W. J. OMER & J. C. STULL.

BOILER SCRAPER.

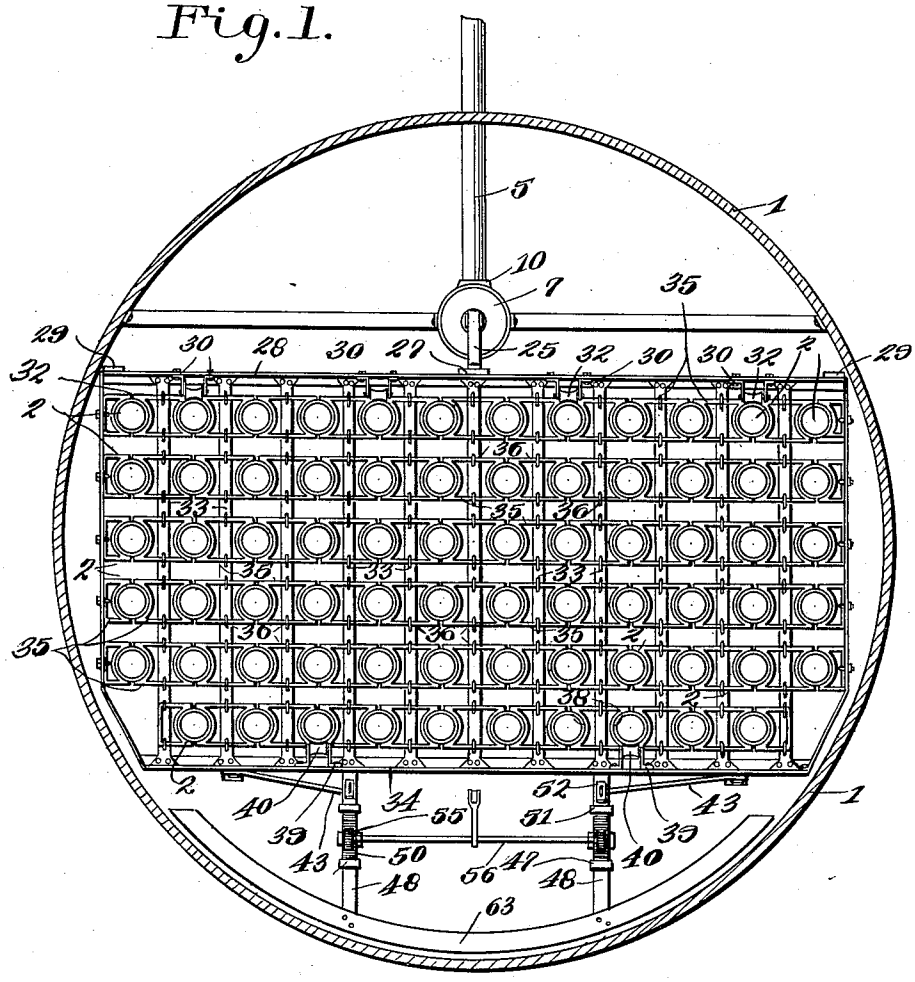
APPLICATION FILED JUNE 17, 1913.

1,095,591.

