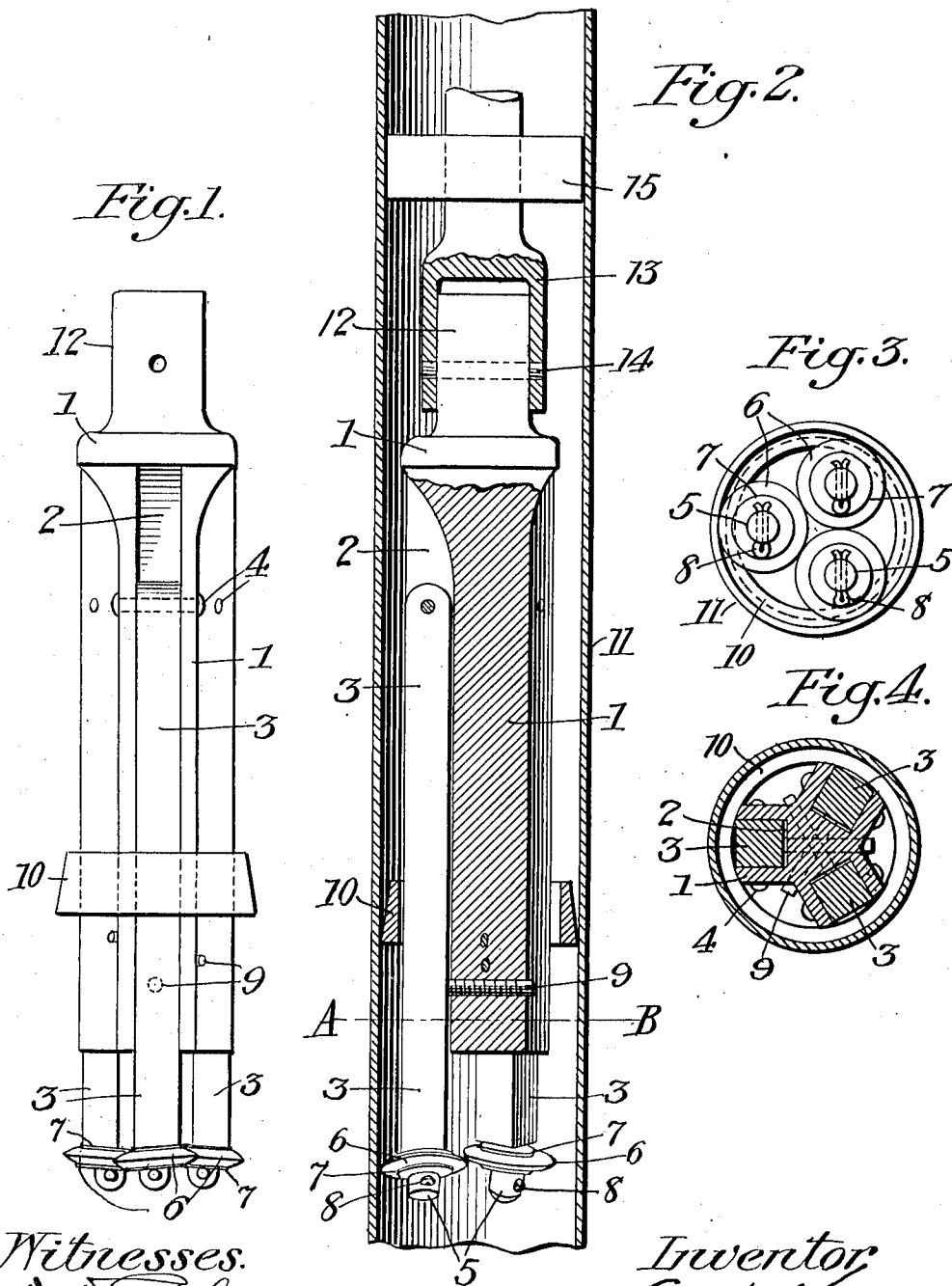


E. KÖPKE.
FLUE SCRAPER.
APPLICATION FILED JAN. 5, 1912.

1,035,363.

Patented Aug. 13, 1912.



Witnesses.
D. A. Edelin.
T. C. Hunt.

Inventor
Ernst Köpke
by
Lennie Edlin
Attorney.

UNITED STATES PATENT OFFICE.

