

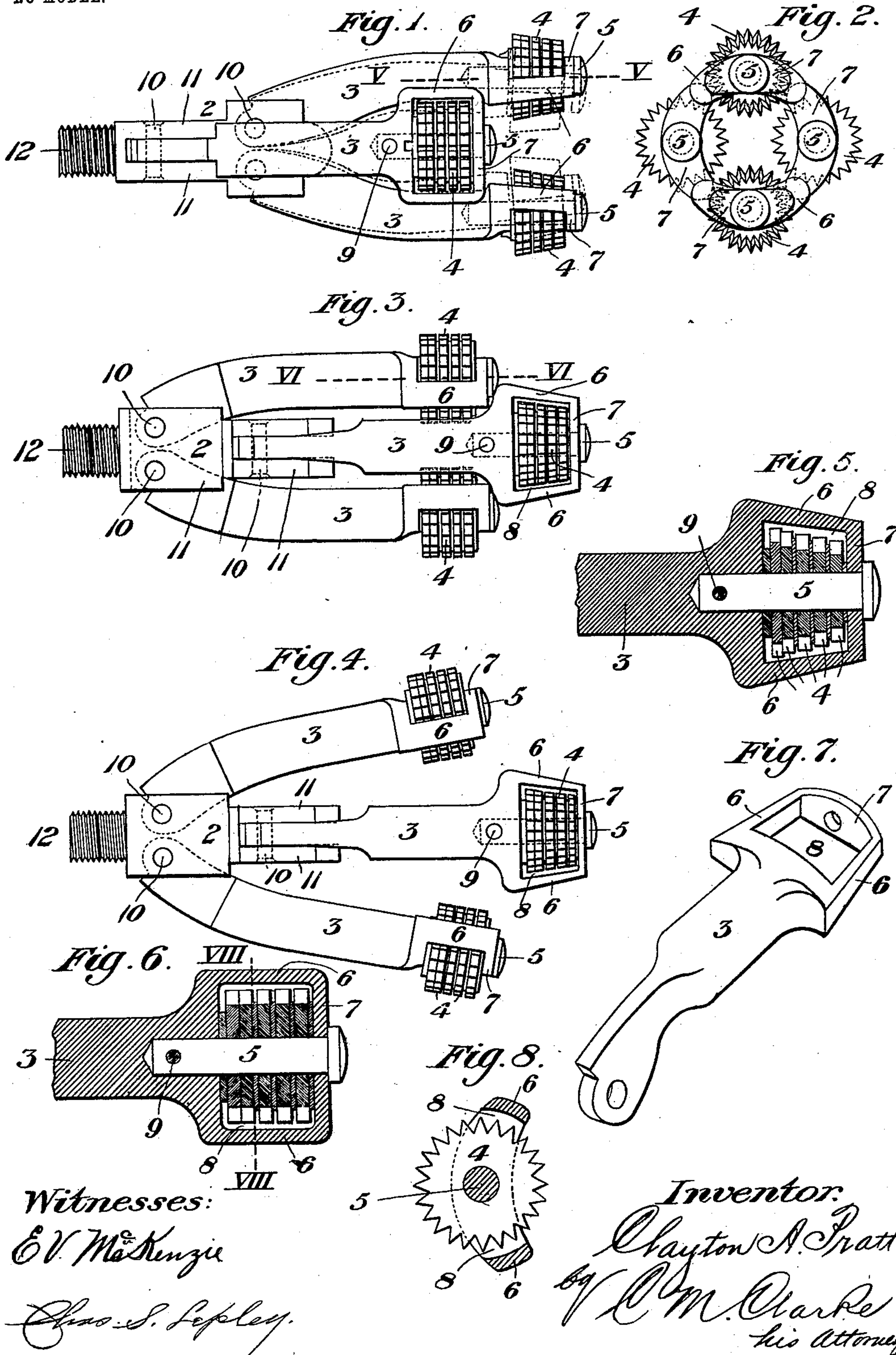
No. 722,750.

PATENTED MAR. 17, 1903.

C. A. PRATT.  
TUBE CLEANER.

APPLICATION FILED NOV. 20, 1901.

NO MODEL.



Witnesses:  
E. V. McKenzie  
Chas. S. Lefley.

Inventor:  
Clayton A. Pratt  
by C. M. Clarke  
his Attorney



# UNITED STATES PATENT OFFICE.

CLAYTON A. PRATT, OF SOUTH OMAHA, NEBRASKA, ASSIGNOR TO  
WILLIAM S. ELLIOTT, OF PITTSBURG, PENNSYLVANIA.

## TUBE-CLEANER.

SPECIFICATION forming part of Letters Patent No. 722,750, dated March 17, 1903.

Application filed November 20, 1901. Serial No. 82,975. (No model.)

*To all whom it may concern:*

Be it known that I, CLAYTON A. PRATT, a citizen of the United States, residing at South Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Tube - Cleaners, of which the following is a specification, reference being had therein to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a view in side elevation of a tube-cleaner provided with my improved cutter-arms. Fig. 2 is an end view thereof. Fig. 3 is a plan view of Fig. 1. Fig. 4 is a similar view, but showing the arms extended. Fig. 5 is a detail sectional view of the outer end of one of the arms on an enlarged scale, indicated by the line V V of Fig. 1. Fig. 6 is a sectional view indicated by the line VI VI of Fig. 3. Fig. 7 is a detail perspective view of one of the arms, the cutters having been removed. Fig. 8 is a cross-sectional detail view indicated by the line VIII VIII of Fig. 6.

