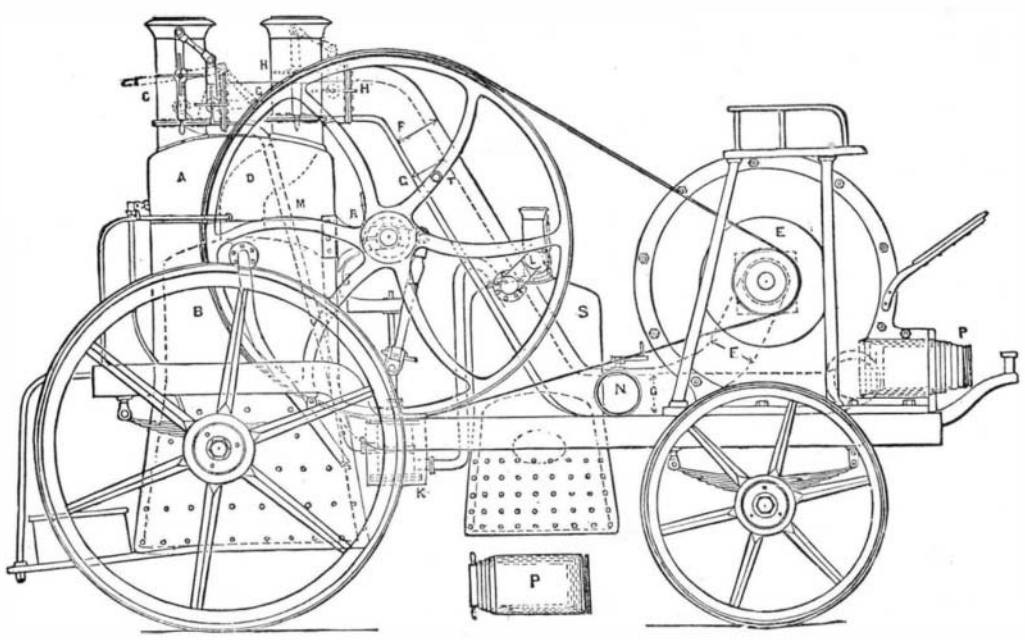
THE CARBON BLAST.

We have recently had brought under our notice a new principle of extinguishing fires. It is the invention of Mr. John K. J. Foster, and is being introduced in London.

In our engraving, A is a boiler or the jacket of a firebox, B, in which a fire is burnt for the purpose of vitiating air. It has an uptake, C, for steam from the boiler or jacket, and another, D, for the products of combustion from the fire box, B. E is a fan drawing the products of combustion from the firebox, B, through a pipe, F, connecting the uptake, D, with the fan casing. G is a similar pipe connecting the steam uptake, C, with the discharge outlet of the fan. H H¹ are throttle valves coupled so that when H closes the outlet through the chimney, H¹ opens a passage through F to the fan, and *vice versa*. A similar pair of coupled valves, I I¹, control C and G. S is a small high pressure boiler supplying steam to an engine, K, which drives the fan. Its chimney is connected with pipe, F, by a pipe, L, and a similar pair of coupled valves is provided to control the communication. M is the exhaust pipe of the engine leading to the uptake, C, below the valve, I. N is an opening in the suction pipe, F, of the fan closed by a throttle valve, which is only opened when ordinary pure air is to be admitted to the fan to clear a room of the vitiated air after a fire. P is the delivery pipe of the fan, made of metal in short lengths, fitted together telescopically. Other similar telescopic pipes, P¹, may be added on by screw couplings, or the delivery pipe may be otherwise constructed. The fly wheel of the engine is connected to the crank shaft by a clutch, so that it may be thrown in and out of gear by a handle, *r*, to enable the fan to be driven by hand at first by a handle, T, on the fly wheel, for the purpose of creating a draught in the furnace of boiler, S, the valve, I¹, then being shut, and the fan drawing air through the pipe, L.



THE CARBON BLAST FOR EXTINGUISHING FIRES.

We thus have what theoretically appears to be a very perfect means of extinguishing fires, and which we hope soon to see tried in practice. Our engraving shows an engine adapted for fire brigades, but for mills and factories generally the fan may be so adjusted to the furnace of the ordinary boiler as to be ready at any moment. Steam may be allowed to mix with the vitiated ai if advisable.

