

(No Model.)

M. C. HENLEY.

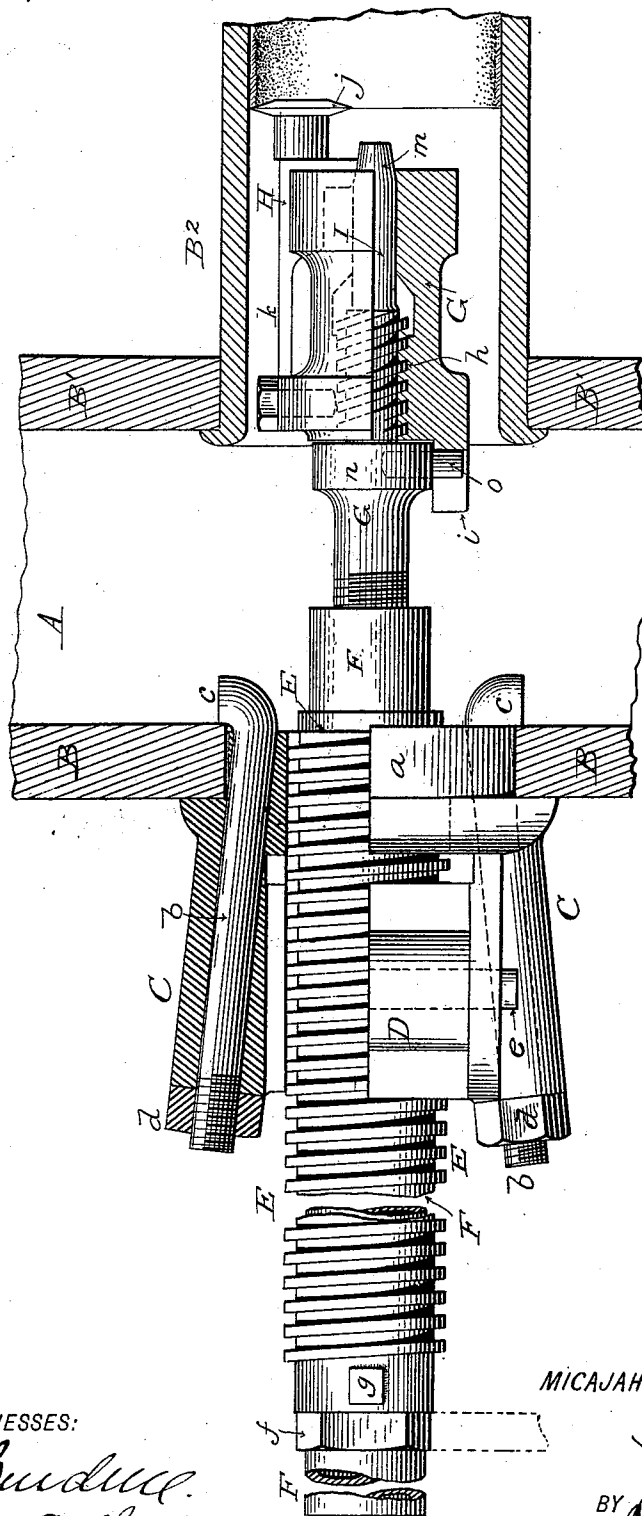
2 Sheets—Sheet 1.

BOILER TUBE CLEANER.

No. 518,995.

Patented May 1, 1894.

Fig. 1.



WITNESSES:

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(No Model.)

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2 Sheets—Sheet 2.

BOILER TUBE CLEANER.

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Fig. 2.

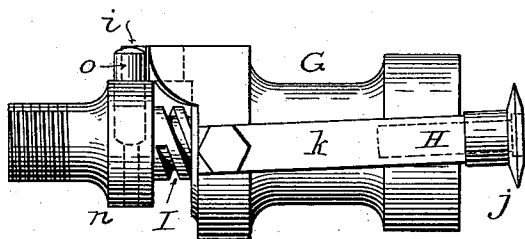


Fig. 3.

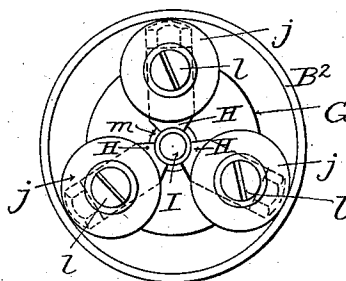


Fig. 4.

