MILKING SYSTEM

AMIN AHMAZADEH Ph.D.

References Dr. H.D. Tyler, Iowa State University and Dr. M. A. Barnes, Virginia Tech

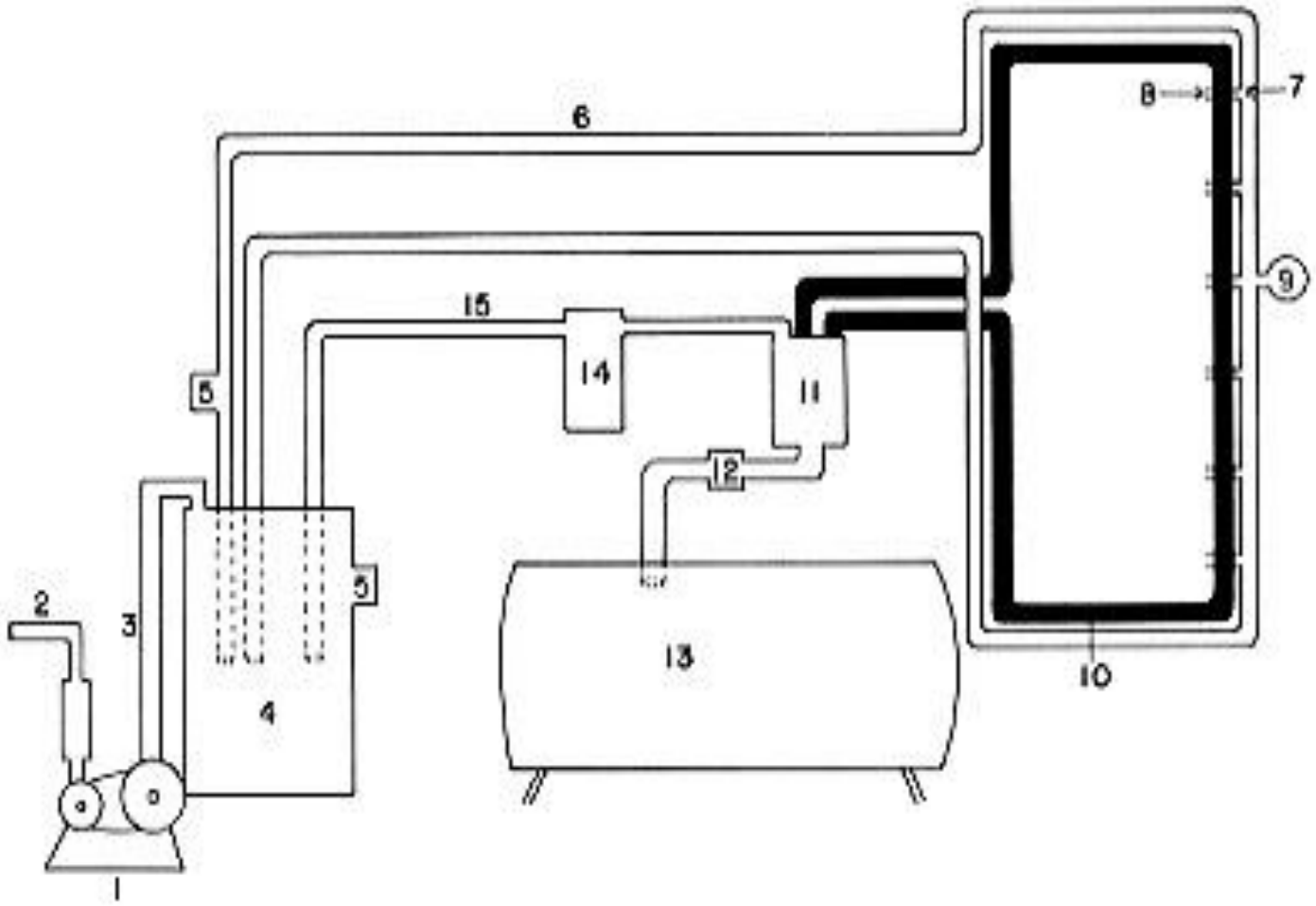
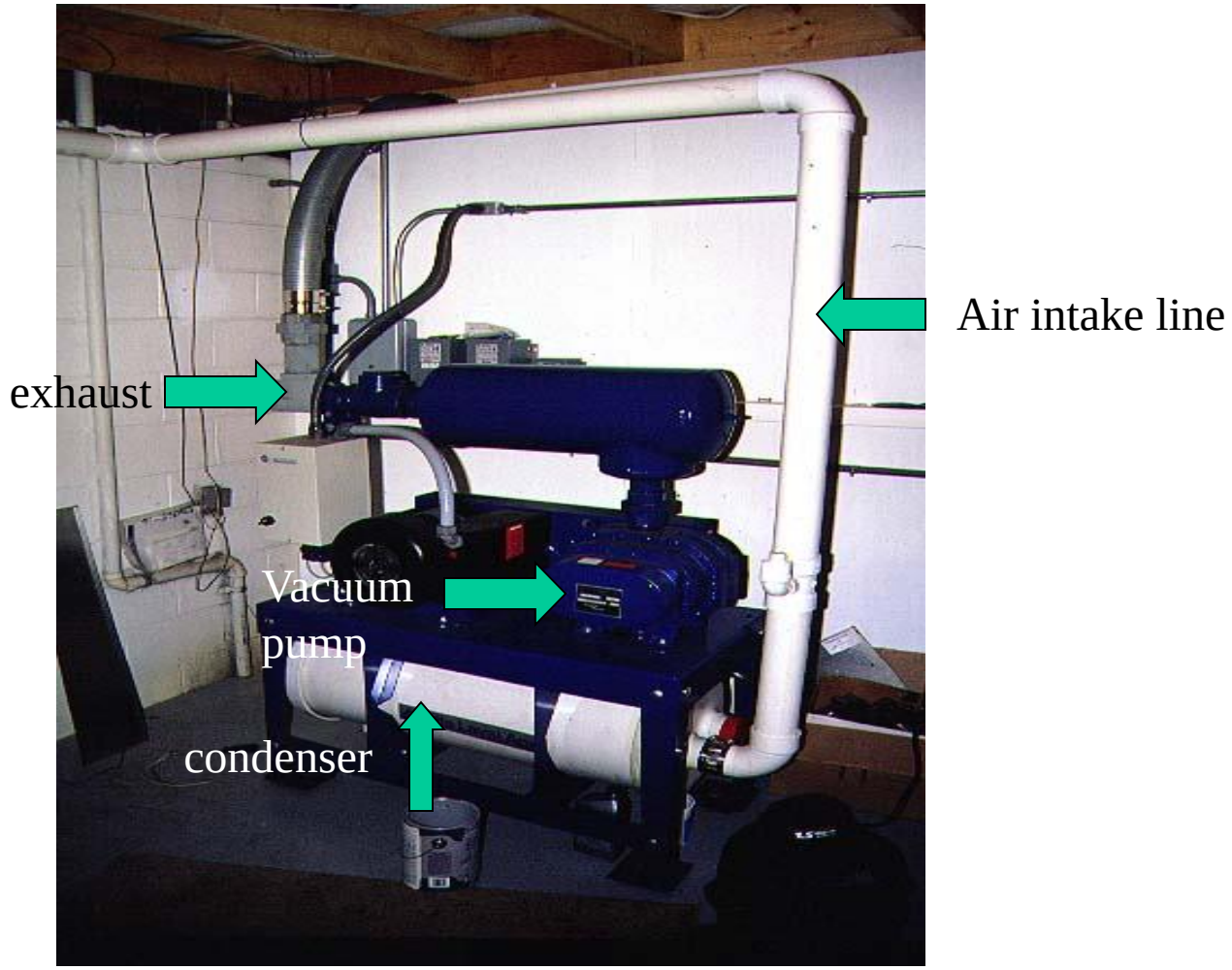
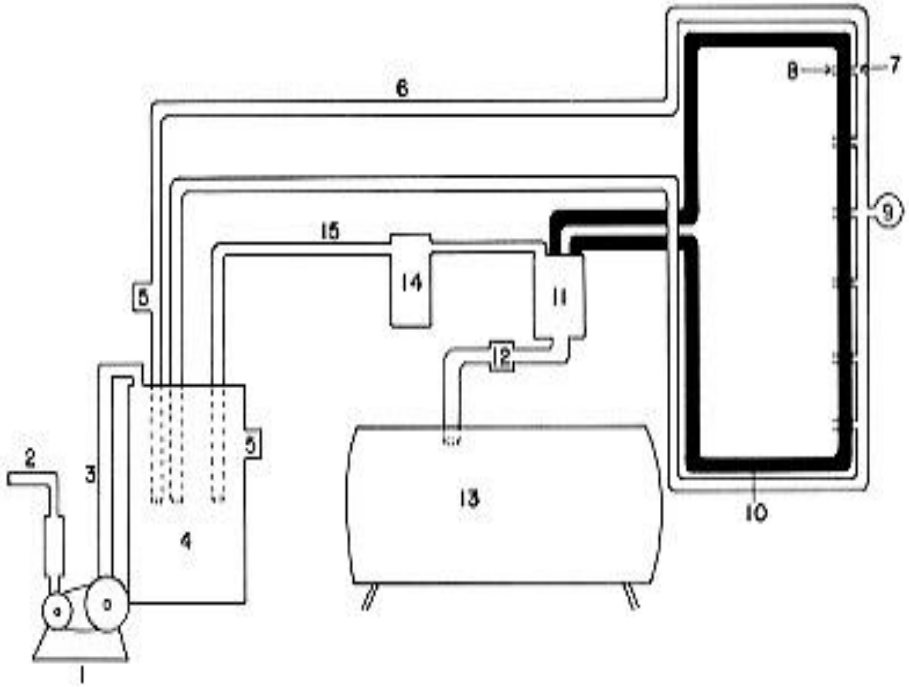


