(No Model.) 2 Sheets—Sheet 1.

S. & J. A. SECOR.

MEANS FOR PROPELLING VESSELS.

No. 313,689. Patented Mar. 10, 1885.

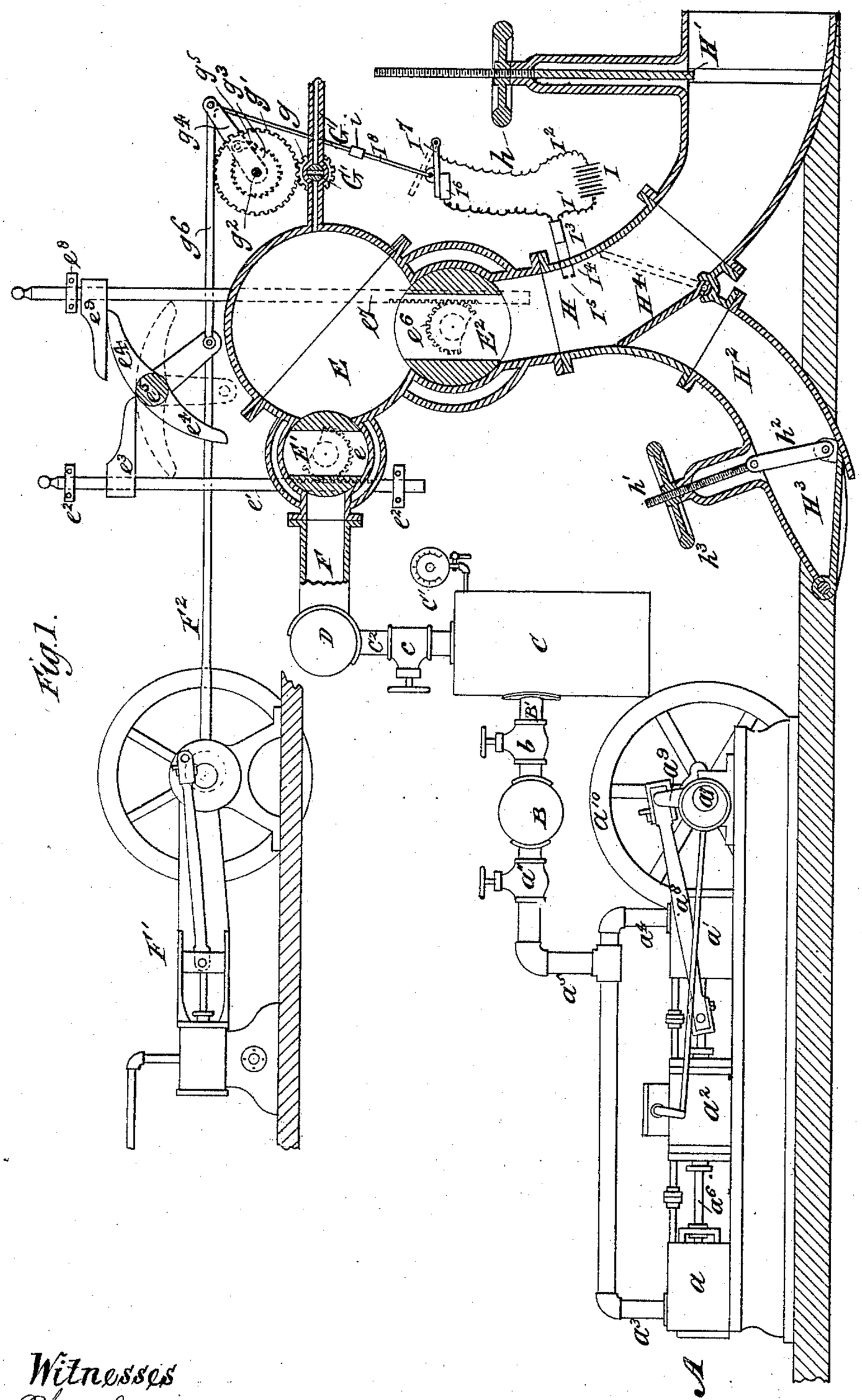

Fig. 1.

Witnesses
Wm. G. Lipsey
Geo. Gaddis

Inventor
Samuel Secor.
John A. Secor.
by their attorneys
Gibbons & Brown.

(No Model.) 2 Sheets—Sheet 2.

