

No. 722,628.

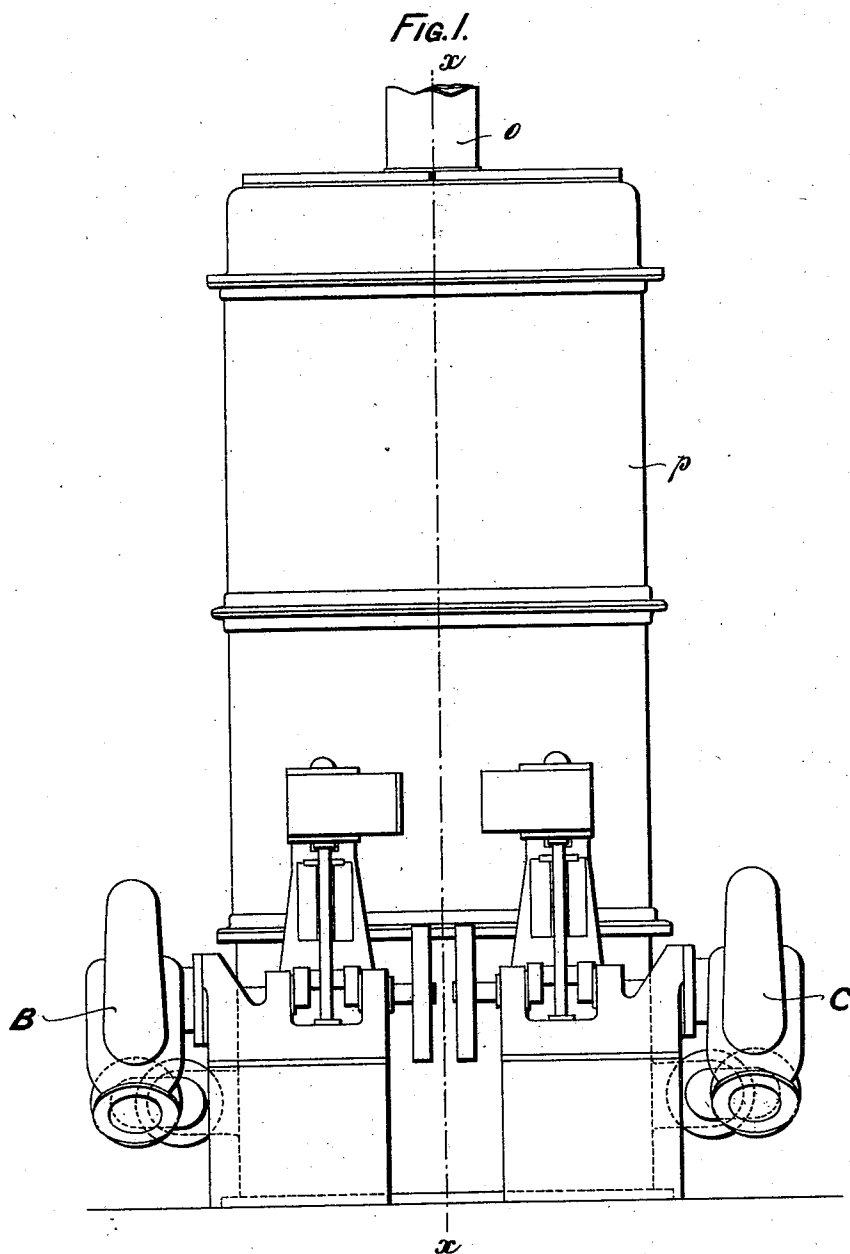
PATENTED MAR. 10, 1903.

J. R. RICHMOND.
STEAM SURFACE CONDENSER.

APPLICATION FILED JULY 11, 1902.

NO MODEL.

3 SHEETS—SHEET 1.



WITNESSES

Stephen Kinsta

Charles A. Bateman

INVENTOR

John R. Richmond,
by Wilkinson & Fisher,
Atty.

