

# Scientific American

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

VOL. II.—No. 15.

NEW YORK, APRIL 7, 1860.

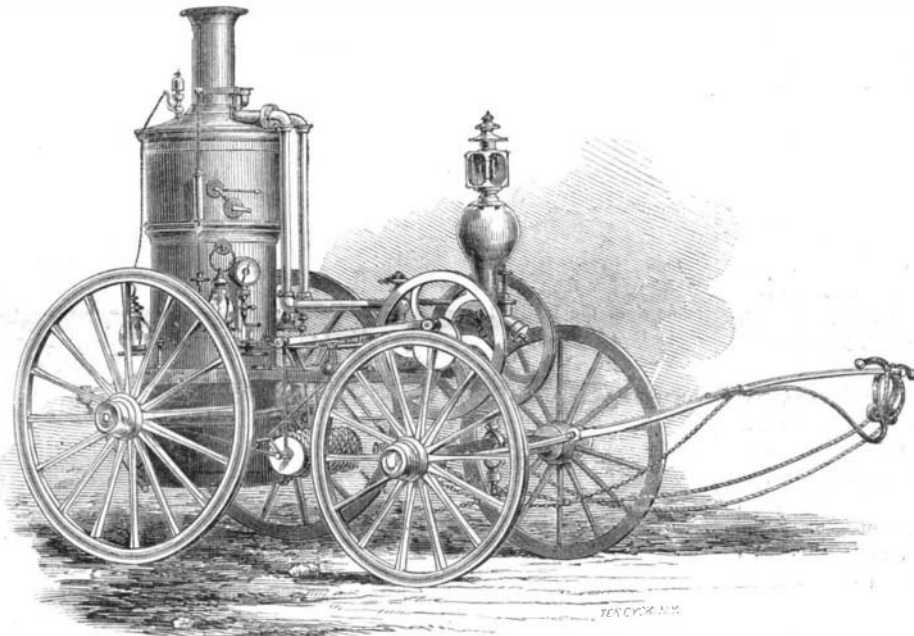
NEW SERIES.

## A LIGHT STEAM FIRE-ENGINE.

We present herewith an illustration of the steam fire-engines built by Messrs. Lee & Larned, of this city, at the Novelty Iron Works. These engines are fitted to be drawn by hand, being intended especially for the use of engine and hose companies; so that villages and small cities may now avail themselves of the superior and untiring power of steam, for fire-engine purposes, with no change in existing organizations, and without the expense of a horse establishment. The engine from which the view is taken has been on duty for several months, in the hands of the Valley Forge Hose Company, stationed in Thirty-seventh-street, this city, and it has rendered signal service on several occasions. It is about 10 feet in length, exclusive of the pole, and weighs 3,700 pounds; which weight, we understand, will be reduced at least 200 pounds, in engines of the same style to be hereafter built. Having large wheels and sensitive springs, it runs as easily as an ordinary fire-engine of 500 or 600 pounds less weight, and easier than the average of first-class hand engines. Its best single stream, for distance, is one inch diameter,; for quantity,  $1\frac{1}{2}$ ; but for ordinary fire duty, it will handle, with good effect, two one-inch streams, drawing its own water. This it did, for ten consecutive hours at the fire on the ship *John J. Boyd*, in January last.

The steam power is derived from one of Lee & Larned's patent annular boilers, of 125 feet of heating surface, with which steam can be raised to working pressure in from six to eight minutes. The pump, which is of brass, and highly finished, is Cary's patent rotary, driven by a single reciprocating engine, of 7 inches bore and  $8\frac{1}{2}$  inches stroke, with a pair of light balance wheels to carry it over the centers. It is intended to make from 200 to 400 revolutions per minute. A flange-disk, cast on the pump shell, makes one of the heads of the steam cylinder; the two, thus combined, forming a steam pump, of novel form and unequalled simplicity and compactness; occupying, indeed, so small a space (only 27 inches in length) that they are hardly seen in the engraving. The piston rod, passing out through the opposite head, acts on a cross-head of such length as to allow a connecting rod from each end of it to pass the cylinder and take hold of cranks on the pump shaft. The valve movement is obtained by means of a rockshaft, actuated by an eccentric rod from the main shaft. The boiler is supplied from an independent feed pump, but has also a connection with the main pump, which may be used at pleasure. The carriage frame is, in front, simply a horizontal bed plate of iron, of less than a foot in breadth, expanding, behind, into a ring, to the inside of which is bolted an upright open cylinder of thin, but stiff, sheet iron, strengthened at the bottom by an angle-iron ring, the whole forming at once a seat and a casing for the boiler, which is placed within it. This end of the bed or frame is hung on platform springs, arranged like those

