Unit I – Topic 9

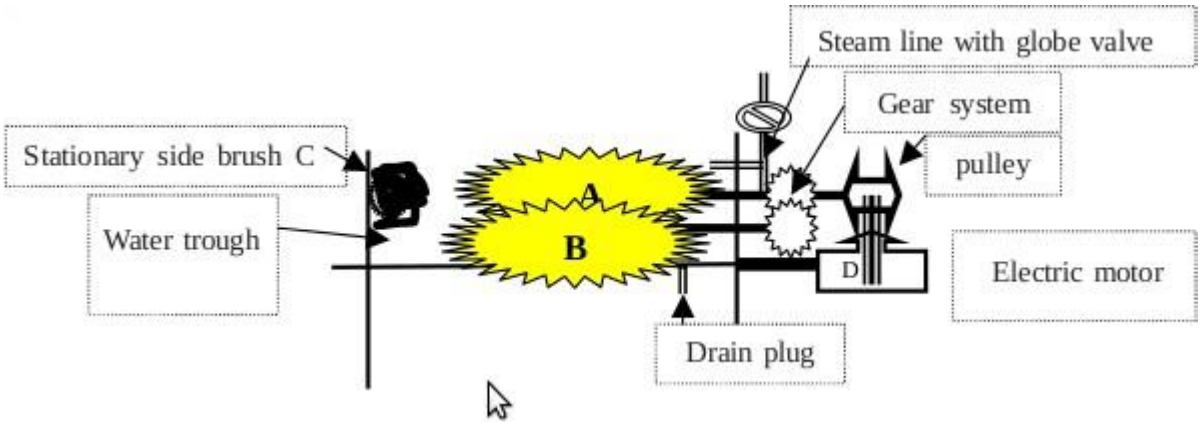
Can washers-types-working

Many types of can washers have been developed and are commercially available for washing milk cans of different shapes and sizes. Popularly, following types could be observed in the dairy industry:

i. Can scrubber
ii. Can Steaming Block
iii. Rotary can washer
iv. Straight-through can washer

i. Can Scrubber

Design and Operator: These are very simple type of can washing machines. As shown in the Fig. one nylon fibre hard brush “A” of cylindrical shape revolves about its axis which is driven by small rating (usually 0.5 to 0.75 HP) electrical motor. Another brush “B” is driven with the connected gear. One stationary brush “C” to suit the shape of can is fitted at one sidewall of the scrubbing machine. The arrangement of these brushes are shown in the following schematic diagram (Fig)



Schematic Diagram of Can Scrubber

Following procedure is usually employed for washing cans in the scrubber:

- Fill the washer and put the required quantity of detergent.
- Heat the solution up to 45 to 50Oc.
- Now start the motor of can scrubber to rotate the brushes.
- Collect can from drip saver and insert it into the scrubber brush “A” from the free end side.
- Hold the can for enough time to loose the deposited materials.
- The brush “A” will scrub the inside surface of can, and rotating brush “B” and;stationary side brush of special shape will scrub the external surface of can.
- Take out the cans and rinse with cold water.
- Check the cleaning status with clean fingers.

Precautions: Major precautions required for effective operation of a can scrubber are:

Proper temperature, concentration of solution and enough holding/scrubbing time are important factors for effective washing. Being manually operated, low-temperature, concentration and holding time are kept at low levels to prevent irritation to the operator. For safety reasons operators should be provided with protective hand gloves. Condition of brush requires regular monitoring so that worn out set of brushes are replaced in time. The brushes after some period of operation either gets worn out or becomes of reduced diameter/thickness due to de-shaping/compression of fibers. With such worn out condition, brushes are not able to touch and scrub the surfaces leading to ineffective cleaning of cans.Care should be taken in adopting right procedure of charging the can scrubber.The clean/soft water is filled up to required level and then measured quantity of detergent is added followed by opening of the steam valve slowly to warm up the detergent solution.Concentration of the detergent solution is checked at desired interval of operation. If required, additional quantity of detergent is charged.The solution is drained after every 150 can washing and then recharged freshly.However, the interval could be changed after observing the practical requirements.

