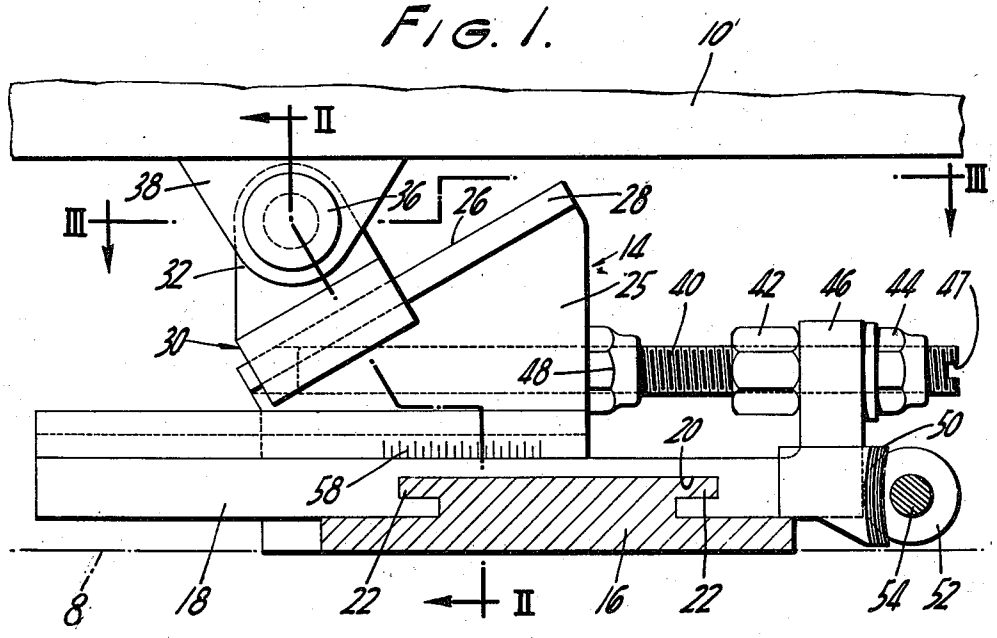
Nov. 30, 1943. J. F. ZIETLOW, JR 2,335,835

ORDNANCE

Filed Oct. 6, 1941 2 Sheets-Sheet 1

FIG. 1.



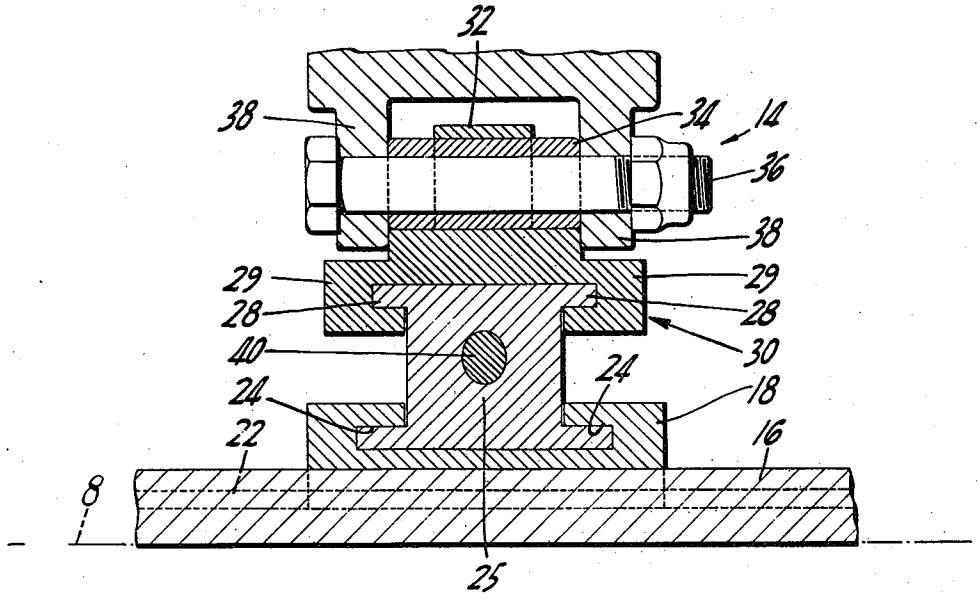


FIG. 2.

