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AIRPLANE PROVIDED WITH AN AUTOMATIC FIREARM

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The present invention relates to airplanes provided with an automatic firearm and it is more especially, although not exclusively, concerned with airplanes provided with a firearm of the so-called open breech type, that is to say in which the breech is open when the arm is ready for firing.

The object of the present invention is to provide an airplane of this kind which is better adapted to meet the requirements of practice.

The essential feature of the present invention consists in so arranging the firearm to be carried by the airplane as above stated that one of the parts of said firearm is fixed to one spar of the wing, while another part of the firearm is supported through means permitting axial movement of the firearm but in substantially fixed position with respect to the structure of the wing.

Other characteristic features of the present invention will result from the following detailed description of a specific embodiment thereof.

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

Fig. 1 diagrammatically shows the arrangement of a gun in the wing of an airplane, according to the present invention;

Fig. 2 shows, on a larger scale, a vertical section through the axis of the gun tube of the device for fixing the gun to the wing according to the invention;

Fig. 3 shows, also on a larger scale, a section, on the line III—III of Fig. 1, of the connecting device provided between the structure of said wing and the rear part of the gun.

In the arrangement according to the present invention, which concerns an airplane provided with a gun lodged in the wing, the airplane proper may be of any type whatever, provided that the wing in which the gun is to be mounted includes at least one main lateral member or spar.

According to the present invention, the automatic gun 2 (preferably the barrel thereof) is fixed to this spar (or to one of the spars if the wing includes several of them, and in this case preferably to the front one). Of course, whenever this is possible, the whole of the automatic gun is housed inside the wing, as diagrammatically shown in the view of Fig. 1.

Furthermore, at the rear part of the gun, there is provided a device 3 adapted to keep the axis of the gun in substantially fixed position with respect to the wing structure. Advantageously this device is so made, in the known manner,

and as shown by Fig. 3, as to permit a sliding displacement of the rear part of the gun with respect to the wing structure, this sliding displacement being intended, in particular, to permit expansion of the gun due to the heating thereof when it is firing.

When, as shown in the drawing, and as it will be assumed hereinafter, the wing includes two spars, or main lateral members, such as 4 and 5, and when the barrel of the gun is fixed to the front spar 4, the above mentioned device 3 preferably will be fitted on the rear spar 5.

With this arrangement I make use, for supporting the gun, of the parts of the wing structure that are the strongest and have the greatest mass. On the other hand, the position of the front spar makes it possible to fix the arm through its barrel which ensures the best conditions of firing.

Of course, the barrel of the gun might be rigidly fixed to spar 4. However, I consider that it is more advantageous to make use of a fixation system ensuring axially, and at least in one direction, a certain elasticity between the gun and the spar, in order to protect the wing structure against recoil effects and other normal and abnormal effects resulting from the firing of the gun.

For this purpose I provide on spar 4 guiding means adapted to permit a certain sliding displacement of the gun barrel with respect to said spar.

Furthermore, I provide, on at least one side of said guiding means, and preferably on both sides thereof, an elastic system, having preferably a certain compression in the state of rest, adapted to elastically maintain the gun barrel in position by applying against a stationary stop a projection carried by said gun barrel.

For practical purposes, this arrangement is advantageously made as shown in detail in Fig. 2 of the drawing.

In this embodiment, spar 4 carries a guiding member 6 the axis of which is parallel to the desired direction of firing. For instance, as shown by the drawing, this guiding member consists of a ring having a rear face 7 and a front face 8 and fixed on spar 4 by means of bolts.

In this guiding member, I mount with a working fit a sleeve 9 provided, at its front end, with a flange 10 adapted to butt against the edge 3 of guiding member 6. This sleeve 9 extends, for instance, a little beyond guiding member 6, toward the rear, and its inner diameter is so chosen that

the barrel 1 of the gun can slide therein with a working fit.

The barrel is provided, at a suitable point thereof, with a stop 11.

- 5 I further provide, on said barrel, a sleeve 12 provided, at its rear end, with a flange 13 adapted to be applied against stop 11. Between said flange 13 and edge 7, I insert at least one spring 14, or preferably a plurality of springs, each mounted in a housing provided in the front face of flange 13.

10 In order to give these springs a suitable initial tension, I fix on guiding member 6 an adjustable stop adapted to coact with the rear face of flange 13. For instance, as shown by the drawing, this stop consists of the flat end of a cap 16 provided with a hole adapted to accommodate the gun barrel and screwed on a tubular part 15 carried by edge 7 of member 6, this part 15 and said cap 16 forming together a kind of casing in which springs 14 are enclosed.

20 The various elements of the fixation device above described are so dimensioned that the elasticity of the elastic system corresponds to the working that will be hereinafter described, and that, preferably, in the state of rest, the rear edge of sleeve 9 is in contact with the front edge of sleeve 12.

