F. McNICOL.

SELF PROPELLED TERRESTRIAL TORPEDO.

APPLICATION FILED MAR. 14, 1918.

1,307,406.

Patented June 24, 1919.

2 SHEETS—SHEET 1.

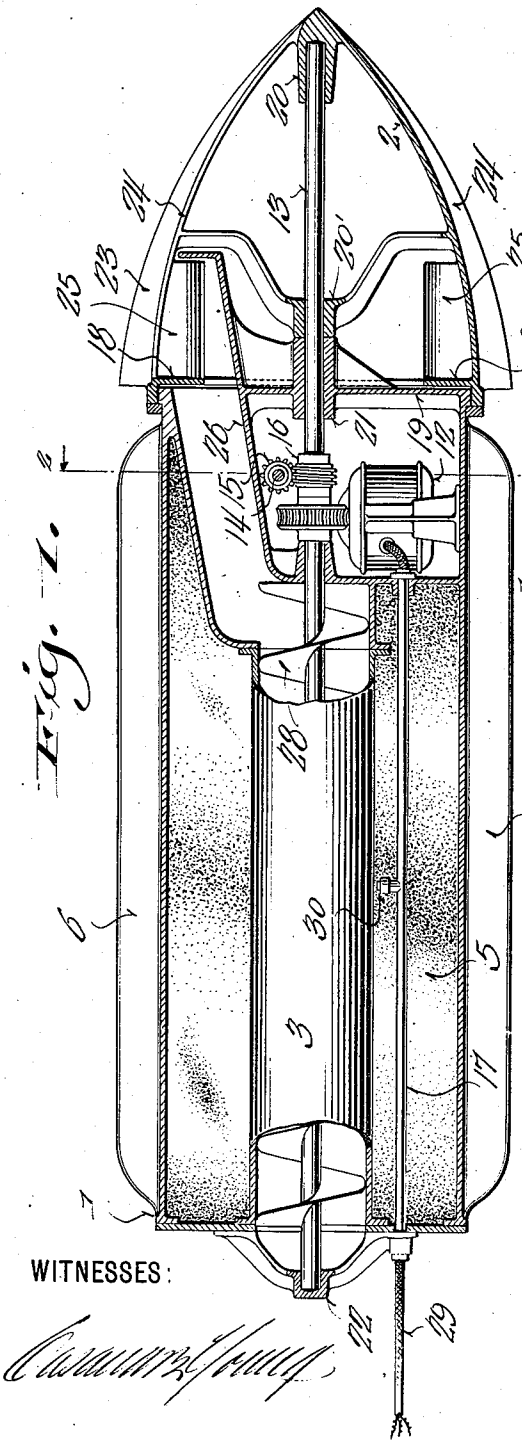

Fig. 1.

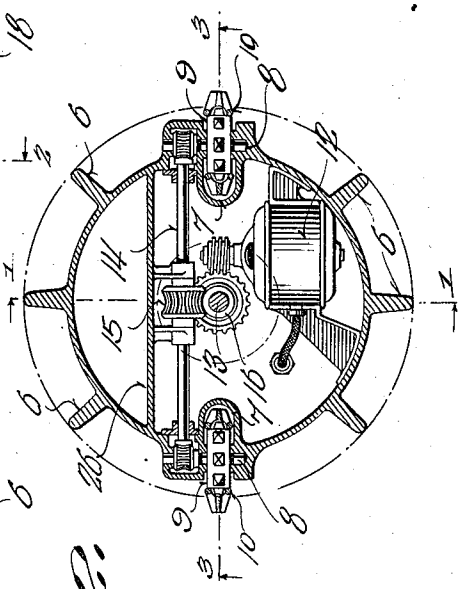

Fig. 2.

WITNESSES:

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Fig. 5.

