

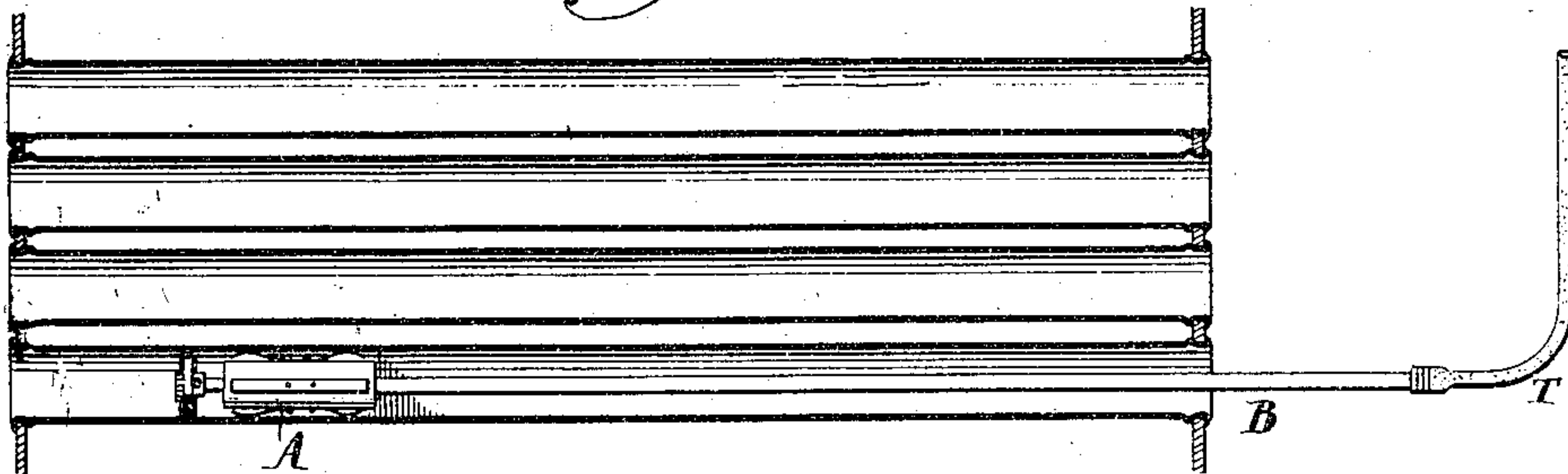
(No Model.)

H. L. HILDRETH.  
BOILER FLUE CLEANER.

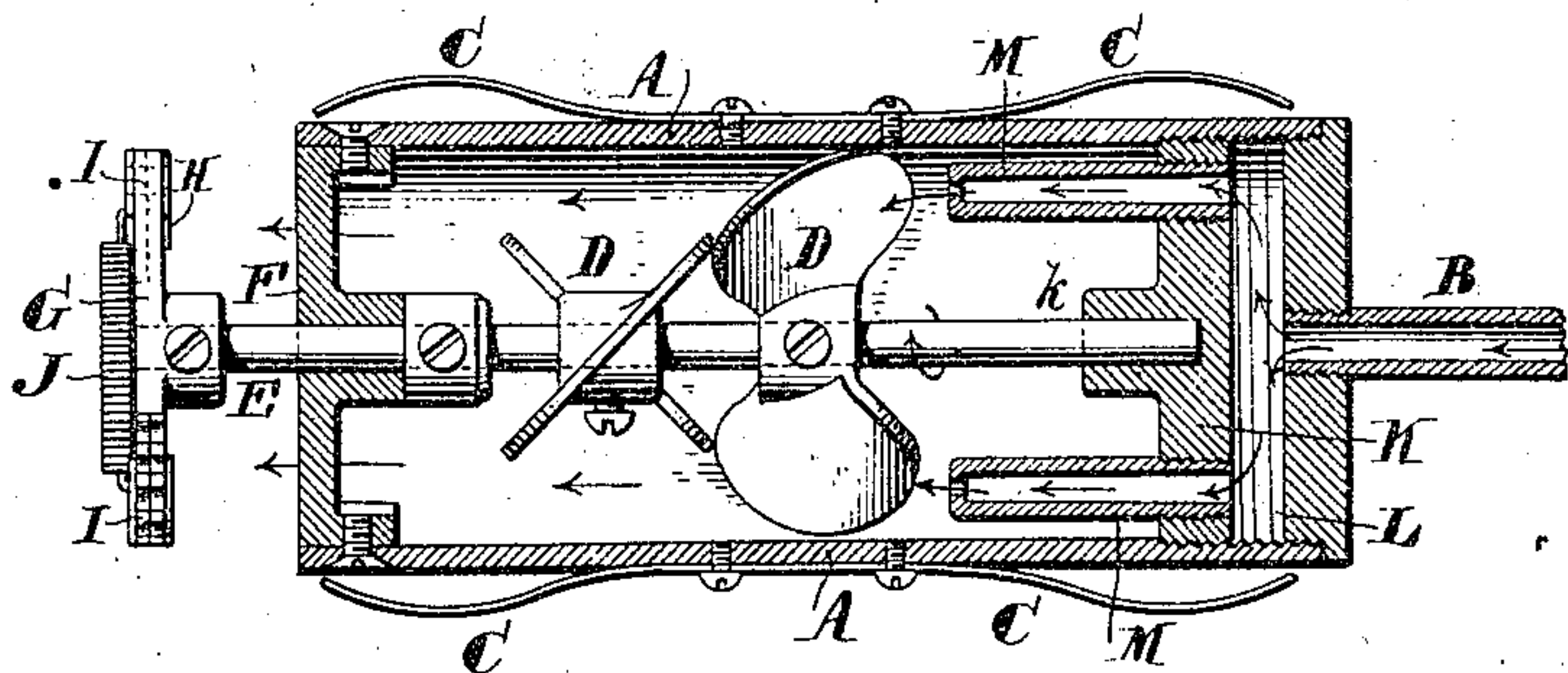
No. 574,422.