INVENTOR
JOHN F. ZIETLOW, JR.
BY
Beau, Brooks, Buckley & Beau.
ATTORNEYS

Nov. 30, 1943. J. F. ZIETLOW, JR 2,335,835

ORDNANCE

Filed Oct. 6, 1941 2 Sheets-Sheet 2

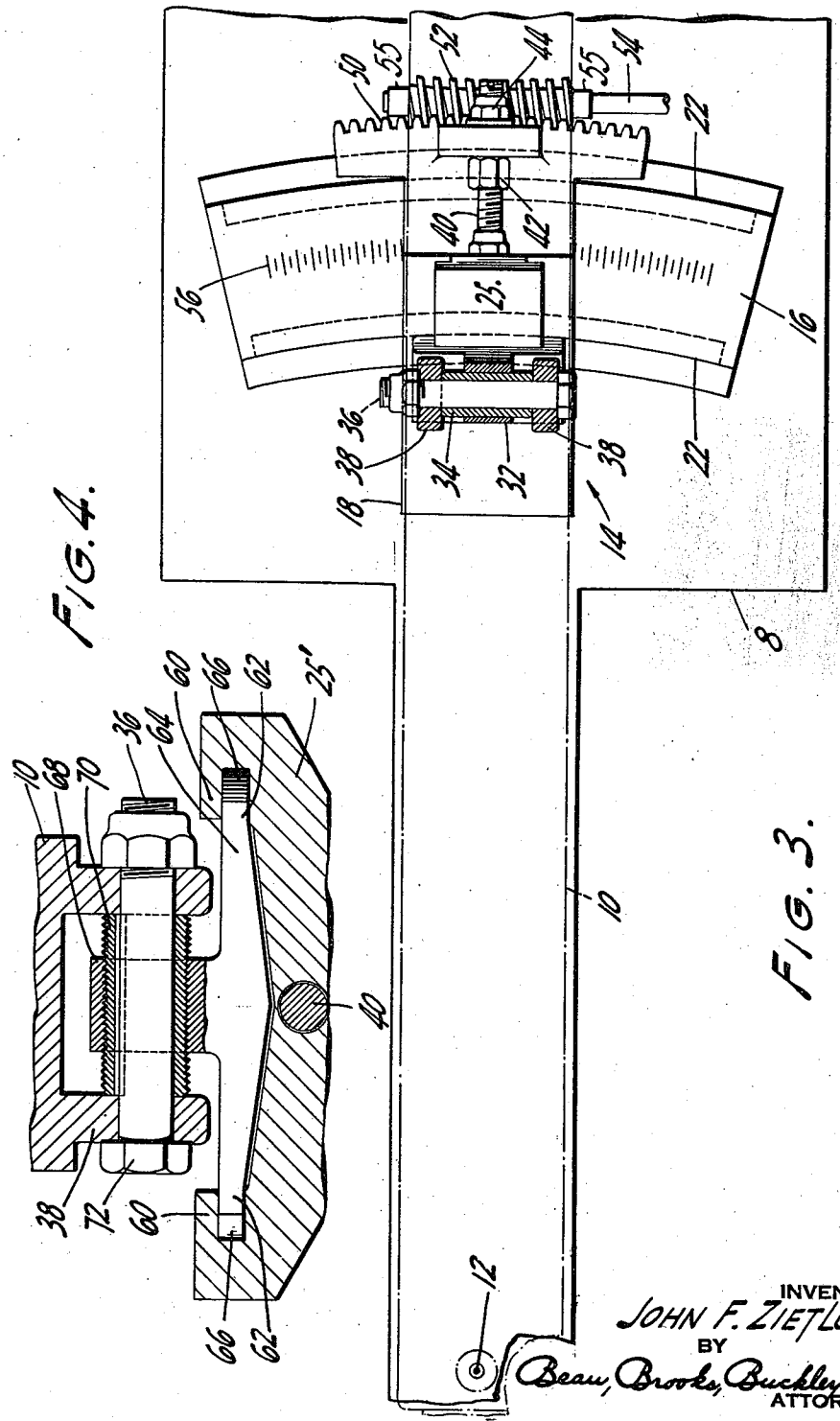


FIG. 4.

