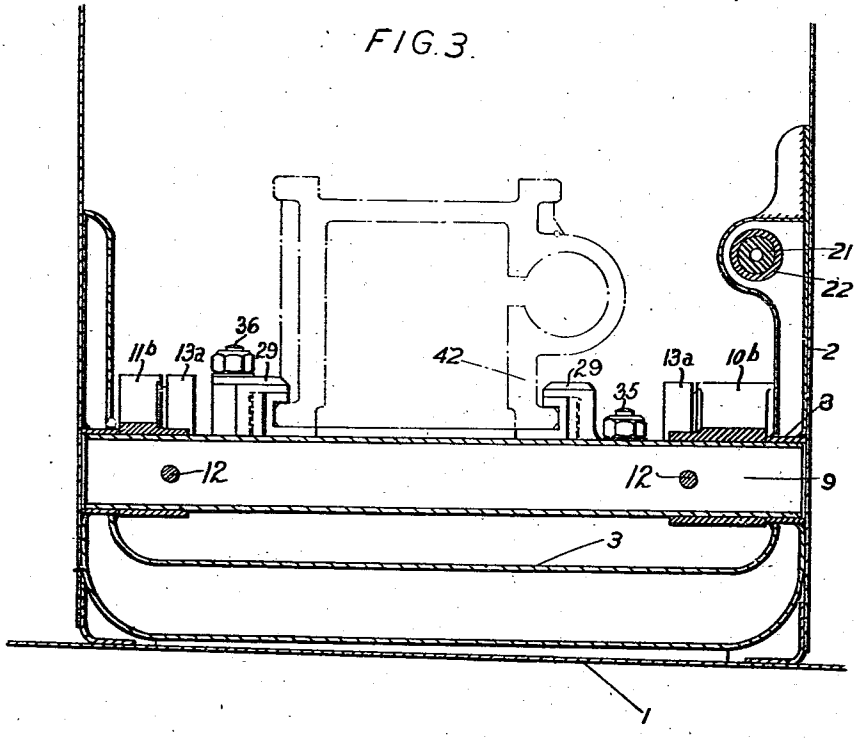
Sept. 18, 1945. J. MARTIN 2,385,218

ADJUSTABLE REAR MOUNTING FOR GUNS

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FIG. 3.



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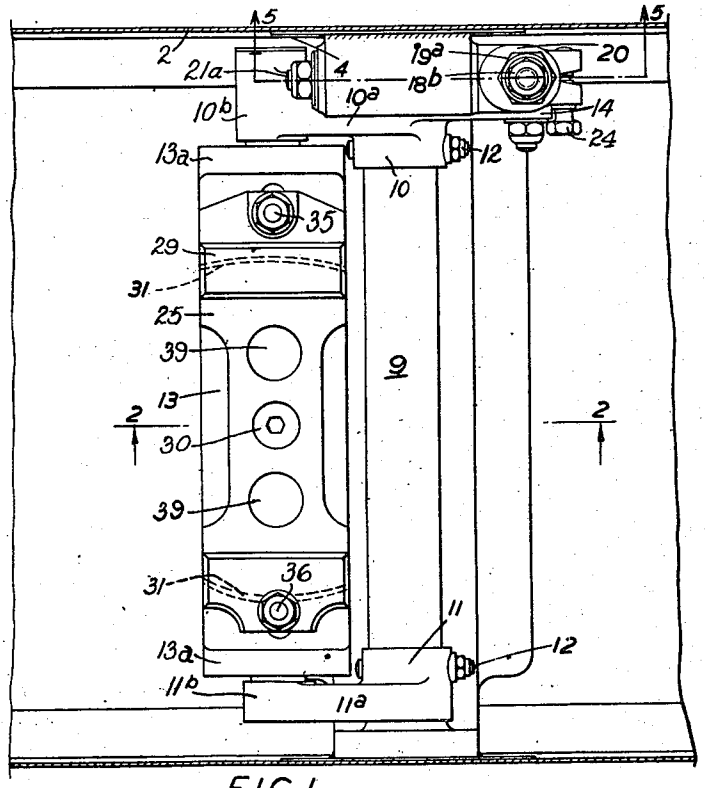
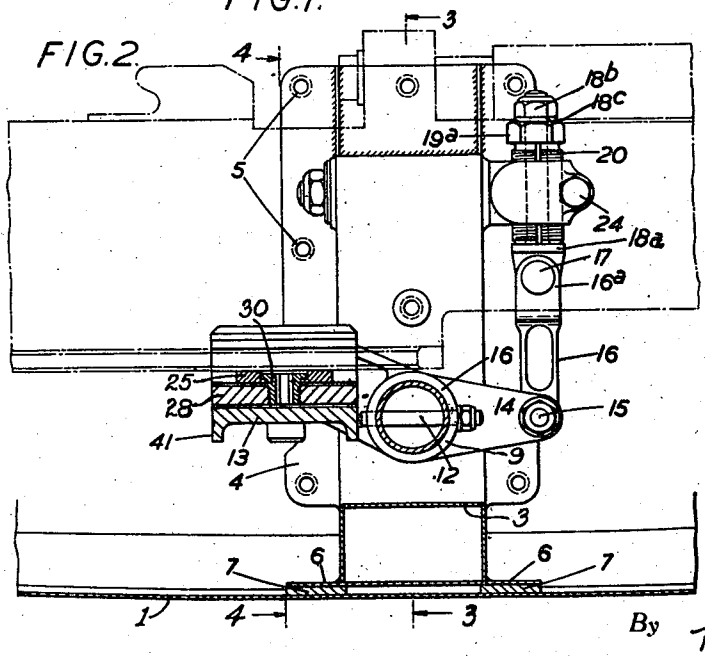


