

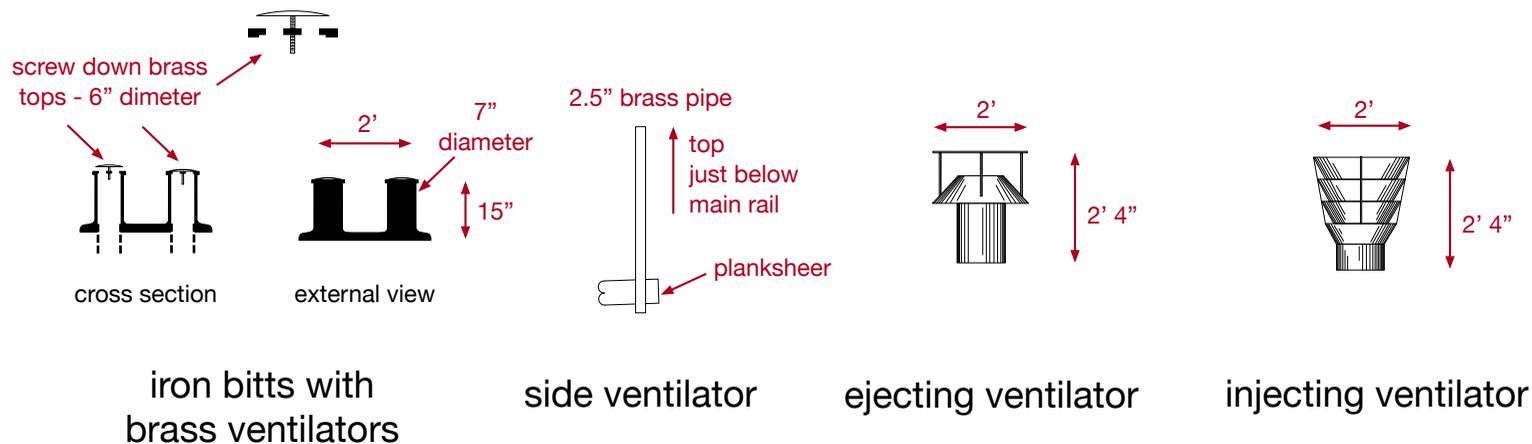
Frederick Emerson received U.S. patent numbers 5,182 and 5,183 on July 3rd, 1847 for an Injecting Ventilator and an Ejecting Ventilator. He also received U.S. Patent Number 5,842 on October 10, 1848 for a method of using his injecting and ejecting ventilators to ventilate ships. Patent 5,842 describes placing one or more ejecting ventilators near the bow of a ship with pipes that extend down into the hold and one or more injecting ventilators near the stern of the ship, also with pipes extending down into the hold. Fresh air would be injected into the hold by the aft ventilators and air would be extracted by the forward ventilators. I have not been able to find any description of just where the Emerson ventilators were placed on the *Flying Cloud*.

A research article on *Side Ventilators* published by Robert C. and Grisel M. Leavitt in the December 1994 *Nautical Research Journal* concludes that clipper ship side ventilators in 1851 when the *Flying Cloud* was launched were likely to be open topped brass pipes 2-2.5" in diameter running from the planksheer to just below the main rail.

The figure on page 29 of George Campbell's *China Tea Clippers* shows iron bits with brass ventilators. These are described on page 144.

The *Flying Cloud* had a number of types of ventilators as described by Duncan McLean in his Boston Daily Atlas article about the launching of the *Flying Cloud*:

*She . . . has air ports below, brass ventilators along the line of her planksheer and in her bitts, and Emerson's patent ventilators indispensable, for every class of ships, but more particularly for packets, and those trading to warm climates.*



FLYING CLOUD - VENTILATORS