

(No Model.)

3 Sheets—Sheet 1.

P. B. WALKER & H. G. RIGGS.
SUBMARINE TORPEDO BOAT.

No. 310,342.

Patented Jan. 6, 1885.

FIG. 1.

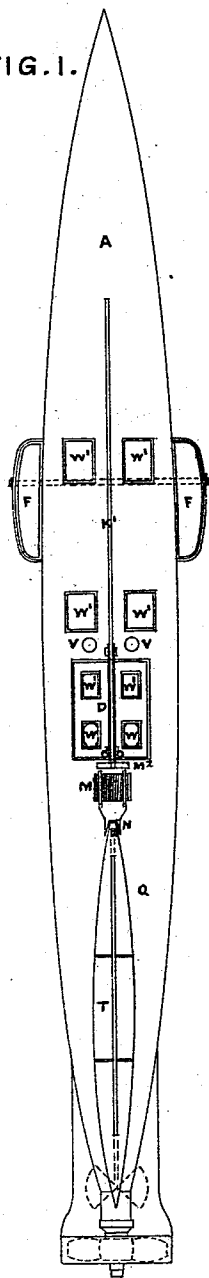
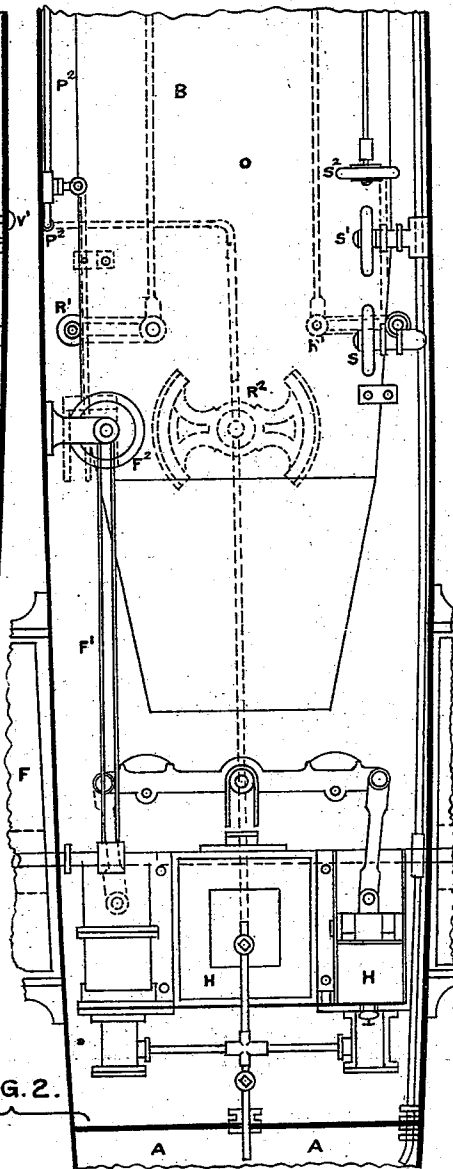


FIG. 2.



Witnesses.

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(No Model.)

