

No. 645,870.

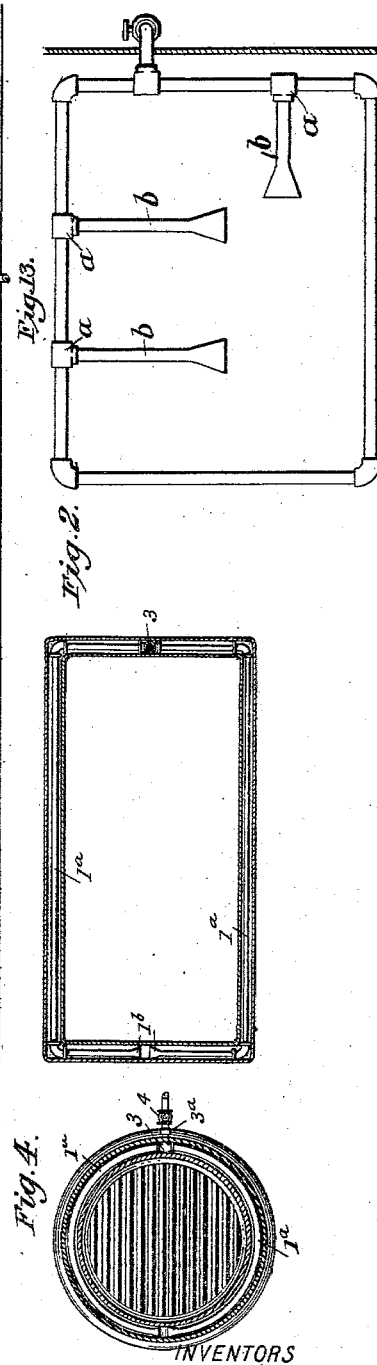
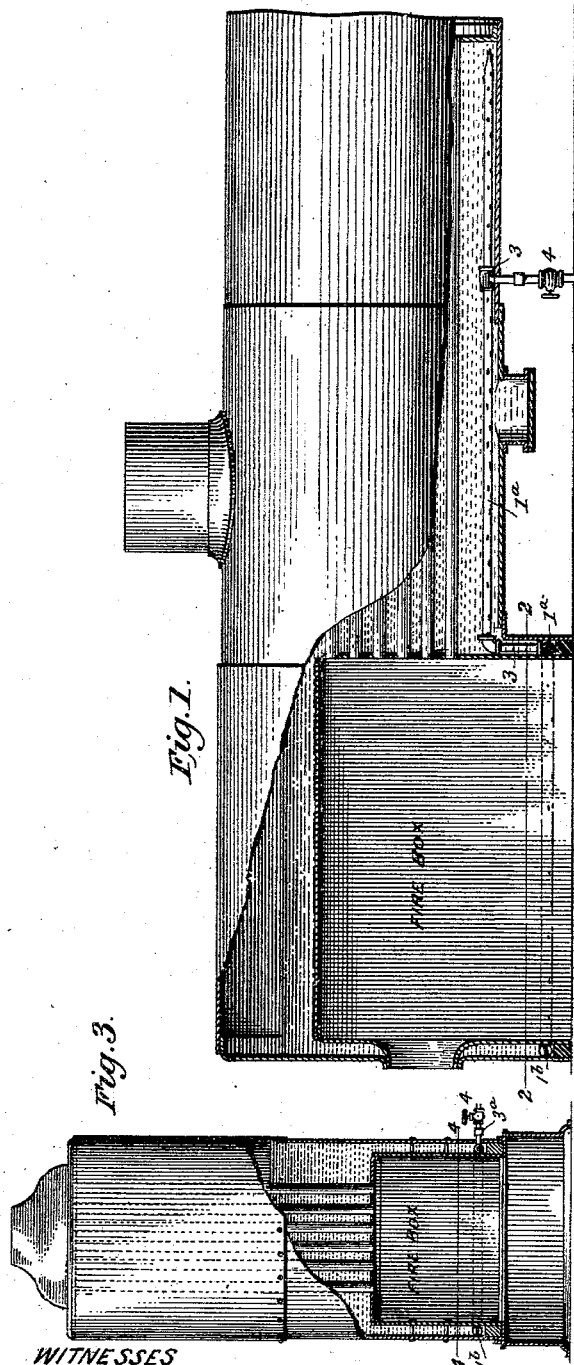
Patented Mar. 20, 1900.

J. T. NORRIS & J. R. SMITH.
BOILER CLEANER.

(Application filed Aug. 14, 1899.)

(No Model.)

