

J. ZILLIOX.  
BOILER TUBE CLEANER.  
APPLICATION FILED JULY 24, 1908.

931,245.

Patented Aug. 17, 1909

Fig. 1.

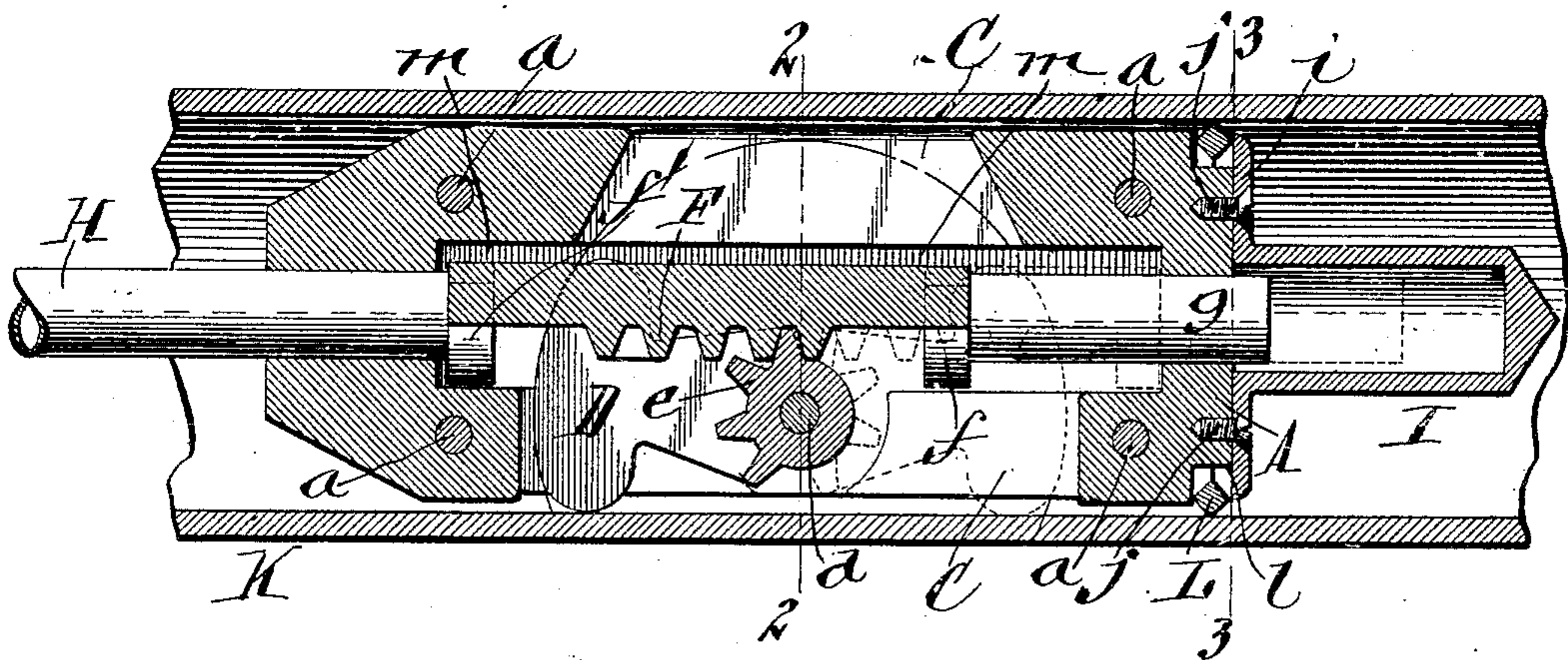


Fig. 2.

