Proof Without Words: From Floor to Stairs

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We present a geometric interpretation of the identity¹

$$\sum_{k=1}^{\infty} \left\lfloor \frac{r}{k} \right\rfloor^2 = \sum_{k=1}^{\infty} (2k-1) \left\lfloor \frac{r}{k} \right\rfloor.$$

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¹This identity can be found in many books on elementary number theory. The earliest mention appears to be in M. A. Heaslett and J. V. Uspensky, *Elementary Number Theory*, McGraw-Hill, 1939 (Problem 10, p. 98).