

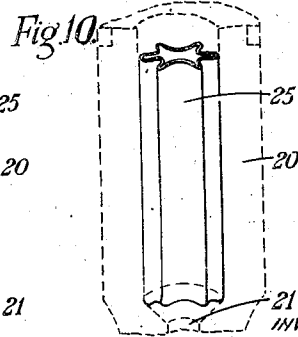
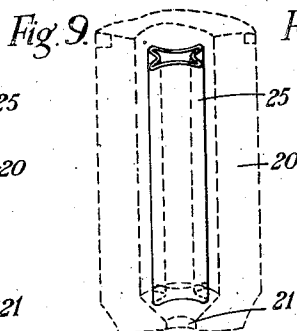
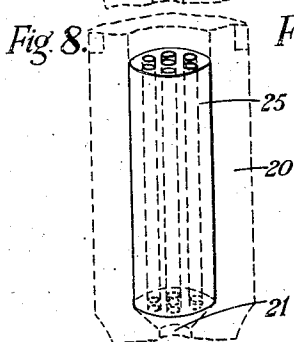
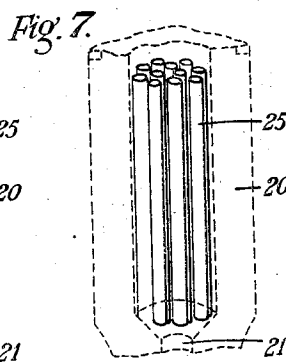
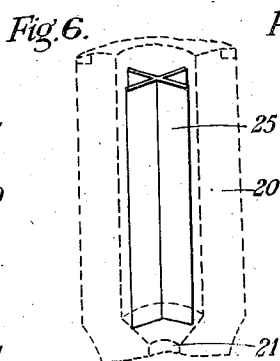
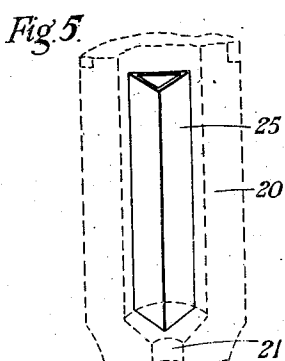
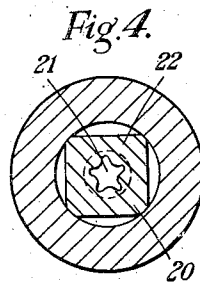
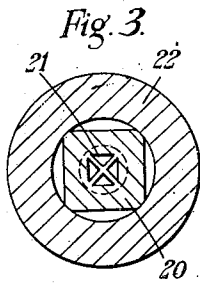
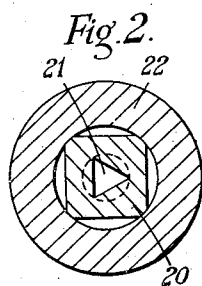
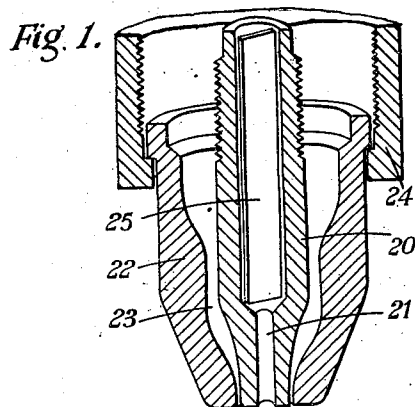
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2,408,588

APPARATUS FOR DIVIDING OR DESURFACING METAL BY USE OF OXIDISING JETS

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APPARATUS FOR DIVIDING OR DESURFACING METAL BY USE OF OXIDIZING SETS

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5 Claims. (Cl. 158—27.4)

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The present invention relates to apparatus for dividing or desurfacing metal by use of an oxidizing jet and more particularly to apparatus for the supply of a stream of oxidizing gas for metal cutting and desurfacing operations.

