W. SCHILOW.

TUBE CLEANER.

APPLICATION FILED MAY 11, 1909.

1,044,920. Patented Nov. 19, 1912.

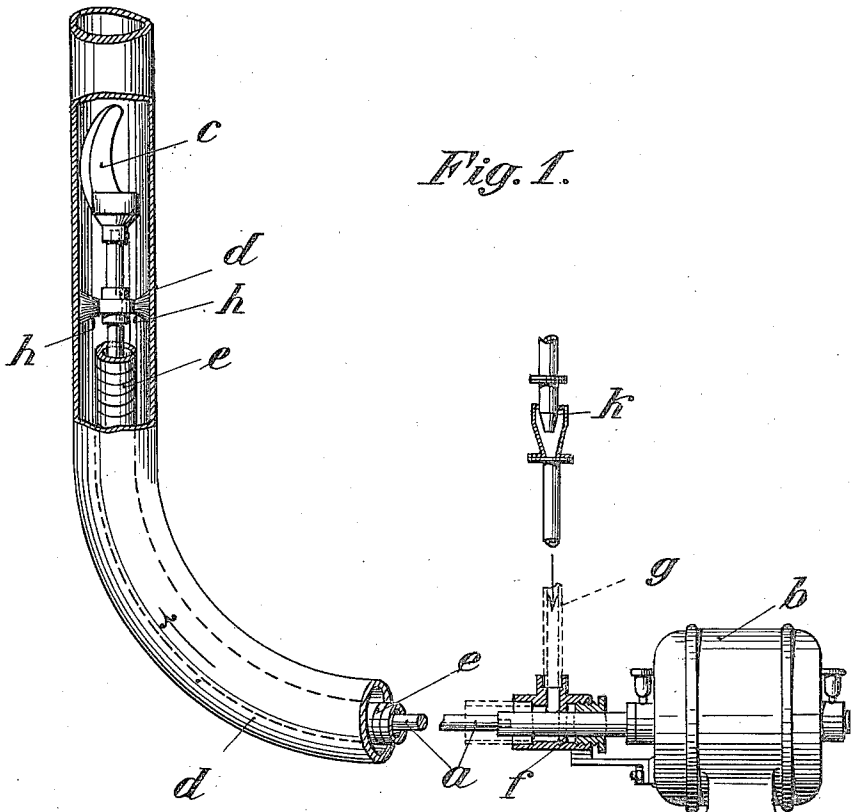
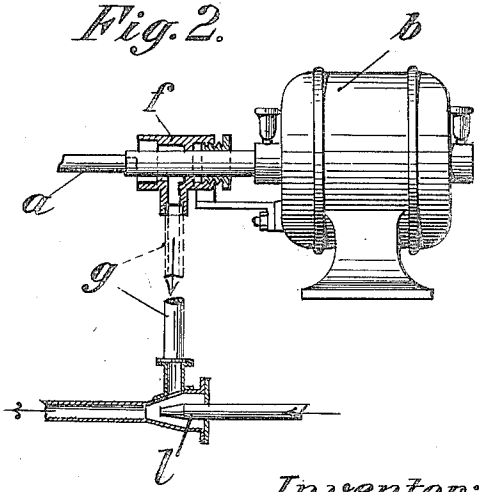


Fig. 1.

Fig. 2.



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UNITED STATES PATENT OFFICE.

WASSILY SCHILOW, OF LIBAU, RUSSIA.

TUBE-CLEANER.

1,044,920. Specification of Letters Patent. Patented Nov. 19, 1912.

Application filed May 11, 1909. Serial No. 495,308.

To all whom it may concern:

Be it known that I, WASSILY SCHILOW, colonel, a subject of the Emperor of Russia, residing at Libau, Russia, have invented new and useful Improvements in Tube-Cleaners, of which the following is a specification.

My invention relates to improvements in apparatus for removing the scale or incrustation, etc., from the interior of boiler-tubes, and the like.

