

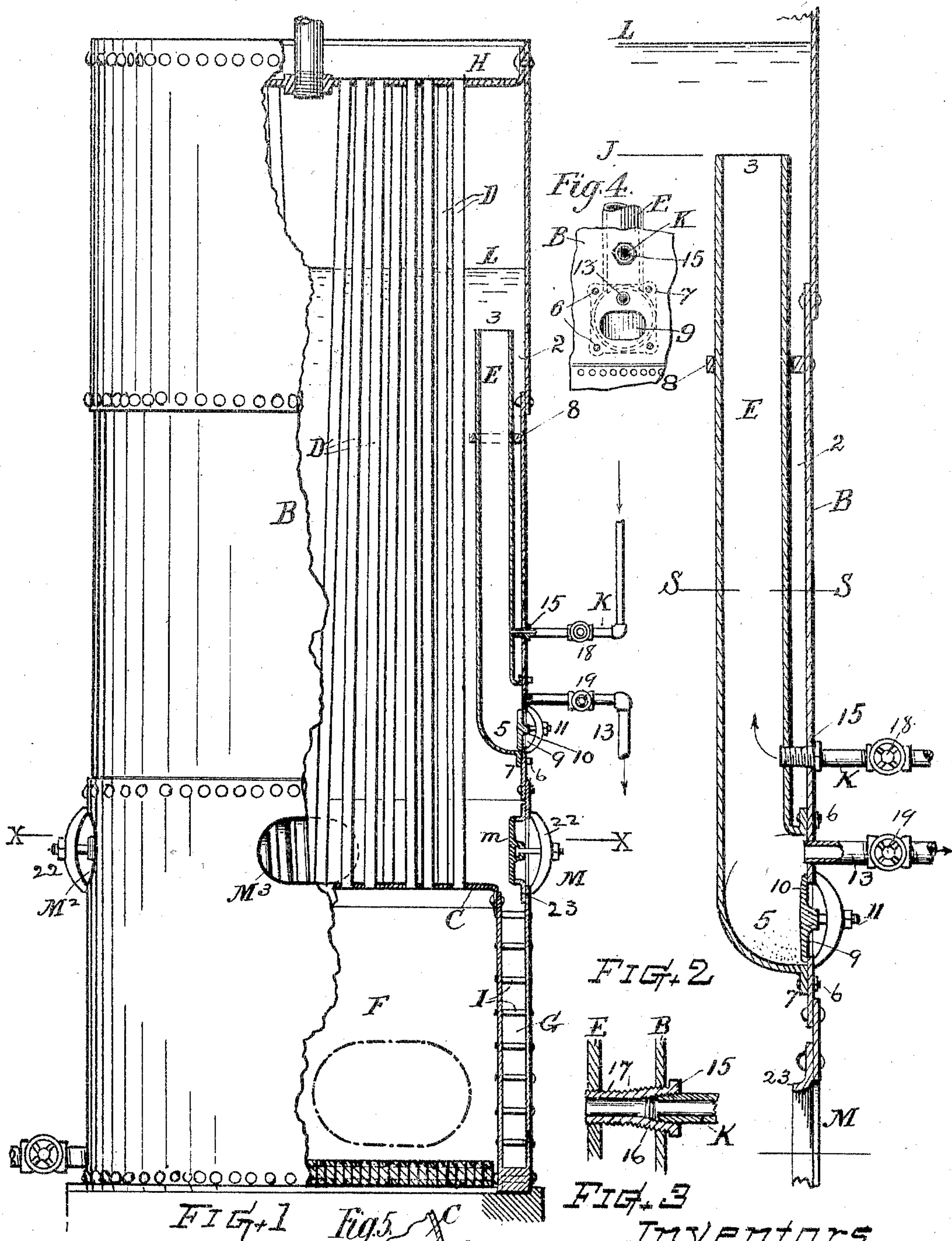
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W. P. & W. G. ALLEN.

STEAM BOILER.

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WHEELS.

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STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 780,255, dated January 17, 1905.

Application filed September 11, 1903. Serial No. 172,806.

To all whom it may concern:

Be it known that we, WILLIAM P. ALLEN and WILLIAM G. ALLEN, citizens of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented new and useful Improvements in Steam-Boilers, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

This invention relates more especially to steam-boilers of the upright tubular type having a fire-box and surrounding water-leg at the lower part of the boiler.

