

Oct. 5, 1954

G. L. TURNER

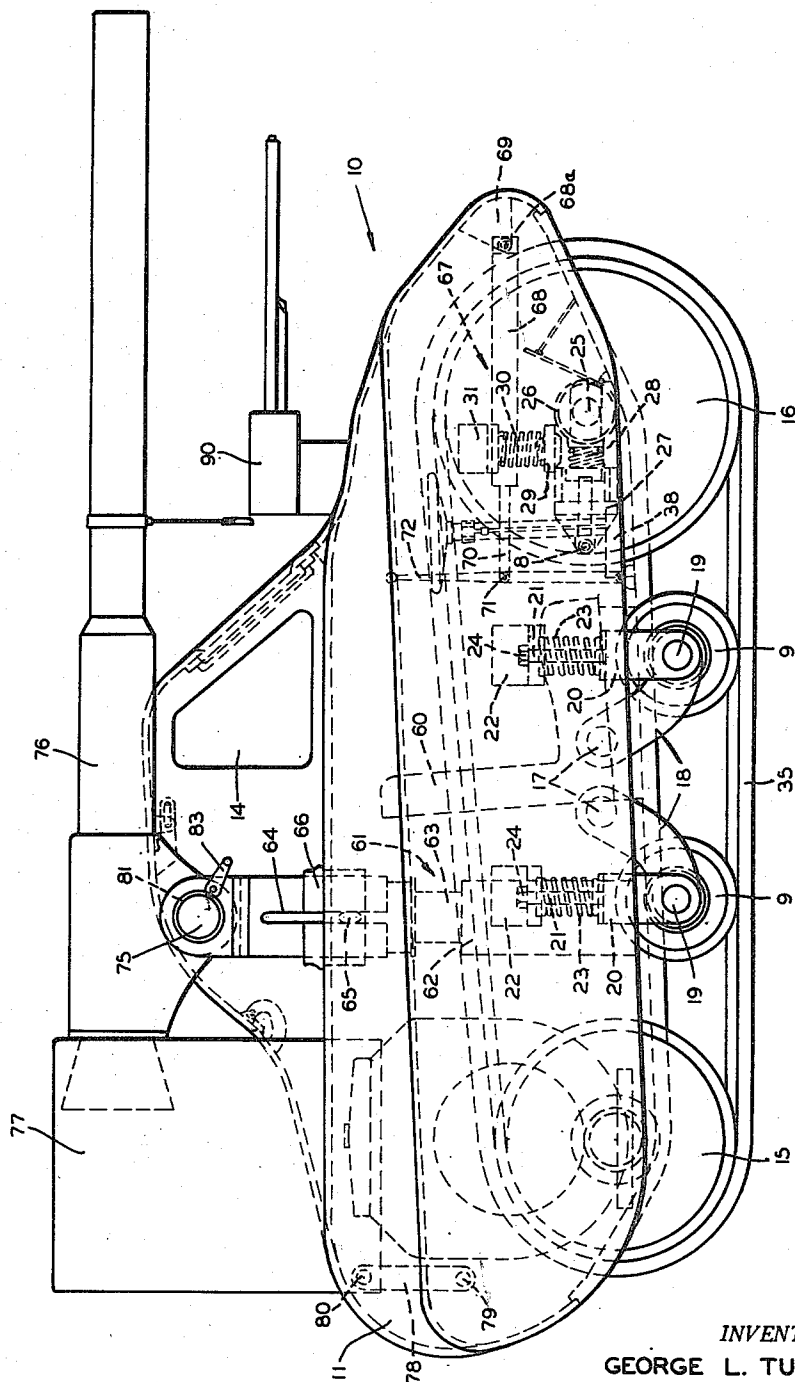
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TANK VEHICLE