Patented May 5, 1914.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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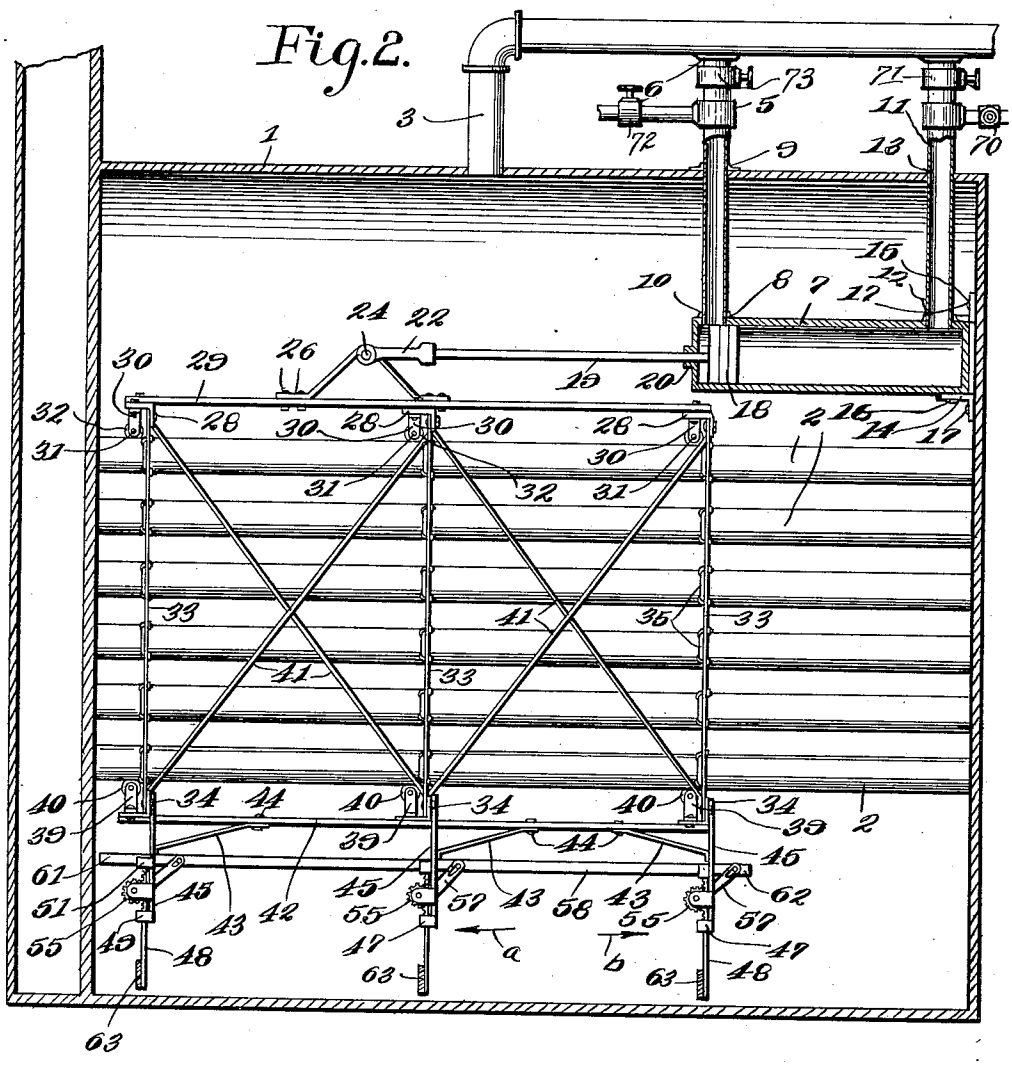
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3 SHEETS—SHEET 2.

Fig. 2.



Witnesses

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3 SHEETS—SHEET 3.

Fig. 3.

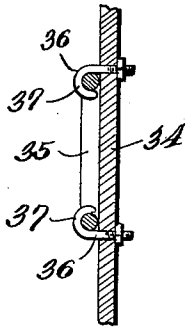


Fig. 4.

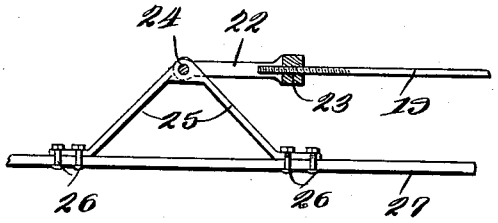


Fig. 5.

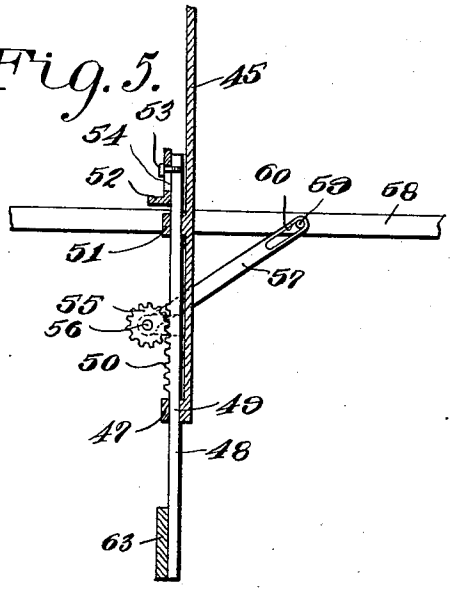
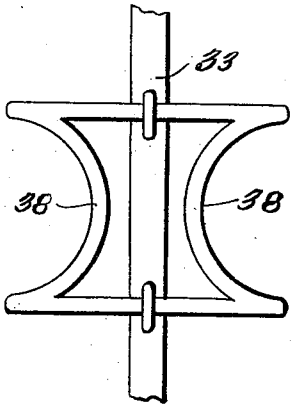


Fig. 6.



Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM J. OMER AND JAMES C. STULL, OF THOMAS, OKLAHOMA.

BOILER-SCRAPER.

1,095,591. Specification of Letters Patent. Patented May 5, 1914.

Application filed June 17, 1913. Serial No. 774,203.

To all whom it may concern:

Be it known that we, WILLIAM J. OMER and JAMES C. STULL, citizens of the United States, residing at Thomas, in the county of Custer and State of Oklahoma, have invented certain new and useful Improvements in Boiler-Scrapers, of which the following is a specification.

This invention relates to scrapers or cleaners for preventing the accumulation of scale and removing the same after it has accumulated upon the exterior of boiler tubes, condenser pipes, or similar devices.

The primary object of this invention is the provision of a scraper for removing the scale, incrustations and the like which form upon boiler tubes or flues and shells, owing to the generating of steam therein, such incrustations impairing the efficiency of the boiler.

Another object of this invention is the provision of a scraper which is mounted within the boiler and has a plurality of scraping blades which engage the outer surface of the boiler tubes or flues and which is operated by a steam cylinder also mounted within the boiler.

With the foregoing and other objects in view, this invention consists in such novel features of construction, combination and arrangement of parts as will be hereinafter more fully described, illustrated in the accompanying drawings and claimed.

In describing the invention in detail, reference will be had to the accompanying drawings wherein like characters of reference refer to corresponding parts and wherein,

Figure 1 is a cross-sectional view through a boiler, showing the improved scraper applied thereto; Fig. 2 is a central longitudinal sectional view through the boiler, also showing the scraper; Fig. 3 is a detail sectional view of a part of the scraper; Fig. 4 is a detail view showing the manner of connecting the scraper to the cylinder; Fig. 5 is a detail view of the manner of adjusting the scraping blades; and, Fig. 6 is a detail view of one of the scraping blades.

Referring more particularly to the drawings the numeral 1 designates a boiler of any ordinary construction which has a plurality of boiler tubes or flues 2 passing longitudinally therethrough for the purpose of generating steam to operate various types of steam engines, for heating purposes, or the like. The boiler 1 has the ordinary steam outlet pipe 3 connected to its upper end which passes upwardly out from the upper side of the boiler and extends to the various mechanism for which the steam is supplied as is shown in Fig. 2 of the drawings. A pipe 5 is connected to the steam outlet pipe 3 as at 6 and extends downwardly through the upper side of the boiler 1, having its lower and inner end connected to a cylinder 7 as at 8. The pipe 5 has a collar 9 mounted thereabout and adjacent the outer surface of the side of the boiler 1 so as to render the joint between the pipe 5 and the boiler fluid-tight. A collar 10 is also mounted about the lower end of the pipe 5 and contacts with the outer surface of the cylinder 7 providing a fluid-tight joint for the connection between the pipe 5 and the cylinder. The outlet pipe 11 is connected to the cylinder 7 as at 12 and extends upwardly and out through the opening 13 formed in the side of the boiler 1. In the drawings the cylinder 7 is shown securely held in its proper position in the interior of the boiler 1 by means of brackets 14 and 15 which are secured to the cylinder 7 as at 16 and to one end of the boiler as at 17.

The cylinder 7 has slidably mounted therein a piston 18 which has a piston rod 19 connected thereto. The piston 19 passes outwardly through one end of the cylinder 7 and a bearing 20 which is formed thereupon and is connected to a link or arm 22 by means of the screw threads which are formed upon its outer end and the screw-threaded aperture 23 which is formed in the end of the arm 22. The arm 22 is pivotally mounted upon a pin 24 which is carried by a triangular shaped bracket 25. The bracket 25 is rigidly secured by means of bolts 26 to a bar 27 which extends parallel

with the tubes or flues 2 of the boiler. Valves 70, 71, 72 and 73 respectively are provided to effect proper operation of the cylinder piston.

The bar 27 has a plurality of angle irons 28 connected thereto and extending laterally across the boiler. The outer ends of the angle irons 28 are connected to bars 29 which extend parallel with the bar 27 and are in the same plane. The angle irons 28 have a plurality of brackets 30 which are also constructed of angle irons secured thereto and depending therefrom. The brackets 30 have shafts 31 journaled therein upon which are rotatably mounted rollers 32. The rollers 32 have their surfaces concave so as to rest upon the tubes 2 of the boiler as is clearly shown in Fig. 1 of the drawings and to pass freely thereupon.

