

Oct. 19, 1948.

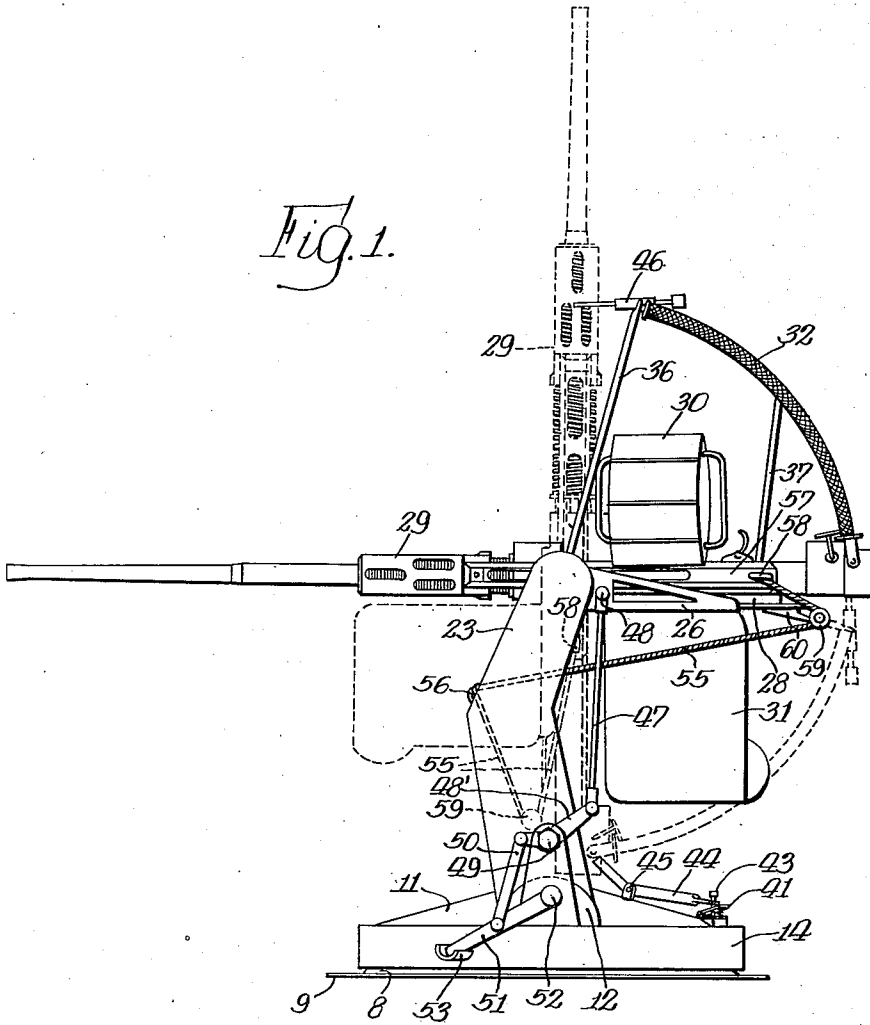
B. DARSIE

2,451,614

GUN AIMING AND FIRING MEANS

Filed June 9, 1944

6 Sheets-Sheet 1



INVENTOR.
Burns Darsie,
BY *Brown, Jackson, Boettcher & Cramer*
Attys.

Oct. 19, 1948.

