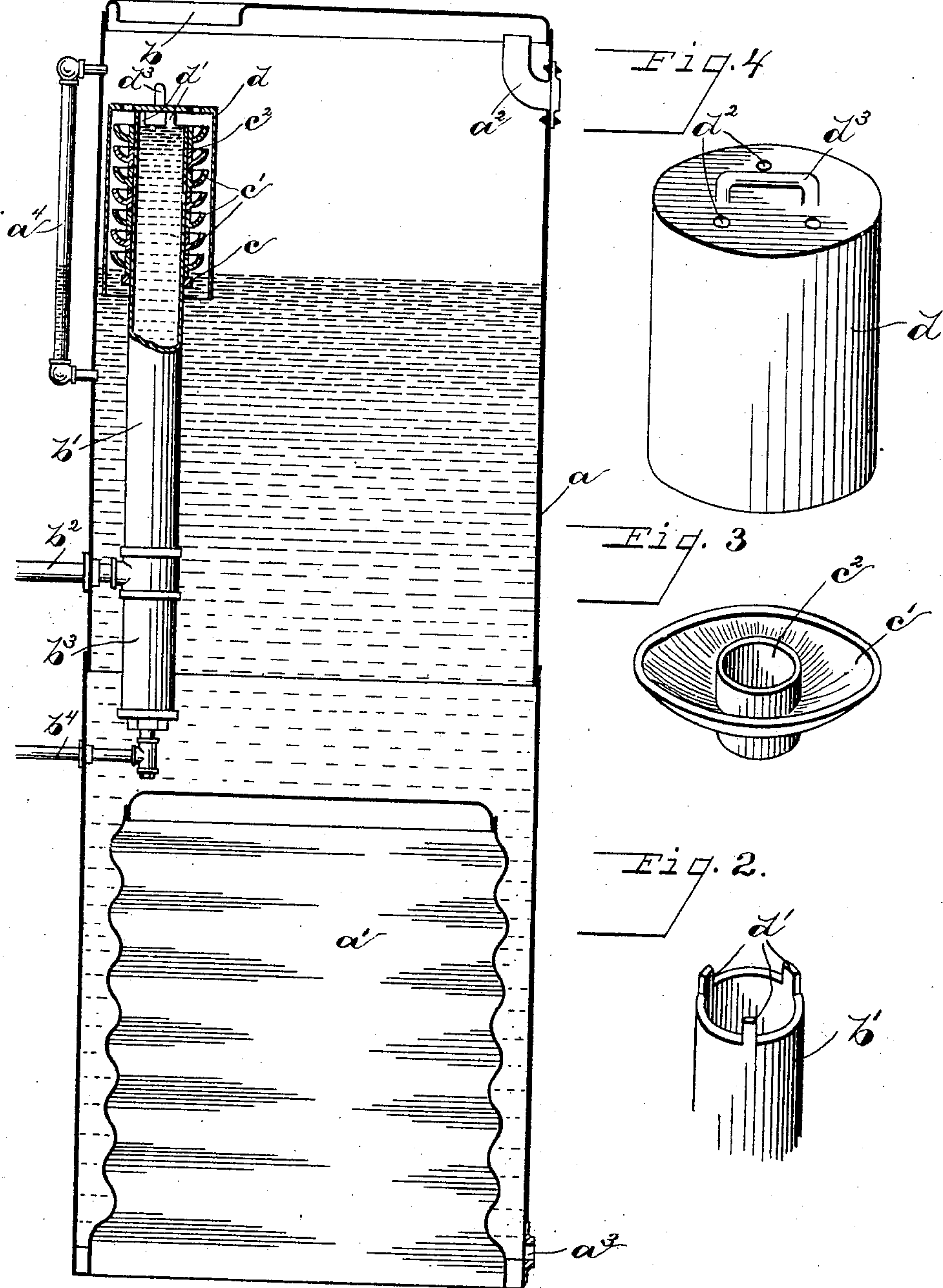


No. 771,339.

PATENTED OCT. 4, 1904.

G. E. TURNER.
FEED WATER PURIFIER.
APPLICATION FILED JAN. 22, 1904.

NO MODEL.



Witnesses
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UNITED STATES PATENT OFFICE.

GEORGE E. TURNER, OF BELLEFONTAINE, OHIO.

FEED-WATER PURIFIER.

SPECIFICATION forming part of Letters Patent No. 771,339, dated October 4, 1904.

Application filed January 22, 1904. Serial No. 190,165. (No model.)

To all whom it may concern:

Be it known that I, GEORGE E. TURNER, a citizen of the United States, residing at Bellefontaine, in the county of Logan and State of Ohio, have invented certain new and useful Improvements in Feed-Water Purifiers, of which the following is a specification.

