E. E. WICKERSHAM.

LAND TORPEDO.

APPLICATION FILED SEPT. 26, 1918.

1,407,969. Patented Feb. 28, 1922.

4 SHEETS—SHEET 1.

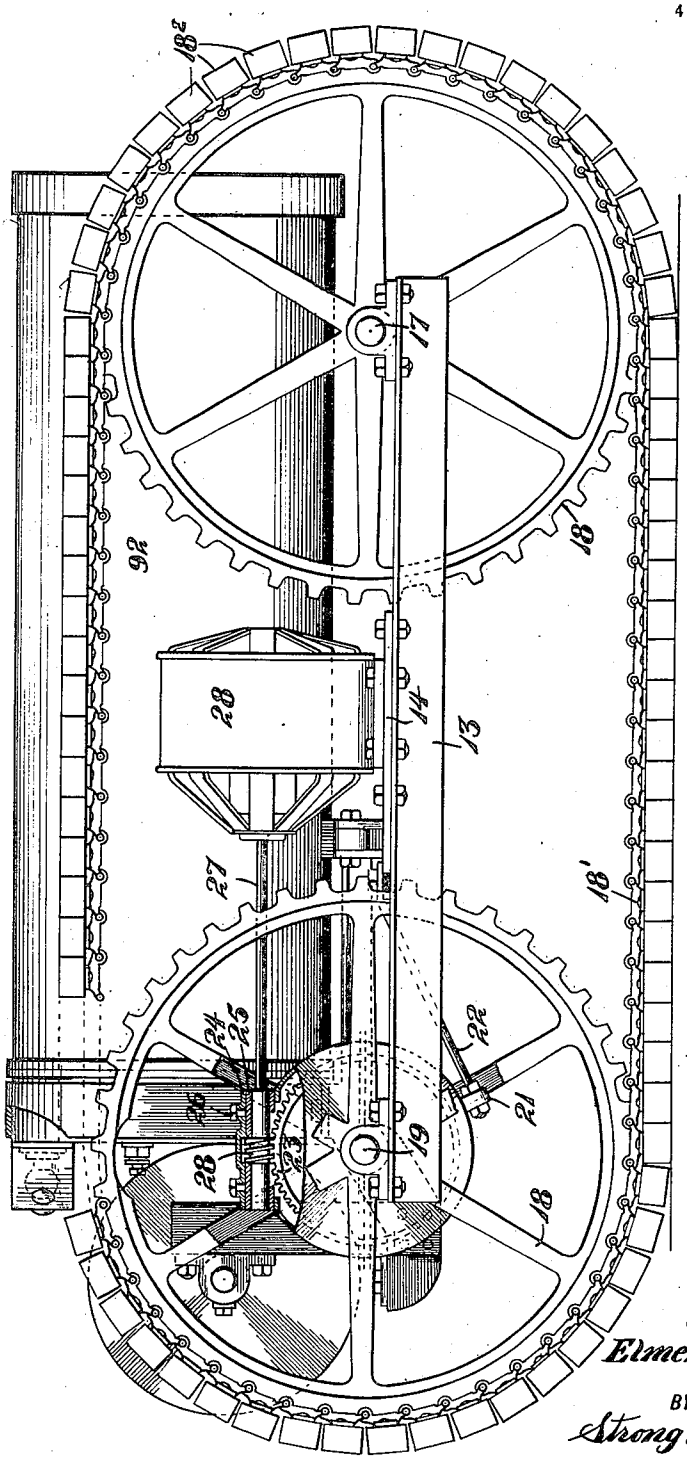


Fig. 1.

