

No. 636,129.

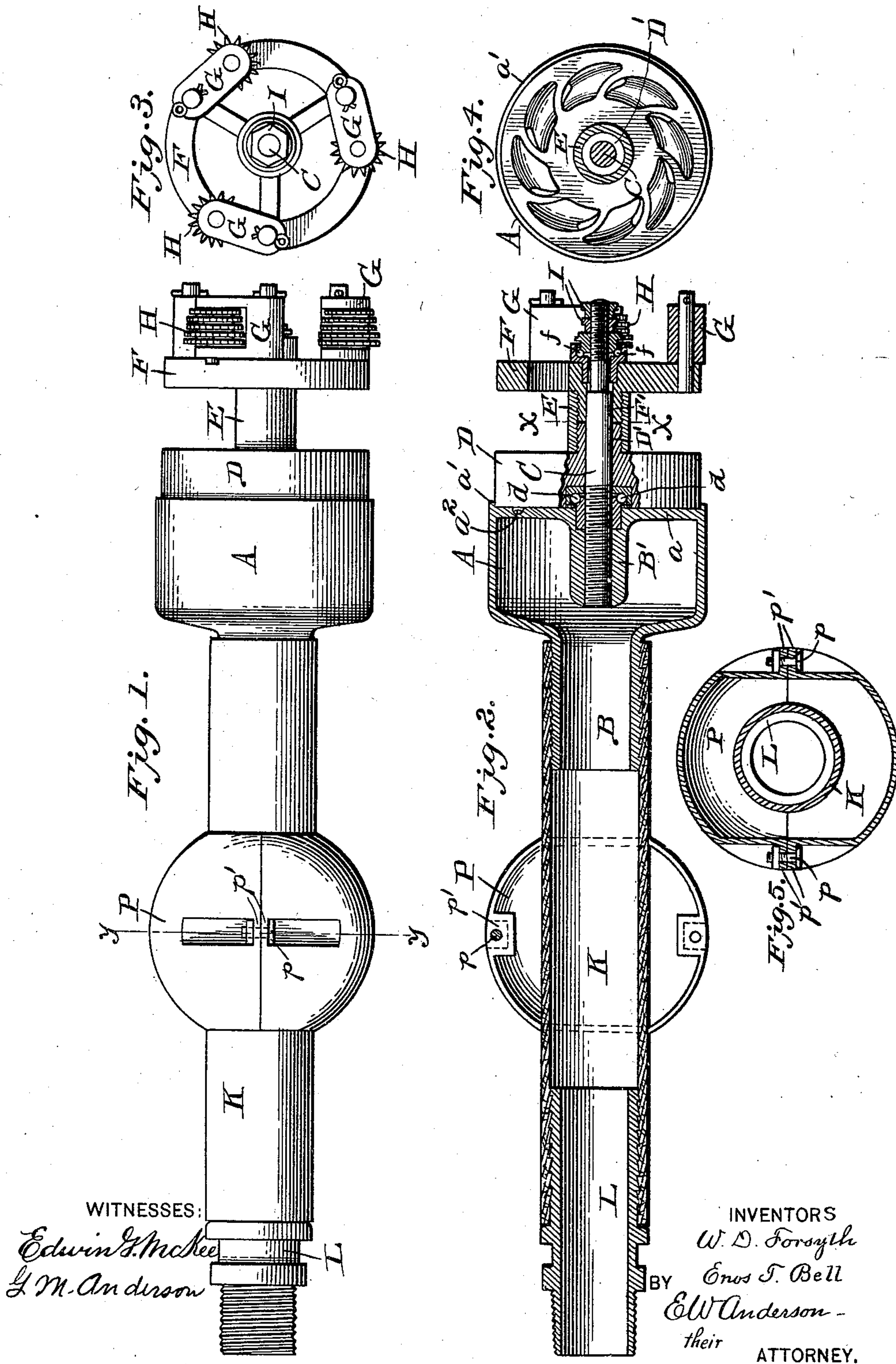
Patented Oct. 31, 1899.

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

BOILER TUBE CLEANER.

(Application filed Feb. 4, 1899.)

(No Model.)





# UNITED STATES PATENT OFFICE.

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ASSIGNORS TO THE UNION BOILER TUBE CLEANER COMPANY, OF SAME  
PLACE.

## BOILER-TUBE CLEANER.

SPECIFICATION forming part of Letters Patent No. 636,129, dated October 31, 1899.

Application filed February 4, 1899. Serial No. 704,527. (No model.)

*To all whom it may concern:*

Be it known that we, WILBER D. FORSYTH and ENOS T. BELL, citizens of the United States, and residents of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Boiler-Tube Cleaners; 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 side elevation of the invention. Fig. 2 is a section on line  $z z$ , Fig. 1. Fig. 3 is a front elevation of cutter-head and cutters. Fig. 4 is a section on line  $x x$ , Fig. 2. Fig. 5 is a section on line  $y y$ , Fig. 1.