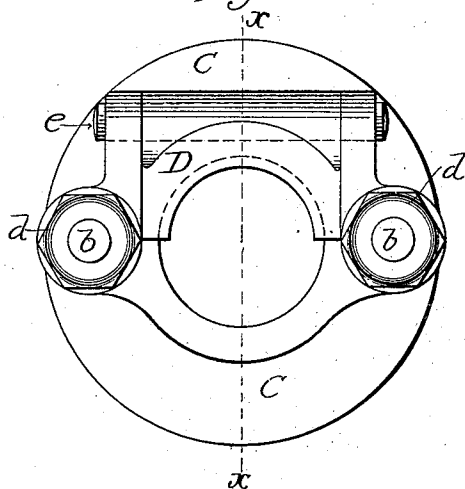
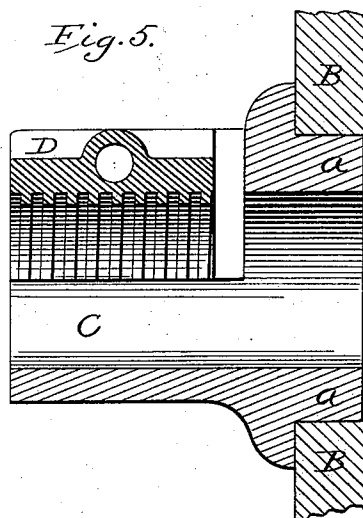


Fig. 5.



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UNITED STATES PATENT OFFICE.

MICAJAH C. HENLEY, OF RICHMOND, INDIANA.

BOILER-TUBE CLEANER.

SPECIFICATION forming part of Letters Patent No. 518,995, dated May 1, 1894.

Application filed January 8, 1894. Serial No. 496,082. (No model.)

To all whom it may concern:

Be it known that I, MICAJAH C. HENLEY, a citizen of the United States, residing at Richmond, in the county of Wayne and State of Indiana, have invented certain new and useful Improvements in Boiler-Tube Cleaners, of which the following is a specification.

My invention relates to boiler-tube cleaners, and has reference more particularly to that class of devices designed for removing the scale or deposit formed on the inner face of such tubes.

In the drawings,—Figure 1 is a plan view, partly in section, of my improved tube-cleaner, as the same appears when at work; Fig. 2, a side view of the cleaner proper detached from the operating devices; Fig. 3, a front end view of the same; Fig. 4, an end view of the frame or holder to be secured to the manifold; and Fig. 5, a sectional view of the same on the line $x-x$.

A indicates the manifold or front of a water-tube boiler, comprising the perforated plates B and B'; and B² indicates one of the tubes secured to the inner plate B' in line with the opening in the outer plate, as is customary in this class of boilers.

Detachably secured to the outer plate B over the opening therein, is a hollow frame or support C,—Figs. 1, 4, and 5,—open from end to end and on its upper side, and provided at its front end with a neck a to fit within the hole or opening in the plate B. This frame is held in place by bolts b whose inner bent ends c bear against the inner face of plate B, and whose outer ends are threaded to receive nuts d ; the said frame being provided with longitudinal holes or passages to receive the said bolts as shown in Fig. 1. In putting the frame in position, the noses or bent ends of the bolts are first turned inward toward each other so that they may be passed through the opening, and after the frame with its bolts has been inserted far enough into the opening, the bolts are turned axially so as to throw their noses or bent ends outward to bear against the inner face of plate B. By tightening the nuts d , the frame will be firmly clamped to the plate. Frame C is further provided with a detachable half-nut D which

fits into the open top thereof, as shown in Figs. 1, 4 and 5, which nut is held in place by a transverse bolt e passing through suitable holes in the nut and frame.

Passing freely through the longitudinal opening in the frame C but engaging the nut D thereof when the latter is in place, is a hollow screw E, Fig. 1, which in practice will be made about two and a half or three feet long, the outer end of said screw being made angular as at f , or otherwise suitably formed to receive a wrench (shown in dotted lines) or a suitable connection for a power mechanism, whereby the screw may be turned or rotated, and moved lengthwise relatively to its frame C.

At or near the outer end, or indeed at any other suitable point, the hollow screw E is provided with a set screw g , by means of which a rod or pipe F passing through the screw, is clamped or fastened temporarily to the screw to partake of the rotary and inward longitudinal movement of the latter. This rod or pipe, which is much longer than the screw,—about as long as the flue or tube to be cleaned,—is connected at its inner end by a screw connection, or otherwise, to the cleaner proper, as shown in Fig. 1, so that the movements imparted to the rod or pipe shall be transmitted to the said cleaner. This cleaning device comprises a hollow body portion G, screw-threaded internally, as at h , and provided at its rear end with an arm or stop i shown in Figs. 1 and 2. The body portion is slotted radially at its front end to receive the blocks H carrying the cleaning cutters or disks j , the said blocks being provided with springs k , which tend to throw or hold the cutters inward away from the surface of the tubes. I prefer to make these springs integral with the blocks, as shown in the drawings, but this is not essential, the construction shown being preferred, however, because of its simplicity and efficiency. The cleaning disks or cutters are secured to the ends of the blocks or spring arms by means of a gudgeon or large screws l so as to permit of ready removal for resharpening or replacement. The blocks H project inward into the longitudinal bore of the body portion G, as shown in Figs.