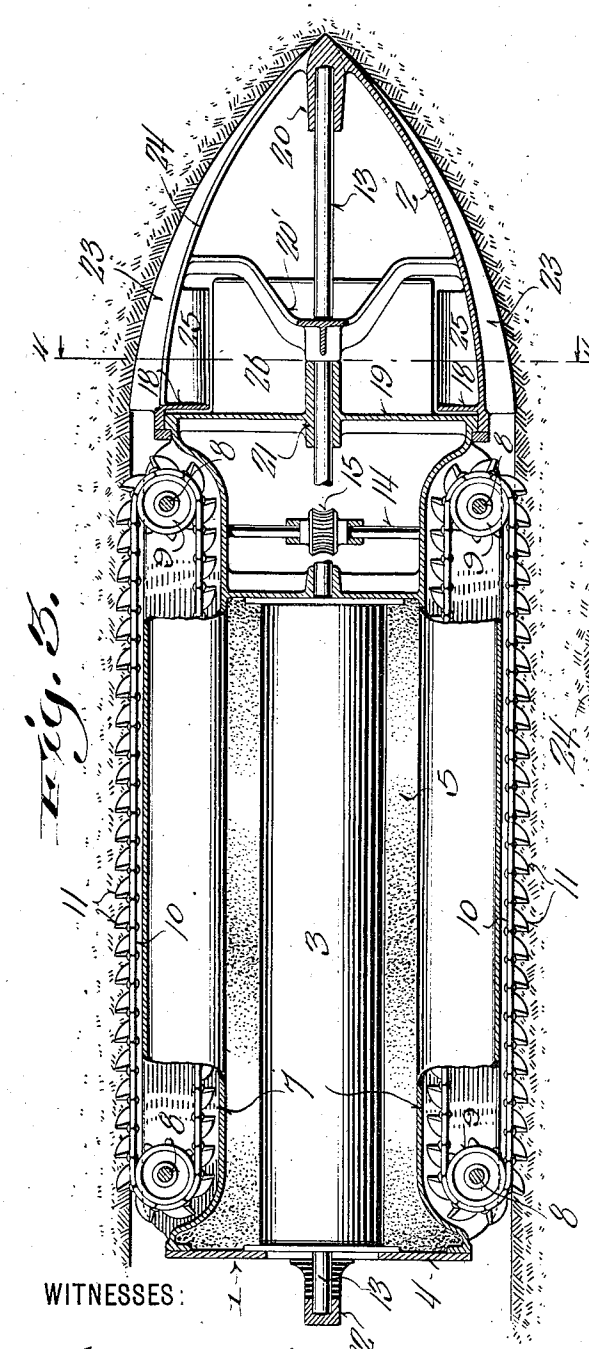
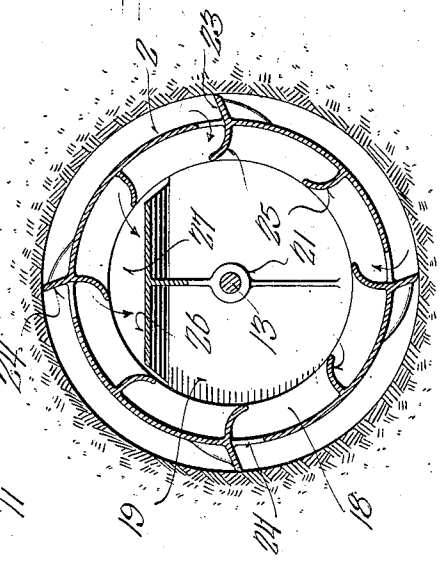


Fig. 4.



WITNESSES:

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UNITED STATES PATENT OFFICE.

FORREST McNICOL, OF MILWAUKEE, WISCONSIN.

SELF-PROPELLED TERRESTRIAL TORPEDO.

1,307,406. Specification of Letters Patent. Patented June 24, 1919.

Application filed March 14, 1918. Serial No. 222,404.

To all whom it may concern:

Be it known that I, FORREST McNICOL, a citizen of the United States, and resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Self-Propelled Terrestrial Torpedoes; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to improvements in explosive devices, particularly those which are adapted to be discharged beneath enemy trenches or other places underground.

