May 21, 1946. A. CORTE 2,400,812

GUN TURRET SEAT

Filed Dec. 27, 1941 5 Sheets-Sheet 1

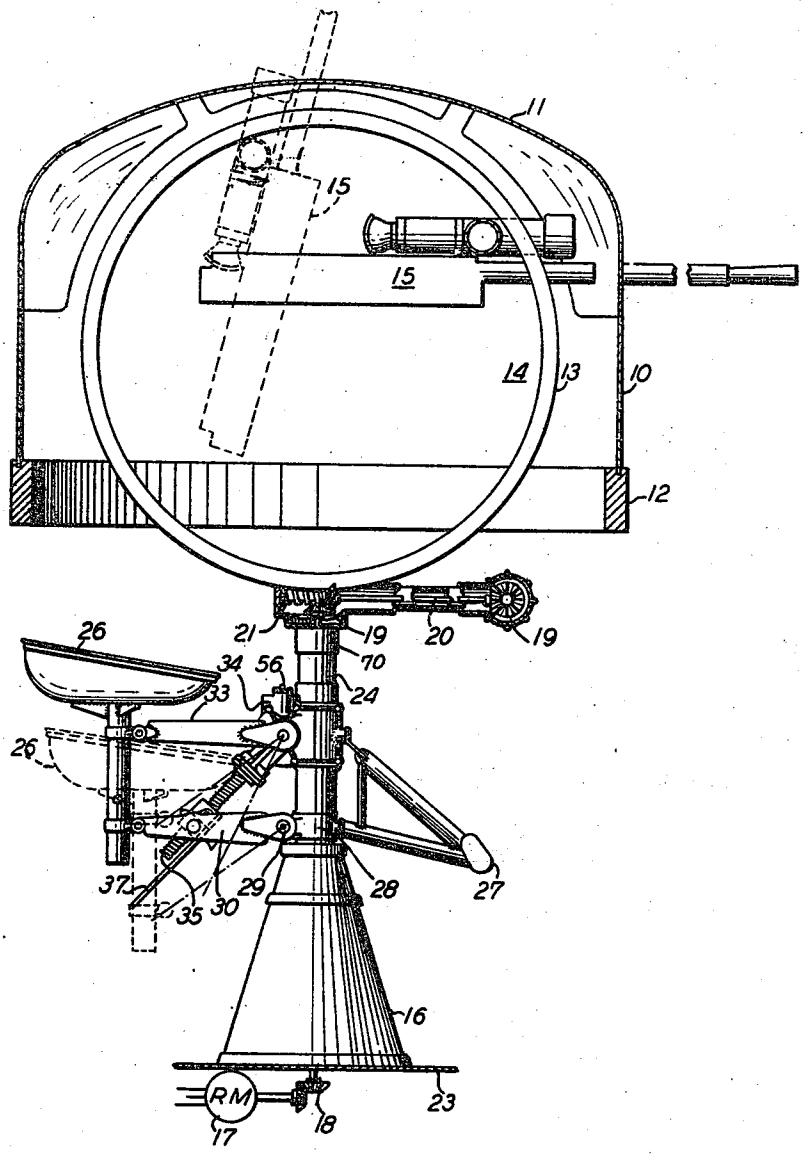


