

No. 649,119.

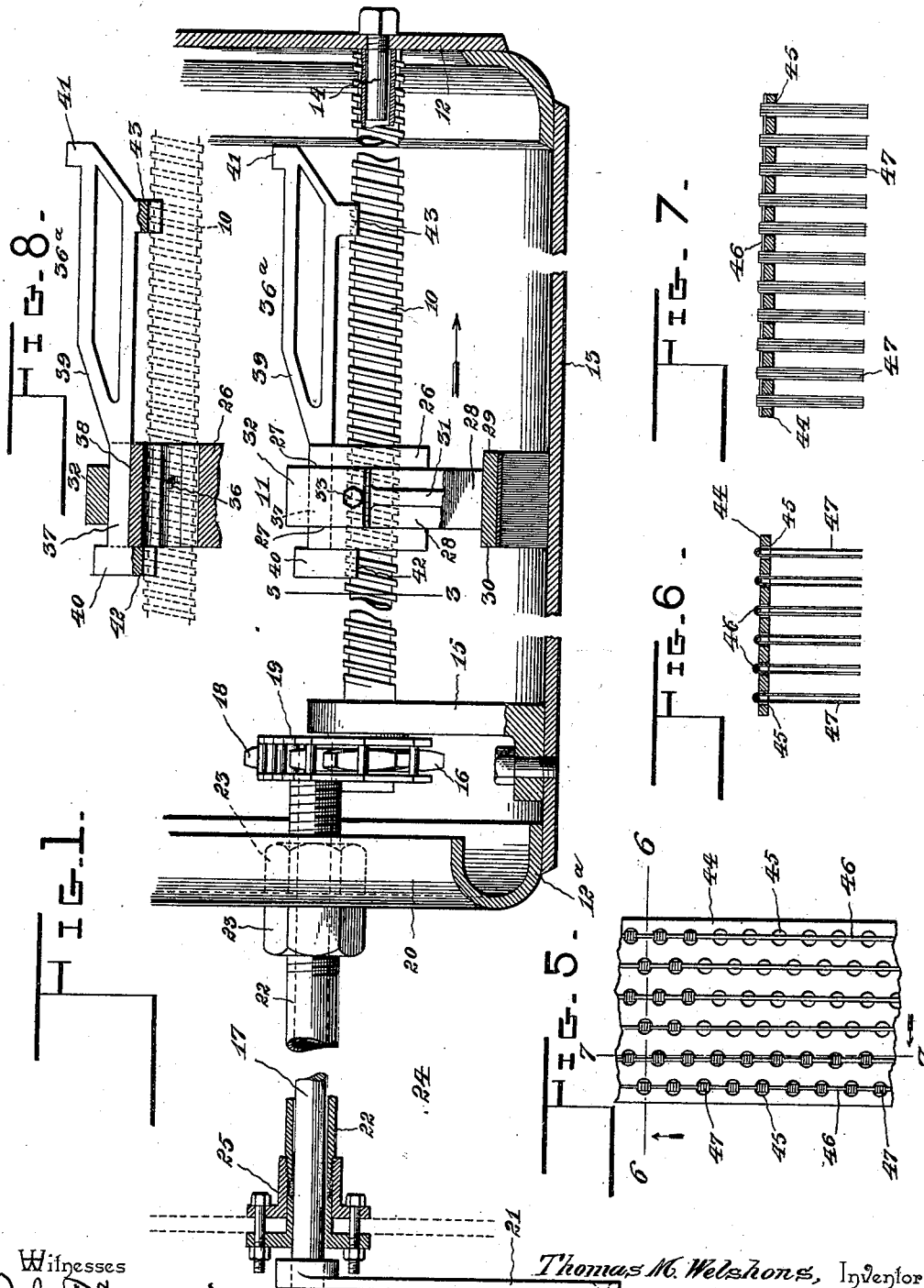
Patented May 8, 1900.

