SCIENCE

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JOHN ERICSSON.

CAPT. JOHN ERICSSON died in New York at twenty-one minutes before one, Friday morning, March 8. He was cared for in his last moments by his attending physician, Dr. Joshua C. Boullee; his superintending engineer, V. F. Lassoe; and his secretary, S. W. Taylor. His last words were, "Give me rest," which followed an inquiry if he must die. Up to the last he retained his wonderful mental energy, his mind being concentrated on the work he had in hand.

The world has lost in this death one of its hardest workers, and one who has done his full share in advancing human welfare. So earnestly was he a worker, that he had not for years allowed any one to see him except on matters pertaining to his experiments. He would receive a tinsmith bringing a can for his laboratory; but he declined to meet Gen. McClellan, who expressed a wish to call on the great engineer. Even his associates could not induce him to break, in any case, this rule that he had made for his life.

JOHN ERICSSON.

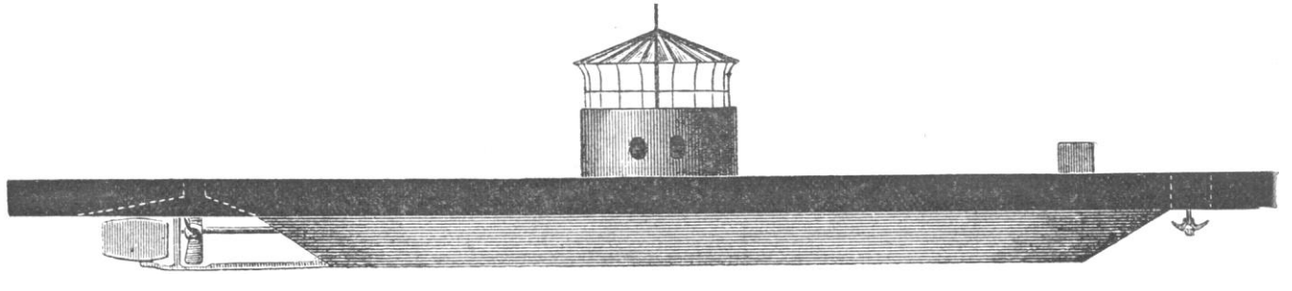
His whole life was given to his work, and his only desire in living was to complete a task that he had set himself. For this reason he retained his residence in Beach Street so long after the locality had been encroached upon by business structures and tenement-houses. This residence originally faced on St. John's Park, but is now shadowed by the gloomy walls of the freight-depot of the New York Central Railroad. Its form, however, is the same as when Beach Street was one of the most aristocratic neighborhoods in the city.

His workshop was in the basement of his residence, and the whole building bore evidence of his vocation. The only ornaments in his parlor were models of his inventions, and a set of engraved resolutions passed by the New York Legislature in acknowledgment of his public services.

The first symptoms of the final illness appeared about three weeks ago, and, on account of his age, little hope was entertained from the first. But even on his death-bed his work was the one thing constantly before him; and among the last things he did was to leave special instructions to Mr. Lassoe, his assistant, for the completion of the work he was engaged in, the development of his sun-motor. He also left to Mr. Lassoe certain plans which he had originated for American coast defences.