The fan would draw the atmosphere through the fire box, the oxygen would be destroyed, and could be conveyed into any room in the factory at will by a fixed sheet iron conductor of sufficient dimensions, having branches with valves to communicate with every room. In case of fire the fan could be turned by manual labor, when, on the valve leading from main flue into the room that is on fire being opened, in two minutes the room would be filled with vitiated air and the fire extinguished.

This same appliance, by simply opening one valve and shutting another (automatically), could be used to exhaust the warm, fœtid air out of any or all the rooms in the factory, or to force fresh air into the rooms at will. The whole of this apparatus would be of little cost, and when applied in the case of small fires, could not do harm as in the case of extinction by water; 20,000 feet of cubic air per minute can be put into circulation by hand power alone. The apparatus in this connection would be stationary, and independent of any other appliance.

For use by railroad companies the hose could be attached to the funnel of an ordinary locomotive engine. In case of fire at a station or goods department, all that would be required would be to run the engine near the fire, attach the tail pipe of the fan to the funnel of the engine; the air drawn through the fire would be vitiated or deprived of oxygen, and conducted by the blast conducting pipe into the burning building, and the fire would be got under at once. Another important application is that of ships. For steamships the fan could in case of fire be attached to the funnel exactly as for locomotives. With Foster's carbon blast the vitiated air could easily be conveyed into any part of a ship's hold. If the hold, or any room in a vessel, was filled with vitiated air and steam, no fire could live many minutes. For ventilation purposes the apparatus would also prove very useful. In short, there appears to be a wide field of usefulness for this invention, and we look forward with interest to its practical introduction.—*Iron.*

THE making of large lenses is a matter of many difficulties, as may be inferred from the fact that there have been nineteen failures to cast the thirty-six inch glass for the great Lick telescope to be mounted in California.

Centenarian Women.

Mrs. Phœbe Brockway died at Union Springs, N. Y., on the 14th of November, 1884, at the remarkable age of 112 years. She had four children, of whom three are still living, Mrs. Marshall Whipple, aged 80, Mrs. Menzie, and William Brockway. Mrs. Brockway was well known as a strong and active woman, who enjoyed excellent health until within a short period of her decease.

At Beaver Brook, Mass., on November 14, 1884, the 100th year of the life of Mrs. Elizabeth Putnam was celebrated by her children. The aged lady is still very vigorous, memory and all faculties in good condition. She has had twelve children, six sons and six daughters, all of whom grew up and were married. Two sons and three daughters still live. All the children lived to be over 66 years of age except two, one of whom died at 30 and the other 34. There have been 42 grandchildren and 24 great-grandchildren, many of whom are living.

Yellow Dye.

A. Poirrier, of Paris, has taken the first step in the direction of producing a yellow dye, to compete with Persian berries; this is the *Jaune solide*, an azo color fixed with acetate of chromium. Poirrier has shown that it can be used like the Persian berry yellow, and that it can be sold cheaper. If fixed alone, the *Jaune solide* gives fine orange-yellow tints of much solidity, and resisting soap and light. —*Manchester Textile Recorder.*

THE COLLADON FOUNTAIN.

