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SAFETY DEVICE FOR AEROPLANES

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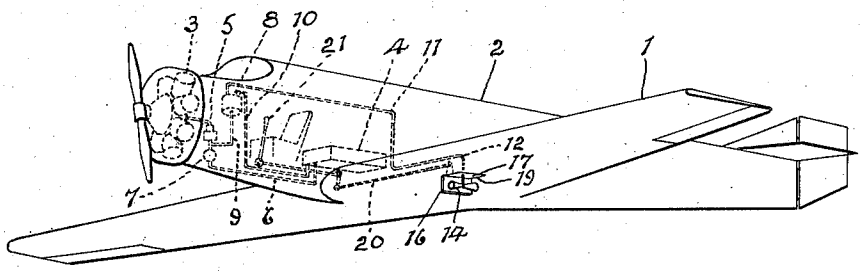

Fig. 1.

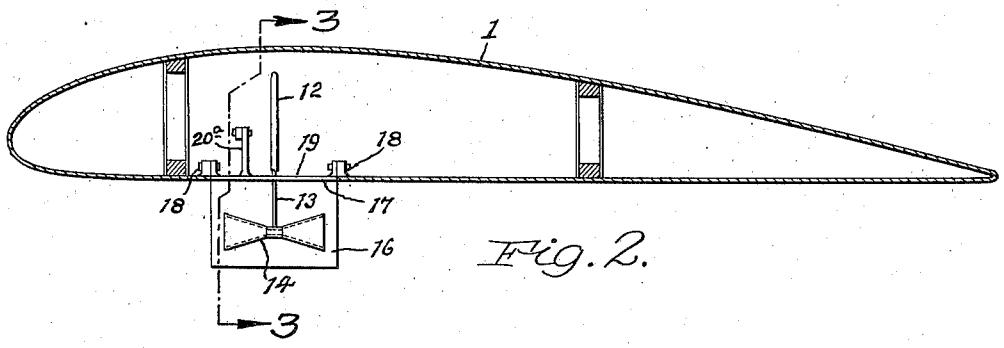

Fig. 2.

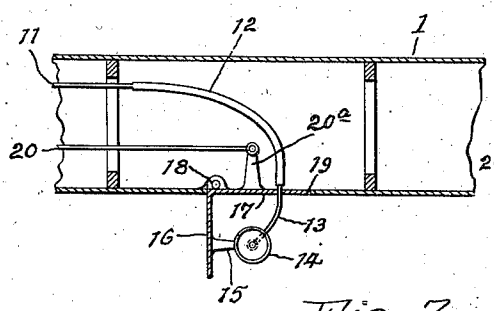

Fig. 3.

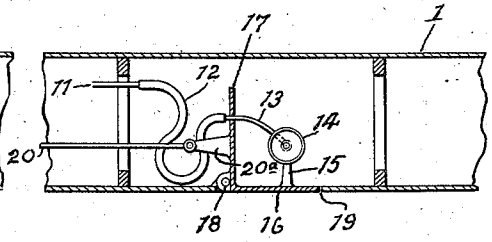

Fig. 4.

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SAFETY DEVICE FOR AEROPLANES

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5 Claims. (Cl. 244—135)

This invention relates to a safety device for aeroplanes and more particularly to an auxiliary fuel feeding means for aeroplane engines. An object of the present invention is to provide means for the purpose which is extremely simple in construction and requires no driving means to operate it, it being an auxiliary device operated by the passage of the aeroplane or heavier-than-air machine, through the air in flight, independently of the operation of its engine. It is also an object to so mount the auxiliary device upon the aeroplane that it may be concealed therein at all times except when an emergency rises, such as when the regular or main fuel feed for the aeroplane engine fails to function in which emergency, the auxiliary device may be quickly projected to be operated by air flow as the aeroplane continues in flight independently of the operation of the engine, the mounting of this auxiliary device being such that it may be again retracted when the main fuel feed becomes operative, and therefore the auxiliary device may be housed within the aeroplane at all times except when functioning to feed fuel, and will offer no resistance to flight when so housed.

A further object is to provide a mounting for said auxiliary device, which mounting is adapted to function as a closure for the opening in the aeroplane through which said device is projected and retracted, and to provide certain other new and useful features in the construction and arrangement of parts, all as hereinafter more fully set forth and particularly pointed out, reference being had to the accompanying drawing in which

Figure 1 is a perspective view of an aeroplane showing in dotted lines the arrangement of an auxiliary fuel feeding device illustrative of an embodiment of the present invention;

Fig. 2 is a longitudinal section through one of the aeroplane wings showing the auxiliary feeding device in elevation;

Fig. 3 is a section substantially upon the line 3—3 of Fig. 2; and

Fig. 4 is a section substantially the same as that of Fig. 3 and showing the mounting for the auxiliary device, in closed position.