B. DARSIE

2,451,614

GUN AIMING AND FIRING MEANS

Filed June 9, 1944

6 Sheets-Sheet 2

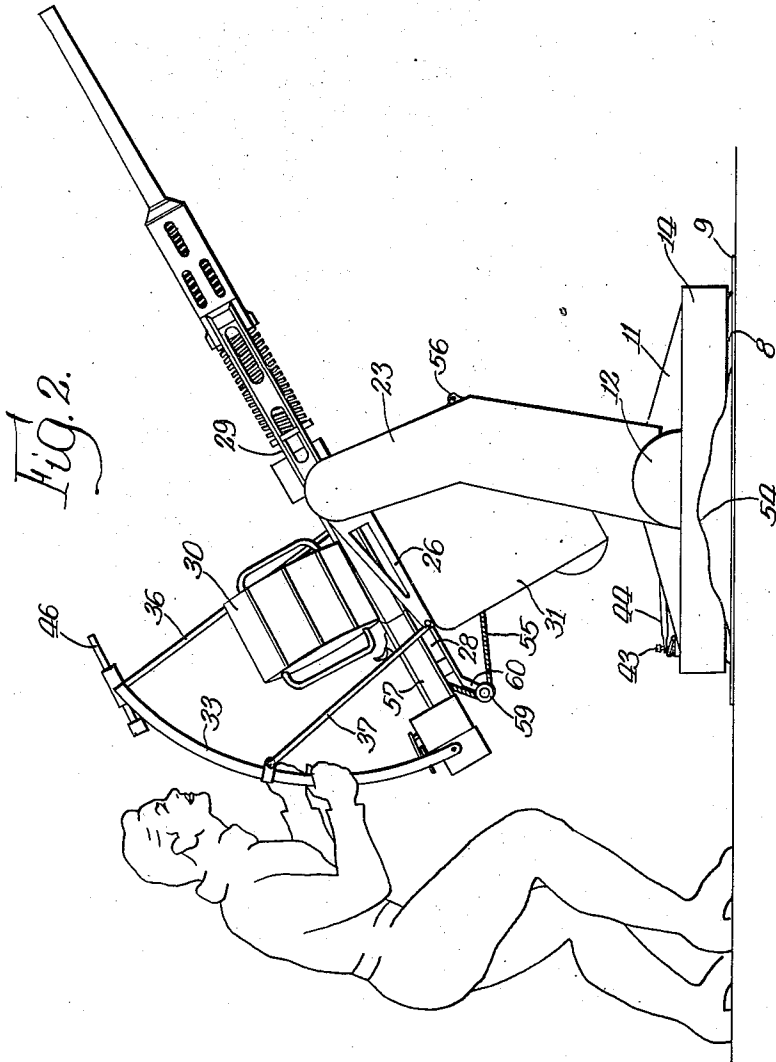


Fig. 2.

INVENTOR.
Burns Darsie,
BY *Brown, Jackson, Boettcher & Diermer*
Attys.

Oct. 19, 1948.

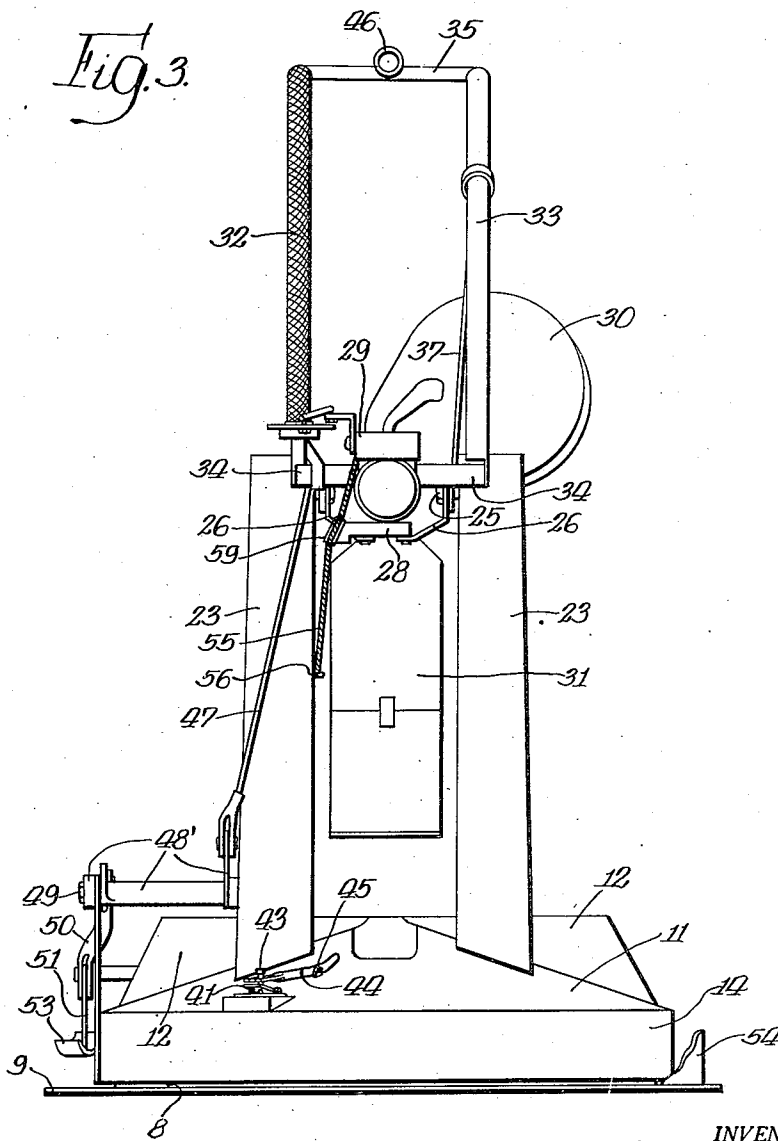
B. DARSIE

2,451,614

GUN AIMING AND FIRING MEANS

Filed June 9, 1944

6 Sheets-Sheet 3



INVENTOR.

