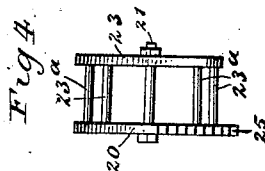
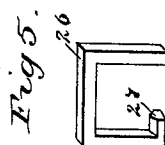
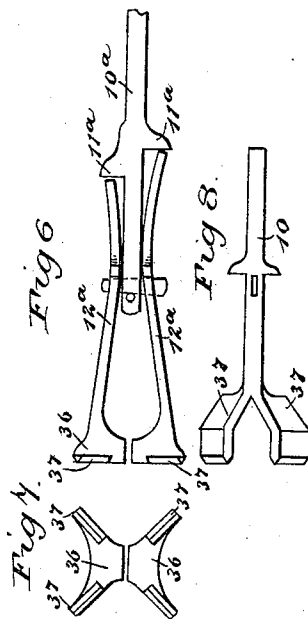
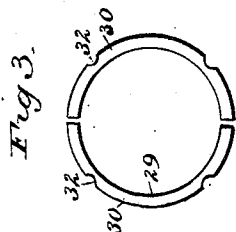
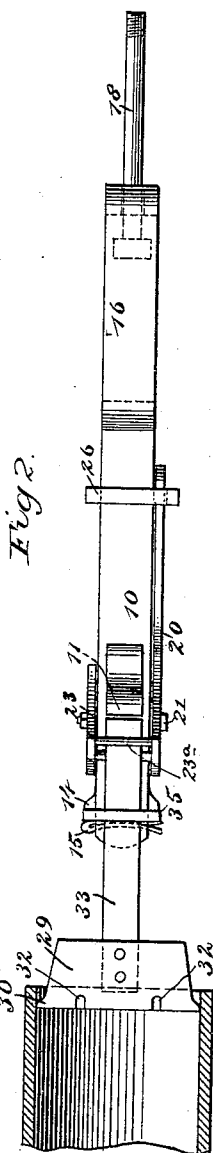
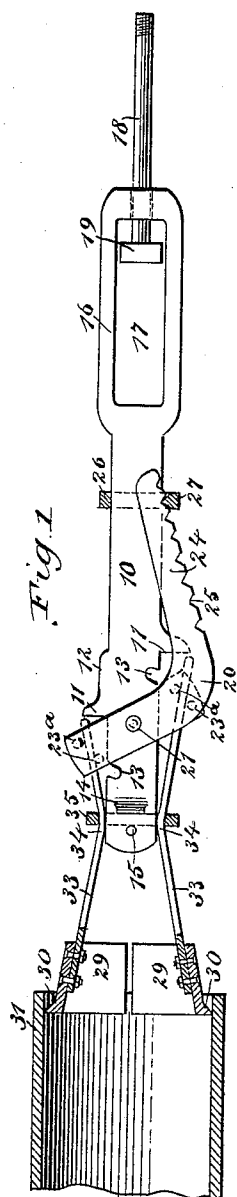


(No Model.)

P. ECKENROTH, Jr.
TUBE SCRAPER.

No. 467,028.

Patented Jan. 12, 1892.



WITNESSES:
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PHILIP ECKENROTH, JR., OF PHILADELPHIA, PENNSYLVANIA.

TUBE-SCRAPER.

SPECIFICATION forming part of Letters Patent No. 467,028, dated January 12, 1892.

Application filed May 29, 1891. Serial No. 394,587. (No model.)

To all whom it may concern:

Be it known that I, PHILIP ECKENROTH, Jr., of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and Improved Tube-Scraper, of which the following is a full, clear, and exact description.

My invention relates to improvements in tube-scrapers; and the object of my invention is to produce a scraper which may be easily operated and which will efficiently remove the scale from boiler-tubes.

When using the common form of scraper it is apt to stick in the tube when an unusually heavy quantity of scale is met with; and a further object of my invention is to provide means for increasing the power of the scraper at these particular points and to produce a sudden shock or jar, thus loosening the scale and enabling it to be easily removed.

To this end my invention consists of a tube-scraper constructed substantially as hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation, partly in section, of the scraper, showing it applied to a boiler-tube. Fig. 2 is a plan view of the same, the tube being shown in section. Fig. 3 is a front end view of the scraper. Fig. 4 is a detail end view of the lever mechanism for adjusting the cutters. Fig. 5 is a detail perspective view of the clasp for fastening the adjusting-lever. Fig. 6 is a broken plan view of a modified form of scraper used in connection with the form shown in the prior figures. Fig. 7 is an end view of the same, and Fig. 8 is a detail side elevation of another modified form.

The body 10 of the scraper is provided on its upper and lower sides with projecting shoulders 11, one being arranged in advance of the other, so as to provide for the thickening of the body at 12 between the scrapers, and thus preventing it from being easily broken. The body is recessed a little in advance of each shoulder 11, as shown at 13, to provide for the swinging movement of the adjusting-lever, and near the extreme front end of the body and on opposite sides are shoulders 14, and in advance of these shoulders a perforation through which a split pin 15 is inserted to hold the clamping-ring in place, as hereinafter described.

The rear end of the body 10 terminates in a widened portion or loop 16, which is recessed longitudinally, as shown at 17, thus providing for the movement of the bolt 18, which bolt extends through a perforation in the rear end of the loop and terminates in a head 19, which slides in the loop. This bolt 18 terminates at its outer end in a screw-thread, so that it may be secured to any suitable form of handle, and the bolt and loop form a ram by means of which the scale in the tube may be easily loosened, as when the head 19 is withdrawn, so as to rest against the rear end of the loop, and the handle is then thrust suddenly forward the sudden impact of the head 19 on the body 10 will cause the body to advance suddenly, and thus cause the cutters to strike a blow upon the scale.