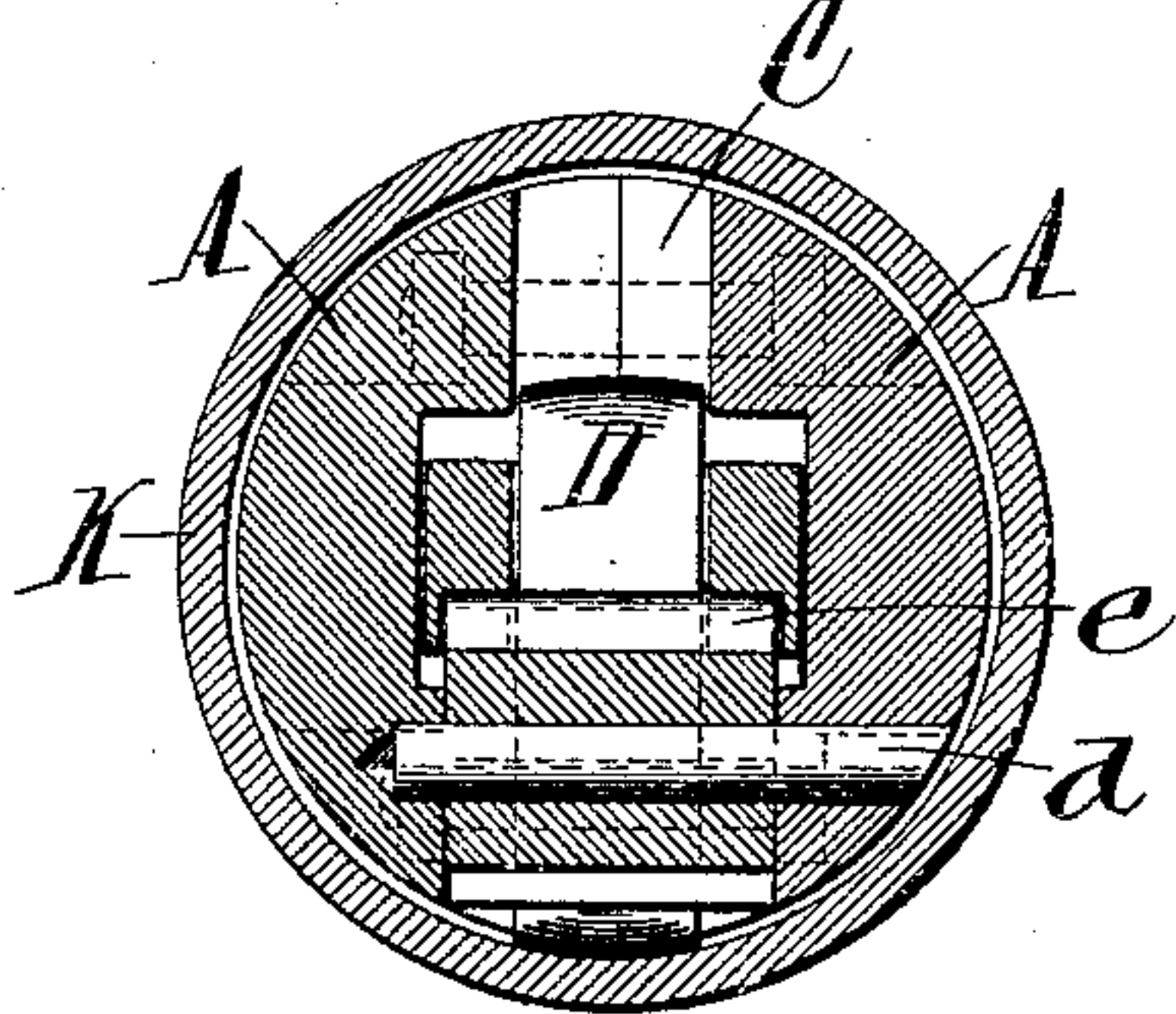


Fig. 3.