FIG. 1.

FIG. 2.



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FIG. 4.

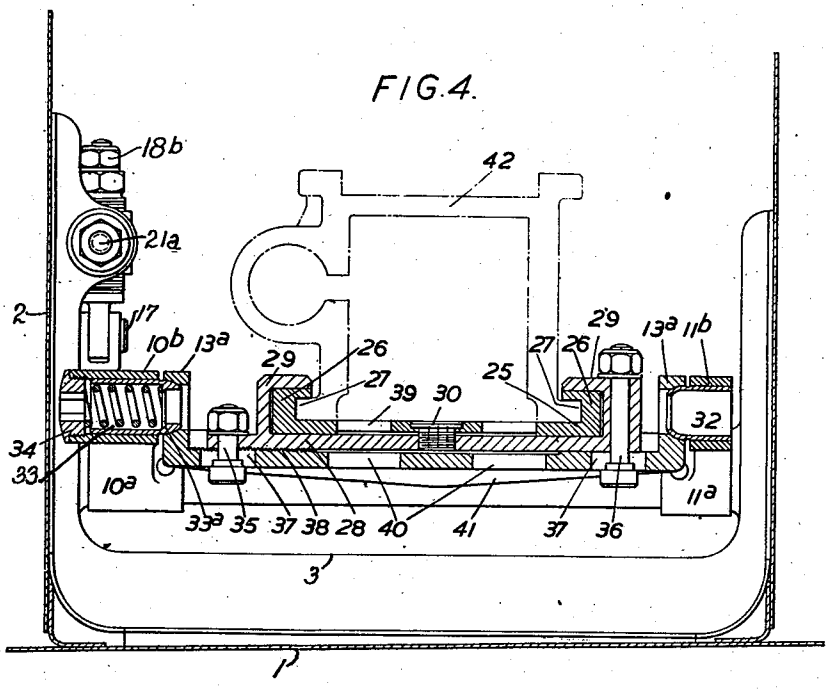
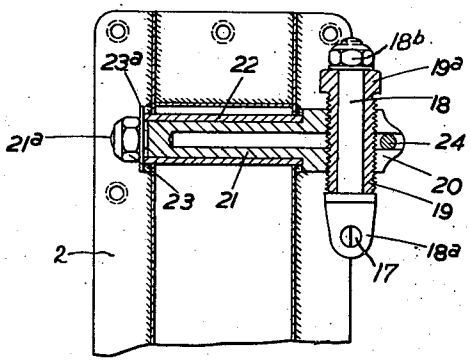


FIG. 5



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ADJUSTABLE REAR MOUNTING FOR GUNS

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Application March 4, 1944, Serial No. 525,004
In Great Britain March 9, 1943