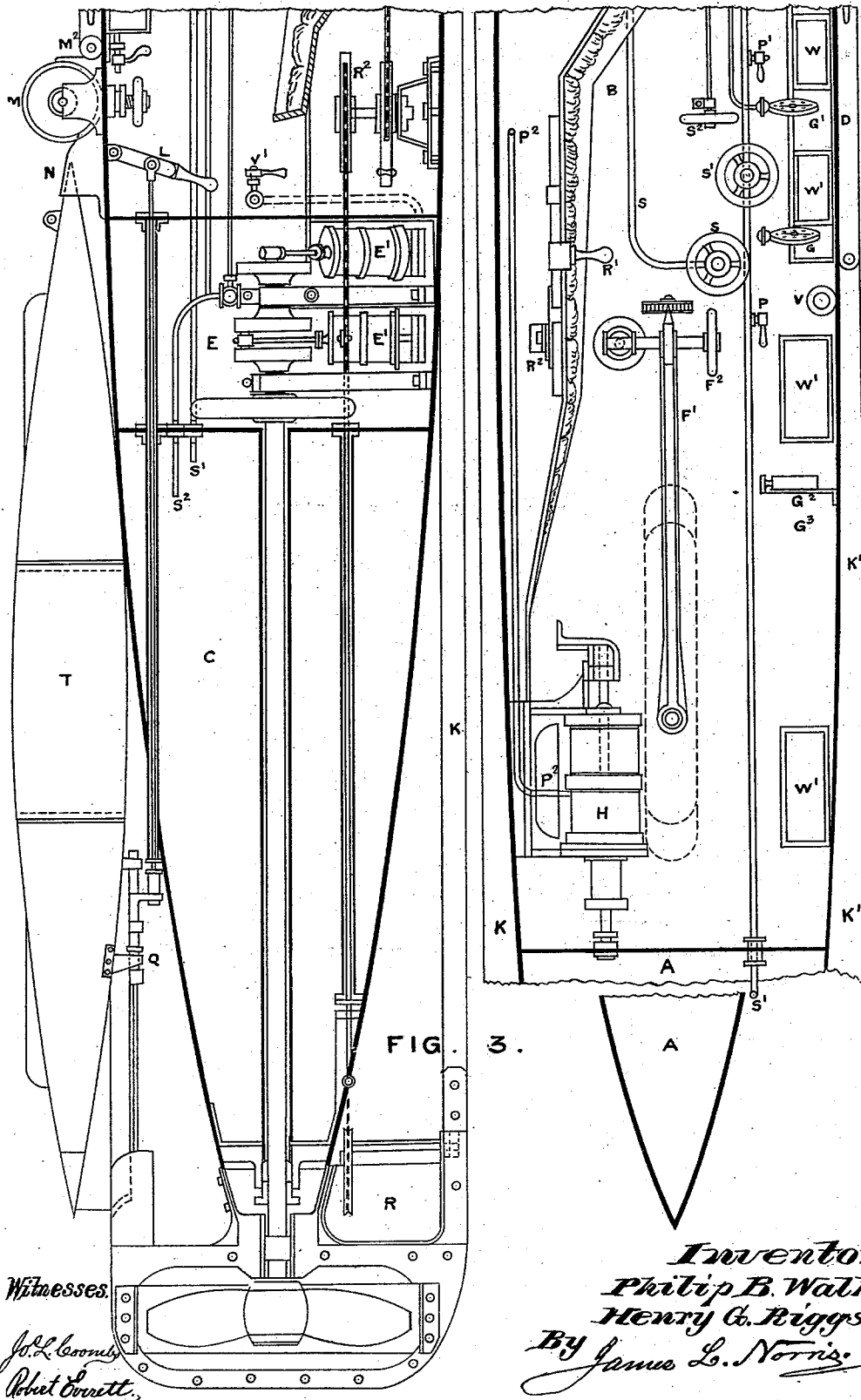
3 Sheets—Sheet 2.

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(No Model.)

3 Sheets—Sheet 3.

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Fig. 4.

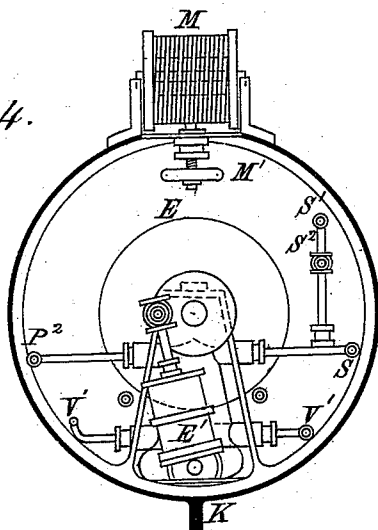


Fig. 5.

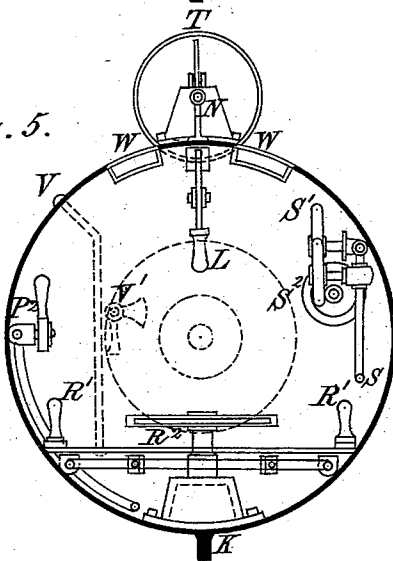
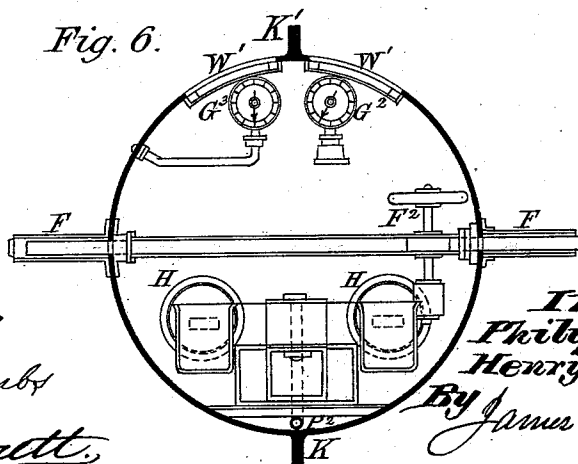


Fig. 6.



