

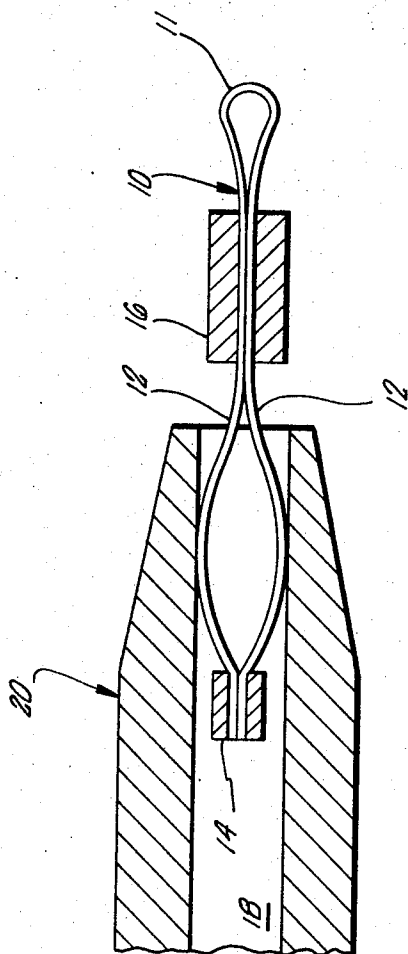
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CLEANING TOOL

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CLEANING TOOL

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2 Claims

ABSTRACT OF THE DISCLOSURE

A tool made of spring wire for engaging and cleaning the interior surface of an orifice such as in a cutting or welding torch.

This invention relates to tools for cleaning orifices in various pieces of apparatus.

The tool of this invention is particularly well suited for cleaning out orifices in torch tips, such as in welding or cutting torches, and is described with reference to that particular use, although it may be used for other cleaning purposes.

In a typical welding or cutting torch, the tip includes an elongated bore or orifice from which gas is jetted and burned to form a hot flame. As the torch is used for welding or cutting, the orifice periodically becomes contaminated with foreign particulate matter which must be removed to insure efficient operation of the tip.

At the present time, it has been common practice to try to clean the tip orifice by reciprocating a rough tool back and forth in the orifice to file first one side and then the other. The prior art tool is of substantially uniform and unvarying diameter, but it has slight exterior serrations which extend in a direction transverse to the longitudinal axis of the tool, and are intended to engage and dislodge the particulate matter contaminating the orifice as the tool is reciprocated in the orifice. Moreover, the prior art tool has weak points due to the serration, which are produced by rolling or stamping.

The prior art tool must be small enough to fit into the orifice, and yet it must make a fairly close fit for good cleaning. Accordingly, the prior art tool must be provided in numerous sizes to take care of various size orifices. Even when the prior art cleaning tool is relatively close in size to the orifice which it is used to clean, it is inefficient because it does not automatically firmly engage the interior of the orifice. Instead, it must be worked laterally back and forth in an attempt to cover the entire interior surface of the orifice and thereby dislodge all particles. The cleaning job is further complicated in some orifices in which the orifice diameter increases in the inward direction, and the tool must be inclined at an angle to the longitudinal axis of the orifice and be reciprocated in an effort to reach the sides of the enlarged portion of the bore. Such manipulation often results in unwanted wearing and enlarging or "belling" of the tip orifice at its exit. Ultimately, the worn tip must be refaced or discarded.

This invention provides a cleaning tool which fits firmly into numerous sizes of orifices and eliminates the need for extra tip cleaners of different sizes. Moreover, there are no weak points on the cleaner of this invention as is the case with the prior art tool which has weak points produced from rolling or stamping of serrations.

The tool of this invention is operated by rotating it about its longitudinal axis, and therefore avoids any reciprocating motion which would enlarge the orifice diameter. In its preferred form, the cleaner is smooth all over its working area and cannot damage the orifice. The tool also automatically spreads to provide the correct pressure on all sides of the orifice, regardless of variation in

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the orifice diameter, and eliminates the possibility of damaging the walls of the orifice or enlarging it. The prior art tool must be manipulated manually, and, depending on the touch of the operator, it is applied with varying amounts of pressure.

Briefly, the cleaning tool of this invention includes two lengths of spring wire disposed side by side. A first clamp is secured around the two lengths to hold them firmly together at one point. A second clamp spaced from the first is secured around the two lengths of wire to hold them together at a second point spaced from the first. The two lengths of wire are spread apart between the two clamps so the distance between the respective outer portions of the wires is greater than the effective diameter of the first clamp which is of a size to fit easily into the orifice to be cleaned.

Preferably, the wire lengths are each circular in cross section to reduce the tendency for them to abrade or wear away the interior of the orifice. In the preferred form of the invention, the two lengths of spring wire are formed integrally from a single piece of wire bent back over itself, leaving a loop at one end which extends beyond the second clamp and away from the first clamp. The second clamp is preferably of a larger diameter than the first to prevent the tool from being dropped or lost into the orifice being cleaned.

These and other aspects of the invention will be more fully understood from the following detailed description and the accompanying drawing which is an enlarged sectional elevation of the cleaning tool.

Referring to the drawing, a piece of spring wire 10 is doubled back on itself to form a loop 11 and two lengths 12 disposed side by side and arranged with their free ends terminating at the same point. A first clamp or nose piece 14 is disposed around the free ends of the lengths of wire to clamp them firmly together. Conveniently, the nose piece is a short cylinder swedged to grip the wire ends firmly.

A second clamp or sleeve 16 is spaced from the first clamp and from the loop 11 to hold the wire lengths firmly together at a point spaced from the first clamp. Conveniently, the sleeve is a short cylinder swedged tightly around the wire lengths. Preferably, the sleeve is of a larger diameter than the first clamp and than an orifice 18 in a tool 20 which is to be cleaned.

The portion of the wire lengths between the nose piece and the sleeve is spread apart so that they normally take a position which makes the distance between the outer portions of the wires greater than the distance across the nose piece and greater than the diameter of the orifice to be cleaned.

The tool is used as shown in the drawing by inserting the nose piece into the orifice. The nose piece prevents any sharp ends or projections from the wire engaging the interior of the orifice, thereby protecting it from abrasion and inadvertent enlargement. The bowed out portion of the wire lengths engage the orifice wall and are slightly compressed. The tool is then rotated by turning the sleeve, or by extending a member (not shown) through the loop 11 and rotating it as with a winding key. The loop is also useful for hanging the tool when it is not in use.

From the foregoing description, it will be apparent that the tool of this invention can clean orifices of different sizes and without danger of damaging them. Moreover, the tool is easy and inexpensive to make, and has no weak points induced by stamping or twisting of the wires.

I claim:

1. A tool for cleaning an orifice in a piece of apparatus, the tool comprising a piece of wire bent back over itself to form a loop at one end of the tool and to form two lengths of spring wire disposed side by side, a first

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clamp secured around the two lengths to hold them firmly together at one point, and a second clamp spaced from the first clamp and secured around the two lengths to hold them firmly together at a second point spaced from the first, the two lengths of wire being spread apart between the two clamps so the distance between their respective outer portions is greater than the effective diameter of the first clamp, the effective diameter of the first clamp being less than that of the orifice.

2. A tool according to claim 1 in which the loop extends beyond the second clamp and away from the first clamp.

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