

(No Model.)

J. L. LOCKHART.
BOILER TUBE CLEANER.

No. 564,932.

Patented July 28, 1896.

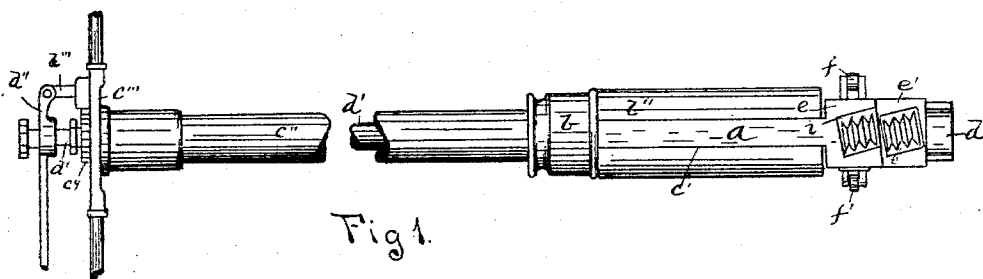


Fig 1.

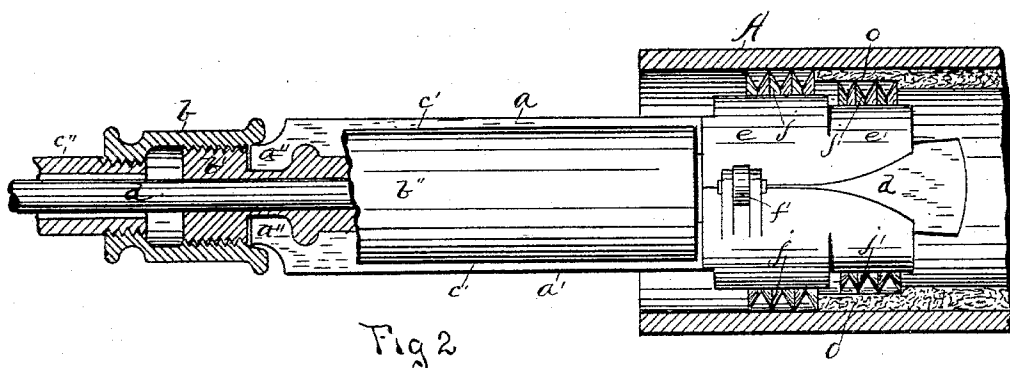


Fig 2

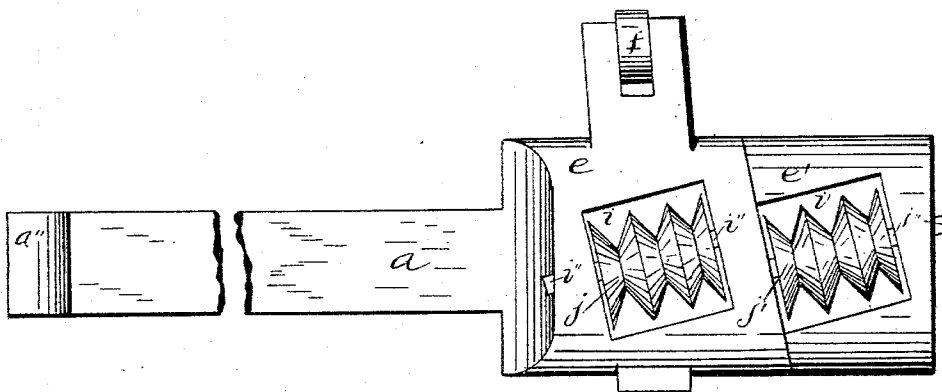


Fig 3.

WITNESSES
C. D. Longenecker.
A. J. Fiorini

INVENTOR
J. L. Lockhart.
ATTORNEY
R. J. McCarty

UNITED STATES PATENT OFFICE.

JAMES L. LOCKHART, OF DAYTON, OHIO.

BOILER-TUBE CLEANER.

SPECIFICATION forming part of Letters Patent No. 564,932, dated July 28, 1896.

Application filed September 30, 1895. Serial No. 564,107. (No model.)

To all whom it may concern:

Be it known that I, JAMES L. LOCKHART, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Boiler-Tube Cleaners; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

15 This invention relates to a machine for removing scale or incrustation from steam-boiler or other tubes.

20 The object of the invention is to provide means for removing incrustation from tubes of any size, without causing the least injury or weakness to said tubes. To this end the invention consists of mechanism that will be fully detailed in the following specification.