Maintenance: Apart from above routine precautionary measures following maintenance aspects need serious considerations:

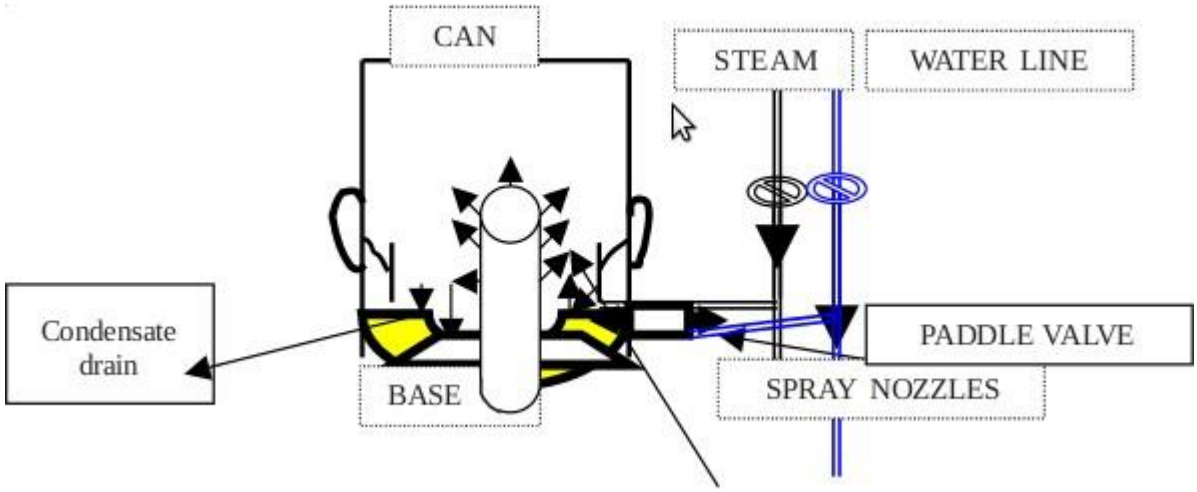
- Draining of dirty detergent solution and washing properly to keep the trough clean.
- Checking all the brushes for proper alignment, tightening and condition of fibers. If found not proper set right properly. Change worn out brushes.
- Checking motor and motion/power transmission system including chain/belt and sprocket/pulley for wear - tear and alignment.

- Providing grease/oiling over the chain/gears
    - **Checking glands to prevent loss of detergent solution.**
    - Checking the drain plug to prevent leakage through it.

ii. Can Steaming Block

After manual cleaning of cans, the sterilization is done either by spraying cold sanitizer solution or steam sanitization through steaming blocks (Fig).

Design and Operation: This equipment is specially designed for holding can in the inverted position. Paddle operated steam and water jets are used to rinse the washed can with cold water and sterilize by injecting live steam till the can becomes hot.



Schematic Diagram of Steaming Block

Precautions: Main precautions required in operating steaming block are to ensure steam opening and working of rinse/steam injection valve. The safety of operator who is holding the hot can need to be ensured to avoid burn. Some times, operator holds cans for less time which may result in an ineffective operation. In order to

avoid accident from hot water spray, the can should be positioned and then rinse or steam valve is opened. Steam pressure of 2 to 3 kg/sq. cm is enough to get the effect.