2 Sheets—Sheet 1.



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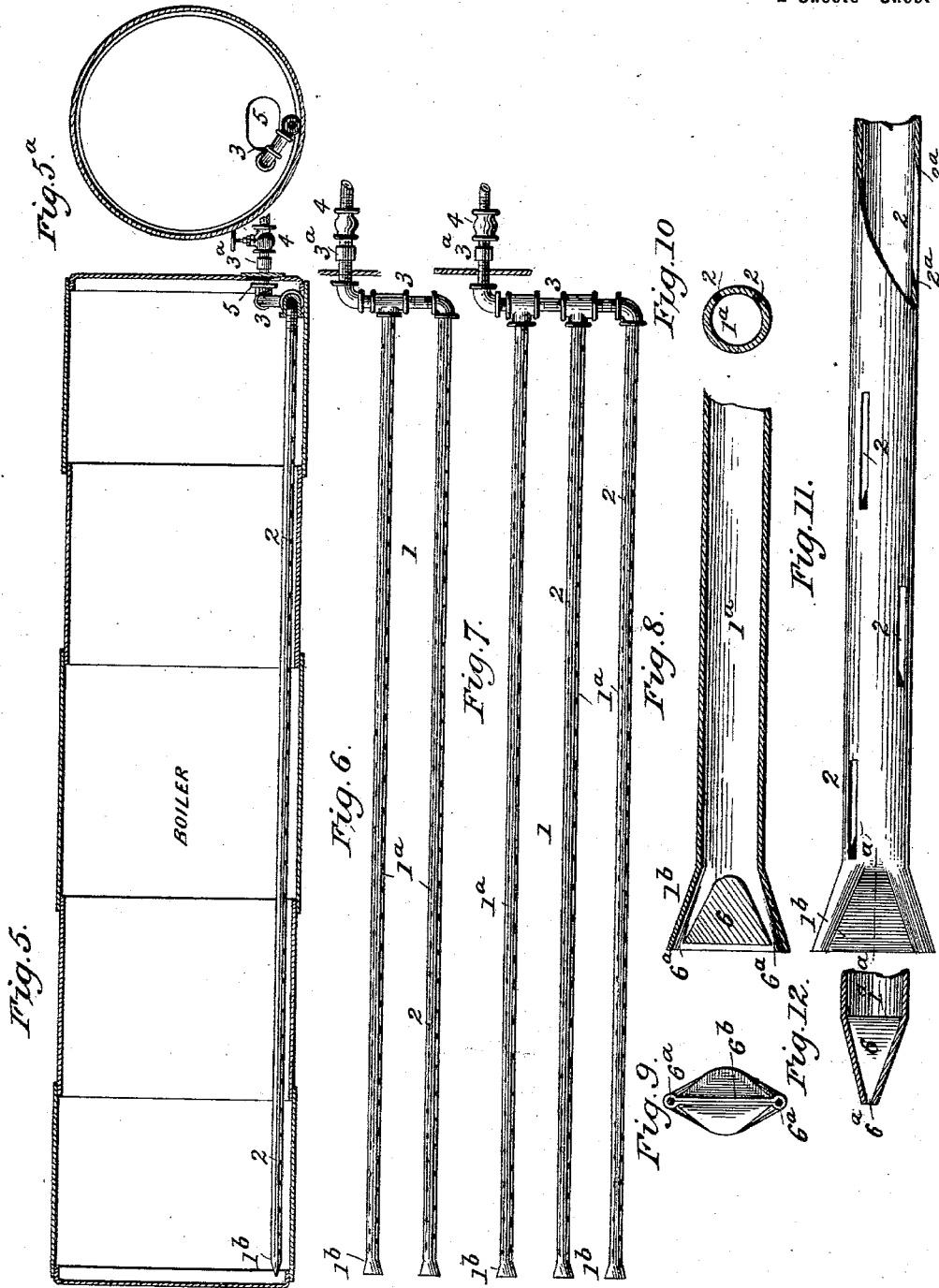
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UNITED STATES PATENT OFFICE.

JOHN T. NORRIS AND JAMES R. SMITH, OF RATON, TERRITORY OF NEW MEXICO.

BOILER-CLEANER.

SPECIFICATION forming part of Letters Patent No. 645,870, dated March 20, 1900.

Application filed August 14, 1899. Serial No. 727,120. (No model.)

To all whom it may concern:

Be it known that we, JOHN T. NORRIS and JAMES R. SMITH, residing at Raton, in the county of Colfax and Territory of New Mexico, have invented a new and Improved Cleaner or Dredge for Boilers, of which the following is a specification.

This invention has for its purpose to provide a simple, economically-made, and easily-applied means for cleaning out or dredging steam-boilers and other like power-generators, whereby to quickly remove sediment therefrom.

