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L. WILSON.

APPLIANCE FOR ELECTRICALLY OPERATING VESSELS AND TORPEDOES FROM A DISTANCE.

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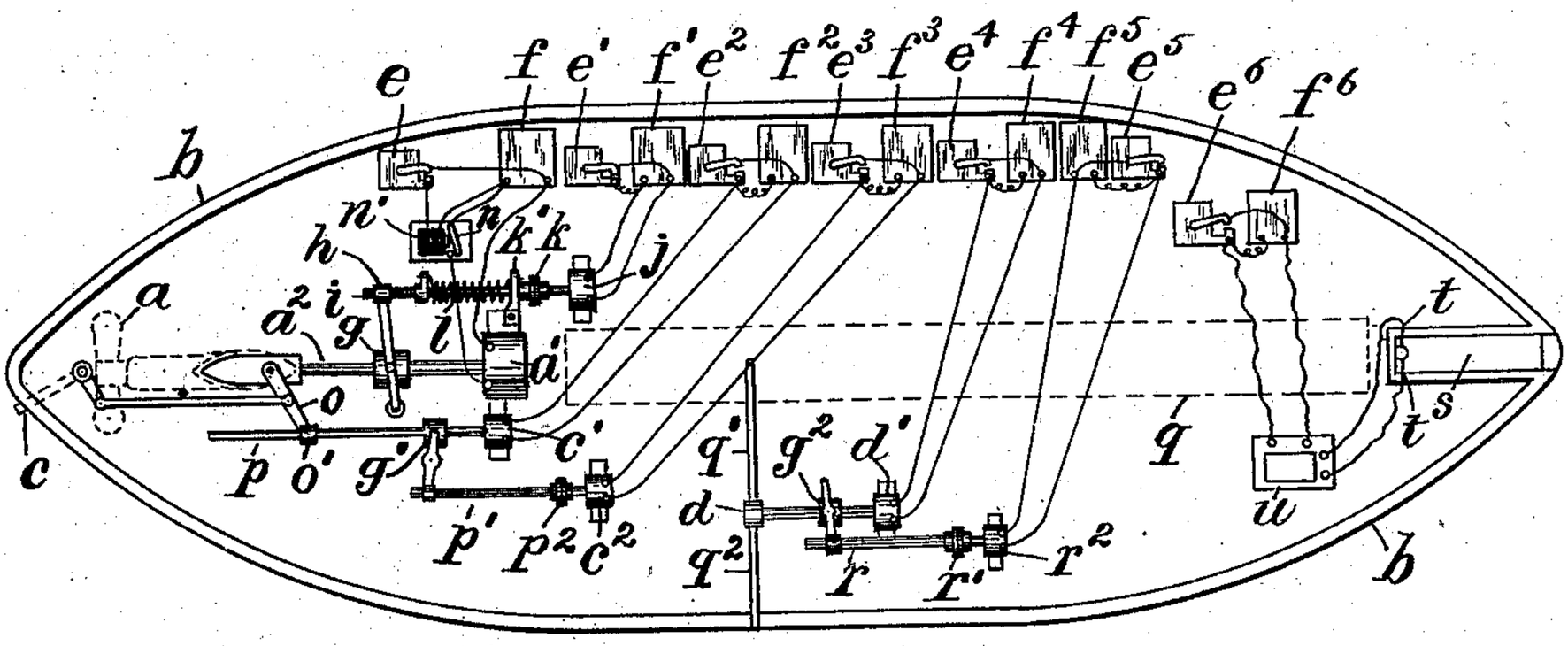
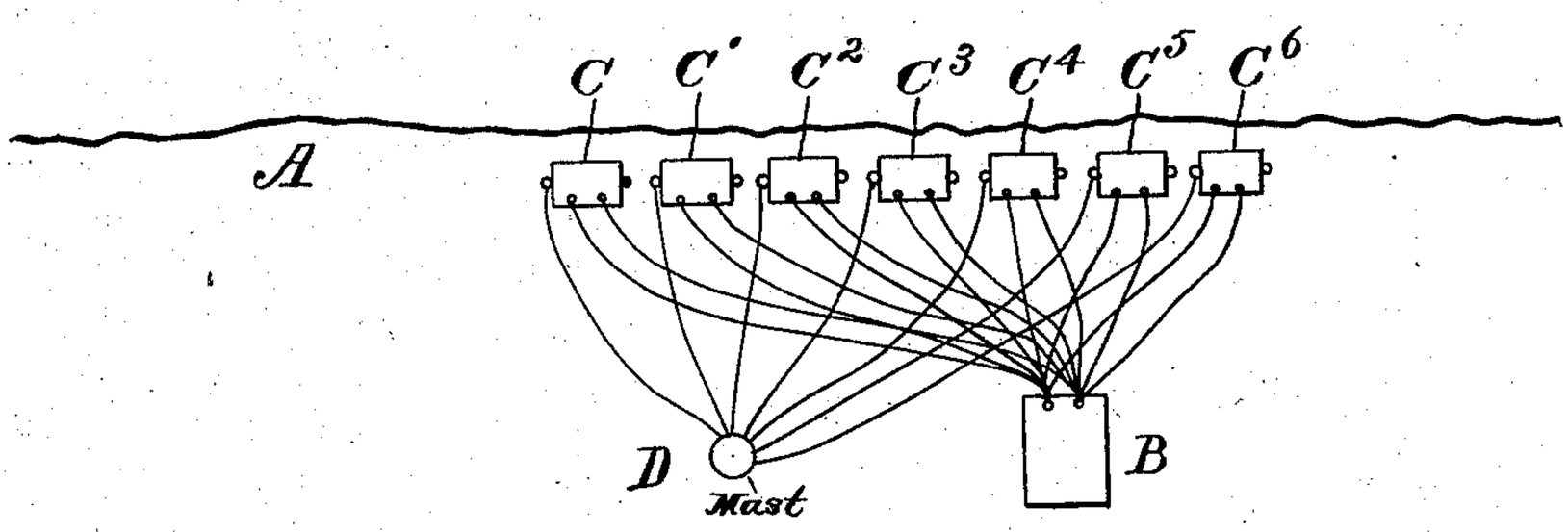
NO MODEL.





