June 16, 1925. 1,541,851

W. M. RISTAU, JR

DUAL FUEL SUPPLY SYSTEM

Filed Aug. 5, 1924

Fig. 1.

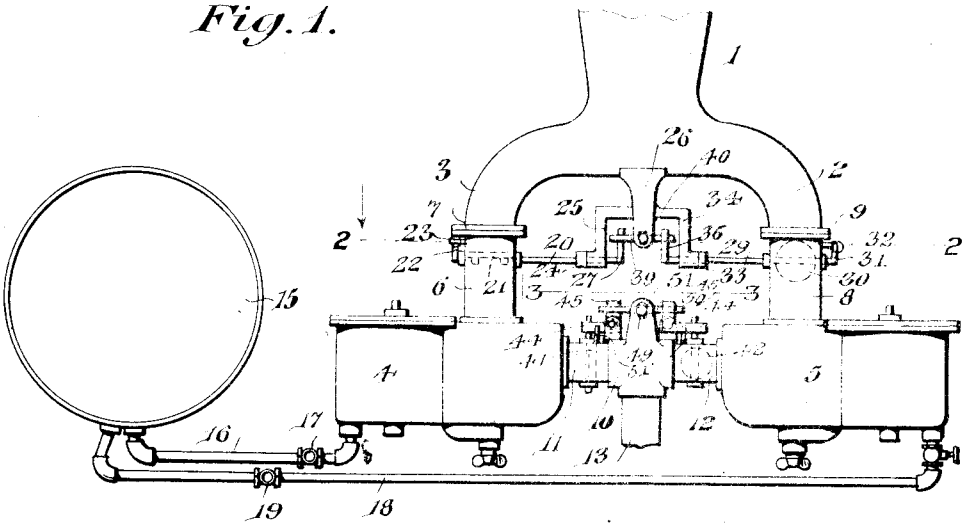


Fig. 2.

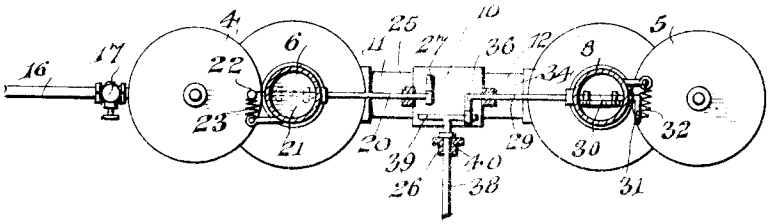


Fig. 4.

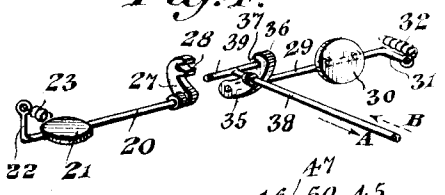


Fig. 3.

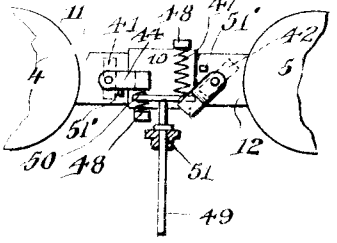


Fig. 5.

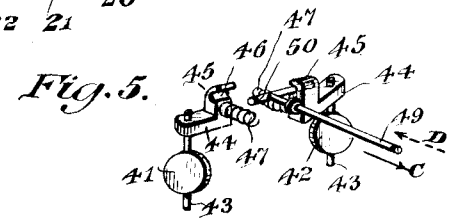


Fig. 6



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UNITED STATES PATENT OFFICE.

WILHELM M. RISTAU, JR., OF FREDERICKSBURG, TEXAS.

DUAL FUEL-SUPPLY SYSTEM.

Application filed August 5, 1924. Serial No. 730,237.

To all whom it may concern:

Be it known that I, WILHELM M. RISTAU, Jr., a citizen of the United States, residing at Fredericksburg, in the county of Gillespie and State of Texas, have invented certain new and useful Improvements in Dual Fuel-Supply Systems, of which the following is a specification.

This invention relates to a dual fuel supply system designed primarily for use in connection with internal combustion motors of motor vehicles and aeroplanes, but it is to be understood that a fuel supply system in accordance with this invention, can be employed for any purposes for which it is found applicable, and the invention has for its object to provide, in a manner as hereinafter set forth, a system of the class referred to, with a pair of fuel supply mechanisms normally closed to an intake manifold common thereto and each including a carbureter adapted to communicate with such manifold and with each of said carbureters independently controlled to provide for the utilization of one to supply fuel while the other is dormant. Under such conditions if one of the carbureters has become impaired or clogged the other carbureter can be immediately utilized to supply fuel to prevent discontinuance of the operation of the motor and to overcome stoppage for repairs.

