No. 793,834. PATENTED JULY 4, 1905.

R. B. HODGE.

CLEANER.

APPLICATION FILED FEB. 6, 1904.

Fig. 1.

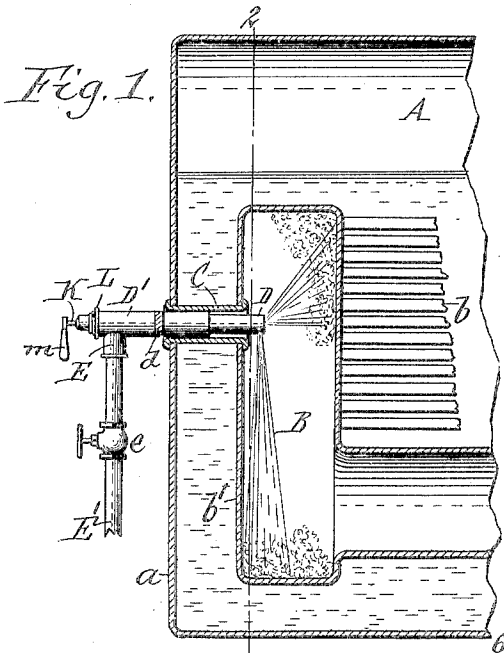


Fig. 2.

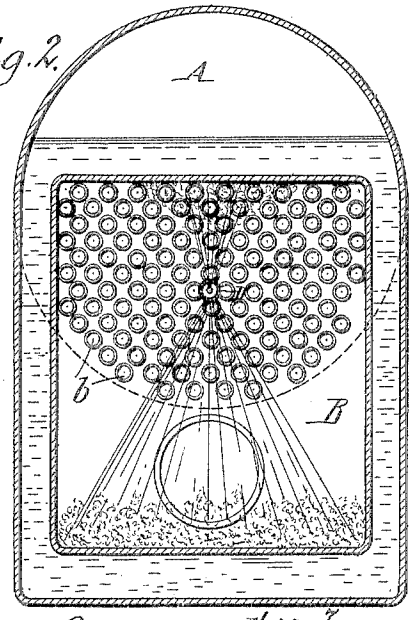


Fig. 3.

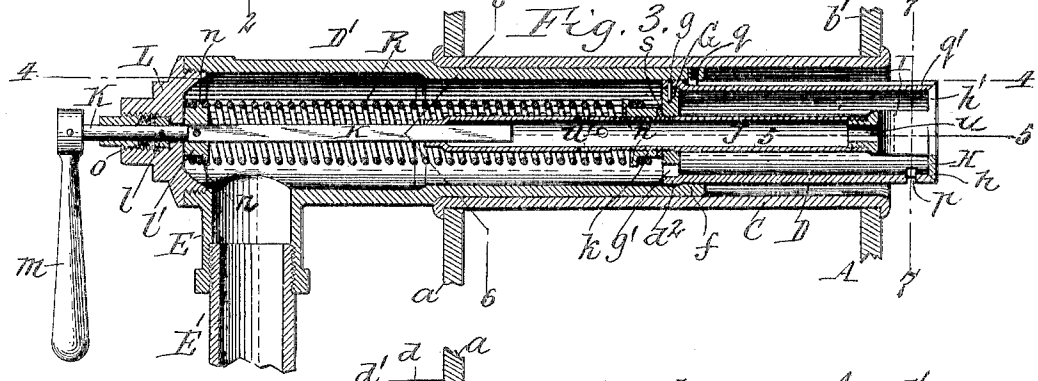


Fig. 4.