INVENTOR

Elmer E. Wickersham

BY

Strong & Townsend

ATTORNEYS

E. E. WICKERSHAM.

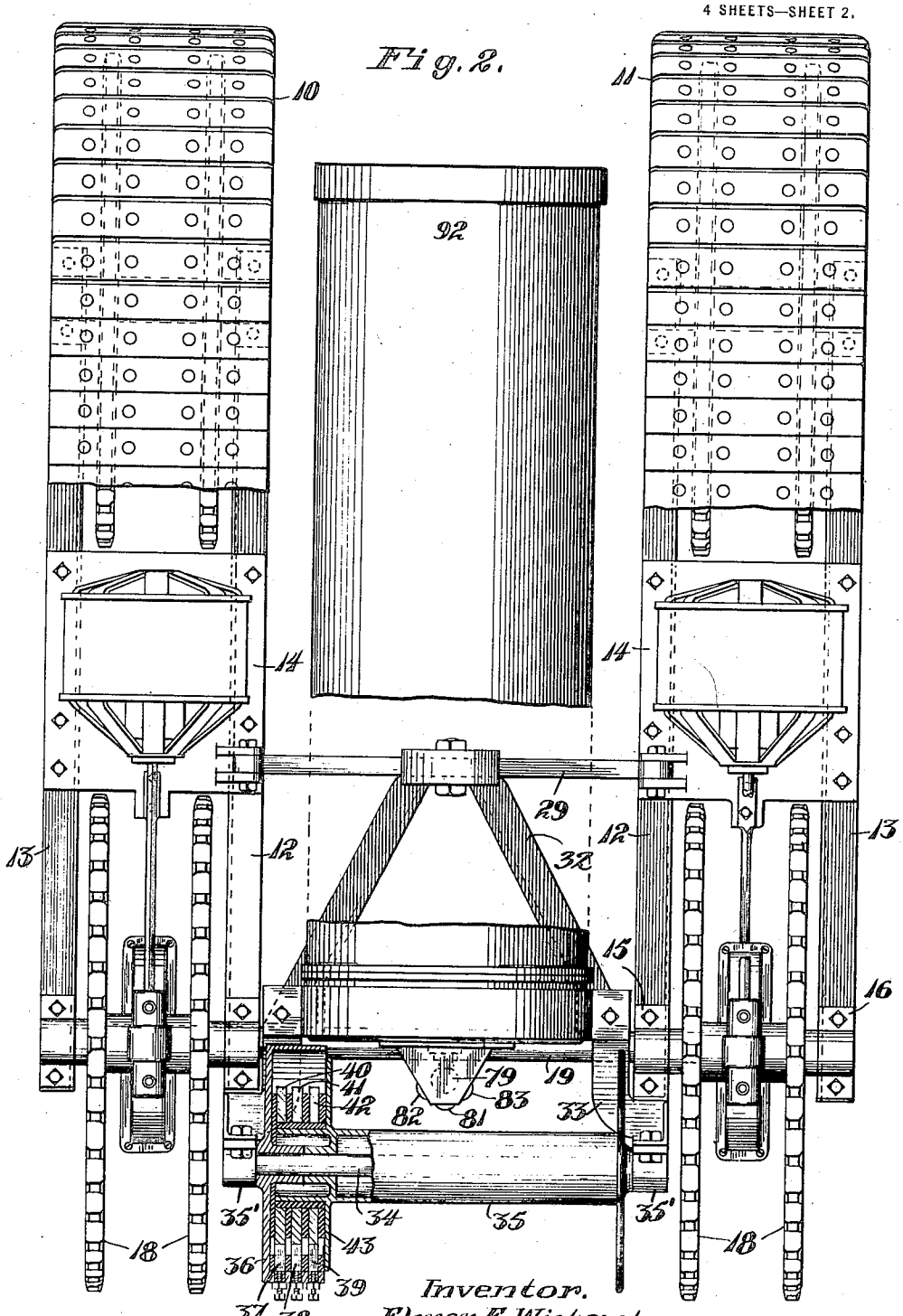
LAND TORPEDO.

APPLICATION FILED SEPT. 26, 1918.

1,407,969. Patented Feb. 28, 1922.

4 SHEETS—SHEET 2.

Fig. 2.



Inventor.

Elmer E. Wickersham

By Strong & Townsend Attys

E. E. WICKERSHAM.

LAND TORPEDO.

APPLICATION FILED SEPT. 26, 1918.

1,407,969. Patented Feb. 28, 1922.

4 SHEETS—SHEET 3.

Fig. 3.

