F. H. GIBBS.

FUEL FEED SYSTEM FOR INTERNAL COMBUSTION ENGINES.

APPLICATION FILED MAR. 24, 1916.

1,303,290.

Patented May 13, 1919.

3 SHEETS—SHEET 1.

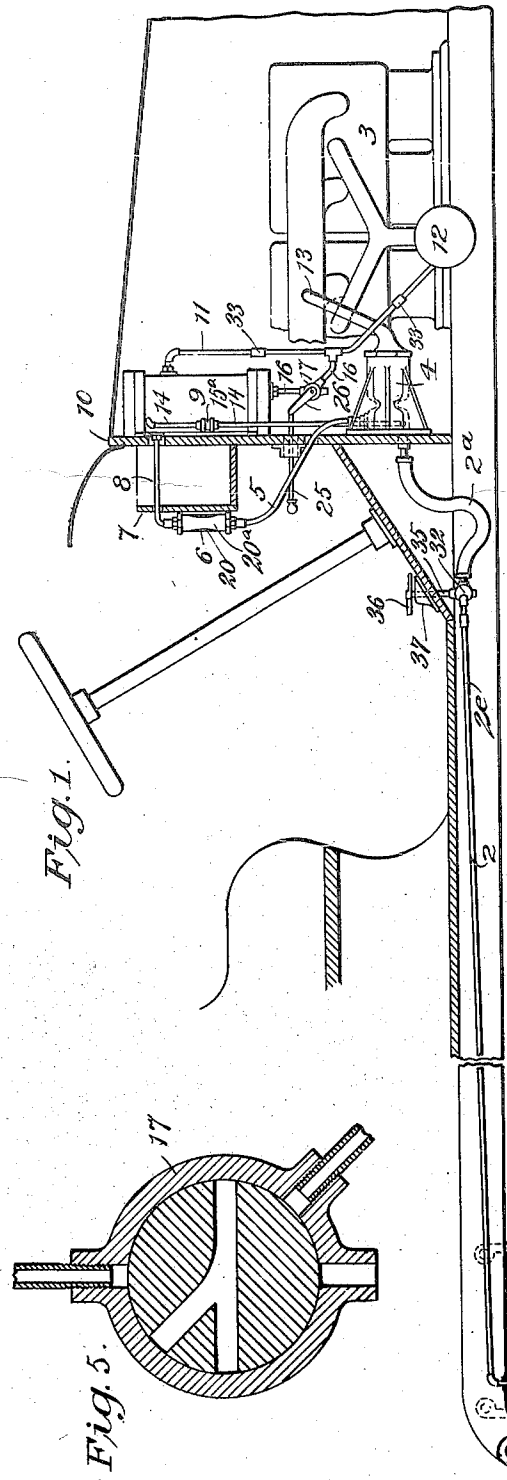

Fig. 1.

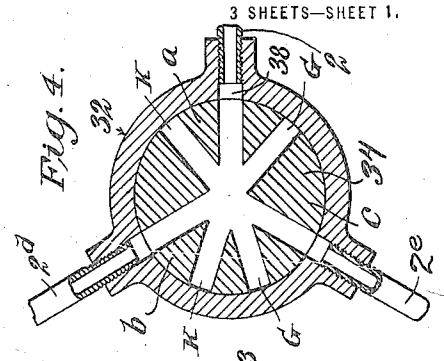

Fig. 4.

Fig. 3.

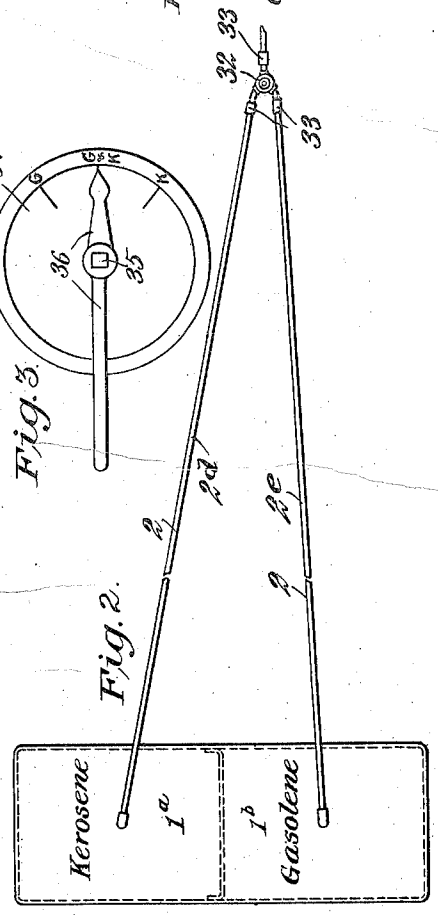

Fig. 2.

Fig. 5.

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Fig. 9.

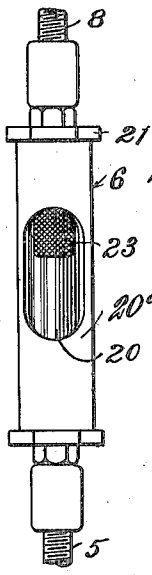


Fig. 10.

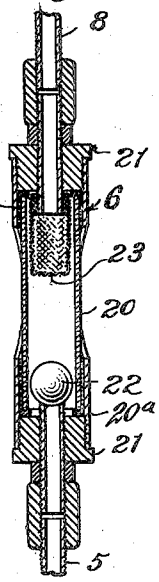


Fig. 6.

