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We consider N -point positive masses moving on a two dimensional space of constant negative curvature K . Using the cotangent potential as a generalization of the Newtonian one on this space, and the Poincaré upper semiplane model of the hyperbolic geometry, we describe some especial kind of periodic orbits where the mutual distances among the particles remain constant for all time. We classify these orbits called relative equilibria for the case $N = 3$. We also describe some relative equilibria for $N = 4, 5$. (Received September 01, 2014)