



RILEY POWER INC.

Anti-roping Device Low NO_x Controlled Combustion Venturi (CCV®) Burners

OVERVIEW

Since the introduction of the first CCV® burner in the early 1990's, Riley Power Inc., a Babcock Power Inc. company, has been continuously improving this burner design and its various components to enhance its overall performance and reliability. The original design was followed by the CCV® dual air zone burner that offered separate air flow control and improved levels of NO_x. Various changes were also made, over time, to improve the mechanical reliability. New materials were also incorporated to improve the overall reliability of these burners depending on coal abrasiveness.

A recent performance enhancement developed by Riley Power is an Anti-roping Device. The anti-roping device was designed to enable operators to achieve more uniform coal distribution at the burner exit, which is an important

component of NO_x emissions control. The US Patent application number for this new device is 12/112,571.

Any CCV® burner can be equipped with this anti-roping device which is located immediately upstream of the burner coal head and oriented relative to the coal pipe design to eliminate the coal particle "rope" which develops in any typical coal piping system. The anti-roping device, in tandem with a ceramic kicker located at the entrance to the coal nozzle, is designed to redistribute the coal particles entering a pulverized coal burner (shown with the patented CCV® coal nozzle in Figure 1). This creates a more uniform coal distribution resulting in improved and controllable combustion. The device eliminates the need for the primary head vanes used previously in CCV® burners, thereby eliminating any potential maintenance associated with these items.

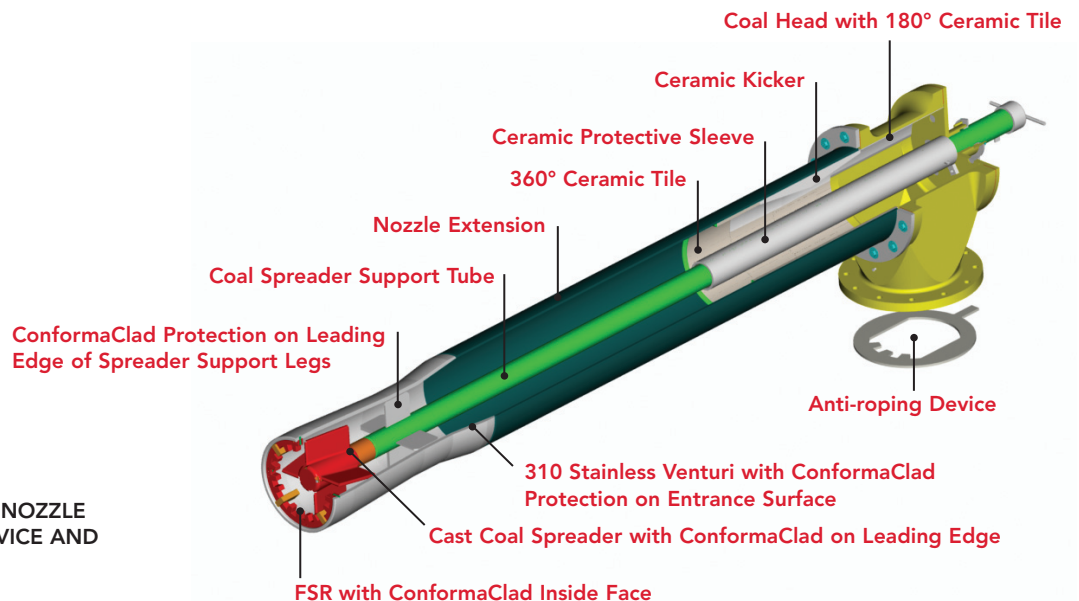


FIGURE 1: LOW NO_x CCV® COAL NOZZLE SHOWING THE ANTI-ROPING DEVICE AND CERAMIC KICKER



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FEATURES/BENEFITS

Eliminates the coal particle "rope" which develops in a typical coal piping system

- Provides a more even distribution of the fuel and air mixture exiting the burner (Figure 2)

Shape and area of device is engineered specifically for each firing system design and characteristics

- Minimize the pressure drop at the coal head inlet

The specific shape creates regions of cross mixing using a combination of segmented and solid areas around the circumference of the device

- Enhances more complete mixing of fuel and air

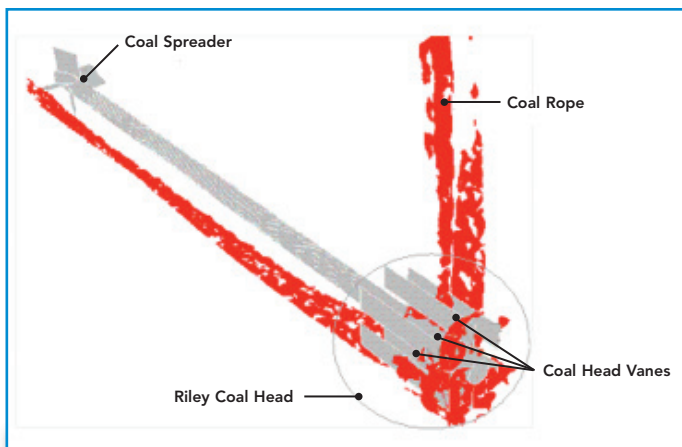
Device is installed between flanges in the existing coal piping system

- Minimizes the required mechanical modifications to the existing system
- Minimizes time and cost to retrofit

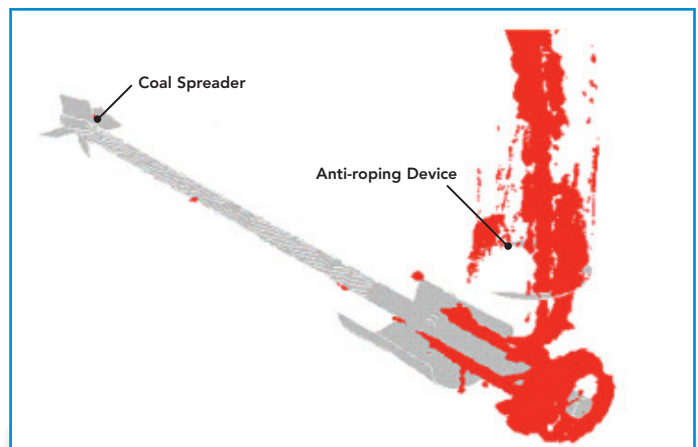
Advanced erosion materials can be applied

- Maintains the geometry of the engineered device, providing extended wear life and performance

FIGURE 2: EFFECT OF THE ANTI-ROPING DEVICE



ORIGINAL RILEY COAL HEAD WITHOUT THE ANTI-ROPING DEVICE SHOWING THE COAL ROPE



NEW RILEY COAL HEAD WITH THE ANTI-ROPING DEVICE SHOWING THE BREAKING AND ELIMINATION OF THE COAL ROPE