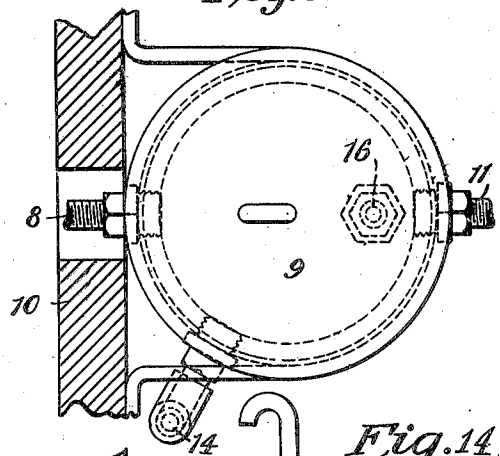


Fig. 14.

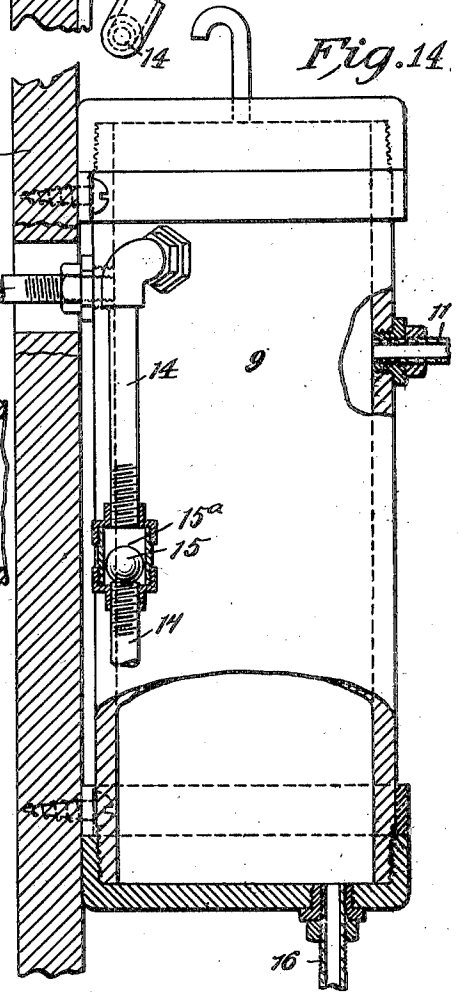


Fig. 7.

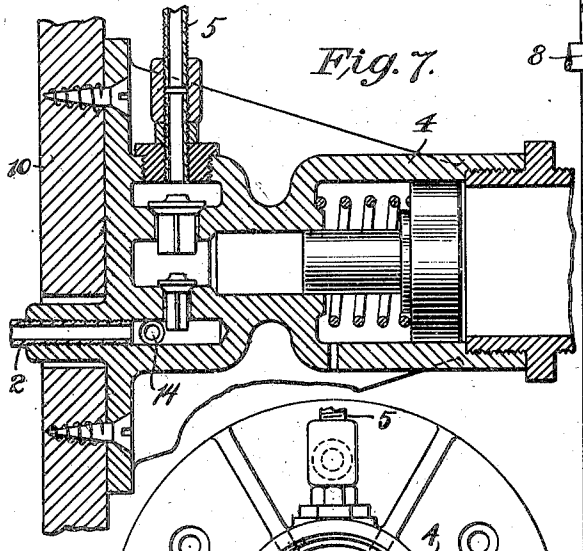
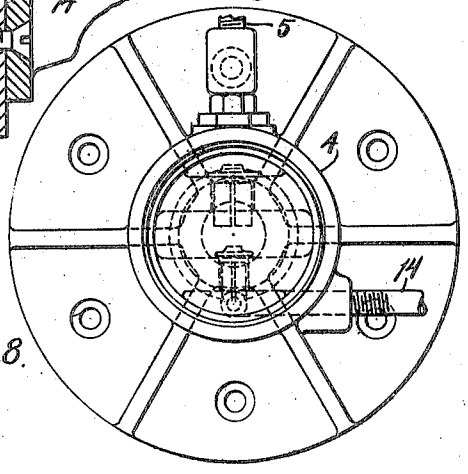


Fig. 8.



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3 SHEETS—SHEET 3.

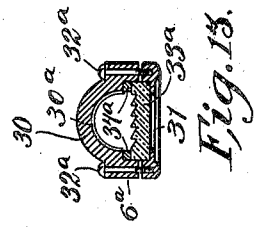

Fig. 13.

Fig. 12.

