(No Model.)

T. J. JONES.

APPARATUS FOR REMOVING SCALE, SEDIMENT, &c., FROM BOILERS.

No. 259,693. Patented June 20, 1882.

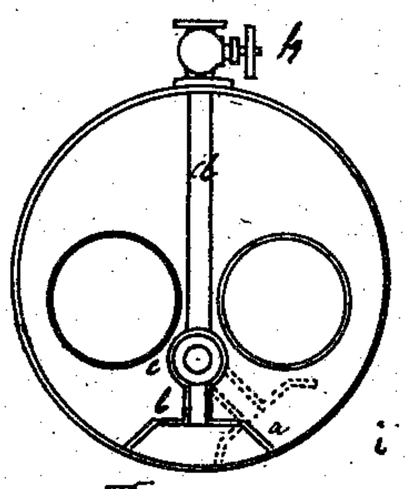

FIGURE 1

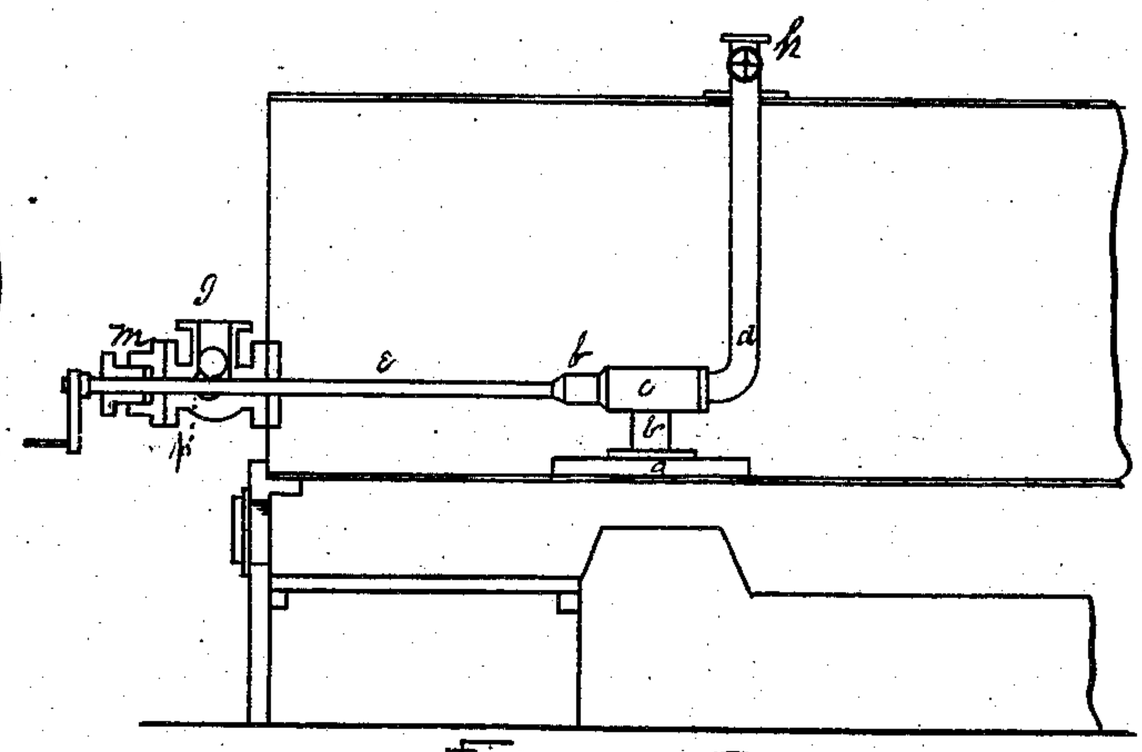

FIGURE 2

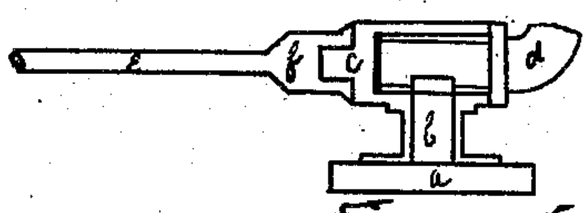

FIGURE 5

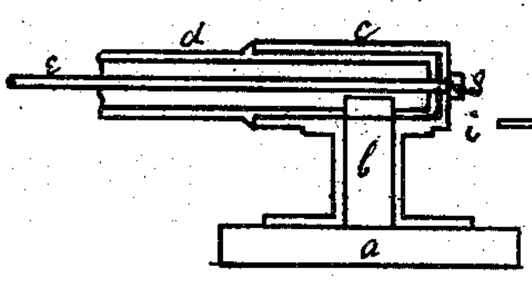

FIGURE 6

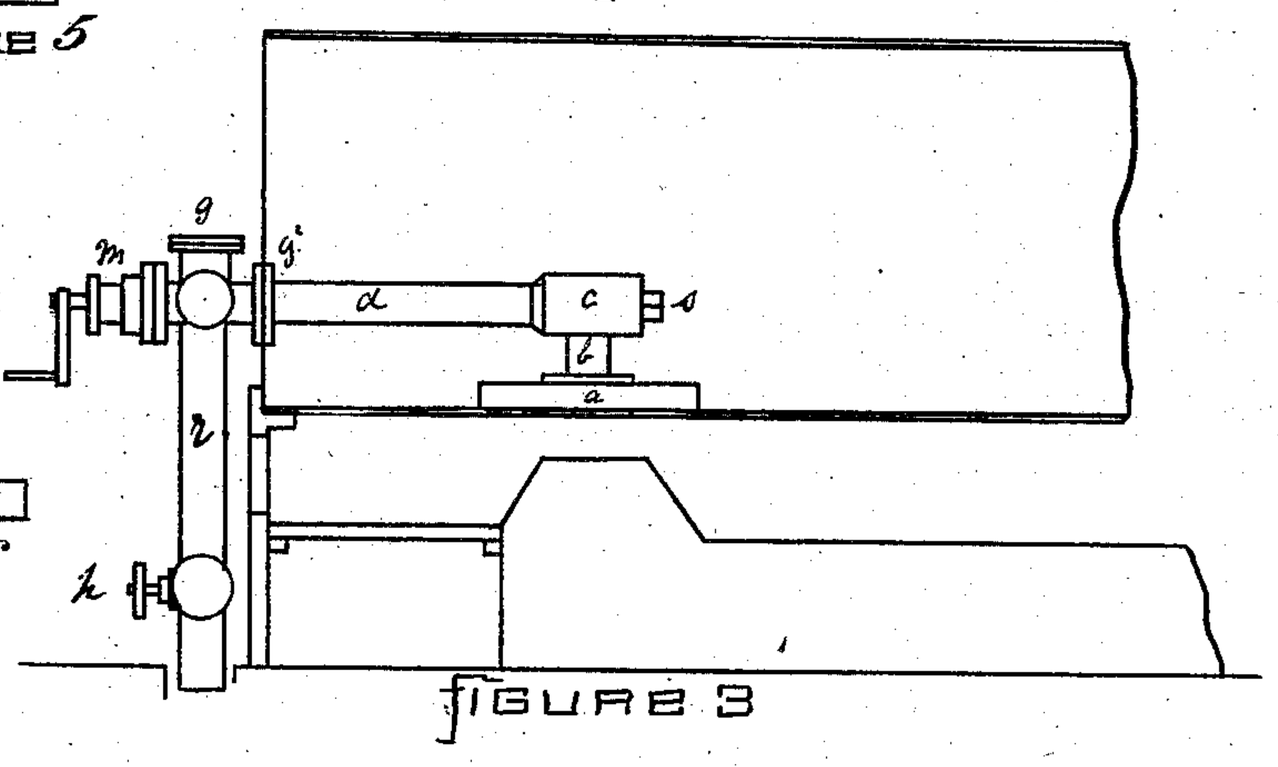

FIGURE 3

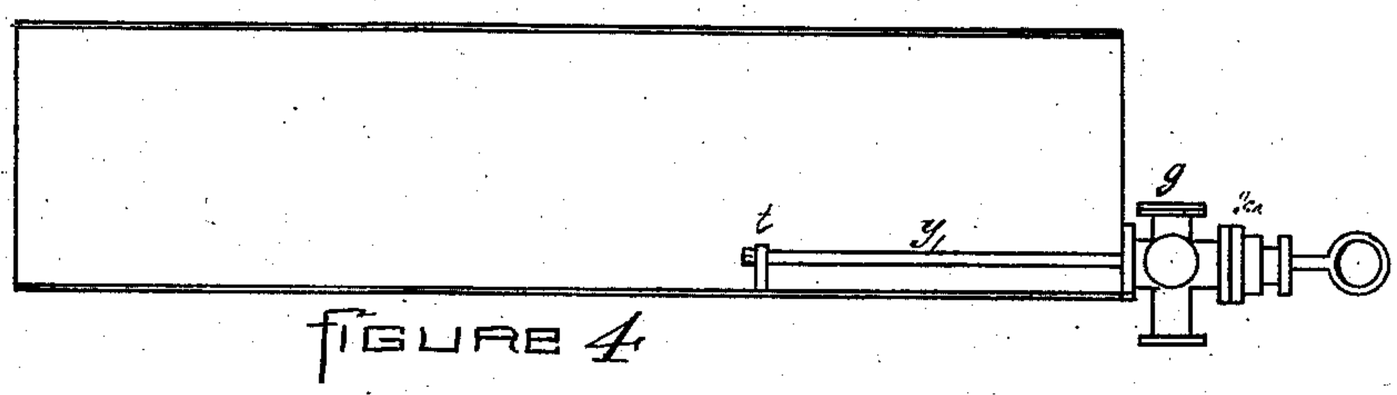

FIGURE 4

Witnesses.

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THOMAS J. JONES, OF SHARON, PENNSYLVANIA.

APPARATUS FOR REMOVING SCALE, SEDIMENT, &c., FROM BOILERS.

SPECIFICATION forming part of Letters Patent No. 259,693, dated June 20, 1882.

Application filed April 10, 1882. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. JONES, a citizen of the United States, residing at Sharon, in the county of Mercer and State of Pennsylvania, have invented a certain new and useful Improved Apparatus for Removing Scale, Sediment, and Mud from Steam-Boilers; and I do hereby declare the following to be a clear, full, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 indicates a cross-sectional view of a steam-boiler with my oscillating scraping-deflector. Fig. 2 is a longitudinal section of same, showing a front connection for operating the scraping-deflector, and a socket and ball valve so arranged as to force the mud and scale up and out of the top of the boiler. Fig. 3 is a longitudinal sectional view of a boiler with my oscillating