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**GUN TRAINING MECHANISM WITH TRIGGER**  
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3 Claims. (Cl. 89—41)

The present invention relates to gun mounts and especially gun mounts for automatic guns of medium caliber, for instance ranging from 20 mm. to 40 mm.

The chief object of the present invention is to provide a gun mount which is better adapted to meet the requirements of practice than those existing at the present time and in particular which does not require, for aiming, the use of the feet and legs of the gunner.

The gun mounts with which the present invention is concerned comprise two laying members for aiming the gun in azimuth and in elevation, respectively, said aiming members carrying means whereby the gunner can fix the gun with respect to the respective axes about which aiming is performed.

According to the present invention, at least one of said aiming members carries at least one mechanical control element for starting and stopping firing.

A preferred embodiment of the present invention will be hereinafter described with reference to the appended drawings, given merely by way of example, and in which:

FIG. 1 is a diagrammatic view of a gun mount made according to the present invention and supporting an automatic gun;

FIG. 2 is a view on an enlarged scale of the aiming device of the gun mount shown by FIG. 1; and

FIG. 3 is a diagrammatic view illustrating a detail of construction according to the present invention.

The gun mount according to the present invention is adapted to enable the gunner to lay the gun, with respect to carriage 1, in azimuth (by rotation about vertical axis XX) and in elevation (by rotation about horizontal axis YY). This carriage is provided with bearings 2 (extending along axis YY) for supporting the gun, these bearings being carried by a U-shaped support 3. This support 3 is rotatable, for laying in azimuth, about vertical axis XX with respect to carriage 1. In order to control both of the laying movements, there is provided, on opposite sides of axis XX, handwheels 4<sub>1</sub>, 4<sub>2</sub> rotatable about a horizontal axis, and each provided with a handle. The axis ZZ of handwheels 4<sub>1</sub>, 4<sub>2</sub>, which is parallel to axis YY, is, in the embodiment shown by the drawings, at a distance therefrom.

Means, which will be described hereinafter, are provided for locking the gun with respect to the laying axes, respectively.

According to the present invention, at least one of said handwheels 4<sub>1</sub>, 4<sub>2</sub> further carries a mechanical control member for manually controlling the firing. If there is only one such member, it is for starting and stopping firing, this member being supposed to be carried by handwheel 4<sub>1</sub>.

When gun A is capable of firing either by bursts or shot by shot, the other handwheel 4<sub>2</sub> carries a mechanical manual control member for choosing between these two kinds of firing.

With such a gun mount, the gunner can control firing manually in all circumstances without having to take his hands off the laying handles 5 carried by handwheels 4<sub>1</sub>, 4<sub>2</sub>.

In the embodiment shown by the drawings, each of the handwheels is provided with a handle 5 perpendicular to axis ZZ and carried by the corresponding handwheel 4<sub>1</sub>

or 4<sub>2</sub> which is in the form of a circular casing adapted to rotate about horizontal axis ZZ. One of said handwheels, 4<sub>1</sub>, is located on the right hand side of vertical axis XX and the other one 4<sub>2</sub> on the left hand side of said axis XX.

Handwheel 4<sub>1</sub> is rigid with shaft 10, which carries a pinion 41 in mesh with a toothed sector 42 carried by gun A, so that rotation of this handwheel 4<sub>1</sub> corresponds to laying in elevation.

Handwheel 4<sub>2</sub> is rigid with a pinion 43 cooperating through pinions 44, 45, 46 and 47, carried by support 3, with a pinion 48 carried by carriage 1, so that rotation of handwheel 4<sub>2</sub> ensures the laying in azimuth.

Each of the handles 5 is arranged in such manner that it can always remain substantially in the same direction with respect to a vertical plane supposed to be fixed with respect to the gun.

For this purpose, each handle 5 is rotatable with respect to the corresponding handwheel about an axis parallel to axis ZZ and said handle is connected, through three intermeshing gears 6, 7, 8, with a tubular sleeve 9 coaxial to ZZ.

If sleeve 9 were entirely fixed, handle 5 would remain always parallel to itself during the rotation of the corresponding handwheel.

But, as a matter of fact sleeve 9 can rotate through a small angle (some degrees) on either side of a mean position thereof, this slight displacement serving to fix the corresponding handwheel in position.

For this purpose, there is provided, coaxially to ZZ:

A central shaft 10<sub>1</sub> rigid with the corresponding handwheel such as 4<sub>1</sub>,

A hollow sleeve 11 rigid with support 3, and

The above mentioned tubular sleeve 9, which carries pinion 8.

Each handle 5 must be capable, by rotation thereof about the axis of said sleeve 9 with respect to its mean position (shown by FIG. 2) of operating braking means for fixing the corresponding handwheel with respect to support 3.