T. M. WELSHONS.
BOILER CLEANER.

(Application filed May 16, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

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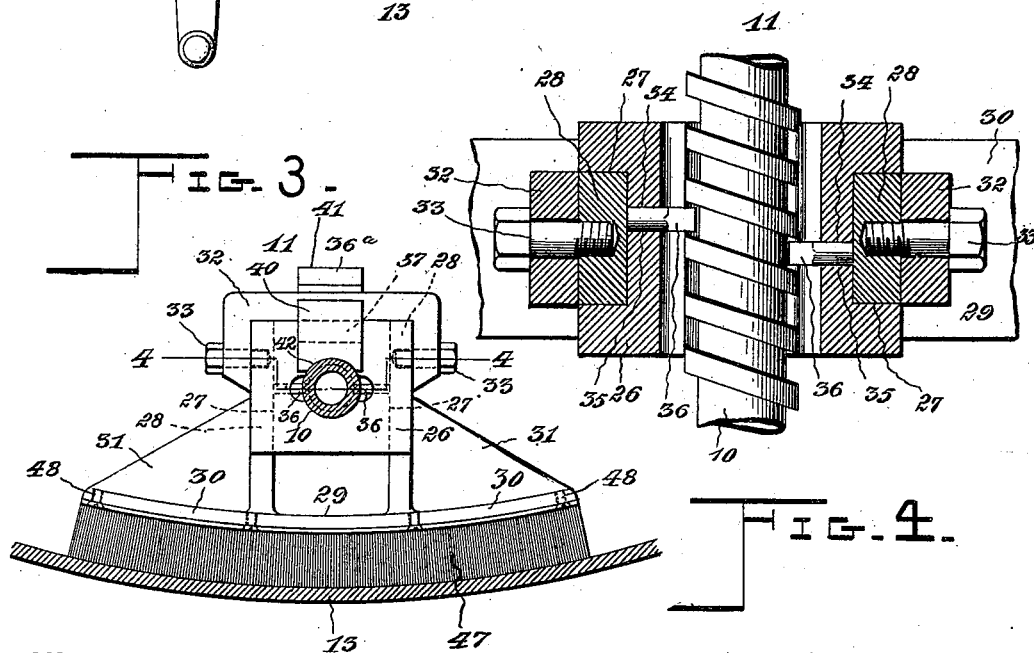
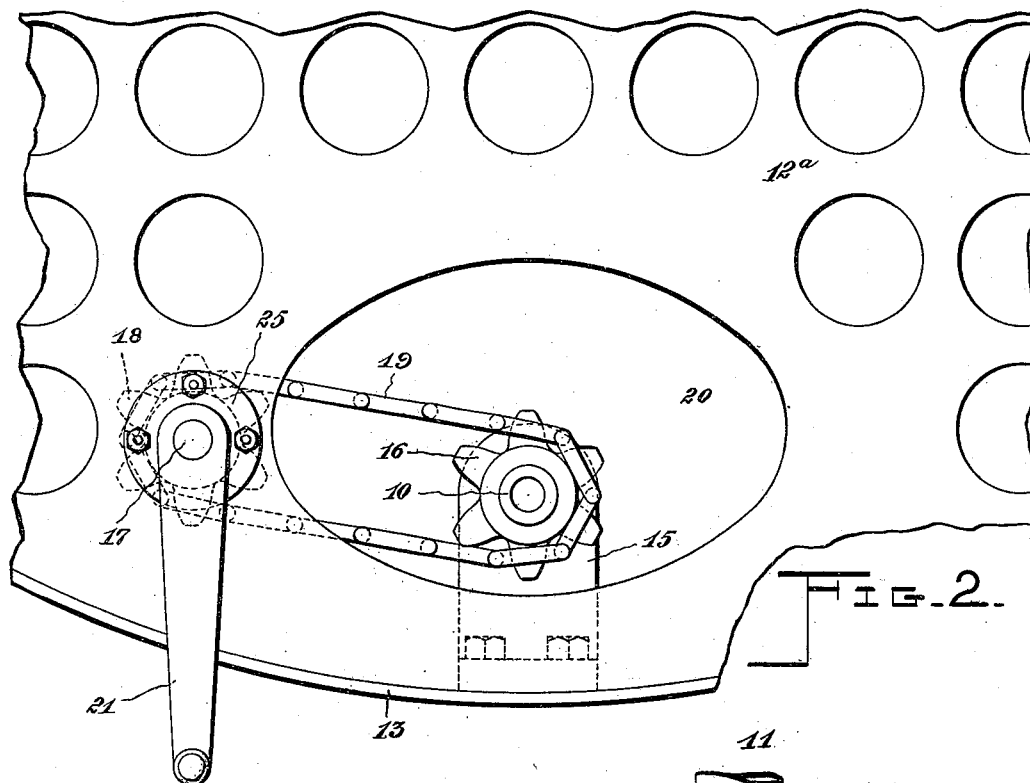
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UNITED STATES PATENT OFFICE.

