

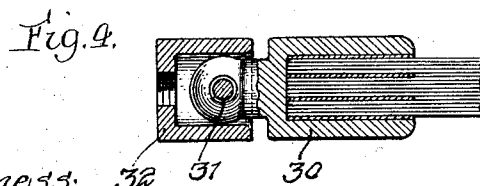
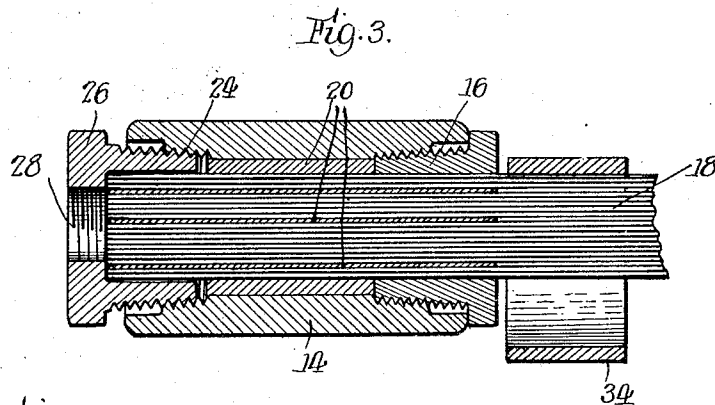
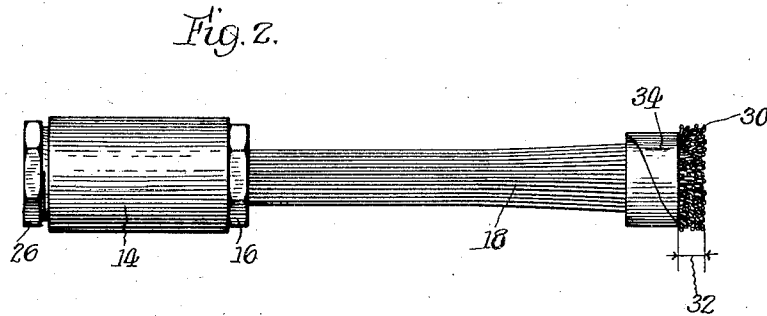
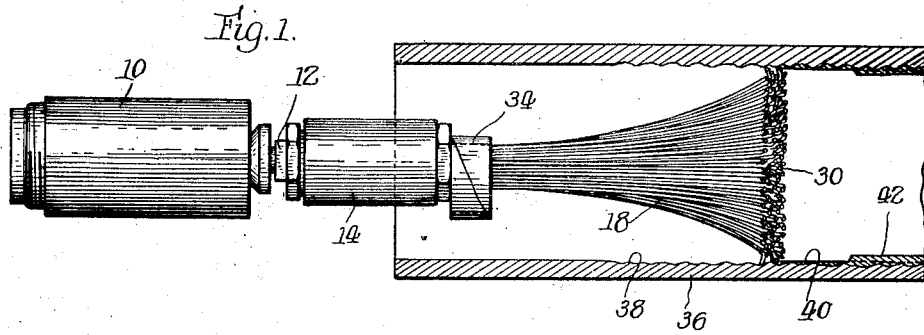
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C. H. STUBBS

1,593,044

TUBE CLEANER

Filed August 18, 1924



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UNITED STATES PATENT OFFICE.

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TUBE CLEANER.

Application filed August 18, 1924. Serial No. 732,595.

My invention relates to the art of cleaning tubes and the like, and more specifically to an improved tool for removing surface formation, deposits and incrustations or scale from the inside of boiler tubes, and for analogous work.

The object of my invention is to provide a tool which will clean the inside of a tube to naked metal surface, especially cleaning out all pits or indentations in the inner surface of the tube.

In the accompanying drawing,

Fig. 1 is a side elevation of a tool, according to the invention, in use;

Fig. 2 is a side elevation of the tool ready to insert into a tube;

Fig. 3 is an enlarged central section through the butt of the tool; and

Fig. 4 is a central section showing a modification.

The embodiment of the invention selected for illustration has been shown as driven by a turbine motor 10 of the usual or any preferred construction well known to the art. These motors have a terminal drive element shouldered at 12, with a threaded portion projecting beyond the same. The tool comprises a nipple 14, which is of standard or stock design and dimensions, with the wide mouthed sleeve 16 threaded into one end, and a large number of metallic wires 18 formed into a compact bundle filling sleeve 16 and the body of nipple 14. Temporarily employing a suitable dummy plug to close the left end of the nipple, the space within the nipple and around the wires is filled solid with a matrix 20 of solder or similar material, as shown in Fig. 3. In this the wires 18 are thus firmly embedded and held, and sleeve 16 and nipple 14 are united with the butts of the wires rigidly and permanently. The wires may extend through at the butt beyond the matrix, as shown.

