

Trenton, New Jersey. There and then he was convinced that steam could far outvie sails or the tense muscles of horses or men. Fitch, poor man, had fallen into a cardinal error of design. His mechanism directly imitated manual toil,—his oars swept the water much as if pushed by an oarsman's thews, and this while rotary paddle-wheels had propelled his first models. In 1788 these wheels appeared in Symington's steamer on the Clyde. Fitch's piston was one foot in diameter, with a stroke of three feet. Each turn of his axle-tree moved its oars through five and a half feet. As six oars came out of the water, the other six entered the water, each having a stroke like that of a canoe-paddle. When all went well, six miles an hour was the pace attained. But the machinery was so roughly made, so badly fitted together, that interruptions were frequent and repairs costly, so that Fitch's backers became disheartened, and his enterprise was abandoned. He stands a pathetic type of the inventor with much initiative and no staying power. But while his steamboat was in itself a failure, it had given Colonel Stevens a golden impulse. With characteristic promptitude he petitioned the Legislature of New Jersey to place a steam engine on board a vessel by way of experiment. He then informed himself as to the difficulties which had thwarted Fitch, that these might be avoided. His plans, carefully drawn, were handed to the official commissioners and a patent was granted to him on September 6, 1791. To grant a patent required a Patent Office, and this was founded at the instance of Colonel Stevens for the express purpose of duly guarding his rights in this invention. At first he used a horizontal wheel. This he soon abandoned for elliptical paddles, which were tested as well as their faulty machinery would allow. His steam engine was copied from a design of James Watt, by an engine-builder who had been long in the service of Boulton & Watt. Colonel Stevens wished to avoid the alternating stroke of