My invention relates to the class of devices for removing scale from the interior of the tubes of boilers, pipes, tubes, &c., more particularly from the interior of the tubes of water-tube boilers, wherein the tool is provided with one or more freely-swinging arms provided with cutters at their outer ends, adapted to be rotated by a turbine or other suitable motor, so as to cause the tool and arms to rotate and vibrate freely within the tube and remove the scale therefrom by picking or indenting against it.

The particular object of the present invention is to provide means for holding and supporting the cutter-supporting bolt in the outer end of the arm, whereby it is maintained in position and reinforced against the severe continuous strain during the operation of the tool.

Referring to the drawings, the tool is composed of a skeleton head or holder 2, in which are pivotally mounted longitudinally-disposed arms 3, having mounted upon their outer ends the cutters 4, composed of toothed wheels adapted to rotate about the longitu-

dinal bolt or pin 5, set in the extremity of the arm.

Ordinarily the bolt providing the cutter-bearing has been inserted in the outer end of the swinging arm and the cutters mounted upon it, the result of such construction being that the outer end of the bolt while unsupported by any outer bearing was liable to rapid wear and deflection under the severe rapid continuous action of the cutters against the scale. For the purpose of supporting the bolt at its outer end the extremity of the arm 3 is provided with lateral outwardly-extending sides 6 6, connected together by a cross-bar portion 7, thus providing the interior space 8, in which are mounted the disks and washers of the cutters 4.

The pin is inserted from the front, passing through the outer cross-bar 7, through the cutters, and into the end of the main body portion of the arm 3, being secured by any suitable device, as a pin 9. As shown, the cutters may be arranged in tapering form or cylindrical, and the arm extremities may therefore also be arranged to receive either form by making the lateral extensions 6 correspondingly tapered or parallel. The outer face of the pin-supporting element of the arm—to wit, the ends of the cross-bar 7—are preferably curved outwardly, so that the extensions 6 are situated back of a plane passing through the bolt, as shown in Fig. 8, thus exposing a greater portion of the cutters and facilitating their action upon the scale without interference by the arms 6, which will thus more nearly approximate the curvature of the tube when extended, although, as will be understood, such construction is not absolutely essential, and the arms may be located midway of the cutters with good results, although the curved form is preferable for the reasons stated and also that when the arms are assembled together, as shown in Figs. 1 and 2, they will form a more compact and closely-assembled group. The bowed construction permits the bearing-bolt and cutters to be located outwardly beyond the sides 6, which are thus located sufficiently far back



to prevent interference with or striking against the scale or inner surface of the tube. When constructed in this manner, the pin or bolt 5 is strongly supported at the outer end, the strain upon the bolt is equalized, and its operation and endurance are greatly improved and increased.

The arms 3 are pivoted at their inner ends closely adjacent to each other upon pins or bolts 10, passing through cheeks 11 11 of the head 2, which cheeks embrace the inner ends of the arms within their intervening slotted portions and serve as supports and guides for such portion of the arm, so that in the operation of the tool by rapid rotation the arms will be firmly braced in a lateral direction. The outward motion of the arms is unrestrained, while in their closed position, as shown in Figs. 1, 2, and 3, the arms are closely assembled, their further inward movement being restrained by bearing upon the inner ends of the slots, so as to prevent interference with each other. This portion of the construction just described closely conforms to the construction of a tube-cleaner patented by W. S. Elliott January 9, 1900, No. 641,092, upon which my present invention is an improvement.

At the back end of the head 2 is a threaded or otherwise suitably-formed extension 12, adapted to engage with one member of a universal coupling, by which the tool may be connected to a turbine or other suitable power-imparting motor by which the tool may be rotated within the tube, such coupling permitting the cleaner to be used in bent tubes, and while not absolutely necessary in straight tubes I have found that the great degree of flexibility which it affords is advantageous in permitting free action of the arms. The universal coupling may, however, be dispensed with and the head secured directly into the turbine-wheel with satisfactory results. Any other operative mechanism may be substituted for the turbine-wheel, and, if desired, the wheel may be actuated by hand

or by any source of power located outside of the tube through proper shafting or other suitable connections.

The advantages of my invention will be appreciated by those accustomed to the use of tube-cleaners, inasmuch as the tool is improved by strengthening and giving rigidity to the cutter-supporting bolt, and while I do not desire to be confined to the particular construction whereby the pin is thus supported, but to include all such changes and variations therefrom as are within the province of the skilled mechanic, I have secured good results from the construction shown.

One of the particular advantages of the tapered or coniform cutters mounted in the curved cross-bearing of the forward arm is that these cutters have a more efficient action in making the initial cut in advance of the second pair, the tapered arrangement admitting of their operation in a confined space, while the bowed bearings also admit of the insertion and centrifugal action in a thickly-incrusted tube.

Having described my invention, what I claim is—

In a tube-cleaner, the combination with a rotary head, of a forward and back pair of arms pivoted to the head in different longitudinal planes, each of said arms having terminal cross bearing portions curved on their outer faces to correspond substantially with the curvature of the tube, and intervening connecting sides, cylindrical cutting-disks mounted between said bearing portions and sides of the back arms, and coniform cutting-disks mounted between the bearing portions and sides of the forward arms, substantially as set forth.

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

CLAYTON A. PRATT.

Witnesses:

JED E. DE LEE,  
HARRY REX.