April 28, 1942. A. P. DE SEVERSKY 2,280,804

ORDNANCE MOUNT

Filed March 5, 1938 3 Sheets-Sheet 1

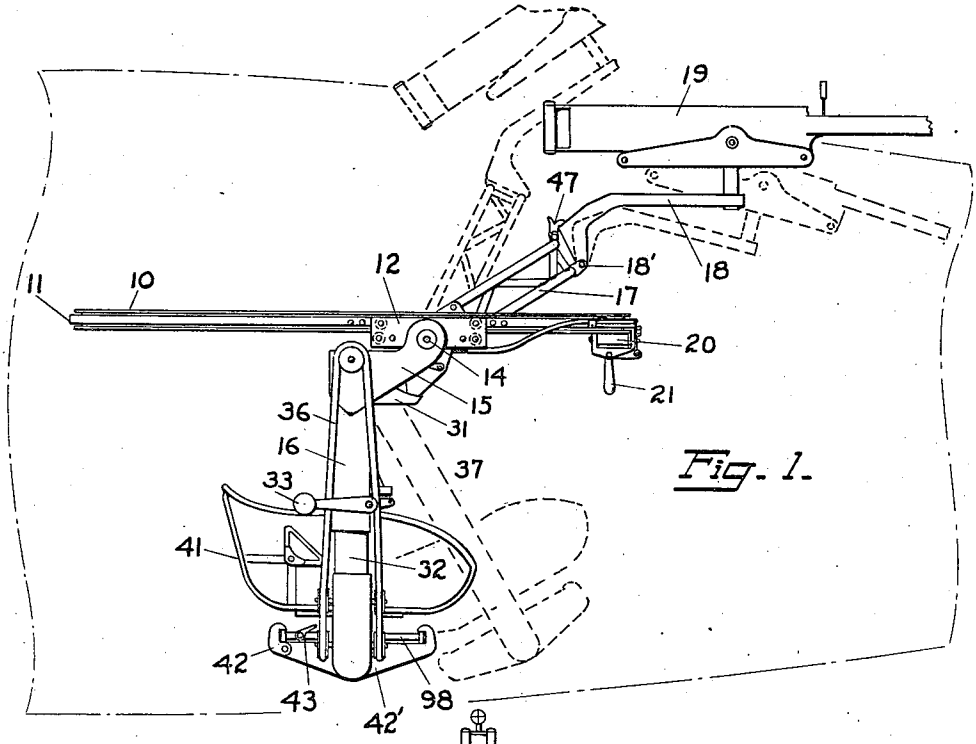

Fig. 1.

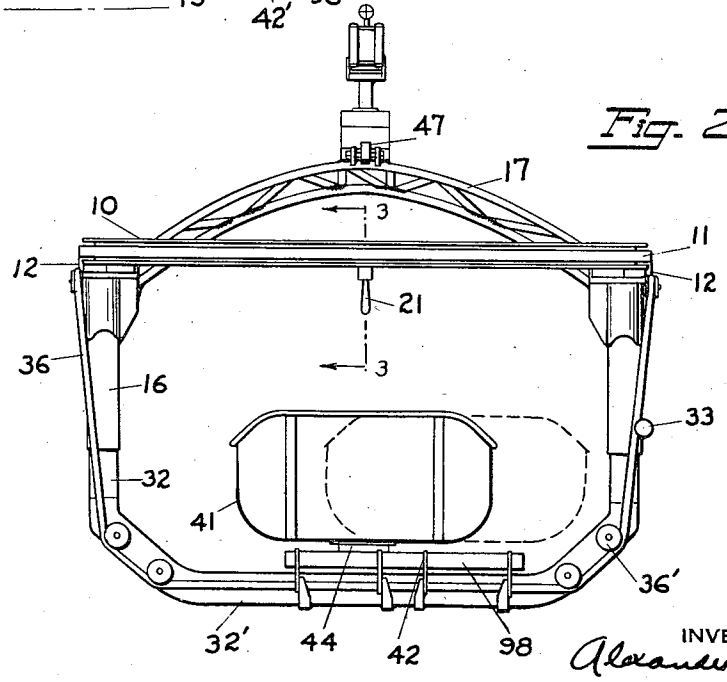

Fig. 2.

