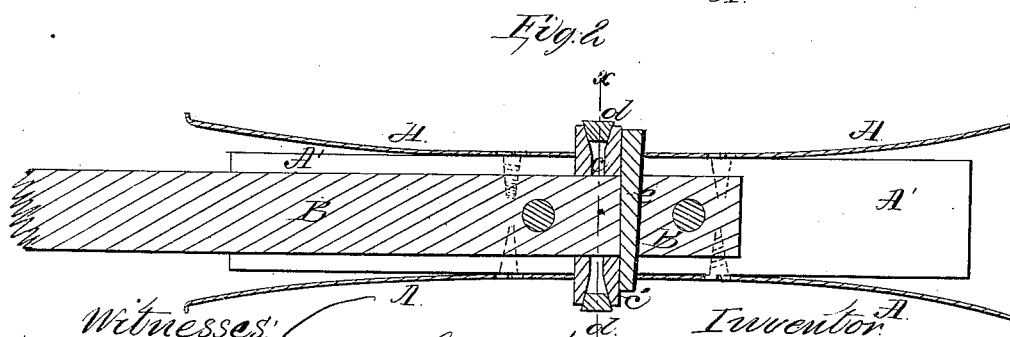
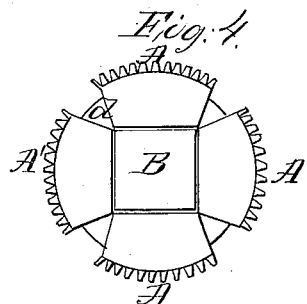
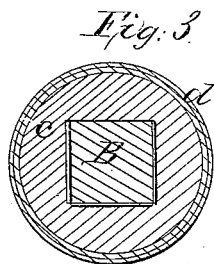
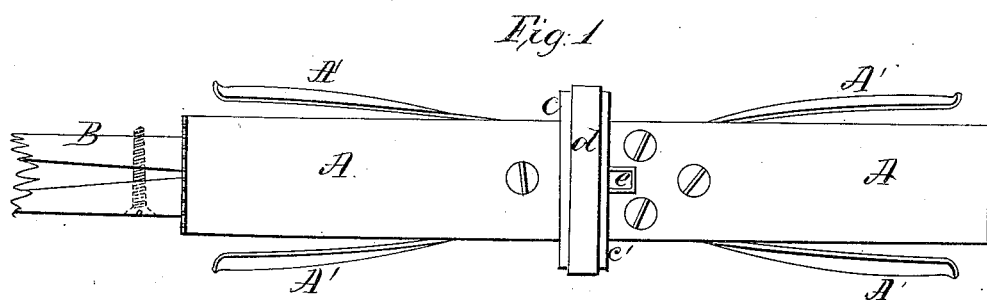


H. Waterman,
Steam-Boiler Cleaner.
N^o 53,203. Patented Mar. 13, 1866.



Witnesses: *Wm. L. McIntire* *Henry Waterman*
D. L. Musgrave *By his atty*
J. M. McIntire

Inventor *H. Waterman*

UNITED STATES PATENT OFFICE.

HENRY WATERMAN, OF BROOKLYN, NEW YORK.

IMPROVED APPARATUS FOR CLEANING BOILER-TUBES.

Specification forming part of Letters Patent No. 53,203, dated March 13, 1866.

To all whom it may concern:

Be it known that I, HENRY WATERMAN, of Brooklyn, Kings county, in the State of New York, have invented a new and useful Instrument or Apparatus for Cleaning Steam-Boiler Tubes; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

My invention relates to an improved fixture or apparatus for cleaning the small tubes or flues of steam-boilers.

It is well known that in the use of tubular boilers the perfect utility of the tubes is greatly diminished by their becoming dirty, and the capacity of the boiler to make steam rapidly and economically thus impaired, so that it is customary to clean out the tubes periodically; but I am not aware that previous to my invention any successfully working tool or apparatus had been devised to readily and effectually clean the tubes of boilers of all dirt, cinder, and scale that collects and forms in them.

