaporizer should only be subject to small negligible variations with respect to the total height of elevation of the fuel. Various devices have been proposed for this purpose but they have certain disadvantages.

The present invention has for its object to remedy the said disadvantage while insuring a head on the vaporizer subject only to variations which are too small to influence the carburation.

In accordance with the present invention, the fuel reservoir of a carburetor fuel elevator is combined with a head regulator which is in communication with a reservoir, the lower end of which regulator is situated in the immediate neighbourhood of the bottom of the reservoir. This head reglator is supplied through its lower end in the reservoir and it is in communication at its upper end with the open air. The pipe by which the fuel is raised ends in the neighbourhood of the bottom of the head regulator.

By this combination the head of fuel on the vaporizer is constant although the level of the fuel in the reservoir should be higher than in the head regulator. It is only when the level of the fuel is lowered in the head regulator through the continued lowering of the level of the fuel in the reservoir that a slight variation of head on the vaporizer is produced but if care is taken to provide the maximum level in the head regulator at a height slightly above the bottom of the reservoir, the variation of head which will result will be insignificant with respect to the normal value of this head, especially if care is taken to make the vaporizer in the form of a small Venturi tube, which as is known possesses properties of auto-regulation as regards aspiration.

The invention has in addition for its object the application of the device defined above to a system of engine supply comprising a main reservoir, situated at the back of an automobile vehicle and below the engine, a device of primary carburation situated in the immediate neighbourhood of the main reservoir above the free level of the fuel in this latter a system of pipes of great length conveying the rich carbureted mixture furnished by the primary carburetor to a secondary carburetor situated near the engine, the primary carburation device comprising a venturi as a vaporizing device for the fuel, and the secondary carburation device being, for example, formed of a diffuser or venturi in which the pipe system taking the rich mixture ends, and a control member for the entry of air into the diffuser under the action of the depression which is obtained between the neck of the diffuser and the regulating valve for the admission of carbureted mixture, to the engine, a retarding device formed of a second primary carburetor situated directly in the reservoir, and a system of tubes connecting this primary carburetor to the induction pipe of the engine at a point situated below the regulating valve.

The accompanying drawings represent by way of example an embodiment of the invention.

Figure 1 is a sectional elevation with part cutaway of a head regulating device on a vaporizer of a carburetor and fuel elevator in accordance with the invention.

Figure 2 is a sectional elevation of a system of supply for engines in accordance with the invention.

Figure 3 is a fragmentary section taken on line 3—3 of Fig. 2.

As it is illustrated in the drawing the head regulating device for the fuel vaporizer comprises a head regulator 1 immersed in the fuel reservoir 2 the bottom of the head regulator 1 being placed as low as possible for example in a cavity 3 stamped in the bottom of the reservoir 2.

This head regulator comprises a float 4 connected to a valve 5 which establishes or forms the communication between the regulator and the reservoir.

The head regulator communicates with the open air by the tube 6.

The tube 7 of the fuel supply to the vaporizer extends practically to the bottom of the head regulator 1. It ends in its upper por-

tion in the figure in a chamber 8 in communication with the neck of a Venturi tube 9, 10 which raises the fuel and mixes it with a certain quantity of air in order to form a carbureted mixture.

The action of the device is as follows:—

If it is supposed that the level of the fuel N in the reservoir is at its maximum it is obvious that whatever this level may be it will not be lowered below N_1 the normal level of the fuel in the head regulator, due to the operation of the float 4 and of the valve 5. This head will remain absolutely constant on the vaporizer, that is to say, in this case on the venturi 9–10. It is only from the moment when the level of the fuel in the reservoir becomes lowered above the level N_1 that the head on the vaporizer will be different from what it was before, but the height h between the initial level N_1 and the bottom of the reservoir is so small relatively to the height of the level N above the bottom of the reservoir as to be negligible in practice. This will especially be the case if the vaporizer is formed as a venturi as in the figure. This height h will be very small if a head regulator is adopted with a very large float the lower face of which is very near to the bottom of the reservoir.

In Figure 2 which represents a system ot engine supply in which the device which has just been described is applied, 1 is again the head regulator, 2 the reservoir, 4 the float, 5 the float valve, 6 the air communicating pipe, 7 the elevating tube for the fuel and 9—10 the vaporizing venturi. In this case, however, there has been provided a second elevation tube 7^a and a second venturi 9^a—10^a intended to furnish the carbureted mixture for retarded running or idling, the venturi 9—10 furnishing a very rich carbureted mixture intended for the normal running of the engine which supply is carried by a tube of considerable length 11 into the diffuser 12 of a secondary carburetor device. The tube 11 for this purpose ends in the said diffuser a little below the neck of the latter. The rich mixture for retarded running produced by the diffuser 9^a—10^a is carried by a tube 13 to a point 14 situated down stream of the valve 15 for regulation of the quantity of carbureted mixture supplied to the engine. Air is added through the tube 16 to this rich mixture.

The secondary air intended to be mixed with the air furnished by the primary carburation device situated in the neighbourhood and above the reservoir penetrates by an entrance 17 controlled by an obturator 18 turning on an axis 19 which obturator is controlled by the vane 20 which forms a rotor piston in a chamber of the form of a sector 21 in communication by a pipe 22 with a point 23 situated between the neck of the diffuser and the throttle valve 15. A spring, for example, a spiral spring, not illustrated, mounted on the axis 19 acts in the reverse direction to the depression which is transmitted to the chamber 1 by the pipe 22.