FIG. 19.7 Diagram of a vacuum supply system to the milking machine. 1. Vacuum pump; 2. Pump exhaust pipe; 3. Vacuum supply line; 4. Vacuum reserve tank; 5. Vacuum regulator; 6. Pulsator vacuum line; 7. Vacuum stall cock; 8. Milk line stall cock; 9. Vacuum gauge; 10. Milk line; 11. Milk receiver jar; 12. Milk sanitary pump; 13. Bulk tank; 14. Sanitary trap; 15. Sanitary trap vacuum supply.


Air intake line
exhaust
Vacuum
pump
condenser



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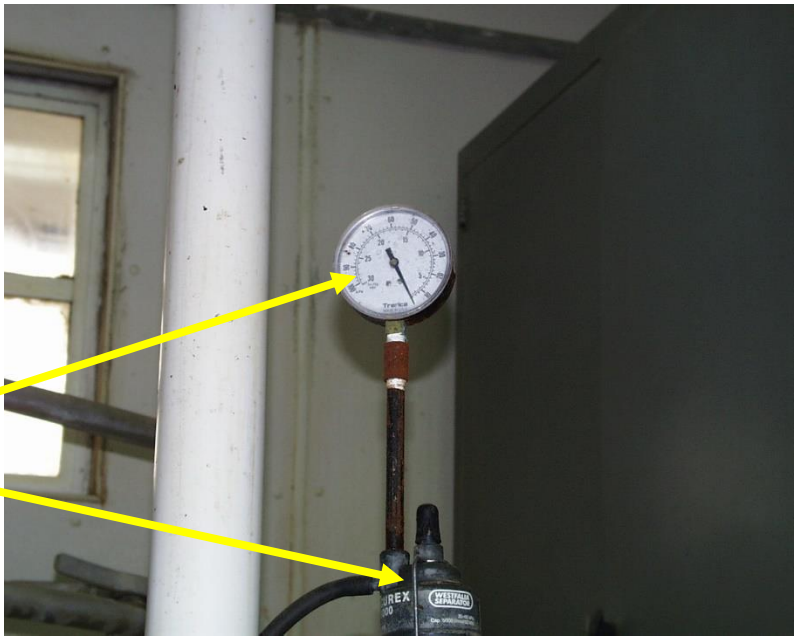
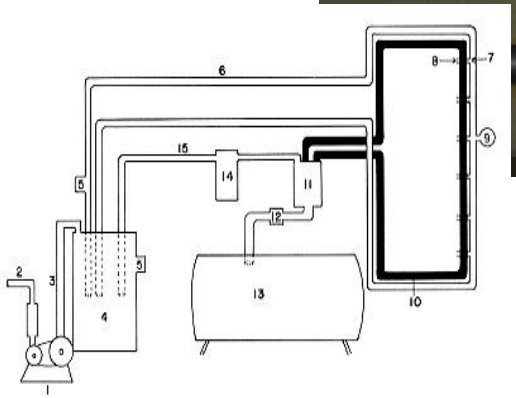
4. Balance Tank