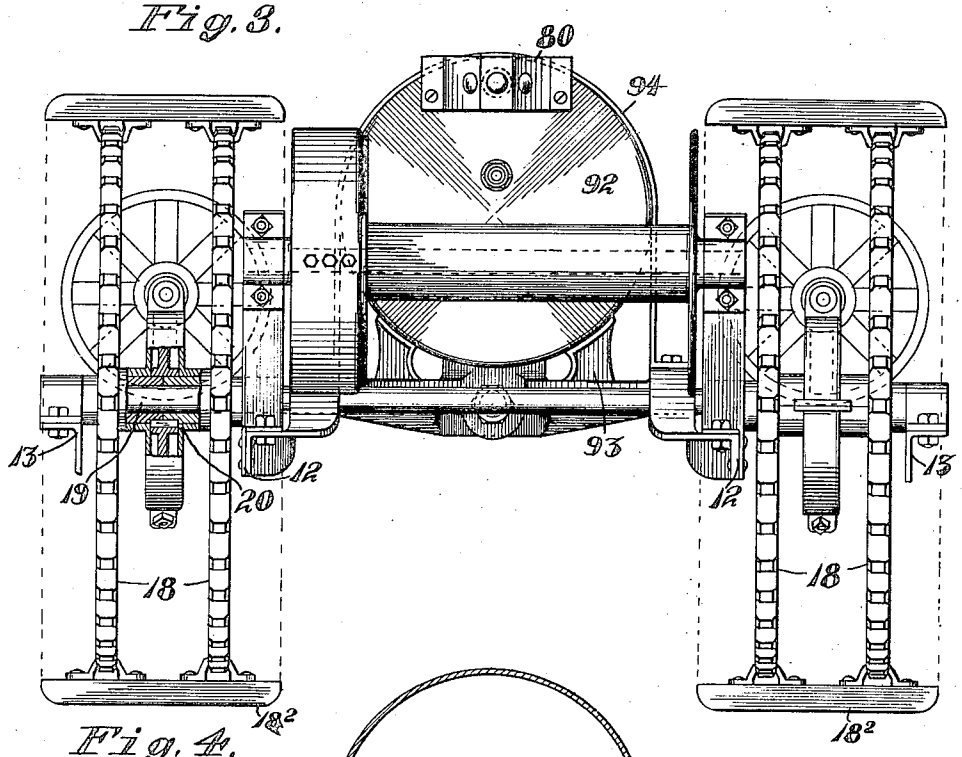


Fig. 4.

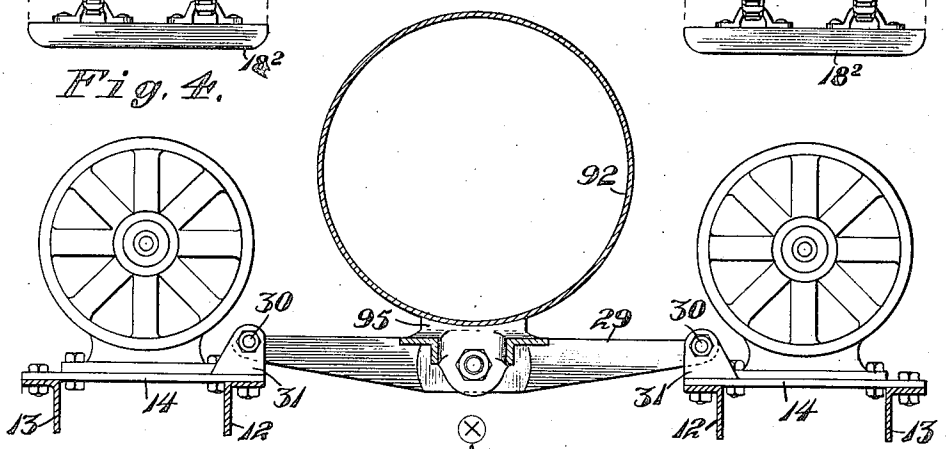


Fig. 6.

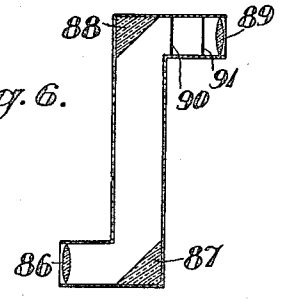
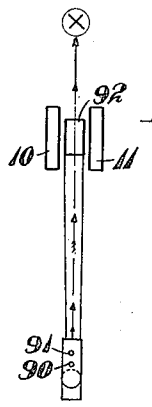


Fig. 7.



INVENTOR

Elmer E. Wickersham

BY

Strong & Townsend

ATTORNEYS

E. E. WICKERSHAM.

LAND TORPEDO.

