



NEW DESIGN OF INDUSTRIAL COAL FIRED BOILER

S. S. Arulappan

Retired Associate Professor, Department of Mechanical Engineering, National Institute of Technology, Trichy, India 620015

ABSTRACT: *New Design of Down Draft Flame Coal Fired Industrial Boiler for producing High Pressure Steam using Soft Water with the Boiler having Closed Flat Top. Boiler is to have open Conical Bottom having Cylindrical Cross Section in the Middle. The proposed geometrical changes of the Boiler are to be adopted. Further some more changes are also Proposed.*

INTRODUCTION

The New Design of Industrial Boiler is towards the aim of more Efficient Combustion of Fuel and Air Mixture; Easy Ash Collection and Soot Blowing. Down draft of the flames makes the combustion of fuel-air mixture better by having more dwell time of the flame and there by more Heat extraction is envisaged.

1.1 Plate Type Heat Exchangers for Steam Production:

Metal rectangular cross section hollow water carrying heat exchangers can replace hollow circular cross section water tube or fire tube boiler. Heat transfer is a surface phenomenon. Hence maximizing surface area to receive the Heat from hot gas inside the boiler combustion chamber Rectangular Cross Section water or fire tubes are suggested.

1.2 Safety Devices to be Installed:

Safety devices are to be Positioned and Installed all around the combustion chamber namely (a) Dead Weight Valve, and (b) "Bursting Disc". Localised Negative and Positive Pressure will occur inside the Combustion zone of the Boiler because of the down draft flame.

1.3 Ash Collection through Syphon Bend:

Ash will get collected at the bottom and it can be continuously removed. Syphon Bend which contains water inside the bend is proposed to be provided so that ash collection takes place inside the syphon bend and clean flow gas is let out after passing through heat recovery boiler. Finally mere flow gas alone is let out into the atmosphere.

1.5 Soot Blowing using Steam Jet:

During Shut down for Periodical maintenance, Cleaning of the combustion chamber and heat transfer plates is carried out. Deposition of Carbon all around the inner surface of the Boiler Chamber and Heat Transfer plates is known as Soot and it should be cleaned by Blowing Steam Jet.

Steam Jet through a Nozzle mounted in Travelling Probe inserted inside the combustion chamber, cleaning process is to be carried out.

1.6 Prototype Boiler is to be made:

Scale down model of the proposed Boiler is to be Fabricated and Tested. Many trial runs before successful final implementation are to be carried out.

2.1 Fuel and Air Fed through Valves:

Pulverised coal and Atmospheric Air are let into the Boiler combustion chamber through Valves known which can be Reed Valves.

CONCLUSION

However much Green Energy sources are installed all around the world still conventional energy sources like thermal power plants are very much needed.

Solar panels will not produce electricity in the Night Time.

Wind energy is not a continuous.

Peak hour demand of electricity has to be met.

Hence new design of Industrial Boiler like Down Draft Combustion and Ash separation using Syphon Bend having water filter can be tried out instead of the conventional coal fired boilers.

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