10 Claims. (Cl. 89—37.5)

This invention relates to a rear mounting for shell firing guns and other heavy type of guns, such as, e. g., the Hispano cannon, as used on aircraft and other vehicles. On aircraft it is customary for the front end of the gun to be guided slidably in a support having a certain amount of universal movement to enable the gun to be adjusted for direction and elevation and for the rear or breech of the gun to be guided on recoil in a rear mounting. The chief object of the present invention is to enable the gun to be adjusted for elevation and direction, e. g., for harmonisation with other guns, by the manipulation of means combined with the rear mounting so that all adjustments for harmonisation can be effected from the breech end of the gun which is the heavier and consequently more stable end. Another object of this invention is to provide a gun mounting which is sturdy and yet of light weight and which will afford a good cradle or support for the recoiling breech end of the gun whilst affording the requisite freedom of movement for harmonisation adjustments. A still further object of the invention is to provide a compact assembly of rear mounting and means of adjustment for elevation and direction in which the means for adjustment is readily accessible for manipulation.

According to this invention a rear mounting for a gun with means for adjusting the gun for direction and elevation comprises a bracket fixed or adapted to be affixed within the aircraft or other vehicle (hereinafter referred to as aircraft), a guide for the breech end of the gun, a support for the guide secured to the bracket, means to adjust the guide relatively to the support for gun direction, and means to adjust the support relatively to the bracket for gun elevation.

In carrying one form of the invention into practice the bracket comprises a light metal box section or tubular section bracket of wide U configuration preferably bolted through flanges on its vertical limbs to side plates of a gun compartment, a horizontal tube journalled at its ends in bosses in said vertical limbs so that it is held against translative movement but can oscillate about its axis, radial arms at the ends of the tube, co-axial trunnions at the free ends of the arms, a saddle disposed across the arms and supported by the trunnions, a gun recoil guide relatively adjustably supported by the saddle, an elevating screw carried by one of the side limbs of the U shaped bracket, and a lever and link connecting the screw to said tube for transmitting the translative movement of the screw to oscillation of said tube to raise or lower the said saddle and slide supported across the free ends of said arms.

In order that this invention may be clearly understood and readily carried into effect drawings are appended hereto illustrating an embodiment thereof, and wherein,

Fig. 1 is a plan view of the rear mounting.

Fig. 2 is a sectional elevation taken on the line 2—2 of Fig. 1.

Fig. 3 is a sectional front elevation taken on the line 3—3 of Fig. 2.

Fig. 4 is a sectional front elevation taken on the line 4—4 of Fig. 2, and

Fig. 5 is a broken detail sectional side elevation of the elevating screw and its mount, taken along the line 5—5 of Figure 1.

Referring to the drawings the compartment for the gun breech is bounded at its base and sides by a substantially horizontal base 1 and two vertical plates forming side walls 2. The base 1 can consist of part of a wing or like covering. Secured at its ends to such side walls 2 is a box section light metal bracket 3 carrying the gun recoil guide and the means for adjusting the gun for harmonisation, the vertical limbs of this U shaped bracket having integral side flanges 4 secured by bolts passed through holes 5 to such side plates, whilst its horizontal section has integral fore and aft section flanges 6 resting on a packing strip or strips 7 which can be tapered to take care of any inclination of the base 1 which may be due to the angle of incidence or dihedral of the wing if the gun is mounted in a wing.

The vertical side limbs of the U shaped bracket 3 are formed near their junctions with the horizontal median part of such bracket with a pair of co-axial bushes 8 in which the ends of a transverse horizontal tube 9 are closely journalled and this tube carries the guide for the breech end of the gun and is adapted to be oscillated slightly in such bushes to adjust the gun for elevation. For these purposes a pair of collars 10 and 11 are secured by taper pins or bolts 12 to the tube 9 near its ends, and these collars are formed with integral forwardly directed arms 10^a and 11^a respectively across which a saddle 13 for the gun recoil guide is supported, whilst the collar 10 is also formed with a rearwardly projecting lever 14 connected at its free end by a bolt 15 to the lower end of a link 16, the upper end of which is formed with a bifurcated head 16^a connected by a hinge bolt 17 to a lug 18^a forming the head of an eye-bolt 18 embraced by a split elevating screw 19. This elevating screw is threaded