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UNITED STATES PATENT OFFICE.

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APPLIANCE FOR ELECTRICALLY OPERATING VESSELS AND TORPEDOES FROM A DISTANCE.

SPECIFICATION forming part of Letters Patent No. 719,405, dated January 27, 1903.

Application filed April 21, 1902. Serial No. 103,892. (No model.)

To all whom it may concern:

Be it known that I, LIDA WILSON, a citizen of the United States, residing at Pierrepont House, Montague and Hicks streets, Brooklyn, county of Kings, State of New York, have invented certain new and useful Improvements in Appliances for Electrically Operating Vessels and Torpedoes from a Distance, fully described and represented in the following specification and the accompanying drawing, forming a part of the same.

The object of this invention is to furnish means whereby various mechanical operations may be initiated at a remote station by what is commonly known as the "wireless" transmission of electricity.

The invention is especially useful in its application to the operation of torpedoes and marine vessels, whether for surface or submarine navigation, and as all such constructions adapted to float in or upon the water are operated in the present invention by similar means the word "vessel" will be used herein as a general term to include all such constructions.

The mechanical operations may be of various kinds—as, for instance, the operation of machinery upon a vessel for the purpose of propelling and directing such vessel and to perform various other functions, also mechanism for closing an electric circuit to ignite a torpedo or explosive charge upon a floating vessel or in a subaqueous or subterraneous mine. The impulse transmitted to a wireless receiver of electricity would in such case be used to initiate the operation of the electric circuit required to produce the igniting-spark. The wireless transmitter, attuned to operate in unison with such wireless receiver, may be upon a floating vessel or upon land.