It is well known that any projection from the fuselage or wings of an aeroplane where such projection is exposed to the air currents during the flight of the machine, very materially affects the speed of the machine, and therefore any device attached to the aeroplane should be of as small an area as possible to function properly and should also be housed within the aeroplane fuselage, wings or other suitable place.

The feeding of fuel to the engine of an aeroplane is usually effected by providing a fuel pump for lifting the fuel from the supply tank to the carburetor of the engine, but to guard against accidents it is very necessary that auxiliary means be provided for feeding the fuel to the engine so that if the fuel pump should fail to function or the fuel line should become clogged during the flight of the aeroplane, the auxiliary fuel supply means may be brought into action and supply the necessary fuel to maintain flight. It it also very material in aeroplane construction that all parts be as light in weight as possible and still perform their functions and this holds true relative to any auxiliary fuel feeding device that may be applied to the aeroplane.

The present auxiliary feeding device is such that the weight thereof is reduced to the minimum due to the form and construction of the device, the main part of which consists of a Venturi tube which, when presented to the airflow during flight of the aeroplane, will function to produce a vacuum within a tank to which the venturi is connected and will thus function because of the vacuum created, to lift fuel into the tank from which it may flow by gravity to the engine and thus provide a fuel supply which is auxiliary to the main supply line.

As illustrated in the accompanying drawing, 1 indicates an aeroplane wing, 2 the fuselage of the aeroplane to which the wing is connected, and 3 indicates a multi-cylinder engine of the radial type. It will be understood however, that the present invention may be applied to any form of heavier-than-air flying machine and that such machines may be equipped with any desired type of motive power which is to be supplied with fuel from the fuel tank 4 located at any convenient point within the machine, said tank being connected with a carburetor 5 of the engine by means of a fuel line 6 having connected therein at any convenient point, a fuel pump 7.

If the fuel pump functions properly and the fuel line does not become clogged, then any auxiliary fuel feeding means would be unnecessary, but such contingencies do sometimes arise, and if the supply of fuel should be absolutely cut off due to such contingency, it would be necessary to land the aeroplane no matter where it might be. Therefore it is highly desirable that auxiliary means be provided for feeding fuel to the engine should the main fuel feeding means fail to operate, and such auxiliary means in the present instance includes a vacuum tank 8 from which fuel is adapted to feed through line 9 to the car-

buretor 5. In order to lift the fuel from the supply tank 4 and deliver it into the vacuum tank 8, a pipe line 10 connects the supply tank with the top of the vacuum tank, and an air line 11 within the fuselage and adjacent portion of the wing 1 is connected at one end to the upper end of the vacuum tank and with its opposite end connected by means of a flexible tube 12, with one end of a short tube 13, the opposite end of which is connected into the contracted or neck portion of a Venturi tube 14 and this venturi is mounted upon a bracket 15 secured to a wall 16 of a pivoted mounting or closure member having a second wall 17 extending at substantially right angles to the wall 16, with this mounting member pivotally mounted as at 18 adjacent the meeting angle of these walls, and this mounting member is supported by said pivot 18 within an opening 19 in the lower wall of the wing 1, said walls 16 and 17 serving to close the opening 19 flush with the wall of the wing when said closure member is swung upon its pivot to either projected or retracted position. As the venturi 14 is mounted within the angle between the walls 16 and 17, when this mounting member is turned upon its pivotal support, the venturi will be moved therewith and swung to the projected position shown in Fig. 3 or moved into the retracted position shown in Fig. 4, the flexible tube 12 permitting such swinging movement, the venturi being carried by the wall 16 with its pipe 13 extending through the wall 17 with the end of the tube 12 connected to the end of this pipe 13 which projects through the wall 17.

Whenever it is desirable that the venturi become operative to form a vacuum in the vacuum tank 8 and thus feed fuel from the supply tank 4 to the vacuum tank, it is only necessary to swing the mounting which carries the venturi, to a projected position as shown in Fig. 3, by means of a connecting rod 20 pivotally attached at one end to a bracket 20a on the upper side of the wall 17, said rod being operated by means of a hand lever 21 connected to the opposite end of said rod 20. The venturi may thus be projected into the airflow along the lower surface of the wing during flight of the machine, and this air passing through the restriction of the venturi will produce a vacuum within the vacuum tank 8 sufficient to lift fuel through the line 10 from the supply tank 4, and with the venturi in projected position, as in Fig. 3, the wall 16 will be turned downwardly from the opening 19 to a vertical position and extend fore and aft of the wing, and the wall 17 will be swung simultaneously with the opening in the wall of the wing and close this opening flush with the lower surface of said wing wall. When the mounting member for the venturi is turned to retract the venturi, the wall 16 will form a closure for the opening 19 flush with outside surface of the wing wall and the venturi will be housed within the wing in inoperative position.