One of the objects of the present invention is to provide means for propelling a subterranean torpedo or bomb whereby it may be caused to proceed underground from one given point to another, the operating means as well as the explosive charge being self-contained. With such a device as this an enemy trench may be blown up without the necessity of performing the usual laborious sapping operations which are at present employed for under-mining a particular section of territory.

Minor objects of the invention are to provide an efficient arrangement for disposing of the dirt or other material excavated by the torpedo during its passage below ground, and to construct a device of this character so inexpensively that it may be manufactured and used in large quantities.

With these and other objects and advantages in view the invention resides in the novel features of construction, combination and arrangement of parts which will be hereinafter more particularly described and claimed and shown in the accompanying drawings:

Figure 1 represents a vertical longitudinal sectional view taken approximately on the plane of the line 1—1 of Fig. 2.

Fig. 2 is a vertical transverse sectional view on the plane of the line 2—2 of Fig. 1.

Fig. 3 is a longitudinal horizontal section on the plane of the line 3—3 of Fig. 2, and

Fig. 4 is a view similar to Fig. 2 on the plane of the line 4—4 of Fig. 3.

Referring more particularly to the drawings it will be seen that the invention comprises broadly a combined explosive carrying and propelling body 1 and a excavating head 2 disposed forwardly of the body. Said body is preferably formed of a sheet metal or cast cylinder of an appropriate length in which is concentrically arranged a cylindrical dirt conveying passage-way 3, the forward end of which terminates inwardly of the forward end of the body. The rear end of the body is closed by a centrally apertured plate 4, the opening of which alines with the passage-way 3. The forward end of the body is also closed whereby to provide an annular explosive chamber 5.

In order to overcome friction between the body 1 and the wall of the subterranean passage-way constructed by the excavating head 2, a plurality of radially disposed longitudinally extending fins 6 are formed on the outer surface of the body. Said body is further provided with a pair of diametrically opposed longitudinally extending channels 7, the plane of said channels being normally positioned horizontally. At the opposite ends of each of the channels is mounted a vertical shaft 8 on which is disposed a sprocket or similar wheel 9. An endless propeller belt 10 is trained around each pair of sprocket wheels 9, said belt having a plurality of traction lugs 11 secured thereto, which lugs project outwardly of the body 1 for engagement with the wall of said subterranean passage-way.

It will be seen that if the propeller belts are moved in the proper direction the body 1 and its excavating head 2 will be moved forwardly. Such operation of the propeller belts is carried out through the instrumentality of an electric motor or the like 12, said motor being disposed in the body 1 at the forward end thereof. The shaft of the motor is geared or otherwise connected with a longitudinally extending shaft 13 which is disposed throughout the length of the body 1 and head 2. A horizontally disposed transversely extending worm shaft 14 has its opposite ends geared to certain of the vertical supporting shafts 8, said worm shaft 14 having a worm gear 15 which meshes with a worm 16 on the shaft 13. The conducting wires for the electric motor 12 are conveyed therefrom to the end of the body through a tube 17 as shown in Fig. 1.

The excavating head 2 is in the form of a hollow conical shell, the base of which is open and provided with an inwardly extending annular flange 18 which is parallel to and in close proximity to the front wall 19 of the body. This head is rotated with respect to the body 1 by the revolution of the shaft 13 to the forward end of which it is con-

nected as at 20 and 20'. Said shaft is journaled in a bearing 21 formed in the front wall 19 and in a bearing 22 carried by a bracket secured to the rear wall 4, the intermediate portion of the shaft being within the conveyer passage-way 3 for a purpose to be hereinafter more particularly described.

For effective excavating operations the head 2 is provided with a plurality of radially disposed excavating ribs 23 which are inclined slightly in the direction of rotation of the head and are positioned parallel with a plurality of radially disposed openings 24 formed in said head. These openings 24 permit the material as it is excavated by the ribs 23 to drop within the hollow head to be conveyed to the rear end of the body. On the inner surface of the wall of the head and adjacent the base thereof is formed a plurality of conveyer elements 25 which are in the form of longitudinally curved plates.

