(No Model.)

B. T. STOWELL.

STEAM CONDENSER.

No. 285,703. Patented Sept. 25, 1883.

Fig. 2.

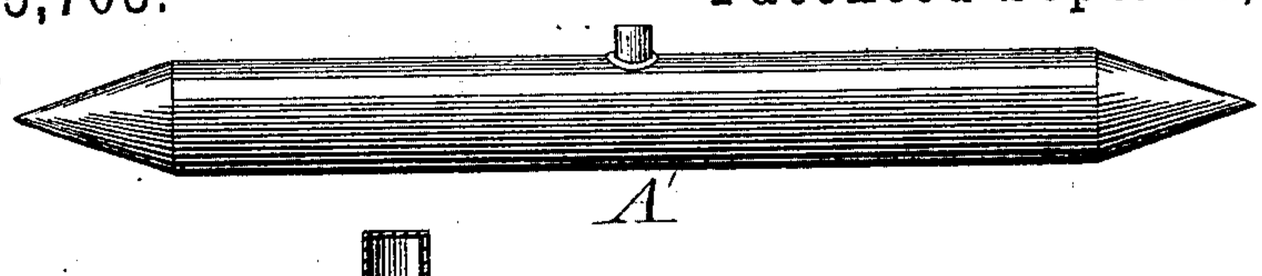
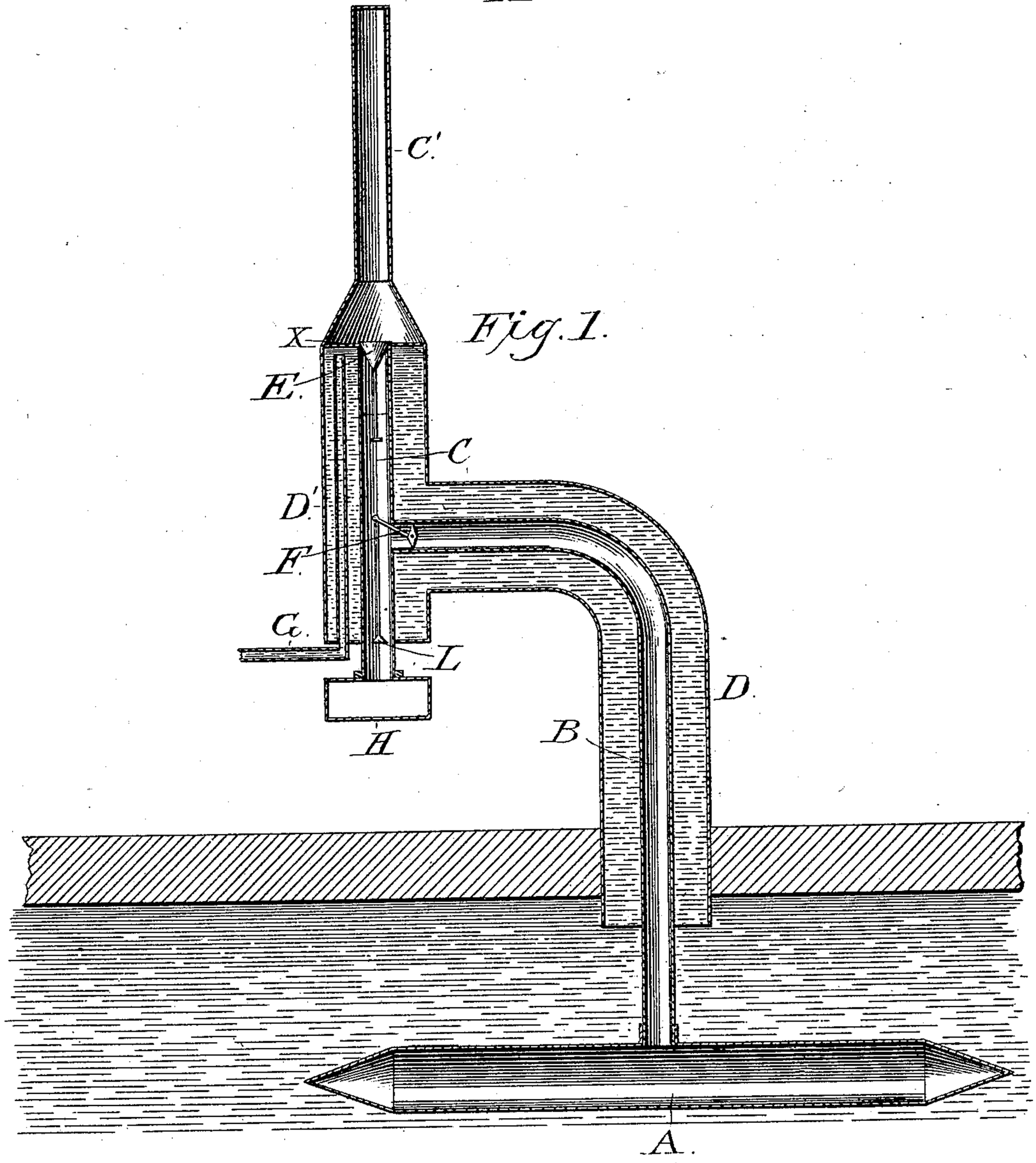


Fig. 1.



Witnesses;
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Inventor;
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UNITED STATES PATENT OFFICE.

BARNA T. STOWELL, OF SOMERVILLE, MASSACHUSETTS.

STEAM-CONDENSER.

SPECIFICATION forming part of Letters Patent No. 285,703, dated September 25, 1883.

Application filed May 17, 1883. (No model.)

To all whom it may concern:

Be it known that I, BARNA T. STOWELL, a citizen of the United States, residing at Somerville, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Steam-Condensers, of which the following is a description.

