REMOVAL ROOF FOR THE COCKPITS OF AIRCRAFT

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Fig. 5

Fig. 2

Fig. 3

Fig. 4

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The present invention concerns improvements in removable roofs covering the cockpit of an airplane pilot. The roof according to the present invention is intended to be opened normally through a sliding displacement and can further, in case of accident or in case of need, be wholly and immediately detached from the body of the airplane.

This arrangement enables the pilot, in case of danger, to immediately get rid of his roof, in order, for instance, to be able to jump with his parachute.

The device according to the present invention is essentially constituted by a frame connected in a detachable manner with two carriages adapted to slide along rails fixed to the sides of the fuselage; these carriages being adapted to be operated from the inside of the airplane by the pilot. This frame carries the roof and the two lateral panels. The whole normally slides along the rails through the carriages. The device is completed by means for permitting the pilot, by a mere operation performed from the inside of the airplane, to release the frame from the carriages by which it is carried.

A preferred embodiment of the present invention will be hereinafter described, with reference to the accompanying drawings, given merely by way of example, and in which:

Fig. 1 is a perspective view of the system, the removable roof being detached from the airplane cockpit;

Fig. 2 is a similar view showing the roof fixed to its carriages and partly moved in a backward direction;

Figs. 3, 4, 5 and 6 are perspective views showing details of the device serving to the fixation of the roof.

As shown by Fig. 1, the detachable roof is made of a frame, consisting of bent pieces 2 and 3, connected together by upper members 4 and 5 and the lower members 9 and 10. The roof proper is fixed to the upper members 4 and 5, this roof being advantageously made of a translucent material. The two lateral panels 1 and 8 are made of a translucent or transparent material fixed to bent pieces 2 and 3 and to upper and lower members 4 and 5, and 9 and 10, respectively.

The lower members 9 and 10 carry fixation members 11, in the form of rings provided with a radial slot 22 (Fig. 6), which serve to connect and secure the detachable roof to carriages 12 and 13 through spindles 14, rigid with rods 15.

Under normal conditions, members 11 are in position in the space between lugs 16 rigid with the carriages, and said members 11 are fixed in this position by spindles 14.

When bell-crank lever 17 is operated by means of control member 34, through cables 18, the branch 19 of this lever moves in a forward direction and drives rods 15 in the same direction through the medium of pieces 20.

In this movement, the whole of rods 15 moves in a forward direction and spindle 14 leaves the space between lugs 16. Rod 21 is located now opposite the slot 22 of member 11 and the removable roof can be separated from the carriages and got rid of when it is pushed upwardly.

The whole of the mechanism is kept in this position by finger 23. Said finger has been acted upon by branch 29 of lever 17 in the course of the forward movement of rods 15. But as soon as it comes opposite notch 24, said finger is moved back downwardly by its return spring 25 and drops into the notch 24 of piece 20, thus preventing the latter from moving backwardly and spindle 14 from coming back into the space located between lugs 16. Thus, once the operation has been performed, the pilot can release control member 34 without the mechanism coming back to its initial position.

When the roof is in the normal position, in which the frame is secured to carriages 12, 13, rods 15 are in their rear positions and members 11 are locked on spindles 14, in such manner as to assemble all the elements together, the whole being kept in the closed position by spring 26. This position is shown in Fig. 3, corresponding to the fixation of the roof to the carriages as shown by Fig. 2.

In this position, the roof is allowed to slide, as above explained, while remaining assembled with carriages 12, 13, along rails 27, fixed to the longitudinal members of the fuselage.

Carriages 12 are, for this purpose, provided with rollers 28 which roll along rails 27. The movements of the carriages are controlled through racks 29, provided on the carriages, and toothed wheels 30 acting on said racks and operated by the pilot through crank 31, acting through the medium of rod 32 on a small rack 33 in mesh with a small pinion which is not visible on the drawings but which is keyed on the spindle of toothed wheel 30.

It will be readily understood that, with such an arrangement, when the pilot rotates crank 31, he produces a sliding displacement of the whole and of the movable roof along the rails and therefore along the fuselage.
The sliding displacement corresponds to the normal opening and closing movements of the roof.

