

Scientific American

A JOURNAL OF PRACTICAL INFORMATION IN ART, SCIENCE, MECHANICS, AGRICULTURE, CHEMISTRY, AND MANUFACTURES.

VOL. II.—No. 26.

NEW YORK, JUNE 23, 1860.

NEW SERIES.

STEAM FIRE-ENGINE FOR RUSSIA.

Owing to the great number of wooden structures which were originally erected in the cities and villages of our country when it was new and timber so abundant, their combustible character naturally led to frequent and extensive conflagrations. To prevent and mitigate such evils, the energies of our people were aroused, and their natural mechanical genius was excited; and as a consequence, they became the inventors and builders of the most efficient hand fire-engines in the world. These were divided into several classes, and with some variations, generally consisted of two upright pumps, situated opposite one another, at the rear of a long water box placed on a carriage, and connected with a suction pipe behind and a discharge pipe before leading through an air-chamber to the hose and nozzle. The pumps had two valves—an inlet and discharging one. Some of these were furnished with springs, but the most common kind were simple flap valves. The suction valve opened into the cylinder, the discharge one opened outwards, thus forming a force pump. The two pumps were operated by a long horizontal lever or brake at each side, united by cross arms to an oscillating central shaft supported in bearings. The engine therefore was a large double force pump, by which a continuous stream of water was forced through the hose upon a fire by a row of men at each side working the brakes up and down as most of our readers have no doubt seen. Engines of this character, and of various capacities, are still made and used; but in cities and large towns, they are being rapidly superseded by steam fire-engines, in the construction of which some of our mechanical engineers have already obtained a world-wide celebrity. The

annexed engraving represents the one which has been recently built for Messrs. Winans, Harrison & Winans, of St. Petersburg, Russia, by Messrs. Ettenger & Edmond, of Richmond, Va., and wherever it goes it will carry with it credit to the builders and to our country. The workmanship of it appears to be first-class as regards strength, beauty of finish, and efficiency. The boiler is a vertical-tubular, with an extensive heating surface, so as to generate steam rapidly. The entire machinery is secured on a strong four-wheeled spring truck; and the whole arrangement embraces great simplicity and compactness. Pressure and water gages, and every other device necessary to secure safety, convenience and efficiency, have been provided.

This engine was built from designs made by Mr. Alexander McCausland, and has proved itself equal in every respect if not superior to any engine of its dimensions heretofore built. The boiler, while running at an ordinary rate, is about twenty horse power; it is easily managed, and has the advantage of working very dry steam, not raising its water as most engines of the same

class do. There is one 9-inch steam cylinder, with the steam chest beneath, and the valve is so arranged that, in case of any water working over from the boiler, it will work its own way out without having to open the cylinder cocks. The valve is worked by an eccentric on the fly-wheel shaft, in connection with a rock-arm, as on ordinary engines. The stroke of the engine is 15 inches. The pumps are of gun-metal, and set one above the other, and are reciprocating in their action, the cross-head of the engine being made in such a way that the piston rod from the steam cylinder is fastened in the center; the two pump pistons take hold, one above the other, below the steam piston, while the side or connecting rods take hold of the ends which project over the sides of the frame, and give motion to the fly-wheels. One of the