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UNITED STATES PATENT OFFICE.

PHILIP B. WALKER AND HENRY G. RIGGS, OF SYDNEY, NEW SOUTH WALES.

SUBMARINE TORPEDO-BOAT.

SPECIFICATION forming part of Letters Patent No. 310,342, dated January 6, 1885.

Application filed September 1, 1884. (No model.) Patented in England May 8, 1883, No. 2,320.

To all whom it may concern:

Be it known that we, PHILIP BILLINGSLEY WALKER and HENRY GEORGE RIGGS, subjects of the Queen of Great Britain, residing at Sydney, in the Colony of New South Wales, have invented a certain new and useful Improved Submarine Torpedo-Boat, (for which we have obtained a patent in Great Britain, No. 2,320, bearing date May 8, 1883,) of which the following is a specification.

This invention relates to and is designed to provide improved means for carrying and fixing torpedoes under water; and it consists in the construction and combination of parts, hereinafter particularly described, and pointed out in the claims.

Figure 1 of the accompanying drawings is a plan view of the boat; Fig. 2, a plan of the same in sections on an enlarged scale, with parts broken away to show the interior of the boat. Fig. 3 is a side elevation on the same scale as Fig. 2, and also in sections, with parts broken away to show the interior of the boat. Figs. 4, 5, and 6 are transverse views taken through different parts of the boat.

The outer shell of the boat has the shape of a cylinder tapering at both ends, Fig. 1. The lower part is fitted with a keel, K K, Fig. 3, the upper part with a fin or reversed keel, K' K', arranged toward the stern, for receiving and securing the torpedoes T to be carried. A four-bladed screw propeller and rudder, R, are also provided, and movable fins F F, Figs. 1, 2, and 6, are placed on each side of the boat, to regulate the level or inclination at the different depths and speeds. These fins and the screw propeller and rudder are protected by guard plates and frames. The interior of the boat is divided into compartments. The fore compartment, A, Figs. 2 and 3, and the stern compartment, C, are accumulators or reservoirs for compressed air. The compartment E is reserved for the air-engines, and the center compartment, O, is the room for the man or occupant in charge. A man-hole or air and water tight door, D, Figs. 1 and 3, is provided at the top of the center compartment to give access to the interior of the boat. Thick plate-glass windows W and W W are secured in this door, as well as on the top of the boat, with wire guards over them to give light to the in-

terior. The room is fitted with a reclining-bed, B, for the operator or man in charge, and the handles for the complete management of the boat are conveniently placed within his reach and the different gages within his view. A pair of small air-pumps, H H, Figs. 2, 3, and 6, connected with a foot-treadle, is so arranged that the man can work them easily with his feet when required. The engine-compartment E contains the compressed-air engines E' E', which are of the ordinary type, and provided with all the usual valves, &c., for shutting off or reversing when required, and direct acting or reversible. The motive power is compressed air stored in the accumulators or reservoirs A and C, Figs. 2 and 3, fitted by separate air-pumps on board the ships, and in connection with the accumulators by suitable pipes and valves. Pressure-gages G and G' indicate the air-pressure in the fore and after compartments, respectively. Suitable cocks, P P', are fitted on the air-pipes, to admit air in the center room for breathing, the pressure being indicated there by the air-gage G², Fig. 6, and regulated according to the depth or sinking of the boat by the water-gage G³, Fig. 6, communicating with the outside. Valves V V, Fig. 1, are provided to carry away foul air when the boat is under water, or to bring in fresh air when it is floating on the surface. Exhaust-valves V' V', Figs. 2, 3, 5, under the control of the operator, discharge the air outside or into the room at his option to utilize the exhaust-air therein, if required. The pipe S and valve-cock S, fitted to the pipe S', Figs. 3, 4, 5, supply compressed air from the accumulator A to the engine, and the pipe S² and the valve-cock S², Figs. 2, 3, 4, 5, from the accumulator C to the engine. The pipe S' S', Fig. 3, and the valve-cock S', are to regulate the equal pressure, or otherwise, when required, between the two accumulators A and C. The pipes and cock P², Figs. 2, 3, 4, 5, are for supplying the engine with the air compressed by the foot-pumps H H. The handles R' R' and segments R² R², Figs. 2, 3, 5, are the steering-gear connected with the rudder R. The lever and screw F' and F², Figs. 2, 3, 6, are to raise or lower the pins F F, to regulate their inclination for the descent of the boat below the surface of the water, or for rising from under