FIG — I

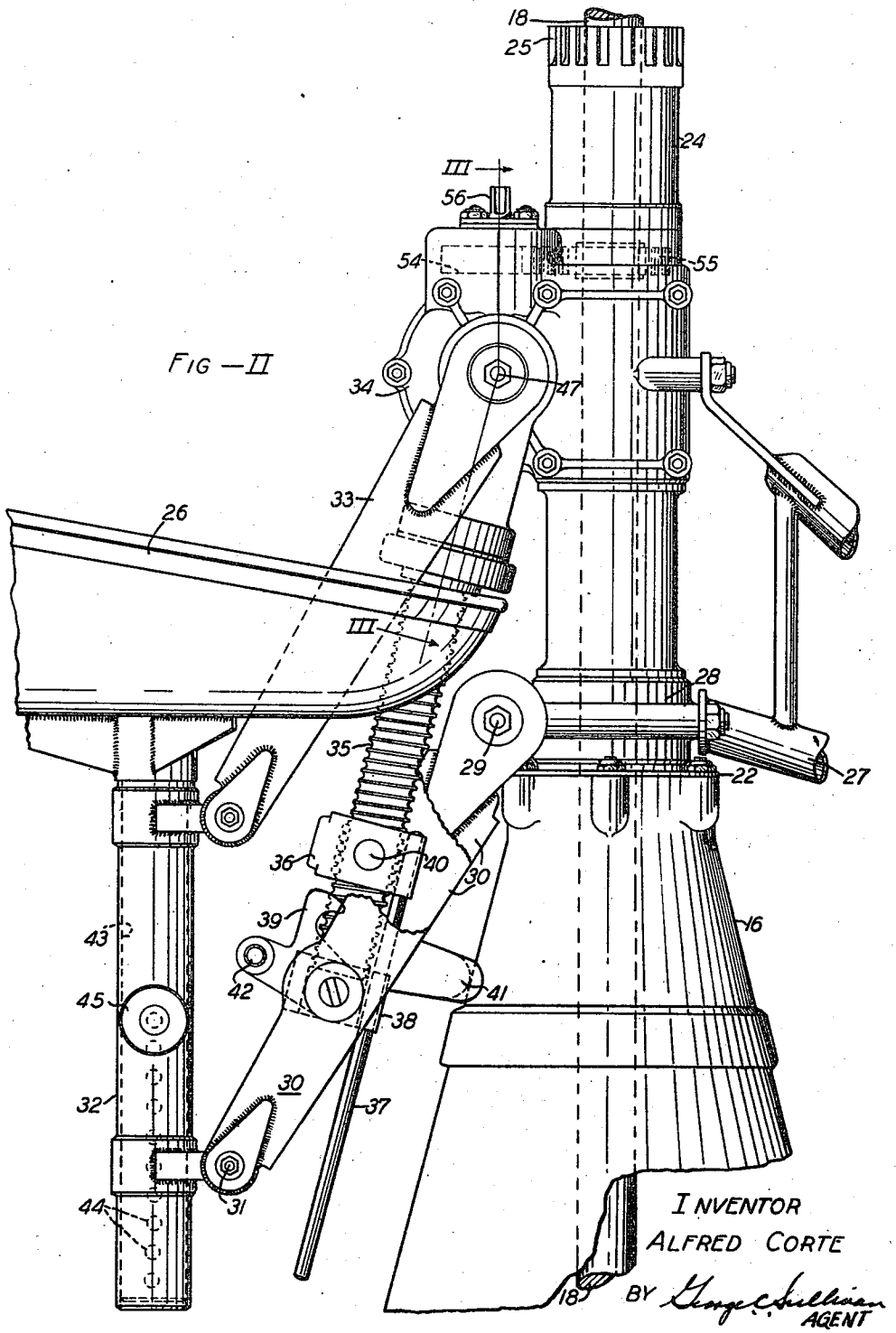
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GUN TURRET SEAT

