Cuntz isometries are $d$-tuples $(V_1, \ldots, V_d)$ of operators on Hilbert space $H$ obeying the relations $V_i^* V_j = \delta_{ij}$, $\sum V_i V_i^* = I$. The row $(V_1, \ldots, V_d)$ implements a unitary operator from $\bigoplus_{j=1}^d H$ to $H$. We consider families of rank-one perturbations of such "row unitaries," and describe their connections with multipliers of the Drury-Arveson space $H^2_d$, deBranges-Rovnyak subspaces of $H^2_d$, and the Gleason problem in these subspaces. A central role is played by the "mixed" characteristic function associated to the perturbed tuple. (Received September 25, 2012)