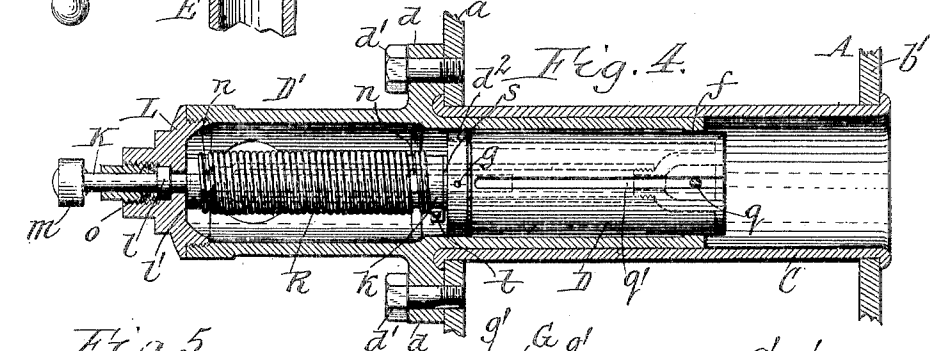


Fig. 5.

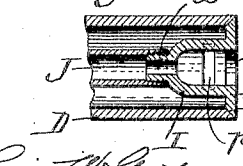


Fig. 6.

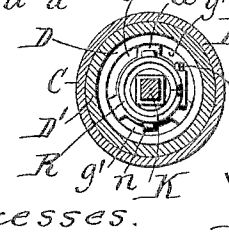
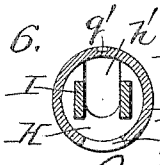


Fig. 7.



Witnesses.

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No. 793,834. Patented July 4, 1905.

UNITED STATES PATENT OFFICE.

ROBERT B. HODGE, OF BUFFALO, NEW YORK.

CLEANER.

SPECIFICATION forming part of Letters Patent No. 793,834, dated July 4, 1905.

Application filed February 6, 1904. Serial No. 192,324.

To all whom it may concern:

Be it known that I, ROBERT B. HODGE, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Steam-Boiler Cleaners, of which the following is a specification.

This invention relates to a boiler-tube cleaner consisting of a steam nozzle or tube adapted to be introduced into the rear portion of the combustion-chamber for delivering a steam-jet into the rear ends of the flues and also against the bottom of said chamber, whereby the soot and other deposits detached from the inner faces of the flues are lifted from the bottom of said chamber and blown forwardly into the chimney or smoke-stack. A flue-cleaner of this character is shown and described in Letters Patent No. 720,252, granted to me February 10, 1903.

The object of my present invention is to improve the construction and operation of this kind of flue-cleaner to permit of automatically projecting the same into the combustion-chamber for cleaning the chamber and flues or retracting the same therefrom so as to clear said chamber when not in use in order to prevent the nozzle from being burned unnecessarily.

In the accompanying drawings, Figure 1 is a fragmentary longitudinal sectional elevation of the rear part of a marine boiler equipped with my improved cleaner. Fig. 2 is a vertical cross-section in line 2 2, Fig. 1. Fig. 3 is a vertical longitudinal section, on an enlarged scale, of the cleaner and the adjacent part of the boiler, showing the cleaner in its projected or operative position. Fig. 4 is a horizontal section in line 4 4, Fig. 3, showing the cleaner in its retracted or inoperative position. Fig. 5 is a fragmentary horizontal section in line 5 5, Fig. 3. Figs. 6 and 7 are cross-sections in lines 6 6 and 7 7, Fig. 3, respectively.

Similar letters of reference indicate corresponding parts throughout the several views.

A represents the boiler, which is provided in its rear portion with the usual upright smoke-box or combustion-chamber B and with flues *b*, extending forwardly from the smoke-box to the chimney.

