

## ① Cochran Boiler :- ~~Cochran~~

Cochran boiler is vertical drum axis, natural circulation, natural draft, low pressure, multi-tubular, solid fuel fired, fire tube boiler with internally fire furnace. It is modified form of a simple vertical boiler. The efficiency of this boiler is much better than the simple vertical boiler.

## \* Working :-

- ① In Cochran boiler first the fuel is inserted into the fire box and placed on the <sup>great</sup> ~~right~~ bottom of the boiler.
- ② The fuel is burnt in the firebox, and due to the burning of the fuel, smoke and hot flue gases emerge out. The hot flue gases enter into the combustion chamber through flue pipes.
- ③ The flue gases and the smoke after exchanging heat ~~moves~~ moves to the smokebox. From the smokebox, the burnt gases and smoke is discharged to the atmosphere through the chimney.

④ Burnt fuel is transferred to the ash pit. Blow off Valve is present at left bottom of the boiler and is used to blow off the impurities, mud, and sediment from the boiler water.

⑤ Various boiler mounting and accessories are attached to the ~~also~~ boiler for its efficient working.

⊗ Advantage:-

- ① Low initial installation cost.
- ② It requires less floor area.
- ③ Easy to operate and handle.

④ Transportation of Cochran boiler is easy.

⑤ It can use all types of fuel.

⊗ Disadvantage:-

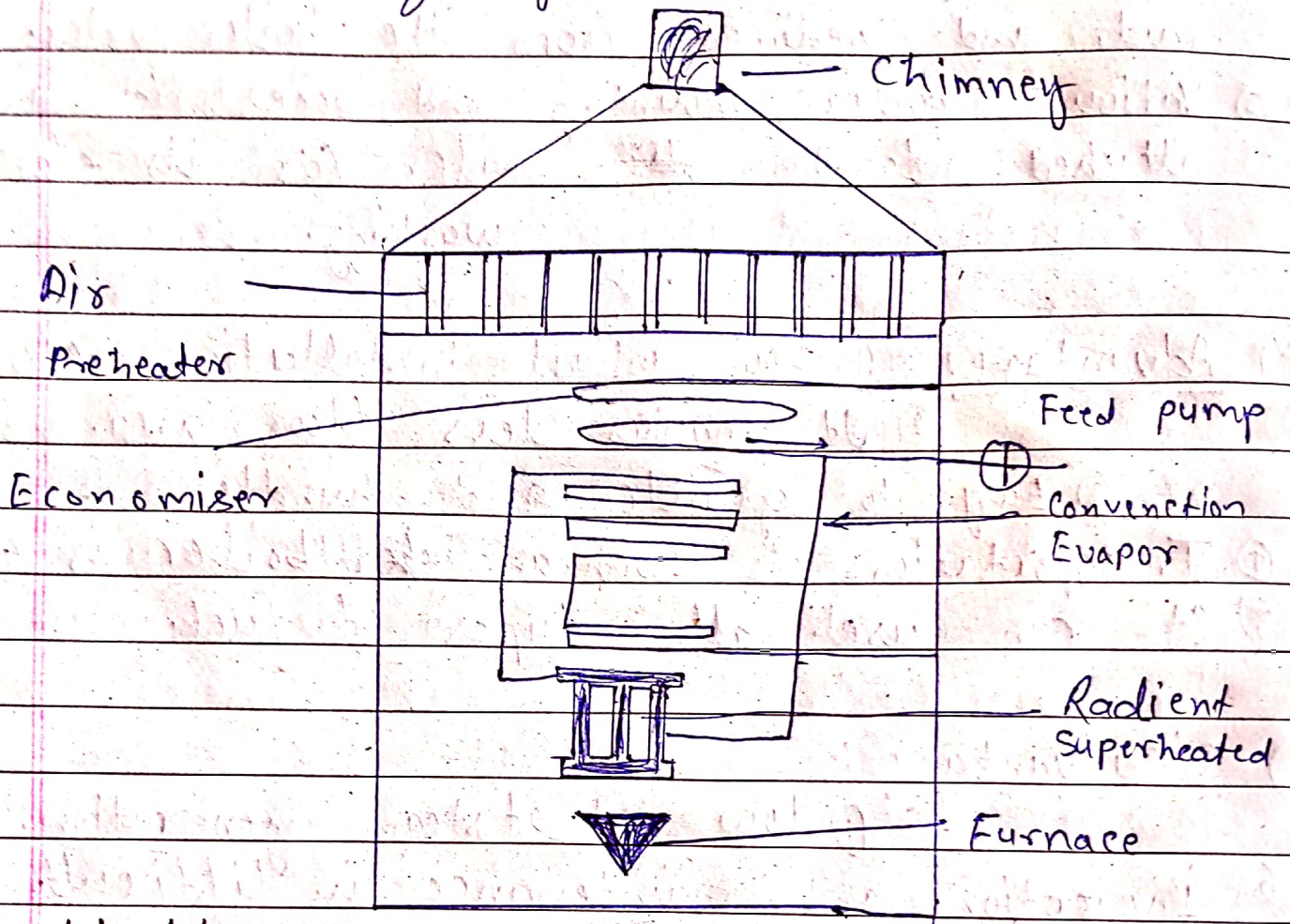
① Low rate of steam generation.

② Inspection and maintenance is difficult.

③ It has limited pressure range.

④ High room head is required for its installation due to the vertical design.

② Benson's Boiler :- Benson boiler is a water tube boiler. This is a drum-less and high-pressure boiler.



⊗ Working :-

① It is on the pressure of the water which is increased to the supercritical pressure (i.e. above the critical pressure of 225 bar).

② When the pressure of water is increased to the supercritical level, the latent heat of water becomes zero and due to this, it directly changes into steam without boiling.

And this prevents the formation of bubbles at the tube surface.

③ In Benson boiler, the feed pump increases the pressure of the water to the supercritical pressure and then it enters into the economizer.

④ From ~~the~~ an economizer, the water passes to the radiant heater.

⊗ Advantage: ① It is light weight and it has no drum. For this reason, it is lighter than another boiler.

② Its starting time is less than other boiler and,

③ It has up to 90 percent thermal efficiency.

⊗ Disadvantage:

① Due to supercritical types of boiler, its controlling need to monitor every time for preventing an explosion.

② Boiler control for the variable load is difficult.