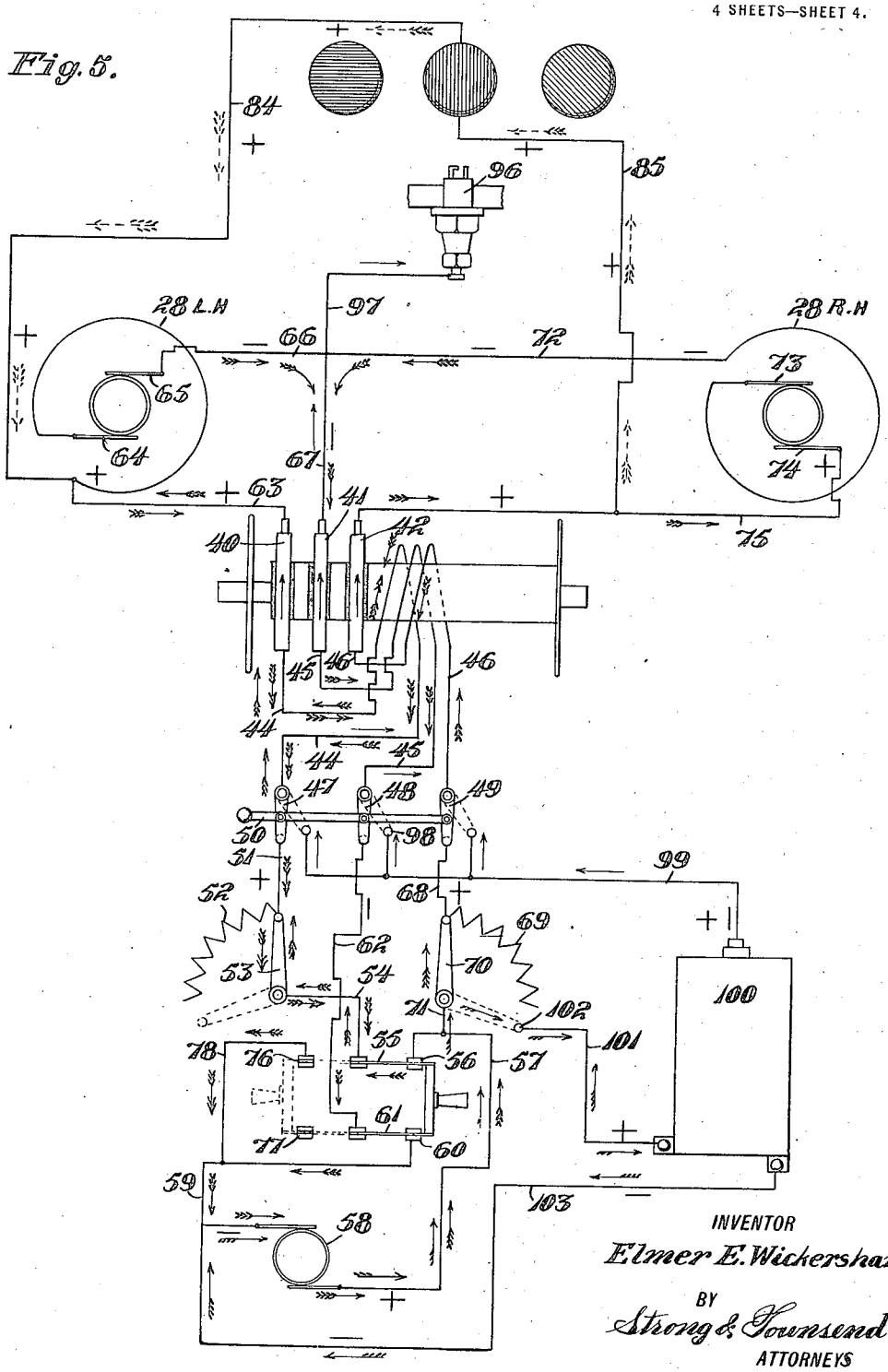
APPLICATION FILED SEPT. 26, 1918.

1,407,969.

Patented Feb. 28, 1922.

4 SHEETS—SHEET 4.

Fig. 5.



INVENTOR

Elmer E. Wickersham

BY

Strong & Townsend

ATTORNEYS

UNITED STATES PATENT OFFICE.

