

(No Model.)

R. A. CHESEBROUGH.

PNEUMATIC PROPELLING AND STEERING APPARATUS.

No. 397,223.

Patented Feb. 5, 1889.

Fig. 1.

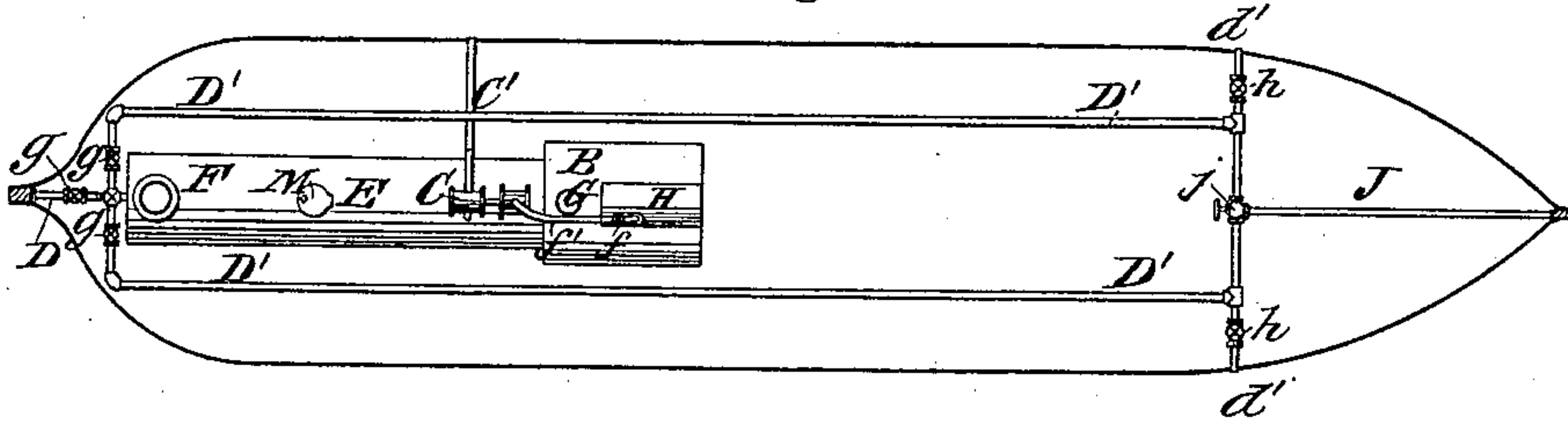
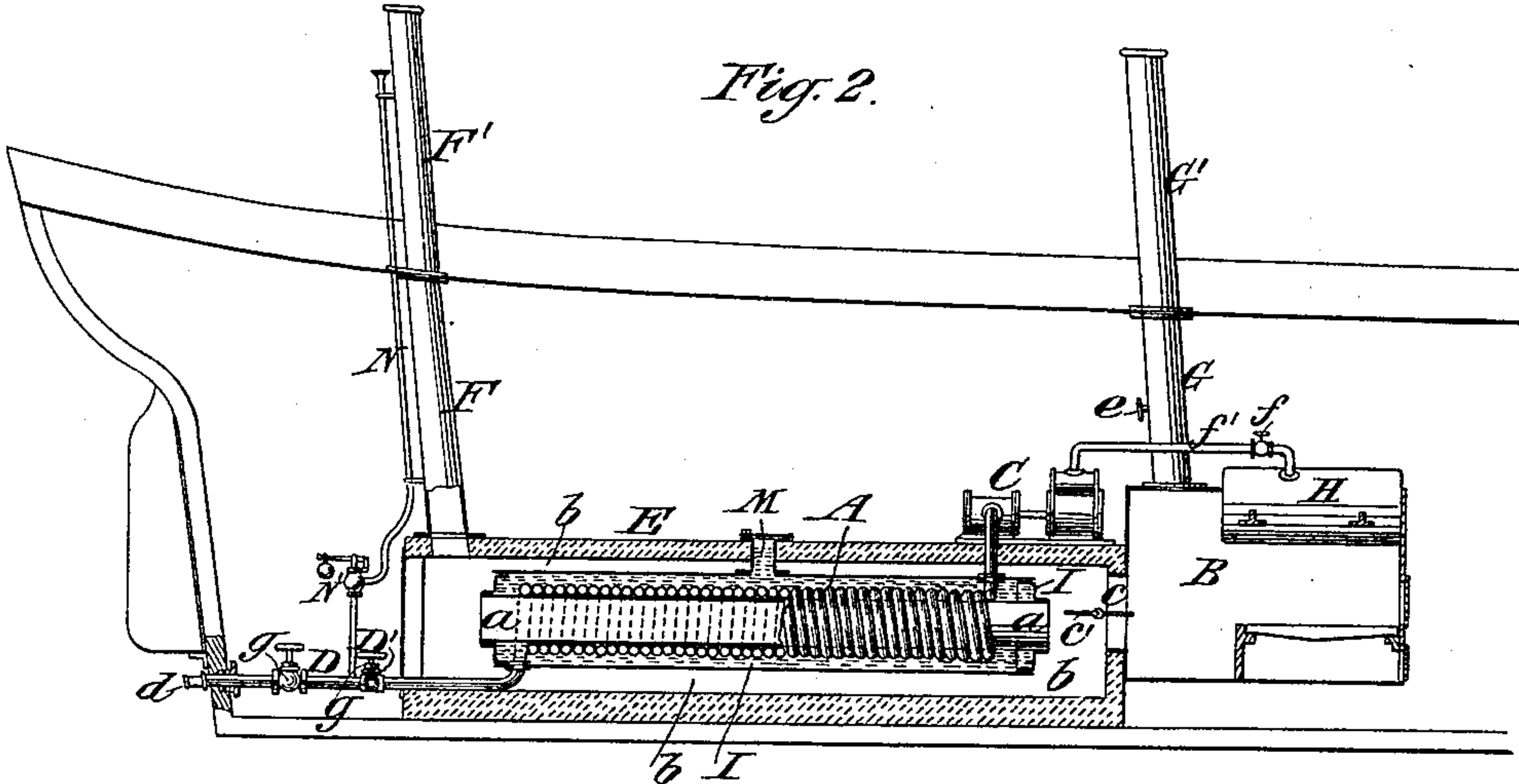