THOMAS M. WELSHONS, OF CRIPPLE CREEK, COLORADO.

BOILER-CLEANER.

SPECIFICATION forming part of Letters Patent No. 649,119, dated May 8, 1900.

Application filed May 16, 1899. Serial No. 717,089. (No model.)

To all whom it may concern:

Be it known that I, THOMAS M. WELSHONS, a citizen of the United States, residing at Cripple Creek, in the county of El Paso and State of Colorado, have invented a new and useful Boiler-Cleaner, of which the following is a specification.

My invention relates to boiler-cleaners, and has for its objects to provide a simple, comparatively-inexpensive, and efficient scraping and cleaning brush for removing scale from the interior surface of a boiler and also to provide compact and efficient means for operating the brush to advance the scale or other accumulations toward the blow-off of the boiler, the operating devices being located permanently in the boiler and being so arranged as to allow access to the interior of the same through a manhole positioned as in the ordinary practice.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims, it being understood that the improvement is susceptible of various changes in the form, proportion, size, and minor details of construction without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is a side view, partly in section, of a boiler-cleaning apparatus constructed in accordance with my invention and applied in the operative position to a boiler, the latter being shown in section. Fig. 2 is a front view of the device, showing the adjacent portions of the boiler and illustrating the means for operating the feed-screw. Fig. 3 is an elevation of the brush-carrier and adjacent portions, showing the feed-screw and boiler in section on a plane indicated by the line 3 3 of Fig. 1. Fig. 4 is a detail horizontal section of the brush-carrier on the plane indicated by the line 4 4 of Fig. 3. Fig. 5 is a plan view of a portion of the brush-plate. Fig. 6 is a detail transverse section of the brush-plate on the plane indicated by the line 6 6 of Fig. 5. Fig. 7 is a detail longitudinal section of a portion of the brush-plate on the plane indicated by the line 7 7 of Fig. 5. Fig. 8 is a detail view,

partly in section, of the cam-faced shifting-slide and adjacent portions of the device.

Similar reference characters indicate corresponding parts in all the figures of the drawings.

The cleaning device embodying my invention consists, essentially, of a feed-screw 10, mounted in fixed bearings in the boiler and held from longitudinal movement, a brush-carrier 11, mounted for reciprocatory movement in a path parallel with the length of the boiler and adapted for actuation by the feed-screw, and a shifting device for alternately elevating and releasing the brush-carrier at opposite ends of its path to cause the brush to traverse the surface of the boiler only during its movement in one direction, whereby the scale may be moved toward the blow-off of the boiler. In the construction illustrated the feed-screw is of tubular construction and is mounted in one head 12 of the boiler 13 by means of a pivot 14, consisting of a screw or bolt threaded into an opening in the head of the boiler, with a jam-nut engaged therewith at the outer surface of the boiler-head, a smooth portion of said screw being fitted in the bore of the feed-screw. At the other end the feed-screw is mounted in a bearing in the bracket 15, which is bolted or otherwise terminally secured to the bottom of the boiler, and beyond the bracket 15 the feed-screw is fitted with a gearing member 16, to which motion may be communicated from an operating-spindle 17. In the construction illustrated the spindle 17 carries a sprocket-wheel 18, connected by a chain 19 with the member 16, which is also of the sprocket-wheel type, and said operating-spindle is mounted in the boiler-head 12^a at one side of the manhole or opening 20 with which boilers are usually provided. Also the spindle 17, which is provided at its outer end with a crank 21 or other operating device, is extended through a tubular guide 22, fitted in a suitable opening in the head 12^a and secured in place by means of nuts 23, which bear, respectively, against the inner and outer surfaces of the head. The extended spindle 17 and guide 22 provide for locating the member 21 outside of the smoke-box 24, of which the front wall is indicated by the dotted lines in Fig. 1, and at the front end of the guide is

arranged a stuffing-box 25 to prevent the escape of steam through the guide from the boiler.