5. Regulator

4._____



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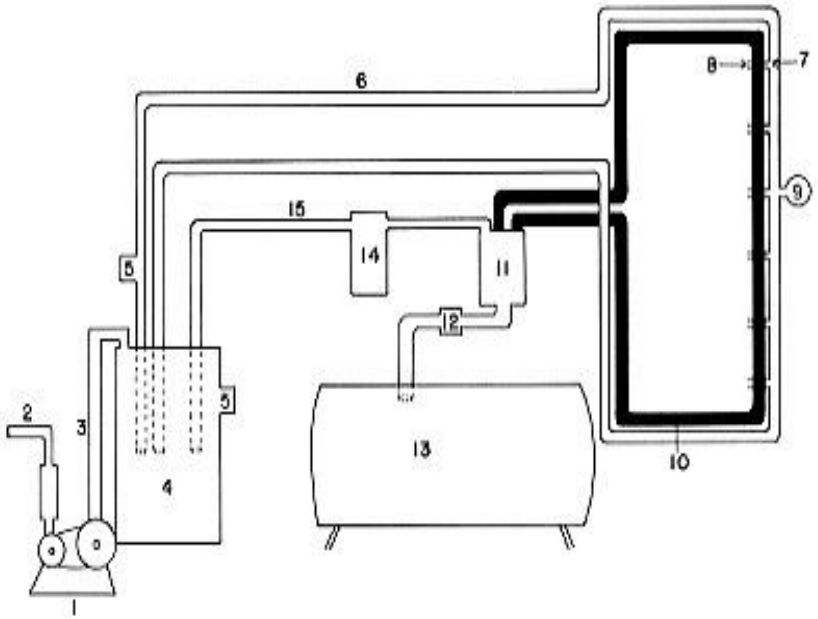
Pulsator

Pulsation Hose

Pulsation line

Carries vacuum to milking unit (fed by reserve tank)

7.Pulsator



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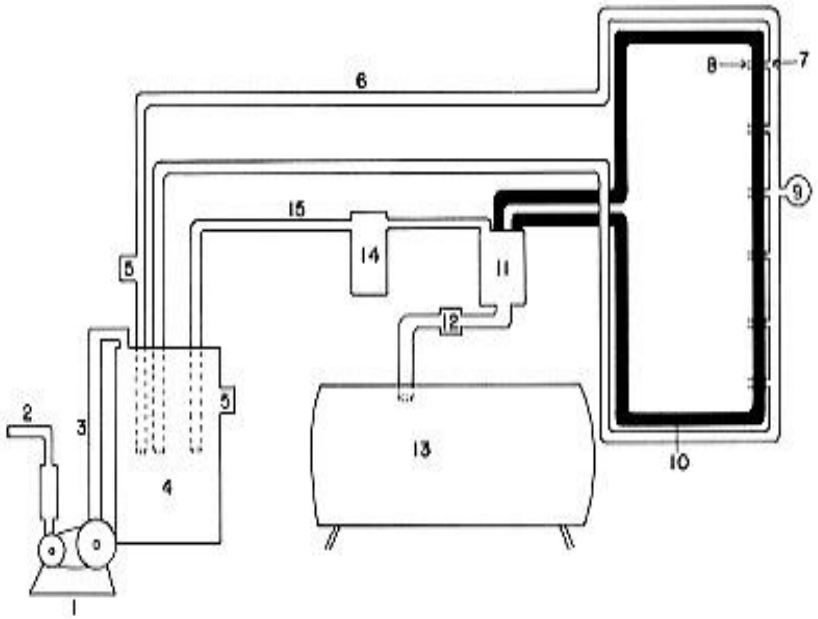
Pulsation Hose

6. Pulsator Vacuum line

7.Pulsator



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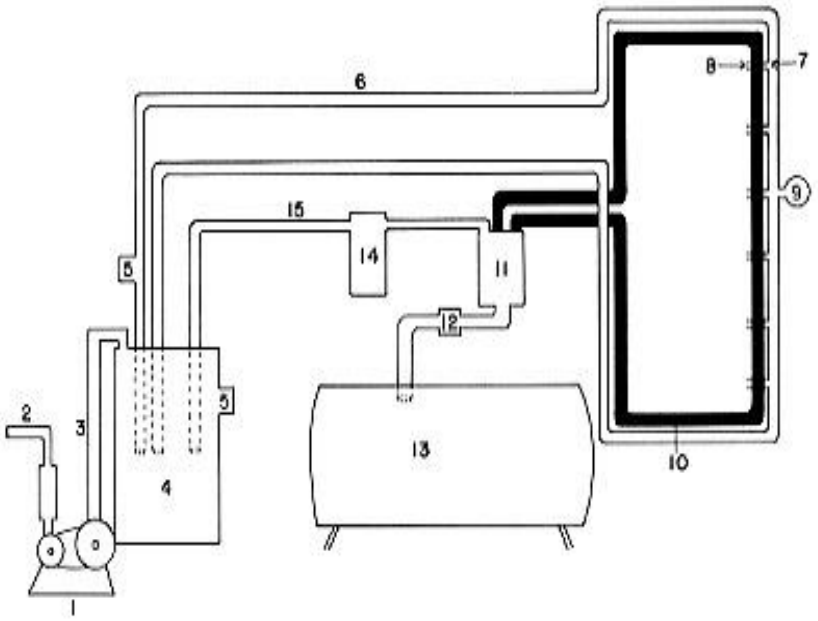
Milk Hose

Milk hose: delivering milk from the udder to milk line

10. Milk Line

10. Milk Line



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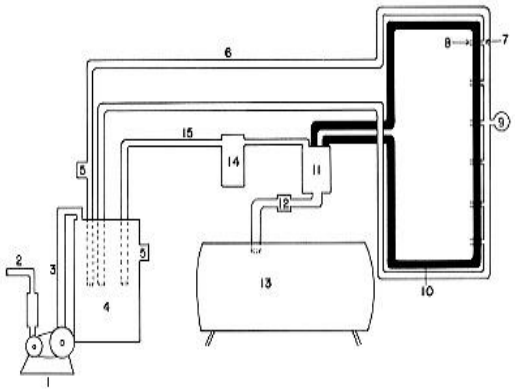

