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Patented Dec. 5, 1899.

W. M. FABER, JR.  
BOILER TUBE CLEANING APPARATUS.

(Application filed Mar. 31, 1898.)

(No Model.)

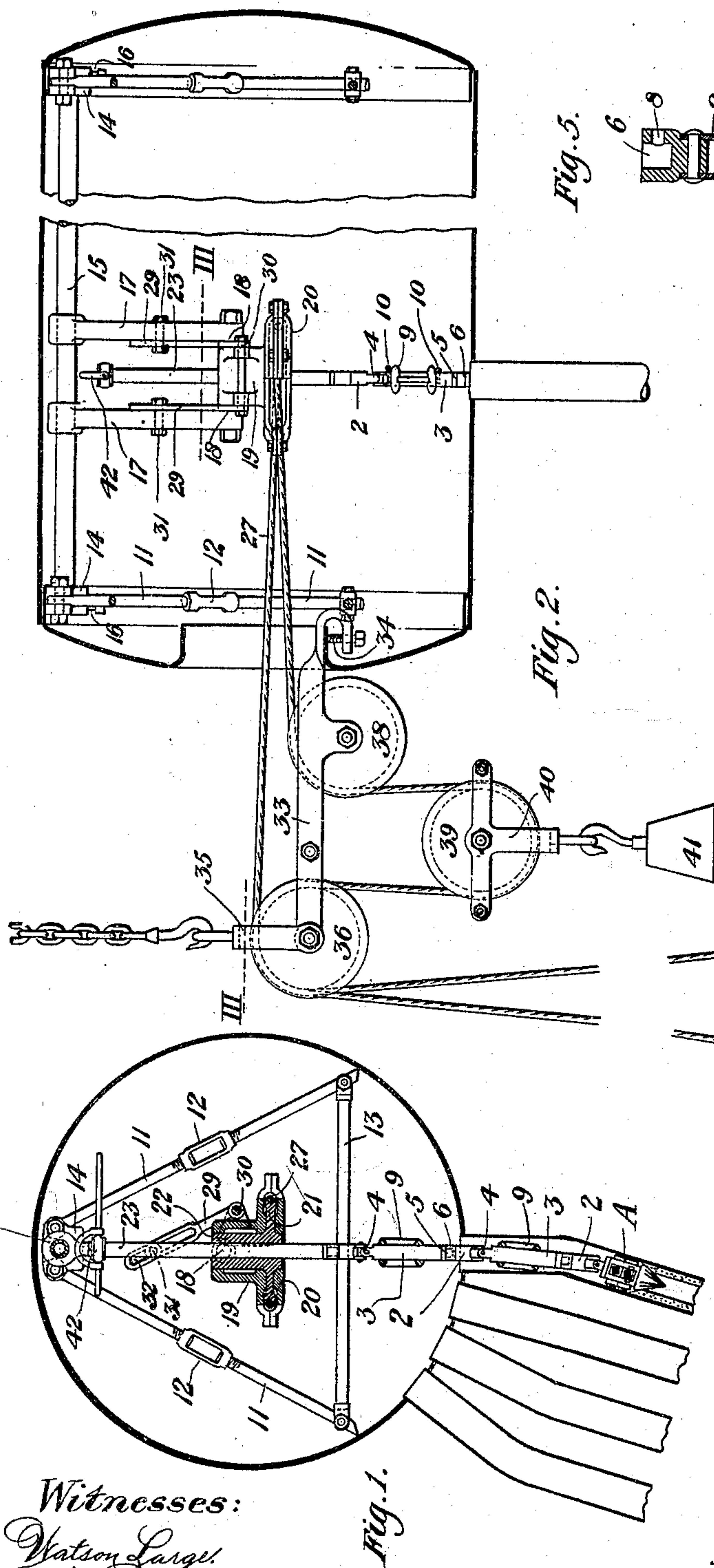


Fig. 5.

