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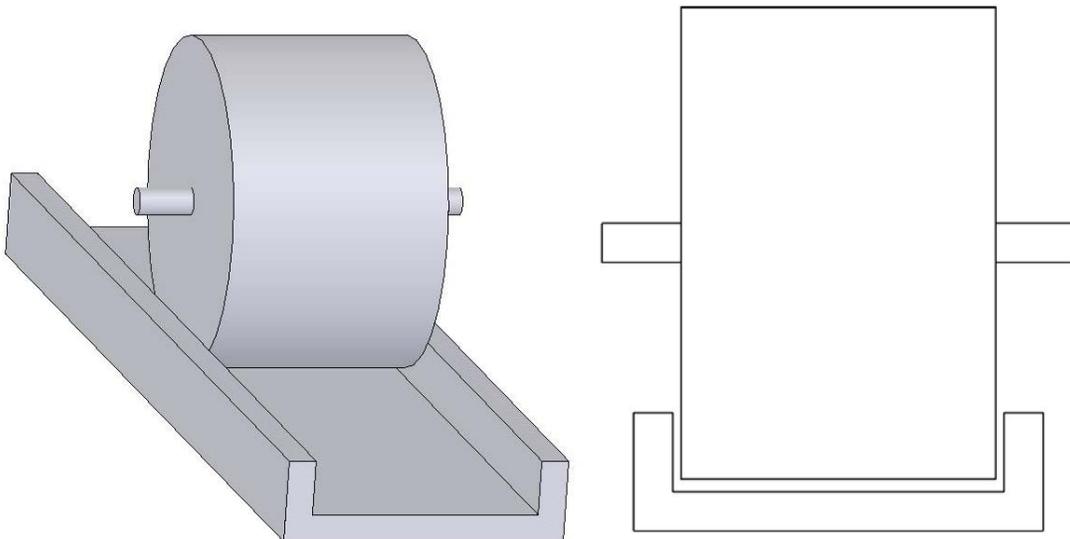
21M.735 Tech Note 6: Rolling

Three Wheel/Track Designs for Guiding a Rolling Wagon

When a piece of scenery is to move around or on and off a stage, there are a few methods of making the piece move with respect to the table, ranging from the simple (just skidding it along) to the complex (air bearings linked to a remote compressor to provide a cushion of air to float along). The most common way to accomplish this is to use some sort of wheels, usually casters.

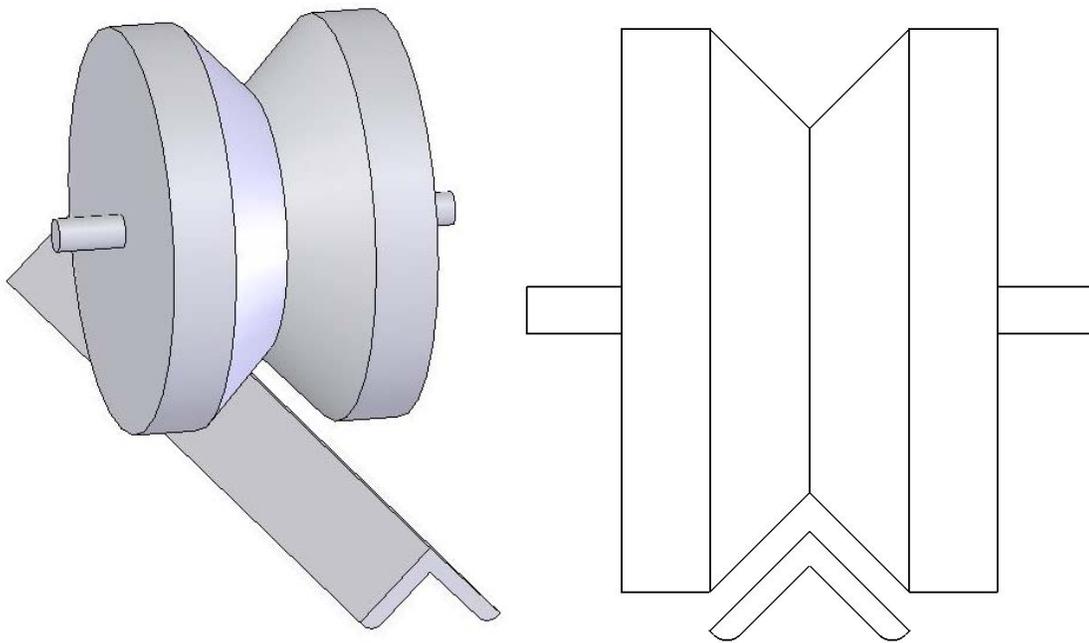
If casters are used in the design, then the next decision is how the piece will be repeatable positioned on stage from performance to performance. Here too, the solutions go from straightforward to intricate: all the way from using the crew eyeballing the position with respect to tape marks on the stage to remotely controlled motors executing computer-controlled drive patterns. Somewhere midway between these two is the solution this tech note will focus on, having the wheels interact with some sort of track on the stage surface.