The excavated material is carried by the conveyer elements 25 and deposited on a relatively stationary inclined conveyer chute 26 that projects forwardly through an opening 27 in the front wall 19 of the body and is thus disposed within said hollow head. The inner end of the conveyer chute 26 opens into the conveyer passage-way 3 and the dirt which is deposited in the latter is moved through the body by means of a spiral or screw conveyer 28 formed on the shaft 13.

The operation of my invention is substantially as follows:—The pointed end of the head 2 is inserted in the ground a suitable distance below the surface thereof and the electric motor 12 started. The head will thus be caused to rotate and bore an opening or passage-way for the body 1 which, as soon as the passage-way is deep enough to receive the front end of the same will be propelled by the engagement of the traction lugs 13 with the wall of said passage-way. The material which is excavated will drop through the openings 24 into the hollow head 2 and will slide toward the rear thereof where it will be caught in the pockets formed by the conveyer elements 25. The head being rotated, these elements will be successively disposed above the conveyer chute 26 where they will be emptied of their contents. From the conveyer chute 26 the material will be moved to the rear of the body and ejected therefrom.

As soon as the torpedo has moved itself forward a sufficient distance, as for instance when it is positioned beneath an enemy trench, the explosive charge in the chamber 5 is set off, preferably by means of electricity which is conveyed through a wire or wires 29 which pass through the tube 5 to a suitable firing member 30. The enemy trench is thus destroyed without danger to the occupants of the other trench, and without the occupants of said enemy trench being aware of the existence of the torpedo beneath the same.

Various minor changes may be made in the form and proportion and in the operating means of the device without departing from the principles thereof as set forth in the appended claims.

I claim:—

1. An explosive device of the class described comprising an explosive carrying body a rotary hollow excavating head, a plurality of digging elements projecting outwardly from the head, a plurality of conveyer elements disposed within the head and positioned adjacent the connection of the digging elements therewith, said head having an opening adjacent each digging element to permit material therefrom to be deposited on the conveyer elements, and a relatively stationary conveyer projecting within the hollow head to successively receive material from the conveyer elements.

2. An explosive device of the class described comprising an explosive carrying body a rotary substantially conical, hollow excavating head having a plurality of radially disposed openings, a digging rib substantially paralleling each of the openings and positioned adjacent thereto, the material excavated by said ribs being adapted to pass through said openings into the head, a plurality of conveyer elements positioned on the inner wall of the head, and a relatively stationary conveyer projecting within the hollow head to successively receive the material from the conveyer elements.

3. An explosive device of the class described comprising an explosive carrying body having a longitudinal conveyer passage-way formed therethrough, a rotary hollow excavating head carried by the body, said head having a plurality of openings, a digging rib substantially paralleling each of said openings and positioned adjacent thereto, the material excavated by said ribs being adapted to pass through said openings into the head, and means for conveying the excavated material from the head to said conveyer passage-way.

4. An explosive device of the class described comprising an explosive carrying body having a longitudinally extending conveyer passage-way, a longitudinal shaft extending through the passage-way and projecting beyond the forward end of said body, a rotary head secured to the projecting end of said shaft, said head having a plurality of openings therein, a digging rib disposed adjacent each of said openings whereby to direct excavated material through said openings, means for conveying excavated material from said head to said conveyer passage-way, means on said shaft for directing excavated material through said conveyer passage-way, and means for rotating said

shaft to operate the last mentioned means and said rotary head.

5. A device of the class described comprising a cylindrical explosive carrying body having a passage therethrough, means at one end of the body for digging into the earth, means for conveying earth through the body, and a caterpillar drive belt arranged longitudinally at one side of the body.

6. A device of the class described comprising a cylindrical explosive carrying body having a passage therethrough, means at one end of the body for digging earth, means for conveying earth through the passage of the body, outstanding longitudinal ribs on the body extending each substantially throughout the length of the body, and means for propelling the body.

In testimony that I claim the foregoing I have hereunto set my hand at Milwaukee, in the county of Milwaukee and State of Wisconsin.

FORREST McNICOL.