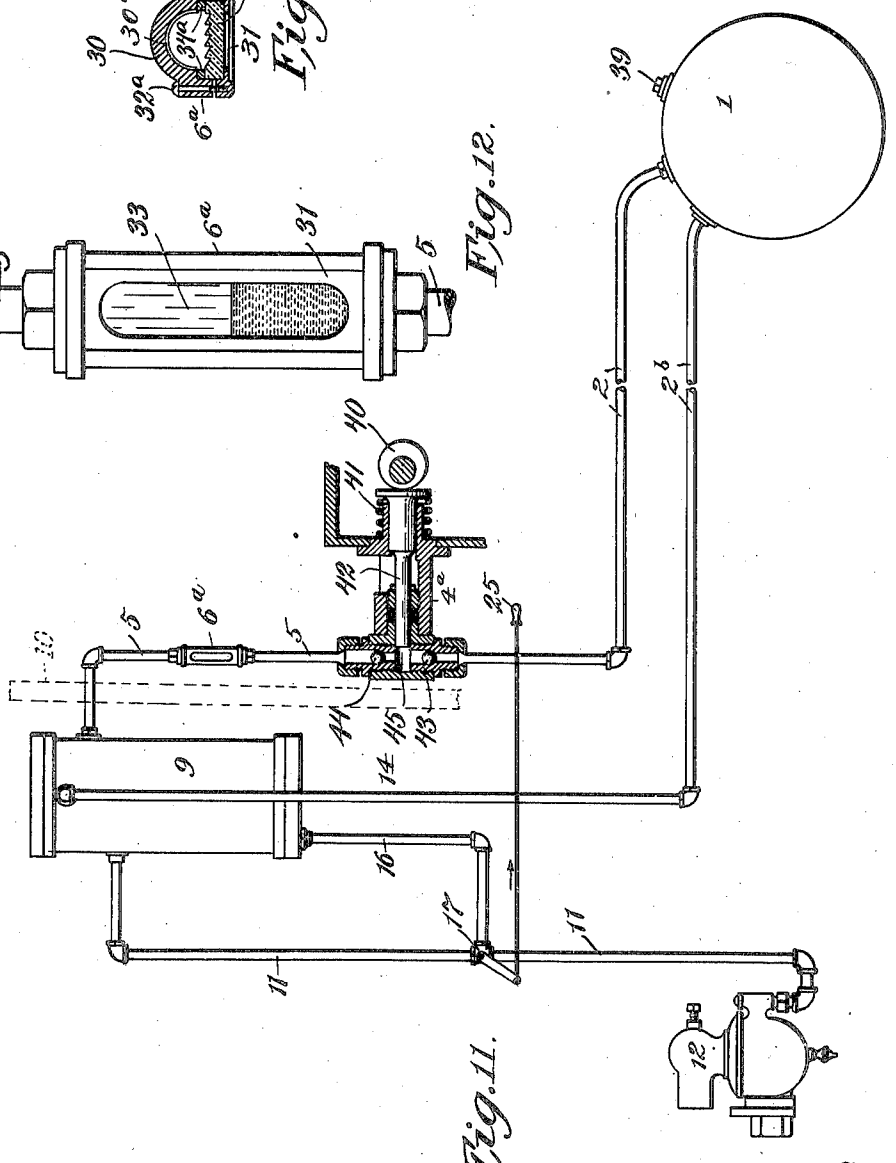

Fig. 11.

Inventor

Frederick W. Gibbs

UNITED STATES PATENT OFFICE.

FREDERICK H. GIBBS, OF BROOKLYN, NEW YORK.

FUEL-FEED SYSTEM FOR INTERNAL-COMBUSTION ENGINES.

1,303,290. Specification of Letters Patent. Patented May 13, 1919.

Application filed March 24, 1916. Serial No. 86,473.

To all whom it may concern:

Be it known that I, FREDERICK H. GIBBS, residing at Brooklyn, county of Kings, city and State of New York, and being citizen of the United States, have invented certain new and useful Improvements in Fuel-Feed Systems for Internal-Combustion Engines, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and to use the same, reference being had to the accompanying drawings, which illustrate the preferred form of the invention, though it is to be understood that the invention is not limited to the exact details of construction shown and described, as it is obvious that various modifications thereof will occur to persons skilled in the art.

In said drawings:

Figure 1 is a diagrammatic view substantially representing a longitudinal section through the major portion of an automobile and shows an installation of my improved fuel feed for internal combustion engines;

Fig. 2 is a plan view illustrating a plural compartment main fuel supply tank and branches of the conduit extending therefrom as to a carbureter and engine;

Fig. 3 is a detail plan view of an indicator for a valve controlling the character of the liquid fuel;

Fig. 4 is a horizontal section through the liquid fuel control valve;

Fig. 5 is a vertical section through the emergency and draw-off valve;

Fig. 6 is a plan view of an auxiliary tank;

Fig. 7 is a vertical section through the pump;

Fig. 8 is an end elevation of the pump, the end receiving impulses from the engine exhaust being shown nearest the observer;

Fig. 9 is an elevational view of the sight feed;

Fig. 10 is a vertical section therethrough;

Figs. 11, 12 and 13 illustrate a modified form of a fuel feed for internal combustion engines, in which Fig. 11 is a diagrammatic view of the feed system; Fig. 12 is a front elevation of the improved sight feed included therein, and Fig. 13 is a horizontal section through the sight feed of Fig. 12; and

Fig. 14 is a side elevation of the auxiliary tank of the fuel feed illustrated in Fig. 1.

One of the objects of the invention is to provide means for indicating to the operator or driver of the automobile or other vehicle, the fact that gasolene or other fuel feed is being regularly supplied to a carbureter employed with an internal combustion engine.

Another object is to indicate exhaustion of fuel from the main fuel tank.

Another object is to strain the liquid fuel in such position relative to the other parts that the strainer is readily accessible for inspection or removal for cleaning, etc.

Another object is to provide an auxiliary tank for gasolene or other liquid fuel which is intended to be nearly full at all times, except when emergency requires that its contents be used.

Another object is to provide such a system of liquid fuel feed that not only is the regularity of feed under constant observation, but includes a settling tank from which the lighter or more volatile fuel is normally drawn upon through an overflow conduit, thence by gravity through the conduit to an internal combustion engine, passing first through a carbureter.

It is old in the art to feed dark lubricating oils downwardly past an observation port; it is also old to feed such dark lubricating oils upwardly through a column of lighter colored fluid as water. It is old to feed water of condensation through a column of dark lubricating oil, the water passing between an observation port and some of the darker lubricating oil so as to visualize its presence.