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FIG —II

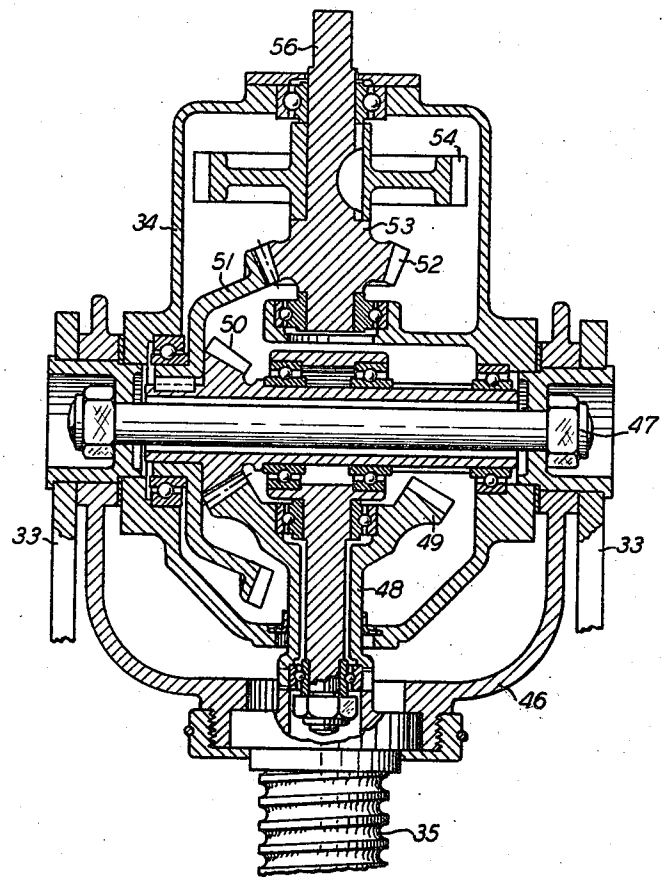


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FIG—III

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GUN TURRET SEAT

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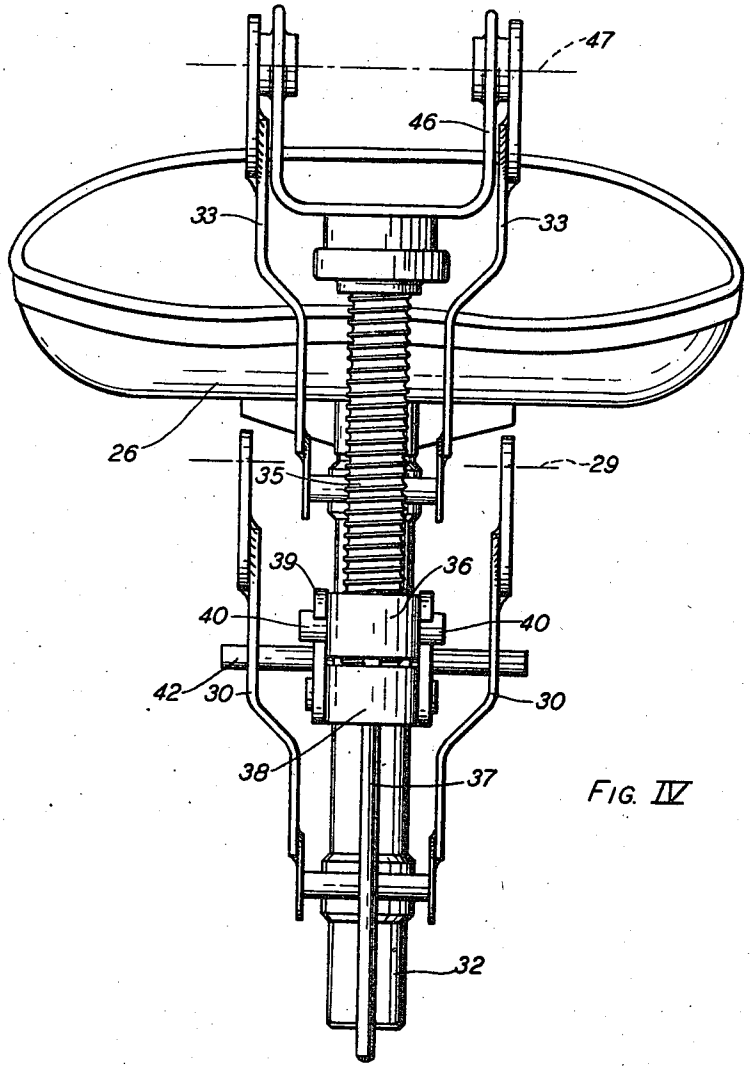


