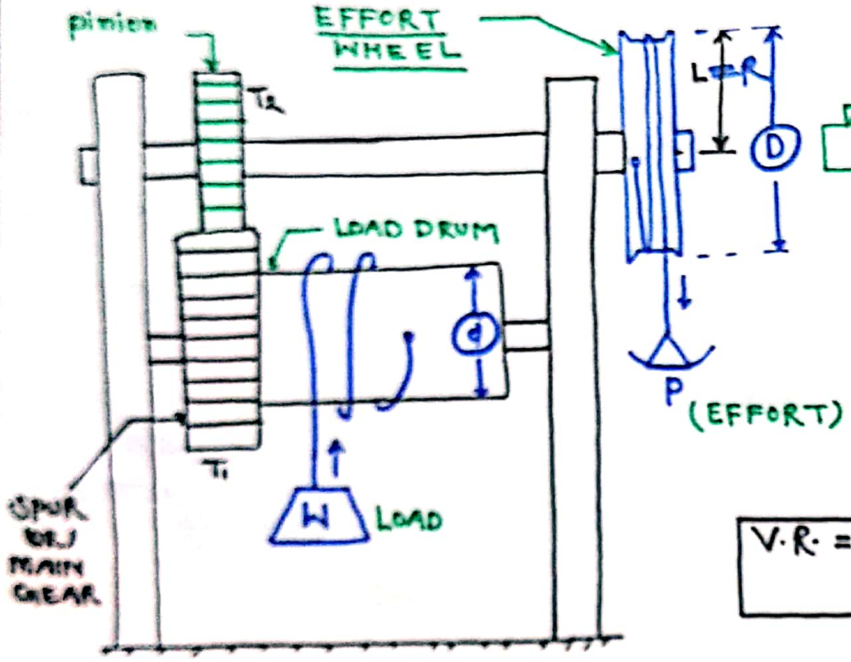
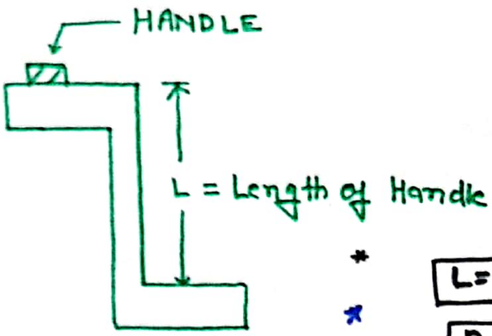
Single Winch Grab :- [Single purchase Winch Grab] :-





* $\boxed{L = R}$
* $\boxed{D = 2L}$

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

→ Distance Moved by effort $(D_E) = \underset{= \pi D}{2\pi R} = 2\pi L$

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

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

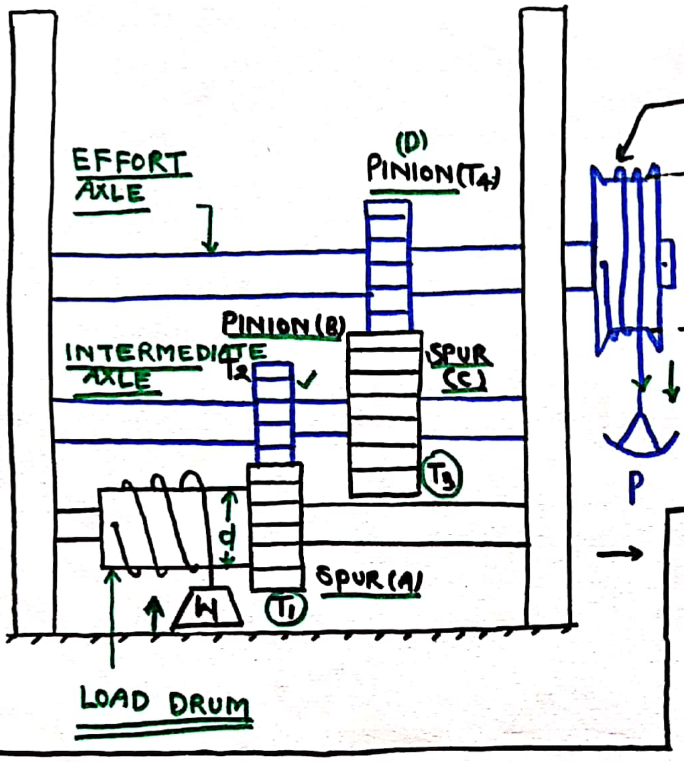
If $\eta = 100\%$ (ideal)

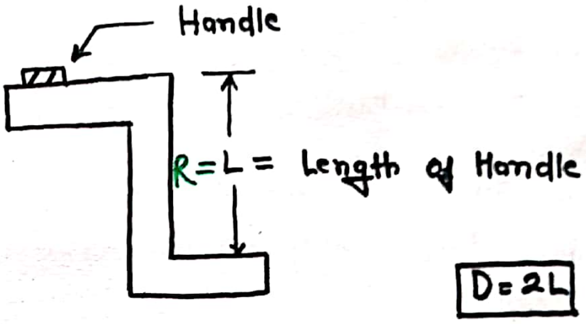
$\Rightarrow \eta = \frac{M.A.}{V.R.}$

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

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

"Double purchase Winch Crab"





$\boxed{D = 2L}$

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

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

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

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

⇒ If Machine is ideal → $\eta = 100\%$.

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

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

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

Important Questions:-

(1) Write short Notes on-

(a) Effort, Weight.

(b) V.R., M.A. & η.

(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 η 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.