of an omnibus, by means of tension rods and braces, taking hold of the angle-iron ring. The center of weight is directly over the hinder axle, which opens into a hoop allowing the boiler to hang within it. The springs are plates of steel, one or more to each, of uniform thickness, but tapering in width from the middle towards either end. In front, two springs of this form are used, placed one above the other, in line with and directly under the bed, receiving the weight of the machinery at the middle or widest part. These serve the two-fold purpose of spring and reach, taking hold in front, by means of forked ends, on swivel-boxes at each end of a short vertical shaft, forming a universal joint with the



LEE & LARNED'S STEAM FIRE-ENGINE.

front axle; giving thus a single point of front suspension, annihilating the tendency of the bed to wring and twist under its load in traveling over rough roads, saving all the weight of metal needed under the ordinary arrangement to counteract that tendency and secure the necessary stiffness, protecting the machinery perfectly against the concussions of travel, and dispensing with the complication and friction of a fifth wheel.

These engines are built of several different sizes, the one we have described being the smallest. The next size larger, weighing 5,200 pounds, is also a hand engine (though either can be fitted to be drawn by a horse or horses, if required), and being of proportionally greater power, it is to be preferred where the condition of the streets is favorable, in respect to surface and grades, and the company is strong enough in numbers to manage it. This engine has thrown a  $1\frac{1}{4}$ -inch stream 260 feet, a  $1\frac{3}{8}$ -inch 228 feet, and for fire duty not unfrequently plays a  $1\frac{1}{2}$ -inch stream with great effect. The *Manhattan* engine, which, in the hands of Manhattan Company, No. VIII., of this city, has done such admirable service at the severe fires of the past winter, and has been, according to the estimate of competent authorities, the means of saving property to the amount of at least a hundred times its cost, is of this size.

For any further information address Lee & Larned, at the Novelty Iron Works, this city.

## VELOCITY OF ELECTRICITY.

Messrs. Guillemin and Burnouf have been making numerous experiments on the transmission of electricity by telegraphic wires, with a view of discovering some law which governs this transmission. They conclude from their researches that the electric fluid is not propagated like the waves or undulations of light, and that it has not a constant and uniform velocity. They find it necessary to fall back upon the idea of Ohm, expressed in 1827, that electricity is propagated through wires, in virtue of the same kind of laws which govern the propagation of heat in a metallic bar. To determine experimentally which of these two opinions ought to prevail—that is, whether electricity is propagated with a constant and uniform velocity, or whether it is transmitted like heat—the authors disposed an apparatus, showing the intensity of the electric current in a certain point of a conducting wire, at different instants of its propagation. The first or the second opinion would then be justified, according as the current acquired suddenly in this point its definite intensity, or arrived at this intensity gradually. The authors found that the current at the point in question began with a very feeble intensity (the galvanometer marking  $0^{\circ} 50'$ ) which augmented gradually, and soon attained a maximum which it did not surpass, however long the contact of the pile with the conducting wire was continued. This maximum or permanent state was obtained in  $0.024$  of a second of

time (the galvanometer then marking  $19^{\circ} 50'$ ) in four lines of different lengths. The experiments were made during very fine weather, from 10 to 12 o'clock at night, from the 4th to the 6th of October, on a telegraph circuit of 104 leagues in length, passing from Nancy to Strasbourg, Mulhouse and Vesul, back to Nancy.

**POISONED PERFUMES.**—A Paris correspondent of the *New York Daily Times* says that the police of Paris have been for some months engaged in the examination of a variety of falsifications, and among the rest that of perfumery. Several actresses have been suffering from the effects of poison absorbed from the face, without suspecting that their sufferings came from this source. The quantity of corrosive sublimate, arsenic, verdigris, vitriol, and other poisonous substances daily absorbed in Paris must in effect be immense, and the reform did not commence too soon. The investigation was instigated by an actress of the Varieties Theater against a perfumer for damages for indisposition attributed to his cosmetics. At the same time the Academy of Sciences is occupying itself with the question of lucifer matches, and the reform necessary in their mode of fabrication. Several deaths from poisoning in the use of these agents directed this learned body to the subject.

Our thanks are hereby tendered to the Hon. John Cochrane, member of Congress from this city, for a full set of the Patent Office Reports for 1858.