1 and 3, in position to be acted upon by the stem or plug I which is externally threaded to engage the threaded body portion G,—the inner end or active portion of said stem being tapered as at *m* where it comes in contact with the blocks H. At its rear end the plug or stem I is provided with a collar *n* and pin *o*, the pin being adapted to strike or engage the lug *i* to limit the inward movement of the plug or stem and prevent its being turned so far into the body portion as to cause it to be jammed or locked, and for the further purpose of causing the body portion G to turn or rotate with the stem or plug after the latter has been moved longitudinally a short distance. When the stem I is first given nearly one complete turn, it is moved longitudinally, and its beveled nose *m* being projected outward between the blocks H causes said blocks to move outward radially to carry their cleaners or cutters out against the inner face of the tube. When the stem has been rotated far enough to cause the projection of the blocks, as just described, the pin *o* strikes the lug or projection *i*, preventing further independent rotation of the stem within the body portion. Further rotation of the stem I by hand or by power through the intervention of the pipe or rod F, causes a rotation of the cleaning device as a whole. Should the cleaner become clogged or fast in the tube, it can be released by turning the stem I backward until its pin *o* strikes against the rear face of lug *i*. The lug *i* and pin *o* also prevent the stem or plug I from being accidentally unscrewed or withdrawn from the body portion G.

Upon reference to Fig. 2 it will be noticed that the spring arms carrying the cleaning cutters are inclined to the axis of the cleaner as a whole, to correspond with the pitch of the hollow screw, so that if the screw have three threads to the inch, one rotation of the screw will advance the cleaner one-third of an inch; and as there are three cutters the lime or deposit removed would equal one-ninth of an inch for each cutter.

The operation of the device is as follows: The cleaner proper is first inserted into the tube to be cleaned with its rod or pipe F projecting out through the front plate of the manifold. The frame C is now passed over the said rod or pipe and clamped to the said front plate B; and the hollow screw E also slipped over the projecting end of the pipe,—the screw and pipe being locked together by means of the set screw *g*. The nut D is now secured in position in frame C so as to engage the hollow screw. Now by turning the hollow screw E by hand, or in any other suitable manner, the pipe or rod F which is connected therewith will partake of the rotary and longitudinal feed motion thereof, and as the rod or pipe is connected with the threaded stem I, the latter will be projected to spread the cutters and bring them into operative po-

sition. As the screw and pipe continue to rotate, the cleaning device proper will be turned or rotated bodily within the tube,—the engagement of the pin *o* with lug *i* preventing independent rotation of the parts of the cleaner proper. The screw E is turned to carry the cleaner about two feet (more or less according to the length of the screw) into the boiler tube, when the rotation is stopped. Set screw *g* is now released, the pin *e* withdrawn and the nut D lifted off the hollow screw. The latter being thus freed, is moved back upon the tube or pipe F a suitable distance, the screw and pipe are again connected by the set screw, and the nut D replaced, whereupon the operation of advancing the cleaner into the tube a farther distance of two feet by the turning of said screw may be carried on. Where the deposit in the tubes is light, the cleaner may be rotated and forced through the said tubes by employing only the rod or pipe F and turning the device by hand, allowing the screw E to act merely as a support for the pipe or rod F; or another support may be substituted for the hollow screw.

Having thus described my invention, what I claim is—

1. In a tube-cleaner, the combination with a body portion; of a series of cutters carried thereby; a rotatable stem mounted in the body portion to force the cutters outward; and means for limiting the independent rotary motion of the stem, whereby when such limit of motion is reached, the body portion is caused to rotate with the stem.

2. In a tube-cleaner, the combination with a threaded body portion provided with lug *i*; cutters carried by the body portion; and a threaded stem mounted in the body portion and provided with a pin or stop *o* to engage the lug *i*.

3. In combination with a tube-cleaner, and its stem; a hollow screw adapted to receive the stem and to be connected therewith and disconnected therefrom; a frame adapted to be clamped to the boiler manifold; and a removable nut carried by the frame to engage the screw; whereby by removing the nut and disconnecting the screw and stem, the screw may be slid backward upon the stem preparatory to further feed of the cleaner.

4. In combination with the frame C adapted to be applied to the boiler manifold; the bolts *b* provided with bent ends *c* and nuts *d*, and adapted to be turned or rotated within their seats in the frame; a nut carried by the frame; a hollow screw to engage the nut; a tube cleaner; and a rod or stem for the latter, adapted to be connected with and disconnected from the screw.

5. In a device for operating tube-cleaners, the combination with a tube cleaner and its stem; of a frame adapted to be applied to the boiler manifold; a half-nut detachably mounted in said frame; a hollow screw; and

means for connecting and disconnecting the stem and screw.

6. In a device for operating tube cleaners, the combination with the frame and means
5 for attaching said frame to the boiler; of a removable nut mounted in the frame; a short feed screw; a flue cleaner provided with an elongated stem to pass through and beyond

the end of the screw; and means for connecting the stem and screw.

In witness whereof I hereunto set my hand
in the presence of two witnesses.

MICAJAH C. HENLEY.

Witnesses:

WILLIAM E. BELL,
CHARLES O. TOOKER.