

Gleber's Gear Teeth Pattern Replication Method for Repairing Wooded Gears

This method is intended to make it easy to draw sections of gear teeth by hand using a template for creating patches for wooden gears. It is designed to be simple to use, accurate and repeatable, but without requiring CAD tools or expensive equipment. This method can also be used to draw an entire replacement gear if desired.

Supplies Required

1. Original wheel
2. Donor wood for new teeth
3. Sheet of 5-10 mil clear plastic at least as large as the wheel. Something like a report cover works fine.
4. Sharp pencil
5. Dividers or compass
6. Scissors
7. Double stick tape
8. Scotch tape
9. Sheet of paper
10. Jig (to be made)

As usual, the quality of your results will depend on the care exercised while working. When marking and cutting, be as precise as possible. If you take your time and mark and cut carefully, I think this method will work very well.

Preparation

1. Cut a dovetail slot into the wheel where the teeth have been damaged or are missing.
2. Cut a section of the donor wood to match the dovetail and trim the excess at the outer radius of the teeth tips, but not too close. For maximum strength, align the grain radially so that it runs from the root of the teeth to the tips. For restoration to as close as possible to original, align the grain with the direction of the grain in the wheel at the location where the teeth are being repaired.

Procedure to Create the Jig

1. The Jig will be used to hold the wheel being repaired and the template allowing you to mark the new teeth. The jig consists of a flat board, an index peg (for wheels off arbor) or hole (for wheels on arbor) and a template shelf. The size of the jig and components depends on the size of the wheel for repair. The shelf should be the same thickness as the wheel. See the photo below. This jig has a piece of paper for easier marking. If you are using a wheel that has been removed from its arbor, the peg should be sized to allow the wheel to fit snugly, and still be able to turn without too much effort. If you are using a wheel on its arbor, a hole should be made for the arbor to fit tightly, and still be able to turn without too much effort. The peg and the shelf and the paper should be secured in place so they do not move.



Procedure to Create the Marking Template(s)

1. Using a piece of the plastic film, mark and cut the profile for the counter clockwise side of a tooth.
2. Using a second piece of the plastic film, mark and cut the profile for the clockwise side of a tooth.
3. Alternatively, you can try to mark and cut the full tooth profile, but cutting the tip this way can be difficult.
4. See photos below for finished templates.

Procedure to Use the Marking Template to Draw the Teeth

1. Place the wheel on the jig with the section to be repaired in line with the shelf, but with at least one tooth also in line with the shelf.



2. Place a piece of double stick tape on bottom of the template for the counter clockwise side of the teeth.
3. Align the template for counter clockwise side of the teeth over the tooth close to the shelf as precisely as possible and tape the template to the shelf so that it will not move. The double stick tape helps to keep the template from moving while you try to align it, but is not secure enough to hold it for marking.



4. Without moving the wheel, mark the locations of the tips of the teeth on the paper as precisely as possible.



5. Rotate the wheel so that the location for the first tooth in the section to be repaired is under the template and realign the teeth with the index marks.

6. Draw the profile for the counter clockwise side of the tooth on the section to be repaired. Repeat the last two steps for the remaining teeth for the section to be repaired.



7. Using the second template for the clockwise side of the teeth, repeat the above steps starting with applying double stick to the template. You will probably need to re-index the tooth tip

marks on the paper. I used lines instead of dots to avoid confusion.



8. Finished markings. Use a divider to check tip to tip and root to root distances and make any adjustments as necessary.



Procedure to Cut the Teeth

1. When the lines are drawn, they should be just inside the actual profile due to the offset of the pencil from the cut edge of the template.
2. You should cut the teeth leaving the lines on and then do any final shaping as necessary.
3. Finished Rough cut.



4. Finished after dressing the teeth tips. Ready for stain.

