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Media Mixing Apparatus

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Objective:
Design a system capable of agitating/mixing the resin media/water slurry in the funnel ensuring a homogeneous mixture is maintained while loading the resin into a container.

Requirements & Constraints:
- Mix 1/3 ft³ of resin with 1-1/3 gallons of water in the funnel
- Space constraint: 15.5" H x 20" L x 20" W
- No pinch points
- Resin/Water mixture must remain homogeneous until volume is drained
- No RCRA hazardous materials (Brass, bronze, etc.)
- Total weight < 50 lbs.

Paddle Design:

Research:
- The main focus of this project was to achieve uniform mixing without compromising individual resin beads.
- Multiple paddle designs and motor mounts were considered.
- Initial designs were based off of the traditional kitchen mixer, optimized specifically for smooth mixing on a much larger scale.

Paddle Flow Analysis:

Motor Mount:
The current design for mounting the motor takes into account much more than simply ensuring the motor is stabilized. This mount design protects the motor from direct contact with resin and water while also providing sufficient air for cooling. The hopper feature allows for easier and cleaner loading when adding the slurry into the funnel.

Figure 1: Initial paddle considerations
Figure 2: Initial motor mount considerations
Figure 3: Results from computational fluid dynamics analysis inside funnel
Figure 4: Current mixing paddle design
Figure 5: Current motor mount/hopper design