Abstract. We remove a small disc of radius $\varepsilon > 0$ from the flat torus $\mathbb{T}^2$ and consider a point-like particle that starts moving from the center of the disk with linear trajectory under angle ω. Let $\widetilde{\tau}_\varepsilon(\omega)$ denote the first exit time of the particle. For any interval $I \subseteq [0, 2\pi)$, any $r > 0$, and any $\delta > 0$, we estimate the moments of $\widetilde{\tau}_\varepsilon$ on I and prove the asymptotic formula

$$\int_I \widetilde{\tau}_\varepsilon^r(\omega)\, d\omega = c_r |I| \varepsilon^{-r} + O_\delta(\varepsilon^{-r+\frac{1}{8}-\delta}) \qquad \text{as} \quad \varepsilon \to 0^+,$$

where c_r is the constant

$$\frac{12}{\pi^2} \int\limits_0^{1/2} \left(x(x^{r-1} + (1-x)^{r-1}) + \frac{1-(1-x)^r}{rx(1-x)} - \frac{1-(1-x)^{r+1}}{(r+1)x(1-x)} \right) dx.$$

A similar estimate is obtained for the moments of the number of reflections in the side cushions when $\mathbb{T}^2$ is identified with $[0, 1)^2$.