ELMER E. WICKERSHAM, OF STOCKTON, CALIFORNIA, ASSIGNOR TO THE HOLT MANUFACTURING COMPANY, OF STOCKTON, CALIFORNIA, A CORPORATION OF CALIFORNIA

LAND TORPEDO.

1,407,969. Specification of Letters Patent. Patented Feb. 28, 1922.

Application filed September 26, 1918. Serial No. 255,818.

To all whom it may concern:

Be it known that I, ELMER E. WICKERSHAM, a citizen of the United States, residing at Stockton, in the county of San Joaquin and State of California, have invented a new and useful Improvement in Land Torpedoes, of which the following is a specification.

This invention relates to a motor vehicle and particularly pertains to a land torpedo or device of like character.

In present day warfare it has become quite a problem to conduct military operations from trench to trench. It is the object of the present invention to provide a device which will facilitate in carrying forward and repelling attacks as well as providing means for communicating with remote points and supplying said points with supplies of any character and instructions for further procedure.

The present invention essentially consists of two self-laying track units adapted to be separately and electrically driven from a remote point, said units being connected with a frame upon which high explosive shells may be carried and exploded or containers for provisions and munitions carried. The present invention also contemplates the use of guide means for dirigibly controlling the machine, either in the daylight or dark and to accurately place it in a predetermined position.

The invention is illustrated by way of the accompanying drawings in which—

Fig. 1 is a view in side elevation illustrating the complete vehicle with the parts broken away to more clearly show its construction.

Fig. 2 is a view in plan, illustrating the construction of the track units, the cable drum and the main frame.

Fig. 3 is a view in rear end elevation, disclosing the disposition of the two track units, the main frame, cable drum, and showing parts of the chain broken away to more clearly illustrate the driving mechanism.

Fig. 4 is a view in transverse section, showing the manner in which the main frame and the side trucks are connected.

Fig. 5 is a diagrammatical view illustrating the various electrical connections of the apparatus and disclosing the various circuits which may be established through the electrical conduits.

Fig. 6 is a view in vertical section through a periscope used in combination with the present apparatus.

Fig. 7 is a diagrammatical view in plan, illustrating the manner in which the vehicle is accurately guided to a definite point by the aid of the periscope.

Referring more particularly to the drawings, 10 and 11 indicate self-laying track trucks, each consisting of truck rails 12 and 13. These rails are spaced in parallel relation to each other and are rigidly bolted together at points between their ends by plates 14. The opposite ends of each rail are provided with bearings 15 and 16. The forward set of bearings receives an axle 17 upon which a pair of sprocket wheels 18 are disposed. The rear sets of bearings of each truck receive axles 19 upon which similar sprocket wheels 18 are positioned.

The sprocket wheels 18 are adapted to receive chains 18′. These chains are commercially known as elevator chains and are provided with lugs to which buckets are normally fastened. In the present instance wooden tread blocks 18^2 are secured to the links and thus provide an endless flexible tread for each of the track units.

As clearly shown in Fig. 2, these sprocket wheels are disposed in spaced relation to each other and are positioned near the inner faces of the rails 12 and 13. The outer hubs of the sprockets bear against the faces of the bearings 15 and 16 while the inner hubs abut against each other and are surrounded by a worm gear casing 20. One of these casings is fitted around the hubs of each set of sprockets at the rear of the machine, as shown in Fig. 3. The worm gear casing is substantially circular and is provided with a lug 21 through which a torsion rod 22 is bolted. This rod extends forwardly and upwardly and is rigidly fixed to the complementary plate 14. By this means each of the casings 20 will be held against rotation and the torque of the driving apparatus will be directly transmitted to the driving gears. The gear casings 20 are formed of two halves which separate along their horizontal centers and allow worm gear wheels 23 to be mounted within the casings

around the hubs of the complementary ckets 18. These wheels are keyed to 1 of the hubs and this insures simul- ous rotation thereof. The upper halves he gear cases are each formed with bear- ; 24 to receive bushings 25. The bushings be held in position by set screws 26 ex- ling through the bearings. Rotatably ported within the bushings at the oppo- ends of the bearings, are drive shafts 27. drive shafts extend horizontally and vardly to unite with the main shaft of tric motors 28, these motors being bolted n the plates 14 of the trucks. Mounted veen the bushings 25 in each bearing is orm gear 28, the outside diameter of ch is less than the outside diameter of bushings and therefore may pass into the ring through the opening provided for e bushings. This worm gear meshes 1 its complementary gear wheel 23, as be understood.