Fig. 2.



Witnesses:

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PNEUMATIC PROPELLING AND STEERING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 397,223, dated February 5, 1889.

Application filed October 19, 1888. Serial No. 288,539. (No model.)

To all whom it may concern:

Be it known that I, ROBERT A. CHESEBROUGH, of New York, in the county and State of New York, have invented a new and
5 useful Improvement in Apparatus for Propelling and Steering Ships and other Vessels, of which the following is a specification, reference being had to the accompanying drawings.

10 This invention relates to the propulsion of vessels by the ejection, through a pipe entering the water astern or outside of the vessel, of steam generated on board the vessel.

The improvement will be first described
15 with reference to the drawings, and its novelty will be pointed out in the claims.

Figure 1 in the drawings is a plan of the interior of a vessel fitted with my propelling apparatus. Fig. 2 represents a vertical sectional view of the after part of the vessel and
20 of the propelling apparatus.

Similar letters of reference designate corresponding parts in all the figures.

A B designate the principal members of
25 the steam-generator, the member A consisting of a hollow coil or worm made of copper or other metal pipe. The member B consists of a furnace for heating the said coil.

30 C designates a steam-pump for forcing water into the coil at that end thereof nearest the furnace.

D is a pipe proceeding from the other end of the coil and projecting from the stern of the vessel in the form of a nozzle, as shown at
35 d in Fig. 2.

The coil A is represented as arranged horizontally in the form of a cylindrical helix and as having a flue, a, running directly through it, and is also represented as inclosed
40 within a setting or casing, E, the interior of which forms a flue, b, surrounding said coil externally. Communication between the said flues and furnace is provided by an opening, c, fitted with a damper, c', by which it may be
45 closed when desired. An uptake, F, and a smoke-stack, F', are provided at the end of the setting or casing E farthest from the furnace, and an uptake, G, and smoke-stack G' are provided the furnace B, the last-mentioned uptake being fitted with a damper, e,
50 by which it may be closed.