scraping-deflector, with socket and ball valve so arranged as to blow off the mud and scale through the front head of the boiler. Fig. 4 is a view of same with one scraper and socket and ball valve. Fig. 5 is a view showing the internal construction of the sleeve and scraper shown in Fig. 2. Fig. 6 is a like view of the same parts as shown in Fig. 3.

Like letters refer to like parts where they occur.

This invention relates to an improvement on that described and claimed by me in Letters Patent No. 244,249, date of July 12, 1881, its object being the more perfect removal of the mud and scale deposited in steam-boilers by the evaporation of dirty water, and the protection of life by the use of my socket and ball valve, as I shall more fully explain hereinafter.

In the practice of vaporizing water into steam the heat developed by combustion of the fuel must pass through the shell of the boiler into the water, and as the earthy matter contained in the water does not pass off with the steam it is deposited on the bottom of the boiler as scale. Now, this scale is a non-conductor, and when permitted to accumulate to the thickness of a quarter of an inch, which is often the case, it requires the combustion of double the amount of fuel to raise the same amount of steam that it does when the scale is not present.

While my invention set forth in Letters Patent No. 244,249 is very efficient in ordinary practice, where the scale is calcareous or silicious, I find that when the scale is of an aluminous nature it sticks so tight to the bottom of the boiler that it must be loosened by means of a mechanical scraper.

In the use of mechanical scrapers it is necessary that the rod or stem to which the scraper is attached should pass out through the head of the boiler, so as to operate it while the boiler is in use. Now, in practice I find that the rod or stem sometimes breaks, and in one case where this occurred the rod was forced out and the hot water was blown out through the stuffing-box, to the peril of the life of the engineer, and the steam had to be let down in order to repair the scraper or close the stuffing-box. In order to obviate these difficulties, I have provided the scraper stem or rod with a socket and ball valve, so that in case the stem or rod should at any time be withdrawn the ball will fall into the socket, and thus close the orifice and prevent the hot water from escaping.

In the application of my improvement to a double-flued boiler, such as is used upon Ohio River steamboats, I place an oscillating deflector (having the sides bent down) over the fire-bridge sheets, such as shown in Figs. 1 and 2. The deflector *a* is about six inches wide and two feet long. The scraping-sides extend downward about one and one-half inch on each side, the ends being open. This deflector is riveted to a hollow arm, *b*, which is a part of the sleeve *c*. The sleeve *c* is supported by and oscillates around the pipe *d*, which passes into the sleeve.

