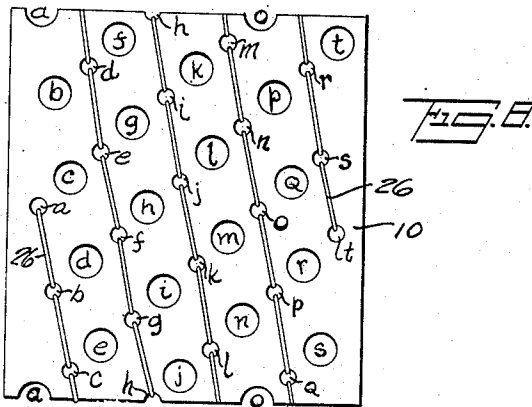
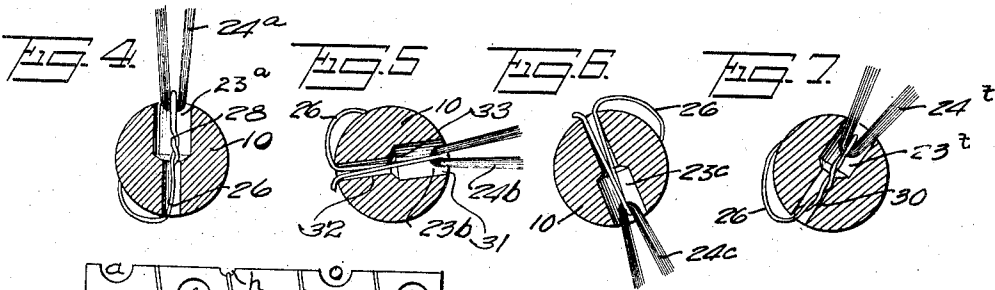
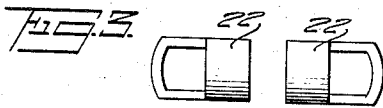
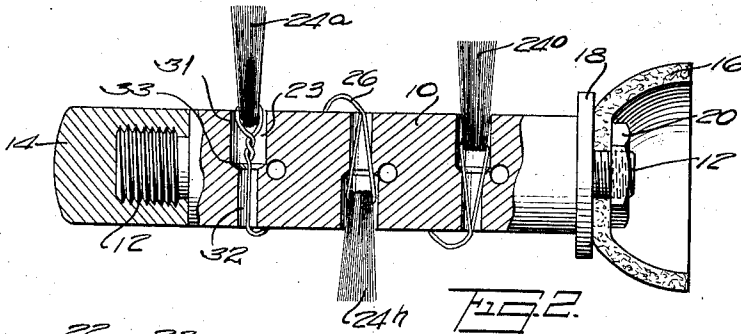
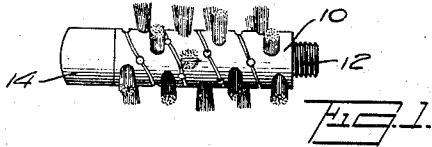


Sept. 7, 1926.

1,598,771

C. C. GERHARDT  
BOILER TUBE CLEANING BRUSH  
Filed March 24, 1926



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# UNITED STATES PATENT OFFICE.

CHARLES C. GERHARDT, OF NEW YORK, N. Y.

BOILER-TUBE-CLEANING BRUSH.

Application filed March 24, 1926. Serial No. 97,063.

This invention relates to a new and improved boiler tube cleaner.

Heretofore, as is well known, great difficulty has been experienced in effectively cleaning boiler tubes of the smaller diameters; in fact, the usual method has been to employ a twisted wire brush rendering the operation tedious, uncertain in action and costly.

For larger tubes than those above specified, the cleaning has been satisfactorily taken care of by the employment and use of hollow-cored wire brushes, but unfortunately the construction of such brushes is such that they cannot be made in sizes small enough to permit them to be utilized in the cleaning of the smaller tubes above referred to.