Where a number of mechanical operations are to be performed, a series of the wireless receivers may be employed to initiate the movements of the several mechanisms, and a corresponding series of wireless transmitters, each synchronized and attuned in unison with one of the said wireless receivers, would be used to initiate such mechanical operations independently, so that each receiver can only be influenced by a transmitter attuned in sympathy with it. In many cases the various mechanisms may be advantageously actuated each by an electric motor and storage battery carried upon the vessel, and the movement of each motor and the resulting operation is initiated by means connected with the wireless receiver of electricity upon the vessel. The ignition of an explosive charge, whether upon a craft, torpedo, or in a mine, is correspondingly effected by the use of a wireless receiver to close an electric circuit and direct a spark into the charge to explode the same. A series of motors to perform different functions upon the same craft may be set in operation by a series of wireless receivers constructed or attuned differently one from another, but each adapted to operate sympathetically synchronously in unison with a special one of a corresponding series of wireless transmitters located at the same or at different distance stations, so that each receiver can only be influenced by a transmitter attuned in sympathy with it. The transmitters may be connected electrically with a kite or mast, which may be placed vertically, inclined, or horizontally.

The invention is illustrated in a diagrammatic form in the annexed drawing, which represents a sectional plan of a submarine boat resting upon the water and a portion of the adjacent shore fitted with apparatus for a transmitting-station.

A designates the transmitting-station; B, a generator connected with a series of wireless electricity-transmitters (designated C C′ C^2 C^3 C^4 C^5 C^6) and each of the transmitters connected with a mast D. The submarine boat *b* is shown provided with propeller *a*, driven by electric motor *a′*, a rudder *c*, moved by motor *c′*, and a ballast-shifter *d*, actuated by the motor *d′*. A series of wireless electricity-receivers *e* *e′* e^2 e^3 e^4 e^5 e^6 is shown upon the boat and a series of storage batteries *f* *f′* f^2 f^3 f^4 f^5 f^6.

The motor *a′* is connected with the storage battery *f* by circuit-wires and a switch *n*, the latter being normally open and closed by an electromagnet *n′*, which magnet is in circuit with the battery *f* with a switch upon the wireless receiver *e*. The wireless transmitter C and the wireless receiver *e* may be sympathetically synchronized, so that the one may actuate the other, and an impulse sent by the transmitter C may therefore operate

the receiver e and close the switch in the circuit of the magnet n'. This switch may be made of delicate construction and operate to close the switch n, which may be made of larger parts and contacting surfaces adapted to carry a heavy current to operate the motor a', and thus rotate the propeller-wheel a when desired.

By reversing mechanism already well known the motion transmitted by the motor a' to the propeller-wheel may at pleasure be reversed, so as to reverse the movement of the boat without stopping or reversing the motor. A reversing-gear (represented by a casing g) is shown interposed in the propeller-shaft a^2, and the end of its operating-lever is provided with a nut h, to which a screw i is fitted, and driven by a reversing-motor j through the intervention of friction-plates k. The screw is extended through a bearing k', and a strong spiral spring l is attached at opposite ends, respectively, to the bearing and to a dog upon the screw, so as to give the screw when required a movement reverse to that produced by the reversing-motor j. The reversing-motor j is shown in circuit with the battery f' and a switch actuated by the wireless receiver e', and such receiver e' may be constructed to operate sympathetically synchronously with the transmitter C', so that the reversing-motor j may be started by operating such transmitter C'. The motion of the reversing-motor j turns one of the friction-plates k, and the friction of such plate turns the adjacent plate and the attached screw i, thus operating to move the reversing-lever into a position opposite to that shown in the drawing and at the same time to wind up the spring l. The friction-plates slip when the reversing-lever has moved to the limit permitted by its adjustment. When the electric current is cut off from the reversing-motor j, its armature runs free and the spring reverses the rotations of the armature and of the screw and throws the lever of the reversing-gear g back to the position shown in the drawing. If the propeller is coupled with the motor a' to drive the vessel forward, with the reversing-lever in the position shown, then the actuation of the reversing-motor j by moving the lever to a reverse position would cause the propeller to drive the vessel backward, while the spring l would normally hold the reversing-gear g in a position upon the motor a' to drive the boat forward.