FIG. IV

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GUN TURRET SEAT

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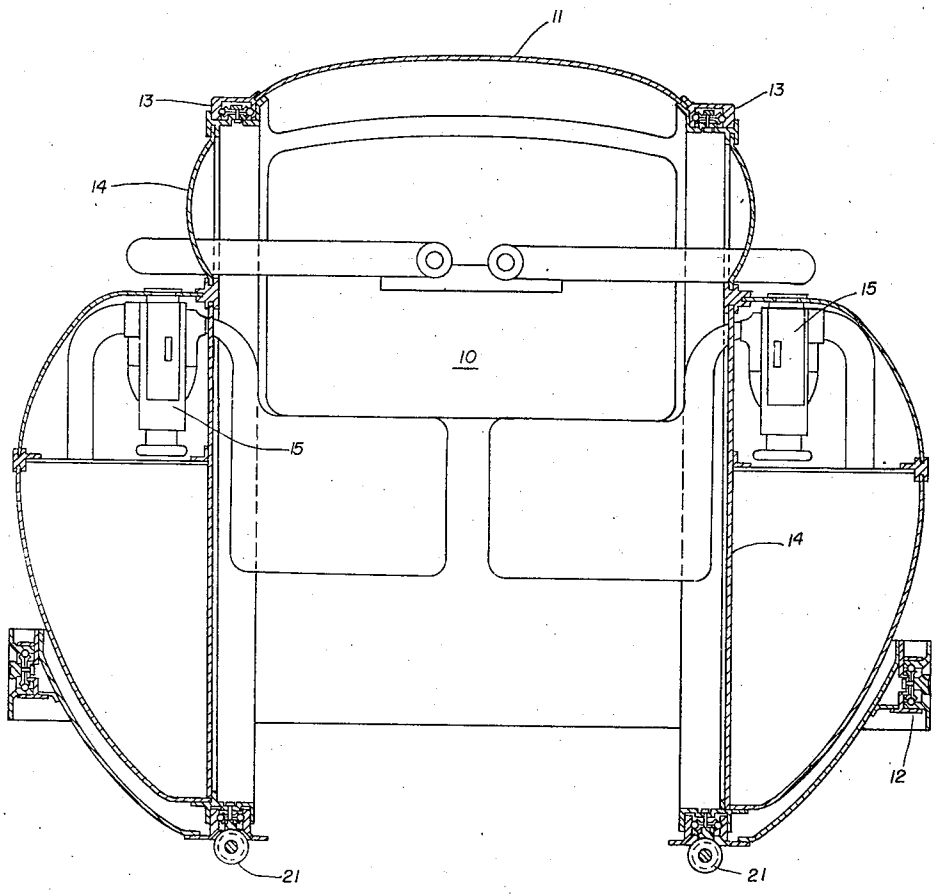


FIG-V

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Patented May 21, 1946

2,400,812

UNITED STATES PATENT OFFICE

2,400,812

GUN TURRET SEAT

Alfred Corte, Glendale, Calif., assignor, by mesne assignments, to Lockheed Aircraft Corporation, a corporation of California

Application December 27, 1941, Serial No. 424,637

8 Claims. (Cl. 89—37.5)

This invention relates to an adjustable gunner's seat arranged for cooperation with a gun turret having relatively movable components wherein elevation of the gun or guns depresses the gunner's seat to maintain his eye level approximately in line with the gun sight, the tilting of the angle of sight requiring a progressive lowering of the gunner's head as the gun is elevated.

It is among the objects of this invention to provide an improved and automatically operated gunner's seat that lowers the gunner as the gun is elevated, the seat being operated in synchronization with the gun by a power take-off from the gun elevating mechanism; to provide a turret seat supported independently of the turret but traversing as a unit therewith, whereby to relieve the turret of the gunner's weight; and to provide a seat releasable from the synchronized power take-off drive so that the seat may be lowered to facilitate entrance and exit from the turret.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

This invention in its preferred form is illustrated in the drawings and hereinafter more fully described.

In the drawings:

Figure I is a central longitudinal section through a power operated turret embodying a preferred form of the seat of this invention, the turret proper being schematically illustrated.

Figure II is an enlarged detail of the seat mounting, the seat being shown as released from the elevating mechanism to facilitate access to the turret.

Figure III is an enlarged detail section on the line III—III of Figure II showing the drive to the pivoted elevating screw.

Figure IV is a view normal to Figure II and looking towards the left thereof, the column being omitted and the seat being lifted and latched into operative position.

Figure V is an enlarged fragmentary transverse section of the upper portion of the turret.

As shown on the drawings:

The seat of this invention is shown in connection with a power driven airplane twin gun turret of the general type shown in my United States Letters Patent 2,364,425 issued December 5, 1944. In the turret proper a central compartment 10, having a transparent turret or canopy 11, is mounted in a circumferential bearing 12 for rotation about a vertical axis. The compartment 10 supports a pair of spaced vertical bearings 13 in which side closures 14 revolve in unison about a transverse or horizontal axis; the side members carrying machine guns 15 fixed thereon. In the turret chosen for illustration purposes, the gunner is seated between twin guns and the eye piece of the gunsight is between and forward of the rear ends of the guns, so that the gunner does not have to get behind the guns to aim the same. For the present purposes it will be sufficient to state that turret traverse is obtained by a power drive applied to the bearing 12; and gun elevation is accomplished by a common drive to the two vertical bearings 13. As shown, a pedestal 16, to be described in more detail, is floor supported and aligned with the vertical axis of the turret. The elevating drive is shown diagrammatically as a reversing electric motor 17 driving an axial shaft 18 the upper end of which, by means of suitable gearing 19, drives shafts 20 in the plane of each bearing 13, which shafts carry worms 21 engaging said bearings.