Further objects of the invention are to provide, in a manner as hereinafter set forth, a dual fuel supply system which is simple in its construction and arrangement, strong, durable, compact, thoroughly efficient and convenient in its use, readily installed, and comparatively inexpensive to set up.

With the foregoing and other objects in view, the invention consists of the novel construction, combination and arrangement of parts, as hereinafter more specifically described and illustrated in the accompanying drawings, wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which come within the scope of the claims hereunto appended.

In the drawings wherein like reference characters denote corresponding parts throughout the several views:—

Figure 1 is a fragmentary elevation of a dual fuel supply system in accordance with this invention.

Figure 2 is a sectional plan.

Figure 3 is a fragmentary view, in plan, of the air control mechanism.

Figure 4 is a perspective view of the throttle valves and the controlling mechanism therefor.

Figure 5 is a perspective view of the air controlling valves and the operating mechanism therefor.

Figure 6 is a detail illustrating a closure plate for the intake manifold when one of the carbureters is disconnected.

Referring to the drawings in detail, 1 denotes an intake manifold leading to the cylinders of a motor and which at its outer end is provided with a pair of branches 2, 3.

Two carbureters of known construction are employed and when one is active, the other is dormant and by this arrangement if the active carbureter becomes impaired or clogged the other carbureter can be placed in active position, under such conditions providing for the necessary supply of fuel to cause the continuance of the operation of the motor. One of the carbureters is indicated at 4 and the other at 5.

The carbureter 4 is provided with a fuel supply pipe 6, which is detachably connected to the branch 3, as at 7. The carbureter 5 is provided with a fuel supply pipe 8, which is detachably connected to the branch 2, as at 9.

Leading from the carbureter 4 and detachably connected to a T-coupling 10 is an air supply pipe 11, and leading from the carbureter 5 and detachably connected with the coupling 10 is an air supply pipe 12. Connected to the coupling 10 is an air feed pipe 13.

By setting up the carbureters in the manner as stated with respect to the branches 2, 3 and coupling 10, the carbureters can be removed when occasion requires. If a carbureter is detached from one of the branches of the intake 1, the said branch is closed by a closure plate 14, see Figure 6, which is detachably secured in position.

Leading from a gasoline reservoir 15 to the carbureter 4, is a feed pipe 16 having interposed therein a controlling valve 17. Leading from the gasoline reservoir 15 to the carbureter 5, is a feed pipe 18 having interposed therein a controlling valve 19.

Extending diametrically of the pipe 6, in proximity to the end thereof, which is connected to the branch 3, as well as being

journalled in said pipe 6, is a valve actuating shaft 20, carrying a throttle valve 21 which is arranged in the pipe 6 and provides means for controlling the passage of fuel through the pipe 6 to the branch 3. The shaft 20 projects outwardly from the pipe 6 and is formed with a crank arm 22 to which is attached one end of a pulling spring 23. The other end of the spring 23 is anchored to the pipe 6. The function of the spring 23 is to normally retain the valve 21 in closed position and when the shaft 20 is actuated to open the valve 21, the movement of the shaft 20 is had against the action of the spring 23, so that when the shaft 20 is released the spring 23 will rock the shaft 20 in an opposite direction and close the valve. Suitable means is provided in the pipe 6 to limit the return movement of the valve 21, due to the action of the spring 23.

The shaft 20 projects inwardly with respect to the pipe 6 and at a greater distance than what it projects outwardly with respect to the pipe 6, and the said inner projecting portion of the shaft 20 extends through a bearing 24 provided on the lower end of a hanger arm 25, which depends from a bracket 26 secured to the intake manifold 1. The inner end of the shaft 20 carries a curved crank arm 27 provided with a bifurcated upper end 28.

Extending diametrically of the pipe 8, in proximity to the end thereof which is connected to the branch 2, as well as being journalled in said pipe 8, is a valve actuating shaft 29, carrying a throttle valve 30, which is arranged in the pipe 8 and provides means for controlling the passage of fuel through the pipe 8 to the branch 2. The shaft 29 projects outwardly from the pipe 8 and is formed with a crank arm 31 to which is attached one end of a pulling spring 32. The other end of the spring 32 is anchored to the pipe 8. The function of the spring 32 is to retain the valve 30 in closed position and when the shaft 29 is actuated to open the valve 30, the movement of the shaft 29 is had against the action of the spring 32 so that when the shaft 29 is released the spring 32 will rock the shaft 29 in an opposite direction and close the valve 30. Suitable means is provided in the pipe 8 to limit the return movement of the valve 30, due to the action of the spring 32. The shaft 29 projects inwardly with respect to the pipe 8 and at a greater distance than what it projects outwardly with respect to the pipe 8, and the said inner projecting portion of the shaft 29 extends through a bearing 33 provided on the lower end of a hanger arm 34, which depends from the bracket 26 secured to the intake manifold 1. The inner end of the shaft 29 carries a curved crank arm 35 provided with a bifurcated upper end 37.