FIG. 3.

INVENTOR
JOHN F. ZIETLOW, JR.
BY
Beau, Brooks, Buckley & Beau.
ATTORNEYS

Patented Nov. 30, 1943 2,335,835

UNITED STATES PATENT OFFICE

2,335,835

ORDNANCE

John F. Zietlow, Jr., Buffalo, N. Y., assignor to Bell Aircraft Corporation, Buffalo, N. Y.

Application October 6, 1941, Serial No. 413,773

10 Claims. (Cl. 89—37)

This invention relates to ordnance, and more particularly to improved means for mounting small arms of the machine gun type, for example upon military vehicles such as airplanes or the like.

One of the objects of the invention is to provide an improved gun mount for arms such as machine guns or the like. Another object of the invention is to provide an improved adjustable gun mount which is particularly adapted for use in connection with small arms such as machine guns or the like when mounted within restricted spaces. Another object of the invention is to provide an adjustable gun mount of the character described which comprises novel and improved combination azimuth and elevational adjustment features. Another object of the invention is to provide a gun mount device of the character described which is so formed as to be relatively compact and rugged and mechanically simple and adapted to be manufactured inexpensively. Other objects and advantages of the invention will appear from the specification hereinafter.

In the drawings:

Fig. 1 is a fragmentary elevation of a machine gun and mounting connection device of the invention;

Fig. 2 is a section taken substantially along line II—II of Fig. 1;

Fig. 3 is a section taken along line III—III of Fig. 1, on a reduced scale, and extended in the direction of the gun barrel; and

Fig. 4 is a view corresponding to Fig. 2 of another form of the mounting connection device of the invention.

The drawings illustrate the invention in connection with a mounting base 8 and a gun indicated generally at 10; and it will be understood that the gun may be of any type arranged to be fixedly mounted upon the support such as may comprise an airplane wing or the like. For example, as illustrated in Fig. 3, the front gun mounting may comprise any standard or suitable swivel mounting connection as indicated at 12, about which the gun may be adjusted in azimuth and in elevation for final training thereof relative to the mounting base structure subsequent to initial installation thereon. Thus, it will be understood that the swivel connection device at 12 may comprise, for example, the usual swivel yoke device or the like, whereby the gun 10 is mounted adjacent the front end portion of its casing upon any suitable stationary portion of the mounting vehicle.

Adjacent the rear end portion of the gun casing, the gun is carried by a novel combination azimuth and elevational adjustment mechanism which is designated generally by the numeral 14. The mount connection 14 includes an arcuate rail 16 which is fixed to any suitable stationary portion of the mounting base 8 so as to be centered about the vertical axis of rotation of the swivel connection device 12 at the forward gun mount connection. A base plate 18 is recessed and laterally grooved as at 20 so as to engage in keyed relation upon opposite flange portions 22 of the rail 16 and so as to be freely slidable thereupon in arcuate directions transversely of the longitudinal axis of the gun. The base plate 18 is recessed and oppositely grooved as at 24 (Fig. 2) in directions longitudinally of the gun 10 for key-slide engagement with an elevation block 25 which is thereby mounted to be freely slidable upon the base plate 18 in directions longitudinally of the gun 10.

The elevation block 25 is substantially sloped at its upper face portion 26 relative to the planes of the rail 16 and the base plate 18, and is formed with overhanging flange portions 28 at opposite sides thereof for key-slide engagement with opposed recessed side wall portions 29 of a bracket 30. The bracket 30 extends upwardly into an eye portion 32 which is mounted upon a bushing 34 carried by a bolt 36 which is in turn suspended from opposed mounting lugs 38 extending integrally from the casing of the gun 10.

