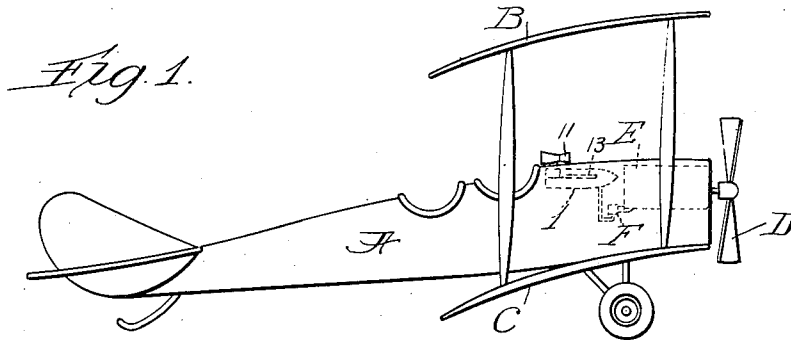
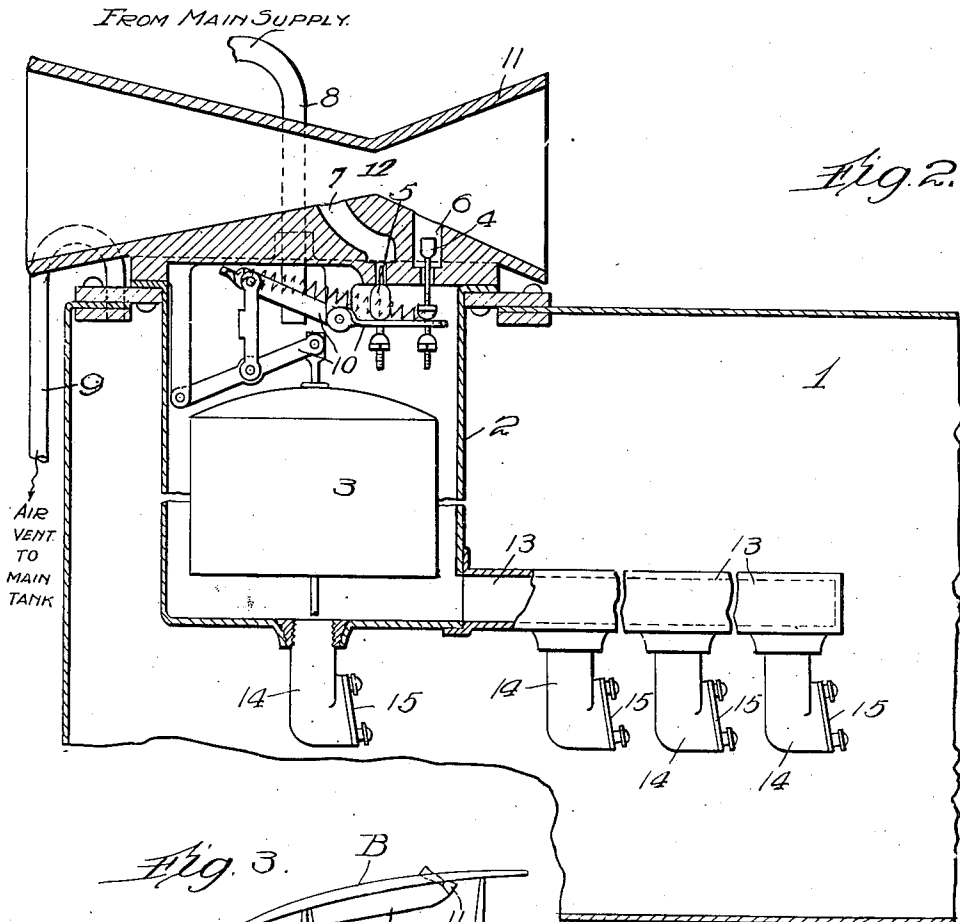
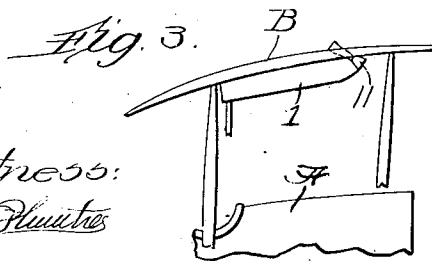


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 VACUUM FUEL FEED DEVICE FOR AERIAL VESSEL ENGINES.
 APPLICATION FILED JAN. 2, 1918.

1,283,524.

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UNITED STATES PATENT OFFICE.

WEBB JAY, OF CHICAGO, ILLINOIS.

VACUUM FUEL-FEED DEVICE FOR AERIAL-VESSEL ENGINES.

1,283,524.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WEBB JAY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Vacuum Fuel-Feed Devices for Aerial-Vessel Engines, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved expedient for producing the partial vacuum required in a vacuum fuel feed device for an internal combustion engine of an aeroplane or other aerial vessel. It consists in the elements and features of construction shown and described, as indicated in the claims.

In the drawings:

Figure 1 is a side elevation of an aerial vessel, showing in approximately relative position the propeller and engine thereof, and showing the engine equipped with a vacuum fuel feed device embodying this invention.

Fig. 2 is a detail view showing upon a larger scale and in vertical section the vacuum chamber of the vacuum feed device and the vacuum duct leading therefrom, together with a portion of the fuel feed tank into which the vacuum chamber discharges.

Fig. 3 is a fragmentary side elevation of an aerial vessel showing an alternative mounting of the vacuum feed device and tank.

In the drawings Fig. 1 indicates conventionally a bi-plane, A, with upper and lower planes, B and C, respectively, and propeller, D. Mounted within the fuselage is shown in dotted outline the engine, E, and a fuel feed tank, 1, connected with the carbureter, F.

