Les King Turntable Failure

By JOHN GONDER

Photo by Jamie Haislip

John Gonder's turntable has just fallen apart while turning his Woodings motorcar Oct. 11, 2008, at Old Spruce on the West Virginia Central Railroad.

On the West Virginia Central trip in October 2008, my Les King Turntable malfunctioned and fell down on the ties. Thank goodness this happened as I was turning the car, not while I was moving. However, it could have!

The Les King Turntable is a good design and very strong. Until this trip it has been trouble free. I was traveling along in the car when the "ALARM" sounded for the table. I stopped immediately, and my passenger and I looked over the table and found nothing wrong. We ran it up and down a few times to see why the alarm went off. All seemed well. It wasn't raining, so the switch hadn't gotten wet. I disconnected the alarm thinking the switch had gone bad.

Things were fine until I turned the car at our turnaround spot. The car didn't seem to lift correctly. The motor on the table labored and moved very slowly. It did lift the car and we did turn it around. When I retracted the table it went up about half way, and then with a loud clank, the entire inside shaft of the jack and the plate, along with all the bearings and spacers, fell to the ties. This could have been deadly had it happened while moving.

There wasn't enough time or room under the car to remove the table. John Cook helped me push it back up inside the jack, and chain it in place to continue the trip. The lesson learned here: "PAY ATTENTION TO YOUR ALARM." The slight movement downward in the table had been just enough to trigger the alarm.

When I got home I disassembled the entire turntable to see what had failed. The motor ran fine. However, the clutch that "clicks" and slips at the end of the stroke travel of the jack hadn't been working for a while. I would just lift the jack until it stopped, and that seemed to work fine. The clutch was the culprit that caused damage to the rest of the jack.

Inside the jack at the top of the tube, between the motor and the jack shaft, is a drive coupler nut with a slot in it. The drive shaft on the motor has a pin through it that matches up with the slot and drives the shaft up or down. When the jack lifts the car, the motor and shaft rotate clockwise. This tightens the nut on the threads. However, when you retract the table, all this turns counter-clockwise, and when the end of travel is reached, the nut can spin off the threads, just as it did here.

The drive coupler nut is squeezed onto the shaft at the factory to keep if from coming off the threads, but the motor has enough torque to spin it off easily if the clutch doesn't work. When the drive coupler nut comes off there is nothing at all to stop the entire bottom half of the jack from falling completely out of the car. After talking with the manufacturer of the jack, it was determined that the failure was a direct result of running the table up until I heard the clutch "click," because that is what I thought we were supposed to do. The manufacturer says no. The clutch is not to be used except in emergencies.

I replaced the clutch and the gear that contains it along with a new drive coupler nut. If your table goes up and stops, but does not slip, it is urgent that you replace the clutch. Dean Mark at Fredericksburg Shops has the replacement parts in stock. The part numbers for the clutch are:

Photos (3) by John Gonder

The bearing assembly (top right) sits on the threaded actuator shaft (above) and is held in place by the drive coupler nut (top left). If the drive coupler nut should back totally off, the entire turntable will fall and cause a moving motorcar to crash forward onto its nose.

Torque Limiter and base casting (must be purchased together as an upgrade) 30476 and the drive coupler nut is 11537. All are easily replaced. The new gear is metal instead of plastic. While you have the motor head off the jack, inspect the drive coupler nut to make sure it is threaded all the way down against the spacer and bearing assembly.

I suggest that when reinstalling the drive coupler nut, you drill and pin it to eliminate any chance of this happening (see photo 3 on page 12). Also check the motor housing at the set screws where it fits over the jack. Tightening the set screws too tight will split the casting along the bolsters for the set screws.

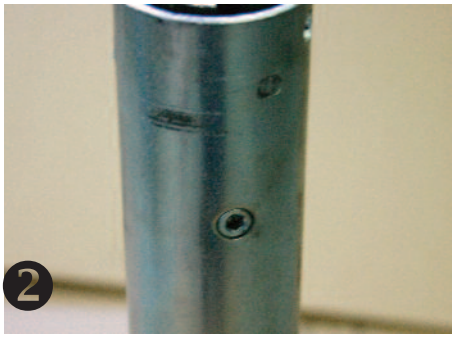
Finally, adjust your alarm to stop just a split second before you hit the clutch to allow the motor to stop turning before the clutch starts to "click." In other words, make the alarm the end of travel indicator, not the clicking sound from the clutch.

Les King Turntable Solutions

By Jim Morefield

Photos (9) by Jim Morefield

The latest concerns about the Les King Turntables involve the slotted drive coupler nut on the top of the actuator shaft (above), and the security of the actuator shaft provided by three Allen head setscrews (below) countersunk into the outer tube .



