(No Model.)

J. McFARLANE.

BOILER CLEANER.

No. 565,387. Patented Aug. 4, 1896.

Fig. 1

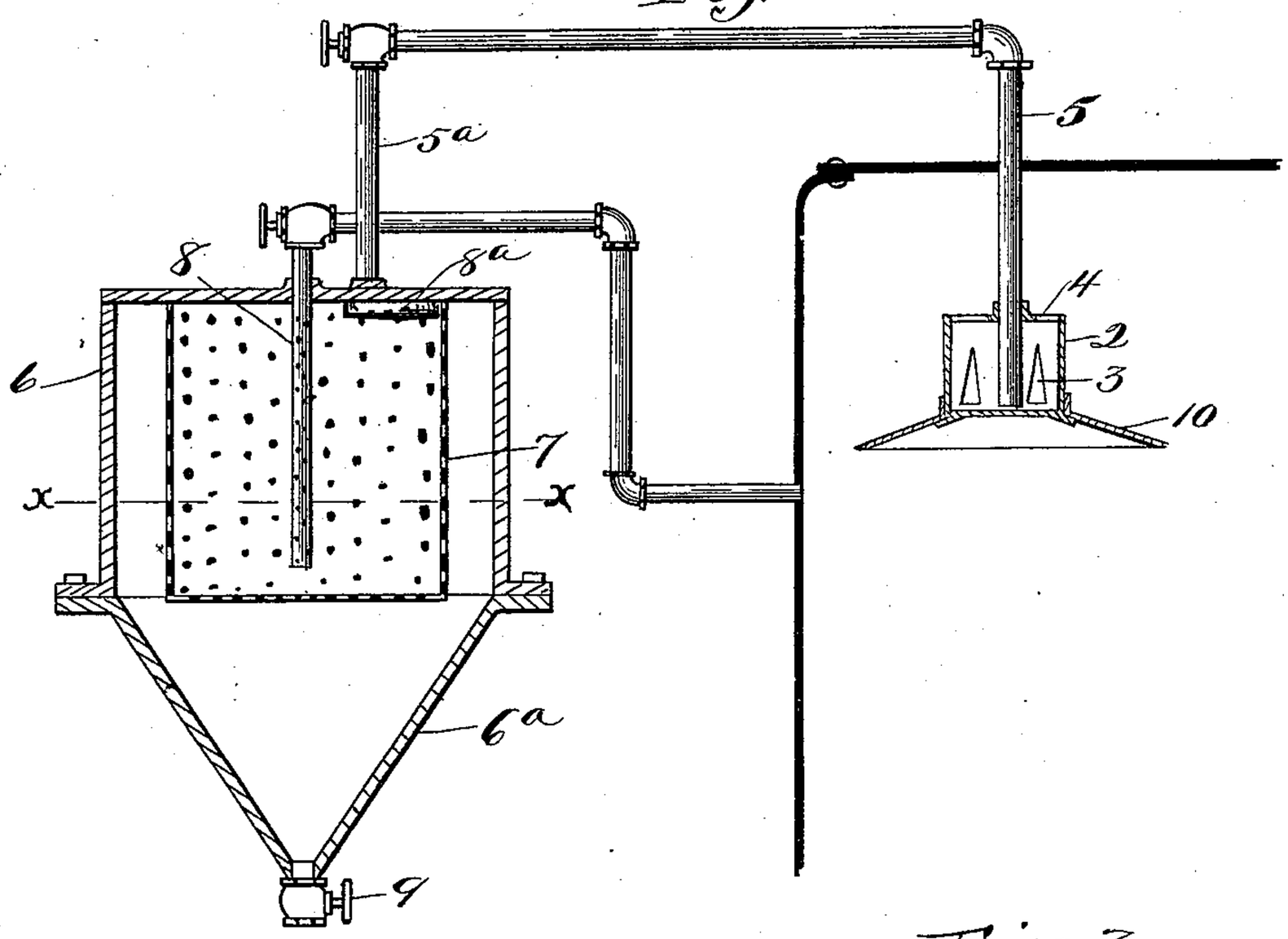
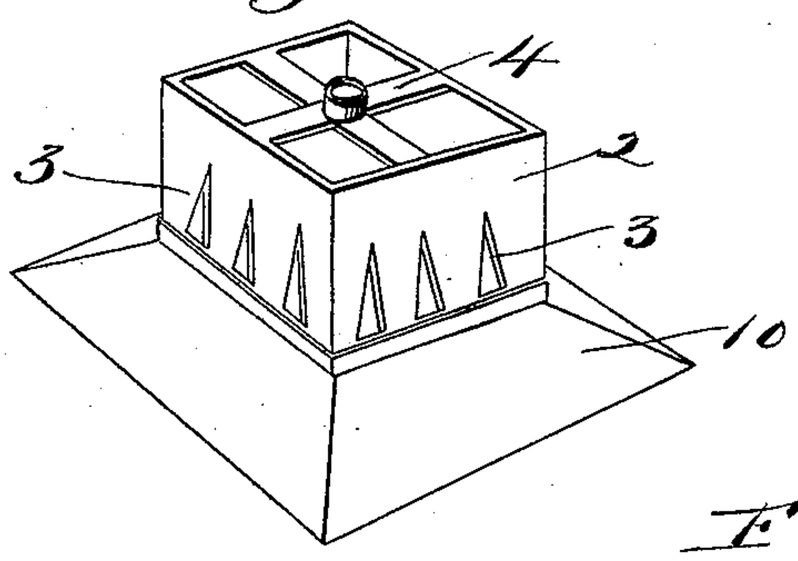


