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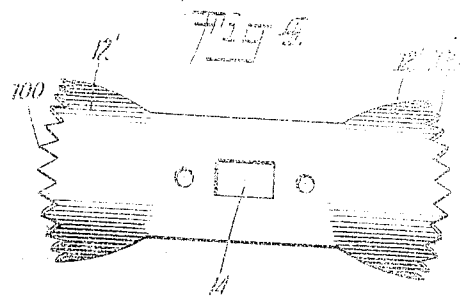
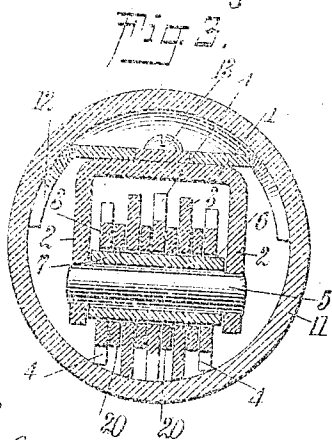
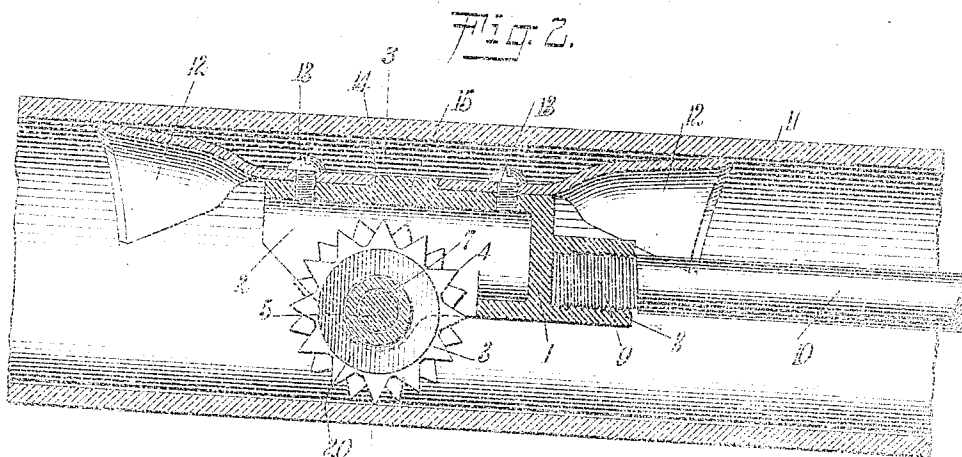
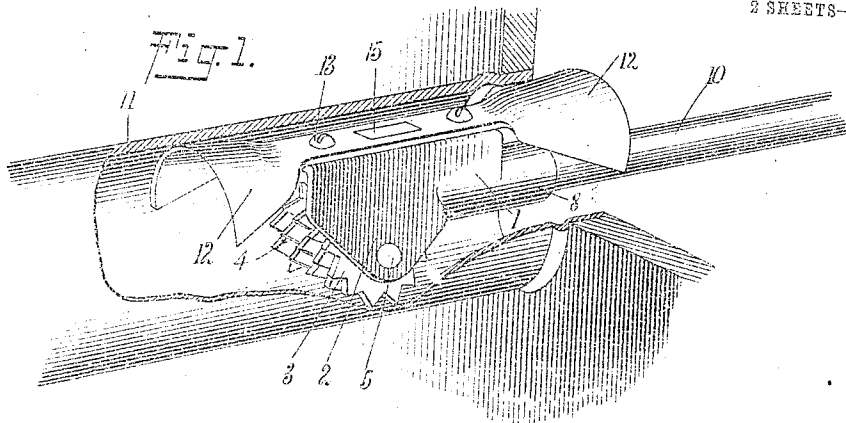
TUBE SCRAPER.

APPLICATION FILED DEC. 8, 1911.

1,042,841.

Patented Oct. 29, 1912.

2 SHEETS-SHEET 1.



WITNESSES

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L. J. Gallagher.

