

Jan. 9, 1951

P. E. PETERSON

2,537,419

ADJUSTABLE REAR MOUNT FOR MACHINE GUNS

Filed July 21, 1944

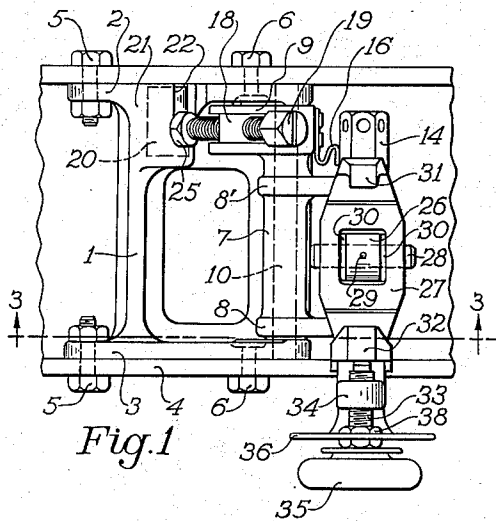


Fig. 1

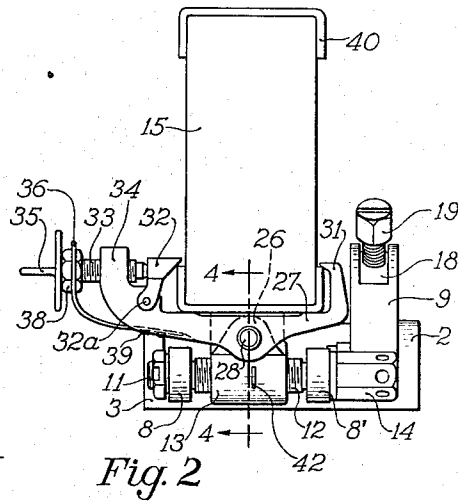


Fig. 2

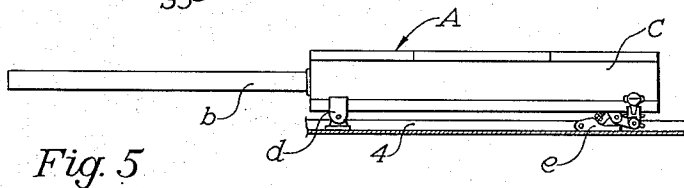


Fig. 5

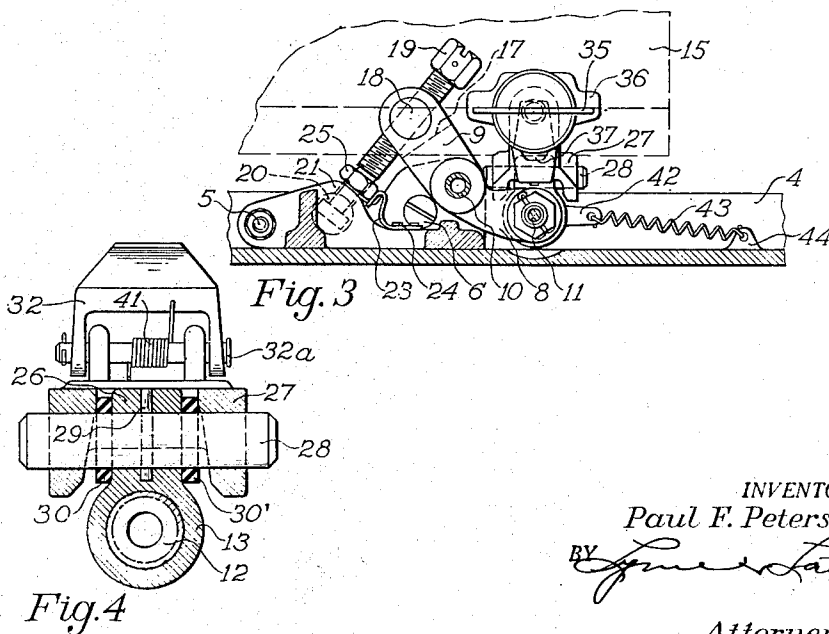


Fig. 3

Fig. 4

INVENTOR.
Paul F. Peterson
BY *James Latta*
Attorney

UNITED STATES PATENT OFFICE

2,537,419

ADJUSTABLE REAR MOUNT FOR MACHINE GUNS

Paul F. Peterson, Los Angeles, Calif., assignor to North American Aviation, Inc.

