

Building a safety lock for the Les King style turntable

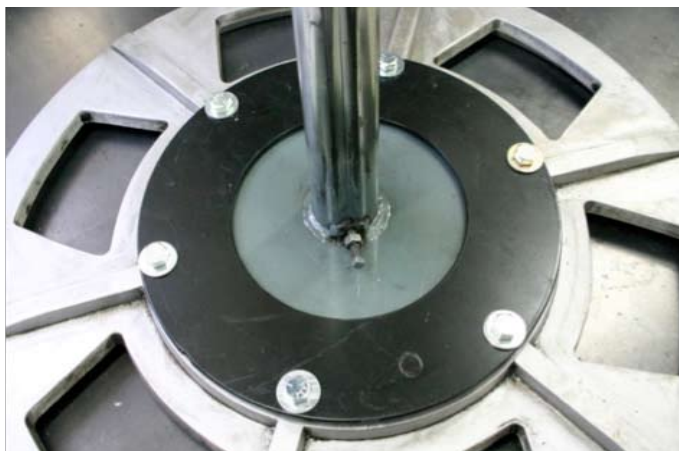
By Jim Morefield

In my 40+ years working on the railroad I've never seen an electric, hydraulic or manually operated turntable on any equipment that didn't have some kind of a locking mechanism to prevent it from dropping unexpectedly due to a malfunction. I realized that I have been operating my motorcar for several years that has a turntable and no safety lock.

I had seen one report of the actuator nut in an electric turntable assembly unscrewing from the actuator shaft which allowed the inner assembly to drop (while testing in a shop) and decided to remove my unit, disassemble it, and secure the nut. I drilled the nut and shaft and inserted a compression pin prevent the nut from unscrewing (shown in the photo below).



Many operators have had problems with the base of the turntable either loosening up or falling off due to the single bolt in the center backing off. Rod Whitney invented a safety plate that bolted on the base with a center hole that was smaller than the base of the jacking mechanism. If the center bolt backed out or broke off, his fix prevented the base from falling off. This modification is standard equipment on the assemblies that Dean Mark markets and is shown in the photo below.



Both of these modifications are covered in an article I wrote for the March / April, 2009 issue of *The Setoff*.

The following modification works on my MT-19A motorcar and should work on any motorcar equipped with this type of turntable, although the linkage may have to be constructed differently.

After removing my turntable to check for possible problems with the slotted nut that the gear box off the motor engages, I decided to see what it would take to build a safety lock. When I was taking the unit out of the car I noticed the turntable mounting bracket was as wide as the base plate of the turntable.

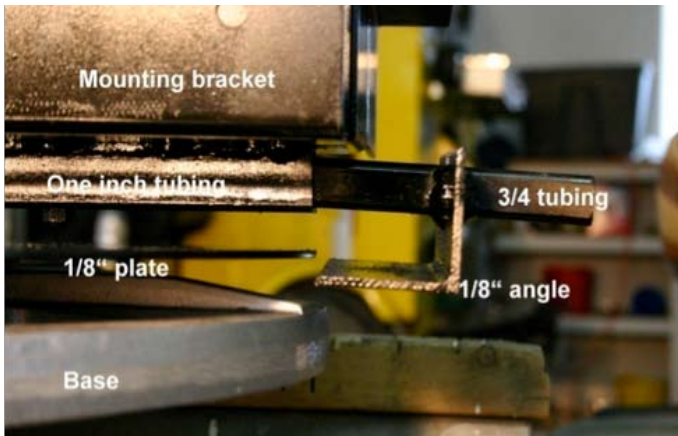
I removed the bracket from the motorcar and set everything up on the workbench. I first cut a piece of 1/8" plate to a diameter of 21" with a 6-1/2" hole in the center. I marked and drilled holes in the turntable base and drilled matching holes in the plate. This is a variation of the Rod Whitney modification that keeps the turntable base in place if the center bolt fails, except the diameter is much larger. Shims will have to be used between the base and safety plate on the older models to give adequate clearance between the safety plate and bottom of the jacking mechanism, but the plate will bolt right on the newer models due to the higher sides of the center bowl.



Next, I placed a piece of 1" square tubing 5" long on each side of the bottom of the main bracket, set both back from the edge a half inch and drilled a hole through the tubing and bracket and bolted them in place, tightening the bolt enough to securely hold the tubing. I cut two pieces of 3/4" square tubing 6" long (which slides nicely into the 1" tube) and two pieces of 1/8" 2 x 2 angle iron 5" long.

