Waves - Torsion Pendulum

In 26-100 there is a 20 torsion pendulum suspended from the ceiling. It can be used to display traveling and standing waves, and reflection of waves from terminated and free boundaries. At the top of the pendulum there is a magnetic damping fixture whose action is controllable from the lab bench, can provide either an unterminated (free) boundary or a critically damped condition ($\Gamma = 0$).

Parts:
- Pendulum in 26-100
- Knife switch
- 43.2 wirewound resistor (variable) (R16)
- Banana leads

Schematic:

Use low current plug: 10.9-2

To leads from damping mechanism

Assembly:

Connect banana leads from 100V supply to through knife switch; connect switch to 73.2
X90. Torsional Waves; Gizmo Hanging from Ceiling; Reflection and Termination

**Purpose:** Demonstrate traveling torsional waves with different terminations provided with magnetic brake.

**Equipment:** Torsional gizmo hanging from ceiling of 26-100 consisting of steel band with horizontal dumbbells (see sketch); magnetic brake at ceiling controlled with variable wire-wound resistor.

**Procedure:**
- Start with zero current to magnetic brake.
- Start wave with a sharp rotational motion of handle at motion at bottom of gizmo.
  - E.g., rotation of roughly 90° in one direction with immediate return to original position. Then let go. (Sketch illustrates this case.)
- Wave travels upward.
- Note reflection on free end at top, and at bottom.
- Repeat but hold bottom fixed; note different kind of reflection
- Match impedance at top with magnetic brake
- Repeat sharp motion and watch wave 'disappear' into the sky.