The action of the system is as follows:—

In normal running the throttle 15 being opened the engine creates a depression in the diffuser. This is transmitted by the tube 11 to the primary carburation device 9—10 which raises through the tube 7 the fuel contained in the head regulator 1 and vaporizes it so as to form a rich carbureted mixture which is taken by suction into the diffuser. This suction transmitted by the pipe 22 to the vane 20 causes the obturator 18 to open against the action of the spring 19 and admits at each instant as a function of the variation of depression which exists in the diffuser, the quantity of air necessary in order to form, with the rich mixture conveyed by the tube 11, the carbureted mixture of optimum composition. During the whole time that the level of the fuel in the reservoir is above the normal level N_1 of fuel in the head regulator 1, the hydrostatic head on the venturi 9—10 is constant which contributes to maintaining the constancy of the composition of the carbureted mixture admitted to the engine. The variation in height h between the level N_1 and the bottom of the reservoir is small enough to have practically no influence on the delivery of fuel by the venturi 9—10.

For slow running the throttle 15 is closed and it is then that the venturi 9^a—10^a acts in combination with the tube 7^a and the air passing through the chanenl 16 in order to furnish the appropriate carbureted mixture. During this slow running the same conditions of regulation of the head on the valve 9^a—10^a are realized as during normal running for the venturi 9—10.

What I claim is:—

1. Means for supplying fuel at a substantially constant hydrostatic head, to an internal combustion engine, from a main reservoir situated below the engine, comprising a constant-level chamber situated within the lower part of the main reservoir, said constant-level chamber being provided with an opening at the bottom thereof within the main reservoir and in close proximity to the bottom of the main reservoir, a constant-level float regulated valve for said opening, a free air vent leading from the upper part of the constant-level chamber to the outside air, and an engine liquid fuel supply pipe leading directly from substantially the bottom of the constant-level chamber out through the main reservoir, said pipe being arranged to have its lower end submerged in and sealed by the liquid in said constant-level chamber during normal operation, together with a Venturi tube situated in the immediate neighborhood of the main reservoir above the up-

per level of the fuel in the main reservoir, said venturi being arranged to be fed with liquid fuel from said supply pipe and adapted to produce a mixture of air and fuel for the engine.

2. Means for supplying fuel as claimed in claim 1 in which the main tank is provided with an opening to allow the constant-level chamber to pass, with a plug arranged to close the opening, said Venturi tube being mounted upon the plug outside the main reservoir and said constant-level chamber being suspended from said plug within the reservoir.

3. Means for supplying fuel at a substantially constant hydrostatic head, to an internal combustion engine, from a main reservoir situated below the engine, comprising a constant-level chamber situated within the lower part of the main reservoir, said constant-level chamber being provided with an opening at the bottom thereof within the main reservoir and in close proximity to the bottom of the main reservoir, a constant-level float regulated valve for said opening, a free air vent leading from the upper part of the constant-level chamber to the outside air, and an engine liquid fuel supply pipe leading directly from substantially the bottom of the constant-level chamber out through the main reservoir, said pipe being arranged to have its lower end submerged in and sealed by the liquid in said constant-level chamber during normal operation, together with a Venturi tube situated in the immediate neighborhood of the main reservoir above the upper level of the fuel in the main reservoir, said venturi being arranged to be fed with liquid fuel from said supply pipe and adapted to produce a mixture of air and fuel for the engine, and a secondary carburetor Venturi tube adapted to supply a further quantity of air, and a rich mixture tube arranged to convey the relatively rich mixture from the first mentioned Venturi tube to the said secondary carburetor venturi.

4. Means for supplying fuel as claimed in claim 3 having a throttle valve in the secondary Venturi tube situated up stream of the restriction in said tube, an idling liquid fuel supply pipe extending from near the bottom of the constant-level chamber out through the main reservoir, an idling Venturi tube situated similarly to said first mentioned Venturi tube and arranged to be fed with liquid from said idling liquid fuel supply pipe and produce a mixture of air and fuel, and an idling mixture tube arranged to convey the mixture produced by said idling Venturi tube to a point within the secondary Venturi tube down stream of the throttle valve.

5. Means for supplying fuel at a substantially constant hydrostatic head to an internal combustion engine from a main reservoir situated below the engine, comprising a constant-level chamber situated within the lower part of the main reservoir, said constant-level chamber being provided with an opening at the bottom thereof within the main reservoir and in close proximity to the bottom of the main reservoir, a float controlled valve for said opening, a free air vent leading from the upper part of said constant-level chamber to the outside air, an engine liquid fuel supply pipe leading directly from substantially the bottom of the constant-level chamber out through the main reservoir, said pipe being arranged to have its lower end submerged in and sealed by the liquid in said constant-level chamber, a primary Venturi tube mounted outside the main reservoir above the upper level of the fuel in said main reservoir, said primary Venturi tube being arranged to be fed with liquid fuel from said supply pipe and to produce a mixture of air and fuel, a secondary carburetor Venturi tube arranged to be supplied with the mixture of air and fuel produced by said primary Venturi tube and to supply additional air thereto, and means responsive to the suction in the secondary Venturi tube for controlling the amount of additional air.

In testimony whereof I have affixed my signature.

EDOUARD SEIGNOL.