Patented Jan. 5, 1897.

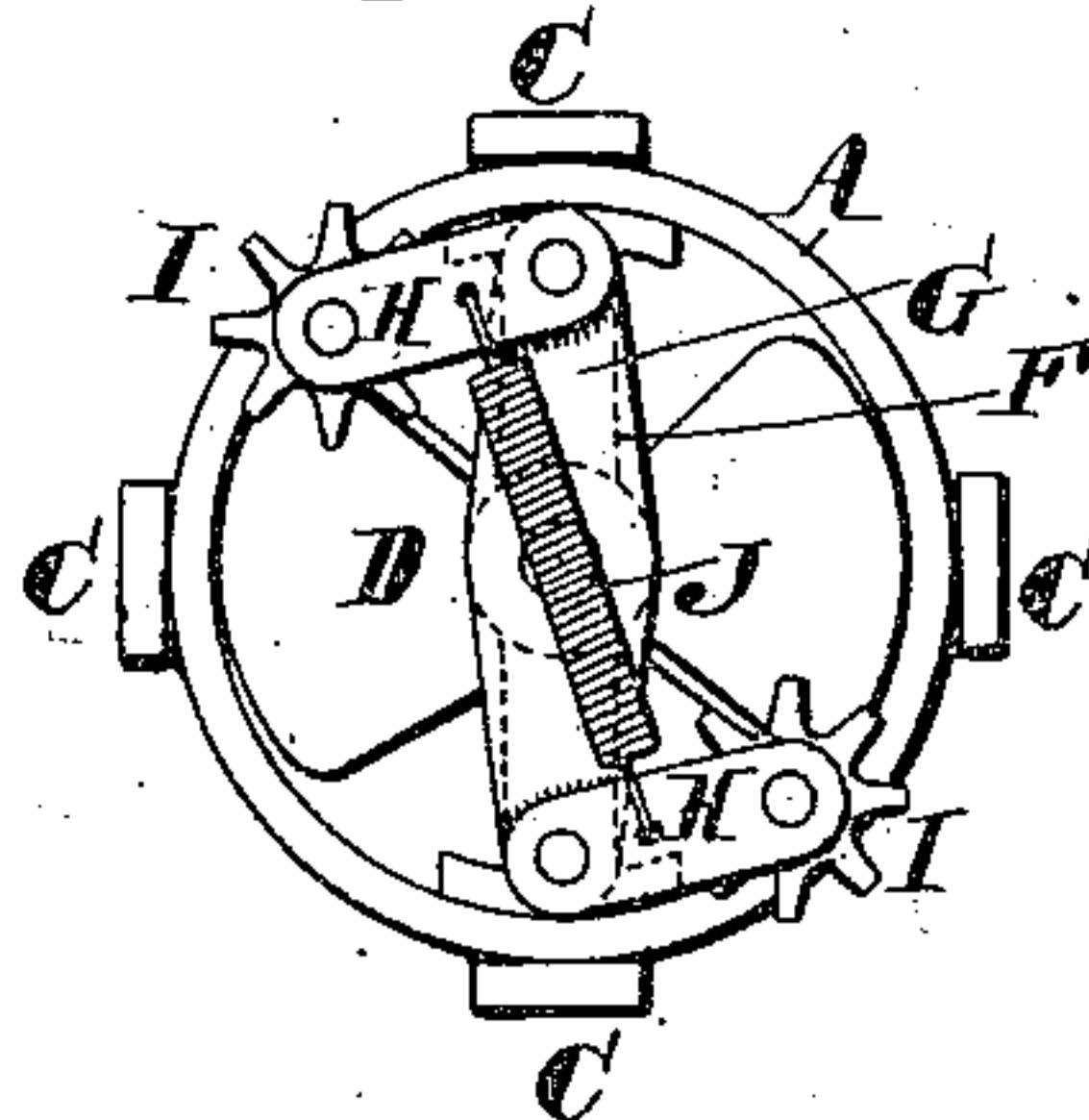
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



