

H. PONTANI.
 APPARATUS FOR REMOVING SCALE AND THE LIKE FROM BOILERS.
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1,045,742.

Patented Nov. 26, 1912.

Fig. 1

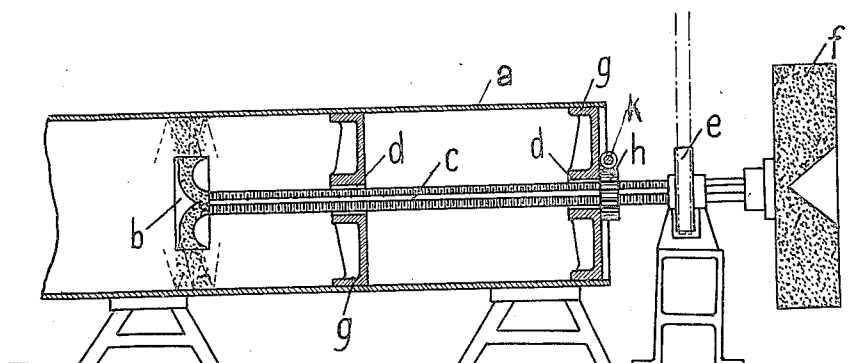
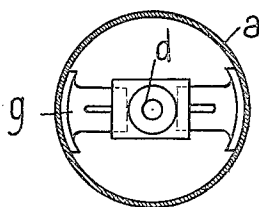


Fig. 2



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APPARATUS FOR REMOVING SCALE AND THE LIKE FROM BOILERS.

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Specification of Letters Patent.

Patented Nov. 26, 1912.

[Application filed October 18, 1911. Serial No. 655,365.]

To all whom it may concern:

Be it known that I, HEINRICH PONTANI, engineer, a citizen of the German Empire, residing at Frankfort-on-the-Main, in the Province of Hesse-Nassau and Kingdom of Prussia, Germany, have invented certain new and useful Improvements in Apparatus for Removing Scale and the Like from Boilers, of which the following is a specification.

The object of this invention is to remove from steam boilers and similar structures all dry incrustations and foreign deposits, such, for example, as boiler scale.

The cleaning of boilers manually by means of picks or hammers which break off pieces of the deposit or scale is laborious and tedious and gives unsatisfactory results, as it is impossible in this manner to remove all of the deposit and the treated surface is left with projections and depressions which facilitate fresh deposits so that the security of the boiler is seriously impaired. It has also been proposed, heretofore, to clean boiler tubes by means of a sand blast directed into the ends of the tubes, but this method is objectionable for the reason that the blast did not penetrate to the inner points of the tube so that while the ends of the tubes might be thoroughly cleaned, the inner or rear parts would frequently be left untouched without any of the deposit being removed.

My invention utilizes an abrading blast for cleaning the walls of tubes and directs the same against the surface being cleaned substantially at right angles thereto so that the full force of the blast is caused to act upon the scale which will, consequently, all be removed. Moreover, by my invention the blast is caused to travel uniformly over the entire surface to be cleaned, the rate of travel being determined by the hardness of the scale and the character of the boiler plate.

One form of mechanism adapted for the performance of my process is shown in the accompanying drawings and the invention will be hereinafter fully described with reference to the illustration, the novel features being subsequently particularly pointed out in the claims.

In the drawings, Figure 1 is a sectional elevation showing the mechanism arranged to operate upon a cylindrical locomotive boiler from which the fire-tubes have been

removed. Fig. 2 is a detail transverse section showing the manner of supporting the working parts within the tube.