Application July 21, 1944, Serial No. 545,941

16 Claims. (Cl. 89—37.5)

1

The present invention relates to improvements in adjustable rear mountings for fixed machine guns of a type particularly adaptable for aircraft installations.

It is an object of the present invention to provide a mount suitable for the foregoing purpose, which is generally compact in all dimensions and particularly in the vertical height whereby a minimum amount of clearance is required on an installation. In current gun placement designs in aircraft wherein a plurality of guns are included within the wing of a ship, difficulties are frequently encountered owing to the very limited amount of clearance within the wing structure, especially in the outboard portion of the extremely thin wings employed on fighter ships. It accordingly becomes of considerable importance to provide a satisfactory mounting means including provision for adjustment of the gun in both azimuth and elevation and yet requiring a minimum amount of clearance between the lower skin of the wing and the bottom of the gun.

It is a further object of this invention to provide adjustment means for a gun mount as above described which are readily accessible and simple of operation. Previous designs have frequently required that adjustments be made from the under side of the wing. Such an arrangement has numerous disadvantages, such as generally requiring two persons in order to perform the operation satisfactorily, one on the wing to direct the operation, while a second operates the adjusting means beneath the wing. Such an arrangement also generally resulted in a portion of the adjusting means projecting through the lower wing surface and into the air stream, or a suitable access door was required. The present arrangement is completely housed, accessible from above, can be readily adjusted by one man, requires no special tools and is completely self-locking immediately upon completion of the required adjustment.

It is a further object of the invention to provide a rear gun mount which will improve the performance and accuracy of the gun during firing. To this end, the longitudinal recoil forces are not transmitted to the rear mount since the rear clamp is free-floating and self-aligning. The longitudinal recoil forces are entirely taken by the front mount and the rear mount serves only to position the gun, i. e., takes loads only in the vertical or transverse horizontal plane. A considerable improvement in the dispersion pattern of the gun during firing is thereby effected.

A still further object of the present invention is the provision of an adjustable rear gun mount including a quickly releasable securing means which may be attached to the gun at any convenient point along the lower side of the rear portion of the gun. This mount may also be readily installed in such a manner as to support

2

the gun from above and may be attached to the upper side of the rear portion of the gun with equal facility.

Still further objects of the present invention are the provision of an adjustable rear gun mount of simple design and rugged construction which lends itself readily to production, being inexpensive to build and having relatively few parts, providing a full range of adjustments which may be quickly and easily made and are automatically secured by self-locking provisions.

Like reference characters designate similar parts in the several views of the drawings, in which:

Fig. 1 is a top plan view of the rear mount;

Fig. 2 is an end elevation of the mount showing the gun in position;

Fig. 3 is a side elevation of the mount taken on line 3—3 of Fig. 1, indicating the gun in phantom;

Fig. 4 is a fragmentary section taken on line 4—4 of Fig. 2; and

Fig. 5 is a side elevation of a machine gun mounted in accordance with the invention.

As an example of one form in which the invention may be embodied, I have shown in the drawing a machine gun, indicated generally at A, mounted on a supporting structure 4 (such as a frame member of a military airplane). The gun A is of a type (such as disclosed in the patent to Browning No. 1,628,226) including a barrel b and a casing c, with conventional recoil absorbing mechanism interposed between the barrel b and the casing c. The casing c is mounted on the support 4 by means of a front mount d, which forms a relatively rigid, recoil transmitting pivotal connection between the casing c and the support 4, and a rear mount e which provides what may be termed a longitudinally floating connection between the casing c and the support 4 so as to offer no resistance to the recoil, but which is adapted to restrain the rear end of the gun against movements transverse to the longitudinal axis of the gun, either in a vertical or a horizontal direction.

