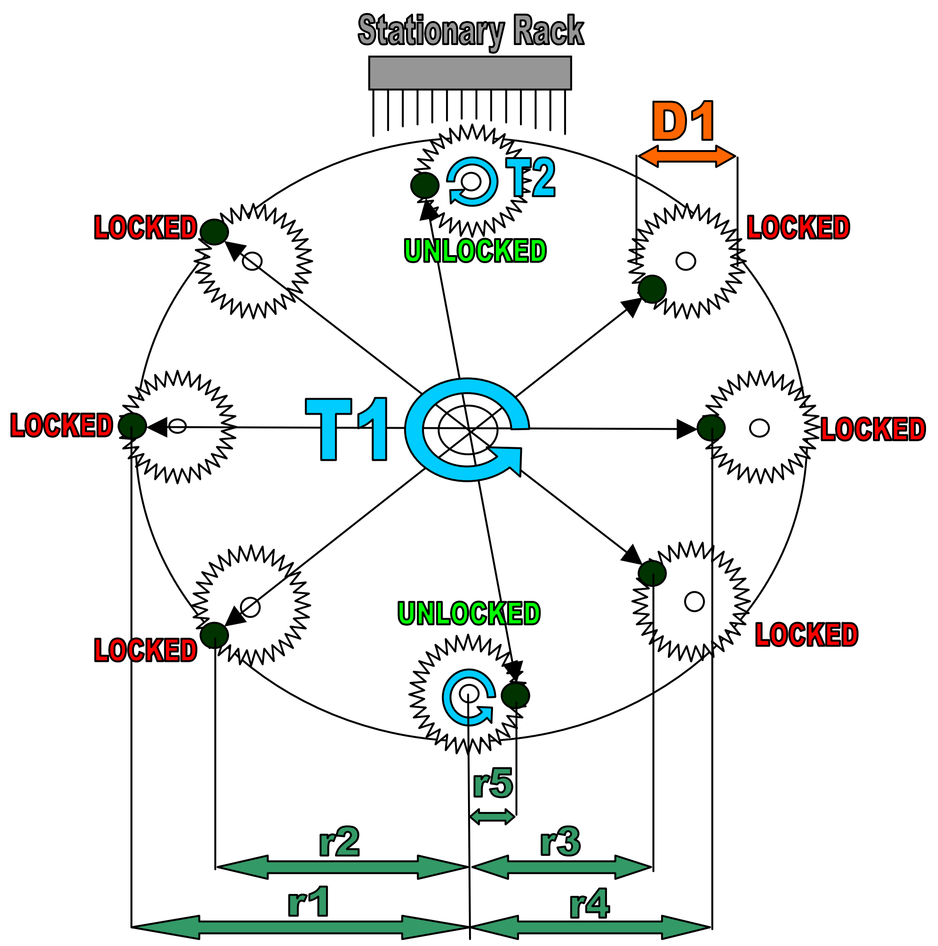
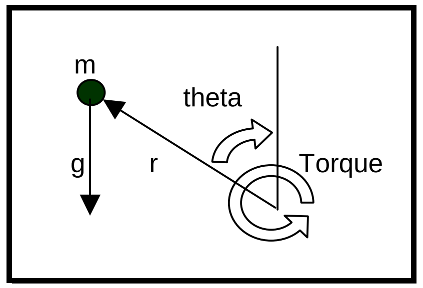


$Torque_{max}$ = r x sin (theta) x m x g

where

m x g =	1	kg
theta 1 =	90	degrees
theta 2 =	45	degrees
D1 =	0.2	m
r1 =	0.6	m
r2 =	0.424264	m
r3 =	0.282843	m
r4 =	0.4	m
r5 =	0.1	m



therefore

$T1_{max}$ = mg(r1 * sin(90)) + mg(r2 * sin(45)) * 2) - mg(r3 * sin(45)) * 2) - mg(r4 * sin(90))
= 1.2 Nm (CCW)

$T2_{max}$ = mg * r5 * sin(90) * 2
= 0.2 Nm (CW)

$Torque_{max}$ = $T1_{max}$ - $T2_{max}$
= 1 Nm (CCW)

Description of Wheel Motion:

8 cogs are spaced evenly around the outside of a large wheel. A weight (the small black circle) is pinned to the outside of each cog. These weights are then connected to the opposite weight on the other side of the wheel by a chain. The tourque (T1) about the centre of the wheel, created by the difference in distance from the wheels axis between the LHS weights and the RHS weights, is enough to overcome the tourque (T2) generated by the 2 weights lifted up when the top cog engages the stationary rack (the stationary rack is independently fastened outside of the wheel mechanism). Once the cog is free of the stationary rack it is locked until it falls to the bottom of the wheel where it is unlocked to be lifted by its opposite weight. Once the weight has been lifted it is locked again until its cog reaches the rack.