For cutting or desurfacing metals, it is usual practice to preheat the metal to its ignition temperature and then to direct against the preheated surface a stream of oxidizing gas, usually oxygen of substantial purity. The apparatus commonly employed for this purpose comprises a blowpipe having one passage to deliver the stream of oxidizing gas, and another passage or series of passages to deliver the gases for the preheating jet. The passage may be formed in a single member or in a plurality of members arranged in a common head. In order to achieve a reasonably high cutting speed with such apparatus, especially when thick plate is to be cut, it is necessary to use an oxidizing stream of high velocity. Difficulty has, however, been experienced in obtaining clean cut surfaces especially when using a high velocity oxidizing stream and, in consequence, the speed of cutting has had to be reduced.

The passage through which the stream of oxidizing gas is delivered has hitherto been of circular cross section and investigation has shown that in its course through such a passage, a swirling motion is imparted to the gas stream. This swirling motion is believed to be the cause of faulty cuts and low cutting speed.

It is an object of this invention to provide means whereby such swirl is prevented and the oxidizing gas constrained to follow a substantially rectilinear path.

According to one feature of the present invention, apparatus for dividing or desurfacing metal by the use of an oxidizing jet comprises a passage for the delivery of a stream of oxidizing gas to a surface to be cut or desurfaced, the passage being of non-circular cross section in order to prevent or substantially to reduce any tendency for the gas to assume a swirling motion in its course through the passage.

In cross section the oxidizing gas passage may be elliptical, triangular, square or any other convenient non-circular shape. When the velocity of the gas stream is low as in the case of descaling, a passage may be used which is elliptical in cross-section, in other words, one which shows no substantial departure from circularity as this may suffice to reduce any incipient swirl to negligible proportions, but with increasing velocities it is necessary to provide more abrupt changes in the circumferential direction, namely, by using

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a passage which is triangular, square or of other cross sectional shape which is distinctly non-circular, if the swirling of the gas is to be inhibited to the desired extent.

Alternatively, the tendency for the gas to assume a swirling motion may be prevented by the provision of baffle means which offer no substantial obstruction to the flow of gas in the longitudinal direction but which prevent the gas from swirling around the walls of the passage. The baffle means may be formed integrally with the walls of the passage or may be constituted by a unit which is mounted in the passage and either secured to the wall thereof or merely contacting therewith at a plurality of points.

It is preferred that the baffle means be located as near as possible to the delivery end of the passage, for example, terminating close to the outlet of the nozzle of a gas cutting torch, but it may be disposed some distance from the delivery end if the passage be of smooth bore so that no turbulence is imparted to the gas after emerging from the baffle means.

The invention will now be more particularly described with reference to the accompanying drawing in which:

Fig. 1 is a view in perspective of a nozzle embodying the features of the invention as shown in central vertical section.

Fig. 2 is a horizontal cross-sectional view taken midway of the length of the nozzle member and shows a desirable modification in structural form.

Fig. 3 is a similar view of a further modification.

Fig. 4 is a similar horizontal sectional view of a still further modification, and

Figs. 5 to 10 are isometric views showing alternative forms of baffle means, the other parts of the nozzle being omitted except for the wall of the oxidizing gas passage which is shown in dotted lines.

The same reference numerals are used throughout for equivalent parts.

The nozzle comprises an internal member 20 having an axial passage 21 for conveying a stream of oxidizing gas and an external member 22 disposed concentrically with respect to the internal member 20, a passage 23 being formed between the two members for the delivery of a stream of preheating gas, such as a mixture of oxygen and acetylene. An internally threaded union 24 is provided for securing the member 22 to an external thread on the body of the torch (not shown) and the internal member 20 is screw-threaded at the end remote from the tip in order

that it may be secured to a complementary screw-thread formed internally in the head of the torch. The oxidizing gas passage at the inlet end is wider than at the outlet where it is constricted to form a jet. The baffle means comprise a flat plate 25 which extends throughout the length of the wider portion of the passage 21 and diametrically across it making a sliding fit with the wall. The constricted portion is of circular cross-section and of smooth bore so as to prevent any swirl being set up after the gas leaves the wider part of the passage where the baffle is located. Such baffle means may readily be inserted in existing types of blowpipe torches. As is the case with the baffle means shown in the other figures, swirling of the gas around the wall of the passage is prevented or at least substantially reduced by the plate 25 and a gas stream having enhanced cutting properties is thereby obtained.