through a split collar or nut 20 forming the head of a horizontal pin 21 accommodated in a sleeve 22 welded within the appropriate vertical limb of the U shaped bracket. A nut 23 threaded on a spigot 21a integral with the front end of the pin 21 firmly locates the said horizontal pin 21 in such sleeve, such nut abutting against a washer 23a engaged against the appropriate end of the sleeve 22. A locking bolt 24 is passed through the split nut 20 to clamp the elevating screw in selected position, such elevating screw being manipulated by a box spanner engaged with its hexagonal head 19a. The eye-bolt 18 is secured in position by a nut 18b threaded on to the upper end of such bolt, a washer 18c being interposed between this nut and the hexagonal head 19a.

The gun recoil guide carried by the saddle 13 comprises a horizontal plate 25 with symmetrical upstanding limbs 26 at its ends formed with opposed parallel channels 27 to receive the longitudinal slides of the gun, the slide carrying part of the gun being indicated by the broken lines 42. As shown in Fig. 1 the ends of this recoil guide are wider than the median and greater portion of the plate 25 to economise in material and to reduce weight.

The guide 25 is supported in a housing constituted by a horizontal plate 28 with integral symmetrical inverted L section transverse flanges 29, the opposed faces of these flanges and ends of the gun recoil guide 25 being radiused about the axis of a centre peg 30 as indicated by the reference numeral 31 in Fig. 1. This centre peg is threaded into the housing 28, and its unthreaded part and head engage in the guide 25 so that the guide is free to adjust itself about the said axis to take care of variations of the direction of the gun axis in the horizontal plane.

Compensation for the arc of travel of the rear end of the gun when being adjusted for elevation by means of the elevating screw 19 is afforded by supporting the saddle 13 across the arms 10a and 11a so that it is free to pivot relatively to such arms, and suitable means for this purpose which also ensures a firm location of the saddle relatively to such arms is more clearly shown in Fig. 4. This said supporting and locating means for the saddle takes the form of trunnions at the free ends of the arms 10a and 11a, for which purpose such free ends have integral cylindrical sleeves or hollow bosses 10b and 11b respectively accommodating in the case of the boss 11b a relatively fixed hollow pivot pin 32, and in the case of the sleeve 10b a plunger type of hollow pivot pin 33 loaded by a coiled compression spring located therein and interposed between a plug 34 and an annular ledge 33a in the inner end of the pivot pin 33. The inner or opposed ends of these pivot pins are part spherical and seat in correspondingly radiused apertures in trunnion blocks or lugs upstanding from and integral with the ends of the saddle 13.

Adjustments of the gun for direction are effected by sliding the housing 25 laterally relatively to the saddle 13, for which purpose two vertical bolts 35 and 36 are passed through the housing 25 and the saddle, the saddle having transverse slots 37 to receive such bolts to provide for the requisite lateral movement of the housing 25. To effect a positive location of the housing relatively to the saddle transverse serrations 38 (Fig. 4) are formed on the opposed faces of the housing and saddle.

It is not essential for the inter-engaging parts of the pivot pins 32, 33 and bosses 10b, 11b to be part spherical as owing to the accuracy of these machined parts they may be conical or cylindrical. To ensure lightness the guide 25 and saddle 13 may be formed with holes 39 and 40 respectively, and the saddle can be stiffened by side webs 41.

I claim:

1. A rear mounting for a gun for use in aircraft and for analogous use comprising a bracket formed with laterally spaced side limbs and adapted to be fixed in a gun compartment, a transverse member journalled at its ends in said side limbs and adapted to support the weight of the gun at the breech end, a saddle supported by said transverse member in a relatively oscillatable manner, a gun guide, means to adjust said gun guide laterally relatively to said saddle and adapted to fix the gun guide in selected position, means to oscillate said transverse member to adjust the gun for elevation, and means to secure such transverse member in selected elevational position.

2. A rear mounting for a recoil mounted gun for aircraft in combination with means for adjusting the gun for harmonisation, comprising a bracket adapted to span a gun compartment, substantially vertical side limbs forming part of said bracket, a transverse member spanning said side limbs, means to oscillate said transverse member for adjusting the gun for elevation connected across said bracket and said side member, a saddle parallel with and carried by said transverse member and also free to pivot on a transverse axis, a gun guide free to pivot about a vertical axis and means to adjust said gun guide laterally relatively to said saddle for varying gun direction, and means to fix it in selected position of lateral adjustment.

