Sept. 17, 1968 C. C. SONS, JR 3,401,598

GUN MOUNTING FOR ARMED VEHICLES

Filed Sept. 6, 1966 2 Sheets-Sheet 1

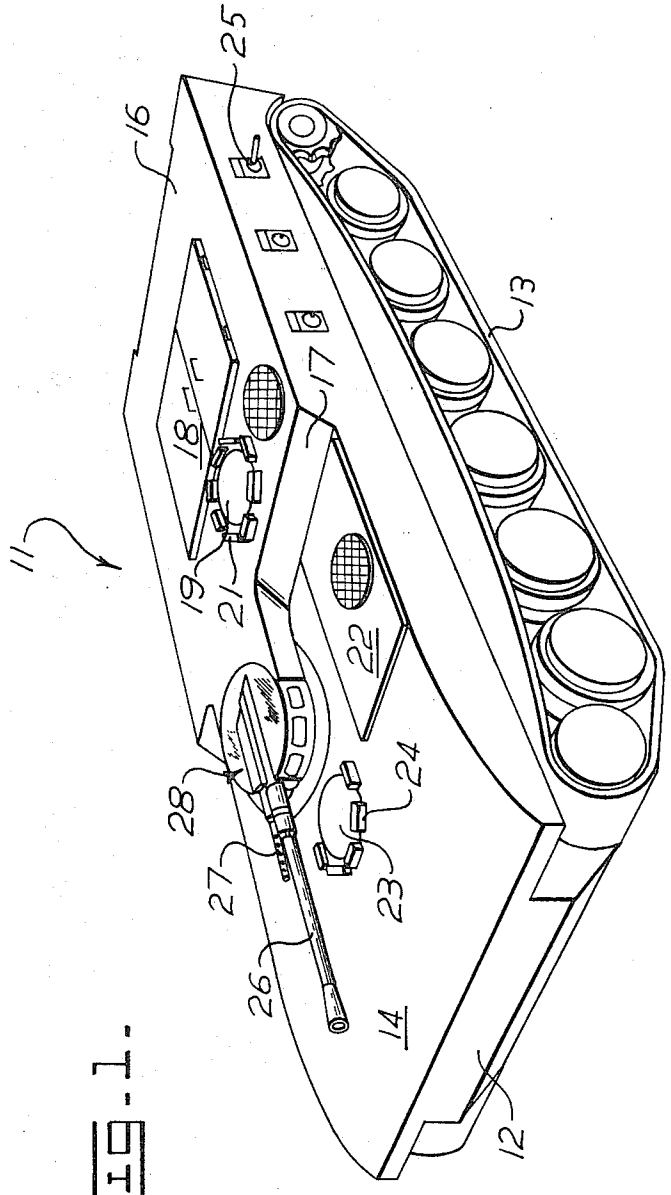


Fig. 1.

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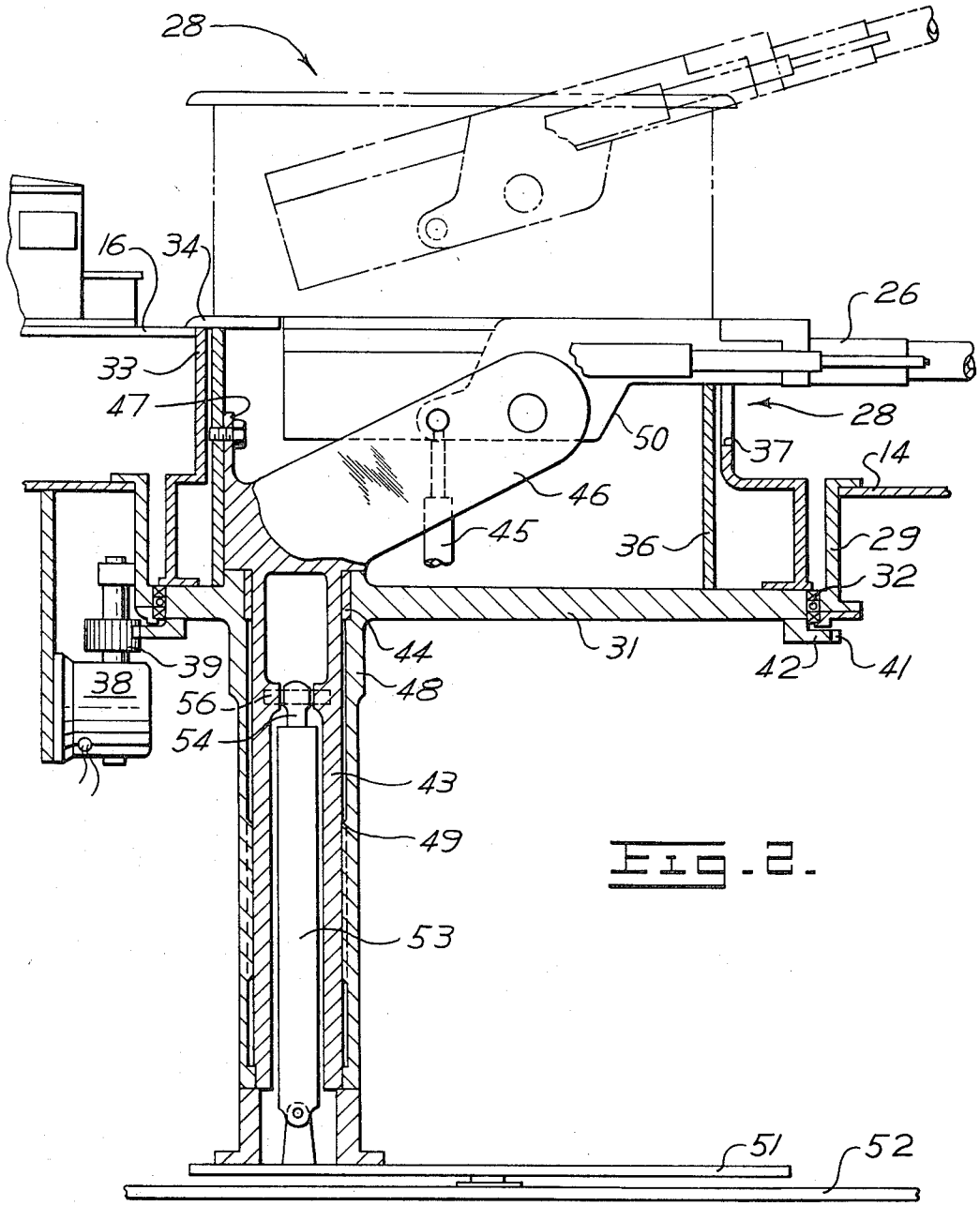