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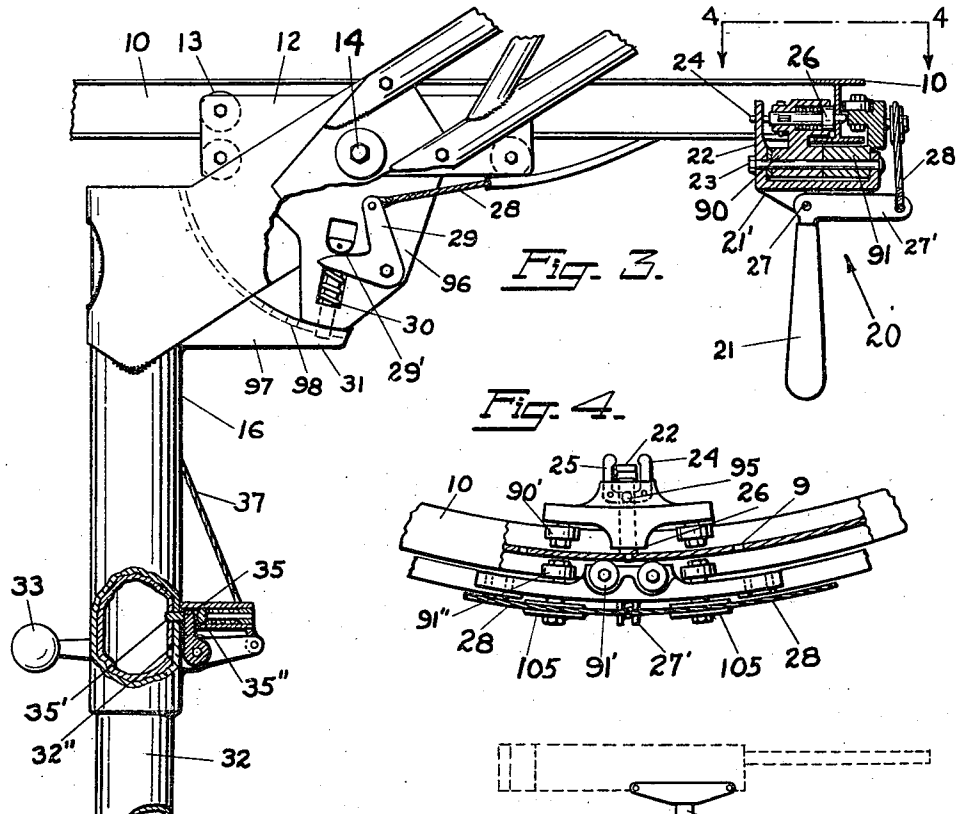

Fig. 3.

Fig. 4.

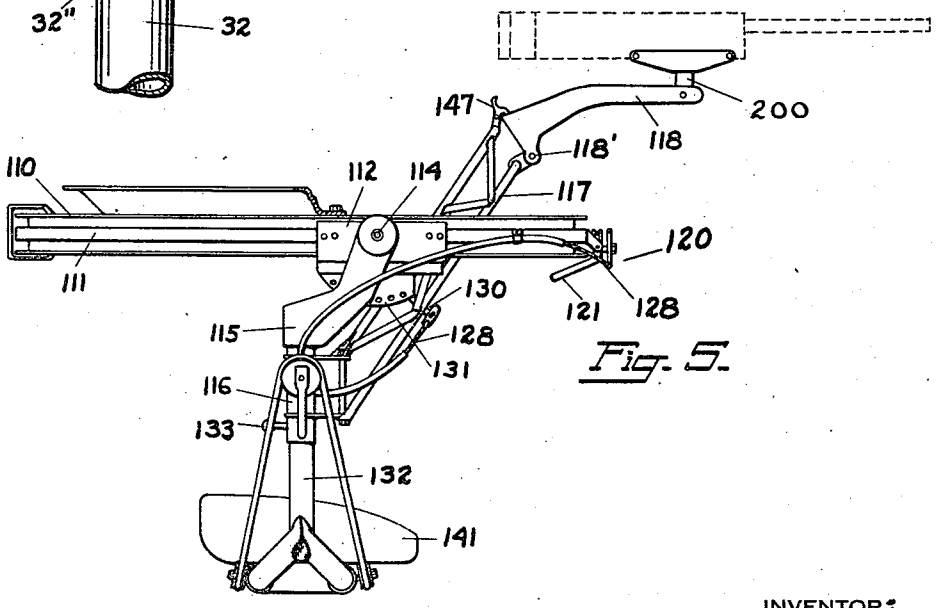

Fig. 5.

