(No Model.) 2 Sheets—Sheet 1.

W. D. FORSYTH & E. T. BELL.

DEVICE FOR CLEANING INTERIORS OF BOILER TUBES.

No. 526,997. Patented Oct. 2, 1894.

Fig. 1.

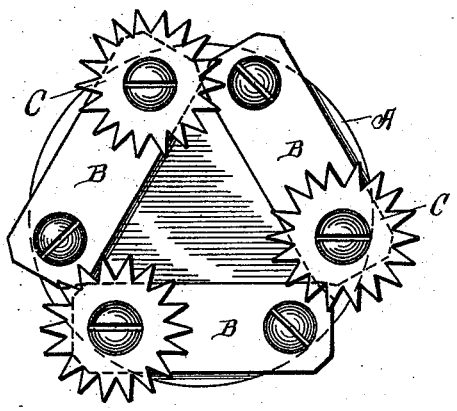
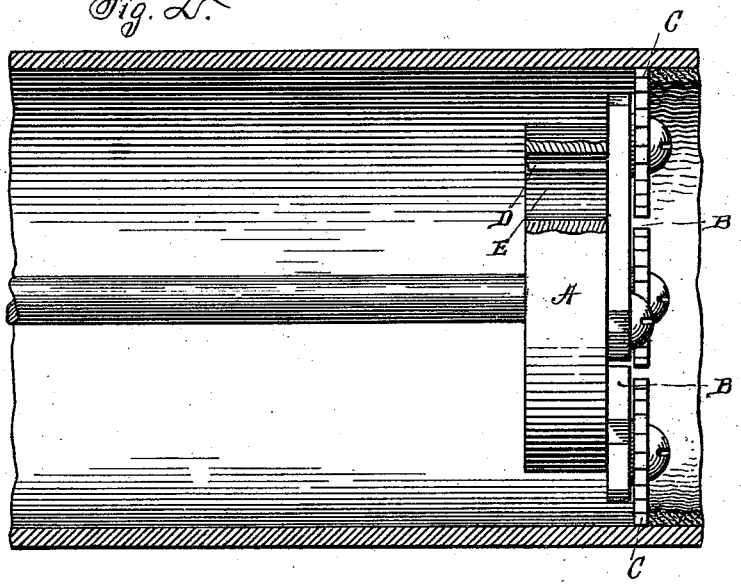


Fig. 2.



WITNESSES

Geo. M. Anderson

Phil. C. Masi.

INVENTORS

W. D. Forsyth

Enos T. Bell,

by E. W. Anderson, Attorney

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

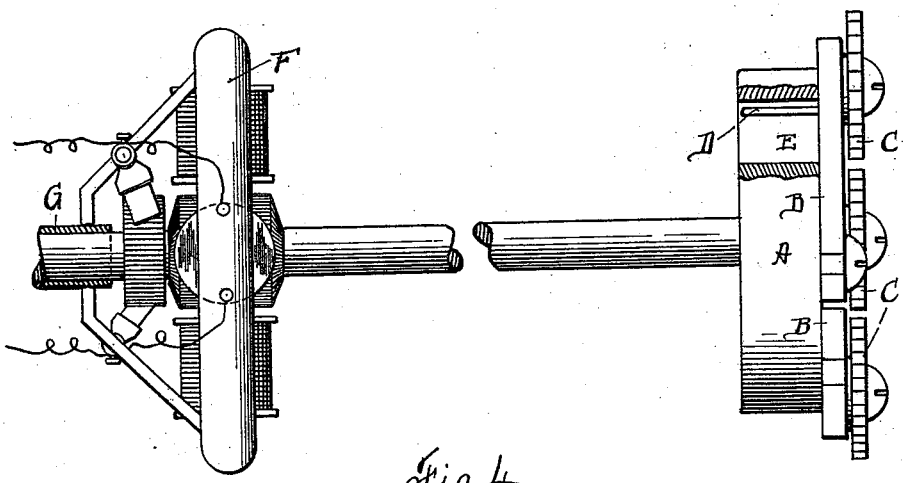
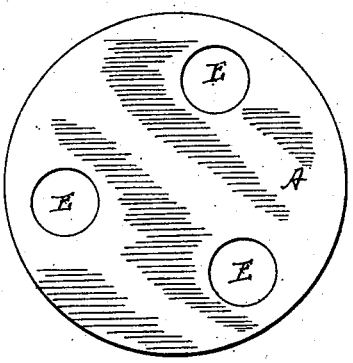


Fig. 4



WITNESSES
Geo. M. Anderson
Phillemasi.

INVENTORS:
Wilber D. Forsyth
Enos T. Bell
by E. W. Anderson
their Attorney

UNITED STATES PATENT OFFICE.

WILBER DAVID FORSYTH AND ENOS T. BELL, OF DUBLIN, INDIANA.

DEVICE FOR CLEANING THE INTERIORS OF BOILER-TUBES.

SPECIFICATION forming part of Letters Patent No. 526,997, dated October 2, 1894.

Application filed November 21, 1893. Serial No. 491,571. (No model.)