The nature of my invention consists of a new and automatic mode for creating and maintaining a vacuum in steam-condensers for either high or low pressure engines without the use of any pumps or power for that purpose, and requiring little or no attention, since, if any part of the apparatus should fail to perform its work, the steam will continue to exhaust in the same manner as before the apparatus was attached.

A noticeable feature of my invention is, the condenser is always placed under water in any place or position where water will flow past or through it. The mode of construction represented in the drawings is more especially adapted for high-pressure engines on inland river boats. This apparatus being very simple in its construction, I have in the drawings represented a sectional view, showing the figure cut vertically down through the center to show interior construction.

Figure 1 is a sectional view of my apparatus. Fig. 2 is a view of the condenser.

In the drawings, A is the condenser, firmly fastened to the side of a boat, and is made long in proportion, or in any form or shape to offer the least resistance in running through the water. From the bottom of the condenser a small pipe (not shown in the drawings) runs down to the pumps that supply the boilers, through which the water from the condensed steam is drawn off.

B is a pipe running from the condenser up and into the exhaust-pipe C, having in its upper end a throttle-valve, F, evenly balanced at its centers. This valve is provided with a lever or arm extending into the exhaust-pipe. From the end of this lever is attached a rod running down in the exhaust-pipe to near the steam-chest H, having at its lower end a funnel-shaped plate, L, for automatically working the valve F in a manner described hereinafter.

C C′ is an exhaust-pipe opening into and resting upon the steam-chest H.

E is a valve fitted to work air-tight in the exhaust-pipe some two feet above the steam-chest. At this place the exhaust-pipe has an enlargement, X, to allow a free passage of the steam, and also to permit water from the condensation of the steam to collect in a quantity sufficient to cover the valve E, thus causing it to work absolutely air-tight.

D D′ is an annular tube or casing around the pipe B and the exhaust-pipe C, below the valve E, made air tight and kept full of cold water to facilitate condensation. It terminates at its lower end under water.

G is the pipe through which the water is supplied to the boilers, running from the pump up through the bottom of the annular tube D D′, and terminating near the top. So it will be observed that the constant pumping to supply the boilers will keep the annular tube D D′ full of cold water.

Mode of operation: As the engine is started the exhaust steam, striking the plate L, closes the throttle-valve F, thus preventing any steam going into the condenser through the pipe B, the steam passing out through the valve E until the pressure of the atmosphere above the valve equals the pressure of steam below, when the valve closes. When the rush of steam through the exhaust-pipe ceases, the throttle-valve F automatically opens by its own weight, thus allowing the small amount of steam left in the cylinder and pipe—not having sufficient expansive force to open the valve E against the ordinary pressure of the atmosphere—to escape into the condenser, where it will be instantly condensed.

It will here be observed that at every pulsation of the engine all the air in the exhaust-pipe between the cylinder and valve E must be carried out by the escaping steam, thus creating and constantly maintaining a good vacuum without the use of any pumps for that purpose.

I will further remark, in the case of sea-going vessels—such as screw-propellers having no guards projecting from their hulls for protection—that I place the condenser in a recess made especially for that purpose, of sufficient depth in the outside of the hull to protect the condenser from any obstructions or injuries incident to making landings, lying at wharves, &c., and to obviate the resistance of

the condenser in passing through the water. The water will flow freely through and around it, the same as when simply placed upon the outside. When the condenser is placed in a recess, the connection-pipe B should pass to the condenser through the side of the boat; but as I claim no particular mode of connection for the pipe B, I have only shown it in the drawings as connected to the condenser when placed upon the outside. I believe this recess is the most economical and proper place to put all condensers for marine purposes.

It is to be understood that the automatic apparatus or arrangement comprising my second claim, for creating and maintaining a vacuum without the use of any air pumps for that purpose, is adapted for all kinds of high-pressure engines with any kind of a condenser. The condenser A is principally adapted to that class of side-wheel boats plying inland waters and western rivers. These boats have guards projecting out from their hulls on a level with and forming a continuation of the lower deck, which will protect the condenser, placed as I propose from injury incident to making landings, &c. Since all these boats have their engines situated forward of the wheels I place my condenser on the outside submerged part of the boat and forward of the wheels, to be as near the engine as possible. The condenser, which should be made long in proportion, to offer the least resistance in passing through the water, should be firmly fastened to the side of the boat and have a number of tubes passing through it, that water may flow freely through and around it in either direction, according as the boat moves either forward or backward, to facilitate the condensation of steam.

I am aware that pipes of various kinds have been placed under water and on the outside of boats, before for various purposes, such as condensing steam to obtain fresh water, pumping ships of bilge-water, &c. I make no claim to any arrangement of pipes or condensers for these purposes; nor do I claim any kind of a condenser when placed on a canal-boat, nor a condenser working in combination with any wheels for directly inducing a current—such as that patented by G. W. Hall, May 4, 1880, No. 227,245.

What I do claim is—

1. For that class of side-wheel boats mainly plying inland waters, the condenser A, attached to the outside of a boat, forward of the wheels, near the engine and below the surface of the water, being made of any suitable size or form required, in combination with the connection-pipe B, when surrounded by water in the tube or casing D D′, as and for the purpose described.

2. The automatic apparatus or arrangement of the exhaust-pipe C C′, with its upper valve E, throttle-valve F, connection-pipe B, suction-pipe G, and annular tube or casing D D′, for the purpose of automatically creating and maintaining a vacuum in the condenser without the use of any air pumps for that purpose, substantially as above shown and described.

In testimony whereof I affix my signature in the presence of two witnesses.

BARNA T. STOWELL.

Witnesses:
HERBERT A. CHAPIN,
L. S. FAIRBANKS.