In carrying out my invention, I arrange within the boiler or tube *a*, a rotary centrifugal blast nozzle *b* which is secured on the end of a tube or hollow shaft *c*. This tube *c* is mounted in bearings *d* which are secured to supports *g*, said supports being extensible by reason of the ordinary slotted construction appearing in Fig. 2 so that they may be fitted tightly within the boiler tube and bear against the walls of the same so as to furnish steady supports for the hollow shaft or blast tube *c*. The shaft or tube *c* is rotated at a high speed by a driving belt or band passing around a pulley *e* feathered on the shaft and the boiler or tube to be cleaned is supported at a slight inclination, as shown, so that the hollow shaft *c* will have its nozzle *b* lower than the hopper *f* from which the sand or other abrading material is drawn. Said material is thus caused to flow naturally and evenly to the nozzle and will also gravitate through the lower open end of the boiler cylinder. As the scale or deposit is removed, the nozzle is successively moved along the boiler to direct the blast against untreated portions of the surface, and to accomplish this result I provide a worm and screw drive, consisting of a toothed wheel or gear *h* threaded on the shaft *c*, and a worm *k*, engaging said gear *h*, so as to prevent independent rotary movement thereof, but adapted to be driven by any suitable means, such as a crank or pulley (not shown) for applying power thereto to rotate gear *h*.

In operation, the hopper *f* being filled with suitable abrading material, such as sand, broken glass, granulated slag, or the like, and the machine being set in motion, the abradant will flow through the hollow feed-shaft *c* and be thrown by centrifugal force against the interior of the tube, and the worm and screw drive being also set in motion, causing the gear *h* to revolve in the same direction as the pulley *e* (through which the shaft *c* may slide by reason of the spline and groove connection therewith), the shaft *c* will be moved longitudinally, thus moving the nozzle *b* along the interior of the tube at a speed determined by the velocity of the driving gears. If the speed of the gear *h* is less than that of the feed-pipe *c*,

the latter will screw itself into the boiler, flue or tube, or in the opposite direction, according to the direction of rotation, and the abrading blast generated within the tube
 5 will be maintained as long as the required speed of rotation of the feed-shaft is continued. If the speed of the worm-wheel or gear h is equal to that of the feed-pipe, the nozzle will remain at a given point, but will
 10 move on when the speed of the feed-pipe is increased to exceed the speed of the gear h .

In the described arrangement of mechanism for carrying out my process, the
 15 abradant material is fed through the pipe c , utilizing the suction created by centrifugal action for feeding, but I do not desire to limit my process to such means, as steam, compressed air or the like may be used in feeding.

20 The abradant penetrates all crevices and irregularities in the surface treated so that no further work on uneven parts, grooves, etc., is required. The cleaning is, therefore, accomplished rapidly and thoroughly at less
 25 cost than heretofore and without accompanying noise or exposing the workman to annoying and disease-breeding dust.

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

30 1. An apparatus for removing scale from boiler tubes or flues, comprising means for producing a blast of abrading material within the tube and impelling it centrifugally against the interior of the tube at an
 35 angle to its axis, means for feeding the blast,

and means for moving said blast in the direction of the axis of the tube.

2. Apparatus for removing scale from 40 boilers comprising a nozzle, means for supporting the nozzle within the boiler, means for feeding an abradant to the nozzle, and means for rotating the nozzle and thereby driving the abradant centrifugally against the scale.

3. Apparatus for removing scale from 45 boilers comprising a nozzle, means for supporting the nozzle within the boiler, means for effecting travel of the nozzle through the boiler, means for feeding an abradant 50 to the nozzle, and means for rotating the nozzle and thereby driving the abradant centrifugally against the scale.

4. An apparatus for removing scale from 55 boiler tubes or flues, comprising means for creating a blast of abradant material and directing said blast against the interior of the tube by centrifugal force in a direction substantially at right angles to the axis of the tube, means for moving and guiding 60 said blast longitudinally of the tube to enable the blast to act uniformly over the entire surface traversed thereby, and means for automatically feeding abradant material to said blast. 65

In testimony whereof I affix my signature, in presence of two witnesses.

HEINRICH PONTANI.

Witnesses:

FREDRICH CARL WENTZEL,
 MAX DEUTSCHER.