Removal of the dummy plug leaves the threads at 24 available for the reception of a drive plug 26 threaded at 28 to receive the terminal drive element of the motor 10. As this plug is readily removable from nipple 14, it is easy to accommodate any design of motor 10 by providing a few extra plugs 26, each having threads 28 machined to fit the terminal of a particular brand of motor.

The outer ends of the wires are turned

at right angles radially outward at 30 to form short fingers adapted to scrape over the inside of a tube. These outwardly turned points or hooks are preferably not formed all in exactly the same plane, but by having some of the wires slightly longer than others, these points may be made to form a brush having a substantial axial dimension as clearly indicated at 32 in Fig. 2. The wires may be set to tend to flare outwardly so that the fingers are, in effect, spring pressed outwardly to exert pressure on the inside of the tube. In any event, when the brush is revolved by the motor 10, or by a motor at a distance connected therewith by flexible shafting, centrifugal force throws the scraping fingers outwardly. The revolving action may be accompanied by a back and forth action effected by hand.

A simple metal ring 34 lies loose around the wires 18 just in front of sleeve 16 when the device is in use, and may be slid down against the outturned ends as shown in Fig. 2, to bring the ends together and facilitate inserting them into a tube to be cleaned.

Fig. 4 shows a closed end nipple, in which the wires 18 are lodged, the closed end being provided with a pivot joint 31 to connect it with the drive plug 32, which, of course, is analogous to drive plug 26. The inclusion of such a joint facilitates entry of the brush into the less accessible tubes.

According to the invention, the tube, with an accumulation as indicated at 42, is preferably first cleaned with the heavier milled head cleaners well known in the art. These cleaners operate by a milling or reaming action, rather than by a scraping action, and while they remove the accumulation within the geometrical limits of a true cylinder, they do not accommodate themselves to the actual inner surface of the tube, nor do they reach into pits or other irregularities in the metal. Thus, tube 36 is shown back of brush 18 with the irregular pock marked surface 38 entirely clean, whereas the surface left by a milling or reaming tube cleaner alone will be in effect as indicated at 40.

I claim:—

1. In a tube cleaner, in combination, a nipple of standard design with both ends threaded, a drive plug in one end of said nipple, a scraping brush comprising a plurality of wires extending axially out of said

- nipple, the ends of said wires being turned radially outward to form scraping fingers, said wire ends being staggered axially to define a belt or zone of scraping points, the 5 butts of said wires lying in said nipple, a matrix uniting said wire butts and nipple, a sleeve plug in the brush end of said nipple, said sleeve plug closely fitting the wires and being soldered to them and to the nipple.
- 10 2. In a tube cleaner, in combination, a nipple of standard design with both ends threaded, a removable drive plug in one end of said nipple, a scraping brush comprising a plurality of wires extending axially out of 15 said nipple, the ends of said wires being turned radially outward to form scraping fingers, said wire ends being staggered axially to define a belt or zone of scraping points, the butts of said wires lying in said 20 nipple, a solder matrix uniting said wire butts and nipple, said matrix leaving a clearance for said drive plug, a sleeve plug in the brush end of said nipple, said sleeve plug closely fitting the wires and being soldered to them and to the nipple.
- 25 3. In a tube cleaner, in combination, a nipple of standard design with both ends threaded, a removable drive plug in one end of said nipple, a scraping brush comprising a plurality of wires extending axi- 30 prising a plurality of wires extending axially out of said nipple, the ends of said wires being turned radially outward to form scraping fingers, said wire ends being staggered axially to define a belt or zone of 35 scraping points, the butts of said wires lying in said nipple, a solder matrix uniting said wire butts and nipple, said matrix leaving a clearance for said drive plug, a sleeve plug in the brush end of said nipple, said sleeve plug closely fitting the wires and being 40 soldered to them and to the nipple, and a squeezer ring encircling said wires to slide down and draw the ends together when inserting the tool in the tube.
4. In a tube cleaner, a housing member, a 45 drive element associated with one end of the said member, a scraping brush comprising a plurality of wires extending out of the other end of the housing member, the outer 50 ends of the said wires being turned radially outward to form scraping elements, the other ends of the said wires lying in the said housing member, a member associated with the brush end of the housing member and closely surrounding the wires, said mem- 55 ber serving to position said wires, and means for securing the wires to the housing member.
5. In combination, a nipple, a drive plug associated with one end of the nipple, a 60 second plug associated with the other end of the nipple, a scraping brush comprising a plurality of wires extending from the nipple through and out the said second plug, the outer ends of the said wires being turned 65 radially outward to form scraping elements, said scraping elements being staggered to define a scraping surface, and means associated with the nipple for retaining the inner ends or butts of the said wires in the 70 nipple.
- In witness whereof, I hereunto subscribe my name this 11th day of August, 1924.
- CHARLES H. STUBBS.