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2 Sheets-Sheet 1

FIG. 1



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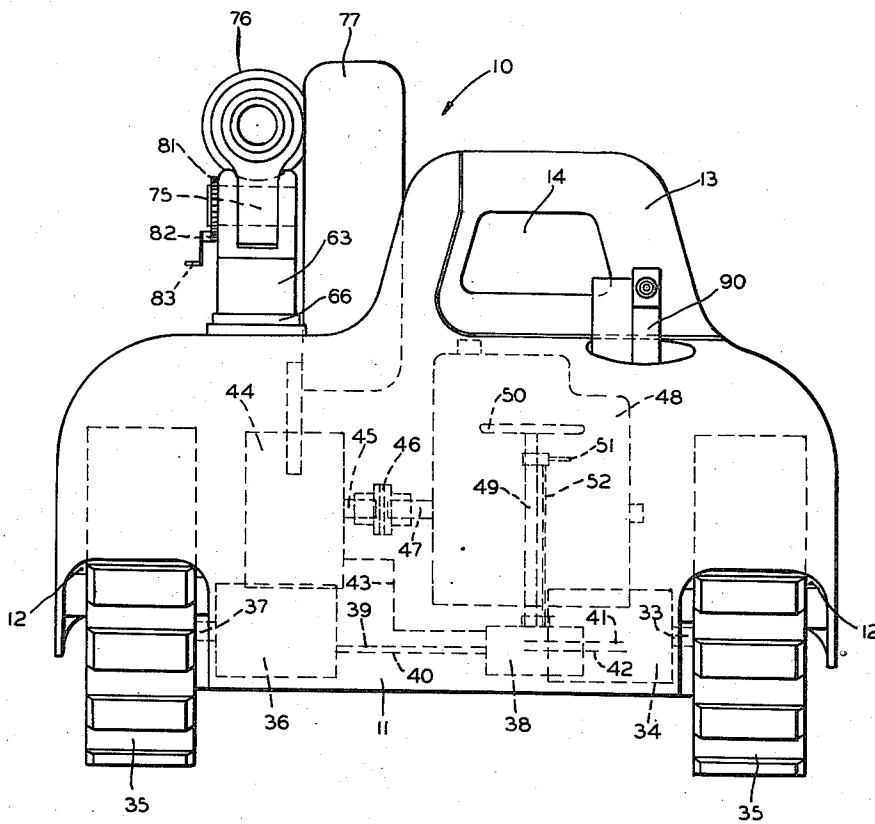
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FIG. 2



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UNITED STATES PATENT OFFICE

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TANK VEHICLE

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2 Claims. (Cl. 89—36)

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My invention relates generally to vehicles, and, more specifically is directed to a diminutive tank vehicle.

Conventional forms of tank vehicles with which I am familiar are large and bulky. Such tanks have many undesirable characteristics. Primarily, these tanks are costly to manufacture and maintain, and due to their complexity are difficult to repair. It is difficult and costly to transport these vehicles over long distances. Furthermore, since these vehicles are relatively large, they are not readily maneuverable. Therefore, they offer excellent targets to the enemy when involved in combat. Also, because of size, they are difficult to conceal and thus are not adapted for surprise attacks.

It is an object of my present invention to provide a diminutive, compact tank vehicle, which is preferably adapted to be operated by one man.

It is another object of my present invention to provide a tank vehicle of the character noted, which is preferably adapted to carry a heavy recoilless gun, as, for example, a 105 mm. recoilless rifle.

It is still another object of my present invention to provide a tank vehicle of the character noted which may be used as a fighting vehicle in motion or as a static field piece.

In the preferred form of my invention, I propose to accomplish the aforementioned object by mounting a vertically extending hydraulic ram assembly to the hull of the tank vehicle. The ram projects through an opening in the hull of the vehicle and at its upper free end is adapted to pivotally support a heavy recoilless gun. An ammunition magazine is secured to the gun adjacent the rear end thereof and the magazine is adapted to be connected to the frame of the vehicle through a floating link. When the link is connected to the magazine the gun is aligned with the lengthwise axis of the tank so that the gun fires in the direction of travel of the tank. By selectively raising or lowering the hydraulic ram the gun is caused to pivot about its connection to the latter; the connection between the floating link and the magazine acting as a reaction point.

When the tank is to be used as a static field piece, the floating link is disconnected from the magazine and the gun is raised on the ram. When the ram is in its extended position, the latter, together with the gun, may be rotated through 360°. Elevation of the gun is then accomplished manually through crank and pinion means associated with the pivotal connection between the gun and the ram.

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It is a further object of my present invention to provide a tank vehicle of the character noted which is readily maneuverable.

I propose to accomplish this object by providing the tank with tracks adjacent the sides thereof which are adapted to be independently driven in the same or in opposite directions, preferably, by separate hydraulic fluid motors.