ERNST KÖPKE, OF HONOLULU, TERRITORY OF HAWAII.

FLUE-SCRAPER.

1,035,363.

Specification of Letters Patent.

Patented Aug. 13, 1912.

Application filed January 5, 1912. Serial No. 669,536.

To all whom it may concern:

Be it known that I, ERNST KÖPKE, a citizen of the United States, residing at Honolulu, county of Honolulu, Territory of Hawaii, have invented certain new and useful Improvements in Flue-Scrapers; and I do hereby 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.

This invention relates to a flue scraper or tool for loosening the scale or incrustation deposited on the interior walls of tubes.

The object of the invention is to produce a tool of this character which shall be particularly applicable to the tubes in calandrias of vacuum pans, evaporator cells, and the like, in which the incrustation is often of such a nature, due to the liquids treated therein, that it cannot be removed by tube cleaners, such as are ordinarily employed for removing the scale from boiler tubes for example.

A further object is that the tool shall accomplish this result in a rapid and efficient manner and without damage to the tubes.

The invention contemplates a body with preferably three bars 120° apart hinged at one end to the body, a V-shaped wheel axled on the other end of each bar, and means for adjusting the position of said bars with respect to the longitudinal axis of the body. The tool is adapted either to be turned by hand or revolved by power within the tube from which it is desired to clean the scale. The bars are adjusted so as to bring the three wheels just tangent to the inner circumference of the tube at three points. A collar is provided to hold the bars in the adjusted position and at the same time guide the tool in the tube, so that it is impossible for the wheels to cut the tube. These wheels may be similar to those employed in pipe cutters where the wheels are applied externally to the pipe to be cut, or they may have any other desired shape of cutting edge. The axles for these wheels on the ends of the bars are each slightly inclined to the longitudinal axis of the body, so as to cause each wheel to describe a spiral path on the inner surface of the tube as the tool is revolved. When the tool enters the tube these wheels follow one another in closely adjacent spiral paths, cutting three threads at

each turn of the tool in the hard scale or incrustation, and forcing same in the direction of least resistance which causes this hard and brittle material to part from the tube, thus dispersing the scale and leaving the tube practically clean. The tools are made of various sizes to suit the tubes to be operated on. It is obvious that, if desired, more than one wheel may be axled on the end of each bar, also that more than three bars may be employed in these tools for the larger tubes.

In the accompanying drawings, forming a part of this specification, a preferred form of flue scraper embodying my invention is illustrated, in which—

Figure 1 is an elevation of the flue scraper. Fig. 2 is a sectional elevation through the center of a tube with the tool in place. Fig. 3 is a view of the cutting end of same. Fig. 4 is a sectional view on the line A—B of Fig. 2.

Referring to the drawings, the body 1 is provided with three longitudinal grooves or recesses 2 to receive the bars 3, each of which is hinged at one end by a pin 4 to the body 1. The other end of each bar 3 is turned to form an axle 5 for a cutting wheel 6 and washers 7, a cotter pin 8 being provided to retain same in place. The axles 5 are slightly inclined so as to tilt the wheels 6, as shown. Three adjusting screws 9 through the body 1 abut the bars 3 and limit their movement toward the center of the body 1. A collar 10 is pushed over the bars 3 and along toward their axled ends until it firmly wedges the bars 3 against the adjusting screws 9, thereby preventing movement of said bars outward. This collar 10 is made of a suitable size to fit the tube 11 and act as a guide for the tool. The body 1 is provided with a shank 12 to which the socket 13 of an operating handle is secured by a pin 14. A collar 15 may be placed above the socket 13 to further aid in the alinement of the tool in the tube.

I claim:

1. A flue scraper comprising a body portion, bars hinged thereto, cutting wheels axled on the ends of said bars, adjusting screws extending through said body and abutting the inner surfaces of said bars, and a slidable collar surrounding the bars adapted to clamp the same against the adjusting screws.

2. In a flue scraping apparatus, a body
portion, bars hinged thereto, cutting wheels
axled on the ends of said bars, means to ad-
just said bars with respect to the body, and
5 a member slidable with respect to said ad-
justing means adapted to positively clamp
said bars against the adjusting means.

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

ERNST KÖPKE.

Witnesses:

FRANK L. JAMES,
I. T. HAYSELDEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."