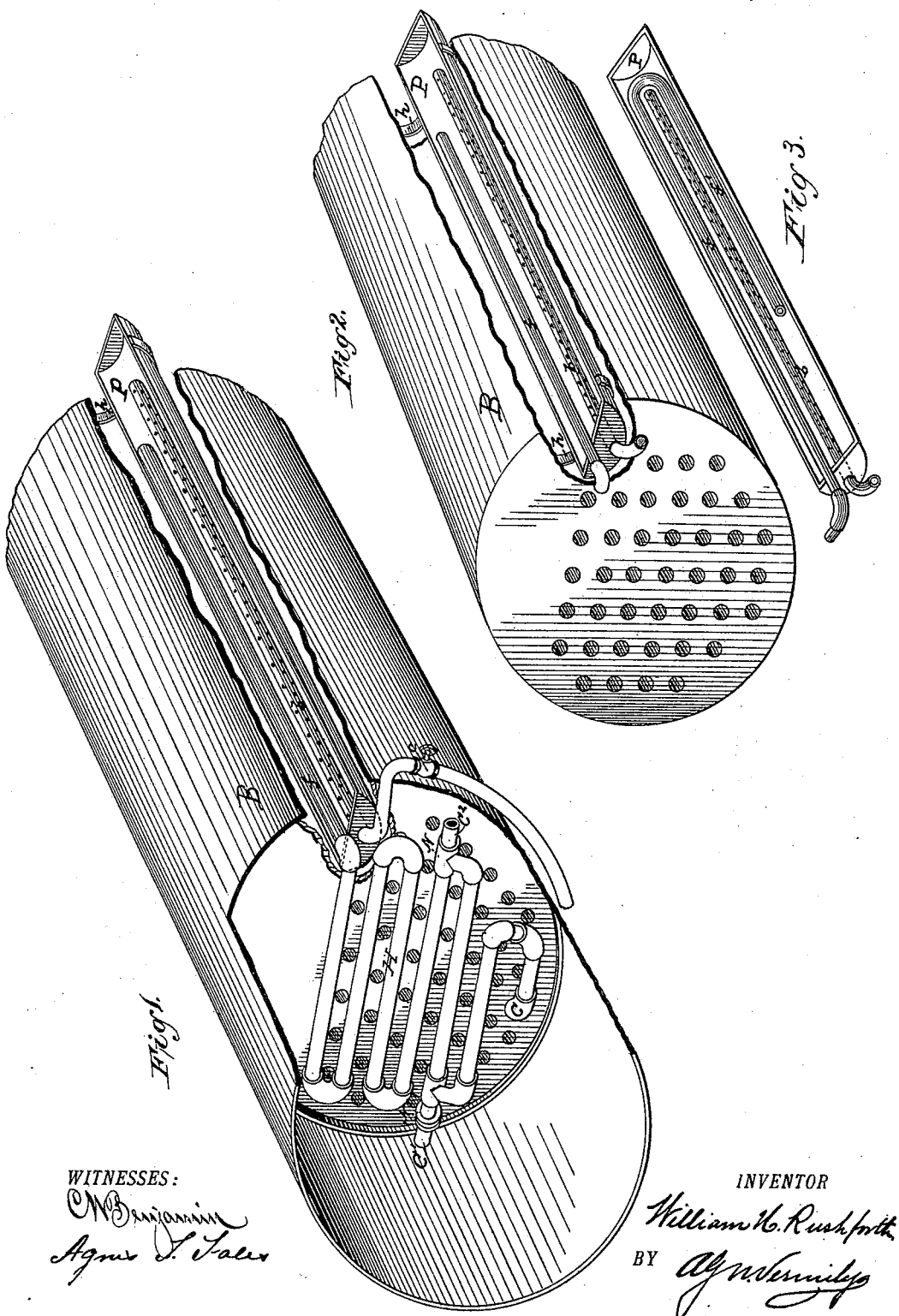
(No Model.)

W. H. RUSHFORTH.

PURIFIER FOR STEAM BOILERS.

No. 419,476. Patented Jan. 14, 1890.



WITNESSES:
C. M. Benjamin
Agnes L. Sales

INVENTOR
William H. Rushforth
BY Alfred Wellington
his ATTORNEY

UNITED STATES PATENT OFFICE.

WILLIAM HENRY RUSHFORTH, OF RUTHERFORD, NEW JERSEY.

PURIFIER FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 419,476, dated January 14, 1890.