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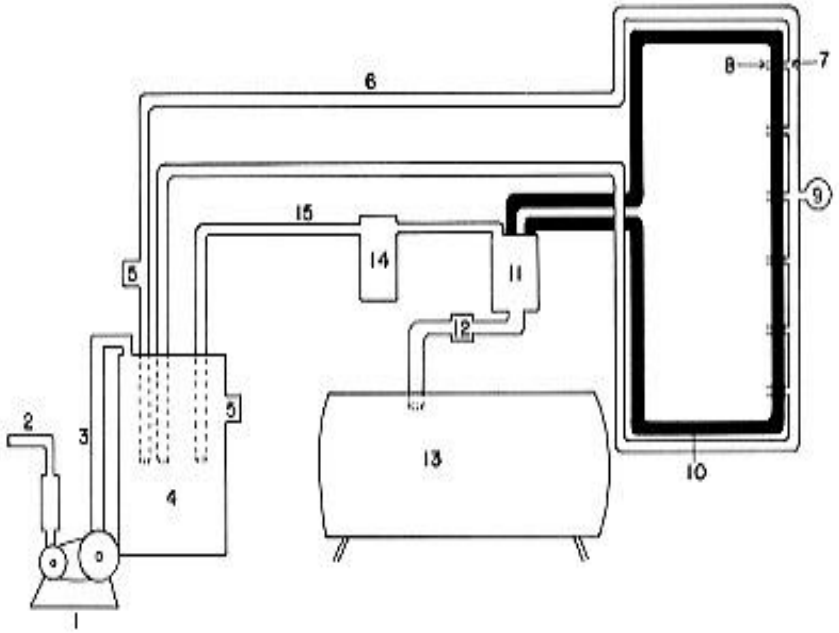
11. Receiving Jar



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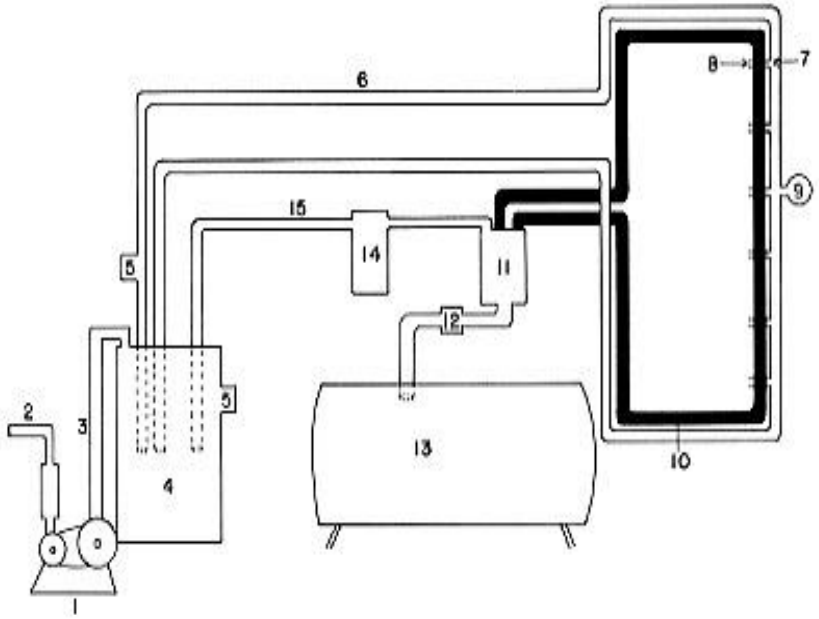
12. Milk Pump



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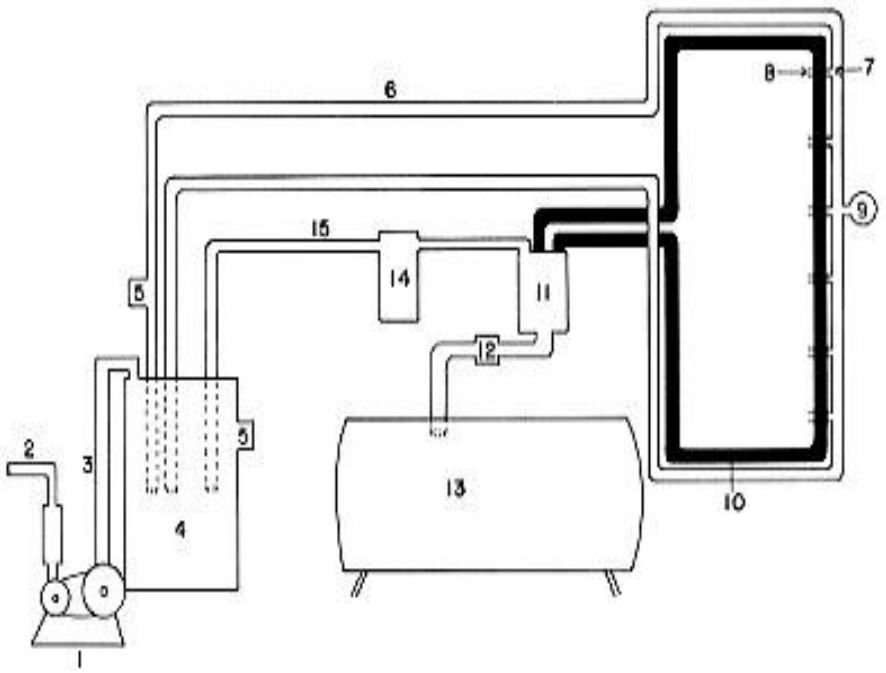
Pumping milk from receiving jar to the milk tank