In all such cases the light and dark fluids are easily distinguishable.

Fuels such as hydrocarbons (gasolene etc.) commonly used in internal combustion engines are transparent and a small column of such fuel is practically indistinguishable while flowing through a feed observation device or "sight feed" in ordinary automobile use.

The person "driving" a motor car has practically no opportunity to watch the flow of transparent liquids. He should be alert to other things familiar to all who have attempted to drive a car in cities.

A cork, a bright metal float or a colored float or other suitable buoyant body floating in a column of gasolene is readily discernible, however. Hence I prefer to employ a buoyant means or float which can be controlled by the flow of fluid in the conduit leading from the source of supply to the

carbureter so as to give due notice that such fluid is active.

In the particular application of such means illustrated the float consists of a ball within a glass tube which latter is cemented, preferably by employment of a suitable asbestos cement, in a metal tube, coincident portions of which are cut away to permit sight through a portion of the glass intermediate its top and bottom ends. Leading to the interior of the glass tube are intermitted portions of the fuel conduit and in the upper end of said tube is a removable fuel strainer which functions to strain the fuel and also as a means to prevent lodgment of the feed indicating float in the upper or exit end of the sight feed.

Positioning the removable strainer within a feed indicating means secured in plain sight of a person in the car permits ready inspection of the strainer while the car is traveling.

One of the objects of the invention is to combine the fuel strainer and fuel feed indicator in a single instrument in the fuel conduit from which it may be easily removed for cleaning or repairs.

Another object is to provide a plurality of fuel tanks for different kinds or grades of fuel, as gasolene and kerosene, which may be mixed and fed in solution or which may be employed separately as may be desired.

Another object is to provide an emergency conduit from the auxiliary tank to the normal overflow feed conduit which may be opened for passage of fuel to the carbureter to start the engine or for use in drawing a supply from the auxiliary tank after the main fuel tank is empty, or at any other desired time.

Other objects and advantages will appear from the following description.

Referring particularly to the parts, 1 indicates a main fuel supply tank, which may have an undivided interior, or be subdivided into uncommunicating compartments, as preferred. 2 the main conduit from said tank, which conduit leads untimately to an internal combustion engine 3, passing first through pump 4 thence upwardly through conduit branch 5, through sight feed-indicator 6, which is located preferably on the instrument board 7 of an automobile or other motor vehicle, the conduit passing through the sight feed thence forwardly through conduit extension 8 into auxiliary tank 9, which is positioned in juxtaposition to and is preferably secured on the front face of dash board 10. The main fuel conduit terminates at the auxiliary tank, from which an overflow conduit 11 extends from an upper portion of said auxiliary tank, as indicated, downwardly to a carbureter 12, thence through a suitable manifold into an internal combustion engine 3.

For convenience of operation, the pump 4 is preferably of such a type that it may be driven by the exhaust from the engine 3 and for that purpose a suitable conduit 13 is provided from the exhaust side of the engine to the pump. As details of construction of the pump are unimportant to the principal invention, its detail construction will be hereinafter considered.

Extending from near the top of the auxiliary tank 9 to and connecting with the main conduit 2, is another overflow conduit 14 tapping the main circuit between the pump 4 and the main fuel tank 1.

In the drawings, conduit 14 extends downward to the valve chamber portion of pump 4, there tapping into the passage in the pump casting which is provided for the reception of the piping of conduit 2 which extends from trap 2^a to the inlet of pump 4. Figs. 1 and 7 best illustrate this particular arrangement.

The upper end of conduit 14 preferably enters auxiliary tank 9 at a point somewhat higher than does the similar end of conduit 11. As a consequence, the liquid fuel in auxiliary tank 9 normally overflows through conduit 11 to carbureter 12. Should the fuel be pumped too rapidly at any time into auxiliary tank 9, instead of filling the same and causing a pressure that might cause the fuel to flood the carbureter, the excess liquid fuel overflows into conduit 14.

To ordinarily close the passage from the overflow conduit 14 to the main conduit 2 while the pump is in operation, a buoyant valve or float 15 is provided which is contained in a chamber 15^a and will float in the fuel passing down the conduit 14 during an abnormal inflow of fuel into auxiliary tank 9, but which will be drawn downwardly by the suction of the pump to close the lower portion of the conduit 14 as illustrated, thereby cutting off the flow of fuel from the overflow conduit 14 to main conduit 2 while the pump is properly supplying tank 9, or is required. As the pump need only operate when fuel in the auxiliary tank 9 is below the normal feed level at the opening from said tank into the conduit 11 and the connection of the overflow conduit 14 with said tank is above said level, it is apparent that fuel will overflow in the conduit 14 only when there is an excess of fuel in the auxiliary tank, at which time it is not important that the pump operate to its maximum efficiency, or in fact that it operate at all. The buoyancy of the float 15 does not prevent the proper operation of the pump when fuel in the auxiliary tank is below the normal feed level.

Communicating with the lower portion of the auxiliary tank 9 and the conduit 11, is an emergency feed pipe 16 in which is provided a cut-off valve 17 which is normally closed, thereby normally preventing passage

of fuel through said emergency feed pipe, but permitting feed through said pipe when the fuel in tank 1 is exhausted by operating handle 25, which is in convenient reach of the driver, thereby providing an emergency supply of fuel to carry the motorist to a convenient supply station.