Referring to the annexed drawings, forming a part of this specification, Figure 1 is a longitudinal elevation of a tube scraper or cleaner having my improvements thereon. Fig. 2 is an enlarged partial sectional view showing the scraper or cleaner in a tube. 30 Fig. 3 is an enlarged longitudinal elevation of one of the jaws detached.

The letters *a a'* designate two jaws which have their ends *a'' a'''* inclosed by a collar *b*. This collar is screwed onto an enlarged portion *b'* of the casing *b''*, in which there are two longitudinal grooves *c' c''*, in which the jaws *a a'* fit. The outer end of the collar *b* also has a screw-threaded engagement with a tubular extension *c'''*, to the end of which 40 there is attached a hand-lever *c''''* and a ratchet *c* for turning the device.

d designates a spreading-bar which has its inner portion *d'* reduced in diameter and inclosed in the tubular extension and between 45 the jaws *a a'* and the casing *b''*.

d'' designates a lever attached to the outer end of the bar *d'* and having a fulcrum on an arm *d'''*, that is secured to the rotating hand-lever *c''''*. When this lever *d''* is turned, all 50 the parts comprising the device turn together.

The foregoing mechanism, with the exception of the jaws *a a'*, are old features and are

set forth merely in order to clearly exemplify the parts comprising the invention, which will now be detailed. The outer end of the 55 jaws *a* and *a'* have two diameters of thickness *e* and *e'*, the latter being the smallest.

f and *f'* designate antifriction-rollers mounted in each of said jaws and serve to guide and facilitate an easy rotation of the 60 device within the tube *A*.

Each of the parts *e* and *e'* is provided with a square opening *i* and *i'* on an angle to the longitudinal axis of the jaws, substantially 65 as shown.

j and *j'* designate two series of rotary cutters mounted in said openings on shafts *i''*, that occupy positions on angles conforming to those of the openings.

The cutters *j'* shear off a part only of the 70 incrustation, and owing to their coming in contact with the inner surface of the incrustation they have a smaller circumference to travel in than have the series *j*. The said cutters *j'* therefore rotate faster and have a disposition to shear off ahead of the rear cutters *j*, thus lessening the work of the latter cutters. Each series of the cutters is in one integral piece formed of hardened steel, and when 75 mounted in their respective openings one set will project slightly beyond the other, as shown in Fig. 2. In order to obtain these positions, the jaws are constructed with two-fold diameters, as hereinbefore described. This is an essential part of the invention, as 85 it has been ascertained from experience that the incrustation formed on the interior of boiler-tubes is of such a rigid nature, especially when allowed to accumulate for any length of time, that its removal is impossible 90 by being subjected to only one scraping or cutting part. Therefore the rotary cutters and scrapers *j'* are so mounted that they will shear and remove a part only of the incrustation, leaving a portion only, as at *o*, to be 95 removed by the second series *j*, which remove the remaining layer from the interior of the tube.

Fig. 2 clearly shows the method of removing the scale or incrustation and the manner 100 in which the preceding cutters *j'* shear the same and prepare the way for the rear cutters *j*, which finally remove all of the incrustation.

I am aware that it is not new to provide a tube-cleaning device consisting of a series of rotary cutters adapted to be forced through a tube under rapid rotation, the said cutters being arranged one in front of another in a progressively-graduated series, and each set operating in the path of the preceding set. Therefore I do not desire to claim such a construction broadly.

10 Having fully described my invention, I claim—

1. In a boiler-tube cleaner, the combination with a spreading-bar, of jaws provided with entering ends having two diameters with 15 openings therein as described, two series of rotary cutters mounted in said openings on angles conforming to those of said openings, substantially as herein shown and described.

2. In a boiler-tube cleaner, the combination with the casing, and spreading-bars, of jaws a and a' provided at their entering ends with two thicknesses of metal e and e' having square openings i and i' , two series of rotary cutters j and j' mounted on angles in said openings, one of said series being adapted to 25 partially remove the scale or incrustation while the other series of said cutters is adapted to remove the remainder of said scale or incrustation, substantially as described.

In testimony whereof I affix my signature 30 in presence of two witnesses.

JAMES L. LOCKHART.

Witnesses:

R. J. MCCARTY,

J. C. LOCKHART.