

Dec. 7, 1937.

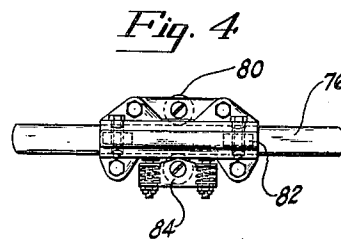
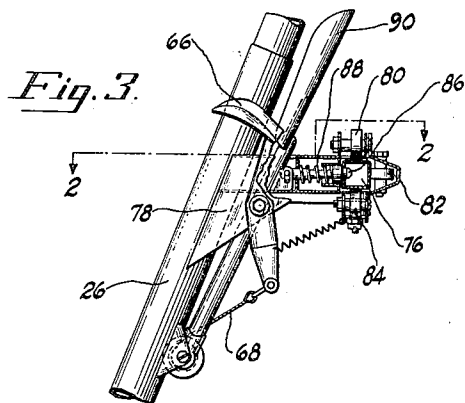
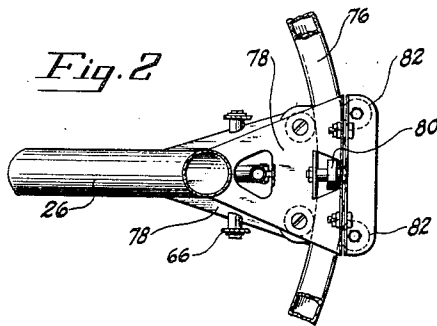
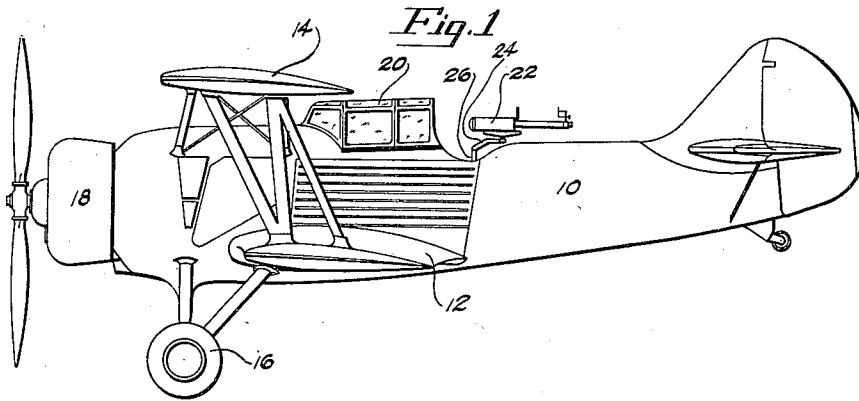
J. G. LEE

2,101,145

ADJUSTABLE GUNNER'S SEAT

Filed Nov. 10, 1933

2 Sheets-Sheet 1



INVENTOR

John G. Lee

BY

Harris F. Luther
ATTORNEY

Dec. 7, 1937.

