

Babcock and Wilcox Boiler: Definition, Parts, Working, Advantages, Disadvantages, Applications [With PDF]

www.pandianprabu.weebly.com

Babcock and Wilcox Boiler was discovered by George Herman Babcock and Stephen Wilcox in the year 1967.

This is a **water tube boiler**, used in steam power plants. In this type of boiler, water is circulated inside the tubes and hot gases flow over the tubes.

This is a Horizontal drum axis, natural draft, natural circulation, multitubular, stationary, high pressure, solid fuel fired, externally fired Water tube boiler.

Page Contents

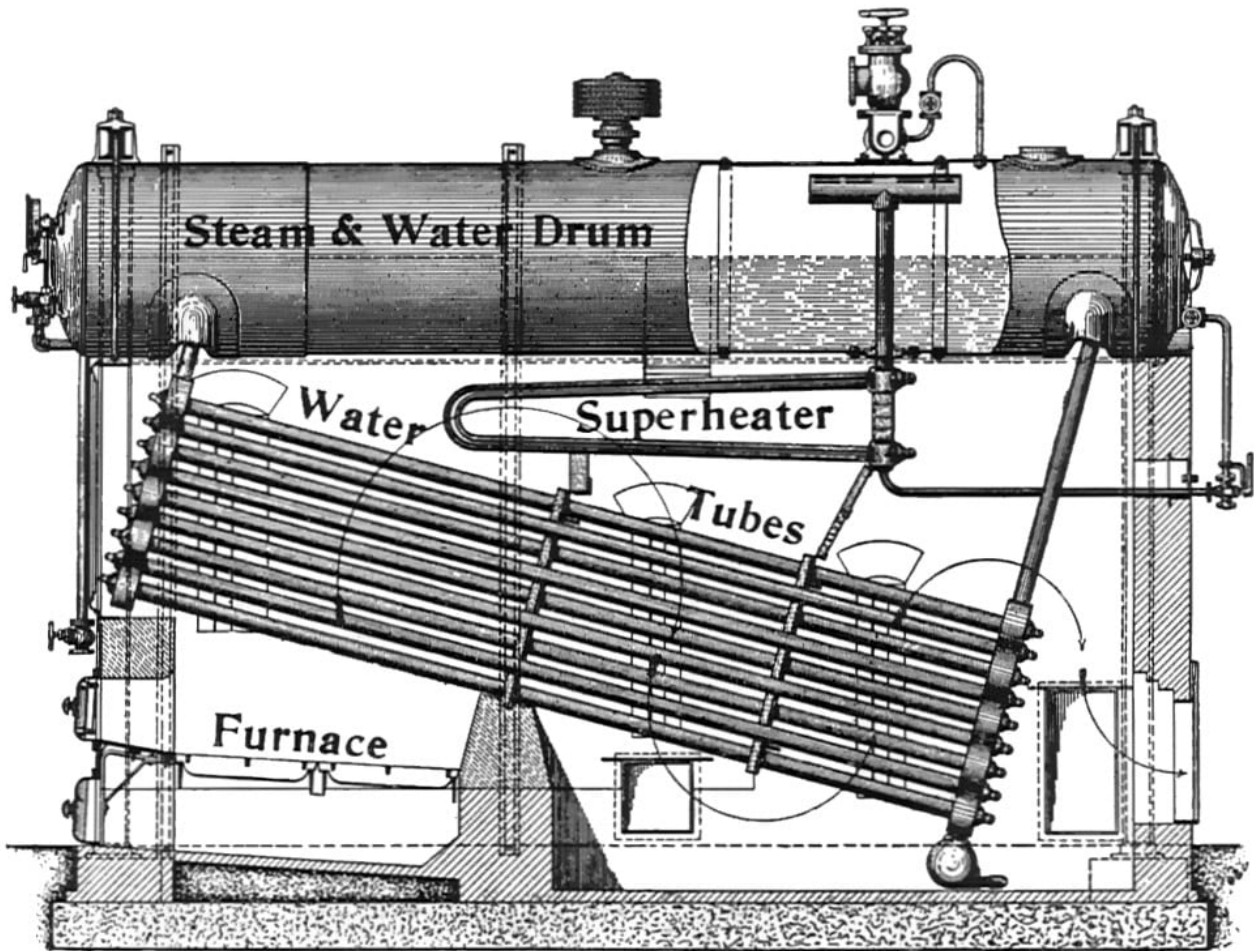
- [Babcock and Wilcox Boiler Parts:](#)
- [Working Principle of Babcock and Wilcox Boiler:](#)
- [Applications Babcock and Wilcox Boiler:](#)
- [Advantages of Babcock and Wilcox:](#)
- [Disadvantages of Babcock and Wilcox Boiler:](#)

Babcock and Wilcox Boiler Parts:

A Babcock and Willcox Boiler Parts or Construction consists of:

- *Drum*
- *Water Tubes*
- *Uptake and Downtake header*
- *Grate*
- *furnace*
- *Baffles*
- *Superheater*
- *Mud box*
- *Inspection Door*
- *Water Level Indicator*
- *Pressure Gauge*

www.pandianprabu.weebly.com



Drum:

This is a horizontal axis drum which contains water and steam.

