

Chuff Magnets & Reed Switches

by Del Tapparo

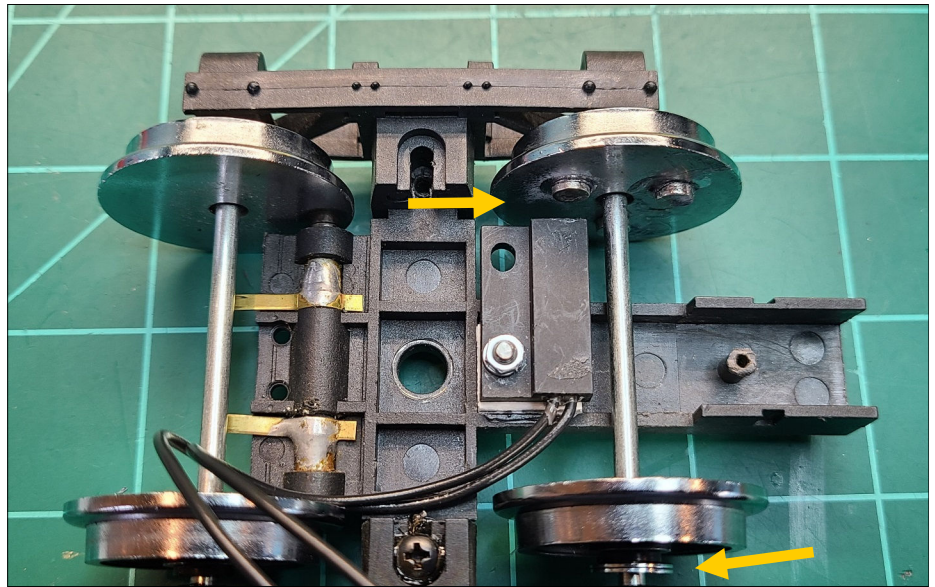
When installing sound in a steam loco, the sound we are interested in first and foremost is the chuff working in sync with the valve gear. The rate of the chuff sound can be done in two different ways; voltage triggered or switch triggered. Voltage triggered means the speed of the chuff increases with track voltage/speed of the loco. There are usually adjustments to determine when the chuff starts in relationship to the motion of the loco and the speed of the chuffs compared to the speed of the loco. This is the easiest method, since it requires no modifications to the loco. However, the chuffs will never be exactly in sync with the valve gear. And the chuffs usually appear to be way off at different speeds.

Some locos come equipped with a factory chuff switch, which can be used with your sound card, and this will accurately synchronize the chuffs with the valve gear. This is the best option.

But in most cases, there is no factory switch, so we may want to make our own. This can be done by gluing chuff magnets to the back of wheels or to a drive shaft. As the wheel or shaft rotates, the magnets pass by a reed switch to signal the sound board. You get a reliable and repeatable chuff at all speeds, even though it will still not be exactly in sync with the valve gear.

Mount the reed switch on the truck so it will be as close as possible (less than 1/10th of an inch) to the magnets. Use washers as spacers on the axle to limit the side to side movement of the axle. This will keep the distance between the magnets and reed switch constant. Otherwise you may lose the chuff on curves.

I recommend neodymium magnets, which are extremely strong and small (0.188" dia. X 0.063"H). In most cases, I install them on the tender wheels, since that is where the sound board is



Flat reed switch mounted on truck with magnets glued to wheel. Spacer washers on axle to limit side to side travel.



located. Two magnets on a tender wheel that is half the diameter of the loco driver wheels will produce four chuffs per revolution of the driver wheel. Likewise, Three magnets on a tender wheel that is 3/4ths the diameter of the loco driver wheels will produce four chuffs per revolution of the driver wheel.

The magnets can be glued to the back of the wheel following these steps.

- 1) Determine the number of magnets, the spacing and the desired location on the wheel and mark it. Keep the magnets at least 1/8" away from the edge of the wheel for clearance through turnouts.
- 2) Place the magnets on the marks (no glue yet) and test. Magnets that are too close together won't allow the reed switch to open. It will be stuck closed with a constant magnetic field.
- 3) Glue the magnets in place with a drop of CA. Hover over the mark and drop the magnet straight down into the mark/glue. Once on the wheel, you won't be able to slide it to adjust the position. It will take a hammer and chisel to remove it.



Flat reed switch



Three magnets were too close together on this 1.2" dia. Wheel. I had to use two.