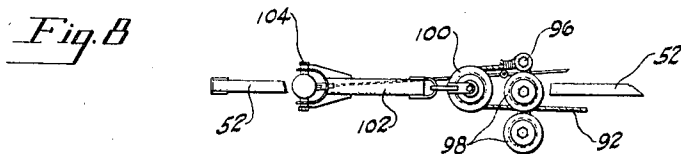
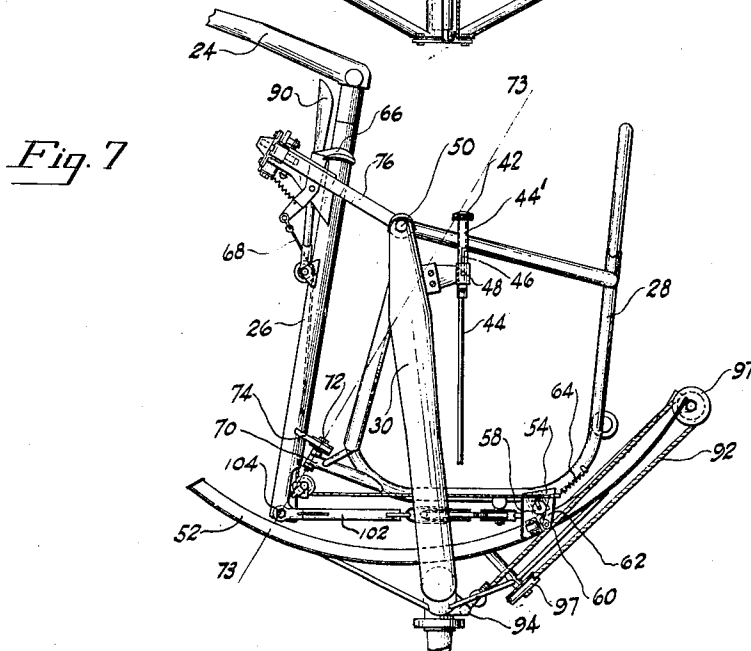
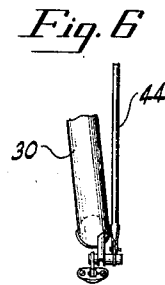
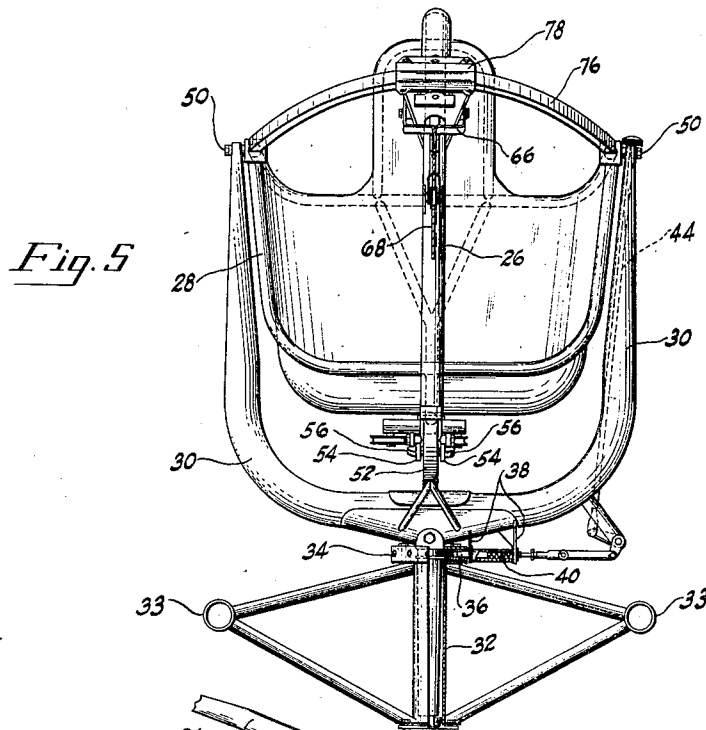
J. G. LEE

2,101,145

ADJUSTABLE GUNNER'S SEAT

Filed Nov. 10, 1933

2 Sheets-Sheet 2



INVENTOR
John G. Lee
BY
Harrie G. Luther
ATTORNEY

UNITED STATES PATENT OFFICE

2,101,145

ADJUSTABLE GUNNER'S SEAT

John G. Lee, Avon, Conn., assignor, by mesne assignments, to United Aircraft Corporation, a corporation of Delaware

Application November 10, 1933, Serial No. 697,423

19 Claims. (Cl. 89—37.5)

This invention relates to gun mounts and more particularly to an adjustable machine gun mount for aircraft.

In military airplanes having a rear gunner's cockpit, it has been customary to so mount the machine gun operated by the rear gunner that he has been exposed to the wind stream passing the airplane, when aiming and operating the gun. In some forms of gun mounts he was exposed to this wind stream in practically all positions of the gun, while in others he was exposed when the gun was aimed transversely of the airplane.

An object of this invention is to provide a gun mount in which the gun may be sighted throughout a wide range of angles without exposing the gunner to the wind stream.

Another object of this invention is to combine a gun mount with a gunner's seat so that the gun may be readily aimed over a wide range.