Thus, the elevation block 25 is adapted to be moved in directions longitudinally of the gun 10 within the keyway of the base plate 18 while sliding relative to the bracket 30 in such manner as to cause the latter to climb or lower, as the case may be, relative to the base plate 18. To actuate the elevation block 25 for this purpose, a stud 40 is screw threaded into the block 25 and provided to extend rearwardly thereof in a direction parallel to the longitudinal axis of the gun. A pair of nuts 42—44 are rigidly fixed to the stud 40 and disposed at opposite sides of an apertured boss 46 extending rigidly and upwardly from the base plate 18 and about the stud 40. Thus, simple turning of the stud 40 as by means of a screwdriver engaged in the slotted end portion 47 will displace the stud 40 axially relative to the block 25 so as to cause the latter to be moved in directions longitudinally of the gun 10, whereby the bracket trunnion mounted portion of the gun casing will be elevated or lowered, as the case may be, to procure a fine elevational adjustment of the gun relative to its supporting base structure. A lock nut 48 is provided to fix the stud 40

in adjusted positions. At its rear end portion the base plate 18 is provided with a toothed segment portion 50 which is centered about the vertical axis of the swivel connection device 12. A complementing worm gear 52 is carried by means of a shaft 54 upon suitably fixed bearing devices 55—55 (Fig. 3), whereby the shaft 54 is adapted to be manually rotated to drive the worm gear in such manner as to move the base plate 18 laterally upon the rail 16. Preferably, a scale will be marked upon each relatively movable member of the adjustment mount device, as for example, as is illustrated at 56—58; whereby the azimuth and elevational adjustments of the gun mounting may be accurately indicated as an aid to accurate control and use of the mechanism.

Thus, it will be appreciated that subsequent to initial mounting of the gun 10 upon the swivel connection device 12 at the front end of the gun casing and upon the adjustment mounting device 14, the gun may be accurately trained and finally adjusted in azimuth and elevation by simple manipulations of the worm shaft 54 and the stud 40.

Fig. 4 illustrates another form of elevation block and bracket arrangement wherein the elevation block 25' corresponds in function to the block 25 of Figs. 1 to 3, but differs therefrom in that it is formed with opposed inturned flange portions 60 at opposite sides thereof so as to provide keyways to engage extending side portions 62 of a bracket 64. The bracket 64 is formed with circularly curved side wall portions 66 and an eye portion 68 extending upwardly from the center thereof for mounting upon the gun trunnion bolt 36. A bushing 70 is carried by the bolt 36 and keyed thereto, as indicated at 72; and the bushing 70 is externally threaded for screw-threaded connection with a similarly threaded bore portion of the bracket eye 68.

Thus, the gun casing 10 is arranged to be laterally adjustable relative to the bracket 64 by simple rotation of the trunnion bolt 36; it being understood that as the bolt 36 rotates it carries the bushing 70 therewith, and thereby drives the gun relative to the eye portion 68 of the bracket either to the right or to the left, as the case may be, relative to the central position thereof which is illustrated by Fig. 4. It will be understood that such lateral shifting of the gun relative to the bracket 64 will provide further fine adjustments of the gun in azimuth, and that incidental alterations of the gun and base plate alignments will be compensated for by slight rotations of the bracket member 64 relative to the block 25' such as is freely permitted by the circularly curved side wall form of the bracket at 66—66.

Thus, it will be understood that when the bracket form of Fig. 4 is employed, an additional azimuth adjustment means is provided in combination with the elevational and azimuth adjustment means previously described, so that the gun mount connection device is particularly adaptable to suit unusually difficult gun mounting conditions. Particular attention is also called to the fact that by reason of the formation and relative arrangements of the elements of the displacement connection device of the invention, the gun may be quickly dismounted relative to the mounting connection devices by first disconnecting the swivel connection device at 12 and then simply sliding the gun rearwardly so that the gun-carried bracket member 30 (Fig. 1) or 62 (Fig. 4), as the case may be, will ride off the rear end of the corresponding elevation block 25—25', whereupon the gun is completely free from the mount. To remount the gun the same procedure may be followed in reverse order.