Engaged with the feed-screw is a feed-nut or traveler 26, provided in its sides with channeled guides 27 for the arms 28 of the brush-carrier 29, said brush-carrier, in addition to said arms, including a seat-plate 30, which may, as shown, be of segmental construction to correspond with the cross-sectional contour of the inner surface of the boiler. The extremities of the seat-plate may be connected with the arms 28 by bracing-webs 31, and connecting the upper extremities of the arms, above the plane of the traveler, is a yoke 32, held in place by fastening-screws 33. Communicating with the guides 27, at opposite sides of the traveler, are openings 34, in which are fitted the round body portions of keys 35, said keys having flattened or angular projecting portions or noses 36 for engagement with the threads of the feed-screw, whereby as the feed-screw is turned by the mechanism above described linear movement is imparted to the traveler to advance the brush toward one end of the boiler.

In order that the brush may be caused to traverse the surface of the boiler in only one direction, I employ in connection with the brush-carrier a shifting-slide 36^a, having a reduced stem portion 37, which fits in a seat 38 in the upper side of the traveler and engages the yoke 32. Adjacent to this stem portion the slide is provided with a cam-face 39, which when the slide is moved in one direction comes into contact with the yoke and raises the brush-carrier to remove the brush from the surface of the boiler. At the opposite extremity of the stem from the cam is a head or tappet 40, and at the opposite end of the body portion of the slide is a corresponding tappet 41, of which the former is adapted for contact with a fixed stop, such as the bracket 15, when the brush is moving in one direction and of which the other is adapted for contact with a fixed stop, such as the head 12 of the boiler, when the carrier is moving in the opposite direction. The slide is provided with bearing-blocks 42 and 43, which bear upon the feed-screw and serve to guide the slide in its movements longitudinally of the feed-screw.

In operation the brush-carrier is advanced—for instance, in the direction indicated by the arrow in Fig. 1—until the tappet 41 comes in contact with the fixed stop provided for its engagement, whereupon the further advance of the carrier causes its elevation, and upon reversing the direction of rotation of the feed-screw the brush may then be returned to the front end of the boiler without drawing the scale or accumulations in the same direction. When the movement of the carrier in the opposite direction to that indicated by said arrow in Fig. 1 has proceeded sufficiently to bring the tappet 40 into engagement with the stop formed by the bracket 15, the cam-faced

portion of the shifting-slide is withdrawn from engagement with the yoke 32 and the brush is allowed to drop into contact with the bottom of the boiler, whereupon the succeeding forward movement of the carrier causes the brush to traverse the bottom of the boiler and carry the scale toward the head 12. Thus without gaining access to the interior of the boiler the cleaner may be operated to scrape the scale from the surface and carry it to a point adjacent to the boiler blow-off, from which it may be removed, as in the ordinary practice.

In the drawings I have shown a preferred form of brush, consisting of a brush plate or back 44, provided with openings 45, spanned by pins or rods 46, and brush-bristles 47, consisting of stiff spring-wire or the equivalent thereof, looped, as shown clearly in Fig. 6, and having their looped portions extended through the openings 45 and engaged with the rods or pins 46. This brush plate or back after the arrangement of the bristles is secured, by screws 48 or the equivalents thereof, to the seat-plate 30, and it is obvious that the curvature of the brush may be adapted to the diameter and peculiar cross-sectional construction of the bottom portion of the boiler to which the apparatus is to be applied.

The device as described may be constructed at a comparatively-small cost, and owing to the described relative arrangement of the parts the same may be manipulated through the crank outside of the smoke-box to cause the required cleaning of the boiler without interfering with the operation of the boiler, the brush and its operating mechanism being permanently mounted in the boiler. Furthermore, it will be seen that the operating mechanism is so located as not to interfere with or in any way obstruct the manhole to which the front plate or head of the boiler is provided. Furthermore, it will be seen that the keys of the traveler, which engage the threads of the feed-screw, are adapted to automatically adjust themselves to suit the inclination of the faces of the threads, whereby binding and unnecessary friction in operation are prevented. Furthermore, the described brush is of simple construction, and the scraping elements or bristles thereof may be replaced at a comparatively-small cost.