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Fig. 6.

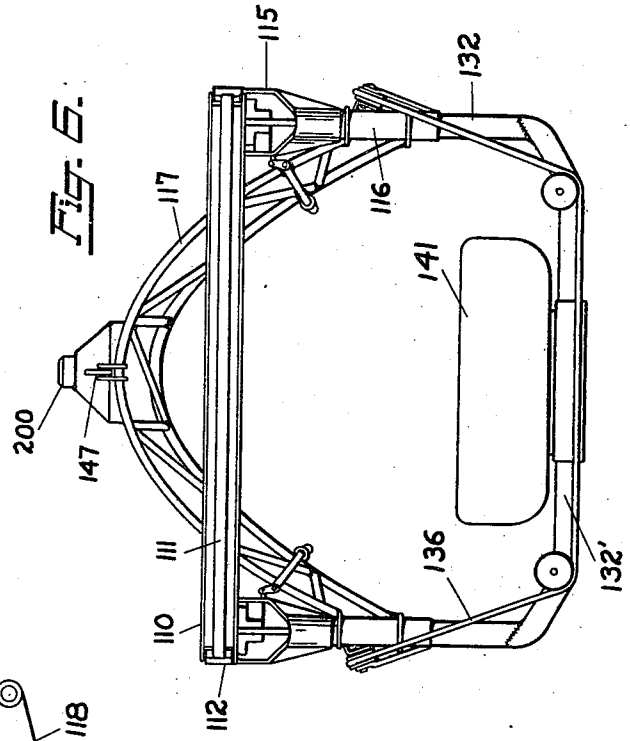
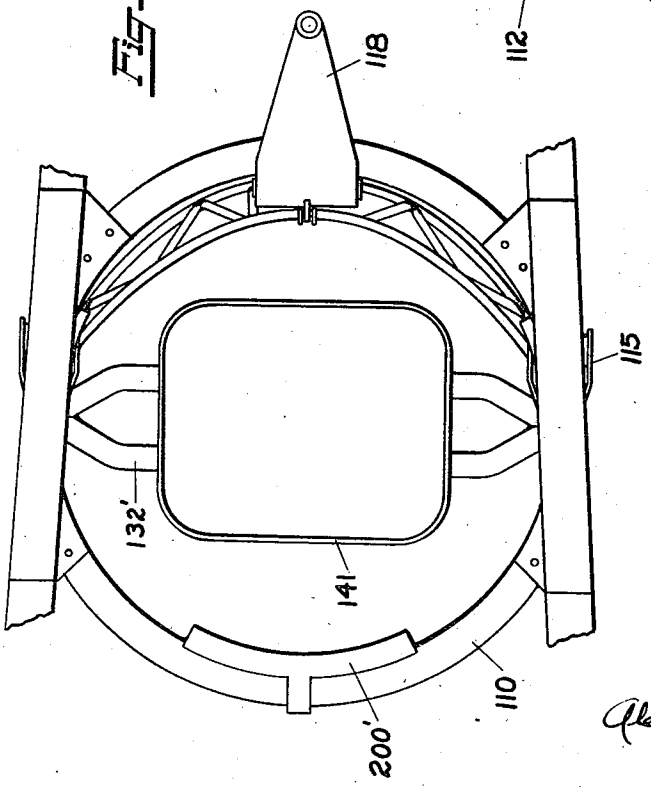


Fig. 7.



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Patented Apr. 28, 1942 2,280,804

UNITED STATES PATENT OFFICE

2,280,804

ORDNANCE MOUNT

Alexander P. de Seversky, Northport, N. Y., assignor to Republic Aviation Corporation, a corporation of Delaware

Application March 5, 1938, Serial No. 194,099

5 Claims. (Cl. 89—37.5)

This invention concerns ordnance-mounts, and relates particularly to those for mounting machine-guns in aircraft.

One of the objects of the invention is to provide a gun-mount for aircraft whereby the gunner may remain seated yet operate the gun through a wide range of azimuth and altitude.