Burns Darsie,

BY

Brown, Jackson, Roetter, Linn, & Atty's

Oct. 19, 1948.

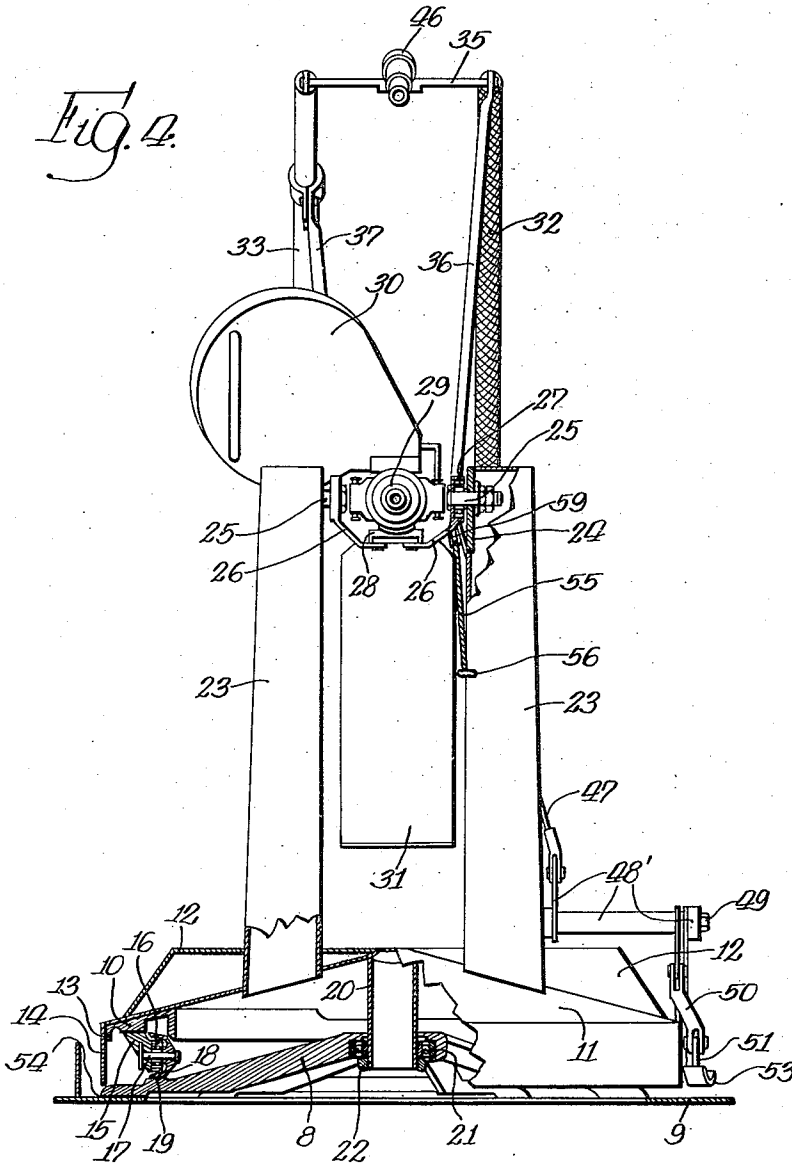
B. DARSIE

2,451,614

GUN AIMING AND FIRING MEANS

Filed June 9, 1944

6 Sheets-Sheet 4



INVENTOR.
Burns Darsie,
BY
Brown, Jackson, Bette & Danner
Attys.

Oct. 19, 1948.