Fig. 2.

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GUN MOUNTING FOR ARMED VEHICLES

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ABSTRACT OF THE DISCLOSURE

Support mechanism for a gun and turret of a military vehicle provides for traverse and elevation of the gun and in addition provides for raising and lowering of the gun and turret to increase effectiveness during firing and to reduce the vehicle height at other times.

This invention relates to combat vehicles and more particularly to maneuverable support mechanism for mounting a gun thereon.

It is usually preferable that vehicles designed for combat operations, such as military tanks, armored personnel carriers, and the like, be of the minimum height consistent with functional requirements. A low profile vehicle is less conspicuous and presents a much more difficult target to an enemy. In addition, a low vehicle is more stable on uneven terrain, encounters fewer problems with overhead clearances, and can usually be designed with more sharply sloping surfaces which may deflect enemy fire.

Such vehicles frequently carry one or more heavy guns which are fastened to the body of the vehicle by some form of support mechanism which allows the gun to be pivoted both horizontally and vertically for aiming purposes. Many vehicles of this class are armored and have a turret structure which encloses the breech casing of the gun. The turret usually turns with the gun and therefore is also carried in part by the gun support mechanism. In most instances it is the gun and its mounting structure which determine the overall height of the vehicle. Accordingly there has heretofore been a tendency to situate the gun as low as is practical in order to achieve the desired low vehicle profile.

There are however, some definite advantages to situating the gun high on the vehicle. A wide gun traverse angle, which should preferably be a full 360°, can easily be provided for as interference between the gun barrel and other elements of the vehicle is more readily avoided. There is also a tactical advantage in that the gun may be more effectively used in combat when fired from a relatively high point.

In the design of combat vehicles some compromise has usually been made with the result that vehicle height has not heretofore been completely minimized.

The present invention provides for reconciling the opposing considerations so that an extremely low profile vehicle becomes practical without sacrificing the battlefield effectiveness of the gun. In particular the invention is a gun support mechanism which provides for selectively raising and lowering the gun and associated turret structure relative to the vehicle according to changing operational requirements.

Accordingly it is an object of this invention to provide more versatile gun mounting structure for armed vehicles.

It is another object of the invention to provide for a lower silhouette combat vehicle without sacrificing firepower effectiveness.

It is a further object of the invention to provide for a broad gun traverse angle in low profile combat vehicles.

It is still another object of the invention to reduce the vulnerability of armed military vehicles to enemy observation and enemy fire while retaining optimum operational capabilities.

It is still a further object of the invention to provide for selective control of the height of a gun mounted on a vehicle.

The invention, together with further objects and advantages thereof, will best be understood by reference to the accompanying drawings, of which:

FIG. 1 is a perspective view of an armored track-type military tank designed to have a minimized height and embodying the present invention therein; and

FIG. 2 is an elevation section view showing the principal armament and associated support and turret structure of the vehicle in FIG. 1.

Referring now to the drawing and more particularly to FIG. 1 thereof, there is shown a military combat vehicle **11** of the class having an armored body **12** and riding on articulated endless tracks **13** at each side thereof. The vehicle body **12** is formed with a sloping top surface **14** at the forward end and a slightly more elevated and horizontal rearward top surface **16** connected thereto by a more sharply sloping transition section **17**. Vehicle **11** is provided with the customary appurtenances including an entry hatch **18** and commander's station **19** with periscopes **21** on the rearward top surface **16**. An engine cover **22** and driver's station **23** with periscopes **24** are situated on the forward top surface **14**. Automatic gun ports **25** are distributed along the sides of the vehicle body **12**.

