

- [54] **GUN TURRET, ESPECIALLY FOR ARMORED VEHICLES**
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FOREIGN PATENTS OR APPLICATIONS

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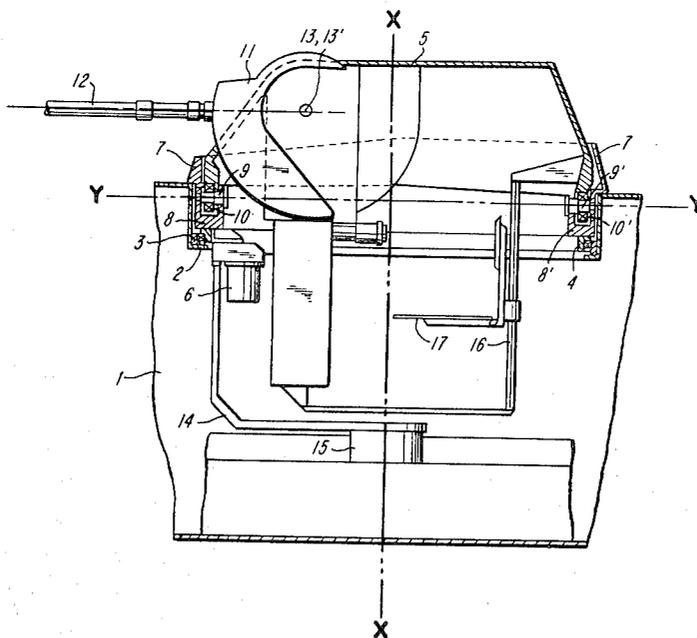
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- [52] **U.S. Cl.**..... **89/36 K, 89/37 G**
- [51] **Int. Cl.**..... **F41h 5/20**
- [58] **Field of Search**..... **89/36 H, 36 K, 37 G, 40 B, 89/41 T, 41 CE**

[57] **ABSTRACT**

A gun turret, especially for armored vehicles, in which the turret is mounted within the outer shell of the vehicle at the top and is tiltable about an axis parallel to the weapon on an azimuth ring which is rotatably supported in the vehicle. The weapon is tiltable in the turret about an axis extending at right angles to the weapon and which last mentioned axis is offset from the axis of rotation of the azimuth ring in a direction toward the weapon.

- [56] **References Cited**
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2 Claims, 2 Drawing Figures