As shown in Fig. 2, the passage 21 is altered to be triangular in cross-section, whilst according to Fig. 3, the passage 21 is square and has in addition baffle means in the form of diagonally extending fins 25 which meet at the centre to form four passages each triangular in cross-section. The passage 21 shown in Fig. 4 is roughly star-shaped in cross-section. With all these forms of passage, any tendency to swirling is largely inhibited and the gas issues from the nozzle with high longitudinal velocity suitable for the production of clean cuts.

As shown in Fig. 5, the baffle means consists of a sheet of metal 25 bent into the form of a triangle which makes a sliding fit within the wall of the passage 21. In Fig. 6 the baffle means consists of metal strips 25 arranged in cruciform fashion.

With the constructions shown in Figs. 7 and 8, swirling of the cutting gas is prevented by subdividing the gas streams into a plurality of separate channels formed, as shown in Fig. 7, by a bundle of tubes 25, or as shown in Fig. 8, by a cylinder 25 provided with longitudinally extending apertures.

In the modification shown in Fig. 9, the baffle means consists of a hollow elongated box-like structure 25 with concave surfaces open at each end. As shown in Fig. 10 the baffle means consists of an elongated structure 25 which is star-shaped in cross-section.

What is claimed is:

1. A nozzle for a blowpipe torch comprising a member having a cylindrical axial passage for an oxidizing gas, a relatively short delivery passage of relatively lesser diameter than said cylindrical axial passage for forming said gas into

a jet, a tapering transition passage between said axial passage and said delivery passage, and anti-swirl means in said axial passage and extending to said tapering transition passage for delivering thereto a gas stream having reduced swirl characteristic.

2. A nozzle for a blowpipe torch comprising a member having a cylindrical axial passage for an oxidizing gas, a relatively short delivery passage of relatively lesser diameter than said cylindrical axial passage for forming said gas into a jet, a tapering transition passage between said axial passage and said delivery passage, and means for dividing said cylindrical axial passage lengthwise into a plurality of anti-swirl channels extending to said tapering transition passage for delivering thereto a gas stream having reduced swirl characteristic.

3. A nozzle for a blowpipe torch comprising a member having a cylindrical axial passage for an oxidizing gas, a relatively short delivery passage of relatively lesser diameter than said cylindrical axial passage for forming said gas into a jet, a tapering transition passage between said axial passage and said delivery passage, and a cruciform anti-swirl baffle device extending lengthwise of said cylindrical axial passage to said tapering transition passage for delivering thereto a gas stream having reduced swirl characteristic.

4. A nozzle for a blowpipe torch comprising a member having a cylindrical axial passage for an oxidizing gas, a relatively short delivery passage of relatively lesser diameter than said cylindrical axial passage for forming said gas into a jet, a tapering transition passage between said axial passage and said delivery passage, and a cylindrical baffle device fitted in said cylindrical axial passage and provided with a plurality of open ended anti-swirl channels extending lengthwise thereof to said tapering transition passage for delivering thereto a gas stream having reduced swirl characteristic.

5. A nozzle for a blowpipe torch comprising a member having a cylindrical axial passage for an oxidizing gas, a relatively short delivery passage of relatively lesser diameter than said cylindrical axial passage for forming said gas into a jet, a tapering transition passage between said axial passage and said delivery passage, and a hollow open ended anti-swirl baffle device located in said cylindrical axial passage and provided with concave walls, said baffle device extending to said tapering transition passage for delivering thereto a gas stream having reduced swirl characteristic.

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