

Sept. 8, 1925.

1,553,249

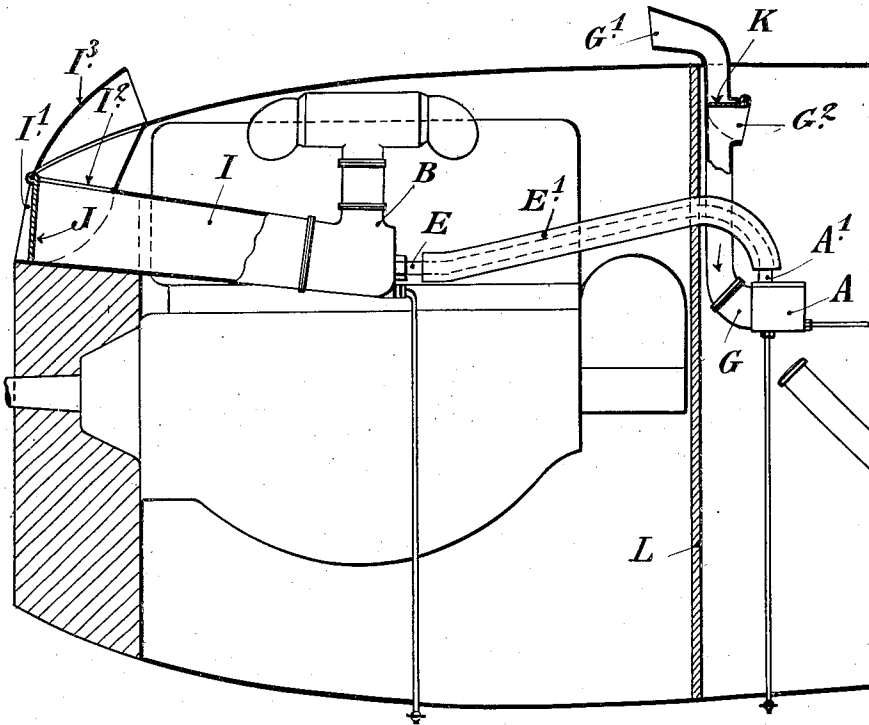
R. L. G. LE GRAIN

CARBURETING APPARATUS PARTICULARLY SUITABLE FOR USE UPON AIRCRAFT

Filed June 16, 1924

2 Sheets-Sheet 1

Fig. 1.



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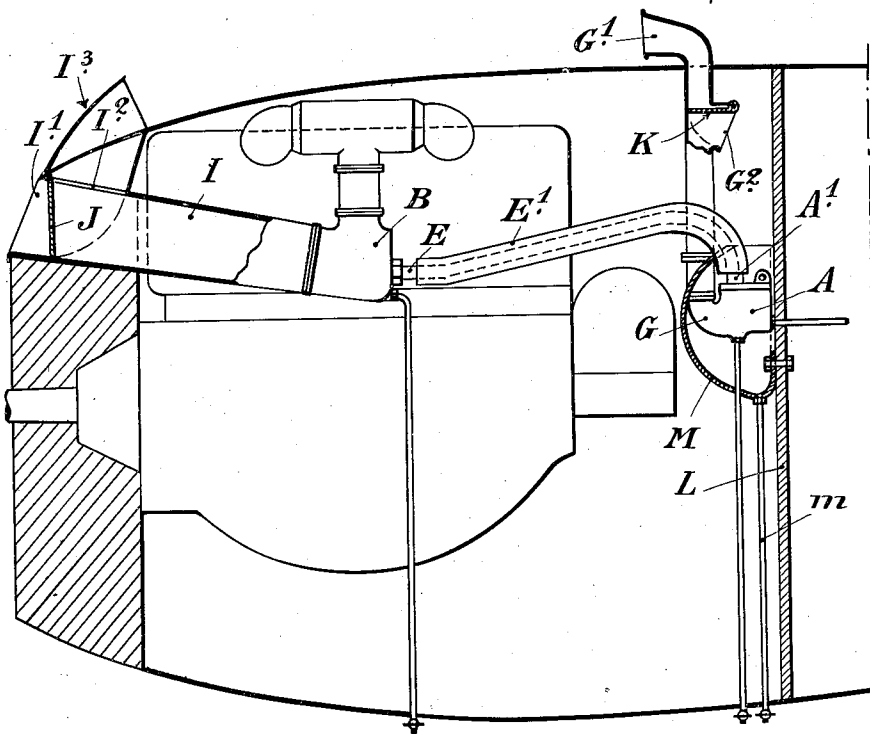
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Fig. 2.



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UNITED STATES PATENT OFFICE.

RENÉ LUCIEN GUSTAVE LE GRAIN, OF PARIS, FRANCE.

CARBURETING APPARATUS PARTICULARLY SUITABLE FOR USE UPON AIRCRAFT.

Application filed June 16, 1924. Serial No. 720,462.

To all whom it may concern:

Be it known that I, RENÉ LUCIEN GUSTAVE LE GRAIN, engineer, a citizen of the French Republic, of 28 Avenue Hoche, Paris, France, have invented certain new and useful Improvements in Carbureting Apparatus Particularly Suitable for Use upon Aircraft, of which the following is a specification.

This invention relates to improvements in or modifications of the invention for which I made application for Letters Patent Serial No. 720,463 filed June 16, 1924.