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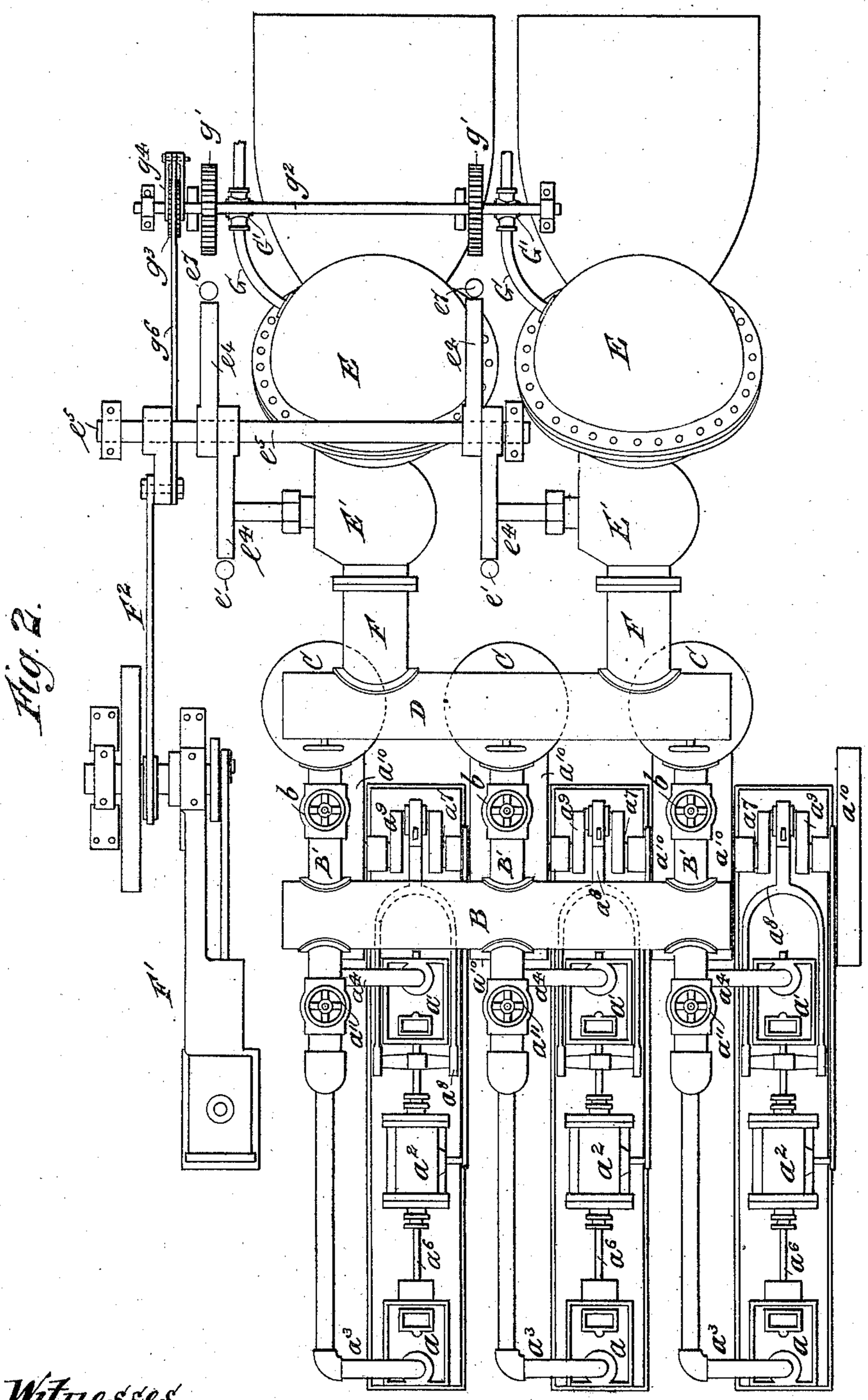

Fig. 2.

Witnesses
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Geo. Wadman

Inventor
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UNITED STATES PATENT OFFICE.

SAMUEL SECOR AND JOHN A. SECOR, OF BROOKLYN, ASSIGNORS OF ONE-FOURTH TO RICHARD POILLON, OF NEW YORK, N. Y.

MEANS FOR PROPELLING VESSELS.

SPECIFICATION forming part of Letters Patent No. 313,689, dated March 10, 1885.

Application filed August 19, 1884. (No model.)

To all whom it may concern:

Be it known that we, SAMUEL SECOR and JOHN A. SECOR, of Brooklyn, in Kings county and the State of New York, have invented a certain new and useful Improvement in Means for Propelling Vessels, of which the following is a specification.

The object of our improvement is to provide a means for propelling vessels whereby a more direct application of the power may be made than is ordinarily possible.

We will describe in detail an apparatus embodying the improvement, and then point out the various features of the improvement in claims.