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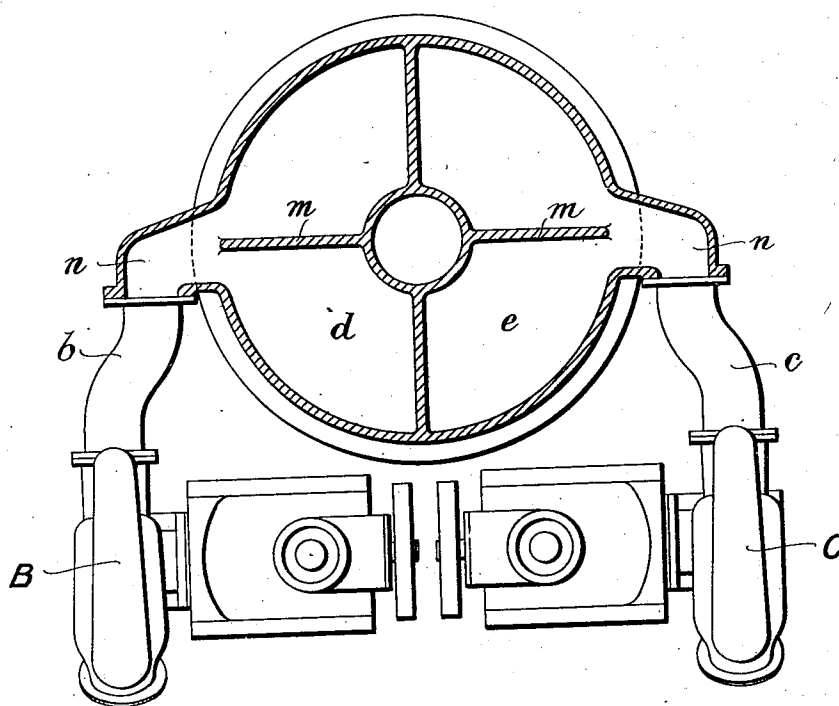
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3 SHEETS—SHEET 2.

NO MODEL.

Fig. 2.



WITNESSES.

Stephen Hinton

Clarence A. Patterson

INVENTOR.

John R. Richmond,
by Wilkinson & Fisher,
Attys.

No. 722,628.

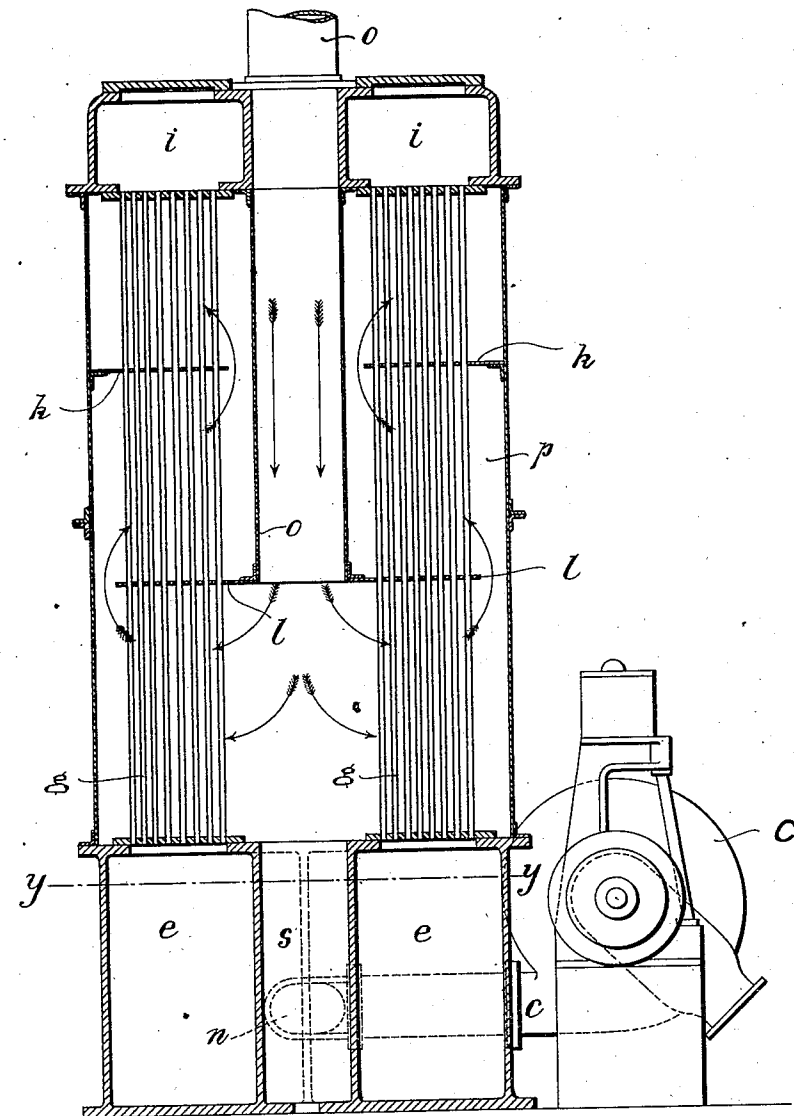
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3 SHEETS—SHEET 3.

FIG. 3.



WITNESSES.

Stephen Kinsten.

Clarence A. Bateman.

INVENTOR

John R. Richmond,

by Wilkinson & Fisher,
Attys.

UNITED STATES PATENT OFFICE.

JOHN RITCHIE RICHMOND, OF GLASGOW, SCOTLAND.

STEAM SURFACE CONDENSER.

SPECIFICATION forming part of Letters Patent No. 722,628, dated March 10, 1903.

Application filed July 11, 1902. Serial No. 115,207. (No model.)