The pedestal 16, up to and including a collar 22, is fixed relative to the floor 23 and supports a column 24 which rotates with the turret due to a spline 25 at its upper end slidably engaged in a collar 70 associated with the turret. The spline does not transmit vertical loads between the turret and column, but assures synchronized rotary movement therebetween, so that an adjustable seat 26 and a fixed foot rest 27, both associated with the column 24, rotate with the turret to maintain the gunner's position therein. With the spline arrangement just described the seat 26 and the mechanism associated therewith turn with the turret during its traverse movement but are free for limited vertical movement or play relative to the turret. The foot rest 27 is rigidly attached to a band 28 on the column 24, which band also provides pivot points 29 for lower links 30, the outer ends of which are attached to pivot pins 31 associated with a supporting tube 32 for the seat 26. Upper links 33 are similarly pivoted between a gear box 34 and the upper part of the tube 32; the arrangement of the links 30 and 33, column 24 and seat tube 32 being approximately a parallelogram, distortion of which results in raising and lowering of the seat relative to the pedestal 16 and column 24.

Such raising and lowering of the seat, by distortion of the parallelogram linkage, is conveniently accomplished by means of a screw 35 on which a nut 36 travels due to rotation of the screw. As shown, the nut and screw have a ball bearing thread engagement, and the nut is held against rotation by a guide pin 37 slidable in a collar 38 pivoted between the lower links 30 and

in turn sliding on the screw 35. The collar 38 carries a releasable forked hook 39 engageable with pins 40 on the nut 36 for normally holding the nut and collar together to transmit raising and lowering movements to the links 30. Release of the hook 39 allows the seat to be lowered to the limit of its motion, determined by a pumper 41 contacting the pedestal 16, as shown in Figure II, this arrangement lowering the seat to facilitate access to the turret. The hook 39 and pins 40 are arranged to snap together when the seat is lifted into proper position, and remain engaged until the hook is rotated counter-clockwise by handles 42.

The tube 32 adjustably supports the seat by means of a telescoping tube 43 therein which can be clamped on any of a series of perforations 44, by means of a clamping pin 45 passed therethrough, thus providing an initial seat adjustment that can be set to suit an individual gunner's head height, without affecting the automatic range of adjustment of the seat.

The lead screw 35 is rotatively and pivotally supported from the gear box 34 by a yoke 46 pivoted on a transverse shaft 47 which shaft also supports the inner ends of the upper links 33. The pivotal support of the screw 35 is necessary because of its angular movement as the parallelogram linkage is distorted, and this pivotal movement must be carried through the rotary drive for the screw 35. As shown in Figure III, the upper end of the screw 35 makes a splined engagement with a shaft 48 rocking about the shaft 47, which shaft 48 carries a bevel gear 49 meshing with a bevel pinion 50 rotatable on the shaft 47. The pinion 50 in turn is associated with a bevel gear 51 on the same axis which is meshed with a pinion 52 on a stub shaft 53 driven by gears 54 and 55 from the central shaft 18 in the column 24. With this arrangement the screw 35 will be driven in synchronization with the turret elevating drive but at a considerable reduction ratio through the two sets of reducing bevel gear drives.

The upper end 56 of the shaft 53 projects at the top of the gear box and is squared to provide a wrench grip for emergency or service movement of the seat and/or the gun elevating mechanism, as when it is desired to bore sight the gun or guns.

In the normal operation of the arrangement of this invention, the seat will be left in its lowermost or disconnected position as shown in Figure II upon the gunner's exit from the turret, and upon his return he will lift up the seat 26 under him until the hook 39 engages the pins 40 on the nut 36. Since the turret would ordinarily be parked with the guns level, the seat would be lifted from the position shown in Figure II to the full line position of Figure I. The dotted line positions of the seat and gun in Figure I illustrate the relative movements corresponding to an intermediate elevation of the latter, the seat links 30 and 33 being pivoted downwardly by rotation of the screw 35 in a direction to force the nut 36 outwardly thereon.