Application filed September 19, 1888. Serial No. 285,787. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HENRY RUSHFORTH, a subject of the Queen of Great Britain and Ireland, but residing at Rutherford, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Purifiers for Steam-Boilers, of which the following is a specification, reference being had to the accompanying drawings, forming part of the same, in which—

Figure 1 is a perspective view, partly in section, of a boiler containing apparatus embodying my invention. Fig. 2 is a similar view of another boiler, showing the apparatus also, but without the heater, which is shown in Fig. 1; and Fig. 3 is a detached view of the apparatus slightly modified.

Much of the water used in steam-boilers when fed thereto is charged with mud and other solids, which, collecting at the bottom of the boiler and around the tubes, seriously interfere with the heating of the water and also hasten the formation of scale upon the boiler plates and tubes, the results of which are too well known to need particular description. Various devices have been provided to catch said solid substances; but those which I have seen or about which I have heard or read all have objectionable features, the most common one being that the place of deposit is so arranged that further feeding of water must necessarily disturb the particles of solid matter that have already been deposited, thereby rendering it certain that some of them will be carried out of the depository and to those places within the boiler from which it is desired to keep them, and especially to avoid this I have devised the apparatus herein set forth.

It consists, primarily, of a pan P, located within the boiler and some distance at least above the bottom, preferably only slightly below the water-line, as shown. It may and usually does extend practically the whole length of the boiler, though that is not an absolute requirement, and may be supported by hangers *h*, bolted fast to the shell of the boiler B. I then arrange the feed-pipe *f* so that it shall discharge the feed-water immediately over this pan, but above its bottom. It may do this at or near or a little above the top, the result aimed at and secured being that the solid particles which settle to the bottom of pan P are not forcibly disturbed each time more feed-water is introduced. The solids settle to the bottom of the pan, into which the incoming water flows; but the pan being full of water, while that which is pumped in naturally seeks the bottom, because colder than that already in the boiler, it does so with a gentle movement, not disturbing the deposits already made or being made, the pan presenting a considerable area, upon and within which the solids may settle without covering the boiler sheets or tubes.

At the bottom of the pan, and preferably extending a considerable distance along its length, I locate another pipe *b*, for blowing off the mud and other solids that may have collected in the pan. It is preferably perforated along its length to permit the easy egress of the solids, and extends without the boiler and down to or near the ash-pan or other convenient point, being provided with a cock *c*, which may be opened or closed at the will of the attendant. Sometimes the pipe *f* has a bend and a return *f'* given to it, as shown in Fig. 3, that its delivery may be near the end where the blow-off pipe enters, which is of advantage in causing the greatest part of the deposit to accumulate near that point. Furthermore, such disposition of it gives a greater length of pipe within the boiler, and therefore effects a greater heating of the feed-water before it is discharged into the pan. This heating assists the separation of particles of solid matter from the water, lime especially separating more easily from heated water than from that which is cold. The bends need not be wholly over the pan, and they may be arranged to constitute a coil within the boiler. I further enhance the results obtained by causing the feed-water, before it enters the boiler, to pass through a heater, which will raise it to a high degree of heat, though I do not limit myself to the particular form of heater shown. The particular advantage gained arises from the fact that there is a connection between the boiler at the lower part and the heater, so that when the feed is cut off the water in the lower part of the boiler passes through the heater and is continuously discharged into the pan, thus giving further opportunity to catch any

remaining sediment. I prefer to use that shown, which is one heretofore devised by me, but for a patent upon which I have already applied and from which the present invention is entirely distinct. The heater H, as shown, consists of several bends and lengths of pipe located in the smoke-box of the boiler and connected to it by the connection C at the bottom and by means of the pipe *f* at the top. The feed-water is introduced into the heater through pipe C′, which leads from the pump, or C^2, which leads from the injector, each of said connections being provided with a nozzle N, as described in my application, Serial No. 223,997, filed January 11, 1887.

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

1 The combination, with a steam-boiler, of a mud-catching pan located within the same, a heater connected with the boiler at a point below the level of said pan, and also with the feed-pipe, and provided with a discharge-pipe opening into said pan, substantially as set forth.

2. The combination, with a steam-boiler, of an open-topped mud-catching pan located within the same and a heater, with connections from and to said heater, one from the feed-pipe, one from the boiler at a point below said pan, and one to and discharging into said pan, substantially as set forth.

3. The combination, with a steam-boiler, of a mud-catching pan located near the water-line and within the boiler, and a heater, with connections, one from the feed-pipe to the heater, one from the boiler at a point below said pan to the heater, and one from the heater discharging into said pan, substantially as set forth.

WILLIAM HENRY RUSHFORTH.

Witnesses:
AGNES S. FALES,
A. G. N. VERMILYA.