Now the main object of the present invention is to make a brush of the type already used in the cleaning of large tubes, modifying its structure in such manner as to enable it to be effectively used for cleaning boiler tubes of small diameters and so replace the slow and ineffective twisted wire brush method hitherto employed.

With the above and other objects in view, the invention will now be described with reference to the accompanying drawings, in which:—

Figure 1 is a plan view of a brush constructed according to the present invention;

Fig. 2 is a central sectional view through the brush;

Fig. 3 is a plan view of a detail;

Figs. 4 to 7 are transverse sections showing the disposition of various sockets; and,

Fig. 8 is a plan view of the solid core of the brush flattened out to show the disposition of the various sockets therein.

As will be seen from the various figures of the drawings, the brush according to this invention consists of a central solid preferably cylindrical body portion 10 of metal, at each end of which are provided integral screw-threaded portions 12 of reduced diameter, one of which is adapted to receive a cap 14 as shown in Fig. 1, when the brush is to be used in connection with a rotating flexible shaft, one end of which shaft would of course be secured to the threaded portion 12 at the other end of the brush.

When the brush is to be used with compressed air as the propelling force one threaded portion 12 is provided with a cap 14 and the other with a cupped washer 16

held in place between a washer 18 and nut 20 as shown in Fig. 2. Should it be desired to use the brush in connection with what is known as "the pull-through" method, then the threaded portions 12 would be provided with the end pieces or caps 22 shown in Figure 3 to which can be attached the desired pull-throughs. When the brush is used with a flexible shaft as above described, and it shows signs of wear in one direction the cap 14 and shaft can be readily reversed as to position on the brush as will be understood.

The circular solid body portion 10 of the brush is bored to provide a plurality of sockets 23<sup>a</sup> to 23<sup>t</sup> adapted to receive tufts 24<sup>a</sup> to 24<sup>t</sup> of wire. Of course the number of sockets and tufts employed may be varied as may be found convenient or necessary.

Each of said sockets, as shown, extends transversely of the body 10 of the brush, and comprises an enlarged bore 31, adapted to receive and house the inner portion of a tuft of wire, and a reduced bore 32 of smaller diameter through which the tuft retaining means, preferably a length of wire, is passed. The difference in the diameters of the bores 31 and 32 produces a shoulder or abutment 33 between the bores which serves as a seat against which the tuft firmly rests when the latter is pulled into position by the retaining wire. The shoulder 33 positively limits inward movement of the tufts.

The said sockets are bored in rows spirally disposed longitudinally of the body portion 10 (see Fig. 8).

Figs. 4 to 7 inclusive are views taken transversely of the body 10 showing the disposition of the first three and last of the sockets bored therethrough and from these figures can also be seen the method employed in securing the tufts of wire in place, each of the tufts being formed, as will be clear from the drawings, from a plurality of lengths of wire doubled in half.

To refer first of all therefore to Fig. 4 a tuft 24<sup>a</sup> is taken and about its doubled end is secured one end of a length of wire 26, this being accomplished by bending the wire back upon itself and twisting such end round the body of the wire as shown at 28. The other end of said wire is then threaded through the first socket 23<sup>a</sup> and pulled tight until the tuft 24<sup>a</sup> is pulled firmly against the

abutment or shoulder 33. This other end of the wire 26 is then carried round the circumference of the body 10 and threaded into the smaller end of the next socket 23<sup>b</sup> (Fig. 5), out through the larger end thereof, doubled back upon itself over the doubled end of the next tuft 24<sup>b</sup>, back through said socket again, pulled tight to draw the tuft 24<sup>b</sup> firmly into place and is then carried further round the circumference of the body 10 where it is threaded into the smaller end of the next socket 24<sup>c</sup> (Fig. 6) and the operations explained in connection with socket 23<sup>b</sup> repeated in order to secure the tuft 24<sup>c</sup> into its socket 23<sup>c</sup>, and so on, until all of the sockets have been provided with tufts, the last tuft 24<sup>i</sup> being secured in place by passing the wire through the smaller end of the last socket 23<sup>i</sup>, out through the larger end thereof, doubling it upon itself over the doubled end of the last tuft, passing it back through the socket again and then finally twisting it upon itself as shown at 30 in Fig. 7.

