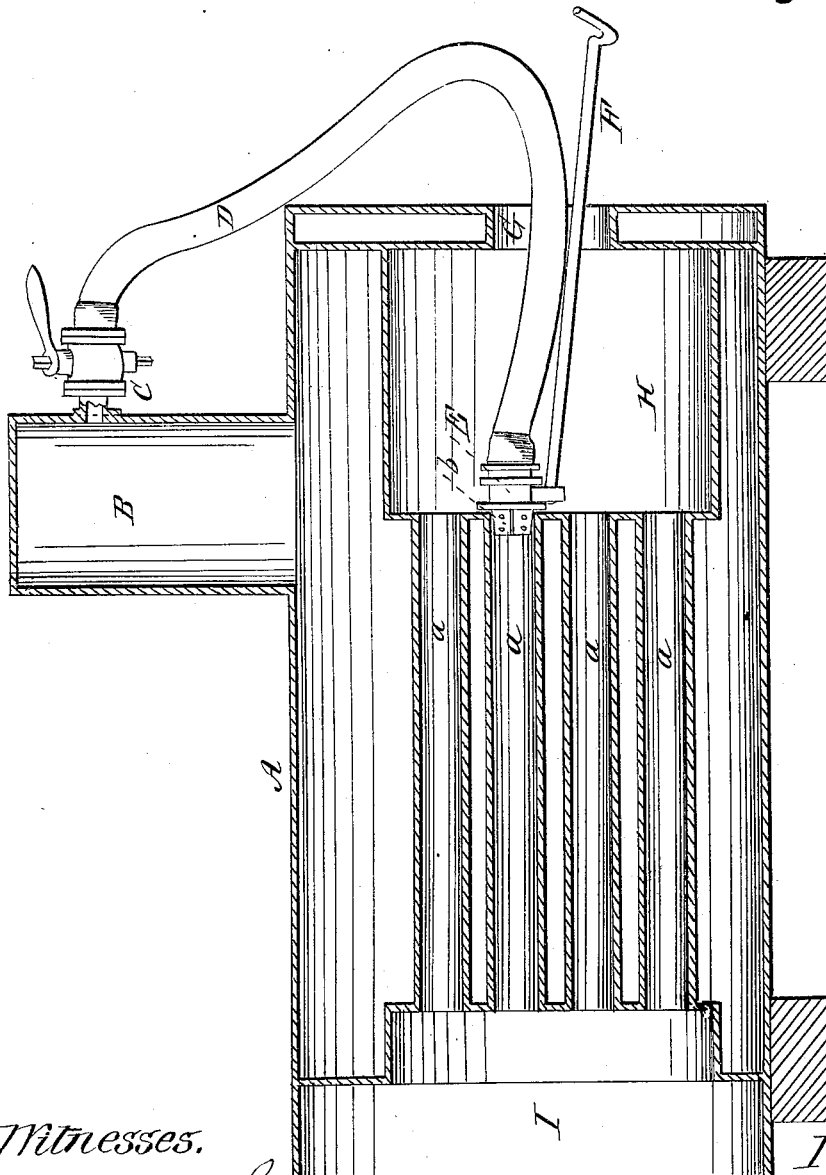


*J. J. Illingworth,*  
*Steam-Boiler Cleaner.*  
*No 48,948. Patented July 25, 1865.*



*Witnesses.*

*M. M. Livingston.*  
*C. L. Popliff.*

*Inventor.*

*Joseph Illingworth.*

# UNITED STATES PATENT OFFICE.

JOSEPH JACOB ILLINGWORTH, OF BROOKLYN, NEW YORK.

## IMPROVEMENT FOR CLEANING TUBES IN BOILERS.

Specification forming part of Letters Patent No. 48,948, dated July 25, 1865.

*To all whom it may concern:*

Be it known that I, JOSEPH J. ILLINGWORTH, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Cleaning Tubes and Flues of Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to fully understand and use the same, reference being had to the accompanying drawing, forming part of this specification.