For this purpose, there is provided an engagement along oblique planes between the inner end of sleeve 9 and the hub 12 of a disc which is prevented from rotating with respect to sleeve 11 by a rod 13.

Thus sleeve 9, when it is moved in either direction away from its mean position, being unable to move along its axis, pushes hub 12 in the direction where the edge of the above mentioned disc (the hub of which is shown at 12) bears against an annular flange 14 rigid with handwheel 4. Said annular flange 14 is then tightly held between said disc and a stationary annular surface 15 rigid with carriage 1. Friction linings 16 and 17 carried by elements 12 and 15 ensure, when the braking means are applied, a good fixation of flange 14.

Thus any small rotation of one handle 5 about its mean position secures the gun with respect to carriage 1 concerning the laying (either in azimuth or in elevation) performed through the handle 5 that is considered.

The means for starting and stopping firing and the means for determining the kind of firing that is performed each consist of a trigger lever 18 extending in the same direction as handle 5 and oscillatable with respect to said handle 5. Said lever 18 controls, through suitable transmission means, the amount by which projects, with respect to the end of central shaft 10 any suitable transmission for performing the desired control, a rod 19 which controls.

The means for starting and stopping firing, operated by the handle 5 carried by handwheel 4<sub>1</sub>, are such that the end of rod 19 moves between two positions 20 and 21 (shown by FIG. 1). Therefore trigger 18 is con-

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nected to rod 19 through a linking member 22 interposed between the right hand end of rod 19 and the left hand end of another rod 23 extending coaxially in shaft portion 24 through which handle 5 is connected to pinion 6. The whole is arranged in such manner that when rod 23 is pushed back, rod 19 is also pushed back. In order to control the displacements of rod 23, the end thereof opposed to that cooperating with linkage member 22 cooperates with a bevelled guide 25 carried by trigger 18 at a point distant from its pivot axis 26, which is distinct from the axis about which handle 5 is pivoted.

The means for determining the kind of firing that is desired, i.e. either shot by shot or by bursts, are carried by the other handle 5 and they are advantageously made similarly to those just described (elements 19, 22, 23) but the internal end of rod 27 (corresponding to the above mentioned rod 19) is arranged to occupy one of the three positions 28, 29 and 30 shown on the left hand side of FIG. 1, each of these three positions corresponding to one of the cases that are considered (firing by bursts, no firing, and shot by shot firing).

In this case the device consisting of trigger 18 may be replaced by a small lever 31 pivotally mounted on handwheel 4.

The gun mount above described may be carried by a base 1 such that it has:

Either the shape of a field carriage, for instance a tripod carriage; or the shape of a vertical column; or again the shape of a circular support carried by a vehicle, this circular support having its vertical axis of rotation generally located to the rear of the elevation aiming axis.

In a general manner, while the above description discloses what is deemed to be a practical and efficient embodiment of the present invention, said invention is not limited thereto as there might be changes made in the arrangement, disposition and form of the parts without departing from the principle of the invention as comprehended within the scope of the appended claims.

What I claim is:

1. In combination,
  - a gun carriage,
  - a gun support rotatably supported by said gun carriage about a vertical pivot axis,
  - two horizontal sleeves extending horizontally from said gun support on opposite sides thereof,
  - a gun rotatably supported by said gun support about a horizontal axis,
  - elevation aiming means for laying said gun with respect to said gun support, said elevation aiming means comprising a first control handwheel of horizontal axis, located on a first side of said gun support, a first shaft rigidly fixed to said first control handwheel and coaxially journaled in one of said sleeves and gearing means connecting said shaft to said gun,
  - azimuth aiming means for laying said gun support with respect to said gun carriage, said azimuth aiming means comprising a second control handwheel of horizontal axis, located on a second side of said gun support, a second shaft rigidly fixed to said second control handwheel and coaxially journaled in the other of said sleeves, and gearing means connecting said second shaft to said gun carriage,
  - means for locking said elevation aiming means with respect to said gun support, located on said first side of said gun support,
  - means for locking said azimuth aiming means with respect to said gun carriage, located on said second side of said gun support,
  - each of said locking means comprising a horizontal tubular shaft surrounding the corresponding sleeve, brake means operative by the rotation of said tubular shaft with respect to a mean position thereof, a handle for controlling said locking means, said handle being pivotally carried by the corresponding

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control handwheel about a horizontal axis and, a train of three equal gears for connecting said handle to the outer extremity of said tubular shaft, said handle having a mean position corresponding to the mean position of said tubular shaft, the plane of said handle in said mean position remaining parallel to a fixed plane, said brake means being operative by the pivoting of said handle about said mean position,

mechanical means for starting and stopping the firing of said gun, said mechanical means including a trigger carried by one of said handles, and mechanical means for selecting the kind of firing of said gun, said last mentioned mechanical means including a lever carried by the other of said handles.