B. DARSIE

2,451,614

GUN AIMING AND FIRING MEANS

Filed June 9, 1944

6 Sheets-Sheet 5

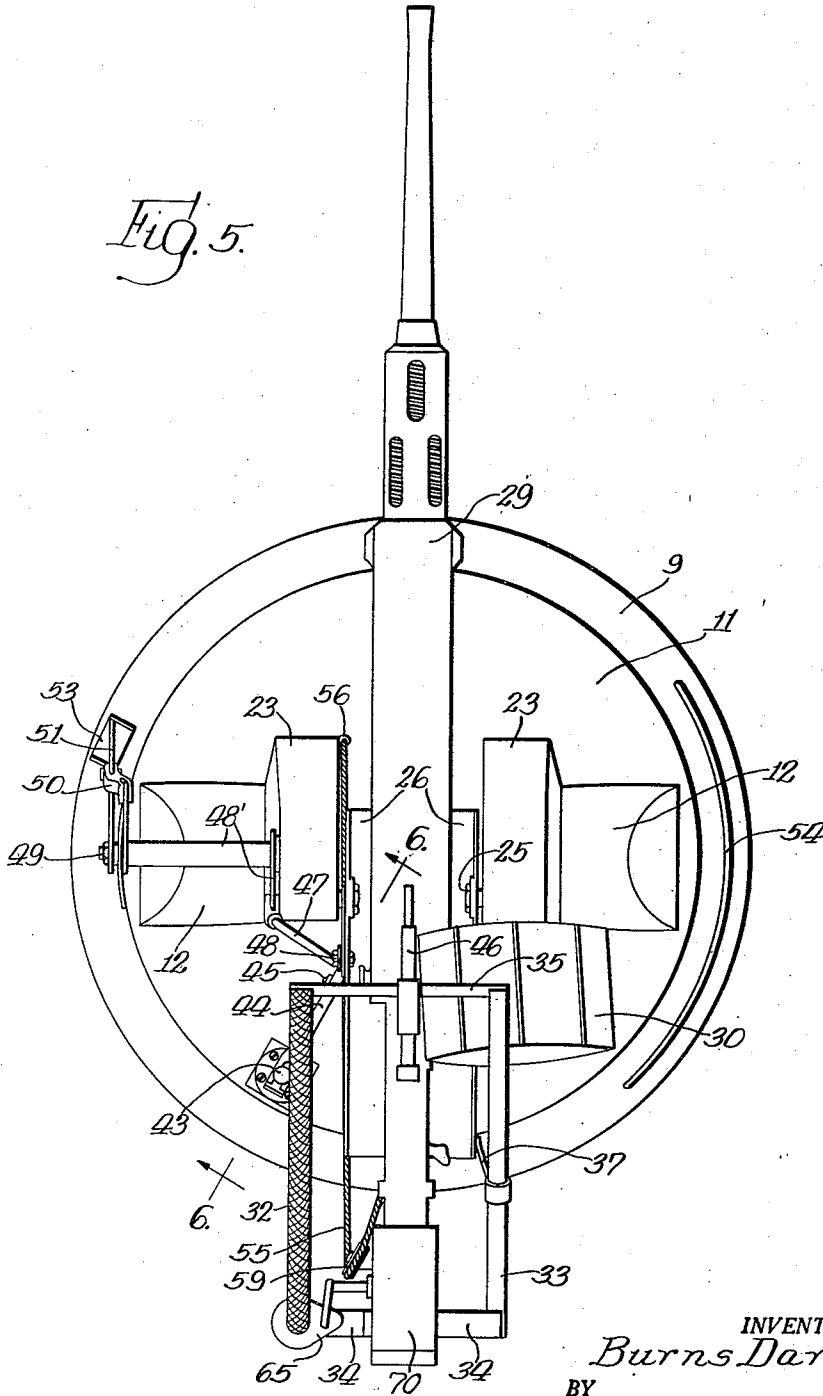


Fig. 5.

INVENTOR.
Burns Darsie,
BY
Brown, Jackson, Poettcher, Steiner
Attys.

Oct. 19, 1948.