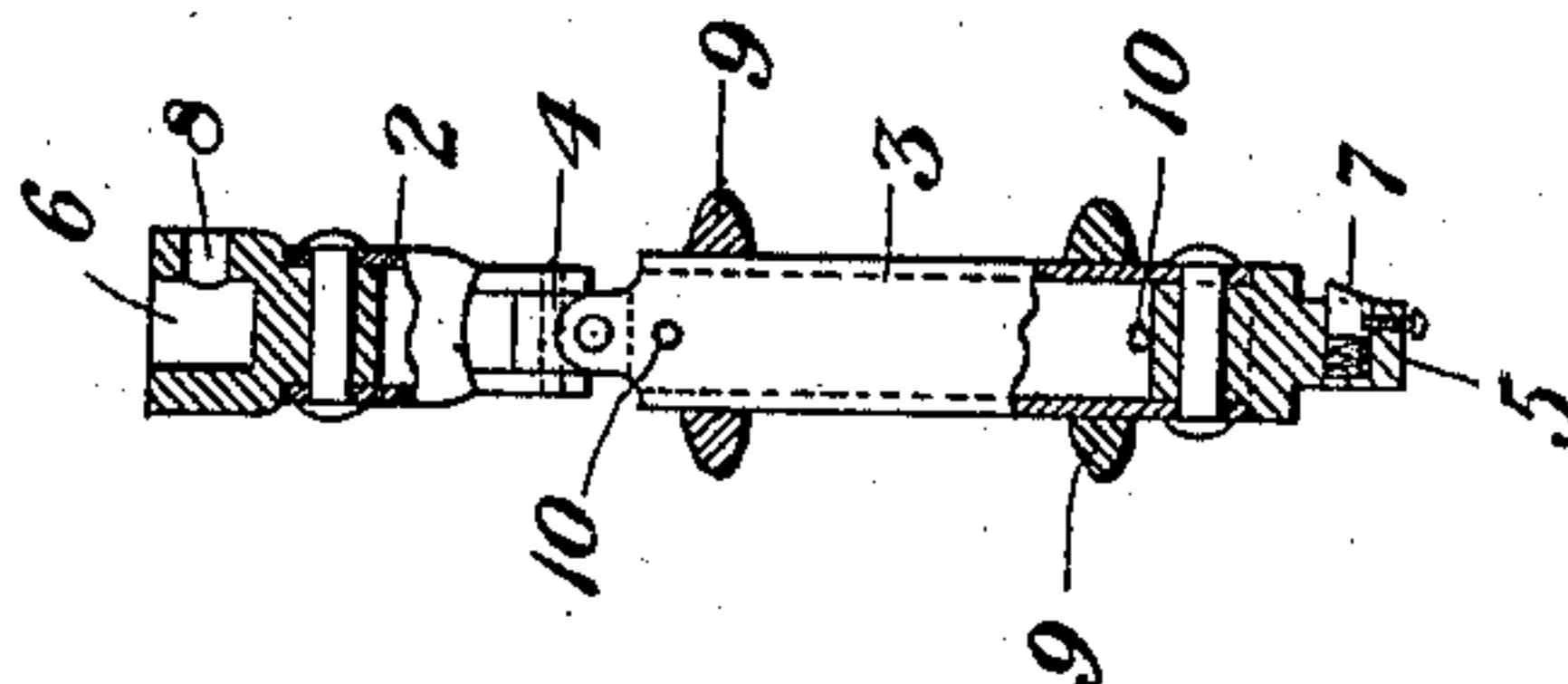
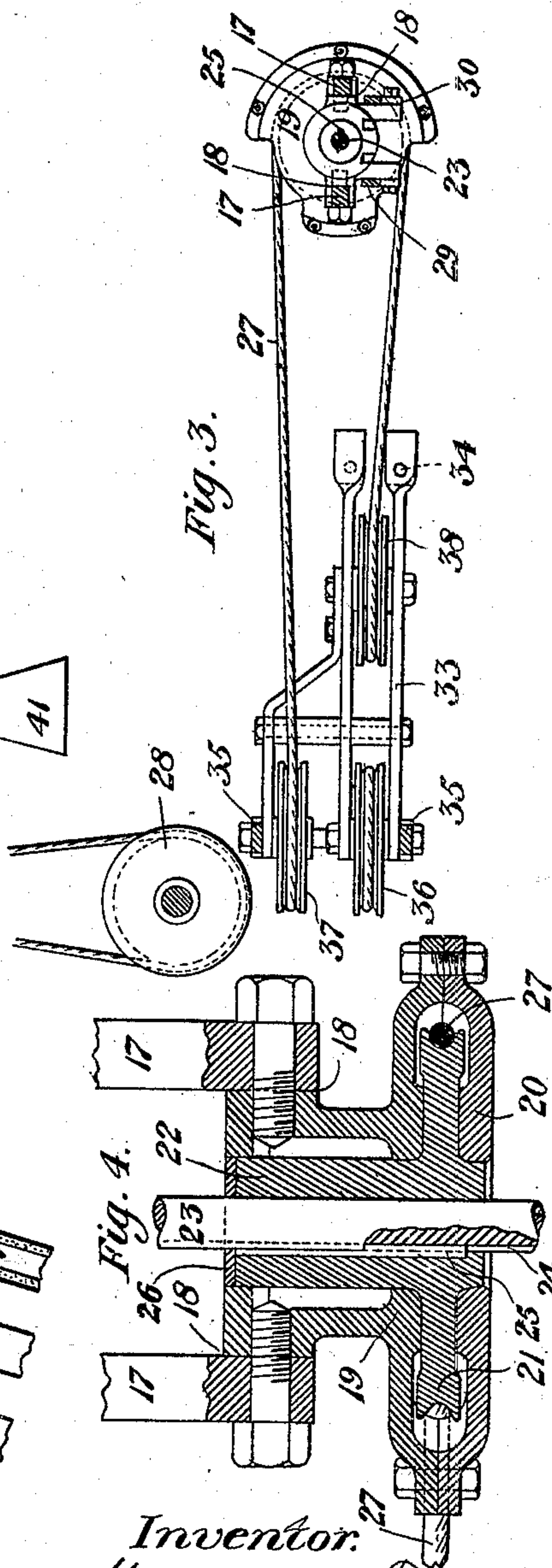


