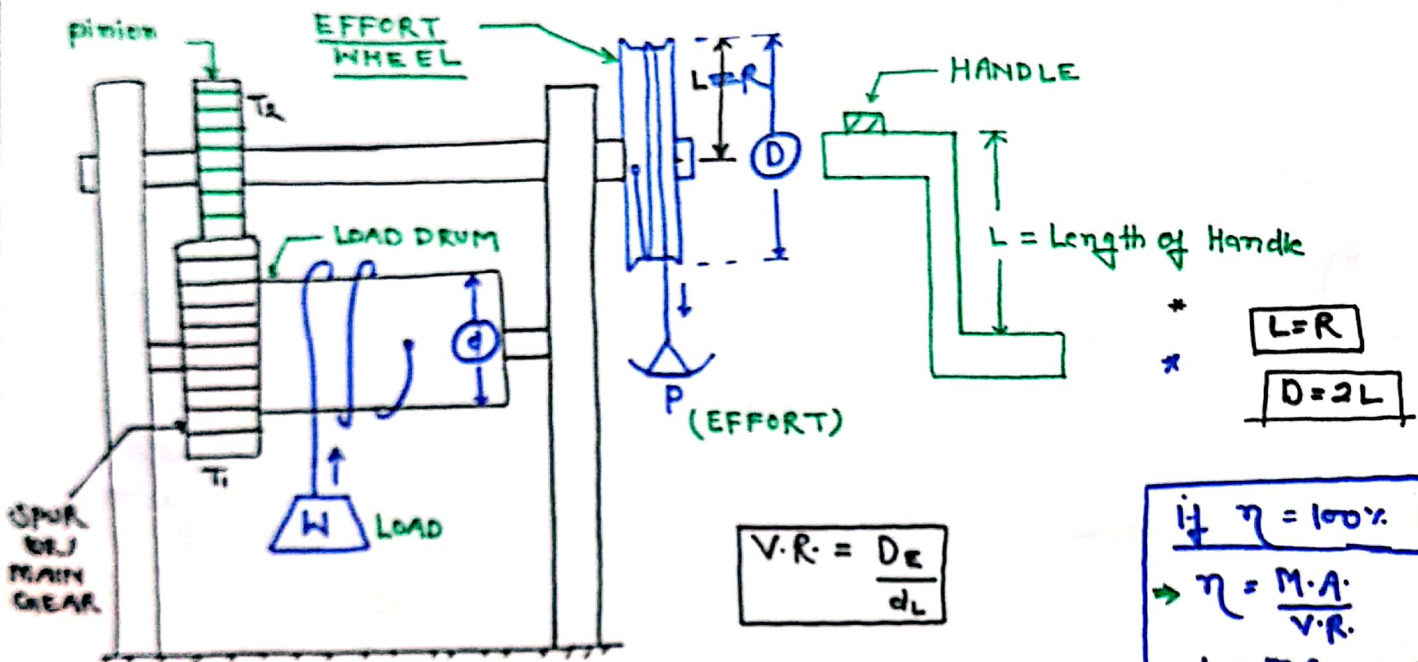


# Single Winch Crab:- [Single purchase Winch Crab] :-

(1)



$$V.R. = \frac{D_E}{d_L}$$

→ Distance Moved by effort ( $D_E$ ) =  $2\pi R = 2\pi L$

→ Distance Moved by load ( $d_L$ ) =  $\pi d \times \left(\frac{T_2}{T_1}\right)$

$$\left[ V.R. = \frac{2\pi D}{\pi d \left(\frac{T_2}{T_1}\right)} = \frac{D}{d} \times \left(\frac{T_1}{T_2}\right) \right]$$

If  $\eta = 100\%$  (ideal)