The rudder c is actuated by connection to a lever o, having a nut o' upon the end, with a screw p fitted thereto and connected with a steering-motor c'. A reversing-gear g' is shown inserted in the connection from the screw p to the motor c', and its reversing-lever is connected with a screw p', to which motion is conveyed, through friction-plates p^2, from a reversing-motor c^2. The steering-motor c' is in circuit with the battery f^2 and the wireless receiver e^2, and a switch actuated by the wireless receiver e^2, which would be sympathetically synchronized with the transmitter C^2, operates to connect the steering-motor c' with the battery and to rotate the screw p. The reversing-motor c^2 for the steering-gear is shown in circuit with the battery f^3 and the wireless receiver e^3, and a switch actuated by such wireless receiver serves to start the motor c^2 when required to move the lever of the rudder-reversing gear g'. The screw p' for actuating such reversing-lever would, like the screw i, be provided with a spring to hold the reversing-gear normally in a position for the steering-motor c' to pull the rudder to starboard, and the actuation of the motor c^2 through the agency of the wireless receiver e^3 would operate to reverse the effect of the motor c' upon the rudder and shift it to larboard. The screw p serves to hold the rudder securely in any position in which it may be when the battery-current is cut off from the steering-motor, which is effected at pleasure by operating the transmitter C^2 corresponding to the receiver e^2.

The drawing represents a submarine boat, and the means for shifting the ballast is represented diagrammatically by a water-tank q and a rotary pump d, (as of the double rotary-piston type,) adapted to propel the water in either direction in which its pistons are rotated. The opposite sides of the pump-cylinder are shown connected by pipes q' and q^2, respectively, with the tank and with the exterior of the vessel. A motor d' to rotate the pump-pistons is shown in circuit with the battery f^4 and a switch upon the wireless receiver e^4, and the actuation of the switch by the wireless receiver when influenced by the wireless transmitter C^4 serves to connect the ballast-motor with the battery. The shaft connecting the motor with the ballast-pump is shown provided with the reversing-gear g^2, having lever actuated by a screw r, friction-plates r', and motor r^2, arranged similarly to those for reversing the steering-gear. The motor r^2 is in circuit with the battery f^5 and a switch upon the wireless receiver e^5, and the actuation of such switch by the wireless receiver when influenced by the wireless transmitter C^5 serves to start the motor r^2. The screw r would be furnished (like the screw i for reversing the propeller) with a spring to hold the lever of the reversing-gear g^2 normally in a given position, which when the current is conducted to the ballast-motor d' would enable the pump to draw water from the tank q and discharge it from the vessel, thus lightening it and permitting it to rise in the water. The actuation of the motor r^2 would reverse the operation of the ballast-motor upon the pump and cause water to be drawn in from the exterior of the vessel and thrown into the tank q, thus causing the submarine vessel to sink in the water.

The drawing represents a charge s of explosive material in a tube in the bow of the boat and spark-wires t conducted from an induction-coil u to the base of the charge to ignite

and explode the same. The primary circuit of the induction-coil is shown connected with a battery f^6 through a switch actuated by a wireless receiver e^6, and a wireless transmitter C^6 is shown at the transmitting-station, which would be adjusted to operate the wireless receiver e^6 when required to explode the charge *s*. The vessel thus equipped constitutes a wirelessly electrically controlled torpedo, which may be directed and controlled from the wireless electric transmitting-station by a knowledge of the range, accurate timing of the transmission for each part and function of the run, an accurate knowledge of the speed, steering, raising, and sinking effects produced by the several motors during the different periods of time during which the corresponding electric impulses are transmitted wirelessly. By carefully recording or charting these during a run the position of the vessel from time to time may be known throughout the run by the operators at the transmitting station or stations.

It is obvious that the several wireless transmitters may be duplicated and located at different points—as, for instance, those for propelling and guiding the vessel in one station and that for exploding the charge in another station—as the operation would be the same and the invention embodied as fully as if the wireless transmitters were all located in the same station. Where the transmitters are located upon a moving vessel, the sphere of operations is of course greatly extended. It is obvious that the control of an induction-coil for igniting the explosive charge in a subaqueous or subterranean mine may be effected by the wireless receiver in the manner shown for igniting the explosive charge upon the vessel *b* and that the charge in the mine may be thus exploded from a fixed station or a floating vessel without any cable or wire connections to such charge. The explosion of such a stationary mine can be effected with more certainty at a desired time than if the electric discharger at such station were connected with the explosive charge in the mine by wire conductors, which would be liable to derangement or to interference from an enemy.