Fig. 2.

Fig. 3.



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# UNITED STATES PATENT OFFICE.

WILLIAM M. FABER, JR., OF PITTSBURG, PENNSYLVANIA.

## BOILER-TUBE-CLEANING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 638,225, dated December 5, 1899.

Application filed March 31, 1898. Serial No. 675,874. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM M. FABER, Jr., a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered a new and useful Improvement in Boiler-Tube-Cleaning Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a cross-section taken through the upper drum of a water-tube boiler, showing my apparatus in position for operation with the cleaning-tool inserted part way into one of the tubes. Fig. 2 is a longitudinal section at right angles to Fig. 1, showing the apparatus in side elevation. Fig. 3 is a plan view indicated by the line III III of Fig. 2. Fig. 4 is a sectional detail view of the housing and driving-wheel. Fig. 5 is a detail view of one section of the flexible shafting.

My invention relates to mechanism for manipulating and driving boiler-tube-cleaners, and is designed more especially for that type of boilers in which the tubes spring from main drums at varying angles, requiring frequent change in the position of the driving mechanism.

In the present case I have shown my apparatus adapted to impart rotary motion to a tool A, which may be of any preferred design adapted to remove the scale from the interior of the tube while being rotated at a high speed as it is advanced through the tube. Owing to the frequent bends in the tubes it is desirable that the tool shall be connected with the driving mechanism by flexible shafting, and I have therefore used a series of short sections of pipe 2 and 3, connected at 4 by a universal joint. These sections are provided at their ends with male and female coupling members 5 6, respectively, the male member being provided with a spring-controlled button 7, adapted to enter a corresponding recess 8 in the female member, thus securing the parts together. Each of the pipe-sections 2 is provided with an encircling shield or fender 9, by which the various sections are maintained in an approximately central position in the tube, these fenders being held against longitudinal movement by cotter-pins 10.

Referring to the driving mechanism, III are the lateral legs of a tripod, sharpened at their ends, each leg being formed in two parts and connected by a turnbuckle 12, engaging right and left hand threads. At their bases these members are connected by the cross-brace 13, and at the upper portion they are hinged to the cross-head 14, bearing against the upper shell of the drum. In practice two of such tripods are employed, firmly braced at each end of the drum, and passing through the heads 14, extending from end to end of the drum, is the rod 15, preferably composed of a heavy pipe-section held in position by set-screws 16. Suspended from such cross-shaft are the bars 17, pivotally connected at 18 to a housing 19, having a lower cap 20, within which housing is rotatively mounted the grooved sheave wheel or pulley 21, having an upward extension 22 journaled within the housing. This hub extension is bored out to receive the shaft 23, having a longitudinal keyway 24 in engagement with a key 25, mounted in the hub extension and retained in position by a plate 26, secured to the hub. It will be seen that when the grooved sheave-wheel 21 is rotated the motion will be transmitted to the shaft 23 and from it through the flexible shafting to the cutting-tool A. Such rotation is imparted to the pulley by an endless cable 27, driven from any source of power, such as the wheel 28.

In the operation of the machine the housing is set so as to aline with the centers of a longitudinal row of tubes, such position being controlled and regulated by the adjusting-links 29, pivoted to the housing at 30 and capable of adjustment by bolts 31, passing through the slots 32 and the main arm 17.