Drawing the supply for the engine normally from the upper portion of the emergency or auxiliary tank 9 results in the heavier portion of the fuel settling to the bottom of said tank, and if desired this may be drawn off through the stop valve 17 which is a two-way valve affording communication through the emergency feed pipe 16 and from the tank 9 through the upper portion of said feed pipe, thence through the valve 17 to the atmosphere.

Referring to the sight feed-indicator 6, it will be noted that the body portion intermediate the top and bottom thereof comprises preferably a glass tube 20 seated in a suitable retainer comprising a metallic or other shell 20^a having one or more sight ports and removable retaining bushings 21 at the top and bottom of glass tube 20 and shell 20^a, suitable packing being provided to prevent leakage of the fuel at the joints between the parts.

In the bottom portion of the sight feed-indicator, a buoyant float 22, which may be cork, a hollow metal body or other suitable material, is provided and inclosing the lower end of the conduit extension 8 within the glass portion of the sight feed-indicator, is a strainer 23 which serves the double function of preventing the float 22 passing upwardly and becoming lodged in the lower open end of the conduit extension 8, and at the same time effectually strains the gasolene or fuel within sight of the driver, so that if foreign matters are caught by the strainer they may be observed and removed without the usual inconvenience of attempting to reach the almost inaccessible strainers now provided in the main gasolene line.

While the engine is running, its exhaust will actuate the pump, thereby drawing gasolene or other fuel from the tank and into and through the sight feed-indicator 6, within which the float 22 will be suspended while the supply of fuel remains in the tank 1, but as soon as the contents of tank 1 are exhausted, this condition will be indicated by the fact that the float will drop to the bottom of the sight feed-indicator and remain in that position, thereby giving warning to the driver that his principal supply of fuel is exhausted, whereupon he may, from the interior of the car, manipulate the rod 25, thereby opening the stop valve 17 and permitting fuel to flow by gravity from the auxiliary tank 9 downwardly to the carbureter, said rod 25 being connected with the arm 26 of valve 17.

I am aware that it is common practice to employ glass tubes for observation set into by-pass conduits which connect at their upper and lower ends with reservoirs, boilers etc. to indicate the amount of fluid etc. therein and in such tubes floats of various kinds have been provided. When the floats have not been employed the observation glass or a port therein has been formed of glass with facets on its inner face and a colored background in alinement therewith has been provided to render visible the fluid but all these things have been provided in by-passes apart from the main feed conduit. Hence, if used as heretofore would fail to indicate the actual flowing of fuel feed from a main tank to a carbureter.

It is immaterial to the present invention what may be provided so long as it serves to indicate activity of the fuel feed.

The strainer 23 of sight feed 6 is but one of the precautions taken against the lodgment of foreign particles in the conduits comprised in the fuel feed system. A trap 2^a is included in the conduit 2 and extends between the valve 32 located at the junction of the branches 2^d and 2^e of conduit 2 and pump 4. Foreign substances of greater specific gravity than that of the liquid fuel will become deposited in the lower bend of trap 2^a and will therefore not enter the pump 4, where they might interfere with the proper seating of the valves of the pump. The piping in the circulatory system is either of comparatively short pieces easily removed and cleaned, or is intermitted and connected by unions 33 which will allow the pipe line to be separated into segments, it only being necessary to uncouple the segment in which trouble is located.

Likewise trap 2^a may be easily uncoupled and cleaned.

When a motorist desires to merely drive his car about town he may, if he chooses, use gasoline alone as a fuel. There are other occasions, however, when he will desire to take more or less extended tours in the course of which the price of gasolene will be a material factor. In the present fuel feed it is contemplated that a conservation of gasolene may be had by either combining kerosene or some other lower priced hydrocarbon with the gasolene, or by using kerosene alone at such times as it is feasible to do so.

To this end, conduit 2 is branched as seen in Fig. 2, wherein branch 2^d of conduit 2 is seen to run from a kerosene compartment 1^a in tank 1, while branch 2^e of conduit 2 runs from a gasolene compartment 1^b in said tank 1, both branches converging and being connected with valve 32.

A horizontal section of valve 32 is shown in Fig. 4, and discloses ports in the shell of the valve to which branches 2^d and 2^e are respectively connected. A rotary valve mem-

ber 34 is seated within the valve shell and provided with a plurality of passages. Rotary valve member 34 is provided with an upwardly extending stem 35, best seen in Fig. 1, upon the upper end of which is fixed an indicator 36 adapted to be swung over a dial on a pressed metal bracket 37, which may be conveniently mounted near the floor of the automobile. The dial contains a number of radial lines marked, respectively, "G", "G & K" and "K". The driver of the motor vehicle may, while seated in the usual driving position, control the character of the fuel by operating the indicator 36 with his foot, and when he so operates it that the pointer end is directed toward the reading "G & K", the rotary valve member 34 will be in the position illustrated in Fig. 4. Under these conditions, and with the pump operating, gasolene will be drawn through branch 2^e of conduit 2, and kerosene will be drawn through branch 2^d of said conduit, both types of fluid passing through valve 32 and out through the exit port 38 of the valve 32, and thence to pump 4 and in the previously described way to the carbureter 12. Should it be desired to use gasolene alone, indicator 36 is moved by the driver so that the pointer registers with the line marked "G", whereupon valve member 34 of valve 32 will be so rotated that the passages G in said rotary valve member 34 will register, respectively, with branch 2^e and valve exit port 38. When this occurs branch 2^d of conduit 2 will be cut off and only gasolene will be fed to pump 4. Believing it advisable to use kerosene alone, indicator 36 is oppositely oscillated to bring the pointer end into alinement with the graduation K, and this results in the rotary valve member 34 being so turned that the passages K register, respectively, with branch 2^d of conduit 2 and the valve exit port 38, whereupon kerosene alone will be fed to pump 4. It is to be noted that rotary valve member 34 may be so turned that some of its segmental portions, such for example as *a*, *b* and *c*, may be made to close all of the ports of valve 32, it then being impossible for any unauthorized person to continuously operate the automobile, particularly if a locking device is associated with the off position of indicator 36.