With the arrangement shown, a rotational movement of the turret, while the elevational control is in neutral, will have a slight elevating or depressing effect on the elevational movement of the turret, as the gearing systems rotate about the central drive shaft—but in practice the traverse and elevational controls are simultaneously energized to keep the guns pointed in the desired direction.

It will thus be seen that I have invented an improved seating arrangement wherein a power operated gun elevating control mechanism automatically varies the seat position in such a manner as to keep the gunner's head in approximate alignment with the gunsight, as the axis of the guns and sight is tilted from a horizontal position.

Having thus described my invention and the present preferred embodiments thereof, I desire to emphasize the fact that many modifications may be resorted to in a manner limited only by a just interpretation of the following claims.

I claim as my invention:

1. In combination with a gun turret having a gun and power operated gun elevating mechanism, a seat supported on a pivot centrally disposed relative to said turret, and seat elevating and lowering means including a power take-off from said gun elevating mechanism whereby movement of said seat is adapted to be synchronized with elevational movements of said gun, and means for disconnecting said power take-off from said seat to permit manual lowering thereof.

2. In combination with a gun turret having a gun and power operated gun elevating mechanism, a seat supported on a pivot centrally disposed relative to said turret, and seat elevating and lowering means including a power take-off from said gun elevating mechanism whereby movement of said seat is adapted to be synchronized with elevational movements of said gun, and an auxiliary manually operatable control for energizing said power take-off and gun elevating mechanism independently of said power operation thereof.

3. In combination with a gun turret having a gun supporting component mounted for elevational movement and power means for producing such movement; a gunner's seat, means for supporting the seat for elevation and depression, driving means operated by said power means for elevating and depressing the seat simultaneously with depression and elevation of said component, and a latch connection between the driving means and the first named means manually releasable to allow lowering of the seat independently of said driving means.

4. In combination with a gun turret having a gun supporting component mounted for elevational movement and a drive mechanism for moving the component; a seat unit including a gunner's seat for the turret and a parallel motion linkage supporting the seat for substantially vertical movement, a power take-off from said drive mechanism, and an operative connection between said take-off and said unit for causing depression of the seat as said drive mechanism elevates the component, said operative connection including a screw driven by said take-off and a traveling nut on the screw operatively connected with said linkage.

5. In combination with a gun turret having a gun supporting component mounted for elevational movement and a drive mechanism for moving the component; a seat unit including a gunner's seat for the turret and a parallel motion linkage supporting the seat for substantially vertical movement, a power take-off from said drive mechanism, and means for operatively connecting said unit with the take-off so that the seat is depressed when said component is elevated by said drive mechanism, said means including a manually releasable latch connection

releasable to allow independent movement of the seat.

6. In combination with a gun turret having a gun movable about a horizontal axis and mechanism for moving the gun; a supporting pedestal, a gunner's seat for the turret, parallelogram linkage supporting the seat on the pedestal for generally vertical movement, means for producing vertical movements of the seat, a latch connection between said means and the linkage manually releasable to allow free lowering of the seat, and a gear train operatively connecting said means with the gun moving mechanism operable to lower the seat during elevation of the gun.

7. In combination with a gun turret movable in traverse and having a gun movable in elevation; a pedestal adapted to be carried by a relatively stationary support, a gunner's seat for the turret, supporting means mounting the seat on the pedestal for rotation thereon and for generally vertical movement, driving means carried by the pedestal for elevating and lowering the seat, and means for connecting the supporting means and driving means with the turret for movement in traverse therewith and providing for relative vertical play between the turret and the two said means so that the gunner's weight is supported independently of the turret.

8. In combination with a gun turret movable in traverse and having a gun supporting component movable about a horizontal axis and having a power drive for moving the component; a relatively stationary pedestal, a gunner's seat for the turret, supporting means carrying the seat for substantially vertical movement, a power take-off from said drive, seat operating means driven by the power take-off for elevating and depressing the seat simultaneously with movement of said component about said horizontal axis, a rotatable column on the pedestal carrying said supporting means and seat operating means, and means for connecting the column with the turret for traversing movement therewith and providing for relative vertical movement between the column and turret.

ALFRED CORTE.