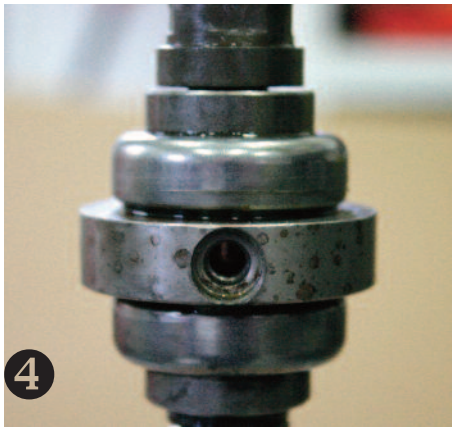
I happened to catch a thread regarding Les King Turntable failures on the speeders list and decided to check mine out. Up until these threads hit the list, the only problems I heard about were the base working itself off because only a single bolt holds it in place.

I took my turntable apart far enough to see how it was assembled and to get an understanding on how it works. When the motor and gearbox are connected to the top of the unit, the output shaft of the gearbox fits into the slotted drive coupler nut at the top of the screw, or actuator shaft (photo 1).

The slotted drive coupler nut is threaded onto the top of the actuator shaft, and holds the top bearings and guide assembly in place. There are three Allen head setscrews countersunk into the outer tube (photo 2) and threaded into the top guide (photo 4). The combination of the threaded nut and the set screws hold the entire inner tube in the up position while traveling via the threaded actuator and actuator nut.

The actuator nut in the inner tube is crimped in place. The inner tube has a slot the entire length (photo 5) that matches up

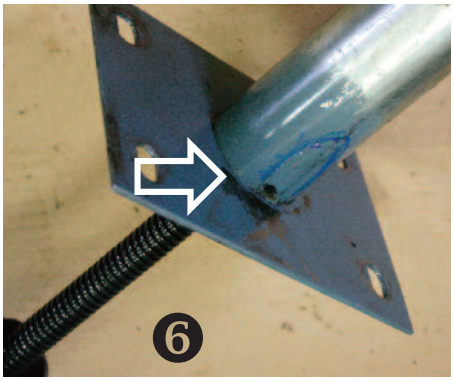
The first part of the solution is to drill the drive coupler nut and shaft, and place a compression pin in the hole (above). The second part of the solution is to inspect the Allen head setscrew holes (below) for wear and to inspect the screws for a good seat in the actuator shaft (left) on a regular basis.



with a "dimple" at the bottom of the outer tube (photo 6) to prevent the inner assembly from rotating. The dimple is filled with weld on the outside of the tube (photo 6 arrow).

In my opinion, it's not likely that the set screws holding the assembly via the top guide will all back out without a competent operator noticing it. A quick inspection of the assembly (photo 2) can be made any time the tunnel cover is off. Depending on the material used for the actuator nut in the inner tube, it could begin to work inside the tube and wear enough to allow it to pass the crimp in the tube or it might tend to spin inside the tube. Turning inside the tube is unlikely as the slot in the tube fits in a depression of the actuator nut. If by some chance it did begin to turn, the turntable motor would run, but the turntable base would not move. It doesn't

The actuator nut in the inner tube is crimped in place. The inner tube has a slot the entire length (above) that matches up with a "dimple" at the bottom of the outer tube (below) to prevent the inner assembly from rotating. The dimple is filled with weld on the outside of the tube (arrow).



appear the crimp will wear out and due to the length of the actuator nut, again in my opinion, it is unlikely this will fail without giving an indication something is amiss.

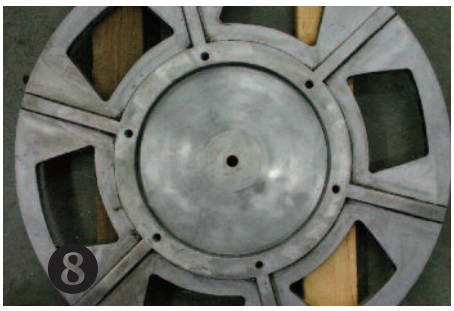
Is there potential for failure? Sure, it's mechanical and anything mechanical can wear out or not be maintained properly or have a flaw in the material.

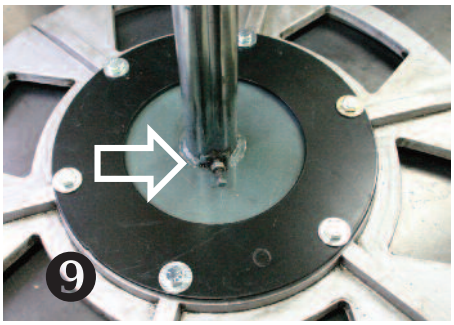
I feel the most likely part to fail is the slotted drive coupler nut at the top of the actuator shaft (photos 1 & 3) and one reported failure indicated this nut worked off the shaft and allowed the assembly to drop while it was being tested off track. It appears after the nut is tightened on the top of the shaft, the threads are deformed to prevent the nut from backing off. The modification discussed in this case was to either weld the slotted drive coupler nut to the top of the actuator shaft or drill the nut and shaft and insert a pin (photo 3).