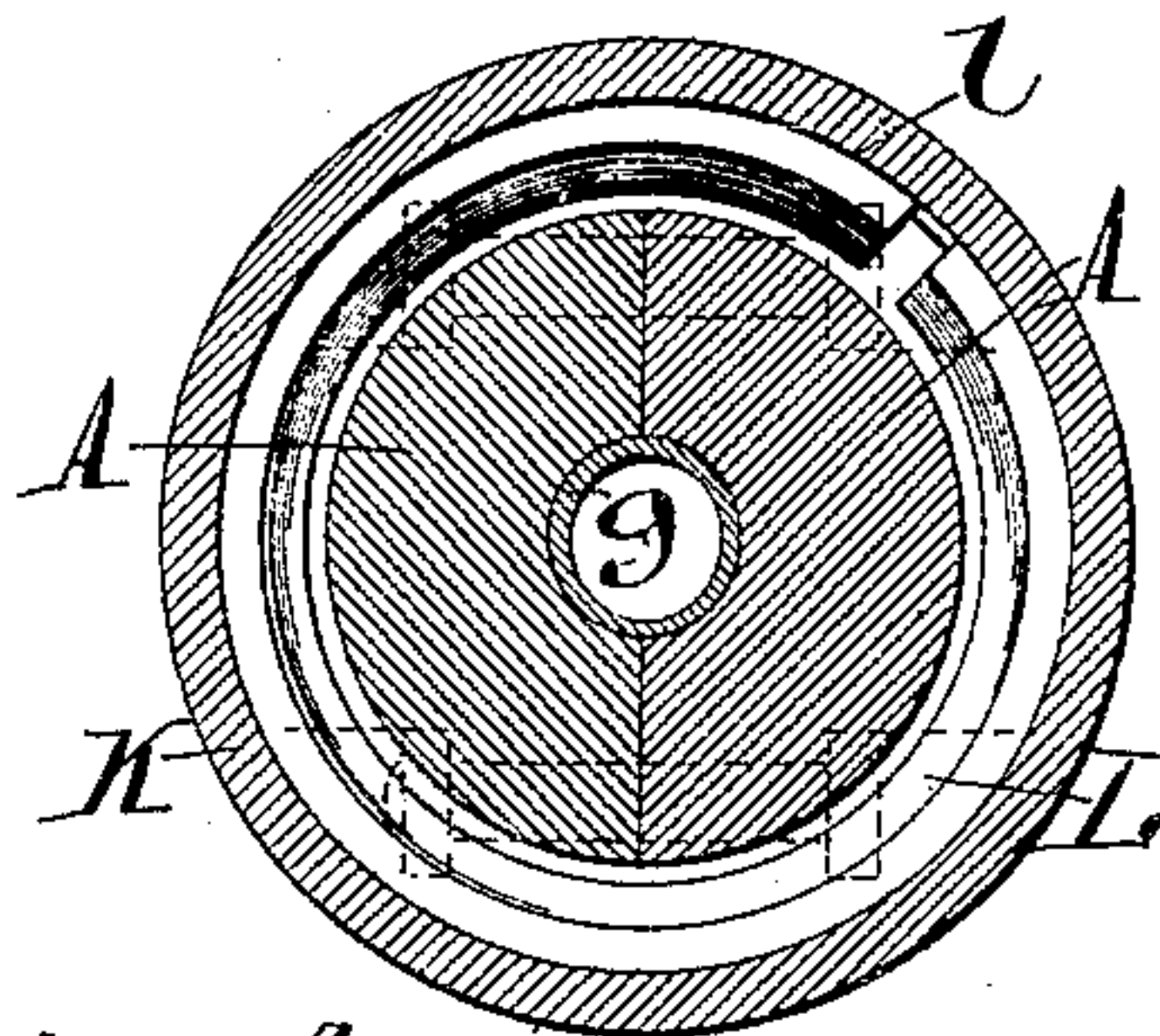


Fig. 4.