water during its course. A spring-handle, L, Figs. 3 and 5, is for locking the torpedo in place or releasing it from the boat. M, Figs. 1 and 4, is a reel of cord line or insulated wire to pay out and tow the torpedo; and M', Figs. 3, 4, is a screw to regulate the brake M', Figs. 1 and 3, and release the reel at will and cut the line. The insulated wire of the reel is connected inside the torpedo with an electrical firing-battery under the control of the operator inside the boat. Tubes (not shown on drawings) are placed at the sides of the boat along the guard frames and plates for the electrical and telephonic wires connected between the operator's room and the ship. These wires may be disconnected instantaneously by the operator and let slip through the tubes when necessary.

B, Fig. 3, is the reclining-bed and cushion for the operator.

En resumé, the whole apparatus is self-contained, and the operator can float, drive, and regulate at will the speed of his boat at any required depth and in any direction, having under his command, after the necessary training and experience, the most complete instrument of offensive warfare yet devised. It is safer under water than any diving apparatus, and does not require the attendance necessary upon the latter. Among other advantages to be derived from this invention are, first, the adaptability of the boat to be used on the surface of the water (being ballasted to float) or at any convenient depth; second, safety from an enemy's fire when under water; third, complete management of the boat under water by the occupant or occupants, as the boat may be constructed to hold one or more operators; fourth, carrying and towing the torpedo or torpedoes under a ship moving or at anchor, and fixing such torpedoes at will by electricity or otherwise; fifth, communicating by telephone or electricity between the torpedo-boat and the ship to which it belongs; sixth, carrying on operations at night by means of the electric light; seventh, its use in naval warfare or harbor defenses.

Although we do not restrict ourselves to precise details already enumerated, it is necessary to explain more particularly the following to clearly understand the importance and the *modus operandi* of this invention. The boat and all its parts and machinery may be made either of steel, iron, or other metal, or material suitable to the requirements of the apparatus. The accumulators or compressed-air reservoirs may be made as strong as necessary to resist a pressure of fifteen hundred (1,500) pounds per square inch, or more, and the engines may be made to work up to five hundred pounds (500 lbs.) per square inch, although it is calculated that a speed of ten (10) knots per hour may be obtained with a pressure of fourteen (14) atmospheres in the air-engines. The range and speed will vary according to circumstances, the operator or operators having it in their power to put on

the full pressure or work slowly, as he or they wish, with the foot-pumps. The torpedoes to be carried may be of various forms, but those of the shape shown are preferable. The keel of the torpedo fits into a groove, the top of the boat and its nose-piece into a conical cap, N, Figs. 1 and 3, and it is secured in position by a spring bolt or latch, Q, Figs. 2 and 3, through its keel, and worked by the handle L, Figs. 3 and 5. The engine-shaft and tubes for the rods of spring-bolts and for steering-gear are fitted with stuffing-boxes. To make these shafts, rods, and tubes thoroughly air and water tight, the shafting of the side fins and all outer holes through the skin of the boat are similarly fitted with stuffing-boxes, and all internal pipe connections and joints are made to resist the great pressure of the compressed air. The ballasting buoyancy and trimming of the boat are adjusted by means of weights sliding on rods and secured with hand-screws at the bottom of the center compartment. The adjustment for depth is performed by the inclination of the fins moved by the lever F', Figs. 2 and 3, having at its end a pointer showing the inclination. A spirit-level is also fixed on this lever. The towing-reel M, Figs. 1, 3, and 4, is fitted in a small frame sliding in vertical or inclined guides, in which it is secured by a screw, M', passing through the bottom of the frame. The rims of this reel can be pressed by this screw against a stop or brake, M', to prevent the unwinding, or to stop the paying out when required, and by unscrewing of the frame the reel may be released and lifted completely away during the towing. If the ignition of the torpedo is mechanical, its nose-piece is provided with a spring or small clock-work lever rising when the torpedo is leaving the cap N and adjusting the firing-gear at the same time. When the ignition is to be performed by electricity from the boat, the required length of wire is paid out from the reel and the torpedo is towed until it strikes, when the operator frees himself of the wire by casting it all free of the boat. In all cases the torpedo is adjusted to maintain a suitable speed. The torpedo may also be fitted with projections to attach it to a ship, and after being towed under or against the ship by the boat the wire may be paid out and the torpedo fired by the operator from a safe distance. The door or man-hole, Figs. 1 and 3, can be opened from the inside or from the outside; also, two lights or windows, W' W', of the door can be opened from the outside, and two, W W, from the inside. They are all fitted with india-rubber seats to make them air and water tight.