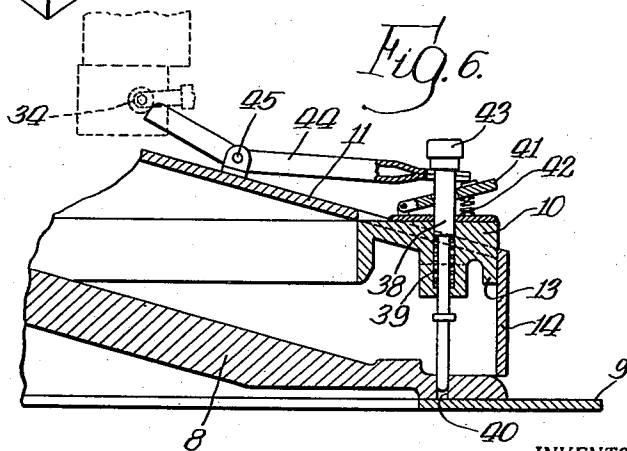
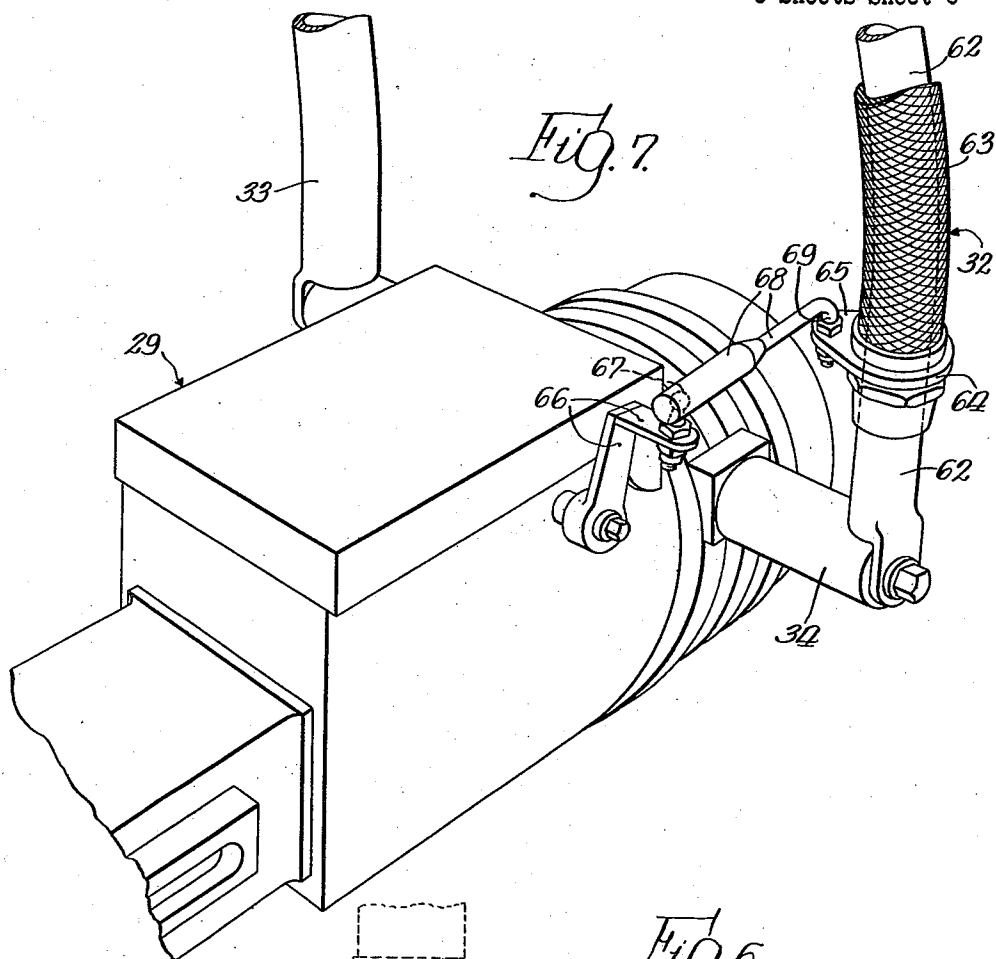
B. DARSIE

2,451,614

GUN AIMING AND FIRING MEANS

Filed June 9, 1944

6 Sheets-Sheet 6



INVENTOR.
Burns Darsie,
BY
Ernest Jackson, Bettcher Cramer
Attys.
1.

UNITED STATES PATENT OFFICE

2,451,614

GUN AIMING AND FIRING MEANS

Burns Darsie, Bayonne, N. J., assignor to Electric Boat Company, Groton, Conn., a corporation of New Jersey

Application June 9, 1944, Serial No. 539,428

6 Claims. (Cl. 89—136)

1

My invention relates to ordnance, and particularly to a mount and accessories for maneuvering and operating relatively small caliber guns for anti-aircraft fire from relatively small naval vessels.

The primary object of the invention is to provide a mount and grip means for quick maneuverability of the gun, in traverse and in elevation, by hand, by a single gunner, and for firing of the gun, with minimum effort on the part of the gunner, whatever be the aimed position. A further feature lies in special means for cocking the gun, whereby this necessary act can be performed with ease. Subsidiary features will be made point of as the description proceeds.