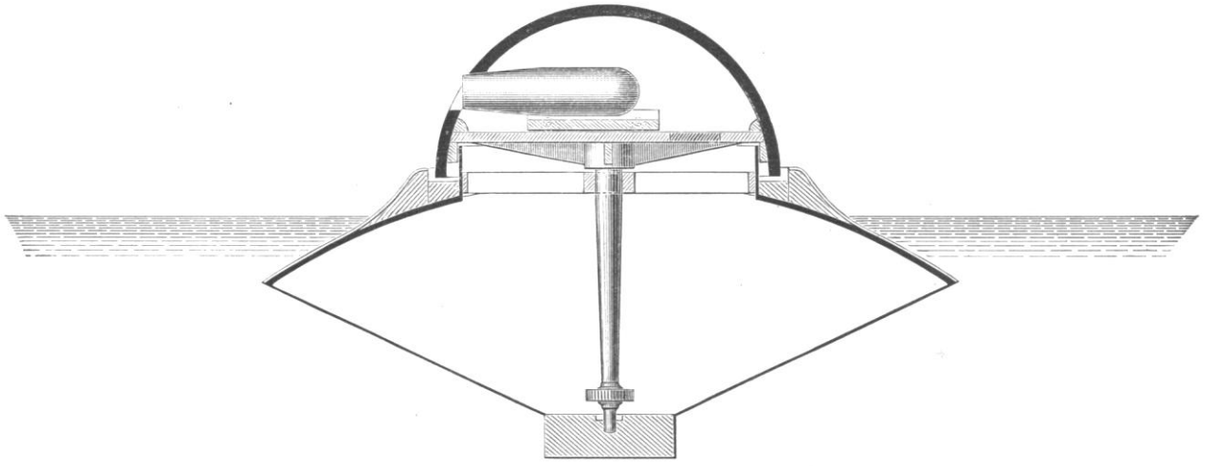
Capt. Ericsson was born July 31, 1803, in the province of Wermland, Sweden. His father, Olof Ericsson, was proprietor of mines; his mother, Sophie, the daughter of an iron-master. He was married in England about fifty years ago, but his wife has been dead a quarter of a century; and he leaves no children.

His special talent showed itself at the age of ten, when he constructed a miniature saw-mill and a pumping-machine that attracted notice. At twelve he was made a cadet of mechanical en-



THE "MONITOR" OF 1862.

gineers; the following year, a leveller on the canal. At seventeen, Ericsson entered the army as an ensign, and rapidly reached a lieutenancy in consequence of his beautiful military maps, which had attracted the special attention of King Charles John (Bernadotte).

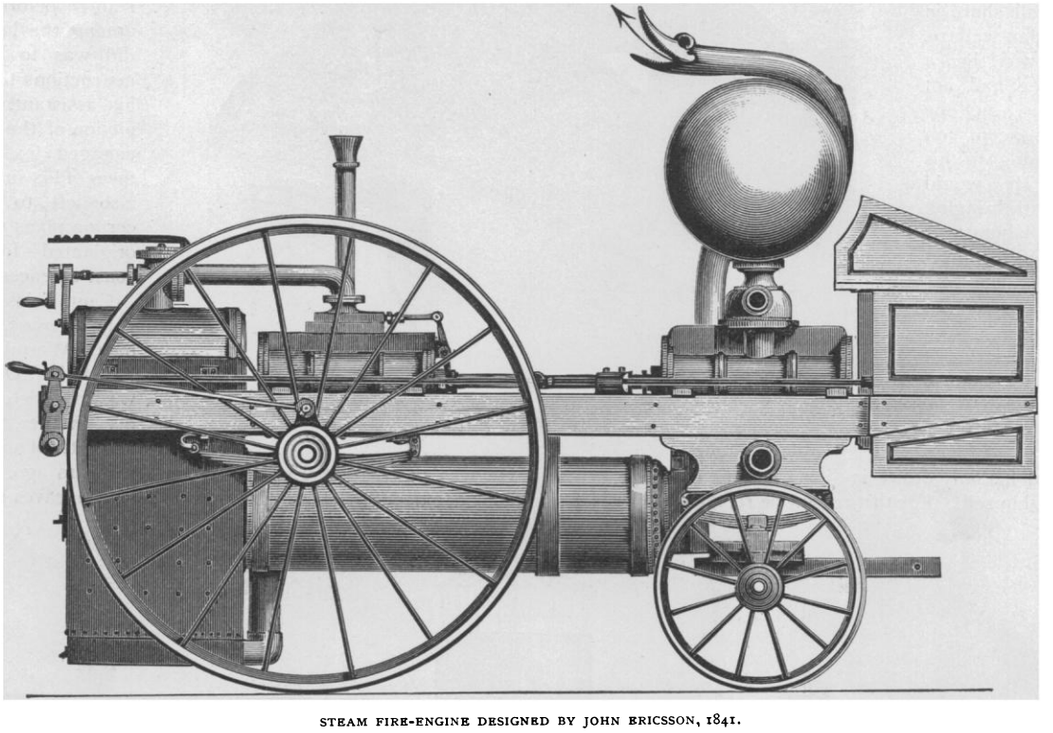


IRONCLAD CUPOLA VESSEL DESIGNED BY JOHN ERICSSON, 1854.