H designates a small boiler for generating

steam for the purpose of driving the steam-pump C. This boiler is here represented as heated by the same furnace, B, which is employed to heat the coil A. 55

C' designates the suction-pipe of the steam-pump, through which water is supplied to the said pump from any suitable point outside the vessel. 60

The coil is represented as surrounded by a jacket, I, which is filled with lead or other fusible metal, which is intended to be kept melted by the heat within the flues a b, for the purpose of preventing the coil from being
65 rapidly burned out by the heat of the flues and for insuring better distribution of the heat throughout the length of the coil. The said jacket is represented as having a mouth-piece, M, furnished with a cover, which may
70 be opened to introduce the fusible metal. A safety-valve, N', and an escape-pipe, N, are represented on the outlet-pipe D to permit the escape of steam in case of excessive pressure being at any time from any cause developed in the coil. 75

The operation of the propelling apparatus, so far as I have at present described it, as for propelling the vessel in a forward direction, is as follows: The damper e being closed
80 and the damper c' being open, the flame and heated gaseous products of combustion from the furnace B circulate through the flues a b and escape by the uptake F and the smoke-stack F'. The steam-pump C is at the same
85 time set in motion by opening the stop-valve f in its steam-pipe f'. Water taken from outside the vessel through the pipe C' is then driven forcibly into and along the coil, and as it passes along the coil steam is generated
90 from it until, at the end of the coil farthest from the furnace, the water has all been converted into steam, in which form it issues from the coil through the pipe D and nozzle d, whence it is projected against the water at
95 the stern of the vessel and thereby caused to propel the vessel forward.

In the above-described operation the circulation through the coil A is so intense and rapid that salt-water and steam generated
100 therefrom will pass through without leaving any deposit of sediment.

In Fig. 1 I have represented pipes D' D' as branching off from the exit-pipe D and run-

ning forward on opposite sides of the vessel, terminating in the nozzles $d' d'$, which project through the sides of the vessel near the bow thereof. The pipes $D' D'$ are each provided with a separate stop-valve, g , for the purpose of closing it whenever necessary; but these valves will generally be open. The said pipes are also fitted with stop-valves $h h$, which are to be within control of the steersman from the front part of the vessel.

When the vessel is to be propelled in a forward direction or under ordinary circumstances, the stop-valves $h h$ in the pipes $D' D'$ are closed, while the valve g in the pipe D is left open. The vessel may then be steered by the ordinary rudder; but in case of its being desired to turn the vessel rapidly or within a short distance the stop-valve g in the pipe D may be closed and that, h , in either of the pipes D' opened, when the steam issuing from the nozzle d' of the open pipe D' will cause the vessel to be turned in the opposite direction to that in which the steam issues from the said nozzle. The addition of the pipes $D' D'$ therefore constitutes a steering apparatus.

For backing the vessel, it is necessary to have a pipe proceeding from the exit end of the coil or worm in a forward direction through the bow of the vessel. I have represented such a pipe, J , in Fig. 1 as connected with the pipes $D' D'$ and furnished with a stop-valve, j , to be opened when it is desired to propel the vessel backward, the said valve being within the control of the steersman.

When it is desired to stop the operation of this propelling and steering apparatus, the damper c' is to be closed and the damper e opened. The heated products of combustion of the furnace will then pass through the uptake G and smoke-stack G' , and the generation of steam in the coil A will soon cease. The pump C may, however, still be kept in operation to keep a gentle circulation of water through the coil; but to obviate all danger of explosion the safety-valve N' and escape-pipe N are provided.

The size of the coil or worm used will be determined by the size of the vessel. The coil or worm may be of any suitable form; but for very large vessels, which would require so large a coil or worm that it would be difficult to make it in the form of a helix, a worm may be made of a number of straight lengths of large iron pipe arranged side by side and connected at their ends by return-bends.

Experience will determine the pressure and temperature of the steam, which it shall be best to use; but I now believe that steam of over two hundred pounds pressure per square inch and of a temperature at least 400° Fahrenheit will prove the most efficient for the purpose.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, in an apparatus for propelling a ship or other vessel, of a steam-generator consisting of a hollow coil and a furnace for heating it, a force-pump connected with one end of said coil to force water thereinto, and a pipe or nozzle proceeding from the other end of the said coil into the outside water for the ejection therefrom of steam generated in said coil from the water forced therein by the pump, substantially as herein described.

2. The combination, in an apparatus for propelling and steering a ship or other vessel, of a steam-generator consisting of a hollow coil and a furnace for heating it, a force-pump connected with one end of the said coil for forcing water thereinto, two or more pipes or nozzles proceeding in different directions from the other end of said coil into the outside water for the ejection of steam therefrom, and stop-valves in said pipes or nozzles for closing either of them at pleasure, substantially as and for the purpose herein described.

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Witnesses:

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