The rear mounting unit e, which includes further detailed features of the invention, comprises a bracket 1 having parallel side flanges 2—3 whereby the mount is attached to the supporting structure 4 as by bolts 5—5, 6—6. An adjustable member 7 which comprises a pair of rearwardly extending arms 8—8' and a forwardly extending arm 9 is carried on a transverse pin 10 supported in the base flanges 2—3. Member 7, arms 8—8', and arm 9 comprise a lever for mounting the gun on the bracket. A shaft 11 having a threaded mid-portion 12 is journaled in the arms 8—8', extending transversely therebetween. A block 13 is carried upon the shaft 11 in engagement with the threaded portion and is arranged to be moved to right or left by the rotation of shaft 11. Gun

3

engaging means are supported upon the block. A hexagonal head 14 is provided at one end of the shaft 11 whereby the required rotation may be readily accomplished in order to secure the desired adjustment of the gun 15 in azimuth. A spring detent 16 is arranged to bear against the flat surfaces of the hexagonal head 14, thereby providing for the retention of the adjustment. The application of a turning force of sufficient moment to rotate the shaft may be readily obtained with a suitable tool, the locking spring deflecting momentarily to permit the passage of the corners of the head 14.

The arm 9, extending forwardly and upwardly, is slotted at 17 to receive a bearing block 18 which is journaled in the bifurcated end portion of the arm, and cooperatively engages an adjusting screw 19. The lower extremity of this screw is journaled in a slotted plug 20 inserted within a boss 21 which is slotted at 22 to permit the self-alignment of the assembly throughout the full range of adjustment. Rotation of the adjusting screw 19 in engagement with the bearing block 18 will secure the vertical adjustment of the gun by virtue of the entire adjustable unit 7-8-9 being pivoted about the pin 10. A spring detent 23 secured to the frame at 24 bears against a hexagonal portion 25 adjacent the lower extremity of the adjusting screw 19 whereby the desired adjustment will be retained.

The block 13, which carries the gun engaging means, is provided with an upwardly extending lug 26 received within a recess in the yoke 27 and is pivotally connected thereto by a short pin 28. The pin is secured to the lug 26 at 29. The lug 26 is positioned in spaced relationship to the sides of the opening provided in the yoke 27 and a pair of resilient washers 30-30' are inserted therebetween. This provides a free-floating arrangement wherein the yoke 27 is relatively unrestrained and therefore may be permitted to move axially upon the pin 28, the resilient washers serving as buffers. This prevents longitudinal recoil forces of the gun from being transmitted to the mount and the supporting structure, thereby preventing a restraining action from occurring at the rear mount whereby the dispersion pattern of the gun is considerably improved.

The floating arrangement provided between the block 13 and the yoke 27 by the pin 28 also allows the gun engaging clamp to become self-aligning by way of rotation of the yoke on the pin. This feature is advantageous in that minor misalignments which may be encountered between the various portions of the gun mount and supporting structure are readily accommodated.

The yoke 27 is provided with quickly releasable clamping means for engaging the gun and securing it to the mount. This means comprises a fixed jaw 31 and an opposing movable jaw 32 pivoted at 32a to the yoke 27, together with an adjusting screw 33, threaded through a boss 34 on the yoke 27, bearing against the movable jaw 32, and having a wing head 35 for engagement by the fingers of an operator. Means for retaining the required clamping adjustment are also provided, comprising a resilient member 36 apertured at 37 to engage the hexagonal portion 38 of the head 35. The resilient member, secured to the yoke at 39, may be deflected toward the yoke to be disengaged from the hexagonal portion of the head 35 to allow the adjusting screw to be rotated and release the tensioning means for free rotation and when released will spring back into locking engagement with the hexagonal portion 38.