In the accompanying drawings, Figure 1 is a vertical section of a vessel and a sectional elevation of an apparatus embodying our improvement for propelling the vessel; and Fig. 2 is a plan of the said apparatus.

Similar letters of reference designate corresponding parts in both figures.

A designates air-compressing engines, of which there may be any suitable number. We have shown three of them in the present example of our invention. Each has two air-compressing cylinders, a a', and an intermediate engine-cylinder, a^2, in which steam or other suitable motive agent can be used. Pipes a^3 a^4 extend from the air-compressing cylinders a a' and communicate with a pipe, a^5. One rod, a^6, may be connected to the piston of all three cylinders.

The valve-gear of the engine-cylinder a^2 may be of any suitable style and operated from an eccentric on a rotary shaft, a^7. The rod a^6 is connected by a link or rod, a^8, to a crank, a^9, on the shaft a^7. On the shaft a^7 are fly-wheels a^{10}.

The pipe a^5 of each air-compressing engine communicates with a chamber, B, here shown as of cylindrical form. This chamber may be made of boiler-iron. The communication of each pipe a^5 with the chamber B is controlled by a cock or valve, a^{11}. By closing any of the valves a^{11} the air-compressing engine with whose pipe a^5 that valve is combined may be rendered useless for the purpose for which it is intended. The chamber B communicates with chambers C, preferably made of similar material. Three of these chambers C are shown. Pipes B′ establish communication between the chamber B and the chamber C. Valves b are combined with the pipes B′, and control the communication between the chamber B and the chambers C. The chambers C may be furnished with pressure-gages C′, if desirable. Pipes C^2 establish communication between the chambers C and a chamber, D, which is similar to the chamber B. With the pipes C^2 are combined valves c, whereby the communication between the chambers C and the chamber D can be controlled at pleasure. From the chamber D extend pipes F. These pipes F lead to propellers, of which but two are here shown.

We will now describe the propellers. Each has a combustion-chamber, E, which may be approximately of spherical form. One of the pipes F communicates with each of these chambers under control of an induction-valve, E′, here shown as consisting of a rotary plug having a transverse port. On the stem of this valve is a toothed sector, e, engaging with a toothed rack-bar, e'. This rack-bar e' slides in bearings e^2, and is provided with a toe, e^3. A rocker, e^4, arranged on a shaft, e^5, acts on the toe e^3, raising and lowering it so as to cause the rotation of the induction-valve E′ suitably for establishing and cutting off communication between the pipe F and the combustion-chamber. The rocker e^4 is operated by means of a steam or other engine, F′, of any suitable kind. From an eccentric on a rotary shaft comprised in this engine F′ a link or rod, F^2, extends to an arm on the shaft of the rocker, and thus motion is imparted to the latter. The combustion-chamber E also has an eduction-valve, E^2, shown as similar to the induction-valve E′. On the stem of the eduction-valve E^2 is a toothed sector, e^6, which engages with a toothed rack-bar, e^7, sliding in bearings e^8. The rack-bar e^7 is provided with a toe, e^9, on which the rocker e^4 acts. The rocker e^4 simultaneously raises the rack-bar e^7 and lowers the rack-bar e', and vice versa. The ports of the valves E′ E^2 are so arranged that when one valve communicates with the chamber the other does not.

G designates a pipe through which gas or any suitable hydrocarbon is forced into the combustion-chamber by means of a pump or pressure generated in any other suitable man-

ner. In this pipe G is a valve, G′, here shown as consisting of a rotary plug provided with a transverse port. This valve permits escape of the gas or hydrocarbon into the combustion-chamber when the valve E′ permits the passage of compressed air into the said chamber. It is opened when the valve E′ is opened, and closed when the valve E′ is closed. On its stem is a toothed pinion, g, which engages with a toothed gear-wheel, g', arranged on a shaft, g^2. The shaft g^2 is provided with a ratchet-wheel, g^3. On this shaft g^2 is loosely mounted an arm, g^4, carrying a pawl, g^5, which engages with the ratchet-wheel g^3. A rod, g^6, connects the arm g^4 with the arm of the rocker e^4. Hence when the rocker e^4 is operated the valve G′ will be partially rotated. The gear-wheel g' and pinion g are used to afford the valve G′ the requisite amount of motion.

