We investigate K-*multimagic squares* of order N, these are $N \times N$ magic squares which remain magic after raising each element to the kth power for all $2 \leq k \leq K$. Given $K \geq 2$, we consider the problem of establishing the smallest integer $N(K)$ for which there exists *non-trivial* K-multimagic squares of order $N(K)$. Previous results on multimagic squares show that $N(K) \leq (4K-2)^K$ for large K. Here we utilize the Hardy-Littlewood circle method and establish the bound

$$N_2(K) \leq 2K(K+1) + 1.$$

We additionally address the simpler problem of magic squares consisting of kth powers, improving on a recent result by Rome and Yamagishi.