Another object of the invention is to provide a gun-mount of this character in which the relative position of the gun-carriage proper and the seat-carriage will remain constant throughout all training and elevating operations, so that the gunsights and the eye of the gunner can be maintained in alignment without re-adjustment regardless of the many rapid changes of the position of the objective occurring during aerial gunnery. The gunner can remain seated and nonetheless bring his sighting-line to bear on a new target, located in a widely divergent zone from a previous target, without the necessity for realigning his eye with the gun-sights.

A particular object is to provide means for counterbalancing the weight of the gun and carriage in order to render the forces required for training and elevating even a heavy gun, exceptionally small, and to accomplish this in such a manner as to thereby provide convenient means for supporting and carrying the gunner, along with the gun, on the counterbalance.

Another particular object of the invention is to provide a gun-mount which will carry a gunner seated facing aft, yet whereby the gunner may on occasion act as the pilot without moving from his seat or even loosening his safety belt.

A further particular object of the invention is to provide a single instrumentality which will be manipulatable by one hand for quickly releasing both the gun-carriage proper and the gunner's carriage for permitting both carriages to be simultaneously moved in unison to train the gun in azimuth and to elevate or depress it in altitude.

The other objects and advantages of the invention will be made manifest as this disclosure proceeds.

The presently-preferred embodiments of the invention are by way of example only, shown in the accompanying drawings and described hereinafter, but the invention is limited in its embodiments only by the scope of the subjoined claims. In these drawings,

Figure 1 is a side elevation of one embodiment, with some of the components shown in alternative positions;

Figure 2 is an elevation taken from the left of Figure 1, showing one component in alternative positions;

Figure 3 is a fragmentary sectional detail taken along line 3—3 of Figure 2;

Figure 4 is a fragmentary top plan taken along line 4—4 of Figure 3;

Figure 5 is a side elevation of an alternate form of the invention;

Figure 6 is an elevation view from the left of Figure 5, with the gun omitted, and

Figure 7 is a top plan view of this form.

In both exemplifying forms, the complete, unitary gun-mount is well adapted for inserting, bodily, as a unit in an after-cockpit of a military airplane, replacing the usual seat thereof but not interfering with the piloting controls, or other equipment. It can also be built in with initial framework in building a new airplane.

In the form of execution shown in Figures 1–4, inclusive, the structure comprises a circular track 10, attachable, as by means of suitable brackets (not shown), in the upper part of the cockpit opening near the covering thereof. The track is shown as made of metal of I-sectional shape. Arcuate rolling-blocks, or carriages, 12, one on each side of the track, and each provided with upper and lower sets of rollers 13, fit the curve of the track and ride in same by means of the rollers. The members 12, by means of a suitable pivot-group 14, each carry arms 15. At the upper inner end of each arm 15, as shown in Figure 3, is rigidly attached a bowed truss, 17, and at the lower end of each arm 15 is rigidly attached a seat-group suspending member, 16. The truss 17 bears an arm 18 which supports the gun-group proper.

A ring-member 11 encircles the outer recess of track 10, and, being rigidly attached to the members 12, is supported thereby for rotation therewith around the outside circumference of the track 10. Spaced substantially on the center of the arc of the ring 11 which is subtended by the yoke of wihch 16 is a part, is a lock-group 20, comprising a handle 21 pivotally mounted on a bracket 21' in turn mounted for lateral pivoting on a bolt 23, the bracket 21' having a finger 22 extending vertically from its rear face. Blocks 90 and 91 are mounted in the bracket, block 91 being integral with ring 11. Block 90 bears two rollers 90' and two bellcranks, 24 and 25, adapted to be engaged, one or the other, by the finger 22. It also bears a spring-loaded pin 26 adapted to engage in one at a time of a plurality of apertures 9 in the web of the track. On moving the handle into or out of the plane of the paper, one

of the bellcranks engages a lug 95 on pin 26 and withdraws the pin from the aperture in the track, leaving the ring 11, carrying the gun yoke unitary with the seat-yoke, free to be rotated around the track for training the gun while maintaining the relationship between the gunner's attitude and the gun-axis, quite unchanged. A large number of the apertures 9 is provided around the web of the track to allow locking the gun in practically any azimuth position desired.

Block 91 bears two horizontal rollers 91' and two vertical rollers 91'', as well as two guide rollers 105 for two flexible members 28, attached to an arm 27' of the handle 21, each flexible member leading to a different side of the double-yoke swinging unit.