It will be appreciated that the features and advantages of the invention are provided through use of an unusually compact adjustment device which is of novel and structurally simple and rugged form, and so formed and provided as to require only a very small space in conjunction with the mounted gun. Also, it will be appreciated that the adjustment device 14 is of such form and character that its greatest dimension is parallel to the longitudinal axis of the gun, and it is therefore adapted to nest compactly in association with the gun in an improved manner. Thus, the invention is of particular advantage and importance when used in connection with aerial guns or the like, in which case the spaces available for the gun mount mechanisms are invariably greatly restricted. It will also be appreciated that the adjustment mechanism of the invention is so formed and arranged as to be readily manufactured in an inexpensive manner, and that when it is installed it is accessible for servicing in an improved manner.

Although only a limited number of forms of the invention have been shown and described in detail, it will be apparent to those skilled in the art that the invention is not so limited but that various changes may be made therein without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. A gun mount comprising in combination, a gun, a base support, a swivel connection device based upon said support and connected to said gun, and a displacement connection device disposed at a position spaced from said swivel connection device, said displacement connection device including an arcuate rail centered upon said swivel connection device and fixed to said base support, a base plate keyed to said rail and slidable thereon in directions transversely of the longitudinal axis of said gun, a wedge member keyed to said base plate and slidable thereon in directions longitudinally of said gun, a bracket keyed to said wedge member and slidable upon a sloping portion thereof and pivotally connected to said gun, and means for adjustably moving said base plate relative to said rail and means for adjustably moving said wedge member relative to said base plate for final adjustments of said gun about said swivel connection device in azimuth and in elevation.

2. A gun mount comprising in combination, a gun, a base support, a swivel connection device based upon said support and connected to said gun, and a displacement connection device disposed at a position spaced from said swivel connection device, said displacement connection device including an arcuate rail centered upon said swivel connection device and fixed to said base support, a base plate keyed to said rail and slidable thereon in directions transversely of the longitudinal axis of said gun, an elevation member keyed to said base plate and slidable thereon in directions longitudinally of said gun, a bracket keyed to said elevation member and slidable thereagainst to procure elevational adjustments of said gun and pivotally connected to said gun, and means for adjustably moving said base plate relative to said rail and means for adjustably moving said elevation member relative to

said base plate for final adjustments of said gun about said swivel connection device in azimuth and in elevation.

3. A gun mount comprising in combination, a gun, a base support, a swivel connection device based upon said support and connected to said gun, and a displacement connection device disposed at a position spaced from said swivel connection device, said displacement connection device including an arcuate rail centered upon said swivel connection device and fixed to said base support, a base plate keyed to said rail and slidable thereon in directions transversely of the longitudinal axis of said gun, an elevation member keyed to said base plate and slidable thereon in directions longitudinally of said gun, a bracket connected to said gun and to said elevation member and movable relative thereto to procure elevational adjustments of said gun, and means for adjustably moving said base plate relative to said rail and means for adjustably moving said elevation member relative to said base plate for final adjustments of said gun about said swivel connection device in azimuth and in elevation, and scale means at adjacent portions of relatively movable members of said displacement connection device for indicating adjustment movements thereof.

4. A gun mount comprising in combination, a gun having a slideway portion extending therefrom, a base support, a swivel connection device based upon said support and connected to said gun at a position remote from said extending slideway portion, and a displacement connection device disposed at a position spaced from said swivel connection device, said displacement connection device including a rail fixed to said base support, a base plate keyed to said rail and slidable thereon in directions transversely of the longitudinal axis of said gun, an elevation member keyed to said base plate and to said gun slideway portion and slidable thereagainst in directions longitudinally of said gun and relative to said base plate and to said gun to procure elevational adjustments of said gun, and means for adjustably moving said base plate relative to said rail and means for adjustably moving said elevation member relative to said base plate and to said gun for final adjustments of said gun about said swivel connection device in azimuth and in elevation.

5. A gun mount comprising in combination, a gun, a base support, a swivel connection device based upon said support and connected to said gun, and a displacement connection device disposed at a position spaced from said swivel connection device, said displacement connection device including an arcuate rail centered upon said swivel connection device and fixed to said base support, a base plate keyed to said rail and slidable thereon in directions transversely of the longitudinal axis of said gun, an elevation member keyed to said base plate and slidable thereon in directions longitudinally of said gun and keyed to said gun so as to be slidable relative thereto to procure elevational adjustments of said gun, and means for adjustably moving said base plate relative to said rail and means for adjustably moving said elevation member relative to said base plate for final adjustments of said gun about said swivel connection device in azimuth and in elevation.

