This invention relates to heat treating apparatus particularly adaptable for use in flame hardening machines and the like.

This application is a division of our co-pending application, Serial No. 613,090, filed August 23, 1945, for Automatic Heat Treating Machine.

One of the objects of this invention is to provide a new and novel torch head particularly adapted for heating cylindrical work pieces in a flame hardening machine.

Another object of this invention is to provide an improved torch of the class described which will create a series of radially directed uniform heating flames around the periphery of a cylindrical work piece.

Other objects and advantages of the present invention should be readily apparent by reference to the following specification, considered in conjunction with the accompanying drawings forming a part thereof, and it is to be understood that any modifications may be made in the exact structural details there shown and described, within the scope of the appended claims, without departing from or exceeding the spirit of the invention.

Referring to the drawings in which like reference numerals indicate like or similar parts:

Figure 1 is a view in elevation of the improved apparatus constituting this invention.

Figure 2 is a section on the line 2—2 of Figure 1.

This invention relates to a torch or burner which is particularly designed for heating round work pieces in that it will create a uniform heating zone around the work piece by radially directing the flames against the work.

In general, the burner is in the form of an annular ring and comprises a housing 10 from the opposite sides of which extend radial supporting arms 11. These arms are substantially square in shape and are adapted to fit into slots formed in adjustable bracket 12. From Figure 2 it will be noted that the arms are made hollow to form a receiving chamber 13 to which a gas inlet or supply pipe 14 is connected.

It will be understood that the gas supplied through the pipe 14 is a properly mixed gas of acetylene and oxygen, the mixture having taken place before the gas is delivered to the burner.

The gas in the chamber 13 passes through an opening 15 formed in the outer wall 16 of the housing and into an outer chamber 17 which chamber extends all the way around the annular housing 10. A baffle plate 18 is secured in the housing between a pair of end plates 19 and 20 which thus divides the interior of the housing 10 into an exterior chamber 11 and an interior chamber 21. It will be noted that the baffle plate is provided with a series of radial holes 22 which serve to cause an even distribution and a more uniform pressure of the gas throughout the interior chamber 21. A removable burner plate 23 for delimiting the interior chamber is attached to the inside of the housing by a series of bolts 24, and this plate has formed therein a series of axially extending rows of radial holes 25 forming burner ports through which the gas passes and is ignited on the exterior side thereof. The object of making the plate 23 removable is that other plates with various patterns and sizes of burner ports may be substituted to suit various types of work to be treated. By making the plate 23 of suitable material it is not necessary to use special burner tips.

It will be noted that the construction provides a pair of end chambers 26 and 27 which are closed by discontinuous annular plates 28 and 29 through which water may be circulated to prevent overheating of the parts. In order to maintain complete circulation of water throughout the burner the chamber 26 has a water inlet connection shown at 30 in Figure 1 and a water outlet connection shown at 31. Thus the water is forced to flow completely around the burner. Similar connections are provided for the chamber 27. It will be noted that the arms 11 are adapted to be clamped into the brackets 12 by clamping screws 32 and upon loosening of these screws the burner may be adjusted laterally to center it with respect to a work piece. In addition, the brackets 12 may be adjusted relative to their supports 33 and secured in adjusted position by clamping bolts 34.

The gas supply inlets are provided with flexible hose connections 35 and the water connections are similarly supplied with flexible hose connections indicated by the reference numeral 36.

It will be noted that the annular ring or housing 10 is discontinuous in that it provides an opening 37 between the adjacent ends thereof whereby a temperature control viewing tube may be mounted in suitable position for focusing a thermopile 38 on a target area of the work piece as more fully explained in our co-pending application.

There has thus been provided an improved and novel torch for the purposes described which is of simple and unique construction.

What is claimed is:

1. A torch head for a heat treating machine comprising a discontinuous annular housing
providing a radial opening in the periphery thereof through which temperature measurements can be made of work being heated within the surrounding housing, said housing including a cylindrical outer wall and attached end plates normal thereto, a concentric cylindrical perforated baffle plate extending from one of said end plates to the other, dividing said housing into concentric outer and inner chambers, a second concentric perforated burner plate extending from one of said end plates to the other, delimiting said inner chamber, said perforations in the burner plate forming radial burner ports and spaced axially of said housing, means removably attaching said burner plate to said housing whereby interchangeable burner plates having different perforation patterns may be substituted therefor, a pair of radially extending supporting arms projecting from said housing normal to a radius of said housing which extends through said opening, said arms having gas receiving chambers formed therein communicating with said outer chamber and gas supply ducts connected to said receiving chambers for forcing heating gas through the outer chamber and baffle plate to maintain a uniform gas pressure in the inner chamber for supplying said burner ports.

2. A torch head for a heat treating machine comprising a discontinuous annular housing providing a radial opening in the periphery thereof through which temperature measurements can be made of work being heated within the surrounding housing, said housing including a cylindrical outer wall and attached end plates normal thereto, a concentric cylindrical perforated baffle plate extending from one of said end plates to the other, dividing said housing into concentric outer and inner chambers, a second concentric perforated burner plate extending from one of said walls to the other, delimiting said inner chamber, said perforations in the burner plate forming radial burner ports and spaced axially of said housing, means removably attaching said burner plate to said housing whereby interchangeable burner plates having different perforation patterns may be substituted therefor, a pair of radially extending supporting arms projecting from said housing normal to a radius of said housing which extends through said opening, said arms having gas receiving chambers formed therein communicating with said outer chamber, gas supply ducts connected to said receiving chambers for forcing heating gas through the outer chamber and baffle plate to maintain a uniform gas pressure in the inner chamber for supplying said burner ports, said outer wall and end plates being shaped to form enclosed coolant receiving chambers adjacent said inner and outer chambers, discontinuous annular plates closing said coolant chambers and coolant connections to said coolant chambers at opposite sides of said radial opening.

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