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In 3-connected matroids, the relationship between fans and wheels and whirls is well understood, as are the highly symmetrical structures involved. We consider an analogous question for **internally 4-connected binary matroids**. If such a matroid has an exactly 4-separating “fan-like” set of elements X that can be ordered (x_1, \dots, x_k) such that for all $1 \leq i \leq j \leq k$, $\{x_i, x_{i+1}, \dots, x_j\}$ is 4-separating, then what structures might X have? We begin by considering those “wheel-like” matroids whose groundset has a cyclic ordering (x_0, \dots, x_{n-1}) such that for all $0 \leq i, j \leq n-1$ the set $\{x_i, x_{i+1}, \dots, x_{i+j}\}$ is 4-separating (all subscripts are read modulo n). We then think about the structures when only part of the matroid in question, a “fan-like” part, has this property. Just as the wheels, whirls and fans have nice symmetric structures, we find that for internally 4-connected binary matroids, the cyclically sequential matroids and the fan-like structures have aesthetically pleasing, symmetrical structures. (Received January 20, 2010)