The operator noticed that the turntable when retracted fully wouldn't ratchet or click in the gearbox and would stall the

motor which indicated the clutch wasn't working properly. He felt that the motor placed enough torque on the drive coupler nut that it unscrewed it when the clutch failed to disengage. This stands to reason as the slotted nut is right hand thread and the actuator shaft rotates counter clockwise when retracting the turntable. My turntable when retracting fully also stalls the motor without the clutch disengaging, but as soon as I hear the motor start to stall, I shut it off and don't give the clutch time to begin working.

In testing my turntable after it is fully retracted and I engage the motor, the clutch will start to click and disengage. I believe the clutch was placed as a safety measure to prevent excess torque from working on internal components in the unit and not as an indicator telling the operator that the turntable has reached its limit. Running the turntable to its limit every time it is operated and having the clutch disengage and start clicking would work somewhat like an impact wrench on the slotted nut.





Top: Hole pattern for plate with a 6 1/4" center hole in a 11 1/4" diameter 1/8" plate. Center: Corresponding hole pattern in the base. Bottom: completed assembly is much stronger than the original single bolt (arrow).

Since the unit was already apart, I decided to drill the nut and shaft and place a compression pin in the hole (photo 3) to prevent the nut from spinning off. This option (vs. welding) will allow me to remove the pin and nut to replace the two bearings at the top of the screw shaft if the necessity ever arises. I also attached a version of the Rod Whitney modification to the base before I reinstalled the turntable.

Until recently, the bases on electric turntables were attached to the bottom of the jack mechanism by a single bolt held in place with a set screw (photo 9 arrow). This was necessary to allow the motorcar to rotate on the base while turning the car. Several operators noted the bolt would back out and leave the base loose and in one instance, the base fell off while the operator was hauling his car on a trailer.

Rod Whitney came up with good solution for this situation. He cut a quarter inch aluminum plate 11.5" in diameter with a 7" hole in the center that would slide over the mounting plate of the jack, but was smaller than the base of the jack. He drilled holes in the turntable base (photo 8) and attached the plate to the base. He left the center bolt in place to keep the base centered, but if the bolt should back out, the safety plate will hold the base in place.

The new turntables now available have safety plates (photo 7) constructed of 1/8" steel plate 11-1/4" in diameter with a 6-1/4" hole in the center and attach the same way. Instead of a bolt in the center of the base, a stud is used solely for centering purposes and the plate holds the base in place.

The side of the bowl in the base on older models is low enough that the plate must be shimmed to allow the base to rotate freely. Newer models have higher sides on the bowl and don't need to be shimmed. I would recommend a minimum 1/8" gap between the plate and jack mechanism (photo 9).

The three photos at left show the hole patterns for the safety plate and turntable base, and what it looks like after inserting the bolts in from the top to check clearances. Once satisfied I had the clearance I wanted, I used 3/8 x 2-1/4" bolts with washers on both ends inserted from the bottom of the base and secured with nylock nuts.

I seldom raise my car to the limit when setting on or turning, and I notice many others do the same. Once the wheels are high enough to allow the car to rotate, we stop. When we retract the turntable, we always reach the limit. The things to look and listen for are the motor stalling at full retraction with the clutch not working properly (if you use the sound of the clutch to indicate fully retracted), which indicates the motor is applying more torque than usual to the slotted nut. If the motor continues to run at full retraction, and the clutch isn't disengaging, and no movement in the turntable is observed, something is turning within the assembly which could be a stripped gear in the gearbox or a malfunction within the inner workings of the turntable tubes.

Bottom line is if a turntable should extend suddenly while underway, it could result in a catastrophic accident. Should this happen, NARCOA could require all electric turntables whether they be Les King models or one built by the motorcar owner to have a positive locking mechanism. If through thorough education and good maintenance we can avoid an incident, we can avoid legislation.

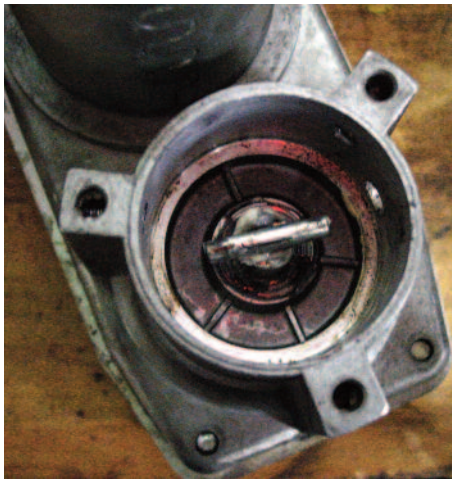


Photo by John Gonder

The drive shaft on the motor has a pin through it that matches up with the slot and drives the shaft up or down.

Turntable Alarm

The alarm on Les King Turntables is NAPA #**730-1014**. Got some other useful NAPA numbers? Please e-mail them to The SETOFF.