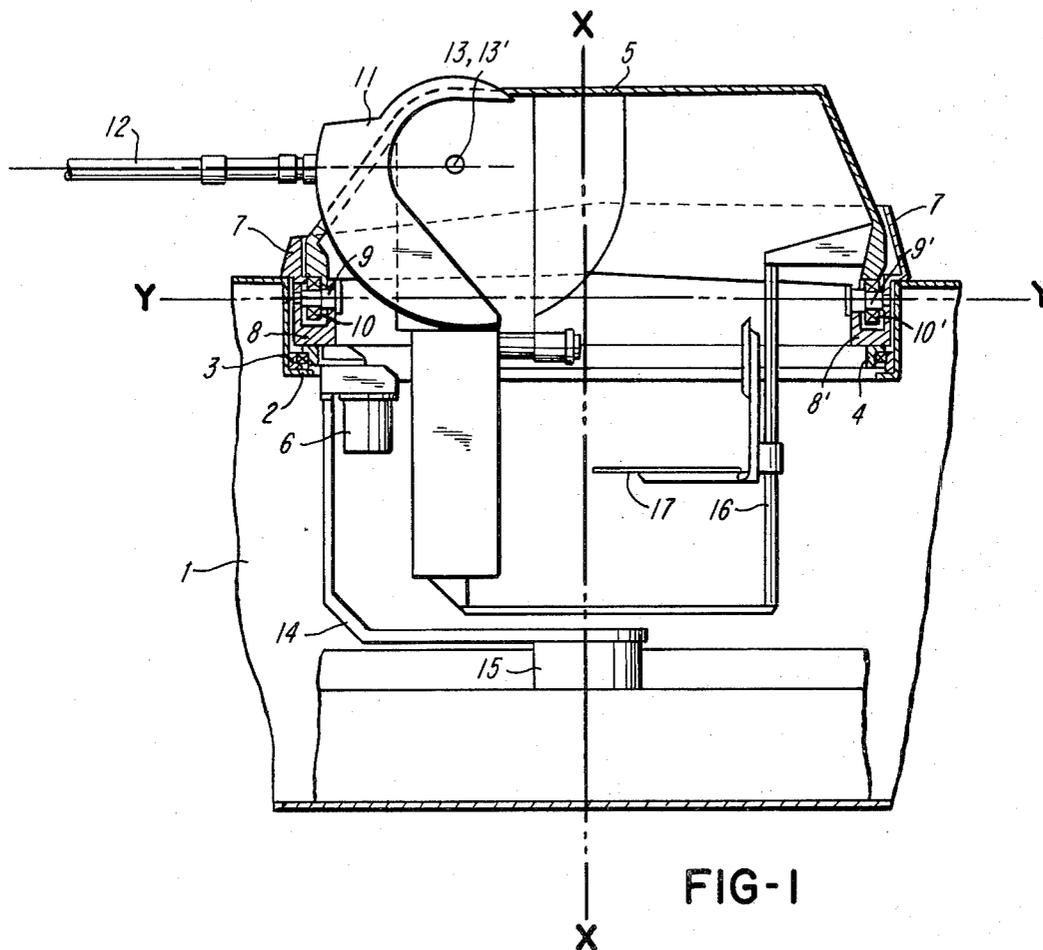
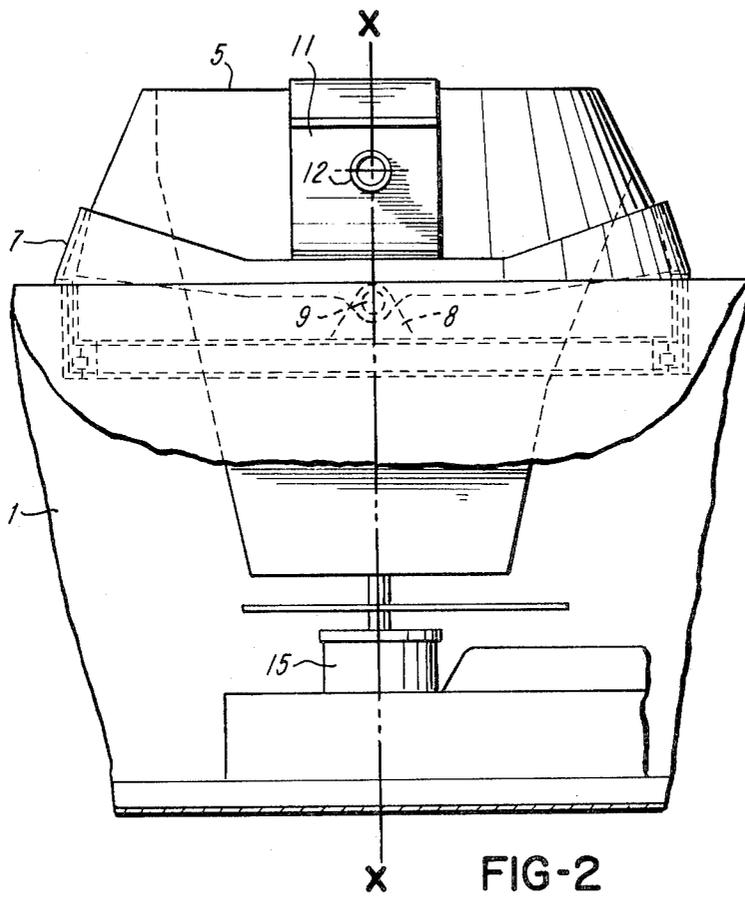


FIG-1



GUN TURRET, ESPECIALLY FOR ARMORED VEHICLES

The present invention relates to a gun turret, especially for armored vehicles. The turret is movable about the transverse side axis and the axis of swing, while the tubular weapon is pivotable on trunnions or gudgeons connected to the turret skin. The trunnions or gudgeons form the elevation sight of the weapon.

With gun turrets for armored vehicles of the general type referred to above, there exists the requirement that it should be possible to shoot in an aimed manner even when the armored vehicle is on a cross-country drive and carries out pitching and rolling motions.

According to a heretofore known design of a gun turret, the ball-shaped turret is tiltably suspended between two shield plates which together with the turret are rotatably journaled in the vehicle. With this design the shield plates, however, must be so big that they protrude beyond the vehicle whereby the vehicle contour is not only considerably enlarged, but also offers to the enemy an easily recognizable target to be fought. Furthermore, the bearing areas in the shield plates are exposed to outer influences so that aside from easily being susceptible to disorders they may also be easily damaged by being shot at and may even be destroyed. Moreover, the axis of the bore of the weapon tube which simultaneously forms the line of action of the recoil force will be located above the turret axis of elevation so that during the firing operation a torque will be generated which has to be absorbed by the sighting drive.

These moments or torques bring about oscillations which not only result in faulty hits but also disadvantageously affect the devices and persons in the turret.

It is furthermore known to suspend gun turrets in the vehicle so that they are movable in three dimensions, and to install the weapon unit in the turret either in a rigid maner or so that it can be elevated in the turret.

For vehicles equipped with weapon installations adapted to be elevated as anti-aircraft weapons, it is known in order to obtain a high sighting range and to obtain sufficient space for the operating crew, to mount the weapon installation with its trunnions on both sides as far toward the front in the turret as possible. In this connection, however, it is disadvantageous that the spacing between the axis of elevation of the turret and the axis of elevation of the weapon is rather great. Consequently when the weapon is elevated in such a manner that the effective line of the recoil does not intersect the axis of elevation of the turret, considerable torques may act upon the turret stabilizing drive. These torques affect the stabilizing precision and frequently do not permit an optimum installation arrangement for the weapon.