The vehicle **11** has been designed throughout to achieve an extremely low profile and consistent with such purpose the principal armament, which is a cannon **26** in this embodiment, is mounted above the forward top surface **14** by means to be herein described which provide for raising or lowering the gun relative to the vehicle body **12** as desired.

Cannon **26**, which may be a high muzzle velocity rifle and which has a parallel machine gun **27** secured thereto, projects from a rotatable cylindrical turret **28** situated above the vehicle body top surface **14**. Rearward top surface **16** and transition section **17** of the vehicle body **12** extend forwardly behind the turret to enclose the rear half of the side wall thereof when the turret is in its lower position.

Considering now the structure of the gun and turret support mechanism, with reference to FIG. 2, a well which receives the lower end of the turret **28** is formed by an annular member **29** secured to the vehicle top surface **14**. The turret has a rotatable circular baseplate **31** journalled coaxially within the lower end of the annular member **29** by a bearing **32**.

An annular outer sidewall **33** of the turret **28** is secured to baseplate **31** and a circular turret cover **34** is disposed above the outer sidewall and rests thereon when the turret is in its lowermost position so that the top surface of the turret is substantially continuous with the rear top surface **16** of the vehicle at such time. To provide for the desired vertical telescoping movement of the turret **28**, an annular inner sidewall **36** extends downwardly from cover **34** within outer wall **33**, the inner sidewall being secured to the cover. A slot opening **37** is provided through the forward portions of outer sidewall **33**, inner sidewall **36** and cover **34** to allow the cannon **26** to project from the turret and to provide for vertical pivoting of the gun.

Traverse of the cannon **26**, including the turret **28**, is effected by a reversible electrical motor **38** secured to the vehicle and having a drive gear **39** which engages gear teeth **41** on a flange **42** which projects from the rim of the turret baseplate **31**.

A vertical tubular gun support post **43** is transpierced through the turret baseplate **31** near the edge thereof and on the opposite end of the turret from the gun port opening **37**. Post **43** is movable in a vertical direction

and a bearing 44 is disposed therearound at baseplate 31 to facilitate such movement. A fork 46 at the upper end of post 43 inclines towards gun port 37 and the breech casing 50 of cannon 26 is pivoted to the fork for movement in a vertical plane. A hydraulic jack 45 is connected between post 43 and the breech casing 50 of cannon 26 to control such movement. A member 47 connects fork 46 with the inner sidewall 36 of the turret so that upward movement of the post 43 carries the inner sidewall and turret cover 34 upward along with the cannon 26.

Considering now the mechanism for controlling the vertical position of turret 28 and cannon 26, post 43 extends downward from the turret baseplate 31 within a vertical tubulation 48 formed as part of the baseplate and is engaged therewith by splines 49 which prevent the post from rotating about its own axis while permitting the desired vertical movement. The base of the tubulation 48 is bolted to a circular turntable 51 which is situated immediately above the floor 52 of the vehicle and which is turnable about the rotary axis of the turret 28. A hydraulic jack 53 is disposed within the lower portion of the post 43 and is pivotably coupled at the lower end to the turntable 51.

The extensible rod 54 of jack 53 is directed upwardly within post 43 and is pivotably coupled thereto by a cross-pin 56. Extension of the jack 53 thus acts to raise the cannon 26 together with the turret cover 34 and inner sidewall 36.

In operation, the several controls for loading, aiming and firing the cannon 26, including controls for the hydraulic jack 53, are operated remotely by a gunner by means understood within the art. With the cannon 26 fully lowered, the turret 28 is not significantly higher than the top surface 16 of the vehicle. In the lowered position and with the cannon 26 horizontal, the gun may still be traversed through a wide angle, 115° in either direction in one embodiment of the invention, and may be traversed a full 360° if it is inclined sufficiently to clear the hull to the rear. Whenever it becomes tactically desirable, the cannon 26 together with turret 28 may be lifted by actuation of jack 53. In the raised position the cannon 26 may be rotated 360° while in a horizontal

position and may be depressed below horizontal when directed substantially forward.

While the gun mounting has been described with reference to an armored track type vehicle and a specific type of gun, it will be apparent that the invention is equally applicable to other forms of armed vehicle and to the mounting of a variety of guns or the like.

What is claimed is:

1. Mechanism for mounting a gun on a vehicle comprising a rotatable base platform in said vehicle below said gun, said base platform having a downwardly extending hollow tubulation, a support carrying said gun and having a post having a hollow portion extending downwardly into said tubulation and being slidable therein, and means for selectively raising and lowering said support relative to said vehicle, said means having an extensible jack disposed within said tubulation of said base platform and within said hollow portion of said post and being coupled at opposite ends to each thereof.

2. Mechanism for mounting a gun on a vehicle as defined in claim 1 wherein said downwardly extending tubulation of said base platform is offset from the axis of rotation thereof, and comprising the further combination of a swivel member disposed in said vehicle below said base platform and being journalled for rotation about said axis of rotation thereof, said swivel member extending from said axis to the lower end of said tubulation of said base platform and being secured thereto.

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