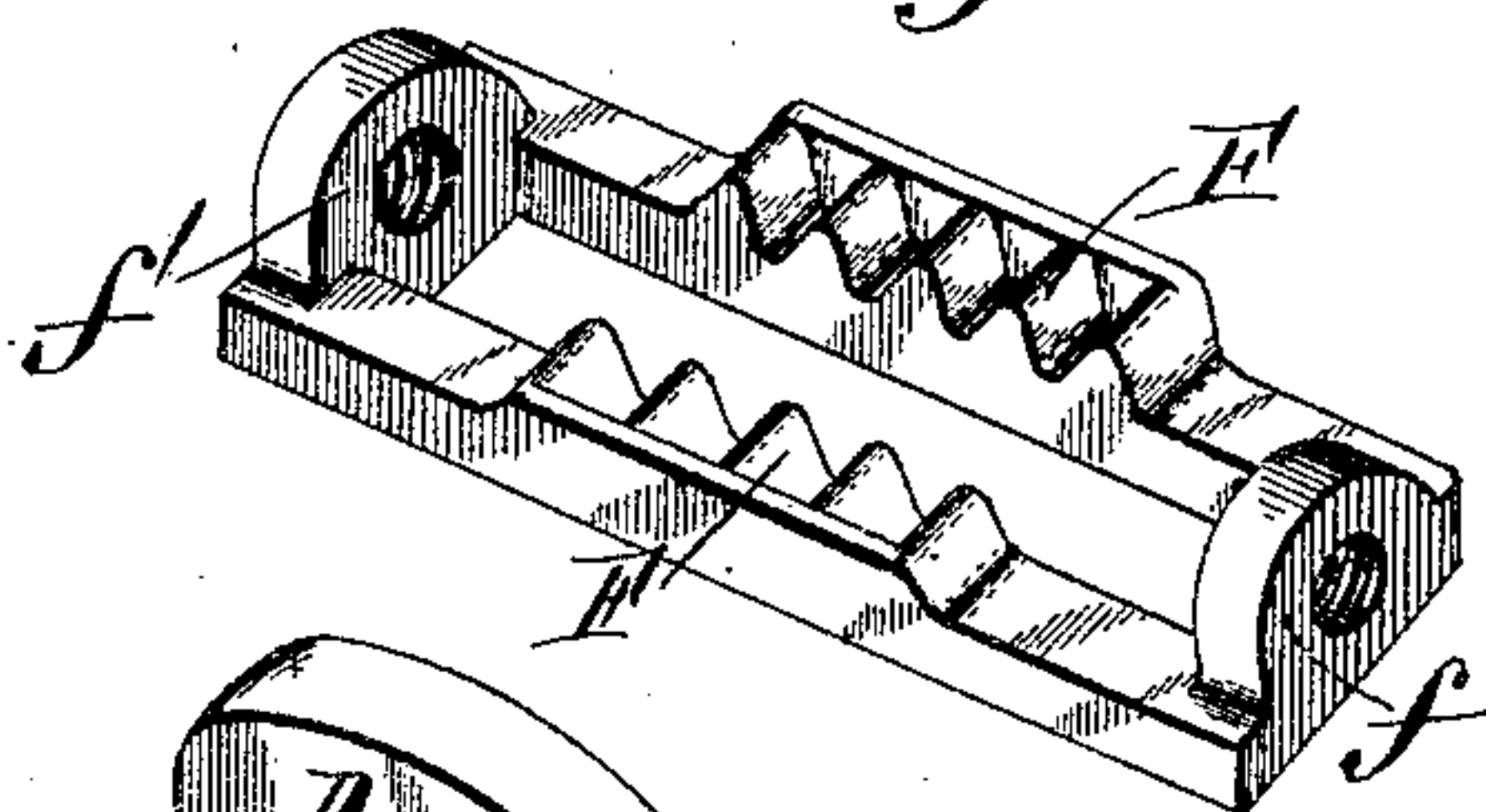
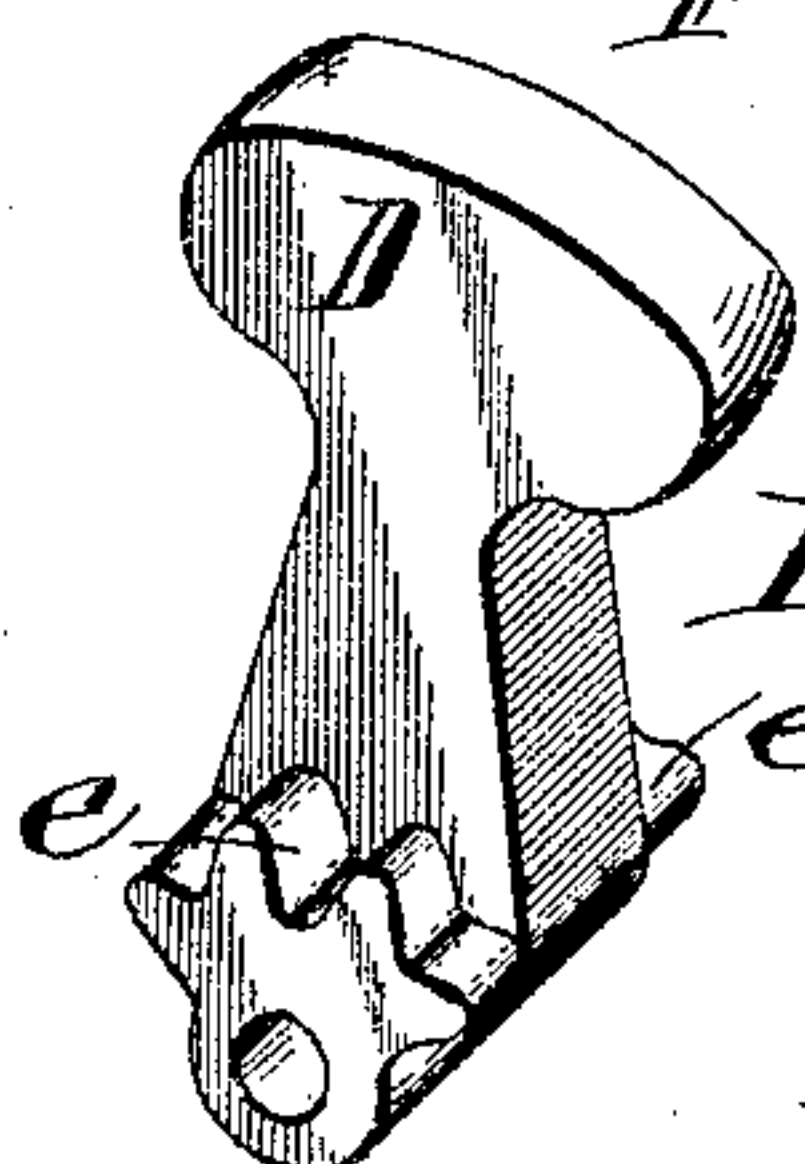


Fig. 5.