Fig. 3.

Fig. 2.



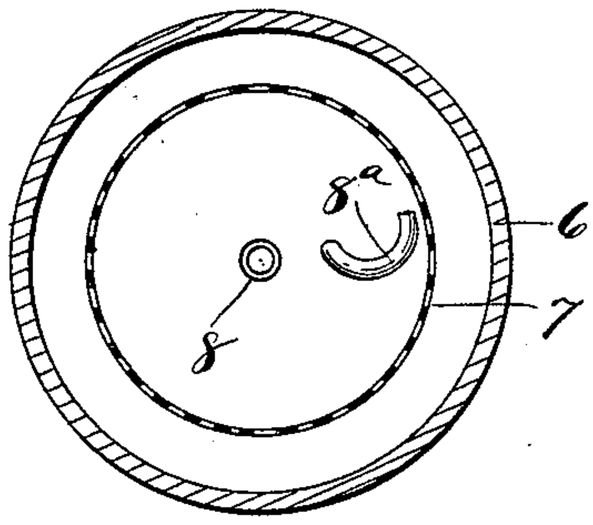
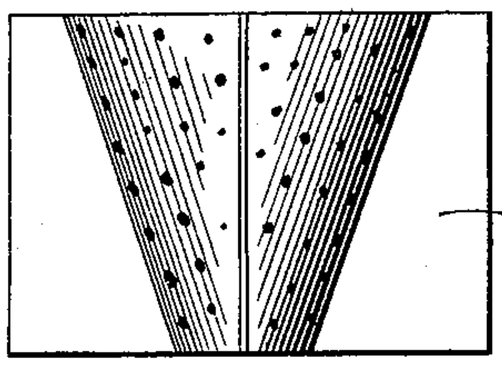


Fig. 4.



Witnesses:
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UNITED STATES PATENT OFFICE.

JOHN McFARLANE, OF WASHINGTON, DISTRICT OF COLUMBIA.

BOILER-CLEANER.

SPECIFICATION forming part of Letters Patent No. 565,387, dated August 4, 1896.

Application filed November 29, 1895. Serial No. 570,404. (No model.)

To all whom it may concern:

Be it known that I, JOHN MCFARLANE, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Boiler-Cleaners; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain new and useful improvements in that class of devices in which the foul water in the upper level of the boiler is caused to pass from the boiler into a suitable separator, wherein the foul matters by their superior weight are caused to separate from the body of water, which is then returned to the boiler, and for this purpose my invention consists in the construction, arrangement, and combination of the several parts of which it is composed, as will be hereinafter more fully described and claimed.