My invention is illustrated in the accompanying drawings in which—

Figure 1 is a side elevational view, showing the gun in position of maximum elevation in dotted lines;

Figure 2 is an elevational view, from the opposite side, showing the manner of pointing the gun;

Figure 3 is a rear elevation;

Figure 4 is a front elevation, parts being broken away and shown in section in order to show the means whereby the gun is mounted for traverse;

Figure 5 is a plan view;

Figure 6 is a fragmentary sectional view taken on the plane of the line 6—6 of Figure 5 and looking in the direction indicated by the arrows; and

Figure 7 is a fragmentary perspective view particularly showing the means for operating the trigger of the gun.

Like reference characters are applied respectively to the same parts throughout the various figures.

The entire structure is mounted on a circular base 8, which is a casting of substantial size and weight and is suitably bolted to the deck, deck plate 9 intervening.

A turntable is mounted on this base, and this turntable comprises a main supporting ring 10, carrying the circular crowned covering apron 11 of iron sheet, this apron being supplemented by a transverse tunnel housing 12 forming the bight of a yoke to which further reference will be made presently (Fig. 4). A downwardly extending flange 13 on the ring 10 carries the housing band 14 about the periphery of this apron.

The ring 10 is provided with a plurality of short inwardly extending arms 15, each of which is provided with a bearing 16, in which is mounted a stub shaft 17 carrying a roller 18, and these rollers run upon the circular track 19 formed on

2

the base 8. Extending centrally downward, from the inside of the apron 11, is a tube 20, which centers the turntable on the base, with the rollers 18 on the track 19, by engagement in the central bearing 21 on the base, the lower end of the tube 20 being provided with a hold-down nut 22 by means of which the turntable and base are held together, with adequate play for free rotation of the one upon the other.

The yoke, which has already been referred to, comprises the tunnel housing 12 and the hollow iron sheet uprights 23, 23; and it will be seen presently that the gun itself is hung in this yoke.

The upper end portion of the inner wall of each of the uprights 23 is in the form of a special supporting member 24, of more substantial thickness than the iron plate of the uprights, this supporting member being welded in place as part of the upright and providing for the support of a pivot bolt 25, and, upon these two pivot bolts, complementary supporting brackets 26, 26 are hung, roller bearings 27 intervening.

These brackets 26, 26 are, in effect, L-shaped in cross-section, the horizontal elements extending toward each other to form a cradle for the reception of the gun carriage 28, bridging and bolted to said horizontal elements. The gun 29 is mounted on the carriage 28; the magazine of the gun is indicated at 30, and its cartridge case collecting bag at 31. The reference numeral 70, Figure 5, designates the breech end of the gun.

The gun construction, per se, is not part of this invention and, for simplicity, there is just sufficient showing of the gun to indicate its nature and its mounting, and to represent those parts thereof that are directly concerned with the means which I provide for cocking and firing the same. The gun shown is of appropriate caliber and is automatic, i. e. it continues to fire shots in rapid succession so long as the trigger is drawn and cartridges are fed, and it is fired in bursts as occasion may require.

The gun, thus mounted on the axis of the pivot bolts 25, 25, is fairly balanced, as between muzzle and breech, and can be swung in elevation from approximately horizontal position, about five degrees depression, to vertical as indicated in dotted lines in Figure 1.

The gun is manipulated manually by means of two elongated grips 32 and 33 extending upwardly from opposite sides of the breech. They are of arcuate shape about the axis of elevation, in lateral alignment and of the same length, but of different construction as will appear presently. The lower ends of these grips are fixed to the breech

of the gun by means of the cross member 34, 34 and are distanced from each other for natural grasping by the gunner's left and right hands, respectively. The upper ends of the grips are fixedly bridged by the cross member 35. The upper end of the grip 32 is also connected with bracket 26, on the corresponding side, by means of the truss rod 36, preferably of steel tubing, and the other grip 33 is connected midway with the opposite bracket 26 by means of a similar truss rod 37.

It will thus be seen that the members 32, 33, 34, 35, 36 and 37 form a handle framework, fixed to the breech of the gun, and that the grips 32 and 33 can be grasped by the two hands, respectively, of the gunner, as illustrated in Figure 2. As the gun is swung in elevation, the gunner can slip the grips in his hands, always occupying substantially the same position relative to the axis of elevation, and thus the gunner can maintain his position for aiming with little change throughout the range of elevation. In handling the gun in elevation, he arrives at an approximate aim by simply slipping the grips through his hands, in one direction or the other, and, upon arriving at an approximation, he does his final aiming with his hands firmly clutched to the grips.