The before mentioned invention refers to carbureting apparatus for use with internal combustion engines and more particularly suitable for use upon aircraft, comprising a primary carburetor element in close proximity to the engine and furnished with means for admitting air, a secondary carburetor element in close proximity to the float chamber or its equivalent and at a considerable distance from the first mentioned element and having means for admitting air, the primary and secondary elements being connected by a long conduit which may be heated by means of a water jacket, or by electricity.

The present invention refers more particularly to improved constructional embodiments rendering the invention particularly suitable for use upon aircraft.

According to the invention in place of providing simple air admission ports or passages in connection with the primary and secondary carburetor elements, each element is provided with two admission orifices, one of which communicates with the outer air and the other either with the space within the hood or casing of the aircraft, or with a conduit opening into the atmosphere, but allowing only the admission of air of reduced pressure; said conduit might receive the form of a venturi.

Flaps or shutters are provided in connection with the passages for allowing for the progressive opening and closing of one or other of the openings and/or for the progressive opening of one and closing of the other.

Means are also added for separating the compartment containing the engine from the secondary carburetor and for ensuring

that conflagration shall not be caused even in the case of a serious backfire.

In order that the present invention may be more clearly understood, it will now be described with reference to the accompanying drawing, which shows by way of example, a construction made according to the invention.

Fig. 1 is a sectional elevation of one constructional embodiment.

Fig. 2 is a similar view of another constructional embodiment.

Referring to Fig. 1, A denotes the cistern or reservoir of the float chamber. To this float chamber is connected the special secondary carburetor element described in the specification of the original application.

A¹ denotes the outlet pipe for saturated mixture which pipe leads into the heater tube E, forming the long connection with the primary carburetor element. This tube may be surrounded by a heating jacket E¹.

G denotes the pipe for the admission of air for supplying the secondary carburetor element in connection with the chamber A. B is the primary carburetor element and I is the corresponding passage for drawing in air.

According to the present invention each of the passages G and I is provided with two openings respectively I¹, I² and G¹, G².

One of these passages or openings puts the conduit with which it is associated into communication with the outer air and the other into communication with the closed space within the cowl of the aircraft, or with a tube I³, the arrangement and direction of which is such as to allow only of admitting air of reduced pressure.

Either of these passages may be closed at will by means of a single shutter J, for the passages I, and K for the passage G.

This arrangement allows for the regulation of the carburetor for normal working up to a determined altitude, for instance 2000 meters with air of reduced pressure, drawn in under the cowl, or through the conduit I³, that is to say air which is not compressed or influenced by the movement of translation of the aircraft and/or the rotary motion of the propeller.

At greater altitudes the flaps or shutters which would be in the positions indicated

in full lines in the figure are brought progressively into the positions in which they uncover the openings I¹ and G¹ for communicating with the draught of compressed air on the outside.

The result is that there is a progressively increasing intake of air from air at high pressure flowing on the exterior, uniting with air at reduced pressure drawn in under the cowl, or through the conduit I³, which permits carburation to be effected as a function of the altitude by replacing air which is not compressed or which is under normal pressure by increasing quantities of compressed air.

The shutters or flaps J and K may be operated separately or from a single control.

In addition, as will be seen from the drawing, the whole group of set of parts located at a long distance from the element B, that is to say the parts A—A¹ constituting the secondary carburetor element and float chamber and if desired the passage G in connection with the secondary carburetor may be separated from the engine chamber by a partition or shield L which constitutes an intercepting means preventing the access of the flames to the group of parts in question however serious the back firing or the flames driven back owing to the current of air.

In place of a special partition, some existing partition might be used, the connecting tube separating the element, that is the tube E—E¹ always passing through the said partition.

In some cases and as shown in the modification illustrated at Fig. 2, it suffices to provide a shield M enclosing the group of parts A—A¹, in the locality where leakages of petrol might take place. The shield might for instance be attached to an existing chamber or to the body of the secondary carburetor.

The bottom of the enveloping shield should comprise a drainage orifice in connection with a pipe or conduit *m* opening on the outside of the casing.

What I claim as my invention and desire to secure by Letters Patent of the United States of America is:—

1. In a carbureting apparatus for use upon aircraft, the combination of a primary carburetor element in close proximity to the engine, an air admission passage to the said carburetor, such passage being provided with two inlet openings, one of which communicates with the outer air and the other of which communicates with the air on the interior of the cowl or covering of the aircraft, a secondary carburetor element in close proximity to a float chamber or its equivalent, an air admission passage to the said secondary carburetor element, such passage being provided with two openings, one of which opens to the outer air and the other of which opens to the air on the interior of the cowl or covering of the aircraft, and a long conduit which may be heated in any suitable manner connecting the outlet of the secondary carburetor element to the inlet of the primary element, for the purposes set forth.

2. In a carbureting apparatus as claimed in claim 1, a construction in which a single shutter is provided in connection with each of the air passages for closing either the opening to the outer air or that to the interior of the aircraft, for the purposes set forth.

3. In an aircraft provided with a carburetor as claimed in claim 1, a construction in which the secondary carburetor and its associated parts is separated from the primary carburetor and the engine chamber by a partition through which the connecting conduit passes, for the purposes set forth.

4. In an aircraft as claimed in claim 3, a construction in which the secondary carburetor is enclosed in a shield which is preferably provided with an outlet orifice in connection with a tube opening to the outside, for the escape of any petrol leaking from the float chamber or carburetor.

In witness whereof I affix my signature.

RENÉ LUCIEN GUSTAVE LE GRAIN.