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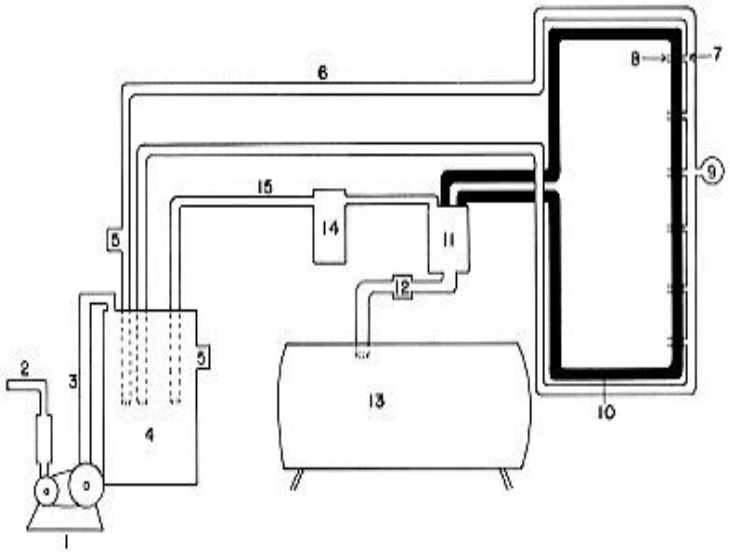
14.Sanitary Trap

Cooling Plates

Decreasing milk temperature before is stored in the milk tank

13. Milk Tank



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Cooling system Control

Milking Equipment

- Milking unit
  - Each has four individual teat cups attached by hoses to a unit pulsator
    - Each teat cup has a teat-cup liner

Fig 32-7. The milking claw is designed to harvest milk with the least amount of damage to teat end tissues (Courtesy of Westfalia)

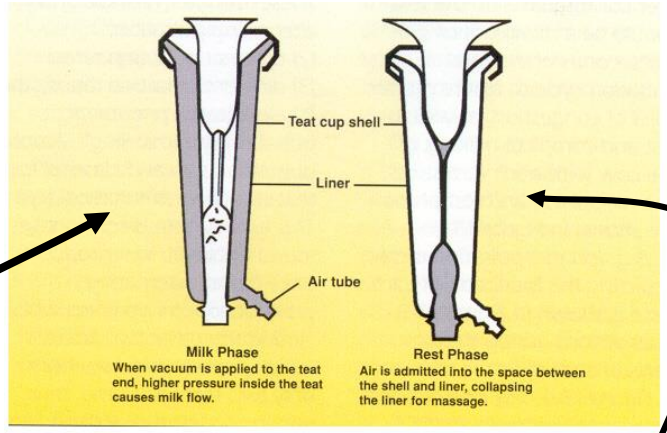
Fig 32-8. Teat cup liners must be replaced at regular intervals to maintain optimal function of the milking system (Courtesy of Westfalia)

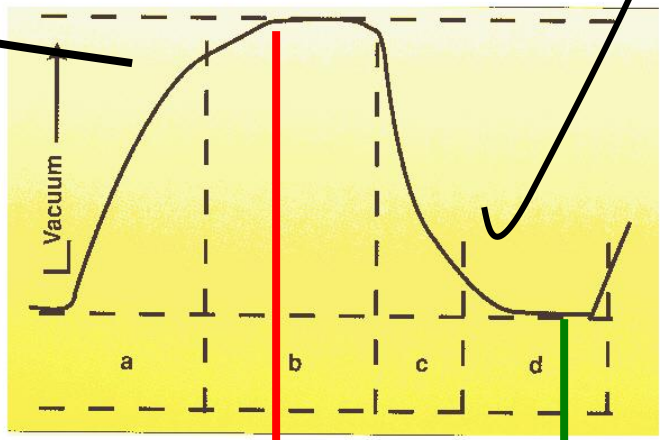
Milking Systems; pulsators

-
  - allow alternating vacuum/atmospheric pressure into teat cup chamber
  - attached to pulsator vacuum line
  - 1 pulsator/milking unit