For operating the gun in train, he simply swings it about its vertical axis, this being an easy operation due to the roller mounting of the superstructure upon the circular base 8, maintaining his same position in back of the gun at all times.

When out of action, the gun occupies the vertical position shown in dotted lines in Figure 1, and it is held there by a mechanism which also locks it against traverse, and which will now be described.

Referring particularly to Figure 6, it will be seen that the ring 10 is provided with an enlargement, exposed through the apron 11 and provided with a vertical bore for the reciprocating plunger 38, urged upwardly by means of the spring 39. The lower end of the plunger is adapted to enter an opening 40 in the base 8, thus to hold the ring 10, and all that is carried with it, against rotation on the base. The plunger 38 passes through a related opening in a cant catch 41, urged upwardly by spring 42, and, when the plunger is depressed, that catch operates automatically to hold it in that position against the upward force of the spring 39. When the cant catch is independently depressed, the plunger is permitted to move upwardly, under the force of the spring 39.

The plunger is provided with a head 43. A lever 44 is pivotally mounted, at 45, in a bracket on the apron 11, the power arm of said lever being bifurcated and engaging under the head 43, as shown. This lever is so formed, and the relationship is such, that when the plunger is in its lowered position, the load arm of the lever extends up to that position in which it will latch behind the cross member 34 on the lowered breech, as indicated in dotted lines in Figures 1 and 6. Thus, when the gunner swings the gun to upright position, and brings the turntable into position with the plunger 38 over opening 40, of which there may be more than one if desired, and then lowers the plunger by pressing his foot down upon the head 43, all is locked in out-of-action condition. To free the gun for action, he simply momentarily depresses the cant catch with his toe, which allows the plunger to rise, under the pressure of the spring 39, out of the opening 40, release of the cant catch resulting in the rais-

ing of the power arm of the lever 44 and the lowering of the load arm thereof away from the cross member 34 under the pressure of the spring 42.

Considering the gunner in the position shown in Figure 2, it will be obvious how he can move to his left or right, in order to manipulate the gun in train, at all times keeping his posture for manipulating the gun in elevation. A sight, preferably a unit sight, 46 is conveniently mounted on the cross member 35.

Means is provided automatically to elevate the gun when rotated in traverse to a vertical plane intersecting vessel superstructure, thus to relieve the gunner of concern in that regard. This means is in the form of linkage comprising the rod 47, connected at one end to the gun at 48, and at the other end to one arm of a bell crank lever 48' pivoted on the turntable at 49. The other arm of the bell crank lever is connected by link 50 with lever 51 pivoted to the turntable at 52, this last-named lever being provided with a cam follower 53 for following the cam 54 on the deck plate 9. It will be seen that, when the turntable is brought around to a position where the follower 53 rides upon the cam 54, the gun will be elevated, and the cam is so located and formed as to keep the line of fire away from deck superstructure.

The gun is cocked by means of a cable 55 attached, at one end, at 56, to one of the uprights 23, and, at the other end, to the breech mechanism slide 57 of the gun at 58, this cable passing over the idler pulley 59 pivoted on arm 60 on the gun carriage 28. The pulley 59 is so located that, when the gun is in upright position, as illustrated in dotted lines in Figure 1, the breech mechanism slide 57 is in its forward and uncocked position. It will be noted that when the gun is in this position, the grips 32 and 33, though in their lowered position, have their upper ends high enough for the gunner to grasp them conveniently and effectively, and his first act, after releasing the cant catch 41, in order to release the gun, freeing it for movement in elevation, is to swing the gun into horizontal position, i. e. the position shown in full lines in Figure 1. This act, due to the relative positions of the points 56, 59 and 58, and the paths of movement of the later two, brings about the drawing back of the breech mechanism slide by means of the cable, as indicated in Figure 1 (dotted lines to full lines), and it is material that this cocking action is thus spread over nearly the entire movement of the gun from vertical to horizontal position, thus reducing the physical effort necessary in this operation. A marked mechanical advantage is secured by the fact that the movement of the points 58 and 59 relative to the point 56 is in the nature of a toggle action, i. e. as the gun approaches the horizontal position, the point 59 approaches the straight line passing through the points 56 and 58; in this way, the mechanical advantage increases as increased force is necessary, and the cocking of the gun is accomplished with a minimum of physical effort.

The means for operating the trigger of the gun is of special importance and is as follows:

Reference is made particularly to Figure 7.