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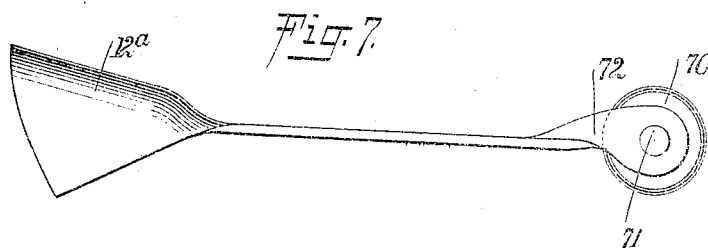
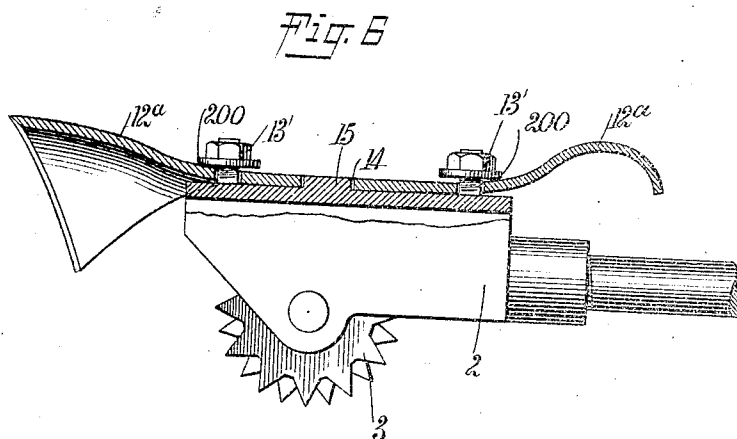
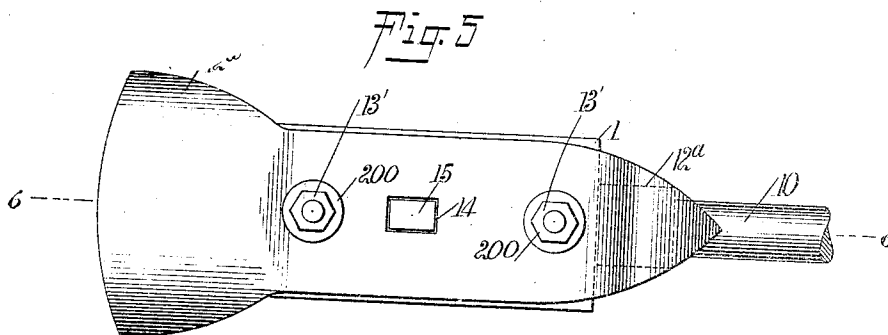
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WITNESSES  
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# UNITED STATES PATENT OFFICE.

MARTIN J. THORSEN, OF WEEHAWKEN, NEW JERSEY.

## TUBE-SCRAPER.

1,042,841.

Specification of Letters Patent.

Patented Oct. 29, 1912.

Application filed December 8, 1911. Serial No. 664,563.

*To all whom it may concern:*

Be it known that I, MARTIN J. THORSEN, a citizen of the United States, and a resident of Weehawken, in the county of Hudson and State of New Jersey, have invented a new and Improved Tube-Scraper, of which the following is a full, clear, and exact description.

My invention relates generally to boiler tube scrapers and more particularly is directed to an improved device of this class designed to more thoroughly and effectively clean such tubes in the manner designed to prevent the material scraped from the tube from becoming wedged therein and clogging the same.

The principal object of my invention is to provide a new and improved boiler tube scraper of such construction and embodying such parts that, in addition to the scraping action on the interior of the tubes whereby the material thereon is removed therefrom, the said material will be crushed or broken up into fine particles so that as the scraper is moved through the tube such material will not tend to form a mass which will obstruct the tube.

A further object of my invention is to provide a new and improved tool for cleaning and scraping boiler tubes; the tool is provided with suitable elements for scraping the deposit from the tube and with other elements for crushing the said removed deposits as well as deposits not removed so that as the device travels through the tube piling up of the removed material is avoided and clogging thereof is prevented.