Referring to the accompanying drawings, in which corresponding parts are designated by corresponding marks of reference, Figure 1 is a vertical sectional view showing the general arrangement of the parts according to this invention. Fig. 2 is a perspective view of the skimmer within the boiler. Fig. 3 is a sectional view taken on the line *x x* of Fig. 1, as seen from below. Fig. 4 is a detailed view of a modified form of sieve, which is in the shape of an inverted frustum of a cone, the side walls of which are perforated and the bottom open, intercepting vertical side walls being cast upon the exterior of the former to more perfectly break up any motion in the liquid exterior to the sieve.

Within the boiler 1 is contained the skimmer 2 at about the normal water-level therein. As shown in the drawings, this skimmer consists of a rectangular box having a closed bottom, the sides of the skimmer having slots 3 therein, the upper ends of the slots being narrower than their bottom, and, as shown, I prefer to make these slots triangular. The angular shape of the box prevents circulating currents therein, thus causing the scum that may enter it to settle to the bottom, thus relieving the separator of a part of its work, and I have found that this is an important and valuable feature. A suitable spider 4 is secured to the upper edges of the sides of the box and has a central threaded aperture therein, through which the eduction-pipe 5 passes, the said pipe terminating within the box and extending upwardly through the crown of the boiler and being connected with the pipe 5^a, which, as will be seen, enters the top of the settler. Such a settler is for convenience constructed of two parts 6 and 6^a, the upper part 6 being cylindrical in shape and the lower part 6^a being of the shape of an inverted cone, the different parts being suitably bolted together. Within the upper part 6 is contained a cylindrical sieve 7, the bottom and sides of which are perforated, while the top of the upper section 6 of the settler has cast therein the passage 8^a, leading from the connection of pipe 5^a to near the side wall of the sieve, into which it discharges in a substantially tangental direction. Through the center of the top of section 6 passes the returning-pipe 8, which has its lower end terminating immediately above the perforated bottom of the sieve, and extends therefrom through the front of the boiler into the interior thereof, into which it discharges below the water-level, and that portion of the pipe 8 which is contained within the sieve has its side walls perforated.

A suitable discharge-cock 9 is placed in the lower end of the lower section 6^a of the separator or settler.

Suitable wings 10 may be attached in any desired manner to the sides of the skimmer, these wings projecting from the walls thereof outwardly and downwardly into the upper layers of the water in the boiler, thereby serving as collectors whereby the scum which it is desired to remove may be more conveniently led into the skimmer.

It will be noted that in the operation of my improved device the heavy scum floating upon the water of the boiler will by the wings 10 be led into the skimmer, from which the matter so collected will pass through the pipes 5 and 5^a into the interior of the cylindrical sieve contained within the upper section of the separator, into which it will be discharged in substantially a tangential direction, causing a rotating flow of water within said sieve. During this flow the heavier mat-

ter contained in suspension will by centrifugal force be thrown outwardly and against the perforated side walls, through which its centrifugal force will carry it into the space outside of the sieve. Here, being protected by the side walls, it will no longer be subject to agitation, and the matter suspended therein will sink to the lower portion of the separator, from which it may be discharged from time to time by opening the cock therein. The purer part, however, of the liquid fed to the separator will, owing to its specific gravity, remain within the cylindrical sieve, and will be forced therefrom through the pipe 8 to make room for fresh matter fed by the pipes 5 5[a], and this lighter portion so returned to the boiler will carry with it a certain part of the matter which has passed through the sieve, for while in the lower part of the separator the heavier particles which have passed through the sieve will settle to the bottom, while the lighter portion, which may also have come through the sieve, will separate therefrom and float upon the top of the portion that is thrown down, and this lighter portion will pass through the bottom of the sieve and mix with the liquid contained therein.

It will thus be seen that by my device I obtain an efficient separator, which, while removing the incrustating impurities from the water of the boiler, at the same time discharges but little of the heated clear water therewith, thus preventing waste of power by the needless discharge of water that has already been heated. I have found, moreover, that by the device I have described above the impurities are more perfectly removed than with any device now in use.