This peculiar arrangement of sockets and tufts and the system of wiring the latter in place in the former have been achieved only after considerable difficulty and numerous experiments; it will be noted that no two tufts are diametrically opposed in the same transverse plane of the body 10 and this is essential in order to permit of the latter being made small enough to permit the brush to be used in tubes of small diameter. The enlarged retaining bore 31 terminates substantially at the major longitudinal axis of the body of the brush. This arrangement permits the bores and tufts to be positioned in slightly overlapping relation so that the maximum number of convolutions is possible for a definite length of handle. It will be clear that if the tufts extended entirely through the handle or even just slightly beyond the major axis of the handle, the tufts would necessarily have to be spaced sufficient distance to afford clearance between adjacent tufts, and consequently the brush would contain fewer tufts than is possible with my construction. Furthermore, the wiring is simple, being straight through and back through each socket, and then round the periphery of the body for a short distance to the next socket, there being no turning or bending of the wire within the said body. This arrangement permits of readily providing a worn out brush with a new set of wire tufts, thus reducing upkeep to a minimum.

In practice brushes constructed according to the present invention have proved an instantaneous success and have at once been adopted to replace twisted wire brushes heretofore used for the cleaning of boiler tubes of the smaller diameters. The present brush will successfully negotiate the sharp

bends found more particularly in what are known as express type boilers and this has been made possible in the present brush by keeping down the overall length thereof, while at the same time the particular arrangement of sockets employed provides a maximum number of wire tufts giving the desired thorough cleaning of the tubes.

What I claim and desire to secure by United States Letters Patent is:—

1. A brush for cleaning boiler tubes comprising a solid body portion of metal having a plurality of sockets bored therethrough and arranged in spiral formation, each socket comprising a portion of a larger diameter and a portion of smaller diameter, an abutment formed at the inner end of the larger portion, a tuft of wire disposed in the larger portion of each socket and seated against said abutment, a wire for retaining said tufts in position and extending from the smaller portion of each socket round the circumference of the body portion to the smaller portion of the next socket, and means on one end of said body portion to detachably receive the brush actuating means.

2. A brush for cleaning boiler tubes of small diameters comprising a solid body portion of metal, having a plurality of sockets bored therethrough and arranged in spiral formation with relation to the longitudinal axis of the brush, each socket comprising a portion of larger diameter terminating adjacent the longitudinal axis and a portion of smaller diameter, a shoulder formed at the junction of the larger and smaller portions, a tuft of wire disposed in the larger portion of each socket, a wire for retaining said tufts in position against the shoulder and being extended up through the smaller portion of each socket, doubled over the tuft of wire therein, returned back through said smaller portion and then carried round the periphery of the body to the smaller portion of the next socket, and screwed portions on the ends of said body portion to detachably receive brush actuating mechanism.

3. A brush for cleaning boiler tubes comprising a solid body portion of metal having a plurality of sockets extending transversely through said body and arranged in close spiral formation, each of said sockets comprising a bore of large diameter and a bore of reduced diameter, a shoulder formed at the junction of said bores, a tuft of wire in each of the large bores seated against said shoulder, each of said tufts being positioned to slightly overlap adjacent tufts, and a continuous wire extending into the small bores to retain the tufts in position.

4. A brush for cleaning boiler tubes comprising a solid body portion of metal having a plurality of sockets extending trans-

versely through said body and arranged in close spiral formation, each of said sockets comprising a bore of large diameter and a bore of reduced diameter, a shoulder formed at the junction of said bores, a tuft of wire in each of the large bores seated against said shoulder, each of said tufts being positioned to slightly overlap adjacent tufts, a

continuous wire extending into the small bores to retain the tufts in position, and means on each end of said body portion for detachably receiving the brush operating mechanism.

In testimony whereof I have signed my name to this specification.

CHARLES C. GERHARDT.