Other objects and advantages of the invention will appear as the description thereof proceeds, all of which is particularly pointed out and included in the appended claims.

Reference is to be had to the accompanying drawings forming a part of this specification in which similar characters of reference denote corresponding parts in all the views, and in which—

Figure 1 is a perspective view of the tube cleaner in operative position; Fig. 2 is a vertical sectional view thereof; Fig. 3 is a sectional view on the line 3—3 of Fig. 2; Fig. 4 is a modified form of blade used in the scraper; Fig. 5 is a top plan view of a modified structure; Fig. 6 is a longitudinal sectional view thereof on the line 6—6 of Fig. 5;

Fig. 7 is a side view of a modified form of blade.

The scraper embodies a suitable body member 1 having down-turned sides 2, between which a number of wheels 3 are positioned, the periphery of each of the wheels being serrated or notched as at 4, the wheels being supported on a shaft 5 secured in each of the down-turned sides. If so desired, the wheel 3 may be provided with a central opening 6 of greater diameter than that of the shaft 5, the wheels being suitably positioned thereon by means of a sleeve 7 which incloses the shaft and extends through these openings in the wheels. The rear portion of the body member 1 is provided with an extension 8 having a threaded interior with which the threaded end 9 of a rod 10 is adapted to engage whereby the scraper may be forced through any suitable tube 11, as shown particularly in Fig. 1.

Secured on the top side of the body member 1 and extending longitudinally thereof are the blades 12, preferably formed from a single piece of material and secured to the body member in any desirable manner, preferably by means of screws 13, the intermediate portion between the blades being provided with an opening 14 which engages the projection 15 on the body member whereby the parts are held in proper relative position.

Referring particularly to Figs. 1 and 2 it will be noted that the edges of each of the blades 12 lie on curves substantially the same as the shape of the interior of the tube with which the scraper is to be used, the blades being bent, the intermediate portion of the blades, however, being flat and rigidly secured in position.

In place of the blades 12 with the continuous edges thereon, it may be desirable in some instances to provide the blade shown in Fig. 4 wherein the curved ends of the blades 12', 12' are serrated or notched, as at 100, in order to provide a structure which in some instances may be more effective in removing the deposits from the interior of the tubes. The shape of the edges, however, is not essential inasmuch as the shapes of such edges require variation in order to adapt the device to tubes of different sizes and inasmuch as the number of wheels 3 will also be varied, depending on the diameter of the tubes, such changes being matters of

detail and tend toward the more efficient performance of the functions desired.

It is to be noted that the distance from the edge of one of the blades to the outer ends of the teeth 4 on the wheels 3 is substantially equal to or sufficiently greater than the diameter of the tubes with which the device is used whereby, when the scraper is to be entered into the tube, sufficient pressure will be brought to bear between the interior thereof and the edges of the blades and the teeth of the wheels in order to insure the removal of whatever substance has been deposited therein.

In using the device, the scraper is inserted from one end thereof and is held in close engagement with the tube, the blades being sufficiently flexible to permit movement thereof in adjusting the edges to the interior; as the scraper is moved through the tube by means of the rod or handle 10, the edge of the blade 12 which is in advance of the toothed wheels 3 will scrape the interior of the tube, thereby causing the removed deposit to fall to the bottom of the tube, this deposit being broken or crushed by the action of the teeth 4 on the wheel 3. This crushing or breaking up of the deposit, in addition to placing the deposit in better condition for removal, also prevents packing of the deposit therein as the scraper is moved through, inasmuch as the wheels in their movement through the tube do not push the deposit bodily forward but engage therewith to break it up, the teeth passing through the deposit. While the toothed wheels operate as described it is also to be noted that during the initial passage of the scraper through the tube these teeth engage the deposit adjacent thereto so that, while this deposit may not be as effectively removed as by the blades, it is broken up to a certain extent, being thereby placed in better condition for complete removal by the blades.

