(No Model.)

H. L. CURRIER.

BOILER TUBE CLEANER.

No. 373,926. Patented Nov. 29, 1887.

Fig-1-

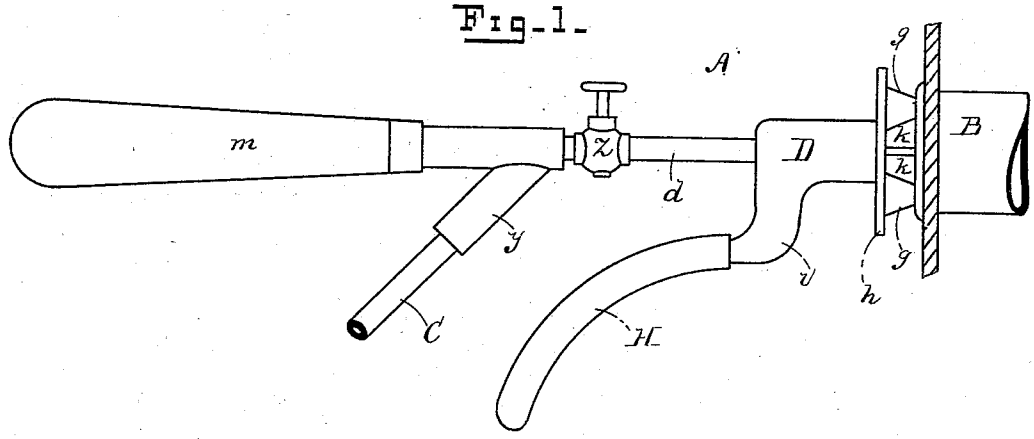


Fig-2-

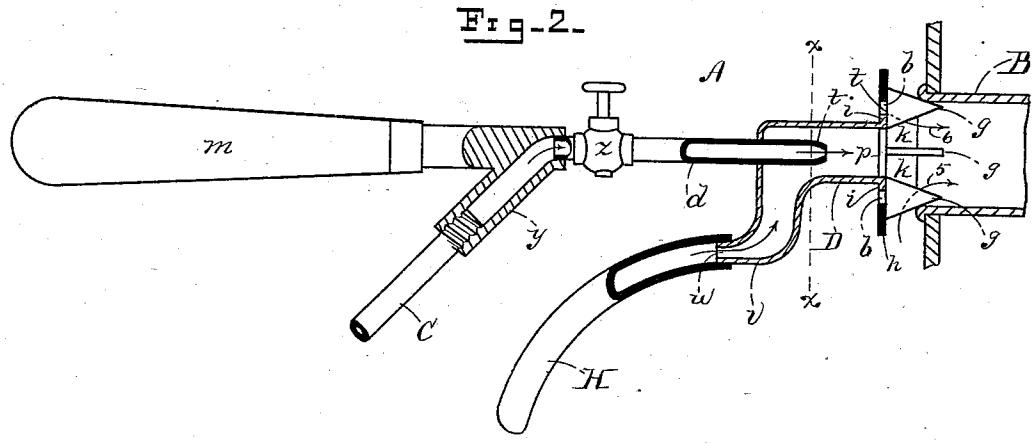


Fig-3-

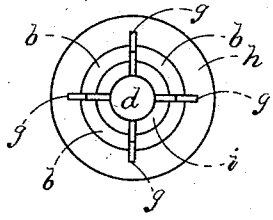
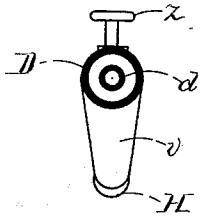


Fig-4-



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UNITED STATES PATENT OFFICE.

HERBERT L. CURRIER, OF LYNN, MASSACHUSETTS, ASSIGNOR TO FRANK B. GRAVES, OF SAME PLACE.

BOILER-TUBE CLEANER.

SPECIFICATION forming part of Letters Patent No. 373,926, dated November 29, 1887.

Application filed August 31, 1887. Serial No. 248,345. (No model.)

To all whom it may concern:

Be it known that I, HERBERT LESTER CURRIER, of Lynn, in the county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Boiler-Tube Cleaners, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of my improved boiler-tube cleaner in position for use, the tube and steam-pipe being shown as broken off and a portion of the boiler-tube represented in section; Fig. 2, a vertical longitudinal section of the nozzle, certain parts being shown in side elevation; Fig. 3, an end elevation of the same; and Fig. 4, a vertical transverse section, taken on line *x x* in Fig. 2.

Like letters of reference indicate corresponding parts in the different figures of the drawings.

My invention is designed as an improvement on the boiler-tube cleaner shown and described in Letters Patent numbered 368,655, dated August 23, 1887; and it consists in a novel construction and arrangement of parts, as hereinafter more fully set forth and claimed, the object being to produce a more effective device of this character than is now in ordinary use.

The nature and operation of the improvement will be readily understood by all conversant with such matters from the following explanation.