Figs. 11, 12 and 13 illustrate a modified fuel feed in which there is a single main fuel supply tank 1, which has but a single undivided chamber and is provided with a vent 39 from the interior of that chamber to the atmosphere. A single line conduit 2 runs from the interior of main supply tank 1 to a pump 4^a, which is of a slightly modified type. The principal difference between pumps 4 and 4^a of the first and second described forms of fuel feed, respectively, is that pump 4 is actuated by impulses from the exhaust of the engine 3, while pump 4^a is operated by a cam 40 and a spring 41. The balance of the operation of both pumps being substantially the same in effect, and the following description, so far as pump action is concerned, is sufficient to indicate the operation of each.

When plunger 42 of pump 4^a is being withdrawn to the position indicated, valve 43 is drawn upwardly by the suction created by plunger 42 and the inlet valve and the pump outlet valve 44 is drawn more tightly to its seat. Gasolene is also drawn into the chamber 45 during this withdrawing movement of plunger 42. A reversal in the movement of plunger 42 causes pump inlet valve 43 to be tightly seated and outlet valve 44 to become unseated, said plunger 42 forcing the gasolene or other hydrocarbon fluid through conduit 5, sight feed 6 and the remainder of conduit 5 to the auxiliary tank 9. Entering said tank in its upper portion, is an overflow conduit 11 leading to the carbureter 12 which is associated with the engine in a manner similar to that shown in Fig. 1 of the previously described form of fuel feed. Valve 17 is located in conduit 11 at a point below auxiliary tank 9 and under normal conditions is open so as not to obstruct the passage of the gasolene or other fuel to carbureter 12. As before, another over-flow conduit entering auxiliary tank 9 at a somewhat higher point, runs, in this instance, back to the main supply tank 1 and is for the same purpose as conduit 4 of the fuel feed illustrated in Fig. 1.

In Fig. 11, overflow conduit 14 is a directed closed line of communication between auxiliary tank 9 and main supply tank 1.

When the supply of gasolene in main tank 1 is exhausted, there will still remain a reserve supply in the auxiliary tank 9 for emergencies, allowing a continued limited operation of the motor-driven vehicle. Main supply tank 1 being substantially empty, no more gasolene is pumped through conduit 2 and conduit 5, the gasolene still remaining in conduit 5 gradually draining back, during operation of the pump, to main supply tank 1. As the gasolene in conduit 5 so drains, its upper level becomes apparent in sight feed 6^a, warning the motor vehicle operator that he must seek a place of fuel replenishment.

Sight feed 6^a differs somewhat in detail from sight feed 6 of Figs. 1, 9 and 10. It comprises a main semi-cylindrical body portion 30, having the internal face of its liquid-retaining wall colored as at 30^a, and a front face portion 31 secured together by screws 32^a or other suitable means. The front face of plate portion 31 is provided with a sight port, back of which is positioned an observation glass 33^a, provided with facets, a suitable seal 34^a being interposed between the main semi-cylindrical

body portion 30 and the facet-glass 33ª. On account of the facets, observation glass 33ª acquires well-known optical characteristics based upon the optical law of the total reflection of light when passing through a medium of greater refractory power into a medium of less refractory power. This optical law and its use is well known and without entering into its philosophy, it will be sufficient to state that that part of the observation glass which is not backed by a hydrocarbon fuel that would cover the color-backing on the curved internal face of body portion 30, will have a markedly different aspect from that which is so backed. As a result, a clear line of demarcation is discernible between the empty portion of sight feed 6ª and that not emptied, and this difference in appearance in the different portions of the observation glass, seen through the port in face plate 31, will immediately call attention of the driver of the automobile to the fact that his main supply tank 1 is exhausted.

From the bottom of auxiliary tank 9, a conduit 16 extends to valve 17, but normally said valve is closed with respect to its conduit 16. Noting the above referred to warning in said glass 6ª the automobile driver pulls handle 25, thereby rotating the handle of valve 17 and causing said valve to open communication between conduit 16 and conduit 11, so that gasolene will feed from auxiliary tank 9 through conduits 16 and 11 to carbureter 12, and the operation of the motor driven vehicle may be continued as before until auxiliary tank 9 is exhausted.

As previously intimated, the positioning of the rotary valve member 34 so that it closes all of the ports in valve 32, *i. e.*, those connected with branches 2ᵈ and 2ᵉ of conduit 2 and also valve exit port 38, completely shuts off the supply of fuel. The motor of the automobile may, however, be operated for a comparatively short time by reason of the reserve supply of fuel in auxiliary tank 9. The complete shutting off of fuel by the proper positioning of rotary valve member 34 has an added advantage in that if it be desired to continuously operate the motor vehicle, but to change from one type of fuel to another, valve 32 may be so regulated as to shut off all further fuel supply until auxiliary tank 9 has been emptied, after which valve 32 may be opened in such manner as to give a fuel supply of different character which will replace that emptied from auxiliary tank 9.