My invention consists of a contrivance formed of a series of spring-scrapers attached to and arranged around a central rod, in connection with a disk formed and adapted to fit the tube and act as a piston to force out all matter accumulated in and scraped from the internal surface of said tube, as will be hereinafter more fully described.

To enable those skilled in the art to make and use my invention, I will proceed to explain the construction and operation of one of my new boiler-tube cleaners, referring by letters to the accompanying drawings, in which—

Figure 1 is an elevation thereof. Fig. 2 is a longitudinal section of the same. Fig. 3 is a cross-section at the line *xx* of Fig. 2, and Fig. 4 is an end view of the same.

In the several figures the same part is designated by the same letter of reference.

A A and A' A' are four springs, made of sheet-steel, of about the form shown, having their extremities serrated, as clearly seen, and being arranged about and secured to a square central rod or shaft, B. At about the center of these spring-scrapers A A A' A', and surrounding them and the square rod B, to which they are secured, are two collars or washers, *c c'*, one of which, *c*, is stationary, the other, *c'*, being capable of lateral play. Between the

flaring and adjacent edges or sides of these two collars is arranged a rubber ring, *d*, which is embraced and held between the said two collars, as clearly shown, by means of a wedge, *e*, which is made to force the movable collar *c'* toward the stationary one *c*, and thus effect the clamping between the two of the rubber ring *d*. In this manner a complete piston is formed, of which the rubber ring *d* constitutes the face or periphery, and which may be made larger or smaller by working the wedge *e* in and out, and thus effecting the distension and allowing the contraction of the rubber ring *d*.

The rod or stock B of the contrivance or implement may be bifurcated, as clearly seen in the drawings, to accommodate a long wooden handle or rod of any kind of sufficient length to enable the workman to work the tool through from one end to the other of the tubes.

The spring-scrapers A A and A' A' should be so shaped and arranged that their adjacent ends require to be sprung or forced slightly together to effect the insertion of the tool into the tube of the boiler, the object of such formation and arrangement being to cause the ends of the said scrapers to exert a constant pressure against the interior or bore of the tube while confined therein. The serrated ends of the scrapers should be so formed as to effectually scrape the tube in whichever direction the cleaning-tool is forced. Of course the peculiar shape and size of the springs and the material of which they are formed is immaterial to my invention, and may be varied in the judgment of the constructor or manufacturer. I propose, however, to make one set of springs (by a set I mean two opposite springs) a little longer than the other set, or where there are more than two sets to have no two sets the same length, to facilitate the insertion of the tool, for it will be seen that if so made two opposite springs may be pressed together at a time with the hand, and the tool can be more conveniently put into the tube than it could be if all the spring or scraper ends had to be grasped in the hand and pressed together at once and put into the tube.

The operation of my improved contrivance will be readily comprehended: The tool is inserted into the tubes of a boiler to which it is adapted, and being drawn back and forth in the tube, the serrated scraper-springs A A and A' A' effectually cut and scrape off all

scale formed on the interior of the tube and all foreign matter adhering thereto, while the piston or disk formed by the rubber ring *d*, confined between the collars *c c'*, effectually removes the contents of the tube.

It will be seen that while this apparatus cannot injuriously affect the material of the tubes, it will most thoroughly and conveniently clean them, and that it will do so rapidly and with comparatively little labor.

I do not desire to be understood as limiting myself to any precise proportions of the springs; but,

Having fully explained my new boiler-tube cleaner, what I claim as new, and desire to secure by Letters Patent, is—

1. A series of spring-scrapers arranged around a central stock, in combination with a clearing-out piston or disk, substantially as set forth.

2. The spring-scrapers constructed of different lengths, whereby the series can be more conveniently inserted within the tube, as set forth.

In testimony whereof I have hereunto set my hand and seal this 28th day of December, 1865.

HENRY WATERMAN. [L. S.]

In presence of—

WM. C. MCINTIRE,
J. MCINTIRE.