Pulsation: Milking Phase Resting Phase

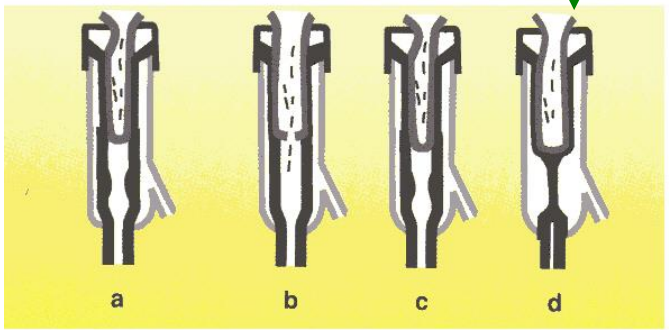
Milking Phase is the expansion phase





Massage phase

Initiated when air is pumped into the space between the liner and outer shell



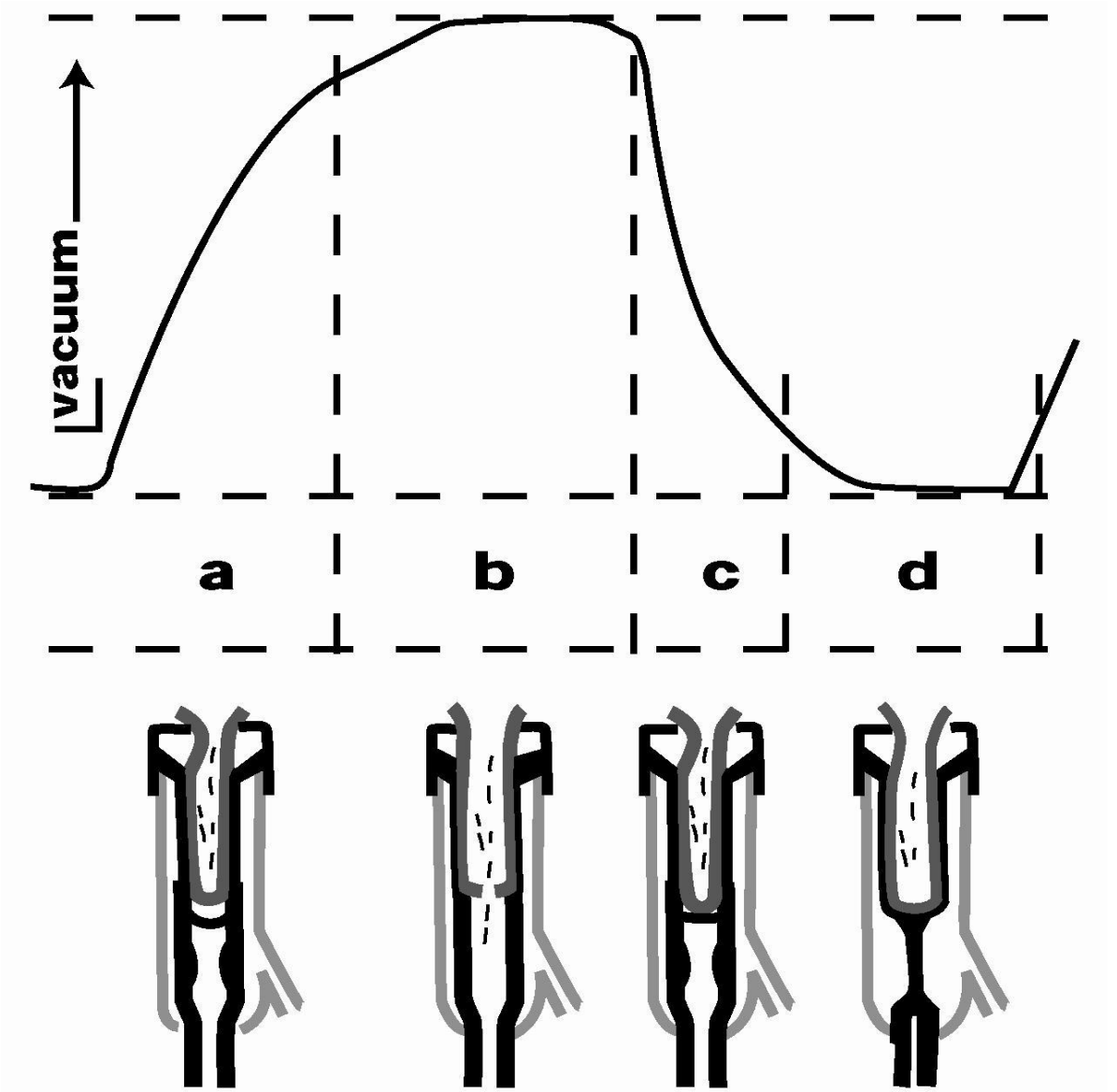


Fig 32-12. Vacuum diagrams visually display the inner workings of the teat cup liner, allowing otherwise invisible problems to be detected (Courtesy of Westfalia)

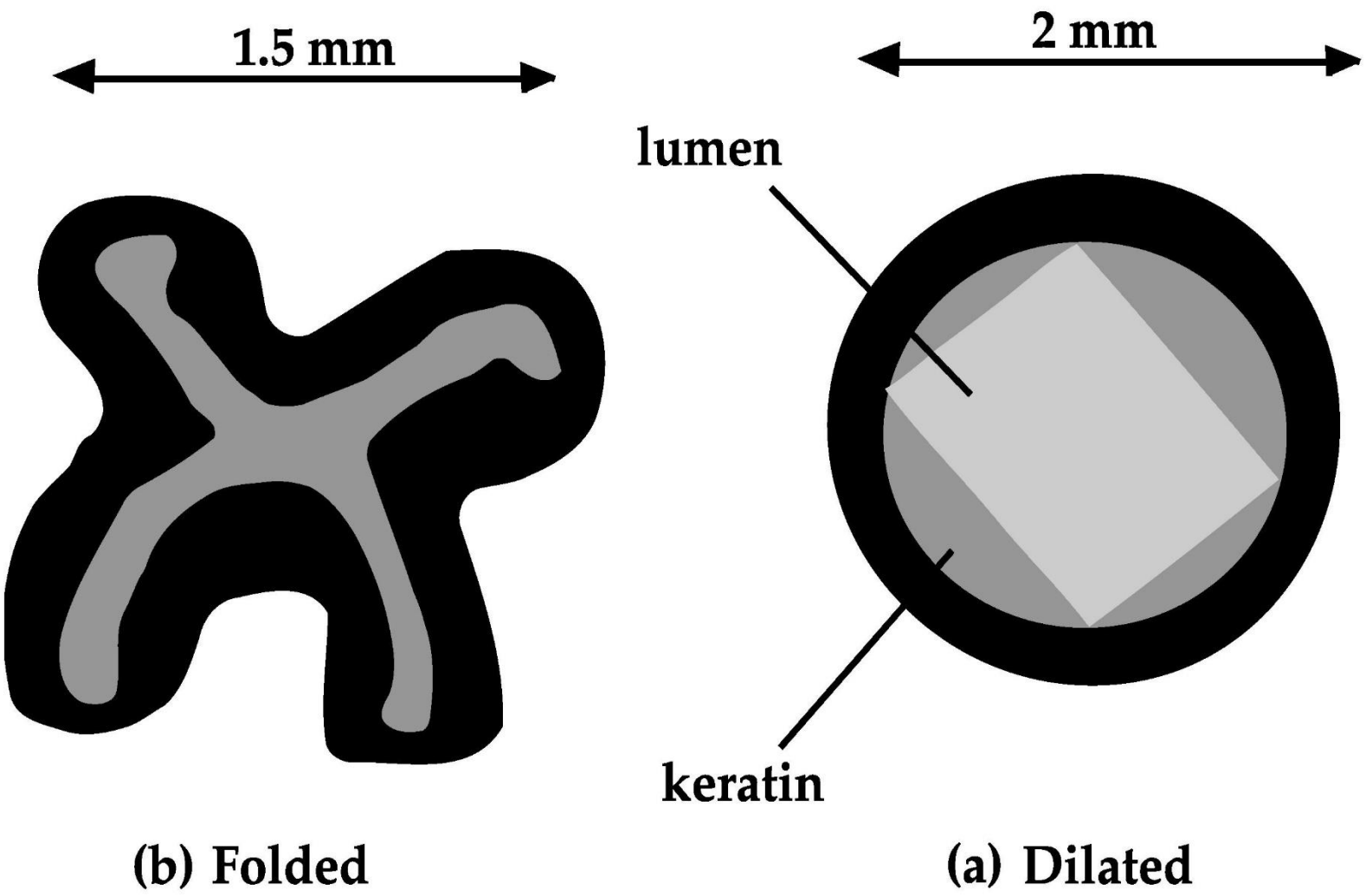
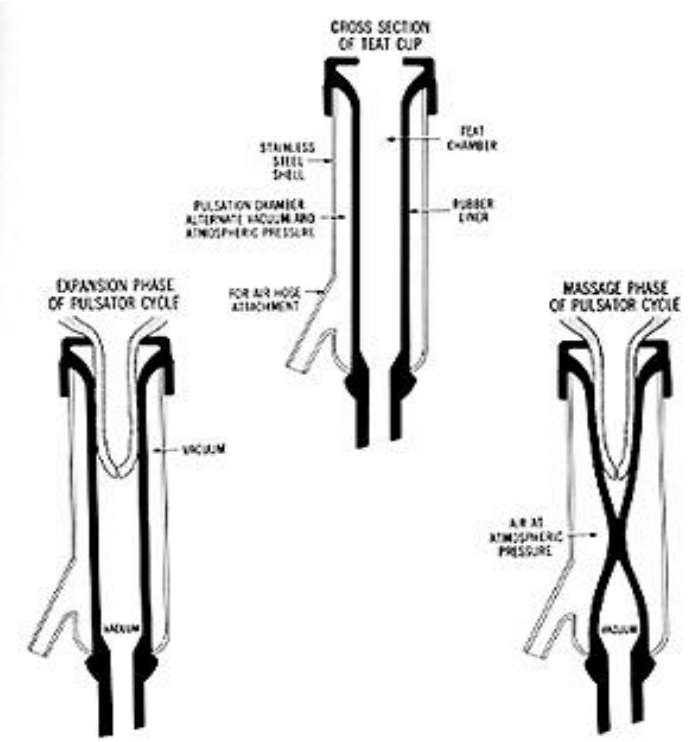