Referring particularly to Figs. 5 and 6, the body member 1 is provided with the before-mentioned handle 10, and also the notched or serrated wheels 3, the blades 12<sup>a</sup>, however, presenting a slightly different construction. The forward blade is similar to that shown in Figs. 1 and 2, the rear blade, however, being shaped as shown particularly in Fig. 5, the curvature thereof being such that the upper portion of the blade merely rests or bears against the inside of the tube and it is not intended that such engagement is to effect the removal of any deposit therein but is simply to provide a rear bearing portion so that the device may be held within the tube. The intermediate portion between the blades is slightly curved, the purpose being that more or less adjustment of the blades is permitted by tightening the nuts 13', the resiliency of the metal holding the blades in firm engagement with

the nuts 13' or with washers 200 positioned thereunder. The projection 15 on the body member engages in an opening 14 in the intermediate portion of the blades, such engagement properly positioning the parts, the tubular shape of the blades permitting the adjustment before-mentioned as well as the resilient engagement of the parts when the device is in use.

In Fig. 7 the rear blade 12<sup>a</sup> is omitted and in its place a roller 70 is provided which is mounted on a suitable shaft 71 carried in oppositely positioned ears 72, secured to the intermediate portion having at its other end the blade 12<sup>a</sup> similar to what has been already described. This modification provides for easier movement of the device in cleaning a tube since the removal of the deposit is effected by the blade 12<sup>a</sup>, the roller 70 providing a rear bearing portion having a rolling friction only whereby the function of the notched wheels 3 and the blade 12<sup>a</sup> is more easily performed. The intermediate portion of this modification may be horizontal, as shown in Figs. 1 and 2, or may be concave, as shown in Figs. 5 and 6, the concave structure probably being more preferable inasmuch as the parts thereby adapt themselves to the size of the tube when the device is inserted therein.

The size of the different parts of the device will depend upon the size of the tube with which it is used as well as the nature of the tubes and the character of the deposits formed therein, the relative thicknesses of substances of which the parts are made being determined by the stresses to be borne by these parts, the purpose and object being to provide an improved device which will operate in an effective manner, the construction being such, however, that excessive cost of production is unnecessary.

Having thus described my invention, I claim as new, and desire to secure by Letters Patent:—

1. A tube scraper comprising a body portion, a blade secured thereto, the edge portion of one end of the blade being curved whereby it may engage the inside of a pipe or similar body, the other end of the blade being adapted for engagement with the inside of the pipe at a distance from the portion engaged by the said edge portion, together with a plurality of removable serrated wheels carried by the body member and positioned intermediate the said blade and bearing member and on the opposite side of the body portion whereby, when the device is inserted in a pipe or tube, the deposits therein may be removed and crushed.

2. A tube scraper comprising a body member, a blade carried thereby adjacent one side thereof, the edge portion of one end of the blade being curved whereby it may engage the inside of the tube or pipe, the

other end of the blade forming a bearing adapted for engagement with the inside of the tube or pipe, together with a plurality of rotatable wheels carried by the body member positioned intermediate the ends of the said blade and adapted for engagement with the pipe longitudinally thereof when the device is positioned within the pipe or tube, and means carried by the body member having a handle attached thereto.

3. A tube scraper comprising a body member, a blade at one side thereof, the edge portion of one end of the blade beyond the body member being curved whereby it may engage the inside of a tube, the other end of the blade being adapted for engagement with the inside of the tube at a distance from the place of engagement by the said curved end portion, a shaft extending trans-

versely of the body member and carried thereby, a wheel mounted on the said shaft whereby, the wheel being on the opposite side of the body member and intermediate the ends thereof when the device is inserted within a tube and moved longitudinally thereof, the said blade will remove the deposit from the inside thereof, the longitudinal travel of the wheel crushing the said deposit, thereby preventing obstruction of the tube.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MARTIN J. THORSEN.

Witnesses:

PEARL S. THORSEN,  
LAURENCE J. GALLAGHER.