When, in flight, the pilot wishes to get rid of his roof, for instance in order to jump with his parachute, he operates, in the manner above described, the control member 34 located at the upper front part of the cockpit. This member acts, through cables 18, on bell-crank lever 17 the arm 18 of which drives piece 20 in a forward direction, said piece 20 being rigid with rods 16. In the course of this forward movement, finger 28 is rotated, while pulling its return spring 28, whereas spindle 14 leaves the space existing between lugs 10 and therefore releases member 11, which can escape owing to the provision of slot 22 therein, said slot being adapted to accommodate rod 21.

In this movement, after having moved away, finger 23, under the action of its return spring 28, drops into notch 24 and keeps the system in the forward position.

Fixation members 11 carried by the roof structure being thus released from rods 21 carried by the carcasses, the whole of the roof can now be lifted and driven away by the action of the wind.

Therefore, it will be readily understood that, with the device according to the present invention, the sliding roof is so devised that the opening and closing displacements thereof are controlled by the pilot from the inside through a mere crank. This arrangement ensures the normal closing and opening of the roof.

On the other hand, when the pilot wants to quickly get rid of his roof, it suffices for him to pull member 34. This movement instantaneously and definitively detaches the roof from the carcasses. Thus, during flight, it suffices for the pilot to slightly lift the roof and the latter is driven off by the action of the wind.

In a general manner, while I have, in the above description, disclosed what I deem to be a practical and efficient embodiment of the present invention, it should be well understood that I do not wish to be limited thereto as there might be changes made in the arrangement, disposition and form of the parts without departing from the principle of the present invention as comprehended within the scope of the appended claims.

What I claim is:

1. In combination with an aircraft having a cockpit, a roof normally slidable above said cockpit and capable of being operated when in flight, means operative from the inside of said cockpit for displacing said roof, said roof being detachable instantaneously from said airplane, and means, operative from the inside of said cockpit, for detaching said roof from said airplane.

2. In combination with an airplane having a cockpit, a roof for said cockpit, a support for said roof slidable with respect to said cockpit, means operative from the inside of said cockpit for controlling the movements of said support with respect to said cockpit, means for detachably securing said support and said roof together, and means operative from the inside of said cockpit for instantaneously releasing said securing means.

3. In combination with an airplane having a body provided with a cockpit, a roof for said cockpit, two caricatures for supporting said roof slidably with respect to said body on either side of said cockpit, means operative from the inside of said cockpit for controlling the sliding displacements of said caricatures with respect to said cockpit, means for detachably securing said roof to said caricatures, and means operative from the inside of said cockpit for instantaneously bringing said securing means out of action.

4. In combination with an airplane having a body provided with a cockpit, a roof for said cockpit, two rails extending on either side, respectively, of said cockpit, carried by said body in the fore and aft direction of said airplane, two caricatures for supporting said roof slidably along said rails, respectively, means operative from the inside of said cockpit for controlling the sliding displacements of said caricatures with respect to said rails, registering annular elements carried by said roof and said caricatures respectively, in coaxial relation, pins adapted to engage in all of said annular elements for securing said roof to said caricatures, and means, operative from the inside of said cockpit, for moving said pins out from at least one of said cooperating annular elements whereby said roof is detached from said caricatures.

5. A combination according to claim 4 in which each of the annular elements carried by said caricatures consists of two ring-shaped lugs having their common axis parallel to the fore and aft direction of the airplane, said lugs being located at a distance from each other, the cooperating element of the roof being adapted to fit between said lugs and being provided with an axial slot of a size adapted to accommodate a part of reduced diameter of said pin.

6. In combination with an aircraft having a space for pilot or passengers, a closing element for said space normally slidable with respect to said space in a fore and aft direction, capable of being operated when in flight, means operative from the inside of said space for displacing said closing elements, said closing elements being detachable instantaneously from said aircraft, and means, operative from the inside of said space, for detaching said closing element from said aircraft.

7. In combination with an aircraft having a space for pilot or passengers, a closing element for said space, a support for said closing element slidable with respect to said space, means for detachably securing said support and said closing element together, and means operative from the inside of said space for instantaneously releasing said securing means.

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