Fig 32-10. Proper milk let-down procedures stimulate dilation of the teat sphincter, permitting faster flow of milk from the teat end and more rapid milking times (Courtesy of Westfalia)

Milking Systems; pulsators

- **Pulsation rate:**
  - **vac/atm = milk/massage**
  -
- **Pulsation ratio:**
  - **vac/atm = milk/massage**
  -
  - **wider = faster milk out**
  - **too wide increases congestion**



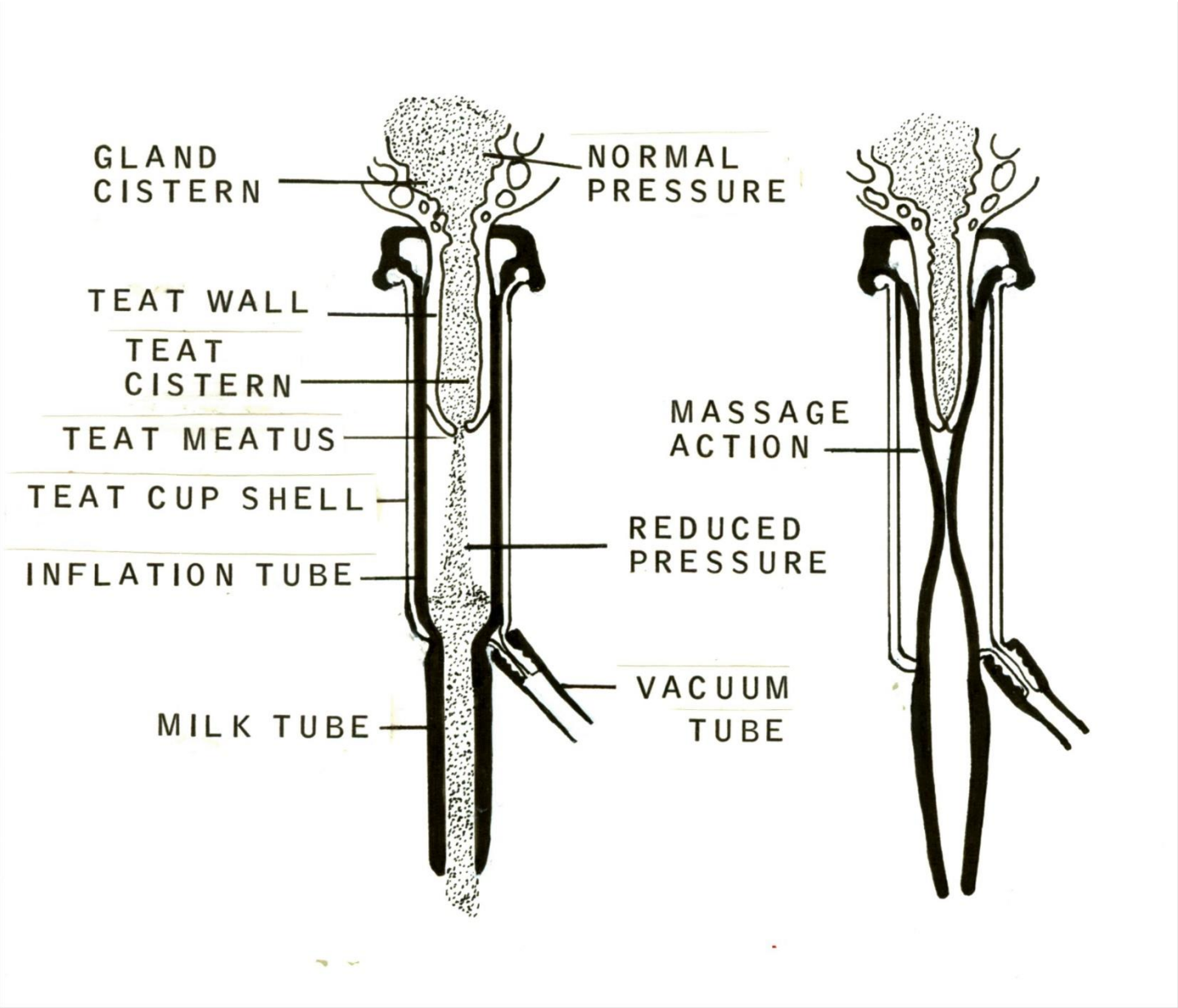
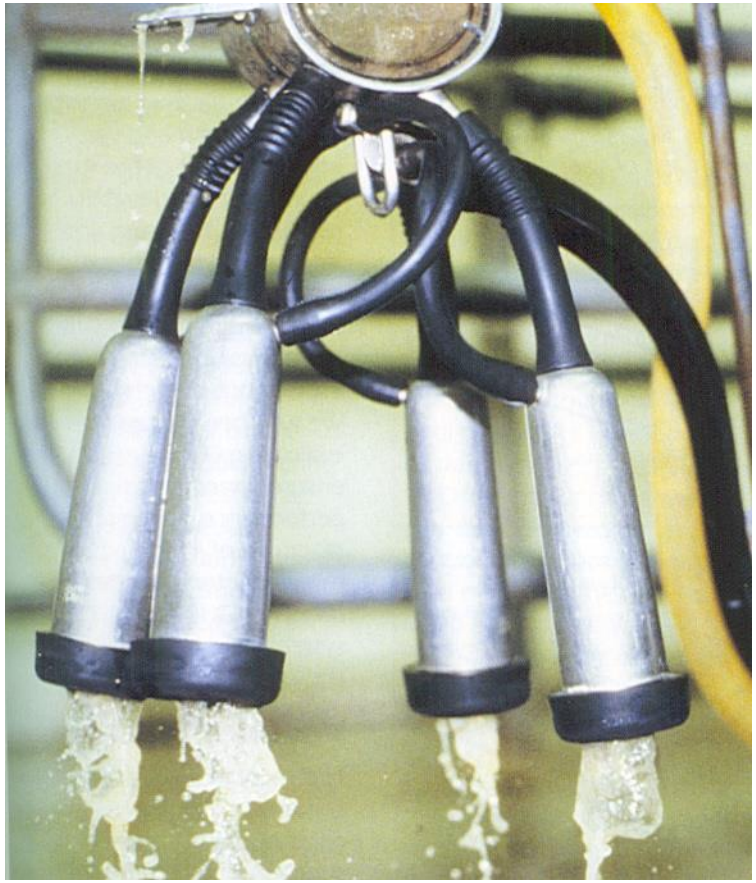