It is to be noted that the term "side wall" is used not only to denote the side walls of the cylindrical sieve shown in Fig. 1, but as also including the side walls of a vessel the sides of which are inclined. Such a vessel, for instance, is shown in Fig. 4, in which the inner vessel is in the shape of an inverted frustum of a cone, the bottom of which is open; but I have claimed such a construction specifically in another application filed by me in the Patent Office on the 19th day of February, 1896, which has been serially numbered 579,879. It is obvious, however, that the vertical radial intercepting walls 7[b] upon the exterior thereof may be applied to the cylindrical form of sieve. Moreover, I do not limit myself to the induction-pipe discharging tangentially against the side walls of the vessel.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a separator for boiler-water, the combination, with a containing vessel, of a vessel in the upper portion thereof having perforated side walls, induction and eduction pipes connected with the interior of the said inner vessel, and a discharge-port for the deposit in the outer vessel below the inner vessel, substantially as described.

2. In a separator for boiler-water, the combination of an outer containing vessel, a sieve contained therein having perforated sides and bottom, a pipe discharging into said sieve, an eduction-pipe connected with the sieve, and means for removing the impurities from the exterior of the sieve, substantially as described.

3. In a separator for boiler-water, the combination, with an outer vessel, of a vessel therein having perforated side walls, an induction-pipe discharging into the interior of the inner vessel, a vertical perforated eduction-pipe in the inner vessel, and means for removing the deposit from the exterior of the said inner vessel, substantially as described.

4. In a separator for boiler-water, the combination, with an outer vessel, of a vessel therein having perforated side and bottom walls, an induction-pipe discharging into the interior of the inner vessel, a vertical perforated eduction-pipe in the inner vessel, and means for removing the deposit from the exterior of the said inner vessel, substantially as described.

5. A separator for boiler-cleaning apparatus consisting of an outer containing vessel, a vessel therein having perforated side walls, a pipe discharging into the interior of said inner vessel in a substantially tangential direction and means for removing the purified products from the interior of said inner vessel, substantially as described.

6. The combination in a separator for boiler-cleaning apparatus of an outer containing vessel, a sieve having a perforated bottom and sides contained therein, a pipe discharging into the said sieve in substantially a tangential direction, and means for removing the purified water from the interior of said sieve and the impurities from the outside of said sieve, substantially as described.

7. In a separator for a boiler-cleaning apparatus having an outer containing vessel, a sieve having perforated sides and bottom contained within the upper portion of the said containing vessel, a passage in the head of such containing vessel discharging substantially tangentially into the interior of said sieve, and a pipe for withdrawing the purified water from the interior of said sieve, substantially as described.

8. The combination of a separator a skimmer-box having perforations in its side walls and collector-wings hung from the side walls of the skimmer-box extending downwardly and outwardly therefrom, substantially as described.

9. In a boiler-cleaning apparatus the combination with a skimmer-box, contained within the boiler having triangular perforations in its sides, the said perforations being narrower at the top than at the bottom, collector-wings hung from the said box extending out-

wardly and downwardly therefrom, a separator consisting of an outer containing vessel having perforated side and bottom walls, the top of the vessel having a passage-way cast within it and discharging in a substantially tangential direction within the inner vessel, a pipe connecting the interior of the skimmer-box with the said passage and a pipe having a perforated end contained within the inner vessel of the separator and discharging into the boiler below the normal water-level therein, substantially as described.

10. In a separator for boiler-water, the combination of an outer vessel, a vessel therein having perforated side walls, vertical intercepting walls between the outer and inner vessel, an induction-pipe and an eduction-pipe connected with the interior of the inner vessel, and means for removing the deposit from the exterior of the inner vessel, substantially as described.

11. A separator for a boiler-cleaning apparatus consisting of an outer containing vessel, a vessel therein having perforated side walls, vertical intercepting walls between the inner and outer vessels, a pipe discharging into the interior of the said inner vessel in a substantially tangential direction, and means for removing the purified products from the interior of the said inner vessel, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN McFARLANE.

Witnesses:
J. L. BOWIE,
JOHN A. ZELLERS.