In the drawings, A represents the nozzle considered as a whole, and B the boiler-tube. The nozzle consists of a metallic tube, *d*, provided at its rear end with an insulating-handle, *m*, and having a downwardly-projecting branch pipe, *y*, screw-threaded at its outer end to receive a steam-pipe, C. An ordinary steam-valve, *z*, is disposed in the pipe *d*, near where the pipe *y* enters it. The inner end or mouth, *t*, (see Fig. 2,) of the pipe *d* converges slightly, so that the steam will be ejected with greater force therefrom somewhat after the manner of an ordinary hose-nozzle. A bulb or large pipe, D, provided at its rear end with a downwardly-projecting branch pipe, *v*, is secured around the pipe *d*, being arranged concentrically therewith and in such a manner that its mouth *t* is slightly forward of the opening of the branch pipe *v* into said bulb. A sand-pipe, H, is attached to the outer end of the branch pipe *v*. The bulb D is provided with an annular flange, *i*, around its mouth *p*. Four triangular-shaped studs or guides, *g*, are radially disposed on and secured at their bases equidistant from each other to the flange *i*, and also to an annular ring, *h*, (see Fig. 3,) leaving air-spaces *b* between said ring and flange. The triangular studs *g* serve as guides and "center" the nozzle, enabling it to be firmly held against the mouth of the boiler-tube B when in use. The object of the openings *b* is to permit currents of air to enter the mouth of the tube B, when said tube is so large that the ring *h* comes in contact therewith, and the spaces *k* between said studs are closed.

I preferably form the nozzle A, with its bulb D, flange *i*, studs *g*, pipe *d*, ring *h*, and branch pipes *y v* integral or cast in one piece; but do not confine myself to so doing, as the parts named may be made separately and united by any suitable means.

In the use of my improvement the nozzle is first connected by means of the branch pipe *y* with a steam-pipe C, which connects with a boiler-dome or an apparatus for supplying and forcing steam into the tube *d*. The sand-pipe H is also attached to the branch pipe *v*, connecting it with a supply of sand, preferably finely-pulverized quartz. The operator then grasps the handle *m* and inserts the studs *g* of the nozzle in the opening or mouth of the boiler-tube B. Steam being admitted into the pipe *d* by opening the valve *z*, it passes through the mouth *t* into the bulb or large pipe D and then into the tube B. The steam in passing the opening of the branch pipe *v* tends to form a vacuum in the bulb D, thereby creating a strong draft through the branch pipe *v*, which causes the sand to be rapidly drawn through the pipe H into said bulb, where it is caught by the jet of steam from the pipe *d* and thrown by it with great force against the interior walls of the boiler-tube, the steam and sand forming a "sand-blast," which removes the

scale collected thereon and carries it forward until it falls out at the other end of the tube. As the steam and sand rush into the boiler-tube, they tend to create a vacuum therein, causing air to be drawn into said tube through the openings *b k* in the direction of the arrows 5 and 6 in Fig. 2. The air thus admitted assists in carrying forward the scale and other displaced deposits, and also prevents to a large extent the back-pressure or "cushioning" of the steam in the boiler-tube.

I do not confine myself to the use of the valve *z* in the pipe *d*, as it may be omitted or inserted in the pipe C. Neither do I confine myself to providing the bulb D with a flange, *i*, as the studs *g* may be secured directly to said bulb; nor to using four guides or studs, *g*, as any number desired may be employed.

Having thus explained my invention, what I claim is—

1. In a device for cleaning boiler-tubes, the pipe *d*, having the branch pipe *y*, in combination with the bulb D, provided with the branch pipe *v*, studs *g*, and ring *h*, the pipe *d* being inserted in the tube D, substantially as set forth.

2. In a device for cleaning boiler-tubes, the bulb D, provided with the pipe *v*, for admitting sand thereto, the triangular studs *g*, disposed at the mouth of said bulb, and the ring or collar *h*, secured to said studs, in combination with the pipe *d*, valve *z*, branch pipe *y*, and handle *m*, the pipe *d* being inserted in the bulb D, substantially as described.

3. In a device for cleaning boiler-tubes, the combination of the following instrumentalities, to wit: a tubular body provided with a branch pipe for admitting steam thereto, a valve for closing said steam-pipe, a bulb secured to said body, and having a branch pipe for admitting sand thereto, and a guide or guides secured to said bulb, substantially as set forth.

4. In a device for cleaning boiler-tubes, the combination of the following instrumentalities, to wit: a tubular body provided with a branch pipe for admitting steam thereto, a valve for closing said steam-pipe, a bulb secured to said body, and having a branch pipe for admitting sand thereto, triangular-shaped radially-disposed guides or studs secured to said bulb, and an annular collar or ring secured to said studs, so as to leave an opening for the admission of air around the mouth of the bulb when the guides are inserted in the tube, substantially as set forth.

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