30 A strong spring 17 is inserted between flange 10 and a stop 18 fixed to the part of the gun barrel 1 located in front of said flange. For instance, according to a preferred embodiment, this stop consists of the rear edge of a tube mounted on the gun barrel and kept in position by a nut 19, which may be, for instance, rigid with a fire protector 20 extending preferably as far as the leading edge 21 of the wing.

40 Spring 17 is given a certain initial compression preferably greater than the recoil force transmitted to the gun barrel, and equal for instance to—

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45 of this force.

The device above described, works in the following manner:

50 When a shot is fired, the recoil causes spring 17 to be but very little compressed if the working is normal. On the contrary, in the case of an abnormal recoil movement of the gun, the compression of this spring is greater and it absorbs the shock transmitted to the airplane.

55 As for springs 14, their function is to absorb the shocks due to the return of the organs of the gun into firing position.

60 In the case of guns of the so-called open breech type, this return movement of the organs of the gun into firing position produces rather important shocks. However, in this case, springs 14 shall advantageously be given an initial compression such that they have practically no action during normal firing, but are substantially deformed only when the last cartridge is fired, because the shock produced by the return of the organs of the gun in this case is much more violent since it is no longer braked by the insertion of a fresh cartridge into the gun.

70 It should be noted that the two systems of springs do not compensate each other but always act separately.

75 While I have, in the preceding 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. An airplane which comprises, in combination, a wing, a wing frame, two spars in said wing frame located one behind the other, a gun mounted in said wing, a guiding member carried by the front spar, a sleeve mounted in said guiding member with a working fit and surrounding the gun barrel, which is mounted therein with a working fit, a flange on said sleeve at the front end thereof, a projection on said gun barrel, a spring interposed between said projection and said flange, and means carried by the other spar for slidably guiding the rear part of the gun so as to keep the axis thereof parallel to the direction in which the barrel of the gun is allowed to slide in said sleeve.
2. An airplane which comprises, in combination, a wing, a wing frame, two spars in said wing frame located one behind the other, a gun mounted in said wing, a guiding member carried by the front spar, a sleeve mounted in said guiding member with a working fit and surrounding the gun barrel, which is inserted therein with a working fit, a flange on said sleeve at the front end thereof, a projection on said gun barrel a spring interposed between said projection and said flange, so as to oppose the recoil movement of the gun, another sleeve mounted on the gun barrel behind the first mentioned sleeve, a flange at the rear end of the last mentioned sleeve, a projection on the gun barrel adapted to cooperate with the rear face of said last mentioned flange, a spring interposed between said last mentioned flange and the rear face of said guiding member, and means carried by the other spar for slidably guiding the rear part of the gun so as to keep the axis thereof parallel to the direction in which the barrel of the gun is allowed to slide in said sleeves.
3. An airplane according to claim 2 further including means carried by said guiding member for adjusting the initial compression of the second mentioned spring.
4. In an airplane, a wing, a wing frame, at least one spar in said wing frame, a gun carried by said wing, means for fixing a part of said gun to said spar in such a manner that said part and said spar will be rigid at least on normal firing, and means carried by said wing for guiding another part of said gun in such a manner as to permit axial displacements of said other part, both of said means acting to maintain the axis of the gun in a substantially fixed position with respect to said wing.
5. In an airplane, a wing, a wing frame, two spars in said wing frame located one behind the other, a gun carried by said wing, means for fixing a part of said gun to the front spar in such a manner as to prevent axial displacements of said part at least on normal firing and recoil and means carried by the other spar for guiding another part of said gun in such a manner as to permit axial displacements of said other part, both of said means acting to maintain the axis of the gun in a substantially fixed position with respect to said wing.
6. In an airplane, a wing, a wing frame, at least one spar in said wing frame, a gun with a barrel carried by said wing, means for fixing the barrel to said spar in such a manner as to prevent axial displacements of said barrel at least on normal firing and recoil, and means carried

by said wing for guiding another part of said gun barrel in such a manner as to permit axial displacements of said other part, both of said means acting to maintain the axis of the gun in a substantially fixed position with respect to said wing.

7. In an airplane a wing, a wing frame, at least one spar in said wing frame, an automatic gun with a barrel, means carried by said spar of the wing for slidably supporting the barrel of said gun, at least one preliminary stressed

spring for yieldingly opposing sliding displacements of said barrel with respect to the wing, the preliminary stressing of said spring being greater than the force of normal recoil, and means carried by said wing for guiding another part of said barrel in such a manner as to permit axial displacements of said other part, both of said means acting to maintain the axis of the gun in a substantially fixed position with respect to said wing.

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