4

This quickly releasable clamp arrangement provides a means whereby the gun may be engaged at any convenient point along the length of the lower edge. Alternatively the entire mount may be installed in an inverted position whereupon the clamping means will engage the corresponding portion of the upper edge of the gun case as at 40. This permits a greater degree of latitude in designing such installations as well as facilitating the actual servicing operation, requiring removal and replacement of the guns. Servicing operations are further simplified by the provision of a light torque spring 41 bearing against the movable jaw 32 and tending to urge it constantly against the tensioning screw 33 whereby the clamping means is held in open position to receive the gun. As a still further aid, a lug 42 is provided on the block 13 and a spring 43 is attached to the supporting structure as at 44 whereby the entire unit 13-27 is held erect and in proper gun engaging attitude, avoiding the possibility of difficulties being encountered by virtue of the yoke falling over during the placing of the gun.

I find that by employing a recoil transmitting forward mount in combination with a longitudinally floating but transversely restraining rear mount, that the dispersion firing pattern of the gun is very definitely improved. Where an attempt is made to restrain recoil through the rear mount as well as the front mount, the recoil induced dispersion effects upon the gun are more pronounced and the dispersion pattern becomes more irregular.

It may be noted that the upper portions of the lever 9 and adjusting screw 19 project upwardly beyond the bottom of the gun casing 15, in a plane at one side of the gun casing, while the bracket 1, the bearing portion of the lever 9, and the clamp 27 are largely disposed between the lower side of the gun and the support 4. The head of the screw 19 projects upwardly at one side of the gun so as to provide for easy access for adjusting purposes.

I claim as my invention:

1. An adjustable gun mount comprising a bracket for attachment to a support, a clamp adapted to embrace and engage the lower portion of a gun casing, said clamp including a pair of spaced portions having aligned bearing apertures, a pin extended through said apertures and supporting said clamp for sliding movement in the direction parallel to the longitudinal axis of the gun, a lever having at one end an upwardly extending lug received between said spaced clamp portions and attached to and supporting the intermediate portion of said pin, cushioning means interposed between said lug and the respective spaced portions of said clamps, for yieldingly opposing said sliding movement, means pivoting an intermediate portion of said lever upon said bracket on a horizontal axis transverse to said longitudinal axis for adjusting movement in a vertical plane, and an adjusting screw forming an adjustable connection between the other end of said lever and said bracket for effecting said adjustment in a vertical plane.

2. A gun mount as defined in claim 1, wherein said adjusting screw extends upwardly and rearwardly and has at its upper end a head for engagement by an adjusting tool.

3. A mount for floatingly attaching a portion of a gun to a support comprising a lever, means for adjustably connecting said lever to said support, means for holding said lever in adjusted

position, and means fixed to the gun and carried by said lever means for carrying said gun with freedom for movement in the direction of its longitudinal axis and rotative movement in a direction transverse thereto.

4. A mount for floatingly attaching a portion of a gun to a support comprising a pin for fixedly attaching to said support and extended in the direction of the longitudinal axis of the gun and a yoke fixed to said gun and rotatably and slidably mounted on said pin.

5. A device as recited in claim 4 and further including buffer means interposed between said pin and yoke.

6. A mount for floatingly attaching the rear portion of a gun to a support comprising interengaging means one of which is to be fixed to the support and the other of which is fixed to the gun and carried by the first named means with freedom for sliding movement in the direction of the longitudinal axis of the gun and rotative movement in a direction transverse thereto.

7. A device as recited in claim 6 and further including buffer means interposed between said interengaging means.

8. A mount for floatingly attaching a portion of a gun to a support comprising a pin to be fixed to the support and extending substantially longitudinally of the gun, a yoke fixed to the gun and mounted on the pin with freedom for rotative and sliding movement, and buffer means between the pin and yoke.