Witnesses.

*Henry Dunning*  
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Inventor.

*H. L. Hildreth*

*By [Signature]*

Attorney.



# UNITED STATES PATENT OFFICE.

HENRY L. HILDRETH, OF SAGINAW, MICHIGAN.

## BOILER-FLUE CLEANER.

SPECIFICATION forming part of Letters Patent No. 574,422, dated January 5, 1897.

Application filed April 28, 1896. Serial No. 589,367. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY L. HILDRETH, of the city and county of Saginaw and State of Michigan, have invented an Improvement in Boiler-Tube Cleaners, of which the following is a specification.

My invention has reference to boiler-tube cleaners; and it consists of certain improvements fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

The object of my invention is to provide a boiler-tube cleaner which shall cause the scale to be cut or scored off from the tube and blown out.

In carrying out my invention I provide a hollow head containing a screw or propeller pivoted therein and adapted to be rotated by a jet of steam or air supplied, preferably, through a tubular handle. The said propeller or screw rotates a shaft carrying jointed one or more arms provided with suitable cutters adapted to be thrown out by centrifugal force, so as to scrape the inner walls of the tube. In operation the jet of steam causes the screw or propeller to rotate rapidly, and this causes the cutters to be thrown against the inner surface of the tubes, so as to cut or scrape them. The loosened scale is then blown

through and out of the tube by the steam or air. To insure perfect dislodgment of the scale, the head may be further provided with steel scraping-blades, which, if the head be turned, are caused to scrape the interior walls

of the tube. Their function, however, is more particularly to center the head within the tube, so that the rotating cutters may be permitted to act more uniformly upon the scale. My invention will be better understood by

reference to the drawings, in which—  
Figure 1 is a side elevation of my improved scraper, showing it applied to a boiler, the tubes of which are in section. Fig. 2 is a longitudinal sectional elevation of my improved tube scraper or cleaner, and Fig. 3 is an end view of same.

A is the head, and is open upon one end and closed upon the other, and to the latter or closed end is attached the tubular rod or handle B, into the end of which steam may be blown by a flexible pipe T or in any other suitable manner. The head A is provided

with the springs C upon its outer surface, which guide the head centrally within the tube K and make it adjustable to tubes of different diameters.

K is a diaphragm near the closed end of the head, and forms a space or chamber L, and which also acts as the rear bearing K for the rotary cutter-shaft. This diaphragm is also provided with nozzles or apertures M, adapted to direct the steam in jets against suitable propellers or screws within the head.

D are propellers or screws within the head A, and have their shaft E journaled in suitable bearings k, F, so as to freely revolve under the action of the steam-jets. Upon the end of the shaft E is a transverse arm G, to the ends of which are pivoted loose arms H, connected by a spring J. The arms H have journals, upon which are loosely supported saw or disk shaped cutters I, preferably formed with teeth, as shown. In practice I prefer to use these cutters in pairs to insure a greater cutting action. When the screws or propellers D are not rotating, the cutters I are drawn inward by the spring J, so as not to touch the walls of the tube.

The operation will now be understood. The head is inserted within the tube, and as the steam, water, or air is forced through the screw or propeller D is put into rapid rotation. This action causes the shaft E to rotate with great rapidity, and under the centrifugal action thereby produced the arms H move outward against the action of the spring J to bring the cutters or scrapers I into contact with the interior walls of the tube, so that the said cutters press against the interior walls of the tube while rotating, and at the same time by manipulation of the tubular handle B they are moved longitudinally through the tube. It will be understood, therefore, that their action upon the scale or coating of the tube will be in the line of the screw having an exceedingly fine pitch, and thus permit the most thorough abrading action upon the coating of the inner surface of the tube. By simply rotating the handle B and the head A all the scale or matter which is loosened but not absolutely detached may be readily scraped from the interior of the tube, and under the action of the steam-jet will be forced entirely through the tube, so



that when the scraper is removed the tube is perfectly cleaned.