The object of our invention is to provide, in a steam-boiler having an interior column or upright chamber, in combination with the feed-water supply-pipe and adapted for purifying the feed-water or effecting the settlement of foreign or mineral substances therefrom before the water enters the boiling-chamber, of means for conveniently removing the deposited matter or sediment at the foot of the settling or purifying column accessible at the exterior of the boiler, also to provide a cylindrical purifier-column having its lower end offset and abuttingly attached to the boiler-shell, as more fully hereinafter described.

Another object is to provide an upright steam-boiler with an efficient appliance for connecting the feed-water pipe with the side of the boiler-shell and with the side of the internally-disposed purifier-column standing with an intervening space between said shell and column.

For the attainment of these objects our invention consists in the parts and combination of parts particularly specified, and definitely pointed out in the claims at the end of the specification, a practical embodiment of our invention being illustrated in the accompanying two sheets of drawings, wherein—

Figure 1 represents a part side part sectional elevation of a steam-boiler embracing the improved means of our invention. Fig. 2 represents a vertical section of the purifier-

column and a portion of the boiler-shell on a somewhat larger scale. Fig. 3 is a sectional detail of the feed-water connection. Fig. 4 is a fragmentary front view at the foot of the purifier-column. Fig. 5 is a horizontal section at line S S on Fig. 2.

Referring to the drawings, B indicates the cylindrical upright boiler-shell; F, the cylindrical fire-box with crown-sheet C, from which the flue-tubes D extend to the head H of the boiler.

G indicates the annular water-leg space between the shell of the fire-box and boiler-shell, and I the usual radially-disposed stay-bolts joining the two shells across said annular space.

E indicates a feed-water purifying appliance consisting of an upright hollow column or settling-pipe—in practice about six to eight inches, more or less, in diameter—suitably disposed within the boiler and standing clear of the shell B along the greater portion of its length to afford intervening space 2 for the boiling water between the shell and column. The upper part of said column terminates with an open top end 3, horizontally coincident with the low-water line J or at any desired distance below the regular water-level L, while the lower end is formed with an offset outward curvature or enlargement 5 in suitable manner to abut against the inner surface of the boiler-shell and is fitted for connection therewith by an open end having attaching-flanges 7. The interior of this lower end stops against the inner surface of the boiler-shell (see Figs. 2, 4, and 5) and is secured thereto by bolts, rivets, or screw-studs 6 or in other efficient manner. A ring or brace 8 is provided on the interior of the boiler-shell for retaining the upper part of the column in position, the column being unattached within said ring.

In that portion of the boiler-shell embraced by the end of the purifier-column there is provided a hand-hole 9, with a removable closure means 10, having suitable fastening devices 11 for retaining it in closed position and for readily releasing it when desired. There is also provided a blow-off pipe 13, which con-

nects with the boiler-shell and enters the purifier chamber or column E adjacently above the hand-hole 9.

The feed-water-supply pipe K is arranged to deliver through the side of the shell into the column or settling-pipe E at some distance above its lower end and is best connected with the boiler-shell B and also with the column or pipe E across the intervening space by a tubular bushing 15, having a uniformly-threaded exterior, with portions of varied diameter, the outer portion 16 being tapered and threaded into the metal of the boiler-shell and the inner portion 17 being straight and of less diameter and threaded into the metal of the column, (see Fig. 3,) while the feed-water pipe K is threaded into the interior of the bushing-tube 15.

The feed-pipe K and blow-off pipe 13 are provided with suitable cocks or valves 18 and 19 for controlling the flow therethrough.

The upright interior of the column E being of much greater area than the feed-pipe, it acts as a settling-chamber, while its lower end 5 is formed to serve as a sediment-collecting compartment. The feed-water rises slowly within the column, which is surrounded by the boiling water of the steam-making compartment, and the increasing heat of the feed-water causes the deposit and settlement of impurities within the lower space 5 before the feed-water passes over the top of the column into the steam-making compartment of the boiler. Consequently the boiler is freed from much matter that would otherwise settle upon the crown-sheet C. With the column or stand-pipe E and connections K and 13 combined with the boiler, as shown, the device can serve as a settler, a mud-receptacle, and a surface blow-off.