All the components were bolted together with enough bolts for a dry fit and measured for the slots needed in the angle iron. I center marked each angle and cut a slot in each one 3/4" wide and just under 1" deep. I measured and marked each angle where the 3/4" tubing hit when the latch was in the locked position (4" from the end), and welded them to the tubing. Once finished I checked to see that the locks still fit and then removed the mounting bracket and welded the 1" tubing to the bottom of the bracket. I left the bolt in place that was used to position the tubing.

Unit on bench assembled and in unlocked position



I installed the bracket in the motorcar and then put the turntable in place and mounted the motor. I attached the foot using 3/8" x 2-1/4" bolts and nylock nuts and retracted the turntable fully. A piece of 1" tubing was cut in the form of a clevis, an end cap welded on and a 3/8" hole drilled in the end cap. A piece of 3/8" cold rolled rod was welded to the end cap and hole drilled in the homemade clevis in the end of the 3/4" tubing to form the linkage.

Next, I measured for the steel to be used for locking the safety latch in the open or closed position. I cut a piece of 1/8" x 2" flat bar 7" long, drilled two holes for 5/16" bolts through it and the side frame of the car. I then drilled a 3/4" hole and two 3/8" holes directly under and filed the edges smooth to form a "keyhole" in the flat bar. The bracket was bolted to the frame and the linkage attached to the lock.

Side frame bracket with keyhole



I marked the 3/8" rod at the fully locked position and fully opened position and took it back to the bench. I took a short piece of 1/4" black pipe used in gas installations and drilled it out so it would slide over the rod and cut it to length to fit the space between the open and closed positions of the lock. I slid a 5/8" flat washer over the rod and then drilled 4 holes in the black pipe. The pipe was slipped on the rod to the position I marked and I welded it to the rod using the holes drilled earlier. The washer which is too big to fit through the keyhole was then welded to the rod to make a stop to prevent the safety latch from coming out too far when withdrawing it to the unlocked position. I ground the welds smooth and after painting, installed the mechanism to the car. Satisfied it would work, the process was repeated on the other side.

Washer and black pipe on rod before welding



Washer and pipe welded to linkage rod



Fully assembled latch and linkage



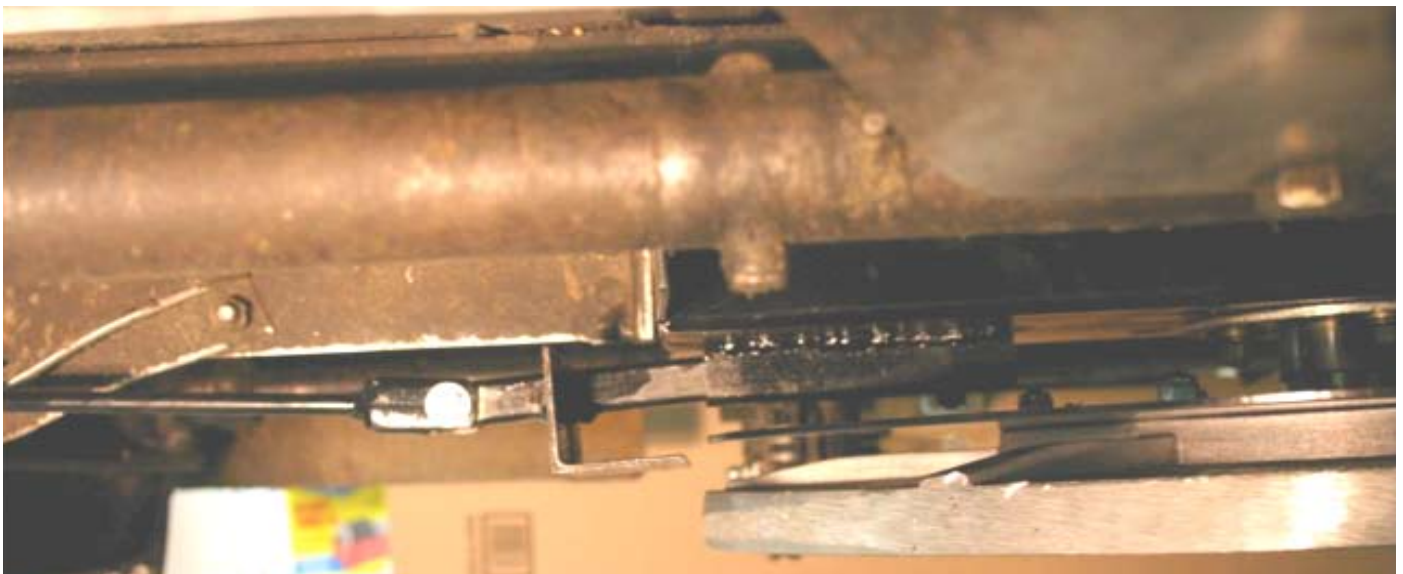
Thinking that I might be able to add another feature to enhance the safety aspect of this unit, I found 2 springs at my local hardware store measuring 7/16" in diameter by 6" long. As I assembled the unit, I connected the long hooked end of the spring to the bolt I left in place on the 1" tubing and threaded it through the 3/4" tube to hook to the bolt holding the clevis to the latch. The spring holds the latch in the locked position and will not allow the safety latch to disengage because of vibration.

