

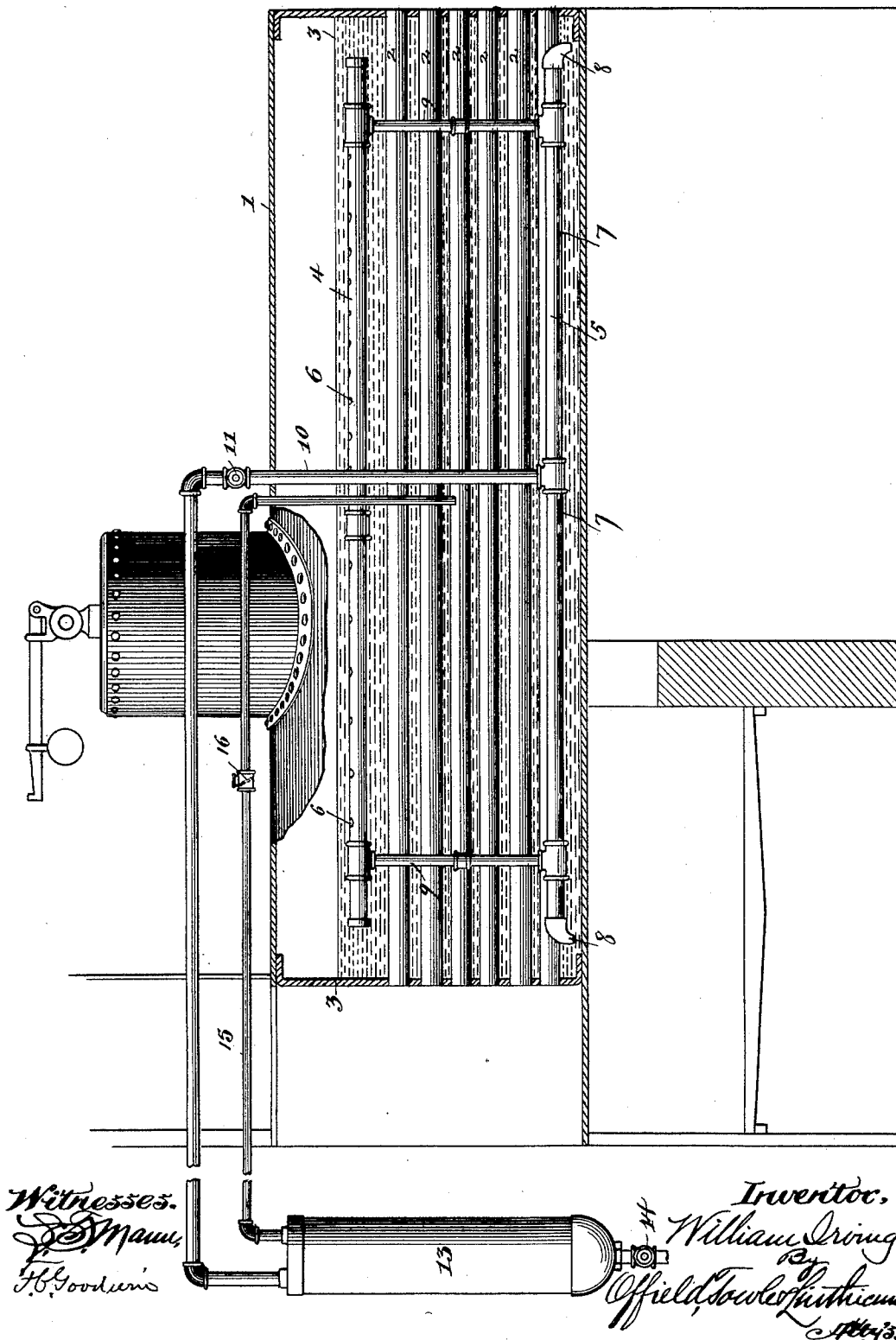
(No Model.)

W. IRVING.

WATER PURIFIER FOR STEAM BOILERS.