he shaft 19 extends entirely across the of the machine and merely provides a port around which the sets of sprockets rotate. The shafts 17 terminate with- the bearings provided at each side of machine and upon rails 12 and 13. It thus be seen that the truck units will capable of individual vertical movement relation to the axis of the shaft 19 and therefore separately adapt themselves he contour of the roadway. This shaft cts to permanently secure the two track ts in lateral relation to each other. An alizer bar 29 is provided to assist in ling the units from spreading. This is shown in Fig. 4 as being pivotally nted by bolts 30 to lugs 31 fixed upon upper faces of the truck plates 14. Piv- l centrally to the equalizer bar 29 is a x-shaped frame member 32. The arms this frame extend outwardly and rear- dly to engage the shaft 19 at a point r each of the rails 12 with the truck ts, the shaft 19 being non-rotatable with- bearings on the ends of these arms. ed to the ends of the arms are brackets which extend rearwardly and then out- dly to form a bearing for a drumshaft

Bearing caps 35′ secure this shaft inst rotation. Mounted upon the shaft is a drum 35, free to rotate in relation its shaft and in relation to a brush 36. s last named drum is secured around the of the shaft 34, as indicated here at the hand of the vehicle. A series of me- ic brushes 37, 38 and 39 are carried by drum and are adapted to register with mutator disks 40, 41 and 42 respectively. disks are dielectrically disposed in re- on to each other and are carried upon end of the drum 35. A flange 43 upon drum normally conceals these disks and tects them. This drum is provided to receive a considerable length of cable carrying three separate electric conduits, as indicated by the numerals 44, 45 and 46, connected separately with the brushes 37, 38 and 39 respectively. These cables are provided with separate two-way switches 47, 48 and 49, connected together and adapted to be operated simultaneously by a shifting rod 50. The normal position of the switch 47 places it in contact with a conductor 51. This conductor is connected with a rheostat 52. The usual swinging rheostat arm 53 forms a part of the rheostat apparatus and is provided with a conductor 54 connecting with a switch blade 55. This blade may engage a contact 56 and thereby unite with a conductor 57 leading to one brush of a generator 58.

The other brush of this generator is connected with a conductor 59 normally communicating with a contact 60. This contact is provided to be engaged by a switch blade 61 complementary to the blade 55 and adapted to be shifted simultaneously therewith by a handle. The blade 61 is in constant electrical connection with a conductor 62 leading to the contact button normally engaged by the switch blade 48. By following this circuit it will be seen that it is complete, due to the communication of the conductors 44 and 45 with the disks 40 and 41 respectively. The disk 40 connects with a conductor 63 secured to the field winding of the lefthand motor 28.

It will be understood that these motors are both series wound and the current will therefore pass to the brush 64. The opposite brush 65 is provided with a conductor 66 which connects with a common lead wire 67, returning to the disk 41, thus completing the circuit through one motor. It will be understood that the wiring system here used utilizes three wires, a common return wire and separate lead wires to the motors.

The switch member 49 electrically unites the conductor 46 with a wire 68. This wire is connected with a rheostat coil 69, the remainder of the rheostat apparatus consisting of a contact arm 70. The contact arm 70 is provided with a conductor 71 in constant communication with the conduit 57. This member will convey the current through the generator 58 to the blade 61 of the switch and thereafter through the various conductors forming the central return wire. This circuit is completed by means of a conductor 67 leading from the disk 41 and connecting with conductor 72 leading through the field of the righthand motor 28 to the brush of the motor 73. The opposite brush 74 is connected with a wire 75 leading to the disk 42. As this disk is in constant communication through the brush 39 with the conductor 46, the righthand motor circuit will be complete.

It will thus be seen that by separate manipulation of the rheostat levers 53 and 70, the two motors may be driven at variable rates of speed and the vehicle thus caused to pursue a desired path of travel.