I believe that one safety latch would be sufficient due to the nature of the construction of the turntable mechanism, but feel more secure with one on each side. It will take a few more seconds to work both latches while turning the car, but knowing they are in place is worth the extra time.

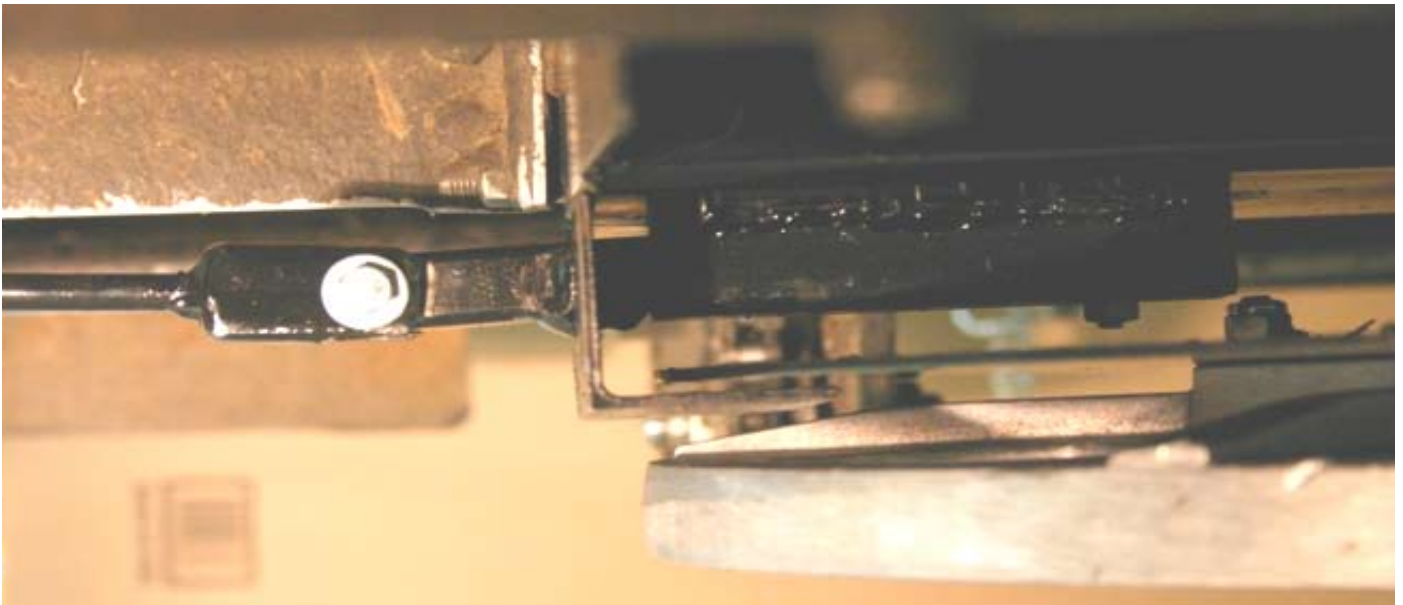
7/16" x 6" spring



Safety latch in open position



Safety latch in closed position



Linkage in open position



Once the bracket is bolted to the frame, the top sticks out a bit from the floor of the car. I bent the bracket inward slightly more for cosmetic reasons than anything else, but it does eliminate a sharp edge and pinch point.

Linkage in closed & locked position



All of the photos are of the right side of the car; the left side is nearly identical. I measured the clearance between the clutch pedal assembly when fully depressed and the safety latch on the left side and have no conflicts when the latch is engaged. When it is retracted, the clutch brushes the latch, but I am not concerned as the latch should not be retracted while the motorcar is running under its own power.

I also ground the leading edges of the 3/4" tubing so there wouldn't be any sharp edges to dig into the 1" tubing as the locks are engaged. I decided against using grease for lubricant and instead, sprayed the interior of the 1" tubing with Permatex spray anti-seize.

Now, all I have to do is remember that I have a locking mechanism in place and get into the habit of unlocking both locks when turning the car and once the turntable is fully retracted, engaging them.