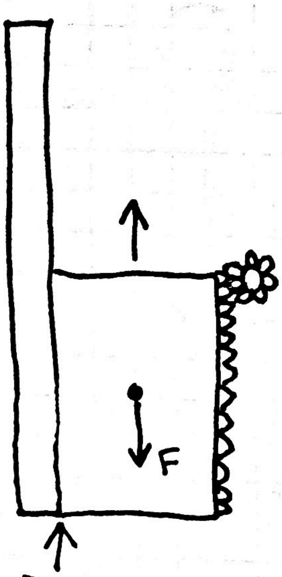


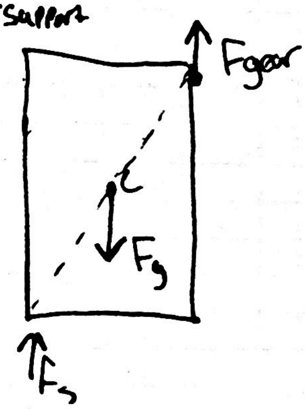
F(from Concept phase) = .0241748753 N

F_g = .00545 lbF

$\overline{Y} = 9$ in

$x = 4.5$ in

$\tau = F d \sin\theta$



$M_{gear} = F_g(4.5) = F_s(9)$

$F_s = .0027725$ lb

$F_{gear} = .0027725$ lb

$F_g = F_s + F_g$

$M_{gear} = M = .0027725\,(2.25\text{ in})$

~~M_{gear}~~ $= \tau_{gear} = .006131251$ lb in

$M_c = F_{gear}\left(\sqrt{4.5^2+9^2}\right) - F_s\left(\sqrt{4.5^2+9^2}\right)$ $\quad F_{gear} = F_s$

Required Torque to hold door up on gear is 0.00613125 lb-in or .073575 lb-ft

$\tau = \frac{Tc}{J}$ = ~~.0735575~~ . ~~[illegible]~~ psi · 2.25 in / [illegible]^4 / 32 ([illegible])

Torsional stress: ~~[illegible] x10^-4 [illegible]~~

$$\tau = \frac{Tc}{J} = \frac{.00613125 \cdot \left(\frac{1.5}{2}\right)}{\frac{\pi}{32}(1.[illegible]5)^4} = .0092522074 \text{ ksi}$$