The drawing, consisting only of one figure, represents an elevation of a vertical longitudinal section of a steam-boiler with my apparatus applied to one of its tubes.

This invention consists in a device, herein-after described, for cleaning the flues and tubes of steam-boilers by means of a jet or current of steam directed through said tubes and flues.

A represents a longitudinal section of a tubular boiler, B its steam-dome, H the furnace, G the furnace-door, and I the place of its back connections. *a a a a* represent some of the tubes of the boiler.

The tubes of steam-boilers are apt to become foul with soot, ashes, and cinders from the furnace, the blast which enlivens the fire sometimes carrying cinders and small fragments of coal out of the fire into the tubes. The collection of ashes and cinders continues to accumulate until some of the tubes are nearly or quite closed, and all of them more or less obstructed and the draft of the furnace in a manner destroyed. When any of the tubes leak the water from the boiler mingles with the ashes and soot or other matter deposited in them, and they acquire a more dense and solid character, which is increased by the heat of the products of combustion, so that the deposits are removed with difficulty. These deposits intercept the heat of the fire and of the products of combustion from acting on the water of the boiler, and a high pressure of steam is often impossible to be had in consequence thereof. The usual method pursued in cleaning the flues and tubes of boilers is to scrape them by means of scrapers or brushes fastened on rods long enough to extend throughout their whole length to the back connections. This is generally done when the fire is withdrawn or has died out from the furnace. In my method of

cleaning the tubes of steam-boilers I employ a flexible hose or tube, D, connected by a steam-cock, C, with the steam-dome B or other suitable part of the boiler, so as to cause dry steam to pass through the hose.

E is a pipe to which the free end of the hose is attached, and which has a nozzle, *b*, of such a diameter as to fit easily in the tubes *a* of the boiler. This nozzle may have perforated sides, or its sides may have longitudinal openings therein, as shown in the drawing.

F is a rod, secured to the pipe E by means of a collar or other usual device. Its length is to be such as to extend out beyond the door of the furnace when the pipe is applied to any of the tubes, and its purpose is to enable the fireman to control and direct the hose, and so be able to insert the pipe in any tube and withdraw it at pleasure, and to hold it at any desired position within the furnace, so as to cleanse its walls by the action of the steam. The hose is to be of such a length as to enable one to insert its free end in any of the tubes.

The manner of using the apparatus for cleaning the tubes of a boiler and for cleansing the sides of the fire-chamber is as follows: The fire being withdrawn from the furnace, the nozzle *b* is placed in the mouth of one of the tubes by means of the handle or rod F, and steam is allowed to pass through the hose into the tube. The force of the steam in its passage through the tube clears out the ashes and cinders and other matter deposited therein and drives them into the space I of the back connection of the boiler. This treatment is applied to each tube in succession until all are thoroughly cleaned. The deposits are afterward removed from the space I in the usual manner. The walls of the fire-chamber are likewise cleaned of the ashes and soot deposited on them by turning the current of steam against them in every direction by means of the rod F.

It is not necessary to withdraw the fire or let it die out in order to use the hose in the tubes or in the fire-chamber; but if it is desired to clean the tubes or the walls of the fire-chamber while the fire is kept up, it can be done with good effect and without injury to the hose from the heat of the fire by applying the hose immediately after fresh fuel has been applied

to the fire, when the heat of the incandescent fuel, which has been covered by the fresh fuel will be intercepted by the latter, and the hose will not be injured in the operation.

If it is thought desirable, that part of the hose which is placed in the fire-chamber may be covered with a metallic shield, which shall also protect the rod F; but I have not found such a shield necessary in practicing my invention.

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

The nozzle E *b* and flexible pipe D, applied substantially as herein described, for cleaning flues or tubes of steam-boilers.

JOSEPH J. ILLINGWORTH.

Witnesses:

M. M. LIVINGSTON,

C. L. TOPLIFF.