Fig 32-9. The mechanics of machine milking (Courtesy of Iowa State University)



Back Flush

Fig 32-17. Kinking inflations prior to attaching milking units minimizes air leaks and vacuum fluctuations at the teat end (Courtesy of Howard Tyler)

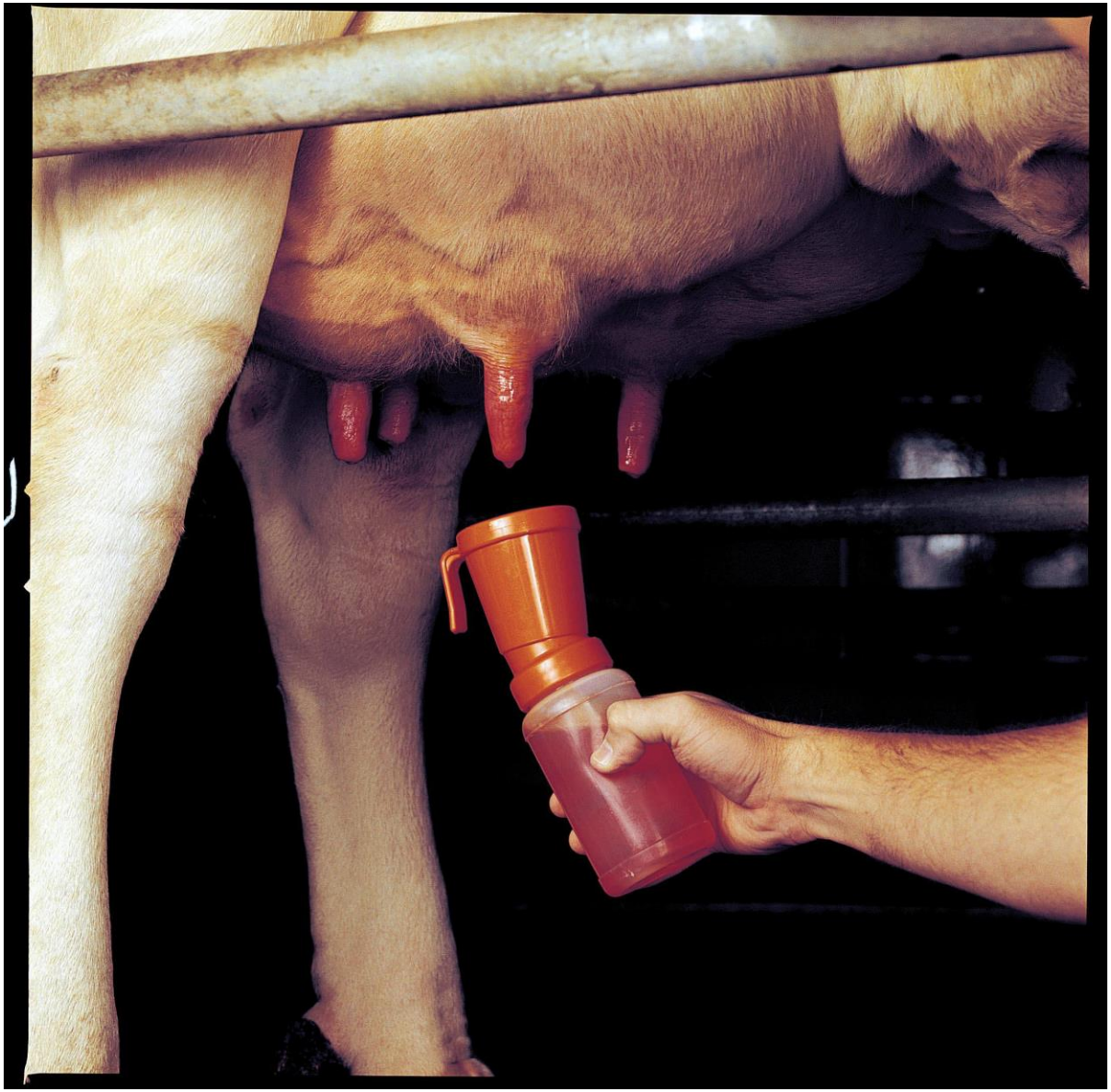


Fig 32-23. Post-milking teat dipping is important to protect the mammary glad from pathogen entry until the teat sphincter closes (Courtesy of Westfalia)

Fig 32-25. Clean-in-place systems allow milking units to be cleaned and sanitized in the parlor between milkings (Courtesy of Westfalia)