Our invention consists in the novel arrangement and peculiar combination of parts, as will hereinafter be described in detail, and specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 illustrates our invention as applied for use in a horizontal or locomotive boiler. Fig. 2 is a horizontal section of the same on the line 2 2 of Fig. 1. Fig. 3 illustrates the manner of applying our invention to a vertical boiler. Fig. 4 is a horizontal section of the same on the line 4 4 of Fig. 3. Fig. 5 is a longitudinal section of the ordinary tubular horizontal boiler, illustrating another way in which our invention is applied. Fig. 5^a is a transverse section of the same. Fig. 6 is an inverted plan view of our appliance as arranged for a large-sized boiler. Fig. 7 is a similar view of the same constructed for use in boilers of an extremely-large area. Fig. 8 is a section of the receiver end of one of the dredge-pipes. Fig. 9 is an end view of the same. Fig. 10 is a cross-section thereof. Fig. 11 is a view of the receiver end of one of the drain-pipes having a modified arrangement of suction-inlets; and Fig. 12 is a horizontal section of the receiver end thereof, taken on the line *aa* of Fig. 11. Fig. 13 illustrates a modified arrangement of our invention hereinafter referred to.

Heretofore cleaner devices or sediment blow-outs for boilers have been provided either in the nature of perforated pipes located within the boiler at the bottom or both at the bottom and at the normal water-line and which have been connected with a sediment-collecting tank and with the feed-water

pipe and so arranged that the water is caused to circulate through the tank and the sediment or scum during the circulation of the water allowed to settle within the sediment-tank. Perforated pipes located outside the bottom of the boiler have also heretofore been provided, which have been tapped with the bottom of the sediment-collecting space of the boiler and provided with blow-offs for the discharge of the sediment or dirty-water accumulation.

Devices constructed on the lines above noted have in practical application been open to objection and found not to produce all of the results desired, for the reason their construction has been costly, as a special arrangement of parts is usually required for different types of boilers, and particularly those operating as a combined feed-water and purifying means have been found to frequently clog up on account of the variable circulation of the water within the boiler and have thereby become either partly or entirely inoperative.

Our invention seeks to provide a simplified means capable of being (without any material changing of structure) applied to almost any type of boiler or power generator and which will effectively serve to quickly clean out the sediment collected in the bottom of the boiler and surrounding water-legs, said invention comprehending, among other features, a novel correlation of parts, whereby a uniform offtake of the dirty water and sediment is produced without danger of the pipes clogging and the boiler-cleaning portion thereby effected in a positive and rapid manner.

Referring now to the accompanying drawings, and particularly to Figs. 1 to 4, inclusive, it will be noticed our dredger or clean-out devices in their simplest form (being that especially adapted for a vertical boiler, as in Figs. 1 and 2) consist of a pair of semicircular horizontally-disposed pipe-sections 1^a, which at one end join with a coupling member, with which a blow-off pipe-section is connected that extends outside of the boiler and is joined to a union-coupling 3^a, to which the blow-off valve 4 is also secured. The under side of each pipe-section 1^a has perfora-

tions 2, which may be either round, as shown in Fig. 10, or they may be in the nature of elongated slits, as shown in Fig. 11, and when thus formed the edges thereof are beveled in the direction of the flow of the fluid, as indicated by 2^a, to prevent danger of said slits becoming clogged.

One of the essential features of our invention lies in the separation of the two pipe members 1^a, their ends being in practice held in a close relation to each other, but separated and formed with openings, whereby to create a compound offtake-current. This manner of drawing off the water in the pipes not alone affords a quick method of cleaning the boiler of its contents, but also effects a more uniform circulation of the water, as will presently more fully appear, and by reason of the extreme opposing ends being open an induced flow into the rear end of the pipes is obtained, which in passing from the entrant ends of the said pipes to their exit ends causes, as it were, an induction force through the several apertures of the pipes, increasing progressively toward the exit ends of said pipes, which tends to create a quick and uniform offtake and at the same time serves as a means for automatically cleaning the pipe-inlets, as the induced current in the said inlets is sufficiently strong to prevent lodgment of any sediment within the said openings.

To increase the injection force of the fluid through the pipes and also to prevent lodgment of scum, sediment, or solids of any kind against the entrant end of the said pipes 1^a, the said ends 1^b are made tapering, they being also enlarged transversely in one direction, and said ends are closed except at their diametrically-opposite points, where they have small inlets 6^a, gradually increasing toward the pipe-body proper, said inlets being separated by the abutting ends of the cone portion of the pipe and a solid wedge-like member 6, as clearly shown in Figs. 8 and 11.