I do not confine myself to the mere details of construction, as it is evident that they may be modified in various ways without departing from the essential features of my invention, which comprehend a steam-actuated rotary cutter controlled by a long handle adapted to be moved through the tube to be cleaned.

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

1. In a boiler-tube scraper, the combination of a cylindrical or tubular head having one end closed and the other end open, longitudinal springs secured at their middle parts to the outer surface of the cylindrical head and having their free ends extending respectively forward and backward and bent outward to form elastic supports substantially as shown, a vapor-supply pipe leading into the closed end of the head and terminating in jets or nozzles, a rotary shaft carried by the head, a propeller or screw secured to the shaft and adapted to be rotated by the jets of vapor, and an expansible cutter operated by the rotary propeller-shaft to scrape the interior surface of the tube.
2. In a boiler-tube scraper, the combination of a tubular head, a screw or propeller arranged close to said head, a shaft journaled in said head adapted to be rotated by the screw or propeller, expansible rotary cutters carried by and rotating relatively of the said shaft, a spring to retract the cutters when at rest and means to supply steam or air to said head for the purpose of rotating the screw or propeller while the head is being moved through the tube to be cleaned.
3. In a boiler-tube scraper, the combination of a tubular head, a screw or propeller arranged close to said head, a shaft journaled in said head adapted to be rotated by the screw or propeller, expansible cutters carried by and rotating with the said shaft consisting of a transverse arm secured to the shaft, movable arms held against centrifugal force by springs pivoted to said transverse arm, circular cutters or scrapers upon the ends of said movable arms, and means to supply a blast to said head for the purpose of rotating the screw or propeller while the head is being moved through the tube to be cleaned.
4. In a boiler-tube scraper, the combination of a tubular head, a screw or propeller arranged close to said head, a shaft journaled in said head adapted to be rotated by the screw or propeller, expansible cutters carried by and rotating with the shaft consisting of a transverse arm secured to the shaft, movable arms held against centrifugal force by springs pivoted to said transverse arm, circular

cutters or scrapers upon the ends of said movable arms, springs arranged about the outer surface of the tubular part for guiding it centrally in the tube and acting as scrapers, and means to supply blast to said head for the purpose of rotating the screw or propeller while the head is being moved through the tube to be cleaned.

5. In a boiler-tube scraper, the combination of a tubular head provided upon the outside with centralizing-springs, a vapor-pipe leading into the tubular head and terminating in jets or nozzles, a rotary shaft journaled in the head and provided with a propeller or screw adapted to be rotated by the jets of vapor, a cross-head on the end of the shaft, and spring-controlled expansible cutters carried by and with the cross-head whereby the action of centrifugal force moves the cutters outward while being rotated with the shaft and screw.

6. In a boiler-tube scraper, the combination of a longitudinally-movable head or guiding support, a tubular handle for moving the said head or support through the tube and holding it against rotation, a rotary shaft pivoted within the head or support and adapted to rotate under the action of a vapor supplied through the tubular handle, a rotary movable spring-controlled pivoted arm carried upon the forward end of the rotary shaft, and a pivoted cutter carried by the free end of the rotary arm, the parts operating in such manner that the head or support controls the longitudinal movement of the rotary cutter and the rotating shaft secures the rotary movement thereof.

7. The combination of the head A, a tubular handle B for moving the same and the nozzles or apertures M within the head, with a rotary shaft E having one or more screws or propellers D within the head and adapted to be acted upon by the steam from the nozzles or apertures, an expansible cutter carried upon the end of the shaft D and movable outwardly by centrifugal force, and a spring to hold the cutter against the action of centrifugal force.

8. The combination of the head A, a tubular handle B for moving the same and the nozzles or apertures M within the head, with a rotary shaft E having one or more screws or propellers D within the head and adapted to be acted upon by the steam from the nozzles or apertures, and an expansible cutter carried upon the end of the shaft D consisting of a transverse arm G, pivoted spring-actuated arms H, and rotary cutters I.

In testimony of which invention I have hereunto set my hand.

HENRY L. HILDRETH.

Witnesses:

EZRA J. DEMOREST,  
H. K. HOWRY.