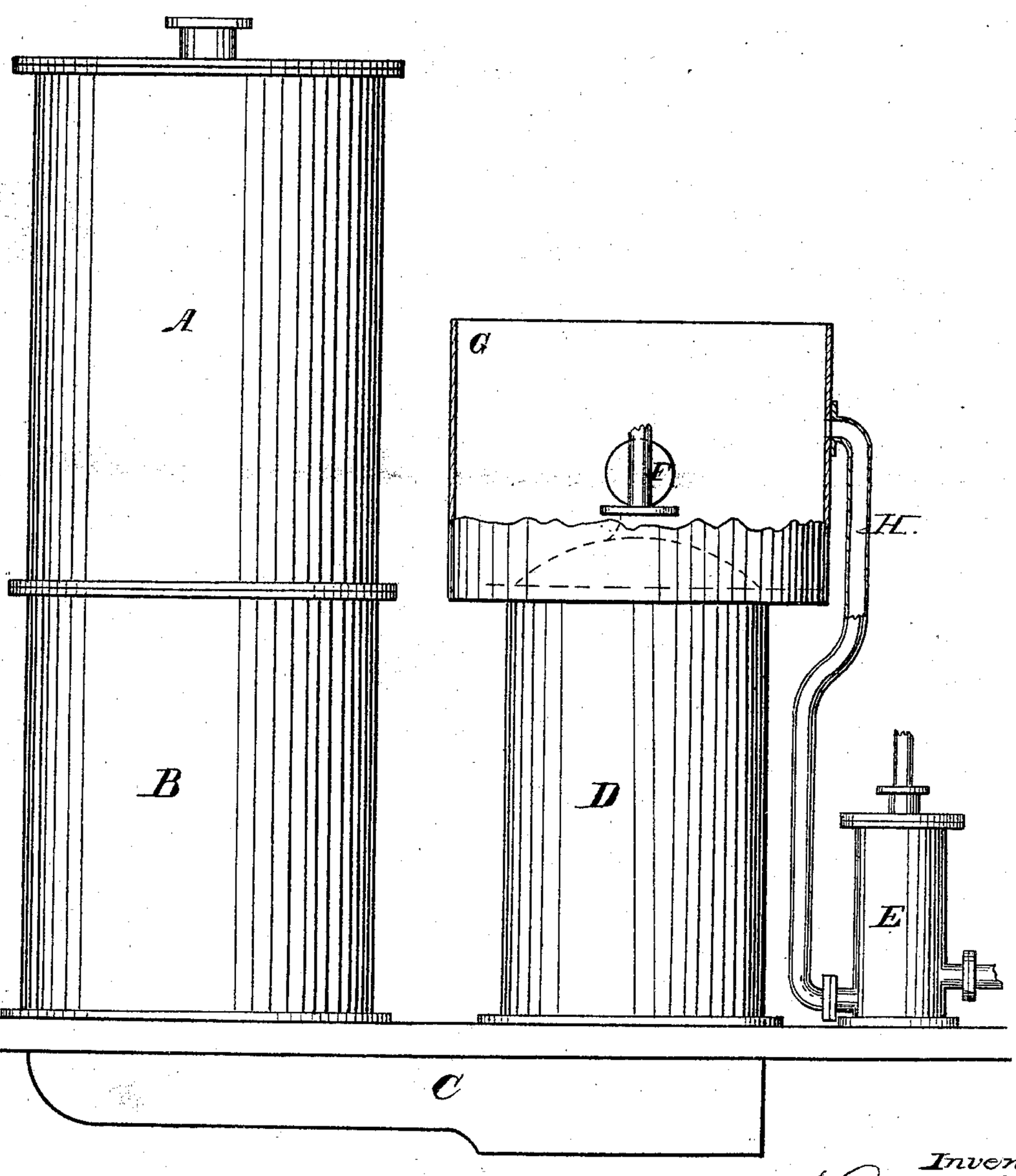
W. A. Lighthall,

Steam-Boiler Water-Feeder,

No. 31,988. Patented Apr. 9, 1861.



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WILLIAM A. LIGHTHALL, OF NEW YORK, N. Y.

IMPROVEMENT IN FEED-WATER APPARATUS FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. **31,988**, dated April 9, 1861.

To all whom it may concern:

Be it known that I, WILLIAM A. LIGHTHALL, of the city, county, and State of New York, have invented a certain new and Improved Arrangement for Regulating the Supply of Feed-Water to Marine Steam-Boilers; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing, and to the letters of reference marked thereon, representing a side elevation of the air and feed pumps of a condensing marine engine, the upper portion of the hot well and feed-pipe being shown in section.

My invention relates to governing and regulating the supply of feed-water to marine steam-boilers where fresh water is used in them for evaporation, and where the steam is condensed in a jet or spray-condenser by fresh water cooled to be reused by being passed through a cooling apparatus. In such cases the injection-water and the water of condensation (or that produced by the condensation of the steam in the condenser) are constant quantities, the first being all required for condensation, and the last being all required to be pumped back into the boiler for evaporation. It is absolutely essential, to produce the best results, that the proper disposition of these quantities should be regulated automatically. If done by manual attention, the proper proportion cannot be attained. The injection or the feed will be in excess of their proper quantity as too much or too little feed is given to the boiler.

My invention consists in so arranging and locating the delivery-pipe from the hot well and the feed-pipe of the force-pump in relation to each other in the hot well that the surplus water produced by the condensation of the steam in the condenser (being the quantity in excess of the injection-water) shall flow into the feed-pipe to pass to the feed-pump, when the injection-water shall have filled the delivery-pipe to pass off to the cooling apparatus to be cooled to be reused in the condenser.

A is the cylinder, B the condenser, C the bed-plate, D the air-pump, and E the feed-pump, of a marine steam-engine, all of the ordinary form and construction.

F is the delivery-pipe from the hot well G, through which the quantity of water that has been used for injection, and been raised by the air-pump, is passed to a cooling apparatus to be cooled to be reused.

H is the feed-pipe, through which the supply of feed-water is passed to the feed-pump E, to be pumped back into the boiler. The quantity of the feed is that that is produced by the condensation of the steam exhausted into the condenser from the engine. This pipe is arranged and located in relation to the delivery-pipe, as shown in the drawing—that is, its lower side is placed at the height of the upper side of the other, so that no feed-water can pass to the feed-pump until after the water in the hot well fills the delivery-pipe, when the surplus passes to the pump to be returned to the boiler.

The advantages of this arrangement are too obvious to require extended comment. None of the fresh water of injection or condensation can be wasted, as would be the case if the feed were regulated by hand, too much feed having the effect of "robbing" the injection and overloading the boiler, and too little having the effect of "choking" the injection and overrunning the hot well and wasting the fresh water.

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

The combination of the delivery-pipe F and the feed-pipe H, when arranged and located in relation to each other and to the hot well G, as described, and for the purposes set forth.

WM. A. LIGHTHALL.

Witnesses:

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