



# REPAIR

## PICKUP ROLLERS & SHOES



How to replace them on prewar, postwar & early modern engines

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**P**ICKUP ROLLERS AND SHOES – those out of sight, out of mind center-rail electrical contacts that are important in a locomotive’s performance – should never be ignored.

Certainly, at a minimum, these pickups should be kept clean and roll or slide freely, but that alone isn’t enough. Even under normal use, they sustain a considerable amount of wear and tear over time. When the pickups have grooves worn into them, or are badly pitted from hours of arcing, it’s time to replace them.

In fact, the *Lionel Service Manual* recommended changing locomotive rollers or sliding shoes every time the unit was in for an overhaul. This company mandate, though probably motivated in part by Lionel’s desire to sell and move replacement parts, made as much technical sense in the past as it does today. With all of the electronic circuitry that has come along in recent years, good electrical contact with the rails is essential.

Though the essential function of pickup rollers and shoes remains the same, the contact design itself has changed. Maintenance procedures vary, depending on the locomotive’s vintage and some hardware variations. Basically, we can break the procedures into four categories. Here’s how to handle each type.

### Some cautionary notes

As described, you’ll find roller or shoe replacements a doable job. But there is a caveat or two to consider.

First, bear in mind that Lionel made many different roller sizes and shapes over the years – some were beveled, some were not, as the photos on this page suggest. Be sure your replacement is the correct one, because exact dimensions are important. Inserting the wrong roller, even if it seems to fit, can result in operational problems, particularly when going over switches. If you don’t know the part number, take the old roller with you to your Lionel parts dealer.

Second, note the exclusion of the Bakelite-cased “Scout” motors in this article. They were excluded for good reason: Their pickups were not designed to be easily replaceable. Fortunately, in many cases, the pickups outlasted the motors themselves anyway.

Once you’ve replaced worn-out pickups, you can let these important electrical contacts hide themselves away again beneath the locomotive and run their course. But never take them for granted. **CTT**



Rollers were made in a variety of shapes and configurations over time. When replacing one, use the old one as a guide.

## PRE-1950 SHOES AND ROLLERS

Most pre-1950 Lionel O-27 locomotives and some prewar O gauge streamliners were fitted with sliding shoes instead of rollers. Not surprisingly, these shoes wore out faster than rollers.

When rollers were used, they were one-piece units with protruding “shafts” mounted on sprung collector arms, which had holes in them to accommodate the protrusions. If not kept lubricated, these holes became elongated, allowing excessive play and decreasing the roller’s efficiency. The rollers themselves were made of soft metals (brass, copper, or a special alloy) prone to rapid wear.

You can easily replace these contacts, whether rollers or shoes, with a screwdriver and narrow-nose pliers. No actual disassembly is required.

To replace a roller, wedge a screwdriver blade between one end of the roller and the side of the collector arm assembly (**fig. 1**). Twist the tool until the roller tip clears its mounting hole and drops out. As an alternative, narrow-nose pliers may be used to bend one side of the collector arm until the roller is loose enough to be removed.

Insert the new roller, and bend the collector arm back into position (**fig. 2**). The roller should be free to spin easily in its mounting.

To replace a contact shoe, slide a slot-head screwdriver blade or any



**Fig. 1** – After wedging a slot-head screwdriver into position, twist until the old roller tip clears its mounting hole.



**Fig. 2** – Use a pair of pliers to bend the collector arms back together to hold the new one-piece roller in place.



**Fig. 3** – To replace shoes, slide a screwdriver under the fiber bottom plate and between the shank of the shoe and the leaf spring clip until you feel the hook at the end of the shank.



**Fig. 4** – Slide a new pickup shoe into position and listen for the click to confirm it has snapped into place properly.

other thin metal instrument under the fiber bottom plate, between the shank of the shoe and the leaf spring clip that holds it in place (**fig. 3**). You should be able to feel the hook at the end of the shank, if your tool is inserted correctly – about  $\frac{1}{8}$  inches from the exposed end of the shoe.

Twist the screwdriver just enough to release the hook from its mooring

slot in the spring. (Be careful not to over bend the spring.) You will then be able to slip the shoe out of its mounting.