My invention relates to feed-water purifying and heating devices for steam-boilers, and especially relates to those purifiers known as "live-steam" purifiers, in which the purifier proper receives full pressure of steam in the boiler and is subject to the same conditions or substantially the same conditions as the water in the boiler and to that class of purifiers in which the incrustating substance and free solids contained in the water are extracted by passing through or over a series of pans or trays.

The object of my invention is to provide a simple and compact construction, efficient in operation, and so arranged that all the parts thereof are easily accessible for the purpose of cleaning.

In the drawings, Figure 1 represents a vertical section of a steam-boiler equipped with my form of purifier. Fig. 2 is a perspective view of the upper end of the stand-pipe. Fig. 3 is a perspective view of one of the pans or trays. Fig. 4 is a perspective view of the cap.

Like parts are represented by similar letters of reference in the several views.

In the said drawings, *a* represents the shell of a vertical boiler having a fire-box *a'*. The boiler is provided with the usual steam-outlet *a²*, blow-off *a³*, and water-glass *a⁴*. In the top of the boiler is an opening in the nature of a hand or manhole *b*, and immediately below said opening is the feed-water purifier, which consists of an upright pipe *b'* or stand-pipe of comparatively large diameter closed at its lower end. Connected with the stand-pipe *b'* at a point somewhat removed from its bottom is a cold-water-feed pipe *b²*. The portion *b³* of the stand-pipe *b*, which extends below the feed-water pipe *b²*, forms a mud-drum and is provided with a blow-off *b⁴*. Mounted on the stand-pipe *b'*, near its upper end at a point preferably just below the normal water-

level of the boiler, is a collar *c*. Surrounding the stand-pipe *b'*, above and supported by said collar *c*, is a series of trays or pans *c'*. Each of these pans or trays is of circular or elliptical shape, as shown in Fig. 3, and is provided with a central hub *c²*, the bore of which conforms with the diameter of the stand-pipe *b'*. This hub *c²* extends above the bottom of the tray, forming the inner wall of said tray and also the support for the next higher tray of the series. Surmounting the structure of stand-pipe and trays is a cap *d*, which extends to a point below the normal water-line. This cap *d* is preferably supported upon fingers *d'*, extending from the upper end of the stand-pipe *b'* to support the cap *d* and at the same time permit a flow of water from the stand-pipe. The same end might also be accomplished by a series of holes in the stand-pipe *b'* at its upper edge.

The cap *d* is provided with a handle *d³* for convenience in handling and with one or more holes *d²*, which may be either in the top or sides of the cap, to permit the entrance of steam to the cap *d*, and thus equalize the pressure within the cap and prevent the steam-pressure of the boiler forcing the water to a higher level within the cap *d* than that of the boiler.

By means of the opening *b* the cap *d* and trays *c'* may be easily removed for cleaning.

In operation the water is admitted through the feed-pipe *b²* and passes upward in the stand-pipe, becoming heated in its passage by the hot water of the boiler, and deposits the mud and matter in suspension in the mud-drum and is further heated by the live steam in the dome thereof as it passes to the trays. The water overflows the stand-pipe *b'* into the topmost of the series of trays, and thence over the edge of that tray and each succeeding tray into the tray below, depositing in and on these trays the foreign matter or scale-forming substance it may contain in solution, until it reaches the water-level of the boiler in a substantially pure state.

Having thus described my invention, I claim—

1. The combination of a steam-boiler, an upright pipe within said boiler extending from

a point below the normal water-line to a point above said water-line, and a series of superposed trays or pans surrounding said stand-pipe above the said water-line and a mud-drum below the water-line, substantially as specified.

2. The combination of a steam-boiler, an upright stand-pipe within said boiler, a feed-water pipe connecting with said stand-pipe, a portion of said stand-pipe extending below said feed-water pipe to form a mud-drum, and a series of trays mounted upon and surrounding said stand-pipe, substantially as specified.

3. The combination with a steam-boiler, of an upright pipe within said boiler, a feed-water pipe connected with said upright pipe at a point removed from the bottom of said pipe to form a mud-drum, a series of trays mounted on said upright pipe and a cap over said trays, substantially as specified.

4. The combination with the steam-boiler, a stand-pipe in said boiler extending below the water-line thereof, said stand-pipe forming the inlet for the feed-water, a series of pans or trays removably supported on said stand-pipe, and a removable cap extending over said trays and forming a cover therefor, substantially as and for the purpose specified.

5. The combination with the stand-pipe and water-supply pipe connected thereto, of removable trays on said stand-pipe, a removable cap also supported by said stand-pipe and forming an inclosing chamber for said trays, substantially as and for the purpose specified.

In testimony whereof I have hereunto set my hand this 13th day of January, A. D. 1904.

GEORGE E. TURNER.

Witnesses:

JOHN E. WEST,
R. F. TREMAIN.