

ENVIRONMENTAL ENGINEERING

Notes by-

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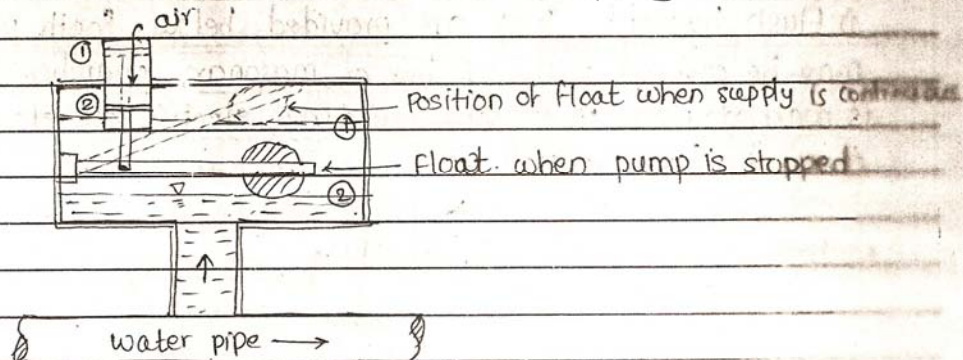
PIPE APPURTENANCES

Following are the pipe appurtenances used in water distribution system for easy & effective working -

- 1) Air valve / Air relief valves.
- 2) Bib cocks
- 3) Fire hydrants
- 4) Reflex valves / check / Non return valve
- 5) Relief valves / Automatic cutoff / safety valve
- 6) Scour valves / Blow off / drain / wash & valve
- 7) Sluice valves / Gate / shut off / stop valves.
- 8) Stop cocks
- 9) Water meters.

① Air / Air Relief valve:-

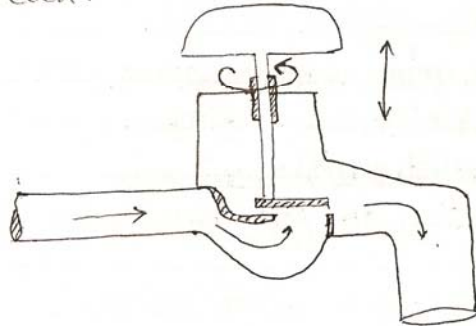
Some quantity of air is contained in the flowing water. This air causes air locking i.e. effective area of flow decreases. To avoid this air relief valves are provided to facilitate exit of air. Air valve also helps in admitting air in the pipe when vacuum is created due to sudden stopping of pump.



As shown in fig., when supply of water is continuous the piston is at closed position ① w.r.t. the water level in the chamber. As flow stops, the water level in the chamber decreases & position ② occurs. At this stage air enters from the valve & it facilitates easy working without making vacuum in the pipe.

• Bib cocks :-

The water taps provided at the end of pipe to stop or continue the flow of water, is known as bib cocks. The bib cocks should be water tight i.e. during off position, water should not flow through cock.



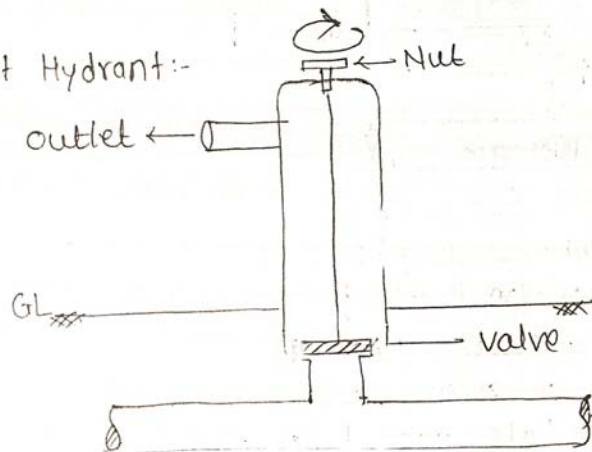
off position

⇒ Fire hydrants:- It is an outlet provided in water pipe for taking water in case of fire.

- Types - 1) Flush hydrants
2) Post hydrants.

Flush hydrant: They are provided below foot path & street & may be covered with CI box or masonry chamber. It's indication is marked near it on any building, electric pole etc. or in case of cover 'F.H.' is marked.

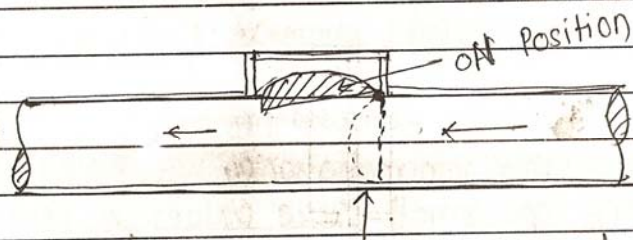
2) Post Hydrant:-



4) Reflux valve / check valve / Non return valve :-

These are provided to allow water to flow in one direction only. In case of shut down of pump, water flows in opposite directⁿ due to gravity so to avoid tⁿ which causes creation of vacume & priming is reqd. for pump. so to avoid this reflux / check / non return valves are provided.

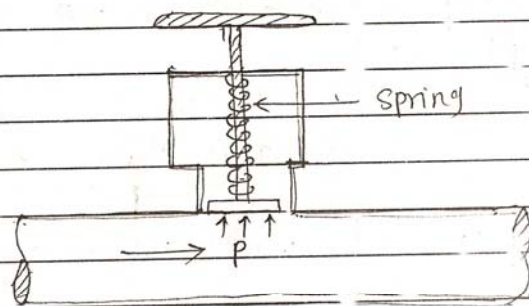
In case of a connection betⁿ water supply & waste water pipe, to avoide intermixing these valves are provided.



Flow stops, due to opposite movement of water the valve comes at this position & avoids flow of water.

5) Relief / Automatic cut off / safety valves :-

These valves are provided to avoid bursting of pipe or any other hazard due to increased p^{ressure} of water. At a max. pressure the spring t^h this valve gets compressed and flow of water from this valve starts & thus it reduces pressure in the pipe u^{ntil} it becomes normal. When pressure becomes normal, due to elastic property of spring, it comes to rest & stops the flow through water.



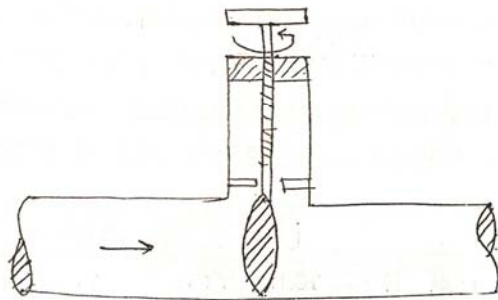
As pre. 'P' increases, spring compr^{esses}.

6) scour valve / gate / shut off, stop valve :- / blow off / drain / washout

These are sluice valves located at dead ends to remove silt & sand deposited in the water pipe.

7) sluice valve / gate / shutoff / stop valve :-

These are the valves which controls the flow of water. To regulate the flow these valves are provided at a dist. of 150 to 200 m to divide the whole length of pipe in suitable sections. Thus, during repairing work, flow can be stopped for that section only.



sluice at closed position

8) stop cocks :- They are small sluice valves & performs working same as bib cocks.

9) water meters :-

The device installed on the pipe to measure the quantity of water discharges through that section of pipe is known as water meter.

Types : a) Positive displacement water meter :- No. of times a known volume of a container is filled & withdrawn is measured to correlates the discharge.

b) Velocity meter :- $Q = V \cdot A$. Thus by knowing velocity of water & c/s area, discharge through a section of pipe can be determined.

→ Turbine meters & venturi meters are velocity type.