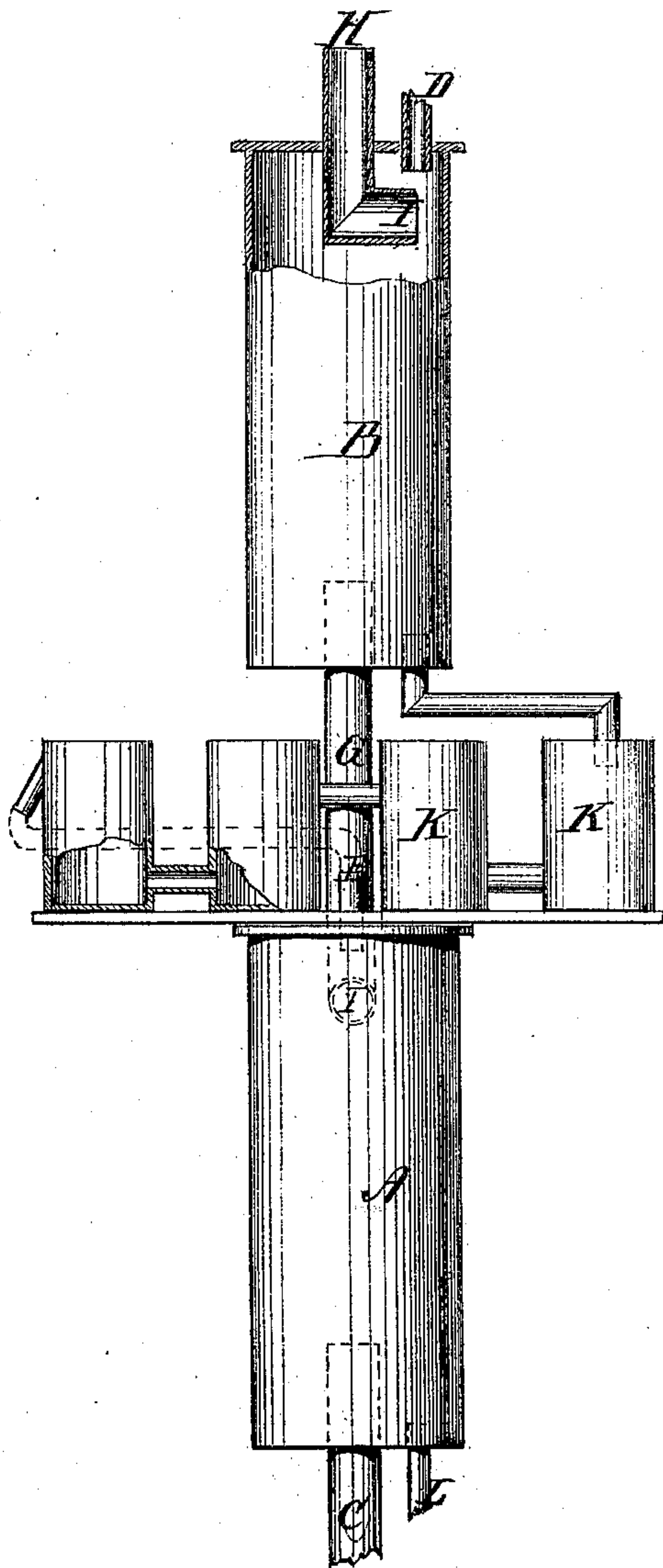


*J. Fairclough,*

*Feed Water Heater.*

*No. 97,371.*

*Patented Nov. 30, 1869.*



**Witnesses:**

*Mark Brooks*  
*Edgar Tate*

**Inventor:**

*J. Fairclough*  
PER *Mmm*  
**Attorneys.**

# United States Patent Office.

JOHN FAIRCLOUGH, OF ST. JOSEPH, MISSOURI.

*Letters Patent No. 97,371, dated November 30, 1869.*

## IMPROVED FEED-WATER HEATER.

The Schedule referred to in these Letters Patent and making part of the same.

### *To all whom it may concern:*

Be it known that I, JOHN FAIRCLOUGH, of St. Joseph, in the county of Buchanan, and State of Missouri, have invented a new and useful Improvement in Feed-Water-Heaters; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

The object of this invention is to provide feed-water heaters for steam-boilers, having greater heating-capacity, and adapted also for filtering the water, and to have great condensing-capacity for returning the steam as feed-water, for use when the feed-water is not always abundant, and particularly adapted for portable and traction-engines.

The drawing represents a side elevation of a heater, constructed according to my improvements, some parts being broken out.

A and B represent upper and lower heater heating-vessel, connected to the exhaust-pipe C of the engine, for the reception of the steam, and into which the supply-water is fed by the pipes D E.

G H represents the exhaust-pipes, for the surplus steam to pass off. From the lower heater A it passes into the upper one, through the pipe G.

These pipes I provide with elbows I, so arranged as to take the steam from directly under the water-supply pipes D E, when the steam must encounter the inflowing water in the manner to have the best effects in condensing the steam.

Between these heaters, A B, I introduce any number of filtering-vessels K, provided with hay or other filtering-substance, through which the heated water from the upper heater B is caused to pass down through the first and up through the second, and so on through the series, and into the heater below.

This cools the water to a great extent while filtering it, the water thus cooled passing into the heater below, where it again encounters the steam, condenses it here to a great extent, saving it for use again, and is again greatly heated previous to entering the boiler.

From the lower heater the water flows to the feed-pump, through pipe L.

By this improved device I am enabled to accomplish three important objects in a great measure, working a considerable economy in the operation of steam-engines and boilers, especially in the matter of filtering the water, whereby the pipes, boiler, and valves are kept clean, and the danger of burning them or exploding the boiler avoided, and an economy of fuel effected in the better application of the heat.

Having thus described my invention,

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

The combination of two heaters, A and B, and any number of filtering-vessels, K, when connected and arranged, substantially in the manner specified.

JOHN FAIRCLOUGH.

Witnesses:

FRED. WM. SCHMIDT,  
J. B. MILLET.