A locking pin 30 is provided on a bracket 96 depending from, but rigid with each side of the ring 11. A bracket 97, arcuate in outline, is provided on one face, with a plurality of apertures 98. The bracket 97 is integral with the post 16. The handle 21 is adapted to be pulled rearwardly, pivoting about bolt 27, and the outer upper end of the handle is connected, by means of a flexible tensile member 28, here shown as a cable, to actuate a bell-crank 29 pivoted on the member 96. The pin 30 is spring-loaded, and bears a lug 29' on its upper end. The arcuate face of bracket 97 has a sufficient extent, and number of apertures, to permit the seat-gun unit to be locked in any desired reasonable position of elevation. Due to the unitary nature of the gun-yoke 17 and the seat yoke 16, etc., the weight of the gun is counterbalanced by the weight of the seat, and thus the force required to change the elevation of the gun or gun-mount proper, will be quite small, making for ease, rapidity, and accuracy in elevating.

Inside members 16 are vertically slidably mounted members 32, which carry the seat-yoke proper, 32'. A headed lever, 33, is pivoted on one of the members 16, and carries a lug 35. The members 32 are provided with a plurality of apertures 32'', and the members 16 each bear a spring-loaded plunger 35', having a lug 35'', and adapted to engage in the apertures 32''. An endless elastic member 36 is led over pulleys 36' under tension, and when the lever 33 is raised so that lug 35 engages against lug 35'' and urges plunger 35' out of an aperture 32'', the unit 32—32', carrying the seat, is raised upwardly until the plunger 35' engages in another and higher aperture 32''. To lower the seat, in order to accommodate a taller gunner, the plunger 35' is disengaged from an aperture 32'', whereupon the mere weight of the gunner will depress the unit 32—32' until he engages the plunger 35', with another and lower aperture.

Both members 16 bear spring loaded plungers 35'. These plungers are connected by a cable 37, which is in turn connected to lever 33, so that when lever 33 is actuated, both the plungers 35' will be operated in unison.

The gunner's seat 41 is mounted on a pivoted or swivelled post 44. The post 44 is carried on a horizontal frame 98 by a thrust bearing 49. The frame 98 is adapted to slide from side to side on rollers 48 riding on the guide track 42. Frame 98 bears a latch handle 43 to operate detents 50 and 51 which cooperate with slots in the seat and guide track. Whenever the gunner is to act as pilot the latch 43 is released, the seat is slid to one side on the guide track, as shown dotted in Fig. 2, in order to give room in the cockpit to allow the gunner's legs to be brought around without necessitating his standing up, and then the gunner propels the seat around 180°, on the pivot 44 by means of applying his feet against the deck while still seated.

The gun arm 18 is pivoted at 18' to the truss 17, and the truss bears a thumb-hook 47 pivoted thereto as shown in Figure 1. When it is desired to stow the gun in the turtle-deck canopy covering the aft-part of the gunner's cockpit, hook 47 is released from engagement with arm 18, and the arm, carrying the gun, can then be lowered into a gun-cradle, not shown, in the aft part of the cockpit, substantially in the depressed position shown in Figure 1.

In the embodiment shown in Figures 5, 6 and 7, 110 is a circular track of I-section attached to stringers forming a part of the fuselage, and on which track ride arcuate carriages 112 bearing rollers similar to the carriages 12. Pivoted to the carriages at 114 are members 115 rigidly carrying members 116, which carry a curvilinear, trussed gun-yoke 117, said members 115 being unitary with members 116 which are seat-unit suspending members. The yoke 117 bears an arm 118 pivoted thereto at 118', and the arm bears a gun-socket 200 for a machine-gun, as shown. A ring 111 encircles the outer recess of the track 110 and is supported thereon for rotation therearound by means of the locking member 120 and carriages 112, etc., being rigidly attached to the carriages.

A lock-group 120, somewhat similar to the lock 20, is unitary with the ring 111 and is adapted to revolve around track 110 in a similar manner. The lock 120 controls the movability of the gun-seat unit around a vertical axis through a plunger and finger combination somewhat similar to that of Figure 3, and handle 121 operates a cable 128 actuating a pin-and-apertured arc arrangement 130, 131 similar to that of Figure 3, to control the elevatibility of the gun-seat unit.