The simplest design is to have a regular caster in a groove, as shown below:



This can be easily achieved, with little more than regular caster, and two strips of wood nailed to the stage on either side of where the caster should travel. Alternatively, if the deck is raised above the stage top, the groove can be recessed into the deck. It could also be accomplished as shown above, with a U-shaped piece. The potential drawbacks of this method are that if the U is too deep, it could bind on the sides of the caster, if sufficient tangential loads were applied to the wagon.

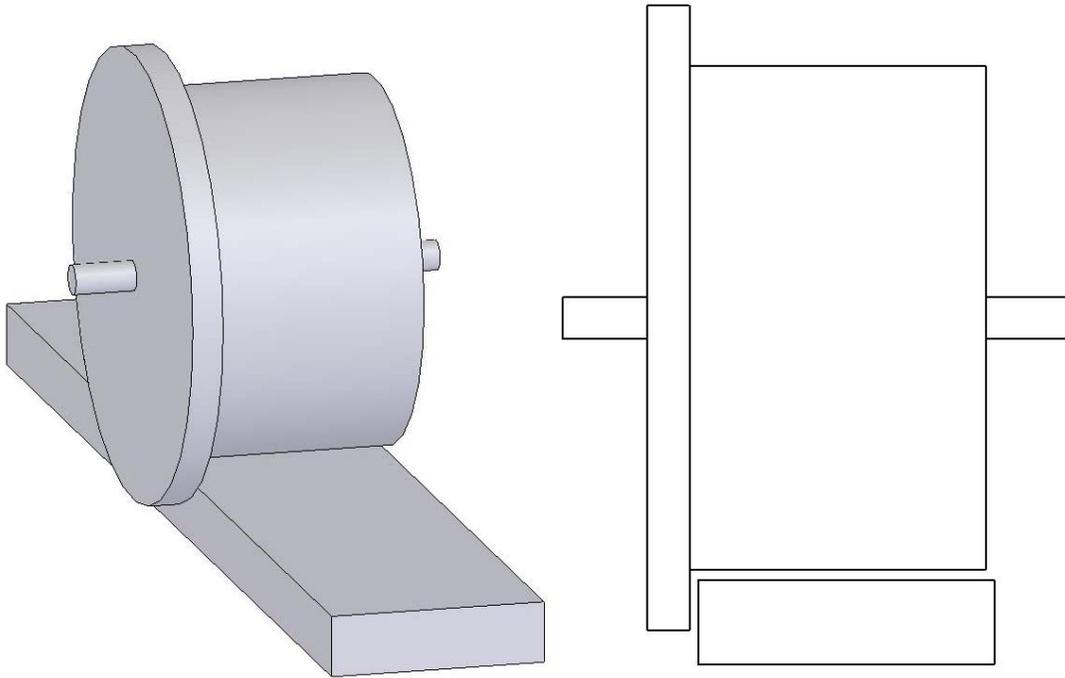
The next design appears below. It employs a caster that has a 90° angle groove notched into it on a lathe. This groove then rests atop an inverted L extrusion, usually made of metal, but that could also be made of wood.



This will provide very accurate positioning, as the neutral position is a stable equilibrium, and the likelihood of undue friction or binding is small. However, it may be more likely to snag feet of actors as they walk over it, and it must also be attached properly to the stage. If the facilities and the material is available, attachment can be as

simple as welding the L extrusion onto a long, thin plate, and then bolting the plate to the stage.

The final design bears most resemblance to that train and trolley cars interface with their track.



Here, the wheel is equipped with a flange on one that limits the lateral translation of the wheel on the track. Unlike the two designs above, which can be used for one side of the wagon and have the other side just normal casters, this design relies upon being employed in reverse on the other side of the wagon. The bearing force is on a flat surface to support the load, and the flange makes sure that the wheels don't drift off the track. The necessity to make sure the two tracks stay perfectly parallel and equidistant apart may make this design challenging, but for heavy wagons, such as slip stages, it may be called for.

References:

Gillette, A. S. Stage Scenery: Its Construction and Rigging. Harper and Row: New York, 1972

2.672 Project Laboratory Pressure-Driven Displacement Cart Design