Abstract

The safety rope is threaded through the device at the top of the climbing wall. By using multiple sprag clutches (one-way bearings), the safety rope is articulated to increase the contact area with the pulleys. The pulleys spins freely one way but do not spin at all the other way. This have the effect of increasing the safety margin when a lighter climber belay (holds the safety rope) for a heavier climber.
Use of multiple sprag clutches creates redundancy in the system in case of failure in any one of the bearings.
The friction is user adjustable by moving one of the bearings to other positions either to increase or decrease the friction depending on how the unit is deployed or based on the weight of the expected users. The friction can be adjusted so that an average climber will escape with little or no injuries should the belayer totally lets go of the rope.