

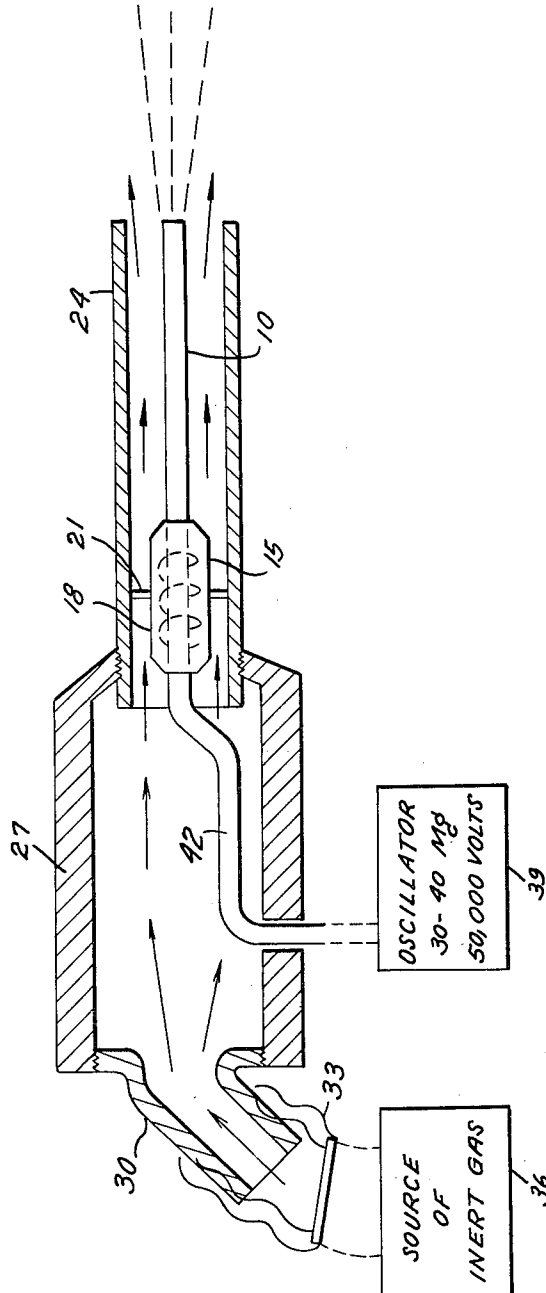
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PLASMA TORCH

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PLASMA TORCH

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5 Claims. (Cl. 219—75)

This invention relates to plasma torches and more particularly to a torch wherein heat is effected by means of a high voltage high frequency electromagnetic field induced in a metallic rod.

It is an object of the invention to provide a plasma torch of simple and rugged construction and one which is particularly adapted for manual use.

It is another object of the invention to provide a plasma torch wherein the region of heat is surrounded by an inert gas in order to prevent oxidation of the work.

It is a further object of the invention to provide a plasma torch wherein heat is effected by transducer action or extremely high frequency vibration of a rod, induced by an electromagnetic field.

Briefly, my invention comprises the use of an oscillator for generating a frequency of the order of 30 to 40 megacycles at approximately 50,000 volts or within such high voltage range and with sufficient amperage for the required purpose. Thus, the construction contemplates a metallic rod on which is a solenoid connected to such a high frequency source. The rod is surrounded by a shielding cylinder which is in turn secured to a handle. A source of inert gas is utilized, connected to the handle so that such gas flows axially along the rod and outwardly of the shielding tube. The effect of the high frequency energy fed to the rod is to produce an extremely rapid microscopic vibration which causes ionization and glowing of the inert gas at the outer tip of the rod. Such glow is in effect a heat flame useful for soldering, welding, or other conventional applications.

A detailed description of the invention will now be given in conjunction with the appended drawing. Referring to the drawing, a metallic rod 10 is disclosed which may be of any suitable, electrical conducting material, such as copper, ferrite, steel or other suitable material. A solenoid 15 within a bobbin 18 concentrically encompasses the rod 10. The solenoid is supported by a spider 21 within a shielding tube 24. The tube 24 may be threaded as shown to a hollow handle 27, which handle is provided at its other end with a fitting 30 for connection as by a flexible hose 33 to a pressure source of inert gas 36. A generator source of high frequency oscillations 39 is provided connected as by wires 42 through the handle to the solenoid. The oscillatory generator is capable of producing of frequency of the order from 30 to 40 megacycles and at high voltage, in the range of about 50,000 volts and effective amperage so that a powerful flux field ensues around the solenoid.

When the generator is operating a high energy, high frequency, magnetic field exists in the rod 10. Such magnetic field within the rod causes the rod to experience extremely rapid high energy vibrations. The inert gas, for example helium, argon, etc. passing concentrically around the rod is ionized by such vibrations and molecular motion in the gas is speeded up to such degree that the gas becomes considerably heated and as it emerges from the tube 24 the heating effect causes the gas to glow.

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The net effect is for a considerable amount of heat to be manifested in the region of glow at the outer end of rod 10. Such region of glow may extend for a sufficient distance forwardly of the rod to be brought against work to be heated. The inert gas, however, surrounding the glowing portion protects and isolates the flow region and prevents oxidization of the work by impinging thereagainst to thus prevent air from contacting it.

Having thus described my invention I am aware that various changes may be made without departing from the spirit thereof and, therefore, do not seek to be limited to the precise illustration herein given, except as set forth in the appended claim.

I claim:

1. A plasma torch comprising an electrically conducting metallic rod, gas source means for effecting a flow of inert gas axially thereof and surrounding said rod, and electrical means for providing a high frequency magnetic field in said rod of an intensity sufficient to effect vibration thereof to an extent to ionize an inert gas flowing in contiguity with said rod and to effect a heat manifestation thereof.

2. A plasma torch as set forth in claim 1, said electrical means comprising a solenoid on said rod and a high frequency oscillator connected thereto, said oscillator being capable of operation in the range of 30–50 megacycles.

3. A method of effecting heat which comprises subjecting an electrically conducting metallic rod to a high frequency magnetic field of the order of 30–50 megacycles, surrounding said rod with an inert gas, wherein the energy of said field is made of sufficient degree to cause vibration of said rod to be imparted to said gas to effect ionization and heating thereof.

4. A plasma torch comprising an electrically conducting metallic rod, a solenoid on said rod, a gas conducting sleeve surrounding said rod and spaced therefrom, a handle secured to said sleeve, a gas conducting fitting secured to said handle and spider means for supporting said rod in said sleeve whereby gas may flow along the outside of said rod while said solenoid is energized by a high frequency source of sufficient magnitude to cause vibration of said rod which vibration is imparted to gas flowing along said rod to effect ionization of this gas.

5. A plasma torch comprising an electrically conducting metallic rod, gas source means for effecting a flow of gas axially thereof and surrounding said rod, and electrical means for providing a high frequency magnetic field in said rod to effect vibration thereof to an extent to ionize a gas flowing in contiguity with said rod and to effect a heat manifestation thereof.

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