It is a still further object of my present invention to provide the tank with track drive means which will normally support the tank should a track become detached from the drive means.

It is a feature of my present invention that the tank vehicle is a poor target due to its diminutiveness, compactness, and maneuverability.

It is a further feature of my present invention that the tank vehicle, due to its diminutiveness and compactness, may be easily concealed and thus is particularly adapted for use as an ambush vehicle.

It is another feature of my present invention that the tank is particularly adapted for deflating.

Still another feature of my invention is that the tank may be economically transported long distances and may be readily delivered to points of combat by sea or air.

Still another feature of my present invention is that the tank may be economically manufactured and maintained.

Now, in order to acquaint those skilled in the art with the manner of constructing and using the device of my present invention, I shall describe in connection with the accompanying drawings, a preferred embodiment of my invention.

In the drawings:

Figure 1 is a side elevational view of the tank vehicle of my present invention; and

Figure 2 is a front elevational view of the tank vehicle of Figure 1.

Referring now to the drawings, there is indicated generally by the reference numeral 10, the tank vehicle of my present invention which comprises a hull 11, formed with vertical longitudinally extending track wells 12 adjacent each side thereof. A hatch 13 is mounted to the hull 11 adjacent the upper end thereof, and is preferably spring loaded to permit an operator of the vehicle to make a rapid escape from within the hull 11. Suitable windows 14 are formed in the hatch 13 at the forward end and side thereof, and in one side of the hull 11. By way of exemplification and not limitation, the hull is approximately nine and one-half feet long, six and one-half feet wide, and five feet high.

A drive wheel 15 and an idler wheel 16 are disposed in each track well 12 respectively adjacent the rearward and forward ends thereof. Pivotaly mounted at 17 to the hull 11, within each track well 12 intermediate of the drive wheel 15 and idler wheel 16, are a pair of bogie arm members 18 which at their lower ends carry pin members 19, which rotatably support bogie rollers 9. Inverted U-shaped bracket members 20 are secured at their free ends to the free ends of the pin members 19. The bracket members 20 carry vertically extending rod members 21 which extend through openings formed in angle flange members 22 mounted to the hull 11. Coil springs 23 are disposed concentrically about the post members 21, intermediate of the flange members 22 and the bracket members 20. Suitable nuts 24 are secured to the upper ends of the post members 21 which nuts 24 are normally adapted to engage the angle flanges 22 for limiting spreading movement of the springs 23.

The front idler wheels 16 are mounted on axles 25, carried in axle housings 26. Pivotaly mounted at 8 within each track well 12, adjacent the forward end thereof is a generally horizontally extending frame member 27. A coil spring 28 is disposed between each frame member 27 and the adjacent axle housing 26 for normally biasing the latter toward the forward end of the hull 11. A vertically extending plunger 29 is disposed in each track well 12 and each plunger 29 is biased, by means of a spring 30, into engagement with the adjacent axle housing 26. Each spring 30 is carried by a flange member 31 secured to the hull 11.

An endless rubber track, preferably reinforced by cables, is trained over each associated set of drive, idler and bogie wheels. Each track 35 has a central radially inwardly directed rib which rides within grooves formed in the aforementioned drive, idler and bogie wheels. The drive, idler and bogie wheels are substantially the full width of the track and thus, if one of the tracks 35 should become detached from the wheels, the latter will normally support the tank vehicle 10. Using an eleven inch wide track, the track contact area is approximately twelve square feet.

Each of the drive wheels 15 is driven by a separate vane type hydraulic fluid motor shown diagrammatically at 34 and 36, operatively connected thereto through suitable reduction gearing (not shown) and drive shafts 33 and 37. Mounted to the floor of the hull 11, adjacent the forward end thereof, is a control mechanism, indicated diagrammatically at 38. A pair of hose lines 39 and 40 interconnect the control mechanism 38 with the hydraulic fluid motor 36, and a pair of hose lines 41 and 42 interconnect the control mechanism 38 with the hydraulic fluid motor 34. The control mechanism 38 is connected, through a hose line 43, to the discharge side of a vane type variable displacement hydraulic fluid pump shown diagrammatically at 44. The shaft 45 of the fluid pump 44 is connected through a coupling 46 to the output shaft 47 of a prime mover 48 mounted to the hull 11, adjacent the rear end thereof. Preferably the prime mover 48 comprises an air cooled engine. The weight of the tank 10 is approximately 6000 pounds and therefore approximately 60 horsepower is required to power the same. Both the control mechanism 38 and the inlet side of the fluid pump 44 are connected through suitable hose lines to a common sump tank (not shown).

