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Mark Levi (levi@math.psu.edu), Department of Mathematics, Penn State, University Park, PA 16802, and **Sergei Tabachnikov*** (tabachni@math.psu.edu), Department of Mathematics, Penn State, University Park, PA 16802. *Tire tracks geometry and Menzin's conjecture.*

The model of a bicycle is a unit segment that can move in the plane so that it remains tangent to the trajectory of its rear endpoint (the rear wheel, fixed on the bicycle frame). The trajectory of the front wheel and the initial position of the bicycle uniquely determine its motion and its terminal position; the monodromy map sending the initial position to the terminal one arises. This mapping of a circle to a circle is a Moebius transformation. Moebius transformations belong to one of the three types: elliptic, parabolic and hyperbolic. I shall outline a proof of a 100 years old conjecture: if the front wheel track is an oval with area at least π then the respective monodromy is hyperbolic. I shall also discuss versions of this result for classical geometries of constant curvature. (Received August 31, 2009)