The curved crank arms 27, 36 are oppositely disposed with respect to each other so that the bifurcated end of the arm 27 projects in a direction towards the bifurcated end 37 of the arm 36. The arm 27 curves in an opposite direction with respect to the curvature of the arm 36. See Figure 4. The valves 21, 30, crank arms 22, 32 and the curved crank arms 27, 36, are so set up that when the arm 27 is shifted to open the valve 21, the action of the spring 32 will cause the closing of the valve 30. When the arm 36 is shifted to open the valve 30, the action of the spring 23 will cause the closing of the valve 21.

A shifting element, common to the arms 27, 36, is employed and said element is T-shaped in contour and consists of a stem 38 provided with a head 39, which is positioned between the curved crank arms 27 and 36.

If the shifting element is moved in the direction of the arrow A, Figure 4, the head 39 will engage the arm 36 and move it to the position shown in Figure 4, whereby the valve 30 will be shifted to open position. If the shifting element is moved in the direction of the arrow B, Figure 4, the head 39 will engage the bifurcated end of the arm 27, thereby actuating the shaft 20 to open the valve 21, but as the head 29 is moved from engagement with the bifurcated end 37 of the arm 36, the spring 32 will shift the shaft 29 to close the valve 30. When the arm 36 is in a position to align with the arm 27, the valves will be closed. The stem 38 of the shifting element travels through a hanger arm 40, which depends from the bracket 26.

Arranged within the pipes 11 and 12 are air controlling valves 41, 42 respectively and each of which is carried by a vertically disposed actuating shaft 43 which extends diametrically of the pipe, as well as being journalled therein. Each of the shafts 42 projects a substantial distance above its respective pipe and the latter has suitable means therein for limiting the closing movement of the controlling valve. Fixedly secured to the upper end of each of the shafts 43, exteriorly of an air supply pipe, is an angle-shaped member formed of a horizontally disposed leg 44 and a vertically disposed leg 45. The vertical leg of each of said members is provided with a transverse groove 46, and the groove 46 on one member is oppositely disposed with respect to the groove on the other member. Connected to the vertical leg of each of said members is a controlling spring 47. The said controlling springs extend in opposite directions and are anchored to lugs 48 carried by the coupling 10. The angle-shaped members

provide means for alternately operating the valves 41, 42, or in other words, when the valve 41 is moved to open position the valve 42 is shifted by its controlling spring to closed position.

The angle-shaped members are alternately operated through the medium of a T-shaped shifting element comprising a stem 49, and a head 50. The stem 49 extends through an apertured support 51 carried by the coupling 10. The head 50 is normally positioned in the grooves 46 of the vertical legs 45 of the angle-shaped members, and when these latter are in normal position the vertical legs thereof oppose each other. When the controlling element is shifted in the direction indicated by the arrow C, Figure 5, the valve 42 will be moved to open position and the valve 41 retained in closed position by its controlling spring, and when the element is shifted in the direction of the arrow D, Figure 5, the head 50 will engage the angle-shaped member carried by the shaft of the valve 41 and will move the valve to open position, but as the shifting element moves in the direction of the arrow D, the controlling spring of the valve 42 will move the latter to closed position. Stops 51' are provided for limiting the return movement of the angle-shaped members carried by the shafts 43.

Any suitable means can be employed for maintaining the stems 38 and 49 in the position to which they have been shifted.

The foregoing construction of dual fuel supply system provides means whereby each carbureter is independently controlled and if one carbureter should become clogged or damaged, the other carbureter can be thrown into action, or if one of the carbureters is removed the other carbureter can be utilized for supplying the necessary fuel to the motor, and it is thought that the many advantages of a dual fuel supply system in accordance with this invention can be readily understood, and although the preferred construction is as illustrated and described, yet changes in the details of construction can be had which will fall within the light of the invention as claimed.

What I claim is:—

1. A dual fuel supply system comprising a pair of carburetors each provided with an air inlet pipe and a fuel supply pipe and means for independently and detachably connecting it to the intake manifold of a motor, a spring controlled throttle valve mounted in each of said supply pipes, a spring controlled air controlling valve mounted in each of said air inlet pipes, means shifting in opposite directions and common to said throttle valves for operating one independently of the other, means common to said air controlling valves for operating one independently of the other, and an independent valved gasoline feed pipe leading from a common source to each carburetor.