Another object of this invention is to provide a gun mount that may be readily moved to and from any desired position in the gunner's cockpit.

Further and other objects and advantages will be apparent from the specification and claims and from the accompanying drawings which illustrate what is now considered the preferred embodiment.

Fig. 1 is a side elevation of an airplane showing one position of the gun in relation to the gunner's cockpit.

Fig. 2 is a detailed sectional view taken on line 2—2 of Fig. 3, showing the guide for the gun supporting post.

Fig. 3 is a side view thereof.

Fig. 4 is an end view of the guide.

Fig. 5 is an end view looking at the front of the gunner's seat.

Fig. 6 is a detailed side view of the swivel locking mechanism.

Fig. 7 is a side view of the gunner's seat.

Fig. 8 is a detail of the gun counter-balancing mechanism.

The drawings illustrate my invention as embodied in an airplane having a fuselage 10, planes 12 and 14, landing gear 16, power plant 18, and cockpit cover 20.

In the particular embodiment shown, this cockpit cover forms a closure for the pilot's cockpit and in combination with pivotally mounted slides, not shown, forms a closure for the gunner's cockpit. These slides may, however, be swung on their pivots to uncover the rear portion of the gunner's cockpit, thus leaving that portion open as shown in Fig. 1.

There is provided for use by the gunner, a machine gun 22 mounted on an arm 24 detachably

secured to the upper portion of post 26, pivotally mounted on a gunner's seat 28. The gunner's seat is pivotally mounted in a U-shaped support 30 which, in turn, is swiveled into a member 32 rigidly supported from the airplane structural members 33.

The member 32 is formed with an enlarged head 34 which is provided with a series of holes adapted to receive a positioning and locking pin 36. The locking pin 36 is slidably mounted in a pair of brackets 38 rigidly attached to the U-shaped member 30. When the pin 36 is in one of the holes in the enlarged head 34, the U-shaped member 30 is held in a fixed position relative to the airplane and its structural members 33. When the pin 36 is withdrawn from the holes in member 34, the U-shaped member 30 is free to swivel about the axis of the member 32.

Pin 36 is urged towards the member 34 by a spring 40 and may be withdrawn against the action of that spring by pressing on the knob 42 of the rod 44 which is suitably connected, by means of a bell crank and a link, to the pin 36.

The knob 42 is provided with a sleeve 44' having a bayonet slot 46 co-acting with a pin 48 whereby the knob 42 may be retained in its depressed position and the pin 36 maintained out of contact with the member 34 so that the U-shaped member 30 may be freely swiveled.

The seat 28 is pivotally suspended from the upper portion of the arms of the U-shaped member 30 by means of the pivots 50 so that the seat may swing with a front and back motion between the arms of the U-shaped member. An arcuate bar 52 is rigidly secured to the central lower portion of the U-shaped member 30 in such a manner that the center of its arc falls on a line connecting the two pivots 50. Plates 54 are secured to a central frame member of the seat 28 and are positioned on the two sides of the arcuate member 52. Rolls 56 are mounted in these plates and bear on the arcuate member 52 to assist in guiding the seat in its swinging movements. A series of holes, provided in the upper surface of the member 52, may receive a pin, mounted between the plates 54 and actuated by a cam roller 58. This cam roller is actuated by a cam 60 secured to a lever 62. This lever is spring pressed in one direction by a spring 64 and may be actuated in the other direction by a lever 66 and a cable 68. Pushing down on the lever 66 will pull the cable 68 and cause the cam 60 to lift the roller 58 and thus remove the attached pin from a hole in the member 52. When the pin is thus removed the seat may be turned about its pivot 50 and

when the pin is in place in one of the holes in member 52, the seat is securely locked in position.

Rigidly mounted near the lower forward portion of the seat is a member 70 carrying a pivot 72 about which the post 26 is adapted to swing, member 74, rigidly secured to post 26 serving as the means of connection between the post and the pivot. The axis of this pivot, indicated by the line 73—73 passes through the normal position of the gunner's head.