The control mechanism 38 is preferably respon-

sive to the rotative position of a hand steering wheel 50 fixed at the upper end of a steering column 49. For a detail showing and description of a control mechanism responsive to the rotative position of a steering wheel, reference may be made to the copending application of myself and Robert Lapsley, Serial No. 115,982, filed September 16, 1949. Secured to the steering column 49 is a shift lever 51, operatively connected through a rod 52 to the control mechanism 38 for selecting either forward or reverse drive.

With the steering wheel 50 in one position and the shift lever 51 disposed in forward drive, the control mechanism 38 is adapted to place the hose lines 39 and 41 in communication with hose lines 43 while hose lines 40 and 42 are simultaneously placed in communication with the sump tank (not shown). Fluid under pressure is thus delivered to one side of each of the fluid motors 36 and 34 while fluid is bled from the other side of each of the fluid motors which causes the latter to rotate in one direction thereby imparting drive to the tracks 35 in a forward direction.

With the steering wheel 50 in the position above described, and the shift lever 51 disposed in reverse drive, the control mechanism 38 is adapted to place the hose lines 40 and 42 in communication with hose line 43 while hose lines 39 and 41 are simultaneously placed in communication with the sump tank (not shown). Fluid under pressure is thus delivered to the other side of each fluid motor 36 and 34 while fluid is bled from the one side of each fluid motor which causes the latter to rotate in an opposite direction to that described above, thereby imparting drive to the tracks 35 in a reverse direction.

With the shift lever 51 in forward drive, the steering wheel 50, in predetermined rotative positions, will selectively effect, through the control mechanism 38, forward drive solely to fluid motor 34 causing the tank 10 to pivot about the track 35 adjacent fluid motor 36; forward drive solely to the fluid motor 36 causing the tank 10 to pivot about the track 35 adjacent the fluid motor 34; or forward drive to the fluid motor 34 and reverse drive to the fluid motor 36 causing the tank 10 to pivot about a point midway between the tracks 35.

With the shift lever in reverse drive, the steering wheel 50, in predetermined rotative positions, will selectively effect, through the control mechanism 38, reverse drive solely to fluid motor 36 causing the tank 10 to pivot about the track 35 adjacent the fluid motor 34; reverse drive solely to the fluid motor 34 causing the tank 10 to pivot about the track 35 adjacent the fluid motor 36; or reverse drive to the fluid motor 34 and forward drive to the fluid motor 35 causing the tank 10 to pivot about a point midway between the tracks 35.

For a detail showing and description of another control mechanism suitable for use in the tank 10 but one which is not responsive to the rotative position of a steering wheel, reference may be made to the copending application of myself and Robert Lapsley, Serial No. 198,454 filed November 30, 1950.

A driver's seat is disposed within the hull 11, centrally thereof. Mounted rearwardly of the driver's seat 60 interiorly of the hull 11 adjacent one side thereof, is a vertically extending fluid ram assembly, indicated generally by the reference numeral 61 which comprises a cylin-

der 62 and a piston rod 63 which extends through an opening in the hull. The enlarged upper end of ram 63 is formed with a vertically extending slot 64, into which slot 64 a pin member 65 is adapted to project. The pin member 65 is carried by a collar member 66 fixed to the hull 11. The lower end of cylinder 62 is connected through a hose line (not shown) to the cylinder 68 of a hand operated fluid piston and cylinder assembly, indicated generally by the reference numeral 65. The cylinder 68 extends generally horizontally and is pivotally secured at 68a to a bracket 69 carried by the hull 11. Mounted for reciprocating movement within the cylinder 68 is a piston rod 70, pivotally connected at its free end, as at 71, to a generally vertically extending control lever 72, intermediate of the ends thereof. The control lever 72 is pivotally mounted at its lower end to the hull 11.