When about twenty-two years old, Lieut. Ericsson constructed a flame-engine of 10 horse-power, and journeyed to London in 1826, on leave, to introduce it. Once there, he resigned his commission. The resignation was accepted, but first he was promoted to a captaincy. He has never returned to his native country, but from it has received many honors and decorations; while in 1867 a great granite monument, quarried by the unpaid labor of the miners, some of whom had worked for his father, was set up with gala festivities in front of his mansion, inscribed, "John Ericsson was born here in 1803." It is under this stone that his last resting-place may be, though at this writing nothing definite can be said.

During the next few years, Ericsson produced about forty machines. They included a file-cutting device, an instrument for taking soundings (still in use), a hydrostatic weighing-machine, an apparatus for making salt from brine, a pumping-engine, a rotary steam-engine, and a famous system of artificial draught for steam-boilers, dispensing with huge smoke-stacks, and economizing fuel. To the steamship "Victory," in 1828, he applied the principle of condensing steam and returning the water to the boiler; and four years later he gave to the "Corsair" the centrifugal fan-blowers now generally used in American steam-vessels. In 1830 he introduced in the locomotives "King William" and "Adelaide" the link motion for reversing steam-engines. In 1834 he superheated steam in an engine on the Regent's Canal Basin.

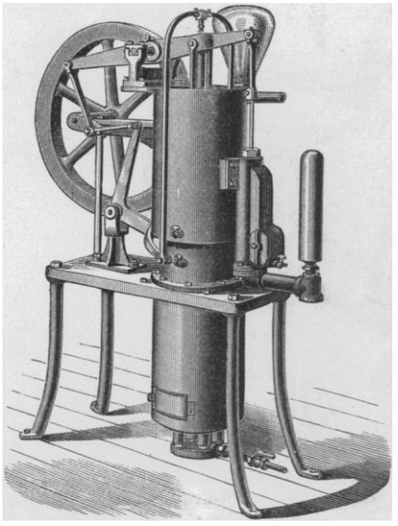
In 1829 the Liverpool and Manchester Railway had offered a prize for competing locomotives. Ericsson planned and hurried to completion an engine, the "Novelty," in seven weeks. The London *Times* of Oct. 8, 1829, said that in speed it "far excelled" all competitors. It shot along the line at the amazing rate of thirty miles an hour; but Stephenson's "Rocket" proved superior in point of traction. Ericsson in 1829, nearly threescore years ago, constructed a steam fire-engine, employed in putting out a fire in the Argyle Rooms, which was objected to as throwing too much water.



STEAM FIRE-ENGINE DESIGNED BY JOHN ERICSSON, 1841.

So much for his progress in England. For Ericsson's removal to

America in 1839, we have to thank the English Admiralty. In 1837 he built a tug, having two propellers of 5¼ feet diameter, invited the British Admiralty to inspect it, and towed their barge at a rapid rate; but their lordships solemnly concluded, that, as the motive power was in the stern, the novel craft would not steer. Thus it was in America, in 1841, that he began to build the "Princeton," the first naval vessel that ever carried her machinery under the water-line, out of the reach of hostile shot.



ERICSSON'S CALORIC ENGINE FOR DOMESTIC PURPOSES.

In 1839 Congress had authorized the construction of three warships. In 1840 the secretary of the navy, in obedience to that law, ordered two to be constructed. The question of whether steam could or could not be successfully applied to war-vessels had not then been solved, the fear of danger from ignition by fire prevailing in the minds of all naval men. One of the officers of our navy, Capt. William Hunter, submitted a plan by which wheels were to be inserted in the bilge of the vessel on each side, — submerged wheels. Ericsson had demonstrated his plan to be feasible, in his experiments in England. The secretary of the navy, in authorizing the construction of these two vessels, directed that one was to be built on Ericsson's plan, and one on Hunter's plan. Hunter's plan proved a total failure: Ericsson's plan laid the foundation of the present steam marine. The "Princeton" was the first war-propeller ever built on the face of the earth, and in her he brought forward not only his propeller, but a great many appliances appurtenant to steam navigation which have since been used in our service.

The honor of having built the first practical screw-steamer was thus Ericsson's, — an invention which was matched by that of the "Monitor," fifteen or twenty years later.