The above description illustrates some of the various operations which may be performed by motors upon a vessel under the control of wireless receivers with means moved thereby for actuating circuit-closing mechanism.

The circuit connected with the propeller-motor a' is shown closed indirectly by a switch moved by the wireless receiver, as it would not be feasible with feeble distant wireless electric impulses to close a heavy switch adapted to carry a heavy current for supplying a propeller-motor, and it should be understood that any of the circuits illustrated may advantageously be thus closed indirectly by a wireless receiver. The drawing shows a series of storage batteries, one for each of the motors represented; but a single battery may be used and the current divided to furnish the various circuits required to propel, steer, and otherwise operate the vessel. Any required number of mechanisms may be operated independently upon a single vessel or in a single receiving-station having no wire conductors extending to the transmitting-station, but having a wireless transmitter and wireless receiver sympathetically synchronously attuned electrically in unison with one another. By the words "sympathetically synchronously" used herein I mean that each wireless transmitter of electricity is arranged and attuned electrically in unison with a corresponding wireless receiver of electricity, so that the said receiver can only receive, accept, and act upon wireless electric impulses from its corresponding electrically-attuned transmitter.

Having thus set forth the nature of the invention, what is claimed herein is—

1. The combination, with a movable vessel, of a series of electric motors for operating the propeller, the steering-gear, the ballast-shifter and other required agencies, an electric battery or batteries upon the vessel for operating such motors, a circuit and circuit-closing mechanism connecting each of such motors separately with the battery, a series of wireless receivers of electricity each having means actuated thereby and connected with one of the circuit-closing mechanisms, and a corresponding series of wireless transmitters of electricity, such receivers and transmitters being mutually sympathetically synchronized in unison in pairs, whereby any of the said motors may be operated at pleasure from a convenient distance.

2. The combination, with a movable vessel, of a motor for propelling the same, mechanism for initiating the movement of such motor, a wireless receiver of electricity with means moved thereby for actuating such initiating mechanism, and a wireless transmitter of electricity operated sympathetically synchronously in unison with the said wireless receiver, a rudder upon the vessel for steering the same, an electric steering-motor for moving such rudder, an electric circuit and switch for operating such steering-motor, a wireless receiver of electricity with means moved thereby for actuating such switch to initiate the movement of said motor, and a wireless transmitter of electricity operated sympathetically synchronously in unison with the said wireless receiver.

3. The combination, with a movable vessel, of a motor for propelling the same, mechanism for initiating the movement of such motor, a wireless receiver of electricity with means moved thereby for actuating such initiating mechanism, and a wireless transmitter of electricity operated sympathetically synchronously in unison with the said wireless receiver, a rudder upon the vessel for steering the same, an electric steering-motor for mov-

ing such rudder, an electric circuit and switch for operating such steering-motor, a wireless receiver of electricity with means moved thereby for actuating such switch to initiate the movement of said motor, a wireless transmitter of electricity operated sympathetically synchronously in unison with the said wireless receiver, mechanism for reversing the operation of the motor upon the rudder, a reversing-motor for actuating such mechanism, a circuit and switch for operating such reversing-motor, a wireless receiver of electricity with means moved thereby for actuating such switch to initiate the movement of said reversing-motor, and a wireless transmitter of electricity operated sympathetically synchronously in unison with the said wireless receiver.

4. The combination, with a movable vessel, of a propeller and electric motor for actuating the same, a rudder and electric motor with suitable connections for actuating the rudder, and a ballast-shifter with an electric motor and suitable connections for operating such ballast-shifter, a circuit and switch connecting each of the said motors with a source of electricity upon the said vessel, a separate wireless receiver of electricity with means moved thereby for initiating separately the movement of each of such switches, and separate wireless transmitters of electricity each operated sympathetically synchronously in unison with one of the said wireless receivers, whereby the operations of propelling, guiding and shifting the ballast upon the vessel may be controlled independently from a distance.

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

LIDA WILSON.

Witnesses:
WALTER H. TALMAGE,
THOMAS S. CRANE.