When the control lever 72 is pushed toward the forward end of the hull 11, the piston rod 70 is moved inwardly within the cylinder 68, thereby causing fluid within the cylinder 68 to be delivered to the cylinder 62, through the aforementioned hose line interconnecting cylinders 62 and 68, which causes the ram 63 to be raised. Conversely, when the lever 72 is moved toward the driver's seat 60, the piston rod 70 is moved outwardly of the cylinder 68, thereby permitting fluid from the cylinder 62 to return to the cylinder 68 through the hose line interconnecting cylinders 62 and 68. The ram 63 may thus be raised or lowered remotely from the driver's seat 60.

The upper end of the ram 63 is bifurcated and a horizontal shaft 75 is mounted therein. Mounted on the shaft 75 intermediate of the legs of the bifurcated end of the ram 63 is a heavy recoilless gun, as, for example, a 105 mm. recoilless rifle. An ammunition magazine 77 is secured to the rifle, adjacent the rear end thereof. A floating link member 78 is pivotally secured at 79 to the hull 11 and at 80, is detachably pivotally secured to the magazine 77. A gear 81 is fixed to the shaft 75 and a pinion 82, carried at the inner end of a hand crank 83, is disposed in meshing engagement therewith.

When the floating link 78 is connected to the magazine 77, the rifle 76 is aligned with the lengthwise axis of the tank vehicle 10 so that the rifle 76 fires in the direction of travel of the tank 10. Since each of the tracks 35 may be driven in the same or in opposite directions, the rifle 76 may be accurately traversed by suitably maneuvering the tank 10. By selectively raising or lowering the ram 63, the rifle 76 is caused to pivot about its connection 75; the connection 80 between the floating link 78 and the magazine 77 acting as a reaction point. When the tank 10 is to be used as a static field piece, the floating link 78 is disconnected from the magazine 77 and the rifle 76 is raised on the ram 63. When the ram 63 is in its extended position and the lower end of slot 64 has cleared the pin member 65, the ram 63, together with the rifle 76 and magazine 77, may be rotated through 360°. Elevation of the weapon is then accomplished manually by turning the hand crank 83 which, through the pinion 82 and gear 81 causes rotation of the shaft 75.

Although I have described the gun 76 as being a 105 mm. recoilless rifle, it will be understood that other guns may be mounted to the tank 10

in place of the rifle 76. The angles of elevation of the gun 76 are approximately 25° clockwise and 45° counterclockwise from a horizontal plane.

Mounted interiorly of the hull 11 and extending outwardly therefrom is a small gun 90, as, for example, a 30 caliber machine gun. The machine gun 90 is disposed forwardly of the driver's seat 60 adjacent the opposite side of the hull 11 as the rifle 76. The machine gun 90 is belt fed and reloading thereof may be accomplished by the driver from interiorly of the hull 11. The gun 90 is adapted to be traversed by the driver 90° to either side of its normal forwardly projecting position.

From the foregoing description it will be seen that the tank vehicle 10 of my present invention is diminutive and compact, and is, therefore, a poor target and may be easily concealed, and thus used as an ambush vehicle. Also due to the tank's diminutiveness, large numbers may be economically transported long distances and may be readily delivered to points of combat by sea or air. Since each of the tracks 35 may be independently driven in the same or in opposite directions, it will be seen that the tank is very maneuverable.

While I have shown and described what I believe to be a preferred embodiment of my present invention, it will be understood that various rearrangements and modifications may be made therein without departing from the spirit and scope of my present invention.

I claim:

1. A tank vehicle comprising, a hull, vertically extending fluid operated ram means including a ram extending outwardly of said hull, a gun pivotally mounted to the free end of said ram, a magazine fixed to one end of said gun, and a floating link pivotally mounted at one end to said magazine and at the other end to said hull for providing a reaction point whereby said gun may be elevated about its mounting to said ram when the latter is moved vertically.

2. A tank vehicle comprising, a hull, vertically extending fluid operated ram means including a ram extending outwardly of said hull, a gun pivotally mounted to the free end of said ram, a magazine fixed to one end of said gun, a detachable floating link pivotally mounted at one end to said magazine and at the other end to said hull for normally providing a reaction point whereby said gun may be elevated about its mounting to said ram when the latter is moved vertically, and manually operable crank and pinion means arranged between and having connection with said ram and said gun for elevating said gun about its mounting to said ram independently of vertical movement of the latter when said floating link is detached from said magazine.

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