Witnesses:  
Richard Sommers,  
Gustav W. Hora,

Inventor:  
John Zilliox,  
by Geyer Popp  
Attorneys.



# UNITED STATES PATENT OFFICE.

JOHN ZILLIOX, OF BUFFALO, NEW YORK.

## BOILER-TUBE CLEANER.

No. 931,245.

Specification of Letters Patent.

Patented Aug. 17, 1909.

Application filed July 24, 1908. Serial No. 445,174.

*To all whom it may concern:*

Be it known that I, JOHN ZILLIOX, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Boiler-Tube Cleaners, of which the following is a specification.

This invention relates to the class of boiler-tube cleaners having a hammer adapted to strike the inner side of the tube for breaking and detaching the scale deposited on its outer side.

The object of the invention is the provision of a simple, effective and inexpensive tool of this kind which can be operated by hand, if desired, rendering the device especially useful for industrial and other plants having but a single steam-boiler.

In the accompanying drawings: Figure 1 is a sectional elevation of the cleaner. Figs. 2 and 3 are cross sections thereof on the correspondingly numbered lines in Fig. 1. Fig. 4 is a perspective view of the double gear-rack connected with the operating handle.

Fig. 5 is a perspective view of the hammer. Similar letters of reference indicate corresponding parts throughout the several views.

The shell or casing of the cleaner is preferably cylindrical and divided lengthwise and centrally into two similar sections A rigidly secured together near their front and rear ends by transverse bolts *a* or other suitable means.

Arranged centrally in the casing and preferably extending from side to side thereof is a longitudinal slot or chamber C in which plays an oscillating hammer D having its hub journaled on a transverse shaft *d* supported in openings or bearings in the sections A, as best shown in Fig. 2. The hub of the hammer is provided on opposite sides of the hammer-shank with gear segments or pinions *e* which mesh with longitudinal gear racks F which are yoked together at their ends by cross bars or lugs *f*, *f*<sup>1</sup>. Projecting forwardly from the front cross bar *f* is a longitudinal guide rod *g* which slides in an opening in the head of the casing A while to the rear cross bar *f*<sup>1</sup> of the gear racks an operating rod or handle H is secured for reciprocating the racks and oscillating the hammer in an obvious manner. This handle is guided in an opening in the rear end of the casing.

In order to exclude soot from the opening

in which the rod *g* is guided, the projecting front end of this rod is housed by a cap I preferably provided at its base with a perforated flange *i* through which pass fastening screws *j* by which the cap is secured to the front end of the casing. The casing is provided in the front and rear ends of the hammer-chamber C with recesses *m* for receiving the yoked ends of the gear racks F.

The shank of the hammer D is of such a length that the hammer may project beyond the surface of the casing A both on the front and rear sides of the shaft *b* and on the same side of the boiler tube, so that upon reciprocating the operating handle H, the hammer is caused to strike the inner surface of the tube at each extremity of its stroke, delivering two forcible blows against the same side of the tube and on opposite sides of the hammer-pivot and breaking and detaching the incrustation on the outer side of the tube.

In the use of the tool, the same is slowly rotated bodily in the boiler tube by means of the handle, as the cleaning operation proceeds, in order to act upon all sides of the tube and detach the scale from all portions thereof. By this improved construction a comparatively short stroke of the handle produces the necessary stroke of the hammer which latter oscillates through an arc of a hundred and eighty degrees, enabling powerful blows to be delivered against the tube with comparatively little effort on the part of the operator. By extending the hammer-chamber C from side to side of the casing, a free and unobstructed discharge is provided for any soot that may drop into the same, thus preventing clogging of the gear racks F and segments *e*.

L indicates a scraper, applied to the casing, and projecting beyond the cylindrical surface thereof for the purpose of detaching any soot adhering to the inner surface of the boiler-tube by the act of moving the tool back and forth in the tube. This scraper preferably consists of a split steel ring seated in an annular groove in the front portion of the casing. In the preferred construction shown in the drawings, this groove is formed by an annular recess *l* in the front end of the casing and the cap-flange *i* which forms the front wall of said groove. The projecting portion of the scraper-ring is beveled both on its front and rear sides, as shown, to facilitate the passage of the scraper over



hard obstructions in the boiler-tube, the elasticity of the ring permitting it to yield and contract upon encountering such obstructions.