C represents a short tube or thimble extending through the water-space between the rear head *a* of the boiler and the back head *b'* of the smoke-box and secured at its ends to these heads by flanging in a well-known manner. This thimble forms an opening for the introduction of my improved cleaner into the smoke-box, which cleaner is constructed as follows: D D' represent the front and rear tubular sections, which form the body of the cleaner. The rear section is fitted at its front end into the outer part of the thimble and rigidly held in place by means of external lugs *d*, formed on the central part thereof and secured by screws *d'* or otherwise to the rear head of the boiler. Near the rear end of the rear body-section the same is provided with a laterally-projecting branch E, which is connected with the steam-supply pipe E'. This pipe is provided with a hand-valve *e* for controlling the admission of steam. The front section of the tubular body is connected with the rear section by means of a telescopic joint to permit of projecting the front section into the smoke-box when the cleaner is in use or to retract the same within the thimble when the cleaner is not in use. This telescopic connection is preferably formed by sliding the rear end of the front section in the front end of the rear section. At its rear end the tubular front section is provided with an external annular flange d^2, which fits the bore of the tubular rear section. This flange in the projected position of the front section engages an internal annular flange *f* at the front end of the rear tubular section, so as to serve as a stop for limiting the forward movement of the front section, as shown in Fig. 3. The cooperating faces or shoulders of the flanges d^2 *f* are preferably beveled, as shown, so that when they are engaged they form a steam-tight joint, which prevents any steam from passing through the cleaner at this point into the smoke-box. At its rear end the front section is provided with a piston G, against which the steam impinges for pushing this section forward into its operative position. This pis-

ton is preferably constructed in the form of a central hub having a plurality of radial arms, which are secured in the bore of the front section by pins g and form openings g', which establish communication between the interior of both sections and permit steam to pass from the rear section to the front section. Upon opening the valve and admitting the steam the pressure of the same against the piston G causes the front section to be moved forwardly until the front end of this section projects into the smoke-box, as represented by full lines in Figs. 1 and 3. In addition to projecting the front body-section of the cleaner into its operative position the steam passes from the rear section through the openings in the piston into the front section and thence outwardly into the smoke-box, where the same is directed into the flues and toward the bottom of the smoke-box for detaching the soot and carrying the same forwardly through the flues into the chimney.

The nozzle at the front end of the front body-section for directing the steam is constructed as follows: H represents a rotary plug or head arranged at the front end of the front body-section and provided with a backwardly-beveled edge h, which engages with the correspondingly-beveled inner end of the front body-section. This plug is provided with a jet aperture or passage h', which is arranged eccentrically and extends from the central part of the plug to the periphery thereof, as shown in Figs. 3 and 7. On its rear side the plug is provided with a yoke or arch I, which bridges or straddles its jet-aperture and which is connected with the front end of a tubular stem J. This stem is arranged axially within the front section and extends at its outer end through an opening formed centrally in the piston G. The steam issuing from the eccentric jet-aperture of the plug in the projected position of the front body-section enters the rear ends of those flues which are within range of the steam-jet and passes forwardly through the same into the chimney, whereby any soot adhering to or lodged in those flues is detached and expelled through the chimney. Upon rotating the plug while the steam is issuing from the same in the projected position of the front body-section the steam can be directed in a circular path over the entire area of the flue-sheet for successively subjecting all of the flues to the cleaning action of the steam-blast. In order to permit of thus turning the plug from the exterior of the cleaner-body and at the same time permit the front body-section to slide freely into its operative or inoperative position, the following actuating or controlling mechanism is provided: K represents an actuating-rod arranged axially within the rear body-section and extending at its rear end through the head L at the rear end of this section, while its front end is arranged in the tubular stem of the plug. The actuating-rod is capable of rotating in the head L, but is held against lengthwise movement therein by means of an outer collar l, secured thereto and engaging with the outer side of the head, and an inner collar l', secured to the rod and engaging against the inner side of said head, as shown in Fig. 3. The actuating-rod is connected with the tubular stem of the plug in such manner that the stem is compelled to turn with the rod, but is free to slide back and forth on the rod in following the longitudinal movement of the front section. This connection is preferably effected by making the actuating-rod square in cross-section and also making the rear end of the tubular stem J square, so that the same fits the actuating-rod, as represented in Figs. 3 and 6. By this means the actuating-rod when turned causes the plug to be turned with the same for directing the steam-blast against the several flues. The turning of the rod is preferably effected by a handle m, applied to the outer end thereof. For the purpose of preventing steam from leaking past the journal of the rod in the head L the joint between the latter and the rod is packed by a stuffing-box o. The inward movement of the front body-section may be limited by a stop device of any suitable construction. The preferred means for this purpose consists in making the tubular stem of such length that its rear end engages the collar l' and arrests the inward movement of the front section when the front end of the same is wholly within the thimble and nearly flush with the front end of the rear section, as shown in Fig. 4. On the under side of the front section adjacent to the plug the same is provided with a side jet aperture or opening p. In the projected position of the front body-section this side aperture is arranged comparatively close to the rear wall of the smoke-box, so that the steam issuing laterally or downwardly therefrom loosens or detaches the soot in the bottom thereof. The soot thus detached is lifted and carried forwardly through the flues into the chimney, this operation of the cleaner being the same as that described in my previous patent hereinbefore referred to. In order to retain the side aperture of the front body-section always on the under side thereof, this section is held against turning in any suitable way. The preferred means for effecting this purpose consists of a screw or key q, arranged on the front end of the outer section and engaging with a longitudinal keyway or groove q', formed in the outer side of the front section, as shown in Figs. 3 and 4. Upon turning off the steam and relieving the piston from the steam-pressure, the front body-section is automatically retracted into its inoperative position by means of the spring R. This spring surrounds the rod K and stem J and is secured at its rear end to the collar l', while its front end is secured to a collar k on the stem. The spring is prefer-