2. The combination according to claim 1 wherein each of said locking means comprises a horizontal tubular shaft coaxially surrounding the corresponding sleeve, the inner end of said tubular shaft being constituted by inclined planes, brake means comprising an annular disc, a hub of said annular disc surrounding said corresponding sleeve, the external side of said hub being constituted by a bevel face, a horizontal rod rigidly carried by said gun support and extending through said disc to permit only axial displacements thereof, a flange rigidly locked to the corresponding control handwheel, said flange being located between said disc and an extension of said gun support, and a friction lining rigidly carried by the external surface of said extension of said gun support and the inner disc surface, said brake means being actuated by the engagement of the inner extremity of said tubular shaft with the outer extremity of said hub, resulting from the rotation of said tubular shaft from a mean position, a handle for controlling said locking means, said handle being pivotally carried by the corresponding control handwheel about a horizontal axis, a train of three equal gears for connecting said handle to the outer end of said tubular shaft, said handle having a mean position with respect to its pivot axis, said mean position corresponding to the mean position of said tubular shaft, the plane of said handle in said mean position being parallel to a fixed plane, said brake means being controlled by the pivoting of said handle about one of said mean positions.

3. In combination,
  - a gun carriage,
  - a gun support rotatably supported by said gun carriage about a vertical pivot axis,
  - two horizontal sleeves extending horizontally from said gun support on opposite sides thereof,
  - a gun rotatably supported by said gun support about a horizontal axis,
  - elevation aiming means for laying said gun with respect to said gun support, said elevation aiming means comprising a first control handwheel of horizontal axis, located on a first side of said gun support, a first shaft rigidly fixed to said first control handwheel and coaxially journaled in one of said sleeves and gearing means connecting said shaft to said gun,
  - azimuth aiming means for laying said gun support with respect to said gun carriage, said azimuth aiming means comprising a second control handwheel of horizontal axis, located on a second side of said gun support, a second shaft rigidly fixed to said second control handwheel and coaxially journaled in the other of said sleeves, and gearing means connecting said second shaft to said gun carriage,
  - means for locking said elevation aiming means with respect to said gun support, located on said first side of said gun support,
  - means for locking said azimuth aiming means with respect to said gun carriage, located on said second side of said gun support,
  - each of said locking means comprising a horizontal tubular shaft coaxially surrounding the correspond-

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ing sleeve, brake means operative by the rotation of  
 said tubular shaft with respect to a mean position  
 thereof, a handle for controlling said locking means,  
 said handle being rotatably carried by the corre-  
 sponding control handwheel about a horizontal axis,  
 and a train of three equal gears for connecting said  
 handle to the outer extremity of said tubular shaft,  
 said handle having a mean position corresponding  
 to the mean position of said tubular shaft, the plane  
 of said handle in said mean position remaining  
 parallel to a fixed plane, said brake means being  
 operative by the rotation of said handle about said  
 mean position,  
 mechanical means for starting and stopping the firing  
 of said gun, said mechanical means comprising an  
 axially movable long rod extending along the axis of  
 one of said two first mentioned shafts rigidly fixed  
 to the corresponding handwheel, the inner end of  
 said axially movable rod being movable between two  
 positions, respectively the firing position and the  
 fire stopping position, an axially movable short rod  
 extending along the axis of the handle carried by  
 said corresponding handwheel, linkage means con-  
 necting said two rods together, a trigger pivotally  
 carried by said handle carried by said corresponding  
 handwheel, and a bevel guide carried by said trigger  
 and resiliently applied against the outer end of said  
 short rod,  
 and mechanical means for selecting the kind of firing  
 of said gun, said last mentioned mechanical means

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comprising a second axially movable long rod ex-  
 tending along the axis of the other of said two first  
 mentioned shafts, the inner end of said second long  
 rod being adapted to occupy one of three positions  
 corresponding respectively to burst firing, shot by  
 shot firing, and no firing at all, a second axially  
 movable short rod located along the axis of the  
 handle carried by said second handwheel, linkage  
 means connecting said second two rods together, a  
 lever pivotally carried by said last mentioned handle  
 about a horizontal axis, said lever having three stable  
 positions corresponding to said three positions of the  
 inner end of said second long rod, and a bevelled  
 guide carried by said lever and resiliently applied  
 against the outer end of said second short rod.

## References Cited by the Examiner

## UNITED STATES PATENTS

1,096,155	5/1914	Dawson et al. ....	89—41 X
2,223,891	12/1940	Krum .....	89—41
2,968,223	1/1961	Weibel .....	89—41

## FOREIGN PATENTS

1,246,692	10/1960	France.
464,543	4/1937	Great Britain.
541,767	12/1941	Great Britain.

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