In the event that a greater torque is desired to be obtained from the motors, the switch comprising blades 55 and 61 may be swung from what is known as its normal parallel position to throw the motors in series by contact with members 76 and 77. The member 76 with which the blade 55 will engage, communicates with the conductor 59 by means of a wire 78. This move will reverse the operation of the apparatus and establish a circuit in series through the two motors. It will be seen that a positive drive will be afforded the separate motors and an accurate control may be maintained over the vehicle as it travels. In order to properly determine the course of travel being pursued by the vehicle, a tail light 79 is provided. This light is enclosed within a case 80, fixed to the rear of the vehicle at a point from which it may be clearly seen.

As shown in Fig. 2, it will be seen that three faces are formed upon the case 80 and are arranged one directly facing the rear of the vehicle and the other faces inclining at each side of the straight rear face. The central face is provided with a red lens 81. The lefthand face is fitted with a blue lens 82 and the righthand face with a green lens 83. These lenses are all in the path of travel of the rays from the light 79. It will thus be seen that when the tail light is observed from a point directly in the rear of the machine, the red light will be plainly seen and will indicate that the vehicle is pursuing the course of travel straight in line with the observer's vision. In the event that either of the side lights show, it will indicate the travel at either side of a straight line, thus making it possible to tell by observation exactly the direction the vehicle is traveling although it may be too dark to see the vehicle. The tail light 79 is supplied with current through wires 84 and 85, the former connecting with the wires 63 and the disk 40, the wire 85 connecting with the wire 75 and the disk 42. In order that the vehicle may be driven to a definite point after dark and after the point has been lost from sight, it is desirable to provide a periscope apparatus designed along the lines indicated in Figs. 6 and 7. This periscope is formed with the usual vision lens 86 focused upon an inclined reflector 87, the light rays thereafter striking a reversely inclined reflector 88 in focus with a lens 89. The periscope is free to swing horizontally and in its upper horizontal neck a pair of stadia wires 90 and 91 are fitted. These wires are in vertical alignment and when brought into horizontal alignment upon a fixed point, may be set. This operation may be performed in the daytime when the objective is visible. At night the vehicle may be guided in a straight course of travel directly to this point by keeping it within a line of vision which will show that the two wires 90 and 91 are in horizontal alignment and in alignment with the vehicle.

It will be readily recognized from the foregoing description that the apparatus here disclosed is especially adaptable for work across contested ground which is impassable, and that the vehicle may be used for a number of useful purposes. It is contemplated to build the structure of small dimensions; that is, the overall length to be approximately three feet and the height proportionate thereto as indicated in Fig. 1. By mounting a receptacle upon the frame 29, supplies may be carried directly to parties in distress and, of course, these supplies may consist of both food and munitions, the transportation being effected either in the daytime or at night, as observed by the periscope. As shown in the drawings, however, the vehicle is fitted with an explosive drum 92. This drum extends longitudinally between the trucks and is held upon a rear seat 93 carried by the forked frame 32. A bolting strap 94 is provided to secure the drum in place upon this seat and to permit it to rest upon a forward seat 95. The drum might be provided with a timing mechanism for effecting its explosion. In the present case an exploding plug 96 is positioned within the rear head of the drum and is in communication with a conductor 97. This conductor is directly fastened to a wire 67 leading to the disk 41. A current is then established through the wire 45 to the switch member 48 and when this member is swung to contact with the pin 98, will establish connection with a wire 99 leading to a high tension vibrator coil 100. The opposite binding posts of this coil are fitted with wires, one, 101 leading to a contact button 102 forming a part of the rheostat 69 and adapted to be engaged by the rheostat arm 70. The other, a conductor 103, connecting with the conductor 59 and leading to one brush of the generator. The shifting of the switch member 48 will also effect the shifting of the other members 47 and 49 and unite all of them with the wire 98.

The preferred manner of operation is as follows: A generator set is established in the trench or back of the lines and is connected with the apparatus up to and including the switch members 47, 48 and 49, it being understood that the cable consisting of the wires 44, 45 and 46 is of considerable length to allow the vehicle a large range

of travel. Previous to the operation of the tractor, the periscope is set upon an objective point "X", as indicated in Fig. 7 and thereafter either in daylight or dark, the vehicle is lifted over the trench and placed in a starting position. The structure, due to its small dimensions, may be easily concealed and should be able to move slowly across the ground intervening between the trenches, without observation from the enemy.