From the combustion-chamber E a conduit or pipe, H, extends to the rear of the vessel and opens into the water in rear of the vessel. When the eduction-valve E′ is opened, the contents of the combustion-chamber pass into the conduit H. The communication of the conduit H with the water in rear of the vessel is controlled by a valve, H′, here shown as having a screw-threaded stem engaging with a nut, h, whereby the valve may be raised and lowered. A branch conduit, H^2, extends forwardly from the conduit H and communicates with the water below the vessel under control of a valve, H^3, operated by a screw, h', connected with it through a link, h^2, and a nut, h^3, engaging with the screw. A valve, H^4, controls communication between the conduit H and branch conduit H^2. It may be operated by an arm on the pivot-pin. When the vessel is to be propelled forward, the valve H^4 is thrown over against the upper end of the branch conduit H^2, the valve H^3 is closed, and the valve H′ is opened. When, however, the vessel is to have its forward motion quickly stopped, or when it is to be backed, the valve H^4 is thrown over across the conduit H, the valve H′ is closed, and the valve H^3 is opened.

We do not wish to be restricted to the form of valves shown, as others can be used.

I designates an electric battery. I' I^2 designate electric circuit-wires extending therefrom to the ends of the primary wire of an induction-coil, I^3. The ends of the secondary wire of this induction-coil have connected to them wires I^4 I^5, provided with terminals, here shown as arranged within the conduit H just below the combustion-chamber E. The wire I' is connected to a metal contact-piece, I^6, and the wire I^2 is connected to a metal contact-piece, I^7, which is pivoted to a support and adapted to be swung into and out of contact with the contact-piece I^6. A rod, I^8, connects the contact-piece I^7 with the arm g^4, extending from the shaft g^2. This rod will preferably be made of metal, and in such case it will be made of two sections united by a coupling, i, of insulating material.

Instead of employing this electrical apparatus for igniting the contents of the conduit and combustion-chamber, we may ignite the same by any other suitable means. When the air-induction valve E′ and the valve G′ are closed, the electric circuit will be closed, and thereupon an electric spark will be produced in the conduit H. The contents of the conduit and the combustion-chamber will be thereby ignited. Immediately upon the ignition of the contents of the conduit and combustion-chamber an explosion will occur. The force thus generated acting upon the water will impart motion to the vessel.

The two propellers may be made to act alternately.

It will be seen that by our invention power may be utilized more directly than ordinarily.

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

1. In an apparatus for propelling vessels, the combination of a combustion-chamber, a conduit extending from the combustion-chamber to the water, a valve controlling the admission of air to the combustion-chamber, a valve controlling the admission of gas or suitable hydrocarbon into the combustion-chamber, a valve for controlling the passage of the contents of the combustion-chamber into the said conduit, and mechanism for igniting the contents of the combustion-chamber and conduit, substantially as specified.

2. In an apparatus for propelling vessels, the combination of a combustion-chamber, a valve controlling the admission of air into the combustion-chamber, a valve controlling the admission of gas or suitable hydrocarbon into the combustion-chamber, a conduit leading from the combustion-chamber to the water, a valve controlling communication between the combustion-chamber and the conduit, a branch conduit extending from the main conduit, valves whereby either conduit may be adapted for use and the other rendered useless, and mechanism for igniting the contents of the conduit and combustion-chamber, substantially as specified.

3. In an apparatus for propelling vessels, the combination of a combustion-chamber, a valve controlling the admission of air into the combustion-chamber, a valve controlling the admission of gas or suitable hydrocarbon into the combustion-chamber, a conduit leading from the combustion-chamber to the water, a valve controlling communication between the combustion-chamber and the conduit, means for igniting the contents of the conduit and combustion-chamber, and a mechanism whereby the said valves and the igniting mechanism will be operated at the proper times, substantially as specified.

4. In an apparatus for propelling vessels, the combination of an air-compressor, a combustion-chamber, a valve controlling the admission of compressed air to the combustion-chamber, a valve controlling the admission of gas or suitable hydrocarbon into the combustion-chamber, a conduit leading from the com-

bustion-chamber to the water, a valve controlling communication between the combustion-chamber and the conduit, and a mechanism for igniting the contents of the conduit and combustion-chamber, substantially as specified.

5. In an apparatus for propelling vessels, the combination of air-compressors A, pipes a^5, cock a^{11}, chamber B, pipes B′, valves b, chambers C, pipes C^2, valves c, chamber D, pipes F, combustion-chambers E, valves E′, valves G′, conduits H, and valves E^2, substantially as specified.

6. In an apparatus for propelling vessels, the combination of a combustion-chamber, E, valve E′, toothed sector e, toothed rack-bar e', toe e^3, rocker e^4, valve E^2, toothed sector e^6, toothed rack-bar e^7, toe e^9, pipe G, valve G′, pinion g, toothed gear-wheel g', shaft g^2, ratchet-wheel g^3, and arm g^4, carrying pawl g^5, substantially as specified.

SAMUEL SECOR.
JOHN A. SECOR.

In presence of—
JOSEPH M. EVERETT,
C. AUGUSTUS HAVILAND.