To all whom it may concern:

Be it known that I, JOHN RITCHIE RICHMOND, a subject of His Majesty the King of Great Britain, residing at Glasgow, Scotland, have invented a new and useful Improvement in Steam Surface Condensers, of which the following is a specification.

My invention relates to improvements in steam surface condensers, more particularly to those taking their supply of circulating or cooling water from rivers, ponds, or the like, where considerable difficulty is frequently experienced, owing to mud, leaves, or other foreign substances being drawn into the supply-passages and partially, if not entirely, choking same, and to marine condensers, where the same disadvantages are frequently experienced from the action of sea-weed or other marine growths, the object of the invention being to overcome such disadvantages by providing means for enabling the flow of circulating or cooling water to be reversed as desired, whereby growths, rubbish, and the like may be easily and automatically removed from the passages and tubes.

In the accompanying drawings, which illustrate my invention, Figure 1 is a front elevation of a condenser constructed according to one form of my invention. Fig. 2 is a plan thereof, partly in section, on line *y y*, Fig. 3; and Fig. 3 is a vertical section on line *x x*, Fig. 1.

Similar letters refer to similar parts throughout the several views.

It will be understood that I do not limit the application of my invention to any particular form of condenser; but in the drawings I have shown a condenser substantially similar to the one forming the subject-matter of my co-pending application, Serial No. 115,206, filed July 11, 1902, and which consists of a vertical cylinder having a chamber *i* at its upper end and a chamber at the base, the latter being divided into two compartments *d* and *e*, each again partially divided by vertical diaphragms *m m*. Communication is obtained between the compartments *d e* and chamber *i* by means of two series of condensing-tubes (one series, *g g*, being shown in Fig. 3) arranged in a chamber *p*. At or near the base of the condenser are arranged two circulating-pumps B and C, capable of independent

action and each having communication with one of the compartments *d* or *e* of the lower chamber by suitable connections *b c*, respectively, with the flanged mouths *n n*. The steam enters the condenser by means of a pipe *o*, which passes through chamber *i* and extends down some way into the interior of the chamber *p* and carries a baffle-plate *l* at its inner end, a second baffle-plate *k* being secured to the wall of the chamber *p* at a suitable distance above the plate *l* to compel the steam to take a course as indicated by the arrows in Fig. 3. The water of condensation passes out by a suitable outlet in the central passage *s*.

The operation of the part of the apparatus to which the present invention relates is as follows: The circulating or cooling water drawn from any suitable supply by, say, the pump C is forced through the pipe *c* into the compartment *e* of the lower chamber, the partition *m* equalizing the rush of water over the chamber. The water then rises through the series of tubes *g g* above the compartment *e* into the chamber *i*, from whence it passes down the second series of tubes parallel to the series *g g* into the compartment *e*, and so through the pipe *b* and pump B, the latter assisting the movement of the liquid through the condenser, so that an efficient circulation is attained. If now the action of the pumps is reversed, the flow will be reversed and the passages, tubes, and other parts will have the rubbish and like foreign matter collected on or in them removed.

It will be evident that instead of passing through the second pump the water may be discharged through a separate outlet; but the action of this second pump is beneficial in assisting the flow, or the direction of flow may be reversed in other ways—say, for example, by employing a single pump, which by means of suitable valves (or by a two-way valve) and connections may be caused to direct the flow in either direction, as is required by the condition of the interior of the apparatus.

What I claim is—

1. The combination with a steam surface condenser of means for providing a continuous flow of cooling water in one direction there-through and means for reversing the direction of such flow for the purpose set forth.

2. The combination with a steam surface condenser of independent circulating-pumps for providing a continuous flow of cooling water through same in reverse directions as desired for the purpose set forth.

3. The combination with a steam surface condenser having water - passages there-through, of means for circulating a flow of cooling-water in one direction through said water-passages and alternately in the opposite direction therethrough for cleaning said passages of foreign substances.

4. The combination with a steam surface condenser having water - passages there-through, of means comprising independent circulating-pumps for circulating a flow of cooling-water in one direction through said water-passages and alternately in the opposite direction therethrough for cleaning said passages of foreign substances.

5. The combination with a steam surface condenser of separate cooling-water chambers, a connection from the exterior into each,

means for providing a continuous flow of water into one chamber and out at the other and means for reversing the direction of such flow whereby the connection into each chamber is alternately an inlet and an outlet substantially as described.

6. The combination with a steam surface condenser having water - passages there-through, of means for circulating a flow of cooling-water in one direction through said water-passages and alternately in the opposite direction therethrough for cleaning said passages of foreign substances, said means comprising independent circulating-pumps alternately coacting as inlet and discharge pumps.

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

JOHN RITCHIE RICHMOND.

Witnesses:

JOHN CRAIG,

JAMES D. IMRIE.