The valve-rod *e* is attached to the sleeve *c* by means of a socket, *f*. The valve-rod passes out of the boiler-head through the case of the ball-valve *g*. When the engineer wishes to clean the scale from the fire-bridge plate the valve *h* is opened and the crank *i* is worked back and forward, which oscillates the sleeve *c* and causes the scrapers *a* to scrape the scale and loosen it from the boiler, and the scale and dirt will pass through an opening of the deflector into the arm *b* and into *d* and out of valve *h*. Should the valve-rod *e* break and be forced out, the ball *o* will immediately be forced into

the socket *p* and close the opening, so that no water can escape.

It will be observed that the ball *o* lies loosely upon the valve-rod, so that it closes the opening automatically the instant the rod is removed from any cause whatever.

In the application of my improvement to boilers where from any cause it will not be convenient to blow up through the top of the boilers, as shown in Figs. 1 and 2, I apply it in the manner shown in Fig. 3, in which the pipe *d* is attached to the boiler-head by the flange *q'*, and a communication is made through the head with discharge-pipe *r* and ball-valve *g*. The valve-rod *e* passes through *g* and *d*, and is fastened to the closed end of the sleeve *c* by the nut *s*. When it is desired to blow off, the valve *h* is opened and the crank *i* is worked backward and forward, which causes the sleeve *c* to oscillate and the deflector-scrapers to clean off the scale, when scale, dirt, and mud will be blown out through *b d r* and valve *h*. All of these ball-valves are provided with stuffing-boxes, as shown at *m*, so as to keep the valve-rods steam and water tight.

In the ordinary practice of double-flued boilers the arrangements shown in Figs. 1, 2, and 3 will be amply sufficient to keep the boilers clean, as I find that, owing to the fact that the hottest part of the boiler is over the fire-bridge, the current of water in the boiler centers at that point, and by keeping the bottom part of the fire-bridge sheets clean the entire sediment of the water may be deposited and removed from that locality by means of the oscillating scraping-deflectors, as shown in Figs. 1, 2 and 3.

In blast-furnace or like boilers, where a considerable length of the bottom of the boiler is to be scraped, I may use a stout rod, *y*, Fig. 4, adapted to be pushed and pulled, armed with a scraper, *t*, said rod passing through the stuffing-box and case of the ball-valve, substantially as shown.

The rod *y* may be made of any suitable length and diameter to do the work.

The advantages of my improvement are--

First. By keeping the fire-bridge sheets clean the maximum evaporation will take place at that point. Consequently the current of water in the boiler will center on those sheets and will deposit nearly all of the earthy matter there, and by blowing it out through the deflector the boilers may be thus cleaned, and not require stopping for cleaning in a year's time, while now, without my improvement, they must be stopped for cleaning once a month, and with dirty water once a week.

Second. By keeping the fire-bridge sheets clean the whole boiler is kept clean, and a great saving of fuel is effected.

Third. By keeping the boilers clean the bulging or burning of the sheets is prevented, and the cost of repairs and delay is reduced.

Fourth. By the use of my automatic valve danger to the life of the engineer is avoided should the valve or scraper rod pass out of the stuffing-box, as the ball-valve instantly closes the opening.

Fifth. The earthy matter can be thus removed from steam-boilers at much less cost than by stopping and cleaning the boilers when cold.

What I claim, and desire to secure by Letters Patent, is—

1. My improved boiler-cleaning apparatus, consisting of a blow-off pipe and an oscillating scraping-deflector, operated by a rod which passes through an automatic valve-chamber.

2. In a device for removing scale, &c., from boilers, the combination of a blow-off pipe, an oscillating sleeve mounted thereon and communicating therewith, and a deflector and scraper attached to the sleeve by a hollow arm, whereby the scale, &c., passes to the blow-off pipe from below the deflector and scraper, substantially as specified.

3. The combination of a boiler-scraper with a rod or handle which passes through an automatic valve chamber.

4. In a device for removing scale, &c., from boilers, the combination of a blow-off pipe, a sleeve adapted to rotate on the blow-off pipe and provided with a scraper, a rod for actuating the sleeve, and an automatic valve, through the case of which the actuating-rod passes, substantially as and for the purpose specified.

THOMAS J. JONES.

Witnesses:
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WALTER REESE.