What I claim is:

1. In an automobile, the combination with a seat and a support therefor, a fuel supply main-tank below the level of said seat, an internal combustion engine, a conduit from said main tank to said engine, a pump, means for preventing fuel-residuum from reaching said engine, and a movable fuel feed-indicator in said conduit supported in such proximity to the seat as to be visible to a person occupying said seat.

2. In an automobile, the combination with a seat and a support therefor, a fuel supply main-tank below the level of said seat, an internal combustion engine, a conduit from said main tank to said engine, a pump, and an elevated auxiliary fuel receptacle adapted to contain an emergency supply of fuel in said conduit, and a movable fuel feed-indicator in said conduit located intermediate said main tank and auxiliary receptacle and supported in such proximity to the seat as to be visible to a person occupying said seat.

3. In an automobile, the combination with a seat and a support therefor, a fuel supply main-tank and an internal combustion engine below the plane of said seat, a fuel conduit from said main-tank to said engine extending above the plane of the seat, a sight-feed-indicator in said conduit comprising a visible float positioned above the plane of the seat so as to be visible to an occupant of said seat and a pump in said conduit adapted to force fuel through said sight-feed-indicator to said engine.

4. In an automobile, the combination with a seat, of a fuel supply main tank, an auxiliary tank extending to a higher plane than said seat, a carbureter for an internal combustion engine extending below the plane of said auxiliary tank, a conduit from said main tank to said auxiliary tank and extending in part through the space between said seat and said auxiliary tank, a pump and a fuel-feed-indicator comprising a movable member in said conduit, the sight-feed-indicator being positioned between the seat and the auxiliary tank and a conduit connecting the auxiliary tank with the carbureter.

5. In an automobile, the combination with a seat, of a fuel supply main tank, an auxiliary tank extending to a higher plane than said seat, a carbureter for an internal combustion engine extending below the plane of said auxiliary tank, a conduit from said main tank to the upper part of said auxiliary tank and extending in part through the space between said seat and said auxiliary tank, a pump and a fuel-feed-indicator positioned between the seat and the auxiliary tank, and a conduit having plural branches leading respectively to an upper and a lower part of said auxiliary tank, connecting the auxiliary tank with the carbureter.

6. In an automobile, a dash-board or partition separating an engine space from a passenger carrying space thereof, an internal combustion engine on one side of said dash-board and a seat on the other side thereof, a fuel supply main tank, an auxiliary fuel tank secured to the engine side of said dash board, a sight feed-indicator formed sepa-

rately from said auxiliary tank and comprising means adapted to visualize the flow of fuel to said auxiliary tank, secured in position on the seat side of said dash-board, and a conduit from said main tank to and from the sight feed-indicator and the auxiliary tank and to said engine.

7. In combination in a motor vehicle, a fuel tank, a carbureter, a conduit adapted to supply liquid fuel from the tank to the carbureter, means in the conduit adapted to be controlled by the liquid fuel therein to visualize the flow of fuel in said conduit, and a fuel-accumulator elsewhere in said conduit.

8. In a fuel supply system for automobiles, the combination of a body, a fuel supply main tank near one end thereof, an internal combustion engine near another end thereof, a single line conduit from said main tank to said engine, a pump in said conduit, a fuel feed-indicator in said conduit in position to be visible to an occupant of said body and a separately formed auxiliary fuel tank and a carbureter between said feed indicator and said engine.

9. In an automobile, an internal combustion engine, a carbureter therefor, a passenger carrying part, a dash-board or partition between the engine and the passenger carrying part, a fuel supply main-tank, a fuel pump, a fuel sight-feed-indicator comprising a transparent portion and a buoyant body between said pump and dashboard on the passenger side of said dash board at an altitude higher than said carbureter, and a conduit from said main tank leading to and from said pump, to and from said sight-feed-indicator and to said carbureter.

10. In combination, an internal combustion engine, a main tank for fuel, a conduit for fuel communicating with said tank, a pump, an auxiliary fuel receptacle at a higher level than said main fuel tank and means intermediate said tank and receptacle controllable by flow of fluid in said conduit adapted to indicate exhaustion of fuel from said main tank.

11. In combination, an internal combustion engine, a main tank for fuel, a conduit for fuel communicating with said tank, a pump, an auxiliary fuel receptacle at a higher level than said main fuel tank, means separate from but in communication with said tank and receptacle controllable by flow of fluid in said conduit adapted to indicate exhaustion of fuel from said main tank, a carbureter in communication with said engine and a gravity feed conduit from said auxiliary fuel receptacle to said carbureter.

12. In combination, an internal combustion engine, a main fuel-supply-tank adapted to contain fuel at about atmospheric pressure and a combined fuel-feed and supply-indicating means including a main conduit in communication with said main fuel-supply-tank and comprising a power fuel-pump, an auxiliary fuel-tank at a level above said main fuel-supply-tank and a structurally independent fuel-feed indicating device in said main conduit controllable by flow of fuel in said conduit, a carbureter for said engine, and a gravity feed conduit from said auxiliary fuel tank to said carbureter.

13. In combination with an internal combustion engine, a carbureter therefor, a main fuel-supply-tank adapted to hold fluid at about atmospheric pressure and a combined fuel-feed and supply-indicating means, comprising a conduit in communication with said main fuel tank, a power fuel pump in said conduit, an auxiliary fuel tank at a level higher than said main tank and said carbureter in communication with said pump, an overflow conduit from said auxiliary tank, a transparent feed-sight or inspection port in said conduit through which said auxiliary tank is invisible, a float controllable by the flow of fuel in said conduit, and a gravity fuel feed conduit from said auxiliary tank to said carbureter.