Having so far described our improved submarine torpedo-boat, we shall now proceed to state the *modus operandi* of this invention. It is assumed that the operator has passed through a regular course of practice with the apparatus and has a thorough knowledge of all its details. The compressed air having

been introduced into the accumulators A and C through suitable valve-cocks, and the torpedo, with the reel M, placed in position and the electrical connection made and tested, the operator enters the room or center compartment, O, reclines on the cushion, and closes the door D and windows W W. He supplies himself with air from the cocks P P', communicating with the accumulators. If a great speed is necessary for a time, he draws the air for his engines from one of the accumulators only reserving the other for additional power. He may at first start the engines with the foot-pumps H H, while speaking or receiving any instructions through the telephone until it is advisable to slip the wire of the latter. Then closing the pump-valve P² and opening the valve-cock S² drives the engines from the accumulator C, the communication between the two accumulators being closed by valve S', the two pressure-gages G and G' indicating the respective pressures in the accumulators A and C, and the gages G² and G³ the depth under water and pressure to be admitted into the room by the exhaust V' or air-cocks P or P'. The operator then adjusts his depth for a straight or inclined course by the screw F² of the lever F', attached to the fins F, Figs. 6 and 3, and then steers direct with the handles R' R', Figs. 2 and 5, for the ship to be operated upon, and regulates his speed accordingly by drawing the compressed air from A by the valve S, or from C by the valve S². When nearing the ship, before passing under it, he draws the spring-bolt Q, with the handle L, Figs. 2, 3, 5, relieving the tail end of the torpedo, and by unscrewing slightly M', Figs. 3 and 4, allows the tow-line to be paid out as far as required, then screwing it tight again it is stopped against the brake M², and the torpedo is ready to be fired, either mechanically or by electricity, as already explained. To prevent the tow-line fouling the screw after firing the torpedo, the reel-frame is disengaged by the screw M' cutting the wire by the same operation, and the reel floats away from the guides. As the torpedo leaves the boat the fins F F are readjusted by bringing the arm F' to a mark on the dial, previously made, to trim the boat according to the weight of the torpedo. The operator then returns to his ship to have another torpedo fitted on the boat for a second attack.

Having thus particularly described the said invention and the manner of working the same, it is to be clearly understood that we do not claim the particular shape or dimensions, nor any mechanical arrangement, singly or apart from the objects or purpose of the said invention as herein set forth; nor do we re-

strict ourselves to the precise details herein described and delineated; but

What we believe to be novel and original, and therefore claim, is—

1. The combination of the boat formed with compressed-air reservoirs A and C at opposite ends thereof, the air-engines E', the valved pipe S², connecting reservoir C with the engines, the valved pipe S' for connecting the two reservoirs and equalizing the pressure between them, and the valved pipe S, communicating with pipe S' between its valve and reservoir A, and connecting with the air-engines for supplying air thereto from reservoir A, substantially as described.

2. In a torpedo-boat, the combination, with engines E', of the compressed-air reservoirs A C, the valved pipes S S², respectively connecting said pipes with said engines, the valved pipe S', connecting said reservoirs, and having pipe S connected thereto between its valve and reservoir A, and the foot-pumps H, connected with the same engines E' by valved pipe P², whereby said engines may be operated in connection with said foot-pumps and reservoirs alternately, substantially as described.

3. The combination, with the boat, of the movable fins F, secured to a shaft passed transversely through the boat and protected by guards, the screw F², located within the boat, and the rod F', connected at one end to said transverse shaft and at the other end to said screw, to be moved vertically thereby, substantially as described.

4. The combination, with a boat, of a torpedo, T, formed at its tail end with a keeper for a bolt, a cap secured to the boat to receive the opposite end of the torpedo, a bolt secured to the outside of the boat, adjacent to said keeper to engage therewith, a pivoted lever, L, within the boat, and a rod connected at one end to said lever and extending through the boat, and connected at the other end to said bolt for retracting the latter, substantially as described.

5. The combination, with a torpedo-boat, of a movable reel, M, on the outside of the boat, a brake, M², also on the outside of the boat, adjacent to said reel, and a screw, M', within the boat and connecting with said reel to control its movement to and from the brake, substantially as described.

In testimony whereof we have hereunto set our hands this 18th day of June, 1884.

P. B. WALKER.

H. G. RIGGS.

Witnesses:

JOSEPH THOMPSON,

Notary Public, Sydney, N. S. Wales.

JOS. L. COOMBS.