By opening the blow-off cock 19 the water within the column E and at the surface of the boiler down to the line J can be blown off, taking the surface scum and floating substances from the interior. When desired, after blowing off, as above, the hand-hole 9 can be readily opened and any accumulated material quickly and easily removed from the lower part 5 of the purifier-column. This access being had from the exterior, the cleaning can be done without completely emptying the boiler. Hence it will be seen that our improved means in its combination in the manner substantially as described is of great practical utility.

It is obvious that in some instances, if desired, a part of the feed-pipe K can be used for the blow-off, said pipe being provided with suitably-arranged branches and stop-cocks, as will be understood by persons conversant with steam-fitting. A separately-connected feed and blow-off is, however, preferred, as shown.

The purifier-column E is preferably formed of such size or dimensions that it can be

passed through the manhole M and the parts so disposed in relation to each other that in the event of any repairs or renewals being required the column can after releasing or breaking the fastenings 6 be taken from the interior through the manhole M and by reverse operation again replaced. In some instances a few of the adjacent tubes might have to be released to permit this removal of the column where the tubes are closely arranged thereto.

We do not claim, broadly, the idea of an upright cylindrical water-purifier column within a steam-boiler, as we are aware that differently-constructed means of that class has been employed prior to our present invention; but our invention relates to the improved construction and manner of combination as defined.

What we claim as of our invention, and desire to secure by Letters Patent, is—

1. In a steam-boiler, the combination of the boiler-shell, a hollow upright open-topped stand-pipe or column having a forwardly-offset enlarged lower end portion, disposed within the boiler, with its lower end opening against the boiler-shell; means for delivering feed-water into said column at a point adjacently above said lower end portion, and means, below the feed-water delivery, for entrance into the offset lower end portion of said column, directly accessible from the exterior of the boiler-shell, for the purpose set forth.

2. A device of the character described, comprising in combination with a steam-boiler; a feed-water-settling column within the boiler, and a hand-hole opening directly into the interior of said column from the exterior of the boiler-shell.

3. In a steam-boiler in combination as described, a hollow settling pipe or column disposed within the steaming-chamber, and provided at its lower end with a flanged mouth fitting against and attached to the boiler-shell, its upper end open to the interior of the boiler; the feed-water pipe connected into the side of said column, a blow-off pipe communicating with said column below the feed-water connection, a hand-hole through the boiler-shell into said column below the blow-off, and a removable closure means for said hand-hole.

4. In a boiler of the character described, the combination with the boiler-shell, of a vertical purifier-column standing clear within the boiler, and having its lower end turned outward and abuttingly joined to the inner side of the boiler-shell, a manhole through the boiler-shell opening directly into the interior of said column, a removable closure-plate and fastenings for said manhole, a blow-off pipe connected through the boiler-shell into the purifier-column chamber, means for delivering feed-water into said column, and means for controlling the feed and the blow-off.

5. In apparatus of the character described,

the combination, of the upright boiler-shell, means for supplying feed-water therefor, a settling-pipe or feed-water-purifier column standing within the boiler, and having the
5 lower offset end connected to the boiler-shell, means for unattachedly supporting the upper part of said column in position, a manhole in the boiler-shell, through which said purifier-column can be bodily inserted and re-
10 moved, and a removable closing device for said manhole.

6. In combination, with the upright boiler-shell, the settling-column within the boiler and standing clear of the shell, with its lower
15 offset portion joined to the inner surface thereof and the laterally-connected feed-water pipe; of a threaded pipe-connecting bushing-tube therefor screwed into the metal of the boiler-shell, and also screwed into the metal of the
20 settling-column.

7. In combination, with the boiler-shell, the internal upright purifier-column standing with a clear surrounding space within the boiler-shell and having an offset or outwardly-curved lower portion joined to the
25 shell, and the feed-water pipe, of a feed-pipe-connecting bushing, having a tapered screw-threaded portion threaded into the boiler-shell, and a straight screw-threaded portion
30 threaded into the purifier-column, said bushing extending across the intervening space and having the feed-water pipe screwed into the outer end of said bushing.

Witness our hands this 31st day of August, 1903.

WILLIAM P. ALLEN.
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Witnesses:

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