The angle irons 28 have a plurality of vertically extending bars 33 connected thereto and to angle bars 34 which extend along the boiler beneath the lower row of the tubes 2. The vertical bars 33 have a plurality of scraping members 35 connected thereto by means of bolts 36. The bolts 36 have their ends 37 curved so as to efficiently engage the scraping member 35 as is shown in Fig. 3 of the drawings. The scraping members have their vertical sides 38 concave, the upper and lower corners or angles meeting the opposite scraping member 35 in the center of the tube or flue on its upper and lower surface thus completely surrounding the curved sides of the tubes 2 for scraping the scale or incrustations off the same.

The angle irons 34 have a plurality of brackets 39 connected thereto which brackets carry rollers 40. The rollers 40 engage the under surface of the lowermost of the tubes 2 of the boiler and serve a purpose identical with the rollers 32. The vertical bars 33 are braced by means of cross braces 41. The angle irons 34 have bars 42 connected thereto, which bars extend parallel with the bars 29 and 27 and also the tubes 2 of the boiler and have brackets 43 connected thereto as at 44. The brackets 43 are connected to vertical rods 45, which rods are in turn connected to the angle irons 34 as at 46. The lower ends of the bars 45 have enlarged portions 47 formed thereupon, which enlarged portions have a bar 48 mounted in an opening 49 formed therein. The bars 48 have a plurality of rack teeth 50 formed upon one side thereof and intermediate their ends. The upper end of the bar 48 passes through projections 51 which are formed upon the rods 45 and is adjustably connected to bar 45 by means of a bolt 53 which extends through a slot 54 formed on one side of the bar 45.

Pinions 55 which are carried by pins 56 mesh with the rack teeth 50 which are formed upon the bars 48. The pins 56 are carried by the lower ends of bars 57 which are pivoted to a bar 58 by means of pins 59 carried by the bar 58. The pins 59 are seated in slots 60 which are formed in the bars 57 as is clearly shown in Figs. 2 and 5 of the drawings. The bars 48 have plates 63 connected to their lower ends, which plates are shaped to form an arc of a circle and are adapted to scrape the inner surface of the lower portion of the boiler 1 when the scraper carrying frame is reciprocated.

When it is desired to operate the scraping mechanism for cleansing the scale or the like off the tubes or flues of the boiler, such operation is as follows: The valves 73 and 70 being open, the piston within the cylinder will travel to the opposite end, that is, providing the said piston be in the position indicated in Fig. 2. By closing the valves 73 and 70 and opening the valves 71 and 72, the piston will travel or return to its normal position, (that indicated in the said Fig. 2) thus completing the reciprocating action desired. Although manually operated means is shown, any suitable automatic means may be utilized in the practical application of the invention. The reciprocatory movement of the piston 18 within the cylinder 7 will impart a reciprocatory movement to the frame which is composed of the various bars 27, 29, 42 and 33, and the angle irons 28 and 34 and carries the scraping members 35. When the scraper carrying frame reaches the end of its rearward stroke as is indicated by the arrow *a*, the end 61 of the bar 58 will engage the rear end of the boiler and operate the same, causing it to move in the direction of the arrow *b* and accordingly operate the pinions 55 which are carried by the bars 57. The operating of the pinions 55 will accordingly operate or move the bars 48 upwardly and cause the scraping members or plates 63 to move out of engagement with the interior of the boiler shell 1. When the scraper carrying frame has reached the end of the stroke as is indicated by the arrow *b*, the end 62 of the bar 58 will strike the front or forward end of the boiler and again operate the bar 58, causing it to operate the pinions 55 and the bars 48, thus causing the scrapers or plates 63 to move into engagement with the shell of the boiler. Thus the scrapers or plates 63 are in engagement with the shell 1 of the boiler only during the rearward motion of the scraper carrying frame. This will cause all of the scale or the like which is upon the sides of the tubes and the shell to be carried to the rear end of the boiler from whence it may be ejected in a suitable manner.

In practical fields, certain minor features of construction, combination and arrangement of parts may necessitate alterations to

which the patentee is entitled, provided such alterations are comprehended within the scope of what is claimed.

What is claimed is:—

1. The combination with a boiler, of a longitudinally reciprocal frame within said boiler, and vertically reciprocable mechanism operable upon said frame, as and for the purpose set forth.