It will be seen that in the progress of the machine to successive positions throughout the length of the drum provision must be made for the extension of the cable, and this I have done in the following manner: 33 is a bracket adapted to be clamped to the flange of the manhole of the boiler-head by set-screws 34, its outer end being supported by a yoke 35, attached from any convenient point. Within this bracket 33 are mounted the sheave-wheels 36 and 37 side by side and similar wheel 38 in line with wheel 36. The cable is passed from the driving-wheel 28, over wheel 37, around the pulley 21, back to



wheel 38, when it is looped downwardly around wheel 39, and up and over wheel 36 to the driving-wheel. The wheel 39 is mounted within a pulley-block 40, to the lower end of which is suspended a weight 41 sufficiently heavy to exert a constant tension on the cable. The pulley-block and weight will rise and fall according to the varying position of the pulley 21.

10 The shaft 23 is of sufficient length to permit of a downward travel approximately equal to or slightly greater than the length of one of the sections of the flexible shafting, so that it may be raised from the lowest position to the highest and a new section inserted. The raising operation is facilitated by means of a swivel 42, secured to the top of the shaft, through which a rope may be passed and led up over the pipe 15. Downward travel may be assisted by pressure on the top of the shaft.

By my improved construction it will be seen that provision is made whereby the housing and its contained shafting may be located at any desired position in the drum either by means of the arms 17 and links 29 or by changing the location of the tripod, and, as is well known, power may be transmitted through the cable 27 to the pulley 21 at whatever angle it may occupy.

The construction is comparatively light and simple, and the changes in location and position may be quickly and easily made, while the space occupied leaves plenty of room for the workman.

While I have shown my apparatus as used in the drum of a water-tube boiler, it is obvious that it may be as readily adapted to other constructions, and such and other changes that will suggest themselves to the skilled mechanic I desire to include within the scope of my invention.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. Mechanism for operating a tube-cleaning tool consisting of a shaft having a flexible connection for a tool, a cable-driven pulley connected with the shaft, a housing for the pulley and a bar and arms connected therewith for supporting the housing in varying positions, substantially as set forth.

2. Mechanism for operating a tube-cleaning tool consisting of a shaft having a flexible connection for a tool, a cable-driven pulley connected with the shaft, a housing for the pulley, supporting-arms depending from a longitudinal bar and adjusting-links secured to the housing and to the arms, substantially as set forth.

3. In mechanism for operating a tube-cleaning tool: a longitudinal bar mounted in supporting-heads having upper bearing-faces, extensible diverging legs attached to lateral lugs in the heads, adapted to bear against the boiler-drum and to clamp the heads in position, and supporting-arms slidingly mounted

on the bar and attached to a housing supporting the driving mechanism adapted to operate the tool, substantially as set forth.

4. In mechanism for operating a tube-cleaning tool: a longitudinal bar mounted in supporting-heads, extensible diverging legs attached to the heads adapted to bear against the boiler-drum and to clamp the heads in position, supporting-arms slidingly mounted on the bar and attached to a housing supporting a cable-driven pulley connected with the tool-driving shaft, with supplemental links adjustably connected to the arms and housing, substantially as set forth.

5. In tube-cleaning apparatus, a two-part housing adapted to be adjustably mounted inside a boiler-drum: a grooved pulley mounted in the housing and adapted to be rotated therein by a driving-cable, a tool-shaft passing through the pulley and having a key connection therewith, sustaining-arms attached to the housing and slidingly mounted on a longitudinal bar, and supporting-framework for the bar, substantially as set forth.

6. A tube-cleaning apparatus having the flexible shafting adapted to enter the tubes and consisting of sections of pipe having an intervening universal joint, an alining fender embracing one of the sections, and means for securing the sections of shafting together, substantially as set forth.

7. A tube-cleaning apparatus having the flexible shafting adapted to enter the tubes and consisting of sections of pipe having an intervening universal joint, an alining fender embracing one of the sections, and a projecting stud provided with a spring-controlled button at one end and a receiving-socket at the opposite end of such sections, substantially as set forth.

8. In combination with a grooved pulley mounted in a housing, said pulley being operatively connected with a flue-cleaning device adapted to be located inside a boiler-drum and driven by a cable: a bracket secured to the drum adjacent to the manhole and sheave-wheels mounted therein adapted to support the cable, substantially as set forth.

9. In combination with a grooved pulley mounted in a housing, said pulley being operatively connected with a flue-cleaning device adapted to be located inside a boiler-drum and driven by a cable: a bracket secured to the drum adjacent to the manhole, two oppositely-located sheave-wheels mounted therein and a third sheave-wheel in alignment with one of the wheels, with a depending pulley-block and weight having a sheave-wheel engaging the cable to take up the slack, substantially as set forth.

In testimony whereof I have hereunto set my hand.

WILLIAM M. FABER, JR.

Witnesses:

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