No. 586,794.

Patented July 20, 1897.



UNITED STATES PATENT OFFICE.

WILLIAM IRVING, OF CHICAGO, ILLINOIS.

WATER-PURIFIER FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 586,794, dated July 20, 1897.

Application filed June 1, 1896. Serial No. 593,765. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM IRVING, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Water-Purifiers for Steam-Boilers, of which the following is a specification.

This invention relates to an apparatus for purifying the water used in steam-boilers; and the object of the invention is to afford means whereby all of the solid impurities held in suspension in the water may be separated therefrom and the scale-forming sediment removed from the bottom of the boiler.

The accompanying drawing is a broken side elevation sectionally through the boiler, showing my apparatus and its method of application.

In the drawing, 1 represents the boiler-shell, 2 the tube, and 3 the water-line. Within the boiler-space I locate two sediment-collecting pipes 4 5, the pipe 4 being arranged longitudinally of the boiler, slightly below the water-line, and provided with perforations, slots, or apertures 6, preferably in its upper side. The pipe 5 has slots or other perforations 7, preferably in its lower side, and said pipe may have the terminals 8 also open on their lower sides. The pipes 4 and 5 are connected by the branches 9, and all of the solid impurities which pass into the pipe 4 through the perforations 6 thereof are drawn downwardly through the branches 9 into the pipe 5. From said pipe a riser 10 leads upwardly through the shell of the boiler and is provided with a gate-valve 11, and beyond said valve is extended to the sediment-chamber 13, the lower end of which has a blow-off pipe provided with a valve 14. A return-pipe 15 leads from the upper end of the sediment-chamber back to the boiler, communicating with the interior thereof below the water-line, and is provided with a gate-valve at 16, which is so arranged as to open toward the discharge end of the pipe.

The operation of this apparatus is as follows: When steam is being made in the boiler, all of the scum and other impurities which are carried on top of the water or in

suspension near the water-line are drawn into the pipe 4, and passing down through the branches 9 into the pipe 5 are sucked up through the pipe 10 and discharged into the sediment-chamber with a carrying current of water, the valve 11 being left open. During this operation all of the sediment will be drawn from the bottom of the boiler into the lower pipe through the perforations thereof, and the water will be very thoroughly purified and all scale-forming deposit removed before it has a chance to solidify and form scale.

When it is desired to flush the boiler and blow out any sediment which may settle in the tubes 4 and 5 and their connections, the valve 14 is opened and the pressure will cause the water to rush through the riser 10 and through the sediment-chamber, the pressure in the boiler closing the check-valve 16 and preventing the return of the water through the pipe 15.

I have found this construction much more effective than any other known to me. I attribute this superiority to the fact that the current flowing toward the sediment-chamber starts nearer the bottom of the boiler, where the water is at a temperature considerably lower than at the water-line, there being ordinarily about 90° difference in temperature. The apparatus apparently works upon the principle of the siphon to draw the sediment from the top downwardly, and the riser-pipe passing through this zone of very hot water the current of water flowing there-through becomes very highly heated, thus inducing a very rapid circulation and a powerful suction upon the sediment at the bottom, while the strength of the current is so great as to effectually draw off all scum and floating impurities in the vicinity of the upper tube.

I claim—

An apparatus for purifying the water in steam-boilers comprising in combination a sediment-collecting tube extending longitudinally of the boiler close to the bottom thereof and having perforations in its lower side, a second sediment-collecting tube located near the water-level and having perforations

in its upper side, a pipe or pipes connecting
said tubes within the boiler, a discharge-pipe
or riser connected with the lower of said tubes
extending through the boiler-shell and having
5 a valve therein, a sediment-chamber with
which said discharge-pipe connects having a
valve-controlled sediment-discharge outlet

and a return-pipe having a check-valve there-
in opening toward the discharge end of said
pipe, substantially as described.

WILLIAM IRVING.

Witnesses:

W. R. MOORE,
P. R. McLEOD.