Such a device was offered by Ericsson in 1854 to Napoleon III. The story of what happened in 1862 is too well known to need repetition here. By extraordinary energy and executive skill, the "Monitor" was launched, with steam-machinery complete, a hundred days from the laying of the keel plate, and arrived in Hampton Roads just in time to defeat, March 9, 1862, the Confederate ironclad "Merrimac," which had destroyed the "Cumberland" and "Congress," and was about to sink or disperse the rest of the government's wooden fleet. Naval warfare was revolutionized.

The Mechanics' Institute of New York offered its great gold medal in January, 1840, as a prize for the best plan of a steam fire-engine. Ericsson, having several years previously designed such machines in England, among which may be mentioned the steam fire-engine employed during the memorable fire at the Argyle Rooms in London in 1830 (the first time fire had ever been extinguished by the mechanical power called forth by fire), had no difficulty in producing plans complying with the conditions of the Mechanics' Institute in a manner warranting the award of the prize offered.

His caloric engine was produced in 1833. In 1853, a voyage of the caloric ship "Ericsson," a vessel of 2,000 tons, 260 feet long, from New York to Washington and back, showed, that, though economical in fuel, the new heated-air motor could not produce speed enough at sea for commercial purposes, nor compete on any large scale with steam. Still, it has been applied successfully in thousands of engines to minor useful purposes.

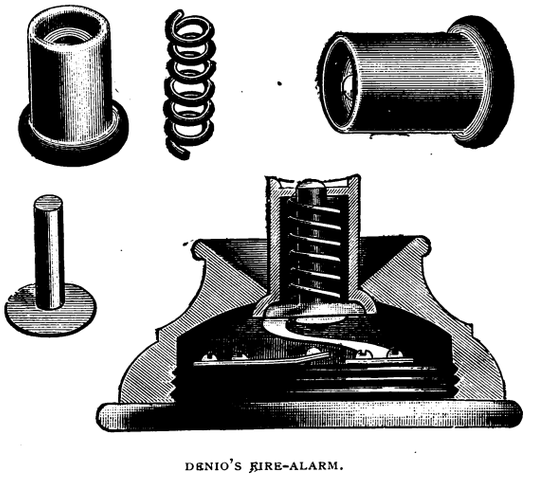
Favored by the possession of a robust constitution and ample means, Ericsson devoted many of his last years exclusively to the investigation of solar heat, and to the determination of the mechanical energy which the sun has in store for mankind when the coal-fields become exhausted. A sun-motor (illustrated in *Nature*, xxix. p. 217) erected in 1883 was found to develop under ordinary sunshine a steady and reliable power. Although he was eighty-six years old, and by no means well since the beginning of the year, Capt. Ericsson continued to labor at this motor until within two weeks of his death; and, as he saw his end approaching, he expressed regret only because he could not live to give this invention to the world in completed form. It occupied his thoughts up to his last hour. While he could hardly speak above a whisper, he drew his chief engineer's face close to his own, gave him final instructions for continuing the work on the machine, and exacted a promise that the work should go on.

No visitor was allowed to enter his workshop. Even his most intimate friends have never gained entrance there. Nor has any servant been in the room where the captain spent more than twelve hours daily for thirty years.

Here in his workshop, as it were, Ericsson lived, and here he died, a recognized leader among those who have added to human welfare, and honoring by his name the rolls of more than a score of associations of learned men.

THE DENIO FIRE-ALARM.

WE illustrate herewith a simple automatic fire-alarm combined with an ordinary electric push-button, which is being manufactured by the Denio Fire Alarm Company of Rochester, N.Y. The construction and operation of the device will be readily understood from the following description. In a thimble with an internal flange at one end, an external hollowed flange at the other, is placed



DENIO'S FIRE-ALARM.

a spring slightly longer than the thimble. This spring, one end of which bears against the internal flange, is compressed, and held in place by a pin which passes through it, the head of the pin fitting snugly in the recess made in the external flange of the thimble. The pin is sufficiently long to project entirely through the orifice in the internal flange end of the thimble. When the parts have been put together, the pin is secured in place by soldering to the flange, the solder used for this purpose being an alloy which will fuse at a low temperature, 150° to 160° F.

By removing the porcelain knob from any of the ordinary push-buttons now in use, and substituting this thimble, the button is