Jan. 16, 1923.

1,442,670.

H. KÖRNER.

TOOL FOR CLEANING THE INTERIOR OF TUBES.

FILED SEPT. 1, 1921.

Fig. 4.

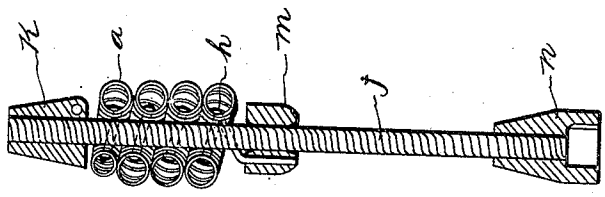


Fig. 3.

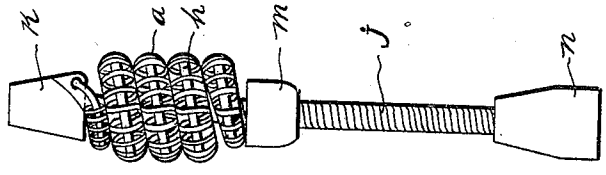
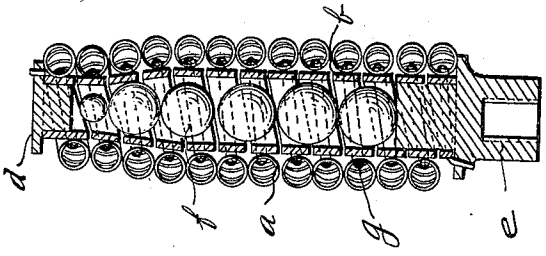


Fig. 2.



Fig. 1.



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UNITED STATES PATENT OFFICE.

HEINRICH KÖRNER, OF BRESLAU, GERMANY.

TOOL FOR CLEANING THE INTERIOR OF TUBES.

Application filed September 1, 1921. Serial No. 497,735.

To all whom it may concern:

Be it known that I, HEINRICH KÖRNER, a citizen of German Republic, residing at Breslau, in the Republic of Germany, have invented certain new and useful Improvements in Tools for Cleaning the Interior of Tubes (for which I have filed applications in Germany on November 20, 1915, and July 10, 1918), of which the following is a specification.

This invention relates to a tool intended in general for cleaning the interior of tubes, and in particular for cleaning and smoothing the interior of curved tubes, for instance such as employed in certain types of water-tube boilers.

The gist of the invention consists in the feature that the known elastic scraping-spring which is wound like the threads of a screw is coiled around a carrier or holder that also is elastic, the arrangement being such that the tool in its entirety forms a completely elastic body which adapts itself to all curvatures and undulations of the tubes however short the radius may be. Rotation of this elastic tool may be effected by the mediation of a flexible shaft driven by any suitable motive power.

The carrier or holder of the tool may consist, for instance, of a strong india-rubber core, or, still better, of a single or multiple spring around which the scraping-spring is wound. To fasten this latter to the carrier or holder a wire may be drawn through its core space and be connected with the carrier or holder.

To obtain a certain mass of the tool in order to be able to exert such a scraping force as is suited to the purpose, the carrier or holder may be hollow and this space may be filled up with solid bodies, such as balls or their equivalents, whereby the action of the tool is rendered quieter and more uniform without any decrease of the tool's elasticity.

In order to make my invention more clear, I refer to the accompanying drawing which shows, by way of example, two forms of construction of the improved tool and in which Figure 1 is a longitudinal section through the one form of construction; Figure 2 shows a portion of the working spring; Figure 3 is a side-view of the other form of construction; and Figure 4 is a longitudinal section through the same.

Referring to Figures 1 and 2, a is the scraping spring proper and b is an inner spring located within the windings of the outer spring a and forming the carrier or holder for it. The windings of the spring a correspond, in the case in question, to those of the spring b, and the two springs are connected with each other by a wire g extending through the windings of the spiral a and lying closely to, and tightly around, the windings of the spiral b. The ends of this latter are closed by members e and d, of which member e serves also for connection with a flexible shaft (not shown). The core-space of the spiral b is filled up with balls f extending from the connection member e to the closing member d. These parts d and e may be affixed to the spiral b by welding, soldering, or the like.

Although, in the form of construction here dealt with the windings of the spirals a and b run in the same sense, still, this is not indispensably requisite; they may run in opposite directions and any one of them may be right-handed, whereas the other may be left-handed. In any case the length and diameter of the spirals, as well as their pitch, depends upon the circumstances, such as the inner diameter of the tubes to be cleaned or scraped out, the stress which the parts are to be exposed to, and the like, and also connecting the various parts with each other may and must be chosen in conformity with the requirements of the case. The tool may be cylindrical or conical. Owing to the scraping member being spiral, the tool advances automatically within the tube to be cleaned.

In the form of construction illustrated in Figures 3 and 4 the scraping spiral a is held in proper position by an inner wire-spiral h, one end of which is secured to a head k affixed to the free end of a flexible shaft j having a coupling member n at its other end. The other end of the wire-spiral h is connected with a sleeve m that may be displaced along the shaft j. The scraping spiral a may, thus, give way in longitudinal direction when being advanced into a tube, or if advancing itself owing to its threads.

Having thus fully described my invention, what I desire to secure by Letters Patent is:—

1. A tool for cleaning the interior of tubes, comprising, in combination: a cleaning member, a hollow yielding holder for it,

and solid bodies arranged in said holder said cleaning member being wound around said holder.

2. A tool for cleaning the interior of tubes, comprising, in combination: a spirally wound scraping spring, a hollow yielding holder for it; and balls filling up the space within said holder; said spring being wound around said holder, substantially as described.

3. In a cleaning tool, a spirally wound hollow core, a spirally wound cleaning member wrapped around said core, a wire extending through the convolutions of the cleaning member and having its ends connected to the core, and balls filling said hollow core.

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

HEINRICH KÖRNER.

Witnesses:
EMIL STEIN,
A. POHL.