The ends of an arcuate guide 76 are secured to the frame work of the seat 28 adjacent the pivots 50 and the arcuate member 76 is so placed that the line 73—73 passes through the center of its arc and at right angles to the plane thereof. A built-up member 78 rigidly secured to post 26 surrounds member 76 and serves to guide the upper end of the post 26 as it turns on pivot 72. A roll 80 is journaled in the member 78 and rolls on the top of member 76. Rolls 82 roll on the front of member 76 and a spring-pressed roll 84 rolls on the bottom thereof. The inner portion of member 76 is provided with a series of holes adapted to receive a pin 86. This pin is spring-pressed in one direction by a spring 88 and may be retracted against the tension thereof by means of a handle 90 connected to the pin 86 by a pin and slot connection. When the pin 86 is removed from the holes in the member 76, the post 26 may be swung from side to side about its pivot 72. By allowing the pin 86 to enter a selected hole in the member 76, the post 26 may be locked in any desired position.

When the machine gun is mounted on the arm 24 and the post 26 is swung to one of its extreme side positions, the gunner must lift the weight of the gun together with guiding means attached to the post against the attraction of gravity in order to bring the gun into its more elevated central position. The effort required to move the gun obviously becomes greater as the axis 73—73 becomes nearer horizontal, which occurs when the seat is tipped backward about its pivots 50. Also, when the seat is tipped back, as it is when firing at an object above the airplane, some difficulty is experienced in again and quickly bringing the seat to an upright position. In my invention, means have been provided for overcoming these difficulties so that the gun may be readily moved from side to side and the seat readily brought forward from a reclined position.

In the embodiment shown, this means takes the form of a shock absorber cord 92, one end of which is fastened to the U-shaped member 30 at 94 and the other end of which is fastened to the seat 28 at 96. The cord is led over guide pulleys 97, 97, between guide pulleys 98 and over a pulley 100. Pulley 100 is attached to an arm 102 pivotally secured at 104 to the arm 26 so that upon movement of the post 26 about the pivot 72, lateral movement is imparted to the arm 102. As will be obvious from the drawings, this lateral movement increases the length of the shock absorber cord 92 and thus creates a force tending to bring the post 26 back to its central position. As the seat 28 is reclined, the end of the shock absorber cord 92 and the pulley 100 is moved away from the pulley 97 and the shock absorber cord consequently stretched, thus, creating a force tending to bring the seat back to its upright position. It will be noted that as the tension in the shock absorber cord is increased as the seat is reclined, the force exerted by this shock absorber cord, tending to bring the post

26 and its attached gun back to its elevated central position is correspondingly greater. It will, therefore, be seen that I have provided means for counterbalancing the weight of the gun, which means is adapted to exert an increasingly greater force as the effective weight of the gun, resisting movement about the pivot 72, becomes greater, and that I have also provided means to assist in bringing the seat to an upright position, which means are effective in all positions of the gun.

The arm 24 and the post 26 are so proportioned that the sights on the gun 22 will be in line with the gunner's eye, when the gunner is comfortably seated and the gun is in a horizontal position, as shown in Fig. 1.

The gun may then be moved to the limit of its transverse movement along the guide 76, and the gunner may keep the sights in line with his eyes by simply turning his head. The gun may be directed upward by simply reclining the seat during which movement the sights may be kept in line with the gunner's eye without any movement of the gunner's head. It will thus be seen that I have provided means whereby a gun may be sighted and operated over a wide angle without requiring lateral movement of the gunner's head.

In operating this device, the gunner takes his place in the seat 28, usually sitting on his parachute with his legs on either side of the post 26 and facing to the rear of the airplane. One hand is placed on the post 26 with the fingers grasping the lever 90 and the lower side of the hand resting on the lever 66. It will be observed that a lever 66 is provided on each side of post 26 so that either hand may be used. The other hand is placed upon the gun 22. If it is desired to move the gun from side to side, the lever 90 may be drawn towards the post 26, thus unlocking the post from the guide 76. The gunner may then readily move the post, with its attached gun, laterally. If it is desired to elevate the gun to fire at an object over head, the hand grasping the post 26 is tipped or moved downward, thus operating lever 66 and unlocking seat 28 from the arcuate member 52. The seat may then be moved about its pivot 50 to bring the gun into any desired elevated position. Release of the levers 90 and 66 will allow their respective pins to lock the post 26 and the seat 28 with the gun pointed in the desired direction and with the gunner still comfortably seated in his seat and within the shelter of the cockpit cover 20.