This invention is designed to provide an improved boiler-tube cleaner of that type which is driven by a motor directly connected to the cleaner-head and carried through the tube therewith, and a more particular object is to provide a cleaner capable of a free movement within the tube, whereby it is adapted for use in curved tubes and in tubes which have become warped through use or misuse, and to allow of its adaptation to the best position for rapid work where the scale is of uneven thickness.

With these objects in view the invention consists in the novel construction and combination of parts, all as hereinafter described, and pointed out in the appended claims.

Referring to the accompanying drawings, the letter A designates a cylindrical casing or shell, having a hollow shank or coupling extension B at the rear and an internal internally-threaded boss B', which projects centrally into its chamber from the front plate  $a$ . Screwed into the said boss is a stem or spindle C, which extends to a point several inches in front of the casing or shell A. Rotatably mounted upon this stem or spindle upon ball-bearings  $d$  is a motor-wheel D, which may be of any well-known or suitable character, but preferably such a turbine wheel as is de-

scribed and claimed in our pending application, Serial No. 690,309. The inner face of this wheel turns closely, but loosely, on the face of the plate  $a$ , and in the drawings the casing or shell is shown as having a slight flange extension  $a'$  to seat the inner peripheral portion of the wheel. This flange, which is usually only about one-sixteenth of an inch in depth, may, however, be omitted entirely.

Mounted upon ball-bearings  $f$  upon the outer end portion of the stem or spindle is a cleaner-head or wheel F, which consists of an annular rim carried by a spider or disk and mounting a series of pivoted cutter-carrying arms G, provided with rolling toothed cutter wheels or disks H. These arms and wheels are of the character well known in previous machines made and patented by us. We have shown each arm G as having five of these wheels or disks of progressively-graduated diameters, but we do not limit ourselves to such number. It may for some kinds of work be advisable to employ two of the heads or wheels F, mounted one in advance of the other, as indicated.

The motor-wheel D has a forwardly-projecting boss D' around the stem or spindle C, which meets a similar boss F' of the wheel or head F, and these two bosses are united and rigidly connected by an interiorly-threaded coupling-sleeve E.

I designates jam and adjusting nuts for securing the head or wheel F and its bearings in proper position.

$a^2$  designates oblique apertures in the plate  $a$  of the shell or casing, through which water from its chamber passes to the motor-wheel. Said wheel may, however, be of proper character to be operated by steam.

K designates a piece of hose, preferably about twelve inches in length, which is connected at one end to the shank or coupling extension B of the shell or casing and at its opposite end to a hollow coupling-piece L, to the opposite end of which is connected the carrying-hose or hollow shaft M.

Secured upon the intermediate portion of the hose K is a guide P, which consists, in the construction shown, of a hollow ball of substantially the same external diameter as the



shell or casing A and is composed of two separable hemispheres connected by screw-bolts *p*, which are seated in inset recessed lugs *p'* to avoid projections beyond the surface of the ball. This guide P, which is essential to the operation of the invention, acts as a fulcrum for the short length of the flexible shaft between it and the motor-casing.

It will be readily seen that the hose connection K permits perfect freedom of movement of the cleaner within the tube, so that it may readily pass curves and through warped portions thereof, being readily followed by the guide P, which is equally free to adapt itself to all curves and bends in the pipe and allowing the head to take the required position necessary for rapid work where the scale is of bumpy or uneven thickness. Said guide may be of different construction from that shown, but should in all cases be of non-angular form. It will also be noticed that the construction and relation of the motor-wheel and cleaner-head are such that there is no obstruction to break the rotary movement of the water discharged from the motor-wheel before it reaches the cleaner-head. We thereby avoid the presence of dead water around the cleaner-head, which must be taken up and churned by it in passing, and also secure the advantage of the action of the rotary impact of the discharged water in removing the loosened scale from the wall of the tube.

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

1. In a tube-cleaner, the combination of a

motor-wheel and casing, a cleaner-head carried and actuated by said motor-wheel, a flexible tube connected to said casing and supplying thereto the power for driving the motor, and a fulcruming device carried by the said tube, substantially as specified.

2. In a tube-cleaner, the combination with a motor-wheel adapted for passage through the tube to be cleaned, of a casing or carrier therefor, a flexible tube or hollow shaft connected to said casing, and a fulcruming device carried by said tube a short distance behind said casing, substantially as specified.

3. In a tube-cleaner, the combination with a motor-wheel and its casing or carrier adapted for passage through the tube to be cleaned, of a short hose-section connected to said casing or carrier, and the ball-guide and fulcrum secured on said hose-section a short distance behind the casing or carrier, substantially as specified.

4. In a tube-cleaner, the combination with a hollow motor shell or casing having a rearward extension, and its motor, of a ball-guide and fulcrum a short distance in rear of such extension, and a short hose-section connected to said extension at one end and carrying the ball-guide, substantially as specified.

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

WILBER D. FORSYTH.  
ENOS T. BELL.

Witnesses:

A. T. REWARD,  
A. FRASER LEGGATE.