

Process and Apparatus for Shrouding a Turbulent Gas Jet

Summary

Improved process for shrouding and protecting a gas jet from the ambient atmosphere.

Overview

Air Products is offering for license a patent that relates to the process for placing a gas shroud around a turbulent gas jet and protecting the gas jet from the ambient atmosphere. It has been found according to the invention that a good gas shrouding of a turbulent gas jet can be achieved by developing a gas shield that has little or no vector flow at the interface with the gas jet, except for the vector flow imparted to it by the gas jet itself. According to the present invention a turbulent jet of gas is produced issuing from an orifice along an axis, and this gas jet as it issues from the orifice is surrounded with an annular cushion of shroud gas of desired composition. This shroud gas is entrained into the gas jet at a given rate, diluting the gas jet, but in a predictable manner, and to the substantial exclusion of any dilution by the ambient atmosphere. To maintain the shroud cushion, the shroud gas is replaced at a rate related to the rate at which it is entrained into the gas jet. Aspiration of ambient air poses a very difficult problem in thermal spray-coating operations involving supersonic and subsonic hot jets of relatively inert or reducing gases carrying reactive droplets or particles of metallic or ceramic feed materials which subsequently form coatings or deposits on an impacted surface. In such thermal spray-coating operations, air aspiration results in oxidation of the coating in a manner which can be very detrimental. In order to address this problem, various new designs of plasma, combustion, and electric arc spraying guns have been proposed as have special retrofit attachments for commercially available spraying guns. In general, such attempts have fallen short because they failed to establish criteria for aspiration flow rates which result from the broad range of turbulent gas jets encountered in the industry. Also, many of the proposed design modifications interfered with the flow field of jets produced by the original equipment. As such, the invention exhibits advantages over the competition.

Benefits:

- Minimizes aspiration of ambient air or other ambient gases into various turbulent gas jets
- Provides a method to control the composition of the aspirated gases
- Can be used to minimize oxidation of sprayed feed materials
- Provides a convenient means for introducing reactive gas into the jet spray
- Does not alter the original flow field of the jet stream
- Does not expose sensitive parts of the spraying apparatus to reactive materials
- Does not require design modifications

Priority Patent Number	Title	Status	Application Date
US 5,738,281	Process and Apparatus for Shrouding a Turbulent Gas Jet	Issued	5/8/1997
US 5,662,266	Process and Apparatus for Shrouding a Turbulent Gas Jet	Issued	1/4/1995

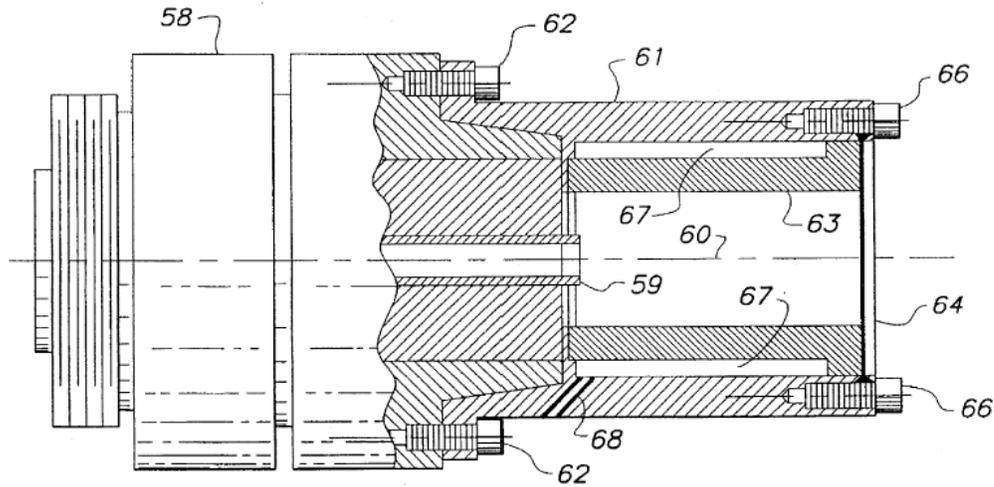


FIG. 15

Also Offered:

Technology transfer is available for a limited time on a fee basis.

Availability:

Air Products is offering licenses to practice this technology worldwide.

For more information on licensing this technology contact:

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