ably secured to the collars l' and k by forming lugs n on the exterior thereof in the proper position to permit the end coils of the spring to be screwed on these collars, so that they interlock with the lugs n. The front collar k bears against the rear side of the piston by means of an interposed washer s, so as to prevent longitudinal movement of the stem in the front section and hold the rotary plug against its seat. To permit of taking up wear on the plug or adjacent parts, the collar k is connected with the stem J by a screw-joint, whereby this collar may be moved toward the piston of the front section for drawing the plug against its seat. For holding the collar k in position after adjustment the same is split and firmly clamped on the stem by tightening a bolt or screw t, which connects the split parts of the collar. The front and rear parts of the tubular stem communicate with the front and rear body-sections by means of an axial opening u, formed in the arch, and a plurality of lateral openings u', formed in the rear part of the stem. The steam enters the stem through the rear openings u' and discharges through the front outlet-opening u, thereby utilizing the stem as a steam-conduit in addition to the tubular body, whereby the maximum steam-delivery of the cleaner is obtained.

My improved construction of boiler-cleaner permits of permanently attaching the same to the boiler so that the latter can be quickly and thoroughly cleaned by simply turning on the steam-valve and rotating the plug.

I claim as my invention—

1. A boiler-cleaner comprising a stationary rear tube-section having a steam-inlet, and a front tube-section movable relatively to the rear section and having a steam-outlet, substantially as set forth.

2. A boiler-cleaner comprising a stationary rear tube-section having a steam-inlet, and a movable front tube-section adapted to project beyond the front end of the rear section and having a steam-outlet, substantially as set forth.

3. A boiler-cleaner comprising tubular front and rear telescoping sections, a steam-outlet nozzle arranged on the front section, a steam-supply connected with the rear section, and means operating to automatically move the front section lengthwise of the rear section, substantially as set forth.

4. A boiler-cleaner comprising a tubular rear section provided with a steam-supply and a tubular front section having a telescopic connection with the rear section and an outlet-nozzle and constructed to be projected by steam-pressure, substantially as set forth.

5. A boiler-cleaner comprising a tubular rear section provided with a steam-supply, a tubular front section having a telescopic connection with the rear section and an outlet-nozzle and constructed to be projected by steam-pressure, and a spring for retracting the front section, substantially as set forth.

6. A boiler-cleaner comprising a tubular rear section having a steam-supply, a tubular front section sliding in the rear section and provided at its front end with a steam-outlet nozzle and at its rear end with a piston, and a spring arranged between said sections and operating to retract the front section, substantially as set forth.