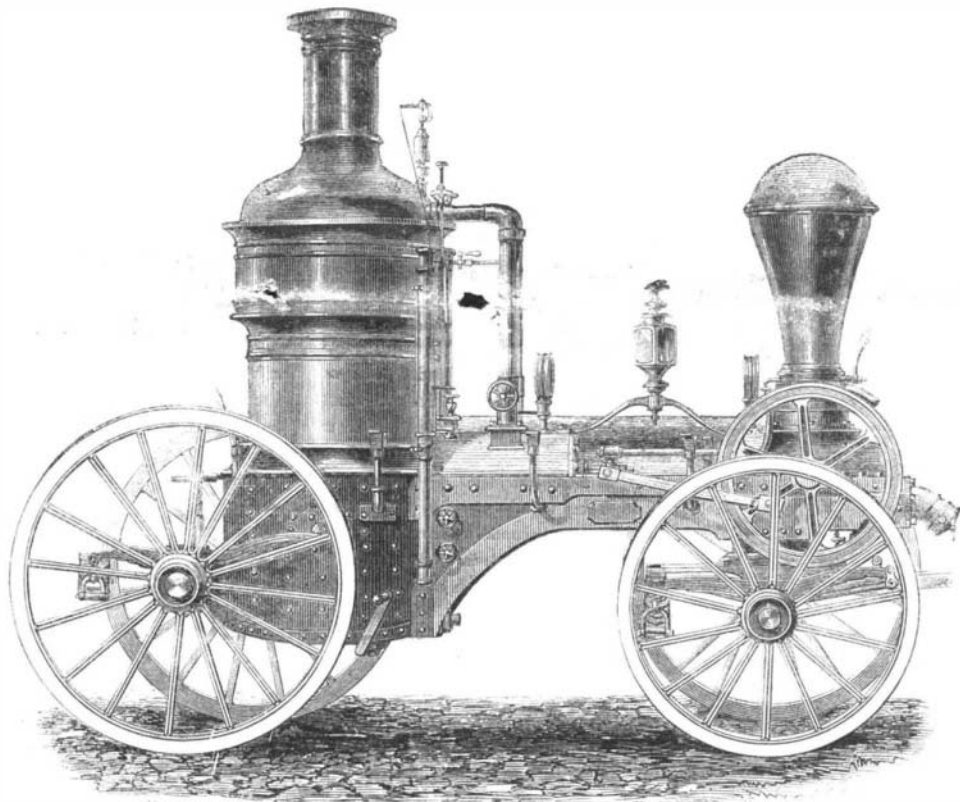
horses. The engine is furnished with a lamp; also, with a horse and a man-tongue. The boiler is handsomely jacketed with Russia iron, with heavy brass bands; a fly-wheel is on each side of the air chamber, which is tall and handsomely shaped. This engine, altogether, was thought to be equal in looks to any yet made, and the Chief-engineer of the Philadelphia Fire Department, in speaking of it, makes use of the following language:—"I consider it, on account of its size, one of the best I have ever seen perform; having thrown water 250 feet, which distance was measured in my presence by George Eckfield, engineer of the United States Mint." At a trial in Richmond, this engine was drawn up to a fire-plug on Main-street, and the fire lighted; in 10 minutes, an abundance of steam to start was

made. The steam was then turned on, and a 1-inch stream was thrown high above the eagle on the American Hotel, and then along Main-street, a distance of 240 feet. It was then taken to the canal, and, while raising its own water, threw a 1½-inch stream 220 feet, a 1½-inch stream 143 feet, and two ¾-inch streams 183 feet each. This trial was made when everything was perfectly new, and the boiler foaming from the grease or oil used in making it. It was pronounced by the Chief-engineer of the Richmond Fire Department worth the whole department put together at a fire. At a subsequent trial in Philadelphia, it threw the 1½-inch stream 250 feet, which distance the builders and those present at the trial think cannot be beaten by any 5-inch diameter pump made; and the builders are willing to put their engine alongside of any other of the same capacity for a trial at any time. Steam is guaranteed in eight

minutes, and the boiler to

maintain any pressure required for hours at a time; in fact to blow-off at 100 lbs. pressure all the time.

It is somewhat surprising that the power of steam was not applied at an earlier date to operate fire-engines in our large cities, as it is only a very few years since the first successful one was built and put into practical use. To the city of Cincinnati does the credit of first introducing the steam fire-engine belong. But if our mechanics have been tardy in applying, and some of our cities rather conservative in adopting steam fire-engines, a spirit is now abroad to redeem our credit, and make amends for past neglects. In Cincinnati, where they were first adopted, no other fire-extinguishers are employed; and St. Louis, Chicago, Philadelphia, Baltimore and New York, are each furnished with several, and the time is not far distant when they will be used exclusively. Sinews of iron and steel never tire, and if the boiler is furnished with food and water, and the joints lubricated with oil, the fire-horse will obey the behests of his masters and spurt copious streams by day and night, and scream defiance at weariness and sleep. It is much to the credit of Messrs. Ettenger & Edmond, and it affords evidence of their abilities and facilities in building engines, that this one was completed in 70 days from the date when the first line of it was drawn.



ETTENGER & EDMOND'S STEAM FIRE-ENGINE.

pumps—the lower one—is cast solid in the vacuum chamber, so that, no matter how much the engine is jolted over the streets, the vacuum chamber will never leak. This arrangement of pump gives a chance for the valves (suction valves) to be placed between the pumps, so that the instant the engine changes its direction the water is taken off the valves, leaving them free to act without any dead water on them. A patent has been applied for, to secure this pump to the inventor of the arrangement. The pump valves are ordinary clack valves, and so arranged that one valve will fit in the place of another as well as it does in its own. The two pumps are each 3½ inches in diameter, same stroke as the engine, and are equal in area to a 5-inch diameter pump. The engine is placed low down on straight axles, and cannot turn over, no matter how fast it may be going while turning corners; the body of the engine rests on six semi-elliptic springs, and rides very easy. It weighs (all complete with wood and water) 6,500 lbs. The back wheels are 4 feet 9 inches high, and the front ones 4 feet 6 inches, and it is easily managed with two