3. A rear mounting for a recoil mounted gun for aircraft in combination with means for adjusting the gun for harmonisation, comprising a bracket adapted to span and to be fixed in a gun compartment of the aircraft, substantially vertical side limbs at the ends of said bracket, a transverse member journalled at its ends in said side limbs, an elevating screw supported by one of said side limbs, means operatively connecting said screw to said transverse member to impart oscillation to said transverse member, arms projecting from the ends of said transverse member, a transverse saddle connected at its ends for oscillation on a transverse axis to said arms, a gun guide, a gun guide receiving member, means pivotally connecting the gun guide to said latter member for oscillation about a vertical axis, and means securing said gun guide receiving member to said saddle and affording adjustment of such member laterally relatively to the saddle to adjust the gun for direction.

4. A rear mounting for a recoil mounted gun for aircraft in combination with means for adjusting the gun for harmonisation, comprising a U shaped bracket adapted to span and to be fixed in a gun compartment, a horizontal tube journalled at its ends in the side limbs of said bracket so that it is held against translative movement but can oscillate about its axis, radial arms at the ends of the tube, co-axial trunnions at the free ends of the arms, a saddle disposed across the arms and supported by the trunnions, a gun recoil guide relatively adjustably supported by the saddle, an elevating screw carried by one of the side limbs of the U shaped bracket, and a lever and link connecting the screw to said tube for transmitting the translative movement

of the screw to oscillation of said tube to raise or lower the said saddle and slide.

5. A rear mounting for a recoil mounted gun for aircraft in combination with means for adjusting the gun for harmonisation, comprising a transverse member adapted to take the weight of the gun, means to support said member for oscillation on a transverse horizontal axis, an elevating screw operatively connected to said member for adjusting said member about said axis, means to lock the screw in selected position, a saddle parallel with and supported by said member for pivoting on an axis parallel with the beforesaid axis, a housing slidable along said saddle, means to lock said housing to said saddle, and a gun guide carried by said housing for oscillation about a vertical axis relatively to said gun guide.

6. In an aeroplane a rear mounting for a recoil mounted gun in combination with means for adjusting the gun for harmonisation, said mounting and means comprising a transverse member adapted to be supported for oscillation in a fixed part of the aircraft, an elevating screw operatively connected to said member for adjusting said member about said axis, means to lock the screw in selected position, a saddle parallel with and supported by said member for pivoting on an axis parallel with the beforesaid axis, a housing slidable along said saddle, means to lock said housing to said saddle, and a gun guide carried by said housing for oscillation about a vertical axis relatively to said gun guide.

7. In an aeroplane a rear mounting for a recoil mounted gun in combination with means for adjusting the gun for harmonisation, comprising a gun compartment, a U shaped bracket spanning and fixed to said gun compartment, a horizontal tube journalled at its ends in the side limbs of said bracket so that it is held against translative movement but can oscillate about its axis, radial arms at the ends of the tube, co-axial trunnions at the free ends of the arms, a saddle disposed across the arms and supported by the trunnions, a gun recoil guide relatively adjustably supported by the saddle, an elevating screw carried by one of the side limbs of the U shaped bracket, and a lever and link connecting the screw to said tube for transmitting the translative movement of the screw to oscillation of said tube to raise or lower the said saddle and slide.

8. In a gun mounting as claimed in claim 1 the provision at the ends of said transverse member adapted to support the weight of the gun of a pair of forwardly directed arms, co-axial pivot pins projecting laterally from the free ends of said arms, lugs projecting from said saddle receiving said pivot pins, and spring means maintaining close contact of said pivot pins with said lugs.

9. In a gun mounting as claimed in claim 4 the provision with said trunnions of a spring loaded relatively slidable pivot pin engaged with one end of the saddle, and means to free said pivot pin from the saddle for releasing the saddle.

10. In a gun mounting as claimed in claim 1 the provision in one of said side limbs of a relatively transverse pin, a split nut formed on one end of said pin, an elevating screw threaded through said nut, means to lock the screw in the nut, and a link connecting said screw to said transverse member whereby rotation of said screw adjusts the gun for elevation.

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