7. A boiler-cleaner comprising a tubular rear section provided at its rear end with a steam-supply branch, a tubular front section sliding in the rear section and provided at its front end with an outlet-nozzle, a piston arranged at the rear end of the front section and having openings arranged to establish communication between the interior of said sections, and a spring arranged between said sections and operating to retract the front section, substantially as set forth.

8. A boiler-cleaner comprising a stationary rear tube-section having a steam-inlet, a front tube-section movable relatively to the rear section, and a rotary head arranged at the front end of the front section and having an eccentric steam-outlet aperture, substantially as set forth.

9. A boiler-cleaner comprising a tubular rear section having a steam-supply, a tubular front section having a telescopic connection with the rear section and provided in its side with a jet-aperture through which the steam issues laterally, a rotary head or plug arranged at the front end of the front section and having an eccentric jet-aperture through which the steam issues forwardly, and means for rotating said head from the exterior of said sections, substantially as set forth.

10. A boiler-cleaner comprising a tubular rear section having a steam-supply, a tubular front section, a longitudinal actuating-rod arranged in said sections and capable of rotation therein but held against lengthwise movement relatively thereto, a tubular front section having a telescopic connection with said rear section, and a rotary plug arranged at the front end of said front section and having an eccentric jet-aperture and a connection with said rod which is constructed to compel the plug to rotate with said rod but permit the head to move axially relatively to the rod, substantially as set forth.

11. A boiler-cleaner comprising a tubular rear section having a steam-supply, a tubular front section sliding in the rear section, a piston arranged at the rear end of the front section, a rotary plug engaging with the front end of the front section and having an eccentric jet-aperture, a tubular stem projecting rearwardly from said plug through said piston, a screw-collar arranged on said stem and bearing against the rear side of said piston, an actuating-rod turning at its rear end in a head at the rear end of the rear section but

held against axial movement therein while its front end slides in said tubular stem but is compelled to turn therewith, and a handle arranged at the rear end of said rod, substantially as set forth.

12. A boiler-cleaner comprising a tubular rear section having a steam-supply, a tubular front section sliding in the rear section but held against rotation relatively thereto and having a jet-aperture in its side through which steam issues laterally, a rotary plug arranged in the front end of the front section and having an eccentric jet-aperture through which the steam issues forwardly, and means for rotating the plug from the exterior of the tubular sections, substantially as set forth.

13. A boiler-cleaner comprising a tubular rear section having a steam-supply branch at its rear end and an internal key at its front end, a tubular front section sliding within the rear section and provided with an external longitudinal groove which receives said key and with a jet-aperture in its under side, a piston arranged at the rear end of said front section and having openings whereby communication is established between the interior of said sections, a rotary plug engaging with the front end of the front section and having an eccentric jet-aperture, a tubular stem projecting rearwardly from said plug through said piston, a front screw-collar arranged on said stem and bearing against the rear side of said piston, an actuating-rod for said plug capable of rotating in the rear section but held against axial movement relatively thereto while its part end is square and receives the correspondingly-shaped rear end of said stem, a rear collar secured to the rear part of said rod, and a spring connecting said collar, substantially as set forth.

14. A boiler-cleaner comprising a tubular body provided with a beveled front end, a rotary plug having an eccentric jet-aperture and a beveled edge engaging with the beveled end of said body, and means for rotating said plug, substantially as set forth.

15. A boiler-cleaner comprising a tubular body having a steam-inlet and a steam-outlet, a rotary plug arranged in said outlet, and a hollow stem operating said plug and serving as a steam-conduit, substantially as set forth.

16. A boiler-cleaner comprising a tubular body having a steam-inlet and a steam-outlet, a rotary plug arranged in said outlet and having an eccentric discharge-opening, and an actuator for said plug consisting of a rod extending through the body and a tube having one end connected with said rod and provided with a steam-inlet while its opposite end is connected with said plug and provided with a steam-outlet, substantially as set forth.

Witness my hand this 2d day of February, 1904.

ROBERT B. HODGE.

Witnesses:
THEO. L. POPP,
EMMA M. GRAHAM.