A seat yoke 132' is sildably mounted in members 116, which bears a seat 141. The yoke is lockable in any desired position of elevation, to suit gunners of different heights, by means of a unit similar to that illustrated in Figure 3 at 33, 35, 35' and 35''.

The seat can be rotated, with the gunner seated in it, in order to permit the gunner to take over the piloting. A back-rest 200' is provided for leaning against when firing with the gun elevated at high angles.

By releasing a thumb-hook 147, the gun-arm, carrying the gun, can be lowered to a depressed position and be stowed out of the way in a gun-cradle (not shown) in the after part of the fuselage.

It is to be observed that, in both embodiments, to fire, the gunner usually faces the empennage-region; to take over piloting, as when the regular pilot becomes disabled in combat, the gunner can swivel around while still seated by merely pushing on the floor with his feet. In both embodiments, the gun-mount proper and the seat move as a single unit, and the weight of the empty gun, etc., is perfectly balanced by the weight of the empty seat, etc. In both embodiments, means are provided for accommodating a gunner of any height. The gun can be stowed out of the way, when not desired, in the rear upper part of the fuselage, so that the rearmost, turtledeck canopy can be closed.

It is to be understood that the foregoing specific constructions are contemplated as being

modifiable in any form within the scope of the sub-joined claims.

Having now disclosed my invention in such manner as to enable anyone skilled in the art to make and use same, what I claim as my property and desire to secure by Letters Patent of the United States, is:

1. An ordnance mount for dual-control aircraft comprising a horizontal track adapted to be stationarily supported upon the fuselage of the aircraft, a carriage supported for rotation upon said track about a vertical axis, arms extending downwardly from opposite sides of said carriage, a cross-member extending between said arms and having its ends slidably engaging said arms, a seat supported upon said cross-member for rotation about a vertical axis, said seat normally facing aft of the aircraft, resilient means connecting said cross-member with said arms for yieldingly supporting the seat and means for laterally adjusting the position of said seat with respect to the cross-member when the seat is rotated to face forwardly of the aircraft.

2. An ordnance mount for dual-control aircraft comprising a horizontal track adapted to be stationarily supported upon the fuselage of the aircraft, a carriage supported for rotation upon said track about a vertical axis, arms extending downwardly from opposite sides of said carriage, a cross-member extending between said arms and having its ends slidably engaging said arms, a seat supported upon said cross-member for rotation about a vertical axis, said seat normally facing aft of the aircraft, resilient means connecting said cross-member with said arms for yieldingly supporting the seat, means for laterally adjusting the position of said seat with respect to the cross-member when the seat is rotated to face forwardly of the aircraft, the arms of said carriage and the ends of the cross-member being telescopically connected, and means for locking the cross-member in vertically adjusted position.

3. An ordnance mount comprising a circular track adapted to be stationarily supported upon the fuselage of an aircraft in a generally horizontal plane, a ring encircling and supported for rotation about a vertical axis upon said track, a generally U-shaped yoke having upright arms pivotally connected to said ring for adjustment of the yoke about a horizontal axis, a seat positioned adjacent the lower end of said yoke, a firearm-supporting member rigidly connected to said upright arms for supporting a firearm in operative firing position with respect to a gunner occupying the seat, a spring-pressed pin for latching said yoke in positions of angular adjustment about its horizontal axis, a spring-pressed pin for locking the ring to the track, a bracket pivotally mounted upon said ring for movement about an axis radially of said ring, a control lever pivotally mounted on said bracket for movement about an axis lying in a plane transversely of the axis of the bracket, said control lever being manually operable to effect movement independently about either of said axes or simultaneously about both axes, and means mechanically connecting said bracket and lever with said pins for withdrawing said pins either independently or simultaneously.

4. In an ordnance mount, a track, a ring encircling and rotatably supported upon said track for movement about a vertical axis, a yoke pivotally suspended from said ring for movement about a horizontal axis, a gunner's seat carried by said yoke, means connecting said seat to the yoke for rotation about a vertical axis and for lateral shifting movement of the seat with respect to said yoke.

5. An ordnance mount comprising a track, a carriage supported for rotation upon said track about a vertical axis, a yoke pivotally suspended from said carriage for movement about a horizontal axis, a firearm and a gunner's seat carried by said yoke, and means for varying the position of the gunner's seat about a vertical axis and laterally with respect to the yoke.

ALEXANDER P. DE SEVERSKY.