Precision Tennis Ball Launcher

Summary:

The precision tennis ball launcher includes the following mechanical elements: a spring, a worm/spur gear interface, bearings, and a cable. The main educational goal is to establish a relation between launch angle and the distance a launched projectile travels. This is made interesting by an assortment of targets/goals for users to try to hit with the launched ball. To hit the furthest targets, a certain angle will be required. It is the goal of this exhibit to provide an intuitive demonstration to find out what that angle is.

Instructions for use:

1. Rotate the freely spinning frame of the ball launcher to desired azimuth (degree is marked on the base of the setup).
2. Rotate the crank to desired elevation angle (two full rotations of the crank will move the elevation through its full range)
3. Pull the cable by the handle until the ball platform is fully seated against the stop in the tube (It will be easy to tell how far back to pull)
4. Release the cable and enjoy the launch!
5. If the ball lands in a goal or hits a target then congratulations! If not, then adjust your angles and repeat!

What happens:

1. Bearings allow the frame to rotate to desired direction.
2. The worm gear interfaces with the spur gear on the tube to control the elevation angle of the launcher.
3. The spring provides the launch force for the projectile.
4. The pull cable provides the mechanism for which the spring is compressed.