If it is desired to fire in a direction forward of that permitted by the extreme lateral movement of the gun on its guide 76, the knob 42 may be depressed, thus unlocking the U-shaped member 30 so that it may be swiveled in the member 32, thus turning the gun about a substantially vertical axis. This movement will, of course, tend to bring the gunner's head out into the wind stream beyond the protection of the cockpit cover 20 and the degree of movement which may be accomplished through swiveling of the seat support without exposure of the gunner to the wind stream will, of course, be dependent almost entirely upon the size of the gunner's cockpit.

At times, when it is not desired to use the gun, it may be detached from the post 26 at the detachable connection between the arm 24 and the post 26 and stowed in any convenient position in or adjacent the gunner's cockpit.

It will, of course, be observed that the means herein described are adaptable to a variety of

other uses. They may, for instance, be used to support motion picture cameras or other devices which it may be desired to train upon moving objects. It is, therefore, to be understood that the invention is not limited to the specific embodiment herein described, but may be used in other ways, and various changes may be made therein without departing from the spirit and scope of the invention, as defined by the following claims.

What I claim is:

1. A combined gun support and gunner's seat, comprising a swivel support, a seat, means to pivotally suspend said seat from said support, a gun standard, means to pivotally mount said standard on said seat, and means carried by said seat for limiting the movements of said gun standard to a predetermined path with respect to the seat.

2. In combination, a swivel support, a seat pivotally suspended from said support, a pivotally mounted gun carried by said seat and means to guide the gun in its movements about the pivotal axis of its mounting said axis passing through the space occupied by the gunner's head when the gunner is seated in said seat.

3. In combination, a swivel support, a gunner's seat suspended from said support, a pivotally mounted gun associated with said seat and means to adjust the gun from side to side relative to said seat upon the axis of the pivotal mounting of the gun, said axis being fixed with respect to said seat and passing through the head of the seated gunner.

4. In an airplane, a support mounted to swing on a substantially vertical axis, a seat suspended from said support to swing about a substantially horizontal axis, a gun supporting post mounted on said seat and means to guide said post in a lateral path transversely across the front of said seat.

5. In an airplane, a support mounted to swing on a substantially vertical axis, a seat suspended from said support to swing about a substantially horizontal axis, a gun support mounted on said seat and means to guide said support in a lateral path transversely of said seat.

6. Means for adjustably supporting fire arms and the like, comprising a seat having two degrees of freedom, a support for the fire arms or the like pivotally mounted on said seat, and means permitting adjustment of the support about its pivotal mounting in all positions of the seat the pivotal axis of the support mounting passing substantially through the normal position of the operator's head.

7. An adjustable gun mount, comprising a pivotally suspended gunner's seat, means tending to keep the seat in an upright position, said means applying increasing force as the seat is inclined, a gun support mounted on said seat and adapted to swing in an arc about an axis inclined to the vertical said arc forming the upper portion of a circle lying in a plane normal to said axis, the inclination of said axis increasing as the seat is inclined, and means tending to keep the gun at the high point of the arc, said means applying increasing force as the gun is moved from the high point of its arc and as the seat is inclined.

8. In combination, a gun standard, a gun mounted thereon, means to guide said gun in an arcuate path about a horizontal axis and means to guide said gun in an arcuate path about an axis inclined to the vertical and biasing means tending to elevate the gun about the inclined axis

and depress the gun about the horizontal axis.