One of the arcuate grips, i. e. the right hand grip 33, is of ordinary tubing, bent to shape and forming a rigid part of the handle structure. The other grip 32 comprises, firstly, a rigid arcuate tubing member 52, bent to the same shape as that of the grip 33 but being of somewhat lesser

5

diameter. Surrounding the tubing member 62, practically throughout its length, is a tubing member 63 which is of inherent limited flexibility, such as a woven metal hose, fitting fairly snugly on the tubing member 62 and being capable of rotation about its own arcuate "axis." Its external diameter is preferably approximately equal to the external diameter of the grip 33.

At its lower end, this outer tubing member 63 has a coupling 64 soldered or otherwise secured thereto and thus rotatable with the tubing member 63 on the tubing member 62. This coupling has a laterally extending arm 65 and that arm is operatively connected to the trigger of the gun so that, as the grip is held in the gunner's left hand for aiming purposes, he can simultaneously rotate the outer tubing on the inner tubing and thus operate the trigger. The trigger operating member is indicated at 66 and is L-shaped, its horizontal arm being connected, by means of a ball-and-socket joint 67, with one end of a link 68, the other end of which is pivotally connected at 69 to the arm 65 of the coupling 64. It will be seen that as the coupling 64 is rotated on the inner tubing 62, by means of the rotation of the outer tubing 63 thereon, the trigger is readily operated to fire the gun, and this operation is precisely the same wherever the gunner happens to be grasping the outer tubing in his aiming the gun.

I claim:

1. In a gun pivotally mounted on a horizontal axis, said gun having a breech end, the combination of a trigger-operating member on said gun, a curved elongated handle member of circular cross-section fixedly attached to and extending upwardly from the breech end of said gun, a tubular grip member fitted on and rotatable on said handle member and substantially co-extensive in length therewith, and means to transmit the rotatable motion of said grip member to the trigger-operating member of said gun.

2. In a gun pivotally mounted on a horizontal axis, said gun having a breech end, the combination of a trigger-operating member on said gun, a curved elongated handle member of circular cross-section fixedly attached to and extending upwardly from the breech end of said gun, a tubular grip member of limited flexibility fitted on and rotatable on said handle member and substantially co-extensive in length therewith, a coupling surrounding the lower end of said handle member and attached to the lower end of said grip member, a laterally extending arm mounted on said coupling, and linkage means operatively interconnecting said arm with said trigger-operating member whereby rotatable motion of said grip member is transmitted to said trigger-operating member.

3. In a gun pivotally mounted on a horizontal axis, said gun having a breech end, the combination of a trigger-operating member on said gun,

6

a cross-member fixed to the breech end of said gun so as to project on opposite sides thereof, a pair of curved elongated handle members secured to and extending upwardly from opposite ends of said cross-member, a tubular grip member fitted on and rotatable on one of said handle members and substantially co-extensive in length therewith, and means to transmit the rotatable motion of said grip member to the trigger-operating member of said gun.

4. In a gun pivotally mounted on a horizontal axis, said gun having a breech end, the combination of a trigger-operating member on said gun, an arcuate elongated handle member of circular cross-section fixedly attached to and extending upwardly from the breech end of said gun with the axis of curvature of said handle member being coincident with said horizontal axis, a tubular grip member fitted on and rotatable on said handle member and substantially co-extensive in length therewith, and means to transmit the rotatable motion of said grip member to the trigger-operating member of said gun.

5. In combination, a turntable having a supporting yoke, a gun cradle hung in said yoke on a horizontal axis, about which it is pivotable, a gun set in said cradle, a trigger-operating member on said gun, a handle framework comprising a cross member attached to the breech end of said gun, a pair of curved elongated handle members extending upwardly from said cross-member on opposite sides of said gun, said handle members being arcuate about said horizontal axis, a cross member connecting the upper end of said handle members, truss members connecting each of said handle members with said cradle, a tubular grip member fitted on and rotatable on one of said handle members and substantially co-extensive in length therewith, and means to transmit the rotatable motion of said grip member to the trigger operating member of said gun.

6. The combination called for in claim 1 wherein said tubular grip member is a woven wire tube.

BURNS DARSIE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,517,351	Fletcher	Dec. 2, 1924
1,519,458	Kauch et al.	Dec. 16, 1924
1,528,952	Russell et al.	Mar. 10, 1925
1,810,243	Herlach	June 16, 1931
1,820,820	Muller	Aug. 25, 1931
2,404,958	Green et al.	July 30, 1946

FOREIGN PATENTS

Number	Country	Date
369,212	Italy	Mar. 15, 1939