Dec. 11, 1945. D. J. CRAWFORD 2,390,516

GUN SIGHT MOUNTING

Filed July 11, 1941

Fig-1-

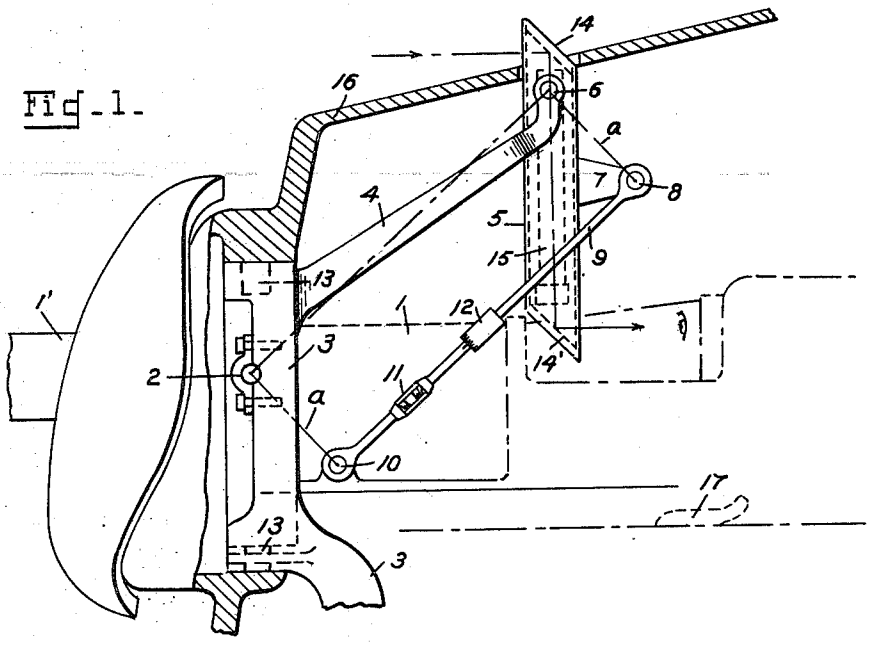


Fig-2-

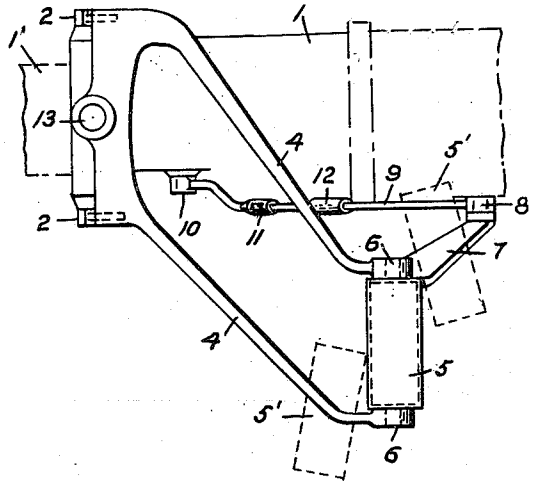
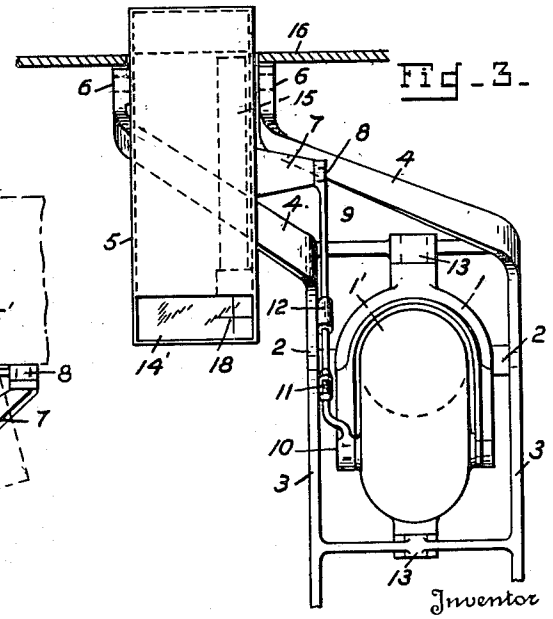


Fig-3-



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Patented Dec. 11, 1945 2,390,516

UNITED STATES PATENT OFFICE

2,390,516

GUN SIGHT MOUNTING

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Application July 11, 1941, Serial No. 401,989

1 Claim. (Cl. 89—41)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to a gun sight and its mounting.

An object of the invention is to provide a simple, sturdy means for accurately sighting a gun on a point or area target.

Another object of this invention is to provide a simple telescopic sight with a wide aperture coacting with a gun in a tank for precise use in the shorter ranges.

A further object of the invention is to provide an observation periscope with a simple coupling to a heavy gun in an armored vehicle to permit quick and accurate alignment with a target which is within the range of modern tank operations.

Another object of the invention is to provide a panoramic observation and aiming system for a tank gun which can be conveniently adjusted for ranges beyond those of conventional tank operations.

A further object of the invention is to provide a gun sight which permits the physical separation of the gun pointing personnel from the moving elements of the gun.

Other objects and advantages will become apparent during the course of the following description, taken in conjunction with the drawing, in which:

Fig. 1 is a side elevational view showing the mounting of the observation device on the gun structure.