9. A mount for floatingly attaching a portion of a gun to a support comprising a lever, means for adjustably connecting said lever to said support, means for holding said lever in adjusted position, and means fixed to the gun and carried by said lever means for carrying said gun with freedom for movement in the direction of its longitudinal axis and rotative movement in a direction transverse thereto, and buffer means between the lever means and the means fixed to the gun.

10. A mount for floatingly attaching a portion of a gun to a support for use in a mounting arrangement wherein another portion of the gun is relatively unyieldingly attached to the support, comprising interconnected elements one of which is to be adjustably fixed to the support and the other of which is fixed to the gun and carried by the first named element with freedom for movement in the direction of the longitudinal axis of the gun, and buffer means between the interconnected elements.

11. A mount for floatingly attaching a portion of a gun to a support for use in a mounting arrangement wherein another portion of the gun is relatively unyieldingly attached to the support, comprising interconnected elements one of which is to be adjustably fixed to the support and the other of which is fixed to the gun and carried by the first named element with freedom for movement in the direction of the longitudinal axis of the gun and rotative movement in a direction generally transverse thereto, and buffer means between the interconnected elements.

12. A mount for floatingly attaching a portion of a gun to a support comprising interconnected elements, one of which is adjustably fixed to the support and the other of which is fixed to the gun and carried by the first named element with freedom for yielding movement in the direction of the longitudinal axis of the gun and rotational movement in a direction generally transverse to the longitudinal axis of the gun, and means for

restraining said other element against movement in vertical and transverse horizontal directions.

13. A mount for floatingly attaching a portion of a gun to a support comprising vertical adjustable means carried by the support, laterally adjustable means carried by said vertical adjustable means, and yoke means attached to said gun and to said laterally adjustable means with freedom for rotative and horizontal longitudinal movements but restrained against lateral movements in horizontal and vertical directions.

14. An adjustable gun mount comprising a bracket for attachment to a support, said bracket being interposed beneath the underside of the gun and said support, means for attachment to said gun, a lever on which said means is pivotally mounted, said lever being fulcrumed on said bracket for movement such as to effect adjustment of said gun, and an adjusting screw acting between said lever and said bracket and adapted to effect said adjusting movement of said lever, said adjusting screw and the upper portion of said lever being disposed at one side of the gun with the head of the screw projecting upwardly.

15. In a mounting arrangement for attaching a gun to a support, relatively unyielding means for attaching one portion of the gun to the support; and means for floatingly attaching another portion of the gun to the support comprising interengaging means, one of which is to be fixed to the support and the other of which is fixed to the gun and carried by the first named means for freedom of sliding movement in the direction of the longitudinal axis of the gun and rotative movement in a direction transverse thereto.

16. A mount for adjustably attaching a gun to a support comprising bracket means for attachment to said support, a lever fulcrumed on said bracket means for movement with respect thereto, means for holding said lever in adjusted position, gun engaging means carried by said lever and adjustable in a direction generally at right angles to the direction of movement of said lever, and means fixed to said gun and carried by said lever for carrying said gun with freedom for movement in the direction of its longitudinal axis and rotative movement in a direction transverse thereto.

PAUL F. PETERSON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,594,365	Houbroe	Aug. 3, 1926
1,628,226	Browning	May 10, 1927
2,076,256	Swalm et al.	Apr. 6, 1937
2,293,069	McNeil et al.	Aug. 18, 1942
2,326,904	Trimbach	Aug. 17, 1943
2,334,984	Berlin et al.	Nov. 23, 1943
2,335,835	Zietlow	Nov. 30, 1943
2,364,509	Bertran et al.	Dec. 5, 1944
2,380,773	McMullen	July 31, 1945
2,385,218	Martin	Sept. 18, 1945

FOREIGN PATENTS

Number	Country	Date
25,119	Austria	July 25, 1906
324,308	Germany	Aug. 26, 1920
483,847	Great Britain	Apr. 12, 1938
491,353	Great Britain	Aug. 31, 1938
865,951	France	Mar. 24, 1941