2. A dual fuel supply system comprising a pair of carburetors each provided with an air inlet pipe and a fuel supply pipe and means to independently and detachably connect it to the intake manifold of a motor, a spring controlling throttle valve mechanism mounted in each of said supply pipes and having its stem formed with a curved crank arm arranged exteriorly of said pipe, said crank arms arranged in spaced relation and oppositely disposed with respect to each other, means common to said arms for operating one of said mechanisms independently of the other, a spring controlled air controlling valve mechanism mounted in each of said inlet pipes and each provided with an angle-shaped member exteriorly of said pipes, and means common to said members for operating one of said air controlling valve mechanisms independently of the other.

3. A dual fuel supply system comprising a pair of carbureters each having means adapted to be detachably connected to and independently communicate with the intake manifold of an engine, a throttle valve mechanism mounted in the said means of each of said carbureters, an air valve controlling mechanism for each of said carbureters, means shifting in opposite directions and common to said throttle valve mechanisms for opening one independent of the other, thereby providing for the activity of one of said carburetors while the other is dormant, and means common to said air valve controlling mechanisms for operating one independent of the other.

4. A dual fuel supply system for internal combustion motors comprising a pair of carburetors each having means for independent communication with the intake manifold of the motor, a normally closed throttle valve mounted in the said means of each of said carbureters, means shifting in opposite directions and common to said throttle valves for opening one independent of the other, an air supply means common to said carbureters, a pair of air inlet pipes leading from said supply means and each communicating with a carburetor, a normally closed air supply controlling valve for each of said pipes, means common to said air controlling valves for opening one independent of the other, and an independent gasoline supply pipe leading to each carbureter from a common source.

5. A dual fuel supply system comprising a pair of carburetors, each provided with an air inlet pipe and a fuel supply pipe and means to independently and detachably connect it to the intake manifold of a motor, a spring controlled pivoted throttle valve

mounted in each of said supply pipes with the pivot of each of said valves extending horizontally and projecting from a supply pipe and having its inner end formed with a crank arm, a pivoted spring controlled air controlling valve mounted in each of said inlet pipes and having the pivot thereof disposed vertically and extended from the inlet pipe and formed at one end with an angle-shaped member, means common to said crank arms for operating one of said throttle valves independently of the other, and means common to said angle-shaped members for operating one of said air controlling valves independently of the other.

6. A dual fuel supply system comprising a pair of carburetors, each provided with an air inlet pipe and a fuel supply pipe and means to independently and detachably connect it to the intake manifold of a motor, a spring controlled pivoted throttle valve mounted in each of said supply pipes, with the pivot of each of said valves extending horizontally and projecting from a supply pipe and having its inner end formed with a crank arm, a pivoted spring controlled air controlling valve mounted in each of said inlet pipes and having the pivot thereof disposed vertically and extended from the inlet pipe and formed at one end with an angle-shaped member, means common to said crank arms for operating one of said throttle valves independently of the other, means common to said angle-shaped members for operating one of said air controlling valves independently of the other, and an air supply pipe common to and connected to said air inlet pipes.

7. A dual fuel supply system comprising a pair of carburetors, each provided with an air inlet pipe and a fuel supply pipe and means to independently and detachably connect it to the intake manifold of a motor, a spring controlled pivoted throttle valve mounted in each of said supply pipes, with the pivot of each of said valves extending horizontally and projecting from a supply pipe and having its inner end formed with a crank arm, a pivoted spring controlled air controlling valve mounted in each of said inlet pipes and having the pivot thereof disposed vertically and extended from the inlet pipe and formed at one end with an angle-shaped member; means common to said crank arm for operating one of said throttle valves independently of the other, means common to said angle-shaped members for operating one of said air controlling valves independently of the other, and an air supply pipe common to and connected to said air inlet pipes, said means for operating said angle-shaped members supported at the point of connection between said air supply pipe and inlet pipes.

8. A dual fuel supply system comprising a pair of carburetors, each provided with an air inlet pipe and a fuel supply pipe and means to independently and detachably connect it to the intake manifold of a motor, a spring controlled pivoted throttle valve mounted in each of said supply pipes, with the pivot of each of said valves extending horizontally and projecting from a supply pipe and having its inner end formed with a crank arm, a pivoted spring controlled air controlling valve mounted in each of said inlet pipes and having the pivot thereof disposed vertically and extended from the inlet pipe and formed at one end with an angle-shaped member, means common to said crank arms for operating one of said throttle valves independently of the other, means common to said angle-shaped members for operating one of said air controlling valves independently of the other, and means connected with the intake manifold of an engine for supporting said crank arm operating means.

In testimony whereof, I affix my signature hereto.

WILHELM M. RISTAU, JR.