Harvey had a short spell in England owing to bad health and was in command of the Sea Fencibles in Essex. In 1799 he was in command of the Triumph of 74 guns and in 1803 of the Téméraire of 98 guns. After 18 months active service he was with the Fleet off Cadiz under Nelson at the battle of Trafalgar. The British warships were divided into the weather column led by Nelson in the Victory followed by the Téméraire, and the lee column led by Collingwood in the Royal Sovereign followed by the Belleisle. It was known that the four leading ships would come under very heavy fire, and reluctantly Nelson agreed to allow the Téméraire to go ahead, but, as the Téméraire came up to the Victory, Nelson changed his mind and shouted through a megaphone 'I'll thank you, Captain Harvey, to keep in your proper station, which is astern the Victory. What Harvey said when he heard the order is not recorded, but he kept so close to the Victory that to use his own words, 'the Téméraire almost touched the stern of the Victory,' as the two great ships moved slowly into battle. Both ships were soon under heavy fire, and so close to the enemy that gun muzzles touched. Again to use Harvey's words 'so nearly engaged that I can give you no other account of this part of the most glorious day's work.

The Victory was locked with the Redoubtable. The marksmen in the French warship's tops almost cleared the decks of the Victory, and French survivors said that the Victory's forecastle and poop were heaped with dead. Nelson was lying in the cockpit and a French boarding party prepared to take the Victory, when Harvey came up in the Téméraire and shattered the Redoubtable with a broadside from the port side. As the three ships were locked together the French Fougeux came up to the Téméraire and Harvey shattered het with a broadside from the starboard side. For a short time the four warships were together like a huge raft of fire and death. Of the Téméraire's share in the battle Collingwood wrote: 'Nothing could be finer. I have no words in which I can sufficiently express my admiration of it. The crew of the Téméraire were feted in London and later Harvey was the guest of honour at a Trafalgar dinner held at the King's Head, Chigwell.

On 9 November, 1805, Captain Eliab Harvey was promoted to rear-admiral. In 1307 he was complimented by Lord St. Vincent for his 'ability, zeal and perseverance,' but his 'intemperate manner' ended his active career in 1809, when he was court-martialled for 'using threatening language' to his commanding efficer, Lord Gambier, and speaking disrespectfully of him to several officers. The officers concerned were closely questioned at the court-martial, and Lord Cochrane admitted that Harvey had said 'he was no canting methodist, no hypocrite, nor no psalm singer; but it was evidently unpremeditated, and arose from the warmth of his feelings at the moment.' Harvey was dismissed the service. Public opinion strongly supported Harvey, and