Fig. 2 shows, on a larger scale, a vacuum feed device associated with the tank, 1, and comprising a vacuum chamber, 2, suspended within the tank, 1, and inclosing a float, 3, connected by a familiar form of linkage with valves, 4 and 5, controlling respectively the atmospheric inlet, 6 and vacuum duct, 7. A fuel supply pipe, 8, leading from a main fuel tank located at any convenient point on the margin lower than the feed tank, 1, and not shown in the drawings, discharges into the upper portion of the vacuum chamber, 2, and an atmospheric vent, 9, leads from the top of tank, 1, preferably to the said main fuel tank to permit overflow from

tank, 1, to the main tank in case of over-filling of said feed tank, 1. In the usual manner, the snap action or linkage, 10, is adapted to place the chamber, 2, alternately under dominance of suction and pressure for causing inflow of liquid fuel through pipe, 8, and discharge of such fuel to the tank or reservoir, 1, by virtue of the alternating closing and opening of valves, 4 and 5.

The present invention relates among other things to means for producing the necessary partial vacuum in the chamber, 2, and this means consists in the disposition of duct, 7, with its opening in a region of low pressure, or in a direction such that the air current produced by the propeller, D, moving rearwardly through the Venturi tube may cause entrainment of air in duct, 7, resulting in reduced pressure therein. For this purpose the means preferably includes a Venturi tube, 11 open forwardly toward the propeller, D, and as shown in Fig. 1, mounted just above the fuselage to receive the current from said propeller. As seen in Fig. 2, the duct, 7, opens into the venturi just beyond the apex or plane of greatest restriction indicated at 12, this being in a region of reduced pressure, by reason of the rapidly expanding cross-section of the Venturi tube beyond its apex with relation to the air movement through said tube. It will be understood that the Venturi tube serves merely to increase the entraining effect of the air current produced by the propeller and that said current, without such increase in its velocity, might be utilized under certain conditions for producing the entrainment and consequent partial vacuum.

As an alternative construction, Fig. 3 shows the reservoir, 1, mounted just under the upper plane, B, with the venturi, 11, opening at the under side of the plane and discharging above the latter so as to be susceptible to the high air pressure at the under side of the plane, as well as the air current from the propeller, D, and by furnishing a vent through the plane for such pressure to create a high velocity current from which vacuum may be derived for the vacuum chamber, 2, within the tank, 1.

In order that the liquid derived by suction from the main fuel tank may be discharged from the vacuum chamber, 2, very promptly upon the intermission of the suction and the admission of the atmospheric

pressure, it is desirable to increase the discharging pressure above atmospheric. For this purpose the inlet, 6, controlled by the valve, 4, opens into the Venturi tube at the intake or pressure side thereof, that is, on the side of the plane of greatest constriction toward the propeller. On account of the constriction of the Venturi tube, there is a high pressure produced in this region, and, upon the opening of the air valve, 4, this relatively high pressure instead of normal atmospheric pressure is admitted to the chamber, 2, for discharging the liquid fuel therefrom into the reservoir, 1. This makes it possible to fill the reserve chamber, 1, to any height for which the pressure derived from the venturi is adequate, instead of being limited to the height at which float 3, in chamber, 2, operates the snap action device, 10, to close the suction valve, 5, as would be the case if only atmospheric pressure were admitted to the chamber, 2, by opening of valve, 4. The tank, 1, may therefore be extended to occupy as great space longitudinally of the aeroplane as may be found convenient, and its storage space extended up as high as the top of the vacuum chamber, 2.

To permit the quick emptying of the chamber, rendered possible by the high air pressure available, said chamber has a horizontal discharge pipe, 13, leading from its lower portion and fitted with several discharge nipples, 14, each controlled by a flat check valve, 15, and all thus adapted to open at once for emptying the vacuum chamber, 2, when the air pressure is admitted thereto.

I claim:—

1. In combination with an aerial vessel having a rotating propeller and an engine for driving said propeller; a vacuum fuel feed device for the engine comprising a vacuum chamber and a conduit leading from a region of reduced pressure in the air current caused by the propeller, said conduit opening in the direction of flow of such air current and communicating with said vacuum chamber for exerting suction thereon.

2. In combination with an aerial vessel having a rotating propeller and an engine

for driving said propeller; a vacuum fuel feed device for the engine comprising a vacuum chamber; means for controlling a portion of the air current caused by the propeller for inducing a region of low pressure and a passage affording communication between such low pressure region and the said vacuum chamber.

3. In a construction such as defined in claim 2, the said means for controlling the air current comprising a Venturi tube interposed in such a current and the passage to the vacuum chamber leading from a point in the Venturi tube near its apex.

4. In a construction such as set out in claims 2 and 3, foregoing the said passage having its opening in the Venturi tube at a point beyond the apex plane thereof with reference to the direction of movement of the said air current therethrough.

5. In combination with an aerial vessel having a rotating propeller and an engine for driving said propeller; a vacuum fuel feed device for the engine comprising a vacuum chamber and means for producing partial vacuum therein, and an air inlet connection with said vacuum chamber having its intake end positioned to receive the air current produced by the propeller.

6. In a construction such as set out in claim 5; means for confining a portion of the air current produced by the propeller for inducing a region of high pressure, said air inlet for the vacuum chamber leading from such region of high pressure.

7. In a construction such as defined in claim 2, the means for controlling the air current consisting of a Venturi tube with two passages leading respectively from points ahead of and behind its apex plane with reference to the direction of flow of said air current, and both passages leading to said vacuum chamber, together with valve mechanism adapted to afford alternate communication of said passages with said vacuum chamber.

In testimony whereof I have hereunto set my hand at Chicago, Illinois, this 13th day of December, 1917.

WEBB JAY.