9. An adjustable gun mount, comprising, in combination, a pivotally suspended gunner's seat, means tending to swing said seat about the pivots to keep the seat in an upright forwardly inclined position, said means applying increasing force as the seat is backwardly inclined, a gun support rotatably mounted on said seat, said rotatable mounting adapted to guide said support in an arc about an axis inclined to the vertical when the seat is in an upright position, said arc forming the upper portion of a circle lying in a plane normal to said axis, the inclination of said axis increasing as the seat is backwardly inclined, said means tending to keep the gun at the high point of said arc and applying increasing force as the gun is moved from the high point of said arc and as the seat is backwardly inclined.

10. In a gunner's seat in an airplane cockpit, a bearing supported at the bottom of said cockpit, a U shaped support carried by said bearing to pivot about a normally vertical axis, spaced bearings carried by said U shaped support, a seat carried by said spaced bearings to swing about a normally horizontal axis, a pivot carried by said seat, a post secured at one end to said pivot, a guide rail carried by said seat above said pivot to limit the movements of the upper end of said post to an arc centered on an axis extending from said pivot through the space occupied by the head of a gunner occupying said seat, and a bracket adapted to pivotally support a gun mounted on the upper end of said post.

11. In a gunner's seat in an airplane, a bearing having a normally vertical axis fixed to the structure of said airplane, a U frame carried by said bearing for complete freedom of rotational movement about a normally vertical axis, a seat supported by said U frame for swinging movements about a normally horizontal axis, and a gun post pivotally supported on said seat for rotational movement about both said normally vertical and said normally horizontal axes and for independent movement transversely of the front of said seat.

12. In a gunner's seat in an airplane, a bearing having a normally vertical axis fixed to the structure of said airplane, a U frame carried by said bearing for rotation about a normally vertical axis, a seat supported by said U frame for swinging movements about a normally horizontal axis, a gun post pivotally supported on said seat for rotational movement about both said normally vertical, and said normally horizontal axes and for independent movement transversely of the front of said seat, and a yieldable tension member resiliently resisting swinging movements of said seat toward a rearwardly inclined position.

13. In a gunner's seat in an airplane, a bearing having a normally vertical axis fixed to the structure of said airplane, a U frame carried by said bearing for rotation about a normally vertical axis, a seat supported by said U frame for swinging movements about a normally horizontal axis, a gun post pivotally supported on said seat for rotational movement about said normally vertical axis and swinging movement about said normally horizontal axis and for independent movement transversely of the front of said seat, and a resilient tension member exerting force increasing with the degree of inclination opposed to swinging movements of said seat toward a rearwardly inclined position.

14. In a gunner's seat in an airplane, a bearing fixed to the structure of said airplane, a U frame carried by said bearing for rotation about a normally vertical axis, a seat supported by said U frame for swinging movements about a normally horizontal axis, a gun post pivotally supported on said seat for rotational movement about said normally vertical axis and swinging movement about said normally horizontal axis and for independent movement transversely of the front of said seat, and a resilient tension member secured at one end to said seat and at the opposite end to said seat support and connected intermediate its length to said post, and means for stretching said tension member as said seat is inclined rearwardly to create a force increasing as the degree of rearward inclination of said seat to urge said seat to its erect position and said post to a centered position with respect to the front of said seat.
15. In a gunner's seat in an airplane, a U frame having side members and a cross member pivotally supported on said airplane structure for rotation about a normally vertical axis, a seat swingably mounted on said side members, a support for machine guns and the like pivotally

mounted on said seat for swingable and rotatable movements therewith and for independent movement laterally of said seat, and a guide rail carried by said seat for guiding the movements of said support relative to said seat.

16. A combined gun mount and gunner's seat comprising, a pivotally mounted support, means pivotally suspending said seat from said support, and means adjustably supporting said gun upon said seat including a gun post, a pivotal connection between said seat and said post, and means spaced from said pivotal connection and rigid with said seat for guiding and supporting said post.

17. An adjustable mount as set forth in claim 16 in which the axis of the pivot passes through the normal position of the seated operator's head.

18. An adjustable mount, as set forth in claim 16, in which the operator's seat has two degrees of freedom.

19. A combined gun mount and gunner's seat as set forth in claim 16, in which the means for guiding and supporting the post comprises an arcuate guide adjacent to the upper end of the post.

JOHN G. LEE.