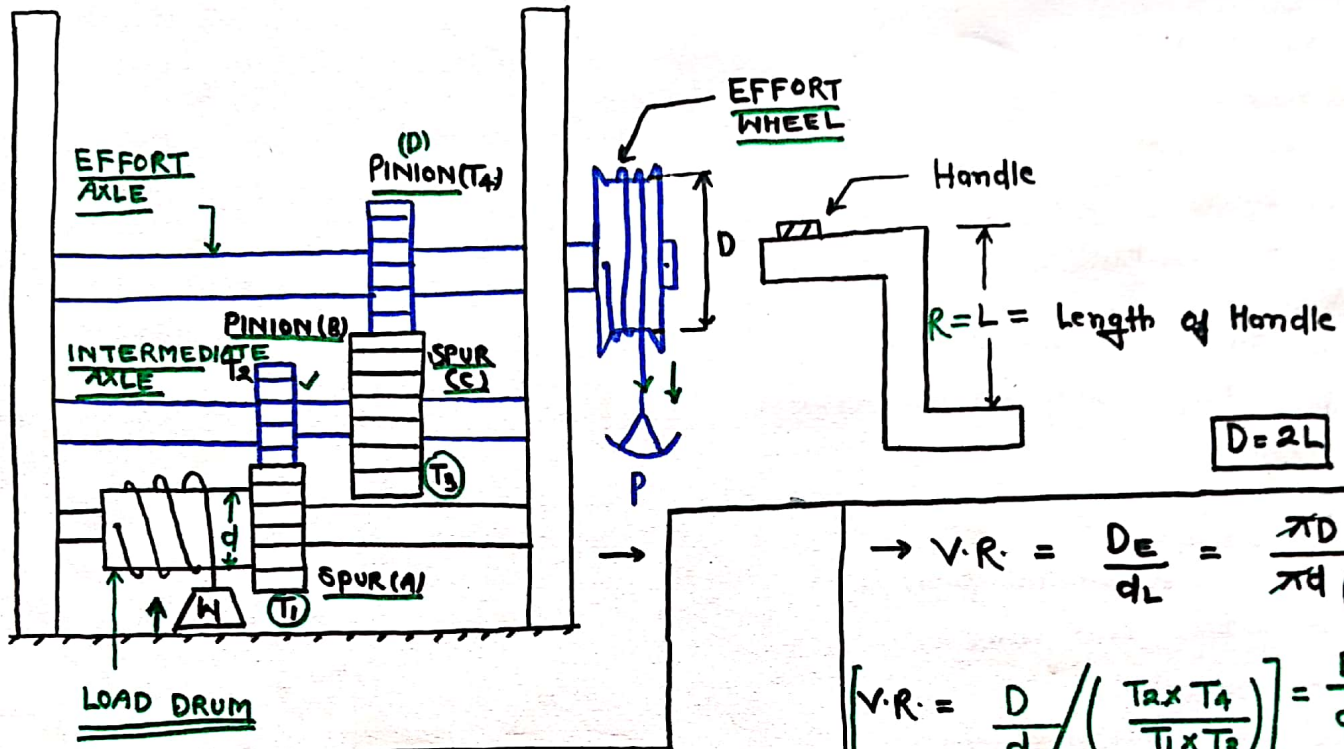
$$\eta = \frac{M.A.}{V.R.}$$

$$1 = \frac{M.A.}{V.R.} \Rightarrow M.A. = V.R.$$

$$\left\{ M.A. = V.R. = \frac{D \times T_1}{d \times T_2} \right\}$$

## "Double purchase Winch Crab"

(2)



$$\rightarrow V.R. = \frac{D_E}{d_L} = \frac{\pi D}{\pi d \left( \frac{T_2}{T_1} \right) \times \left( \frac{T_4}{T_3} \right)}$$

$$\left[ V.R. = \frac{D}{d} \left/ \left( \frac{T_2 \times T_4}{T_1 \times T_3} \right) \right. \right]_{//}$$

$\Rightarrow$  If Machine is ideal  $\rightarrow \eta = 100\%$

$$\therefore M.A. = V.R.$$

$$\{ M.A. = V.R. = \frac{D}{d} \left/ \left( \frac{T_2 \times T_4}{T_1 \times T_3} \right) \right. \}_{//}$$

$$\{ M.A. = V.R. = \frac{D}{d} \left( \frac{T_1 \times T_3}{T_2 \times T_4} \right) \}_{//}$$

$\rightarrow$  Distance Moved by effort =  $\pi D = 2\pi R = 2\pi L$

$\rightarrow$  Distance Moved by Load =  $\frac{\pi d}{\pi} \times \left( \frac{T_2}{T_1} \right) \times \left( \frac{T_4}{T_3} \right)$

### Important Questions:-

- (1) Write short Notes on-
  - (a) Effort, Weight.
  - (b) V.R., M.A. &  $\eta$ .
  - (c) Law of Machine.
  - (d) Actual & Ideal Machine.
  - (e) Machine
- (2) What are all the System of pulleys?  
Derive the Expression for 1st System of pulleys.
- (3) Find M.A., V.R. and  $\eta$  of-
  - (a) Weston's differential pulleys.
  - (b) Simple wheel and Axle
  - (c) Simple screw jack
  - (d) Worm and worm wheel.
- (4) find the V.R. formula for Single purchase winch crab.