Having described my invention, what I claim is—

1. A boiler-cleaning apparatus having a feed-screw, and means for operating the same, a brush-carrier actuated by the feed-screw and mounted for linear movement, and a shifting device for transversely moving the brush-carrier in opposite directions at the extremities of the path of the carrier said shifting device being connected to and movable with the brush-carrier, substantially as specified.

2. In a boiler-cleaning apparatus, the combination of a feed-screw, a traveler actuated by the feed-screw, a brush-carrier mounted

upon the traveler for movement in a path transverse to the feed-screw, and shifting devices for transversely moving the carrier at the limits of movement of the traveler said shifting device being connected to and movable with the said traveler, substantially as specified.

3. In a boiler-cleaning apparatus, the combination of a feed-screw, and means for operating the same, a traveler mounted upon the feed-screw for actuation thereby, a brush-carrier mounted upon the traveler for movement in a path transverse to the feed-screw, and a cam-faced slide mounted for movement relatively to the traveler, in a direction parallel with the feed-screw, and stops arranged in the path of the slide for engagement thereby at the limits of movement of the traveler, substantially as specified.

4. In a boiler-cleaning apparatus, the combination of a feed-screw, and means for operating the same, a traveler mounted upon the feed-screw, a brush-carrier mounted upon the traveler for movement in a path transverse to the feed-screw and having a yoke, a cam-faced slide mounted upon the traveler for engagement with said yoke of the brush-carrier, and provided with terminal tappets, and fixed stops arranged in the paths of said tappets, substantially as specified.

5. In a boiler-cleaning apparatus, the combination of a feed-screw, and means for operating the same, a traveler mounted upon the feed-screw, a brush-carrier mounted upon the traveler for movement in a path transverse to the feed-screw and having a yoke, a cam-faced slide mounted upon the traveler for engagement with said yoke, and provided with bearing-blocks mounted upon the feed-screw, and stops arranged in the path of movement in opposite directions of the slide, and adapted to be engaged by the extremities of the latter to impart transverse movement to the carrier, substantially as specified.

6. In a boiler-cleaning apparatus, the combination of a feed-screw, and means for operating the same, a traveler mounted upon the feed-screw, keys carried by the traveler for engagement with the threads of the feed-

screw, a brush-carrier mounted upon the traveler for movement in a path transverse to the feed-screw, and a shifting device connected to and movable with the traveler for communicating transverse motion to the carrier at opposite ends of the path of the traveler, substantially as specified.

7. In a boiler-cleaning apparatus, the combination of a feed-screw, and means for operating the same, a traveler mounted upon the feed-screw, swiveled keys mounted upon the traveler for engagement with the threads of the feed-screw, a brush-carrier mounted upon the traveler for movement in a direction transverse to the feed-screw, and a shifting device connected to and movable with the traveler for imparting transverse movement to the carrier at opposite ends of the path of the traveler, substantially as specified.

8. In a boiler-cleaning apparatus, the combination with a boiler having in one head a manhole, of a feed-screw disposed longitudinally in the boiler with its front end mounted in a bracket in rear of said head, a brush-carrier actuated by the feed-screw, an operating-spindle mounted in the boiler-head at one side of the manhole, and provided with an exposed operating device, and operating connections between the spindle and said feed-screw, substantially as specified.

9. In a boiler-cleaning apparatus, the combination with a boiler having in one head a manhole, of a feed-screw disposed longitudinally in the boiler with its front end mounted in a bracket in rear of said head, a brush-carrier actuated by the feed-screw, an operating-spindle mounted in the boiler-head at one side of the manhole, and operatively connected with the feed-screw, and a tubular guide through which said operating-spindle extends, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

THOMAS M. WELSHONS.

Witnesses:

WM. CARRUTHERS,
R. MCARTHUR.