According to my invention the flexible shaft which operates the cleaning tool, or tools, is encompassed by a flexible pipe, whose office it is either to supply a pressure-agent for conveying the loosened sediment and dirt to the end of the tube, or to remove the dust, etc., by suction.

One form of construction of the invention is illustrated in the accompanying drawings, Figure 1 of which is an elevation and part sectional view. Fig. 2 is a detail view, showing an alternative form of Fig. 1, in which the loosened sediment and dirt are removed by suction.

Referring to Fig. 1 of the accompanying drawings, the one end of the flexible shaft *a* is connected to a motor *b* or other suitable source of power, while the opposite, free end carries the tool, or tools, which when actuated by the shaft effectively remove the deposits from the inner wall of the tube *d*. If the matter to be removed is scale it may be removed for instance by a tool such as the scraper *c*, fixed to the extremity of the shaft *a* and exerting a percussive action.

The flexible shaft *a* is loosely surrounded by a flexible pipe *e*, whose end which is adjacent to the motor is connected to a tubular T-piece *f*, the one branch of which communicates with a reservoir containing a pressure-agent, or with a force- or suction-pump. The T piece is rigidly connected with the casing of the motor *b*, in any suitable manner, so that only the shaft *a* can rotate, while the flexible pipe *e* remains stationary.

For the purpose of removing incrustation, etc. from a boiler tube, the flexible pipe *e* is grasped and the scraper *c* introduced into the front part of the tube *d* and gradually advanced by hand, whereby owing to the rotary and percussive action all sediment and dirt will be scraped off. Simultaneously the pressure-agent will be allowed to enter through the pipe *g* which leads into the tubular piece *f* and flowing along the space between the flexible pipe *e* and the rotating shaft *a* it will enter the tube *d* and in rushing through it will drive the loosened particles of sediment and dirt to the farther end of this tube.

To enable the larger pieces of scale, which might possibly not be entrained by the pressure-agent, to be likewise effectually removed, a radially directed brush *h* may advantageously be fixed on the shaft *a*, before the tool *c* is secured to the extremity of the latter. The brush serves to remove any portion of the scale left by the scraper or like tool, so that the interior wall of the tube is thoroughly cleaned.

The scraper may be of any desired form, depending upon the nature of the tube to be cleaned. It may be of composite construction, if desired, and for instance of chisel-shape.

If merely loose particles of dust have to be removed, the front tool can naturally be dispensed with, only the brush *h* being employed. Should, on the other hand, a particularly clean surface be required, the brush may be withdrawn, wound around with felt and again introduced into the tube in the manner described, whereby the desired effect will be produced.

In view of the flexibility of the shaft *a* and pipe *e* not merely straight tubes but also bent ones may be readily cleaned. Instead of the flexible shaft being driven by an electric motor, as shown in the drawings, a compressed air or hydraulic motor may be employed, or the shaft may be coupled with a steam turbine.

The pressure-agent employed for expelling the dirt from the tube may be any desired, such as compressed air, or some pressure-liquid or steam either alone or mixed with air.

If a mixture of steam and air is blown through the tube, the pipe *g* must be provided with an injector having a suitable nozzle-piece *k* as shown in Fig. 1.

In the case of boilers with large water-space, the air in the tubes is liable to get particularly dusty. In such case it is preferable to remove the dust by suction through the pipe *e* by means of an injector *l* as shown in Fig. 2.

Having thus described my invention, I claim as new:

A tube cleaner, comprising, in combina-

tion, a flexible shaft, a cleaning tool on one end thereof, means for rotating said shaft, a packed pipe loosely surrounding the shaft and means for conveying pressure fluid to the interior of said pipe at the end thereof remote from the tool, said pipe having a discharge opening adjacent said cleaning tool.

In witness whereof I have hereunto signed my name this 21st day of April, 1909, in the presence of two subscribing witnesses.

WASSILY SCHILOW.

Witnesses:

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