14. In a fuel feed system for hydrocarbon engines, in combination, a main-fuel tank, an auxiliary tank, a conduit adapted to supply fuel to said auxiliary tank from said main tank and means in said conduit removable therefrom without disturbing the structure of said auxiliary tank and being controlled by the flow of fuel in said conduit to indicate when the supply of fuel is active.

15. In a fuel feed system for hydrocarbon engines, in combination, a main fuel tank, an auxiliary tank, a conduit adapted to supply fuel to said auxiliary tank from said main tank, a pump in said conduit intermediate said tanks and means in said conduit controlled by the flow of fuel affected by said pump adapted to indicate a flow of fuel to but not in said auxiliary tank.

16. In a fuel feed-system for hydrocarbon engines, in combination, a main fuel tank, an auxiliary tank, a conduit adapted to supply fuel to said auxiliary tank from said main tank and a combined fuel strainer and means controlled by the flow of fuel in said conduit adapted to indicate a flow of fuel to said auxiliary tank.

17. In a fuel feed system for hydrocarbon engines, a fuel tank, an engine, a conduit from said tank to said engine, and a fuel strainer combined with means controlled by the flow of fuel in said conduit indicating a flow of fuel in said conduit.

18. In a fuel feed system for hydrocarbon engines, in combination, a main fuel tank, an auxiliary tank, a main conduit adapted to supply fuel to said auxiliary tank from

said main tank, means in said conduit intermediate the main fuel tank and said auxiliary tank adapted to be affected by the flow of fuel in said conduit to visualize the flow of fuel in said main conduit, an internal combustion engine, a carbureter therefor and a conduit from said auxiliary tank to said carbureter.

19. In a fuel system for hydrocarbon engines, in combination, a plurality of fuel supply receptacles, a pair of branch fuel supply conduits from said receptacles merging in a single conduit leading to an engine, a valve in said conduit adapted to control the flow of fuel therein and means controllable by the flow of fuel in said conduit adapted to indicate when the fuel is flowing through said conduit.

20. In combination in a device of the character indicated, a conduit for liquid fuel, a buoyant body adapted to indicate the passage of fuel through said conduit, and means adapted to strain fuel passing through the conduit.

21. In a fuel feed system for internal combustion engines, tanks adapted to contain different kinds of fuel, an engine, a conduit having branches to the tanks to receive the different kinds of fuel and leading to said engine, and a fuel feed indicator in said conduit operable to indicate the flow of fuel passing through the conduit from said tank to said engine.

22. In a fuel feed system for internal combustion engines, fuel receptacles, an engine, a conduit having a plurality of branches to the receptacles to receive the different kinds of fuel and leading to said engine, a pump for forcing fuel from the receptacles to said engine, and an indicator in said conduit between said receptacles and pump operable to control the kind of fuel passing through said conduit to said engine.

23. In a fuel feed system for hydrocarbon engines, a plurality of tanks, an engine, a conduit branch to each tank and a single conduit leading to said engine, an indicator with which said branches and single conduit connect operable to place said single conduit in communication with a desired conduit branch or branches, and means for causing a flow of fuel from said tanks to said engine.

24. In an automobile, an engine, a passenger-carrying part, a plurality of receptacles, a conduit from said receptacles to said engine and having a branch to each of said receptacles, an observable indicator in said passenger-carrying part and means operable by a passenger to place a desired branch or branches in communication with the remainder of said conduit, and a pump for forcing fuel from said receptacles to said engine.

25. In combination in a motor vehicle, a fuel supply main tank, an auxiliary tank, a carbureter, a conduit adapted to supply liquid fuel from said main tank to said auxiliary tank and carbureter, and a fuel indicator in said conduit intermediate said main and auxiliary tanks.

26. In an automobile, an engine-carrying portion and a passenger-carrying portion, a fuel supply main tank in the latter portion, an auxiliary tank and a carbureter in the engine-carrying portion, a conduit adapted to supply liquid fuel from said main tank to said auxiliary tank and carbureter, and a fuel indicator in said conduit between said main and auxiliary tanks positioned in the passenger-carrying portion to be observed by a passenger.

27. In combination in a motor vehicle, a fuel supply main tank, an auxiliary tank having a fuel-storing portion, a carbureter, a conduit adapted to supply liquid fuel to the storage portion of said auxiliary tank and to said carbureter, a fuel indicator between said main and auxiliary tanks, a supplemental conduit from the storage portion of said auxiliary tank to said carbureter, and a control valve therefor.

28. In a fuel feed system for internal combustion engines of the class wherein liquid fuel is caused to flow from a fuel supply main tank through a conduit to an auxiliary tank and therefrom to a carbureter, a fuel feed indicator included in said conduit between said main and auxiliary tanks and being adapted to indicate the passage of fuel through the conduit.

29. In a fuel feed system for internal combustion engines of the class wherein liquid fuel is caused to flow from a fuel supply main tank through a conduit to an auxiliary tank and therefrom to a carbureter, a fuel feed indicator in a portion of said conduit that is spaced from said auxiliary tank, said indicator having means adapted to indicate when the flow of fuel is active, said means being controlled by the flow of fuel.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

FREDERICK H. GIBBS.

Witnesses:

F. M. RUPPERT,

JAS. E. HUTCHINSON.