6. A gun mount comprising in combination, a gun, a base support, a swivel connection device based upon said support and connected to said gun, and a displacement connection device disposed at a position spaced from said swivel connection device, said displacement connection device including a rail fixed to said base support, a base plate keyed to said rail and slidable thereon in directions transversely of the longitudinal axis of said gun, an elevation member keyed to said base plate and slidable thereagainst in directions longitudinally of said gun slideway means engaging said elevation member, connection means engaging said gun at a position spaced from said swivel connection device and said slideway means and adjustable to vary the position of said gun relative to said elevation member in azimuth, and means for adjustably moving said base plate relative to said rail and means for adjustably moving said elevation member for final adjustments of said gun about said swivel connection device in azimuth and in elevation.

7. A gun mount comprising in combination, a gun, a base support, a swivel connection device based upon said support and connected to said gun, and a displacement connection device disposed at a position spaced from said swivel connection device, said displacement connection device including an arcuate rail centered upon said swivel connection device and fixed to said base support, a base plate keyed to said rail and slidable thereon in directions transversely of the longitudinal axis of said gun, a wedge member keyed to said base plate and slidable thereon in directions longitudinally of said gun, a bracket keyed to said wedge member and slidable upon a sloping portion thereof and pivotally connected to said wedge member and having a portion extending into connection with said gun and laterally adjustable relative thereto for azimuth adjustments of said gun, and means for adjustably moving said base plate relative to said rail and means for adjustably moving said wedge member relative to said base plate for final adjustments of said gun about said swivel connection device in azimuth and in elevation.

8. A gun mount comprising in combination, a gun having a slideway portion extending therefrom, a base support, a swivel connection device based upon said support and connected to said gun at a position remote from said extending slideway portion, and a displacement connection device disposed at a position spaced from said swivel connection device, said displacement connection device including a rail fixed to said base support, a base plate keyed to said rail and slidable thereon in directions transversely of the longitudinal axis of said gun, an elevation member keyed to said base plate and to said gun slideway portion and slidable thereagainst in directions longitudinally of said gun relative to said base plate and to said gun to procure elevational adjustments of said gun and to permit said gun to be disconnected from said displacement connection device, and means for adjustably moving said base plate relative to said rail and means for adjustably moving said elevation member relative to said base plate and to said gun for final adjustments of said gun about said swivel connection device in azimuth and in elevation.

9. A gun mount comprising in combination, a gun, a base support, a swivel connection device based upon said support and connected to said gun, and a displacement connection device disposed at a position spaced from said swivel connection device, said displacement connection de-

vice including an arcuate rail centered upon said swivel connection device and fixed to said base support, a base plate keyed to said rail and slidable thereon in directions transversely of the longitudinal axis of said gun, a wedge member keyed to said base plate and slidable thereon in directions longitudinally of said gun, a bracket keyed to said wedge member and slidable upon a sloping portion thereof and pivotally connected to said wedge member and having a portion extending into screwthreaded connection with a transversely extending screwthreaded portion of said gun and laterally adjustable relative thereto for azimuth adjustments of said gun, and means for adjustably moving said base plate relative to said rail and means for adjustably moving said wedge member relative to said base plate for final adjustments of said gun about said swivel connection device in azimuth and in elevation.

10. A gun mount comprising, in combination, a gun, a base support for mounting said gun, flexible connection means extending from one portion of said gun into mounting connection with said base support, adjustable mounting connection means extending between said base support and said gun at a position spaced from said flexible connection means, said adjustable connection means comprising relatively obliquely directed slideway means carried by said base support and said gun respectively and a wedge shaped connection device disposed in slideway connected relation between said slideway means and having correspondingly obliquely directed means engaging said slideway means, and means for locking said wedge device at adjusted positions relative to said slideway means, whereby said wedge device may be shifted relative to said slideway means to procure aiming adjustments of said gun about the axis of said flexible connection device.

JOHN F. ZIETLOW, JR.