A curved lever 20, which is substantially like a bell-crank, is pivoted on a bolt 21 near the forward shoulder 11, and the lever is adjusted so that its upper end will project slightly above the body and its lower bent portion will extend below the same. The upper end of the lever is connected by pins with a side piece 23, and this portion 23 extends downward on the side opposite the main lever 20, and is likewise pivoted on the bolt 21.

The side 23 of the main lever is connected to the opposite side by pins 23^a, there being a pair of pins at the upper and lower portions of the lever, and these pins are arranged one above the other, so that the rear ends of the cutter-arms may be inserted between them. The rear portion 24 of the lever 20 is arranged to extend along the side of the body 10, and is provided on the under side with a series of notches 25 to receive the bent end 27 of the U-shaped clasp 26, which clasp fits upon the body 10, and by adjusting the end 27 in one of the notches of the lever 20 it will hold the lever in a desired position.

The cutters 29 are substantially like an ordinary cutter, each cutter being semicircular in shape, so that it will fit nicely in a tube of a boiler, and the forward edges 30 of the cutters are turned up, so as to scrape against the wall of the tube. These edges are re-

cessed at intervals, as shown at 32, to provide for clearance, and each cutter is provided with a rearwardly-extending arm 33, by means of which it is secured to the scraper-body. The arms 33 of the cutters converge slightly as they extend rearward, and near the central portion of the arms they contact with the front end of the body, as shown at 34, which portion thus forms a fulcrum for the arms, and at this converging point the arms are clasped by a ring 35, which holds them in position upon the scraper-body, and the ring is held between the shoulders 14 and the split pin 15. The rear ends of the arms 33 contact with the shoulders 11 of the scraper-body, and when the body is pushed ahead the shoulders striking the rear ends of the arms will force them and the cutters 29 ahead also, so as to scrape the tube 31.

In Figs. 6 and 7 I have shown a modified form of cutter which is adapted to be used in connection with the form described above. In this case the body 10^a is provided with shoulders 11^a and carries arms 12^a, which terminate at their front ends in cutters 36, which have cutting-edges 37 at various points around their periphery, and any number of these cutting-edges may be produced. The object of this form of cutter is to cut grooves through the scale, and in case the scale is too heavy to be started easily by the form of cutter shown in Figs. 1 and 2 these cutters 36 are secured to the scraper-body and are pushed through the tube first, so as to cut grooves through it, and then the main scraper is inserted and the scale may be easily removed.

In Fig. 8 I have shown another modified form of cutter, in which the cutters 37 are produced directly upon the scraper-body and are also adapted to cut grooves through the scale. In using the scraper it is secured to a handle and pushed through a boiler-tube in the ordinary way, and if the scraper sticks the handle may be withdrawn until the head 19 of the bolt 18 strikes the rear end of the loop 16, and then by pushing the handle violently forward it will strike a blow upon the scraper-body and cause the scale in front of the cutters to be loosened.

The cutters may be adjusted to fit any tube, as the rear ends of the arms 33 are held between the pins 23^a on the adjusting-lever, and it will be seen that by tilting the lever the rear ends of the arms may be brought a greater or less distance apart, thus causing the arms to tilt on their fulcrums 34 and bringing them into a desired position.

Having thus fully described my invention,

I claim as new and desire to secure by Letters Patent—

1. A tube-scraper comprising the bar 10, having shoulders 11 on its edges, shoulders 14 on its sides in advance of the shoulders 11, an aperture in front of shoulders 14, a pin 15, a band or collar 35 between the pin and shoulders 14, and the cutter-arms bent toward each other between their ends and passed under at their bends between the edges of the bar and the said ring, substantially as set forth.

2. A tube-scraper comprising a body having shoulders on its opposite edges near its front end, cutters having arms bent toward each other between their ends and pivoted at their bends to the body with their inner ends abutting against the said shoulders, a lever pivoted to the body in rear of the pivotal points of the arms and engaging the arms to simultaneously operate them, and means for securing the lever to hold the cutters in their adjustable position, substantially as described.

3. A tube-scraper comprising a body having shoulders on its opposite edges near its forward end and a longitudinally-extending slot in its rear end, the cutters having arms bent toward each other between their ends and pivoted at their bends to the body with their inner ends abutting the shoulders, and the bolt or rod passing freely through an aperture in the rear end of the body and having a head within the slot, substantially as described.

4. A tube-scraper comprising a body having shoulders on opposite sides, a curved lever pivoted on the body adjacent to the shoulders, said lever having one end doubled to embrace the body and having said doubled portion provided with transverse pins, cutters having rearwardly-extending bent arms secured to the body and with their ends held between the pins of the lever, and a fastening device for the lever, substantially as described.

5. The combination, with a body having opposite shoulders thereon, of cutters having rearwardly-extending bent arms to contact with the shoulders, the bent portions of the arms resting upon the body, a clamping-ring to secure the arms to the body, a bent lever pivoted on the body and provided with pins to engage the rear ends of the arms, the lever also having notches in its rear portion, and a clasp mounted upon the body and having a bent end to engage the notches of the lever, substantially as described.

PHILIP ECKENROTH, JR.

Witnesses:

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