- 5 While a double gear-rack and coöperating gear segments are herein shown and described, it is obvious that a single rack and segment could be used but the double construction is preferably employed to equalize  
10 the strains on opposite sides of the hammer. It is also obvious that the tool could be operated by power as well as by hand.

I claim as my invention:—

1. The combination of a rotatable casing  
15 having a hammer-chamber, a swinging hammer arranged in said chamber, and a continuous rod extending through the rear of the casing, slidable lengthwise thereof and having means for positively connecting the  
20 rod with the hammer, said rod being non-rotatable relative to said casing.

2. The combination of a casing having a hammer-chamber extending through its side, a hammer pivoted in said chamber, a recip-  
25 rocatng handle guided in the casing and extending through the rear end thereof, and gearing connecting the hammer on both sides thereof with said handle, substantially as set forth.

3. The combination of a casing having a hammer - chamber, a swinging hammer pivoted in said chamber and having gear  
30 teeth, a gear rack movable lengthwise of the casing and engaging said teeth, and means for reciprocating said gear rack, substantially as set forth.

4. The combination of a casing having a longitudinal hammer-chamber, a shaft extending across said chamber, a hammer  
40 mounted on said shaft and having its hub provided with gear-teeth, a gear-rack guided in the casing and movable lengthwise of the casing and meshing with said teeth, and a reciprocating handle connected with said  
45 gear rack and extending through the rear end of the casing, substantially as set forth.

5. The combination of a casing having a longitudinal hammer-chamber, a swinging hammer pivoted in said chamber and having  
50 gear teeth, a gear rack engaging said teeth and provided at its front end with a guide-rod slidable in the casing and at its opposite end with an operating-handle extending through the rear end of the casing, substan-  
55 tially as set forth.

6. The combination of a casing having a longitudinal hammer-chamber, a swinging hammer pivoted to oscillate lengthwise in  
60 said chamber and provided on opposite sides of its shank with gear-segments, gear racks arranged on opposite sides of the hammer and engaging said segments, a guide supported in the casing and connected to the front ends of the gear-racks, and a recipro-

cating handle connected to the rear ends of  
65 the gear racks and extending through the rear end of the casing, substantially as set forth.

7. The combination of a casing provided with a longitudinal hammer-chamber there-  
70 in having openings on opposite sides thereof, a hammer pivoted in said chamber and adapted to project through the opening in one side of said chamber and both in front and rear of the hammer-pivot, and means  
75 for actuating the hammer.

8. The combination of a casing having a hammer-chamber, a hammer arranged in said chamber, a reciprocating member  
80 guided in the casing and operatively connected with the hammer, a guide extending forwardly from said reciprocating member beyond the front end of the casing, and a housing carried by the casing and inclosing the projecting portion of said guide, sub-  
85 stantially as set forth.

9. The combination of a casing having a hammer-chamber, a swinging hammer pivoted in said chamber and having a gear-  
90 segment, a longitudinal gear-rack guided in the casing and engaging said segment, said rack bar being provided at its front end with a longitudinal guide-rod passing through the front end of the casing, a hous-  
95 ing applied to the front end of the casing and inclosing the front portion of said guide rod, and means for reciprocating said rack bar, substantially as set forth.

10. The combination of a casing, a hammer pivoted to the casing to oscillate length-  
100 wise thereof and capable of swinging beyond its surface both on the front and rear sides of the hammer-pivot, and means for actuating the hammer.

11. The combination of a casing having a  
105 hammer-chamber extending through its side, a hammer pivoted in said chamber to oscillate lengthwise of the casing, the hammer being capable of swinging beyond the surface of the casing both on the front and rear  
110 sides of the hammer-pivot, and means for actuating the hammer.

12. The combination of a casing, a hammer pivoted to the casing to oscillate length-  
115 wise thereof and capable of swinging beyond its surface both on the front and rear sides of the hammer-pivot, the hammer being provided with gear teeth, a gear-rack movable lengthwise of the casing and en-  
120 gaging said teeth, and means for reciprocating said gear rack.

Witness my hand this 20th day of July, 1908.

JOHN ZILLIOX.

Witnesses:

C. F. GEYER,  
E. M. GRAHAM.