FtsK is a dsDNA translocase that plays a vital role in chromosome dimer resolution in *Escherichia coli*, and is part of the RecA-like hexameric motor family. The aim of this work is to understand how the subunits work together to reach the exceptional speed of 5,000 bp/s. To decipher the sequence of ATP hydrolysis within the hexamer, we have developed a new tool, consisting of covalently linked motor subunits. This technique allows us to introduce mutant subunits in ATP binding or hydrolysis at a precise place within the hexamer. We then studied the behavior of mutant hexamers for three types of activities: ATP hydrolysis, triplex displacement and stimulation of site-specific recombination. These assays show a dramatic decrease in activity of double and triple mutant hexamers. However, looking directly at translocation with “single molecule” experiments revealed surprisingly that a hexamer containing 2 inactive subunits was not impaired for translocation: it could even achieve the same velocity as the wild-type hexamer. Further experiments using streptavidin displacement suggest that these mutants are affected in force generation rather than translocation, revealing a new feature of DNA translocation by this family of molecular machines.