As the rheostat levers 53 and 70 are swung into contact relation to the coils 52 and 69, the two motors will be actuated, it being understood that the switch blades 55 and 61 are in the position shown by solid lines in Fig. 5. If the effective resistance in the two rheostats is the same, the two motors will travel at equal speeds and the vehicle will move in a straight line of travel. This may be easily observed by the appearance of the red light in the tail light housing. If the vehicle is to be moved to either side of its straight path of travel, the respective rheostat is manipulated to increase the speed of the motor upon the opposite side. This will cause the vehicle to turn and will result in disclosing the light at one side. A reversal of the operation will cause a turn to the opposite side.

The two motor circuits will be clearly understood without further explanation. In case a grade is encountered, the switch consisting of blades 55 and 61 may be swung to throw the motors in series and increase their torque. When the vehicle has reached its objective point it may be brought to rest and there held until advantageously exploded or may be instantly exploded at the will of the operator. This is done by first shifting the switches 47, 48 and 49 by the rod 50 and thereafter bringing the switch arm 70 into contact with the pin 102, thus establishing a circuit through the vibrator 100 and causing a high tension current to pass along the wire 99 and through the various conductors then united therewith to the wire 97 and to the spark plug 96, which is grounded to the frame of the machine. The presence of this current at the spark plug will, of course, create a spark sufficient to explode the charge within the shell. When the explosion occurs, the entire vehicle will be destroyed and its parts converted to shrapnel, thus combining the destructive force of the explosive within the drum with sufficient flying metal to produce great damage.

It will thus be seen that the vehicle here disclosed is decidedly simple in its construction and may be inexpensively manufactured when both material and labor are considered. It will further be appreciated that the vehicle of the type designed may readily traverse ground irrespective of its irregularity in contour, and, further, that the vehicle may be caused to pursue any desired path of travel without danger to the life of the operator who may manipulate the vehicle to deliver supplies or carry explosives to objective points. It will be further noted that by the use of these small tractors, offensive attacks may be readily dissipated and in case tractors are used in making the offense, the ease with which the structure here shown may be manipulated will insure that the tractor may be easily rendered useless before it could retreat.

While I have shown the preferred form of my invention, it will be understood that various changes in the combination, construction and arrangement of parts may be made by those skilled in the art, without departing from the spirit of the invention as claimed.

It will be readily recognized that the vehicle here disclosed, when laden with explosives, may be used to instantly prepare the ground over which an attack is to be made and level all the obstructions thereon. It is believed that the breaking up of the parts of the vehicle, and especially the chain, will provide missiles which will tear down barbed wire entanglements and clear them away so that a charge may be instantly made without advising the enemy by previous bombardment. The vehicle may be used to advantage without carrying its explosive shell when it is desired to establish telegraphic or telephonic communication between various points as the cable may be cut after reaching its destination and may then be used as a conductor through which communication may be established and orders given. The arrangement of the cable drum on the rear of the vehicle also acts to protect the cable as it does not necessitate that the cable shall be dragged along the ground as the vehicle advances but merely unrolls the cable and lays it along the ground as desired. This prevents the outer casing of the cable from being torn and also eliminates undue strain which would otherwise be imparted thereto.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. A motor vehicle comprising a frame, separate running gear units at opposite sides thereof and an electric motor for each running gear unit operatively connected thereto, means for operating the motors in parallel, means for separately varying the speeds of the motors to direct the course of the vehicle, means permitting operation of the motors in series and means located at a point remote from the vehicle for controlling the connections and speeds of said motors.

2. A motor vehicle comprising a frame, separate running gear units at opposite sides

thereof, an electric motor for each running gear unit operatively connected thereto, parallel circuits for the motors, a series circuit for the motors, switch mechanism operative from a remote point for changing the circuits of said motors from parallel to series and vice versa, and control means also located at a remote point for separately varying the resistance of the parallel circuits to individually control the speeds of the motors, whereby to direct the course of the vehicle.

3. A motor vehicle, comprising a frame, separate running gear units at opposite sides thereof, an electric motor for each running gear unit operatively connected thereto, parallel circuits for the motors, each circuit including a rheostat, means for connecting the motors in series and means operable from a remote point for individually controlling the rheostats and changing the circuits of the motors from parallel to series and vice versa.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ELMER E. WICKERSHAM.

Witnesses:
W. W. HEALEY,
JAMES M. ABBETT.