By forming the end of the pipe in the manner shown and above described it is obvious the point or tapered edge will serve as a wedge to separate any solid substance or scum bulk that may be drawn against it, thereby not only preventing the clogging at the said ends, but also leaving a small opening 6^a clear for the proper flow of the fluid therein, said opening 6^a converging inwardly, whereby to produce a jet-stream into the end of the pipe, which, gradually becoming augmented by the streams drawn in through the inlets at the bottom of the pipe and which successively increase in their induction force, creates thereby a circulation and offtake flow impossible to obtain by the ordinary arrangement of perforated blow-out pipes.

So far as described the manner in which our improvement operates is as follows: Usually when boilers have been fired externally or internally for twelve or twenty-four hours, more or less, as the case may be, the fire is drawn off or banked. The agitation of the

natural heat within the boiler then begins to cease and the sediment contained therein commences to settle toward the bottom of the boiler, and in a very short time—say two hours—the bulk of it has become deposited on such bottom. At the end of the settling time the blow-off 4, which is in the nature of an ordinary globe-valve, is open, and at this time there is still a pressure of steam within the boiler, say, of forty pounds or more. The pressure of the water will cause a perfect circulation thereof, the same entering the pipes 1^a and, as before stated, taking out with it all sediment that has settled on the bottom of the boiler, thereby overcoming danger of the boiler-shell becoming burned or possibly blown up, such as is likely to occur when the said sediment has been permitted to thicken and lodge on the bottom and sides of the shell.

It is obvious our improved cleaner or dredger device involves a simple arrangement of parts capable of being used on almost any kind of boiler without materially changing the relation thereof. For instance, in locomotive-boilers the two pipe-sections 1^a are disposed in the water leg or chamber that surrounds the fire-box, as shown in Figs. 3 and 4, so as to clear that part of the boiler, while a single pipe-section 1^a is extended over the bottom of the horizontal part of the boiler and connected with the double pipe-section 1^a by a vertical joint 3. In this form the blow-off valve 4 is connected, through the medium of the union-coupling 3, with the single section 1^a. When our invention is used with the ordinary tubular boiler horizontal, as shown in Figs. 5 and 5^a, we employ a plurality of pipe-sections 1^a, extending lengthwise of the boiler, over its bottom, as shown in Fig. 5, the valve 4 connecting with the coupling 4, to which the union-coupling member 3^a connects and which supports the blow-off valve 4. In this form and, in fact, in all types of boilers we use a plurality of pipes 1^a, which in small-sized boilers is usually two, coupled up at one end, as shown in Fig. 6, and for larger-sized boilers three or more pipe-sections 1^a are used, having the one end coupled up, as shown in Fig. 7. In all cases, however, the outer or open ends of the pipe-sections 1^a are constructed alike and arranged in juxtaposition, so as to create a plurality of clearly-defined outflowing streams of considerable force, whereby to not only quickly clean the boiler, but also automatically, as it were, keep the apertures of the pipe-sections 1^a cleared to positively overcome all danger of their choking up. By keeping the pipe-orifices cleared out at all times it is manifest we can utilize the steam-pressure remaining in the boiler after the fire has been cut off and secure a complete clearing out of the boiler before the said pressure shall have by expansion become exhausted.

In Fig. 13 we have shown a slight modification of our invention. In this form the main or take-off pipe is shown with taps *a*, having

laterals *b*, the inlet ends of which are constructed in the same manner as the inlet ends of the pipes 2. This latter arrangement of our invention is intended for use at such places where it would be difficult to use the straight dredge-pipes alone.

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

10 1. A boiler-cleaner, comprising a plurality of perforated pipes, said pipes having one end made tapering, and the said tapering end formed with a plurality of inlet-openings gradually increasing inwardly and merging
15 with the pipe, said pipes having induction-inlets from the tapering end to their exit end, the exit ends of said pipes having a union-coupling, and a blow-out held externally of the boiler connection with the said coupling
20 as set forth.

2. A boiler-cleaner comprising two perforated pipes joined at one end to the common union-pipe, the free ends of the pipes extending in opposite directions about the fire-box,
25 their extremities facing each other, said ex-

trémities having a tapering edge and inlets; and a perforated pipe-section connected with the union-pipe and extended into the sediment-inlets of the horizontal part of the boiler, the extremities of said pipe having tapering apertures, and a blow-off external of the boiler connected with one of the perforated pipe-sections.

3. A boiler-cleaner as described, comprising a plurality of pipes joined at one end to a common coupling member; a blow-off connected with said member, each pipe having a series of inlets, their edges tapering in the direction of the water out-flow, the extremities of said pipes being made wedge-shaped and having a pair of inlets *6^a*, convergently disposed inwardly with increasing diameters and merging with the pipe, all being arranged substantially as shown and described.

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Witnesses:

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