

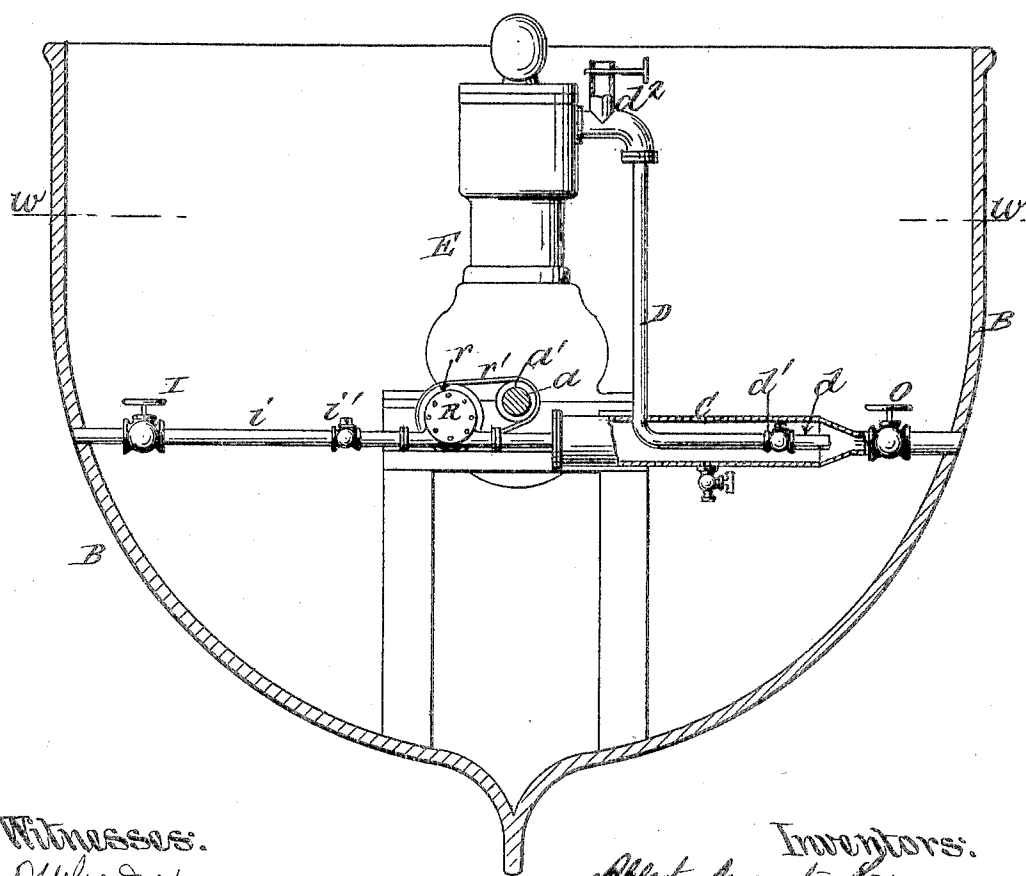
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A. A. LOW & A. WASSMANN.

HYDROCARBON MOTOR.

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Witnesses:

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HYDROCARBON-MOTOR.

SPECIFICATION forming part of Letters Patent No. 793,885, dated July 4, 1905.

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To all whom it may concern:

Be it known that we, ABBOT AUGUSTUS LOW, residing at Horseshoe, St. Lawrence county, and AUGUST WASSMANN, residing at Astoria, Queens county, State of New York, citizens of the United States, have invented certain new and useful Improvements in Hydrocarbon-Motors, of which the following is a specification sufficient to enable others skilled in the art to which the invention appertains to make and use the same.

Our improvements relate to marine motors which are actuated by intermittent explosions of vaporized hydrocarbon; and it has for its object to regulate and maintain a continuous uniform flow of water around the discharge end of the conduit for the products of combustion, so as to cool off that portion of the conduit during the intervals between the explosions in the combustion-chamber, and thereby promote the condensation of the gases; and to this end the invention consists in the novel construction and combination of parts, as hereinafter more fully described, shown in the drawing, and then particularly pointed out in the appended claims.

The accompanying drawing, which, with the characters of reference thereon, forms a part of this specification, illustrates diagrammatically the practical embodiment of our invention in a vessel.