It is, therefore, an object of the present invention while maintaining the principle of the three-dimensional weapon installation, to provide an arrangement for the turret suspension according to which no recoil torques can act upon the turret so that the place of installation for the weapon can be freely selected.

These and other objects and advantages of the invention will appear more clearly from the following specification, in connection with the accompanying drawings, in which:

FIG. 1 diagrammatically illustrates a longitudinal section through the gun turret with tubular weapon and vehicle as well as mounting of the gun turret.

FIG. 2 shows a view as seen from the mouth of the weapon barrel while the vehicle is illustrated as being partly broken up.

The foregoing objects are attained according to the present invention by having the gun turret journaled for movement about the canting or tilt axis. This journaling is effected by two bolts in bearing eyes which serve as plate walls and which are located within the shell or body of the vehicle. The trunnions of the weapon installation are arranged in spaced relationship to the traverse sight axis of the turret and above the axis of swing of the turret.

The special journaling of the gun turret according to the invention in the vehicle shell has also proved advantageous, inasmuch as the axis of swing is mounted completely protected against projectiles, splinters, dust and weather influences.

According to a further development of the invention, one drive each is respectively provided for the stabilizing movement, the traverse sighting movement, and the movement along the axis of swing of the turret as well as for the movement along the elevating sight axis of the weapon installation.

Still another feature according to the present invention consists in that the drives for the sighting and stabilization may selectively be of a mechanical, hydraulic, or electric nature.

Referring now to the drawings in detail, it will be noted therefrom that the azimuth bearing 2 with its outer ring 3 is non-rotatably arranged in the partially illustrated shell 1 of the armored vehicle. The gun turret 5 rests upon the rotatable inner ring 4 and thus is rotatable for the traverse sighting movement about the vertical axis X — X. The inner ring 4 of the azimuth bearing 2 is connected to a stabilizing and sighting drive or motor means 6 and has an upwardly protruding diaphragm ring or circular wall 7 extending through the opening in the shell ceiling. Ring or wall 7 has two bearing eyes 8, 8' which are located diametrically opposite to each other while serving as shield walls, said bearing eyes 8, 8' being of U-shaped cross section and being located within the vehicle shell 1. Bolts 9, 9' are journaled in said bearing eyes 8, 8' and support the gun turret 5 by means of bearings 10, 10'. The turret 5 is, by means of a nonillustrated stabilizing and sighting drive pivotable about the axis of swing Y — Y. Outside the traverse sight axis X — X and above the axis of swing Y — Y there is journaled a weapon installation 11 for the elevating movement in the gun turret. Journaling thereof is effected by trunnions 13, 13' respectively arranged on opposite sides on the weapon tube or weapon barrel 12. The two trunnions 13, 13' are arranged transverse to the axis of swing Y — Y so that the axis of the bore of weapon tube 12 and the axis of swing Y — Y extend in a vertical plane. The drive for the elevational sighting movement is likewise not illustrated. The rotatable inner ring 4 of the azimuth bearing 2 is provided with a follower 14 which is operatively connected to a turn connector located in the vicinity of the bottom of the shell. Connected to the gun turret 5 is a column 16 which extends toward the bottom of the shell and has a seat 17 adjustable as to height.

As will be evident from the foregoing, the arrangement according to the present invention has various ad-

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vantages which primarily may be listed as follows: The weapon installation can be effected in conformity with the space requirement for the crew and in conformity with the weapon technological requirements in the turret. The stabilizing precision is not affected by recoil moments originating with the weapon installation. Furthermore, inasmuch as with the arrangement of the present invention and in contrast to heretofore known devices, the turret is stabilized in the elevation, and the weapon is not only sighted but is also stabilized as well as sighted, it is possible to stabilize far greater elevational angles or axes of swing, depending on the turret position which is not possible in view of the limited pivoting space in the vehicle if a pure turret stabilization were utilized.

It is, of course, to be understood that the present invention is, by no means, limited to the particular showing in the drawings, but also comprises any modifications within the scope of the appended claims.

What is claimed is:

1. In an armored vehicle having an outer shell, a circular azimuth bearing inside and below the top of said shell, an azimuth ring rotatable about a vertical axis on said azimuth bearing, diametrically opposed bearing eyes on said ring below the top of said shell and on a horizontal axis, coaxial shaft means in said bearing eyes, turret means having top and side walls above said shell mounted on said azimuth ring by said coaxial shaft means, said azimuth ring having a circular wall extending about said turret above said shell, a weapon mounted on trunnions in the side walls of said turret means on an axis at right angles to the axes of said azimuth ring and said coaxial shaft means, said weapon including a shield movable about the axis of said trunnion and covering the opening for said weapon in the walls of said turret.

2. A gun turret according to claim 1 in which the axis of said trunnions intersects the firing axis of said weapon to form an elevational axis.

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