Ease the new shoe into the same position. You should hear a click as it snaps into place. In some cases, it may be necessary to lift the leaf spring slightly to get the hook on the shoe shank back into the slot (**fig. 4**).

## POST-1950 REUSABLE PIN

For post-1950 locomotives, a new two-piece contact was designed. It used a tougher, sintered-iron roller with a hole running through it lengthwise and a stationary pin riveted to one side of the collector arm.

You can either replace both the worn-out roller and its mounting pin (as described on page 72) or try to reuse the original pin, a shortcut used by repair technicians for some time with usually good results.

The roller pin must be in good condition – not severely worn – and solidly anchored.

First, with narrow-nose pliers, bend the side of the bracket with the larger hole away from the pin, then bend the other side until the roller clears the bracket assembly (**fig. 5**).



**Fig. 5** – With pliers, outwardly bend the side of the bracket that has the larger hole, then do the same to the other side.

Clean the pin with a solvent to remove old dirt and grease. Slip the new roller into place. Check to see that there is not excessive play between it and the pin.

If the fit is acceptable, carefully



**Fig. 6** – Once you’ve installed the old pin and new roller, squeeze the bracket shut again, making sure the roller turns freely.

and one at a time, bend the brackets back to their original configuration (**fig. 6**).

See that the new roller spins freely. Adjust the mounting bracket, if necessary.

## POST-1950 PIN AND ROLLER REPLACEMENT

If your old roller pin isn't reusable, or if you prefer two new parts instead of one, here's how to swap out both parts.

Although the sintered-iron rollers are indeed tougher than the old soft-metal ones, they are also not as easy to replace. To do the job right without the shortcut described on page 71, the whole collector-arm assembly has to be removed from the locomotive first.

To begin, detach the collector arms from the locomotive by taking out the screws or pivot pins that hold them in place.

Using a file or grinding tool, remove the end of the roller pin that is riveted to the collector arm (**fig. 7**). Note: If you're using a motorized grinding tool, secure the roller assembly in a vise; never use your hands to hold it still.

When enough metal is taken off the pin, it should be loose enough to allow its easy removal from the collector arm (**fig. 8**). The roller will come along with it.

Position a new roller between the holes in the collector arm. Slip the new pin's smaller end into the arm's larger hole, then push it through the roller and seat it all the way inside the smaller arm hole (**fig. 9**).

Carefully position this entire assembly, with the large hole down, on an anvil or some other hard, unyielding surface. With a light hammer (preferably a ball-peen hammer), lightly strike the small end of the roller pin until it is firmly riveted into place (**fig. 10**).

Check to see that the roller spins freely. If necessary, adjust accordingly. Reattach the collector arm to the locomotive, and the job is done.



**Fig. 7** – After detaching the collector arm assembly, file or grind off the end of the roller pin.



**Fig. 8** – When you've removed enough metal, use pliers to remove the old roller from the arm.



**Fig. 9** – With the new roller in position, push the new pin through the side of the arm that has the larger hole and then into the smaller hole.



**Fig. 10** – Using a ball-peen hammer and an anvil, tap the small-hole end of the roller pin until the pin is riveted in place.

## LATE POSTWAR AND INTO THE EARLY MODERN ERA

Lionel's use of sintered iron grew rapidly in the postwar era. The theory was that the harder iron rollers would not wear out as fast as the older ones, and they could be permeated with a permanent lubricant, thus eliminating the need for periodic oiling.

Naturally, tough as they were, these parts did eventually wear out. Because these rollers were difficult to replace, Lionel later sought other design options.

During the late postwar era and into the modern era (1970 to today), Lionel began using small "snap-in" roller-

bracket assemblies that fit into a slot in a leaf contact spring – very much as the old sliding contact shoes did – on a number of low-end steam and diesel locomotives.

Basically, Lionel made the entire roller assembly disposable, allowing service technicians or the locomotive's owner to swap out the parts with ease.

For these locomotives, you can use the roller replacement techniques outlined above if you wish, but at less than \$2 each for the complete assembly, it hardly seems worth the effort.