B represents the hull of a boat or marine vessel of any kind submerged mainly below the water-line *ww*.

E is a gas, kerosene, or other hydrocarbon engine of any description, the operative parts and connections being omitted in the drawing, with the exception of the power-shaft *a* and the discharge-conduit D.

R is a rotary pump, the driving-wheel *r* of which is operated directly by a pulley *a'*, formed on or attached to the power-shaft *a* of the engine E through the medium of the belt *r'*. The rotary pump R when the engine E is in operation and provided with the inlet sea-gate I and outlet sea-gate O are both open forces a continuous current of fresh cold water into and through the water-jacket or cooling-chamber C, in which the lower portion or

horizontal extension *d* of the discharge-conduit D is situated. A check-valve *i'* is interposed in the inlet-pipe *i* between the inlet sea-gate I and the rotary pump R, and a check-valve *d'* is also situated in the discharge-pipe *d* to prevent the possibility of back pressure therein.

The discharging-conduit D is provided with a relief valve or damper *d''*, which may be opened in whole or in part while the engine is started or to regulate or modify the tension within the said discharge-conduit, if desired.

The operation is as follows: The engine having been started and both the inlet and outlet sea-gates I and O having been opened, a continuous supply of cold water is injected into the chamber or jacket C, cooling the products of combustion in the discharge-pipe *d*, and thereby tending to create a vacuum therein and at the same time forcibly ejecting the products of combustion through the outlet sea-gate O, this enforced ejection of the products of combustion by the water also tending to increase the vacuum in the discharge-conduit by suction, so that the power of the motor is augmented to that extent, while discharging of said products is muffled or rendered practically noiseless. The forced current of cold fresh water acting continuously cools off the discharge end of the conduit in the intervals between the ejection of the products of combustion, and thereby promotes the condensation of the gases prior to their actual contact with the water, hence lessening the noise and preventing their escape in gaseous form into the atmosphere.

It is to be noted that our means for effecting the ejection of the products of combustion are situated below the water-line *ww*, so that the resistance of the water has to be overcome, and this we accomplish by the rotary pump R, which not only relieves the discharged products from all need of overcoming such water resistance, but, as a matter of fact, sucks out and ejects such products through the gate O against the resistance of the external water. In other words, the rotary pump R does the work and insures the positive discharge of the products of com-

bustion in such manner that the latter have to overcome no resistance, but are taken up, absorbed, and ejected by the water. The suction thus created in the discharge-conduit is augmented by the condensation of the products of combustion by the cold water in the jacket C, the partial vacuum thus created reducing the resistance to the minimum and adding to the effective power of the motor. This decrease in resistance is so great, as we have found by actual test and experience, that we are enabled to materially reduce the diameter of the discharge-pipe *d*, as indicated in the drawing, with beneficial results. The continuous flow of water obtained by the use of the rotary pump R is an important factor in insuring the smooth and noiseless operation of the motor, since it insures the cooling of the discharge end of the conduit during the intervals between the actual ejection of the products of combustion.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In a motor-driven vessel, the combination with an internal-combustion motor for driving the same, of a water-jacket disposed transversely of the hull, a discharge-conduit for the products of combustion from said motor extending axially within the said water-jacket, an inlet-pipe below the water-line for

fresh cold water from the exterior of the vessel, a rotary pump interposed between said inlet and the water-jacket for insuring a continuous flow of fresh cold water into the water-jacket, an inlet sea-gate, and an outlet sea-gate, and means for driving said pump directly from the shaft of the motor.

2. In a motor-driven vessel, the combination with an internal-combustion motor for driving the same, of a water-jacket disposed transversely of the hull, an outlet sea-gate controlling the outlet from said water-jacket, an inlet-pipe for fresh cold water disposed below the water-line, an inlet sea-gate in said pipe, a rotary pump mounted on said pipe and positively driven directly from the shaft of the motor and arranged to force a continuous flow of fresh cold water through the said pipe and water-jacket, a check-valve in the discharge-conduit from the motor within the water-jacket, and a relief-valve in said discharge-conduit between said check-valve and its connection with the motor, all substantially as and for the purpose specified.

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