Fig. 2 is a plan view of the same with a portion removed to show details of construction, and

Fig. 3 is a rear elevational view of the gun mounting and observation device.

A cradle 1 for a heavy gun is secured to a support such as a tank hull or turret in a conventional manner. Vertical elevation of the gun 1' is accomplished by rotation of the cradle 1 about its horizontal axis 2—2. Connected to extensions 3 on the tank hull or turret are upwardly extending parallel arms 4. A periscope 5 is suspended from the upper ends of the arms 4 at pivot points 6. The periscope 5 has an offset bracket 7 attached to one side and intermediate its ends. The outer end of the bracket 7 carries a pivot 8 for connection with a divided link or rod 9. The lower end of rod 9 is pivoted to the gun cradle 1 at 10. Pivot 10 is designed to be a predetermined distance a from the horizontal axis 2—2 as shown in Fig. 1. The distance between the centers of pivot 8 on bracket 7 and pivot 6 on arms 4 is likewise the same distance a. This results in a parallel linkage suspension for the periscope 5 which ordinarily takes the form of a parallelogram as shown by the dotted lines in Fig. 1. A turnbuckle arrangement 11 may be employed for adjusting arm 9 to its precise length. Intermediate the ends of arm 9 is a range micrometer 12 which will be more fully described later.

Traverse of the gun is accomplished by rotation about the vertical axis 13 shown in Fig. 2. The dotted rectangles 5' indicate diagrammatically the locations of the periscope 5 in several positions of the gun about this vertical axis, and the opening through the armor 16, will be of a shape and size to permit the movements of the periscope as its position changes slightly in the traversing movements of the gun, as indicated diagrammatically in Figure 2.

The periscope 5 is of the panoramic type to permit a wide field of vision and has a conventional 45° mirror system 14—14'. The periscope contains a telescope 15 with unit magnification and is equipped with a reticule (not shown) for aiming purposes. This indirect vision device 5 is mounted so that only the upper mirror 14 is exposed to direct gunfire. The protective armor for this equipment and the gun position is shown diagrammatically at 16.

When the gun is elevated by rotating the gun cradle 1 about its horizontal axis 2—2, the pivot 10 at a distance a from the axis 2—2 describes an arc. Since the arms 4 are attached to the hull and do not move when the gun is elevated, the pivots 6—6 constitute a fixed axis about which the periscope oscillates. Pivot 8 is at a distance a from axis 6—6 and is linked with the pivot 10 on the gun cradle by arm 9. Hence the pivot 8 describes the same arc as does pivot 10. This means the periscope is coordinated with the gun and that the optical axis of the telescope generates the same angle as the axis of the gun when the latter is elevated or depressed.

Exact alignment of the gun 1' with the periscope 5 is secured by collimating the telescope 15 with the gun. Minor adjustments affecting the angular position of the telescope 15 in the periscope 5 will assist in accomplishing this in a manner well known to those skilled in the art. This is done before the gun and sighting system are placed in actual service to secure a precise conjoint action.

With the larger guns, the operator is stationed on a seat 17 on the gun cradle 1 so that his position follows that of the gun cradle. Thus

his line of sight is always properly established with respect to the periscope. When the sight system is interconnected with smaller guns, the seat may be fixed to the tank hull and the observer follows the elevation or depression of the gun by simple movements of his head.

The use of the combination is as follows: The operator looks into the wide angle periscope until be observes his target. The gun is directed until the target falls on the intersection of the crosswires 18 in the telescope. Fig. 3 shows the image of the crosswires 18 as they appear on the lower mirror 16' to the eye of the observer. A projectile fired from the gun will find a target within the range of normal tank operations with exceptional accuracy.

An additional feature of this invention is the employment of the range micrometer 12 in conjunction with the divided arm 9 which is found to be satisfactory for ranges in the proximity of 1000 yards or over. The range micrometer 12 introduces super elevation in the sight system corresponding to the range.

The range micrometer 12 is a device in the nature of a graduated turnbuckle for altering the length of the arm 9. A diagrammatic representation of such a micrometer appears in Fig. 1. By increasing the length of the arm 9 a predetermined distance, the periscope will be tilted downwardly to depress the line of sight. The micrometer 12 is calibrated so that each increment of increase in length of the arm 9 represents a definite increase in range.

The employment of this comparatively simple range micrometer eliminates the necessity of using elaborate and more delicate precision fire equipment in a rough riding armored vehicle.

It will be evident that the embodiment of the invention herein described is merely illustrative and may be modified and departed from in many ways without departing from the spirit and scope of the invention as pointed out in and limited only by the appended claim.

I claim:

In combination, a support, a gun, a gun cradle mounted on said support upon horizontal and vertical axes for elevation and traverse of the gun, a periscope having the upper end thereof pivotally mounted on a fixed part of said support, a laterally extending bracket on said periscope intermediate the ends thereof, a link connected to said bracket on said periscope and to said gun cradle, and a graduated turnbuckle in said link for adjusting the length thereof, lines drawn through the connecting points on each end of said link and the pivot point of the horizontal axis of said gun and the pivot point of the horizontal axis of said periscope forming a parallelogram whereby the quantitative angular movements of the gun in elevation and depression will be the same as the angular movements of the periscope.

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