To all whom it may concern:

Be it known that we, WILBER DAVID FORSYTH and ENOS T. BELL, citizens of the United States, and residents of Dublin, in the county of Wayne and State of Indiana, have invented certain new and useful Improvements in Devices for Cleaning the Interiors of Boiler-Tubes; and we 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 letters of reference marked thereon, which form a part of this specification.

Figure 1 of the drawings is a front view of the invention and Fig. 2 is a side view of same partly in section applied to a boiler tube shown in section. Fig. 3 is a side view, showing the device in connection with an electric motor which may be employed to rotate it. Fig. 4 is a plan view of the head or disk with the cutter carriers removed.

This invention has relation to a certain new and useful device for removing scale from the interior of the water tubes of steam boilers, and it consists in the novel construction and combination of parts, all as hereinafter described and pointed out in the appended claims.

The process of removing scale from the interior of water tubes of steam boilers is a process which has been attended with much difficulty, owing in part to the nature of the work, but largely because of the lack of proper tools, or machinery adequate for the purpose. The operation has therefore been a tedious and laborious one, resulting in many cases in injury to the tubes operated upon.

It is therefore the object of this invention to provide a tool or appliance by means of which the operation of removing scale may be more easily, successfully, and quickly performed.

The invention more particularly consists in a disk, or head, such as illustrated at A in the accompanying drawings, and in a number of arms B, loosely attached or pivoted to the face, faces, or ends of the said disk, or head, said arms bearing each at or toward its outer extremity, a rolling cutter, or serrated wheel C.

In the drawings we have shown the cutters C as consisting each of a disk journaled loosely upon the arm and formed with a series of long, sharp, peripheral teeth. The drawings show three of the arms C pivoted eccentrically to a disk or head and lying upon the face thereof, obliquely to its axis, but it will be understood that the number and arrangement may vary according to the nature of the work to be performed, and that the arms B may be carried by any device suitable for the purpose. The arms B extend in planes parallel with the face of the head or disk to which they are attached, working therefrom in planes at right angles to the axis of the boiler tube. The size and construction of the cutters will also vary in accordance with the nature of the work required of them in removing different scale formations, and to protect the tubes from injury.

The operation is as follows:—The device is inserted in the tube to be cleaned, and is given a rapid rotary motion, by means of a motor impelled either by steam, electricity, or compressed air, or water, or by means of a rigid or a flexible shaft. This rotary motion causes the arms B to expand, or fly outward, forcing the rolling cutters or serrated wheels into contact with the scale on the walls of the tube and drawing them over it, the numerous points or teeth, as they revolve, cutting into and disintegrating the scale and completely removing it. The great velocity of revolution and the multiplicity of cutting points, edges, or teeth on the rolling cutters or serrated wheels are the great factors promoting the successful operation of the device. When the device is attached to a motor which will traverse the tube in close proximity to it, such as a small rotary steam engine, or small electric motor, the device and motor are usually pushed through the tube with a jointed rod.

In Fig. 3 we have shown the device arranged in connection with a small electric motor for rotating it. The shaft which carries the disk or head is shown as being a continuation of the armature shaft of the motor. The frame F of the motor is shown as being supported by a stationary sleeve G.

On the posterior side or face of each of the arms B, is a pin D, which works in an aperture or slot E in the head or disk. The pur-

pose of these pins is to prevent the undue expansion of the arms, rendering it easier to insert the implement into the mouth of the tube, and also preventing a reverse position of the said arms, in which case they would be pushing the wheels or cutters and would cause the device to become locked, in case of an obstruction. These pins may also serve to limit the inward movement of the arms, or this may be effected by arranging the said arms to abut against each other, when not expanded, as shown in Fig. 1.

Having described this invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The herein described tool or implement for removing scale from the interior of boiler tubes, comprising a head or carrier adapted to be rapidly rotated, a series of arms loosely connected at one end portion to said head or carrier, said arms being parallel with the face of the head or carrier to which they are pivoted, and rolling cutters carried by the free end portions of said arms, substantially as specified.

2. In a tool or implement for cleaning boiler tubes, a series of arms supported loosely in planes at right angles to the axis of the tube, said arms being adapted to be forced through the tube under rapid rotation, and a series of rolling cutters carried by said arms, substantially as specified.

3. In a tool or implement for cleaning boiler tubes, the combination with a suitable head or carrier adapted to be forced through a boiler tube and rapidly rotated, of a series of arms loosely pivoted to said head or carrier and extending therefrom in planes parallel with the face of the head or carrier to which they are attached, and small serrated cutter wheels loosely journaled on said arms, substantially as specified.

4. In a device for removing scale from the interior of boiler tubes, the combination with a head or disk, and means for rapidly rotating such head or disk, of a series of arms eccentrically pivoted to the forward face of said head or disk, pins or projections on the posterior faces of said arms engaging apertures or slots in said head or disk, and rolling cutters carried by the free portions of said arms, substantially as specified.

In testimony whereof we affix our signatures in presence of two witnesses.

WILBER DAVID FORSYTH.
ENOS T. BELL.

Witnesses:
WILLIAM B. REED,
JAMES W. HARVEY.