With this arrangement the auxiliary feed or safety device may be normally housed within the aeroplane and should an emergency arise, due to the failure of the ordinary feed line or pump, it is only necessary for the operator to project the Venturi tube from the opening 19 in the wing by operating the handle 21, this being quickly accomplished while the aeroplane is still in flight, even though the engine is not functioning, and therefore, the present auxiliary feed apparatus is entirely separate from and independent of the operation of the engine or main fuel feed line and may be made operative by projecting the venturi while the aeroplane is still in flight so that a current of air will be forced through the venturi to effect a vacuum in the vacuum tank.

Obviously changes may be made in the details of construction and arrangement of parts without departing from the spirit of the present invention and I do not therefore limit myself to the particular construction or arrangement shown.

Having thus fully described my invention what I claim is:—

1. A safety device for aeroplanes having an internal combustion engine and main fuel supplying means for said engine including a fuel supply tank, said safety device comprising auxiliary fuel supplying means operative independently of the functioning of said main supplying means and including a closed tank located within the aeroplane, means for creating a partial vacuum in said tank, and means for mounting said vacuum creating means upon the aeroplane, said mounting means being operative to retract said vacuum creating means into the aeroplane and project the same therefrom into the current of air outside of the aeroplane which current is created by flight of the aeroplane through the air, and flexible tubular means connecting said tank and vacuum creating means to permit movement of said mounting means in projecting and retracting said vacuum creating means.

2. A safety device for aeroplanes having an internal combustion engine and main fuel supplying means for said engine including a supply tank, said safety device comprising auxiliary fuel supplying means operative independently of the functioning of said main supplying means and including a vacuum tank within the aeroplane fuselage for feeding fuel by gravity to said engine, a vacuum creating member, a closure member for an opening in an outer wall of the aeroplane and upon which said vacuum creating member is mounted, flexible tubular means extending into the aeroplane fuselage and connecting said vacuum creating member and said vacuum tank, and mounting means for said vacuum creating member arranged to project said vacuum creating member from said opening in said aeroplane wall into the current of air outside of said aeroplane, created by progress of said aeroplane through the air.

3. A safety device for aeroplanes having an opening in the outer wall of a wing thereof, said safety device including a pivoted mounting member for closing said opening and adapted to swing outwardly therefrom, a Venturi tube mounted upon said mounting member to swing therewith into position outside of said aeroplane and to be housed within said aeroplane by the swinging of said mounting member to a position to close said opening in said aeroplane wing wall, a closed tank within the fuselage of the aeroplane at a distance from said opening, and a flexible tubular connection between said tank and the restricted portion of said Venturi tube to permit free swinging movement of said mounting member.

4. A safety device for an aeroplane having an opening in an outer wall of said aeroplane, said device comprising a vacuum tank within the aeroplane, a suction creating device, a tubular connection between said vacuum tank and said device, a pivoted closure member for said opening in said wall of the aeroplane and upon which said device is mounted, said closure member comprising substantially right angularly disposed members pivotally connected to said wall of said aeroplane adjacent their meeting angle to swing upon

an axis extending fore and aft of said aeroplane and to close said opening in said wall when said closure is swung to bring either one of said members into position across said opening, and means within said aeroplane for swinging said closure member and moving said device therewith from a position within said aeroplane to a position outside of the wall thereof and into the current of air caused by flight of the aeroplane.

5. A safety device for an aeroplane having an internal combustion engine and a main fuel supplying means for said engine, said aeroplane having an opening in an exterior wall thereof; said safety device comprising auxiliary fuel supplying means operative independently of the functioning of said main supplying means and including a closed tank within the aeroplane, tubular means connecting said tank and the main fuel supplying tank, a Venturi tube, a tubular connection between said closed tank and the restricted portion of said Venturi tube to create a partial vacuum within said closed tank and cause a flow of fuel from the main tank to said closed tank upon the flow of a current of air through said Venturi tube, a mounting for said Venturi tube forming a closure for said opening in said wall of said aeroplane, said closure comprising walls extending substantially at right angles to each other and pivotally attached to the outer wall of the aeroplane adjacent the meeting angle of said walls and along one edge of said opening, and means for swinging said mounting means upon its pivotal connection to said aeroplane wall with one of said walls of said mounting providing a closure for the opening in said aeroplane wall when said Venturi tube is housed within said aeroplane, and the other wall of said mounting means forming a closure for said opening in said aeroplane wall when said mounting means is turned to project said Venturi tube outwardly through said opening into the air flow outside of said aeroplane.

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