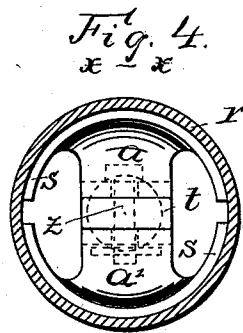
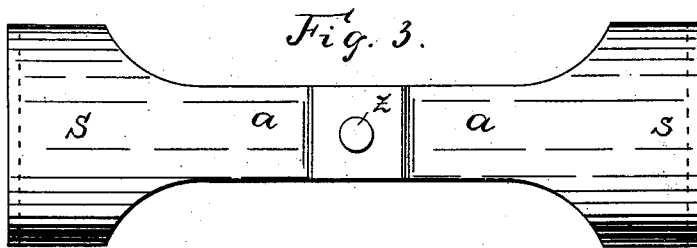
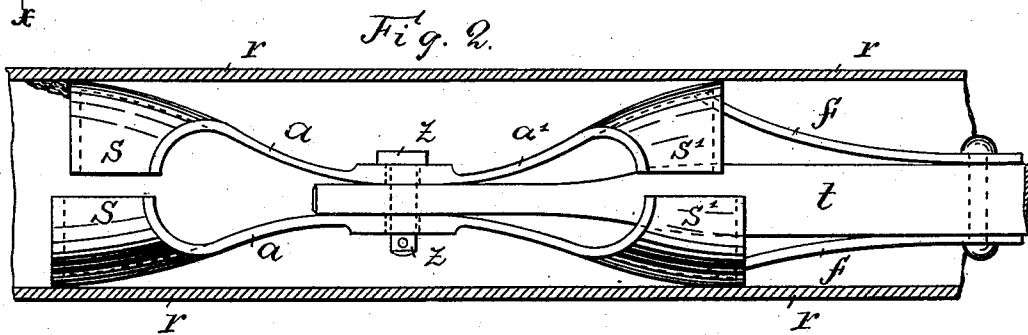
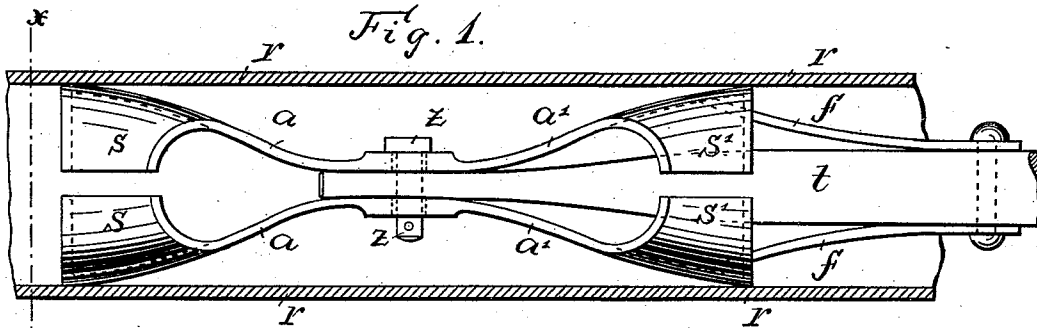


O. BORCHARDT.
BOILER TUBE SCRAPER.

Patented Mar. 1, 1892.



Witnesses:

R. Kerpich.
E. Schultze.

Inventor:
Oswald Borchardt

by
Robert Veinler
Attorney.

UNITED STATES PATENT OFFICE.

OSWALD BORCHARDT, OF KÖNIGS-WUSTERHAUSEN, ASSIGNOR TO FRANZ
PRETZEL & CO., OF BERLIN, GERMANY.

BOILER-TUBE SCRAPER.

SPECIFICATION forming part of Letters Patent No. 469,676, dated March 1, 1892.

Application filed August 25, 1891. Serial No. 403,690. (No model.) Patented in Germany January 17, 1891, No. 57,386, and
in England March 19, 1891, No. 5,054.

To all whom it may concern:

Be it known that I, OSWALD BORCHARDT, manufacturer, a subject of the King of Prussia, German Emperor, and a resident of Königs-Wusterhausen, in the Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Boiler-Tube Scrapers, (for which I have obtained a patent in Germany, No. 57,386, dated January 17, 1891, and in Great Britain, No. 5,054, dated March 19, 1891,) of which the following is a clear and exact specification.

My invention relates to a boiler-tube scraper in which two double-armed spring-levers are attached to a rod in such a manner that they may freely turn on their fulcrums, each end of both the spring-levers being provided with a sharp-edged sector, the curvature of which corresponds to the size of the boiler-tubes; and the objects of my improvements are, first, to afford easy entrance of the scraper into a tube; second, to execute the process of cleansing a tube in two stages—viz., a preliminary stage while pushing the rod forward and a final stage while drawing the rod backward—and, third, to exert a greater force at the backward movement than at the forward one. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figures 1 and 2 are elevations of the apparatus in its working position. Fig. 3 is a plan of the double-armed spring-lever. Fig. 4 is a cross-section taken on the line xx of Fig. 1. The spring-levers $a a'$, together with their sectors $s s'$, are preferably made in one piece, and both levers are fastened at their fulcrums to rod t by means of a bolt z . Two flat springs $f f$, also fixed to rod t , are arranged in such a manner that their free ends press against the inner sides of the hinder sectors or scrapers $s' s'$, which thus are moved when at rest somewhat outward. The fore scrapers $s s$ are moved a little toward each other thereby in consequence of the slight displaceability of the spring-levers on bolt z , and the distance between the centers of the outer edges of the

scrapers $s s$ becomes a shorter one than the inner diameter of the tube r , thus allowing free and easy entrance of the fore scrapers into the tube.

After the fore-scrapers $s s$ are put into the tube the outer and inclined surfaces of the hinder scrapers $s' s'$ push against the inner rim or edge of the tube, and by pushing the rod farther the hinder scrapers are moved one toward the other, while at the same time the distance between the fore scrapers is increased. The fore scrapers are thus slightly pressed against the inner surface of the tube, while the aft scrapers are pressed against the tube with considerably greater force, there acting on the aft scrapers, the springs a' , as well as the springs f . Thus when pushing the rod t forward preliminary cleaning is effected by the fore scrapers $s s$, while, when drawing the rod backward, complete and final cleaning is effected by the aft scrapers $s' s'$.

The spring-levers not only cause the pressure of the scrapers against the tube, but also prevent the scrapers very effectively from break in case of very hard pieces being in the way. In Fig. 2 the upper fore scraper is shown to meet a very hard piece and rod t is to be seen displaced now sidewise out of the axial line of tube r . This pliability of the scrapers, as well as the rod, by aid of the springs is of essential importance.

I claim—

The combination of the double-armed spring-levers $a a'$, having at their ends the fore scrapers $s s$ and aft scrapers $s' s'$, respectively, with rod t and springs $f f$, tending to drive apart the aft scrapers $s' s'$, both the fore scrapers and the aft scrapers being freely movable toward and from each other, for the purpose as described.

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

OSWALD BORCHARDT.

Witnesses:

E. SCHULTZE,
R. HERPICH.