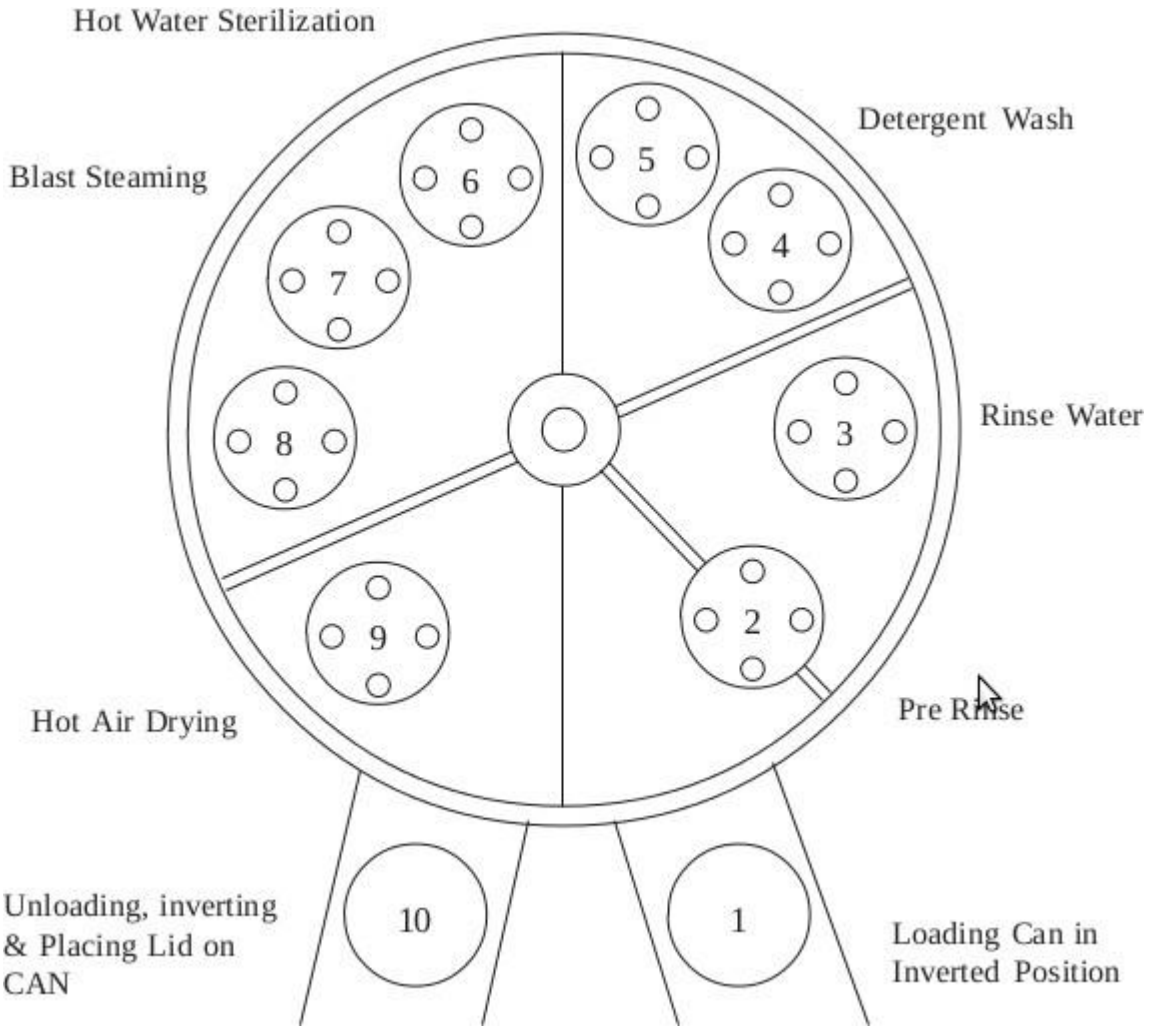
Maintenance

- Check and clean holes of jet regularly.
- Check and adjust spring tension of paddle-operated valve.
- Clear the drain water holes and maintain cleanliness.

iii. Rotary Can Washer

These are semi-automatic or automatic can washing machines, in which cans are rinsed, cleaned and sterilized very effectively. The details of the machine are described below.

Design: The cans are carried on a large rotating table or carrier (Fig);this type of washer is very simple in construction. Deshaped cans are also cleaned without any problem of falling. These are built in various sizes for handling low to medium number of cans and are very compact machines.



Rotary Can Washer

Operation

- The detergent tank is charged.
- Temperatures of rinse water, detergent solution, heating air is set in the automatic type washer. In the semi automatic machine valves are opened to heat the liquid and temperature is monitored.
- Start the machine to revolve the table, to operate pumps and to heat with the steam.

- Empty cans after draining milk at the drip saver are placed one by one manually or automatically on the revolving carrier/table of washer from the entry door
- Cleaned and sterilized cans will come out from the unloading door.

Precautions: Check the effectiveness of cleaning. In case of dented cans or heavy soiled can, scrub the can in the can scrubber before loading in the rotary can washer.