Water tubes:

Water tubes are placed between the drum and furnace in an inclined position (at an angle of 10 to 15 degrees) to promote water circulation.

Uptake and Downtake Header:

This is present at the front end of the boiler and connected to the front end of the drum. It transports the steam from the water tubes to the drum. and

This is present at the rear end of the boiler and connects the water tubes to the rear end of the drum.

It receives water from the drum.

Grate:

Coal is fed to the grate through the fire door.

Furnace:

The furnace is kept below the uptake-header.

Baffles:

The fire-brick baffles, two in number, are provided to deflect the hot flue gases.

Superheater:

It increases the temperature of saturated steam to the required temperature before discharging it from the steam stop valve.

Mud Box:

This is used to collect the mud present in the water.

Mud box is provided at the bottom end of the down-take header.

Inspection Door:

Inspection doors are provided for cleaning and inspection of the boiler.

Water Level Indicator:

The water level indicator shows the level of water within the drum.

Pressure Gauge:

The pressure gauge is used to check the pressure of steam within the boiler drum.

Working Principle of Babcock and Wilcox Boiler:

The working of Babcock and Wilcox boiler is first the water starts to come in the water tubes from the drum through down take header with the help of a boiler feed pump which continues to feed the water against the drum pressure.

The water present in the inclined water tubes gets heated up by the hot flue gases produced by the burning of coal on the fire grate.

These fuel gases are uniformly heated the water tube with the help of a baffle plate which works deflect the flues gas uniform throughout the tubes which absorbed the heating maximum from the flue gases.

As the hot flue gases come in contact with water tubes, It exchanges the heat with heater and converts into the steam.

Continuous circulation of water from the drum to the water tubes and water tubes to the drum is thus maintained.

The circulation of water is maintained by convective current and it's known as Natural Circulation.

The Steam generated is moved upward, due to density difference and through the up-take header, it gets collected at the upper side in the boiler drum.

Anti-priming pipe inside the drum which works separates the moisture from the steam and sends it's to the superheater.

The superheater receives the water-free steam from an anti-priming pipe. It increases the temperature of the steam to the desired level and transfers it to the main steam stop valve of the boiler.

The superheated steam stop valve is either collected in a steam drum or send it's inside the steam turbine for electricity generation.

Applications Babcock and Wilcox Boiler:

The main application Babcock and Wilcox boiler to produce **high-pressure steam in power generation industries.**

Advantages of Babcock and Wilcox:

The advantages of Babcock and Wilcox boiler are:

- *The overall efficiency of this boiler is high.*
- *The steam generation rate is higher about 20 ton per hour at pressure 10 to 20 bars.*
- *The tubes can be replaced easily.*
- *The boiler can expand and contract freely.*
- *It is easy to repair maintenance and cleaning.*

Disadvantages of Babcock and Wilcox Boiler:

These are some disadvantages of Babcock and Wilcox Boiler:

- *It is less suitable for impure and sedimentary water, as a small deposit of scale may cause the overheating and bursting of tubes. Hence, water treatment is very essential for water tube boilers.*
- *Failure in feed water supply even for a short period is liable to make the boiler overheated. Hence the water level must be watched very carefully during the operation of a water tube boiler.*
- *The maintenance cost is high.*

Some FAQ:

What is Babcock and Wilcox boiler?

It is a water tube boiler.

What are the different types of water tube boiler?

1. Loeffler boiler
2. Yarrow boiler.
3. Lamont Boiler
4. Babcock and Wilcox Boiler
5. Lamont Boiler
6. Benson Boiler

What are the advantages of it?

1. The overall efficiency of this boiler is high.
2. The steam generation rate is higher about 20 ton per hour at pressure 10 to 20 bars.
3. The tubes can be replaced easily.

What are the parts or construction of it?

- Drum
- Water Tubes
- Uptake and Downtake header
- Grate
- furnace
- Baffles
- Superheater
- Mud box
- Inspection Door
- Water Level Indicator
- Pressure Gauge