2. The combination with a boiler, of a longitudinally reciprocable frame within said boiler, means carried by said frame engageable with the tubes of the boiler, vertically reciprocable means operable upon said frame, and scrapers carried by said means engageable with the inner wall of the boiler, as and for the purpose set forth.

3. The combination with a boiler, of a frame slidably mounted within said boiler, a plurality of scraper bars carried by the said frame, and means carried by the said frame for automatically actuating the said bars and causing the same to engage the inner wall of the boiler during the sliding movement of the said frame in one direction.

4. The combination with a boiler having a plurality of tubes extending therethrough, of a frame slidably mounted within said boiler, a plurality of scrapers carried by said frame and engaging said tubes, scraper bars depending from the said frame, and means carried by the said frame whereby the said scrapers and the said scraper bars may be actuated to prevent a scraping operation during the sliding movement of the said frame in one direction.

5. The combination with a boiler having a plurality of tubes extending therethrough, a frame slidably mounted within said boiler, scraping means carried by the said frame and disposed for engagement with the said tubes, a plurality of vertically movable scraper bars carried by the said frame, and means carried by the said frame and connected to all of the said bars for automatically forcing the latter into engagement with the interior of the boiler only during the movement of the said frame in one direction, as and for the purpose set forth.

6. The combination with a boiler, of a frame slidably mounted within said boiler, hanger bars depending from the said frame, a sliding rack bar movable vertically within each hanger bar, a scraper carried by each rack bar, an operating rod having connection with each rack bar, said bar being disposed for engagement with one end of the boiler for automatically actuating the said rack bars to engage the said scrapers with the inner wall of the boiler only during the movement of the said frame in one direction.

7. The combination with a boiler, of a frame slidably mounted within said boiler, a plurality of hanger bars carried by the said frame, a rack bar mounted for vertical movement upon each hanger bar, scrapers carried by each hanger bar, a pinion carried by each hanger bar the said pinion being disposed for engagement with the said rack bars, means connecting the said rack bars with suitable operating means for automatically actuating the said scrapers during the movement of the said frame in one direction, as and for the purpose set forth.

8. The combination with a boiler, of a frame slidably mounted within said boiler, rack bars vertically adjustable with respect to said frame, a scraper carried by each rack bar, an operating rod having connection with each rack bar, the said operating rod, during sliding movement of the said frame, adapted to engage one end of the boiler to automatically actuate the said rack bars and bring the said scrapers into engagement with the inner wall of the boiler, as and for the purpose set forth.

9. The combination with a boiler having a plurality of tubes extending therethrough, of a frame slidably mounted within said boiler, the said frame comprising a plurality of vertically extending parallel strips, a plurality of scrapers carried by each strip, the said scrapers being secured to the said strip between the tubes of the boiler, one scraper being disposed for engagement with two of the boiler tubes, and means for transmitting reciprocatory movement to the said frame, as and for the purpose set forth.

10. The combination with a boiler having a plurality of tubes extending therethrough, of a frame slidably mounted within said boiler, the said frame comprising a plurality of uniformly spaced vertically extending strips, a plurality of scrapers carried by each strip, one scraper being disposed for engagement with two of the tubes, the vertical walls of each scraper being shaped to conform to the configuration of the said tubes, and means for transmitting reciprocatory movement to the said frame, as and for the purpose set forth.

11. The combination with a boiler having a plurality of tubes extending therethrough, a frame slidably mounted within said boiler, a plurality of scrapers carried by said frame, one scraper being disposed for engagement with two of the said tubes, a sheave carried by the said frame, the said sheave being disposed for engagement with certain of the said tubes, and means for transmitting reciprocatory movement to the said frame, of a plurality of hanger bars carried by the said frame, a rack bar vertically adjustable with respect to each hanger bar, scraper bars carried by each rack bar, the said bars being shaped to conform to the configuration of the inner wall of the boiler, an operating rod having connection with each rack bar, the said operating rod adapted to extend beyond the extremities of the frame, the

said rack bar, during the reciprocation of the frame, adapted to engage the respective ends of the boiler to automatically actuate the said rack bars for raising and lowering the said scraper bars into and out of engagement with the inner wall of the boiler, as and for the purpose set forth.

12. The combination with a boiler, of a frame, means reciprocating said frame, and means operating automatically upon the frame to engage the inner wall of the boiler only during one of the reciprocating strokes of the frame.

In testimony whereof we affix our signatures in presence of two witnesses.

WILLIAM J. OMER.
JAMES C. STULL.

Witnesses:
MILO C. HUSTON,
FRANK FIALLE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."