Maintenance:

- Like other can washer, pumps and nozzles are to be checked timely.
- Lubricate the moving parts daily or as per the manufacture's instructions.
- Check and attend the gland/oil seal/water seal
- Keep all the doors closed except entry and exit.

iv. Straight-through Can Washer

Design and operation : The washer has rinsing, detergent spraying, hot water rinsing, steaming and air-drying sections (Fig.). The cans are moving from entry door over the steel or plastic chains of special design to hold the can and carry towards the exit door. In other type of moving arrangements cans are carried forward through a ratchet from one position to the next. Can moves forward from entry door in inverted position to rinsing section, where warm water is injected from bottom and other sides removing loosen soils and some part of dirt. Then these cans move to detergent section, in which hot detergent solution of 0.5 to 1% concentration is sprayed inside and out side surface of cans to remove the soil completely. These cans move to hot water rinsing section where the traces of detergent and soils are removed. Now, the

cans are effectively clean and move to steaming section for sterilization. Finally the hot cans are dried into the air-drying section. Before reaching to exit door, by suitable attachment, inverted cans are brought to the normal position with mouth upside.

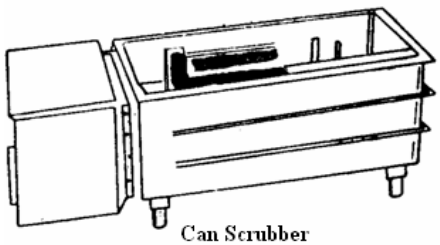
Two types of steam injection are presolent i.e. intermittent and continuous. The intermittent type jets give economy of saving steam.The cleaning operation can be accomplished in semi-automatically or automatically in the machine depending upon the technique employed.

Precautions

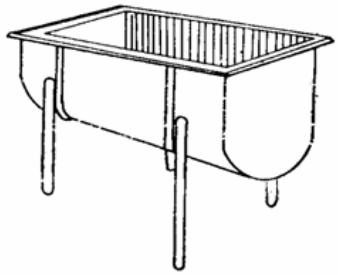
- Steam jets should be cleaned regularly for proper injection of steam.
- Damaged cans should not be used, as they often fall inside the washer and interrupt the washing operation.
- Use steam and air at enough pressure & temperature.
- Ensure that proper quantity of water is available to can washer.
- Keep door closed while washing is in progress.

Maintenance: The following maintenance is required in straight through can washer to carry out the washing operation smoothly:

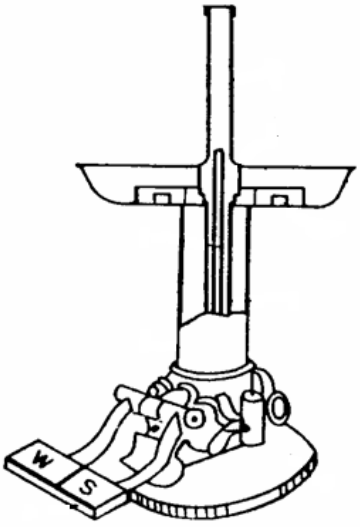
- Check the steam nozzle before and after the washing operation. Clean the blocked nozzle.
- Can conveying chain should be checked, loose link should be repaired/ replaced.
- Clean all the tanks (water/detergent/hot water).
- Inspect the oil seal/water gland of pumps.
- Check the door gaskets and replaced if found damaged.
- Check ratchets movement and do needful adjustment, if required.



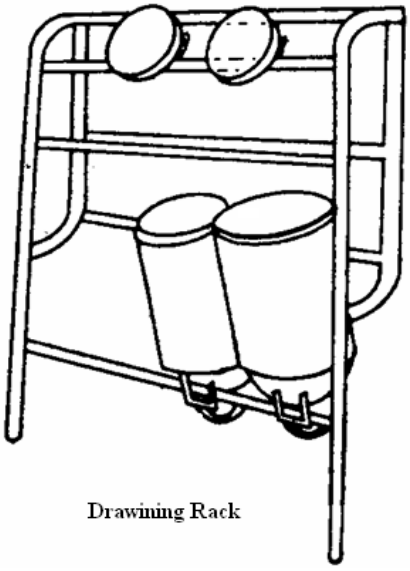
Can Scrubber



Can washing trough



Can Rising and Steaming Block



Drawining Rack