Visitor Vermicelli - Solution

The last number of $1, 2, \ldots, n$ that is reached has to be n, as after that the clock hand returns to n. Furthermore, before this point any of the other numbers has to be reached once, as otherwise the clock hand would have ended up in a loop and n would never be reached. Thus, before reaching n, the clock hand has pointed to $1, 2, \ldots, n-1$ in some order. Thus, the total distance traveled is $\sum_{i=1}^{n-1} i = \frac{1}{2}n(n-1)$. Now, if n is odd, this distance is divisible by n, so that the clock hand has ended up in the same slot as it started. This implies that $n = 1$. Thus, odd n different from 1 are impossible, and clearly $n = 1$ is possible.

For even n, it turns out that it is in fact always possible. A possible solution is obtained by moving the hand by increasing odd amounts clockwise, and by increasing even amounts counterclockwise. This yields a solution of the form

$$1, n-2, n-4, \ldots, 2, n, n-1, n-3, \ldots, 3.$$