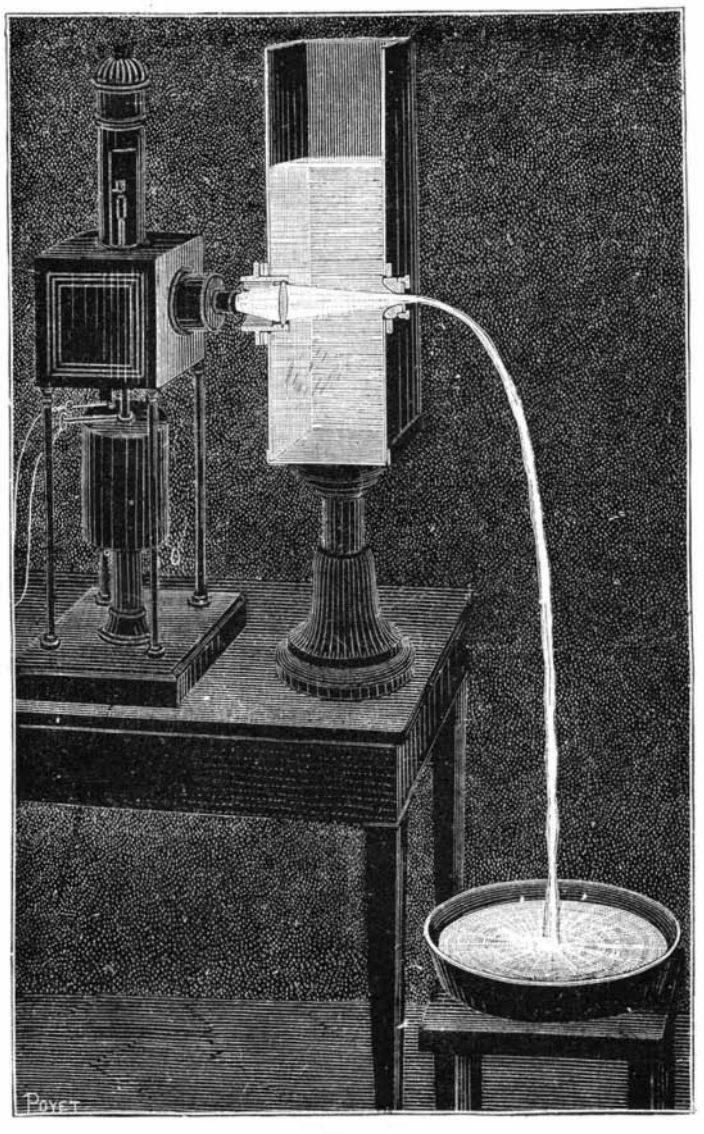
In my lecture courses I have often endeavored to render visible to all the pupils assembled in the amphitheater the different forms that are assumed by a stream of water issuing from various orifices, and it was for this purpose that I was led to illuminate internally a stream placed in a dark space. I have found that such an arrangement is well adapted to meet the object I had in view, and that, moreover, it offers in its results one of the most beautiful and curious experiments that can be performed during a course of lectures on optics.

The apparatus that I use for these experiments consists of an oblong vessel, about three feet in height, in one of whose sides, a little above the base, there is an aperture into which are screwed different diaphragms in order to vary the size and form of the jet. This latter escapes from the vessel in a horizontal direction. In order to illuminate it internally, an aperture is formed in the back of the vessel, and to this there is fitted a convex lens, while outside of the vessel there is added a short, horizontal, internally blackened tube designed to prevent the rays that are oblique with respect to the axis from entering the vessel.

The apparatus is placed in a dark room, one of the window shutters of the latter may be provided with an aperture for adapting the blackened tube to, and a fascicle of solar light may, by means of a mirror, be thrown parallel with the tube's axis. One may also employ with advantage an oxyhydrogen or electric lamp which throws a fascicle of horizontal light, as shown in the engraving. The luminous rays traverse the lens and the liquid, and converge in the aperture through which the stream is escaping; and when once they have entered the latter, they meet its surface at a sufficiently small angle to cause them to undergo a total internal reflection. The same effect is produced at every new point of incidence, so that the light circulates in the transparent jet as in a pipe, and follows all its inflections.

If the water be perfectly limpid, and the aperture of the diaphragm very sharp, the jet will be scarcely visible, although a very intense light is circulating within it. But at every point where the jet meets a solid body that interrupts it, the light which it contains escapes, and the points of contact become luminous. So, upon the jet being received in a vessel that stands horizontally, the bottom of such vessel will be illuminated by the light that issues from the apparatus through the jet. If the stream is falling from a great height, or if its diameter is but a few millimeters, it will be reduced to drops at its lower part, and it will be there only that the liquid will be illuminated, and every point of rupture of the jet will throw out a bright light. If a continuous jet is falling upon a surface capable of a certain number of vibrations, the vibratory motion will be communicated to the liquid, and the latter will then be broken to some height above the vibrating plate. This experiment of Savart, as well as several others that he has studied, and described in the *Annales de Chimie*, may be repeated and rendered visible by this new process. It will be understood, moreover, that it would be just as easy, by means of reflectors, to illuminate a jet that had any other direction, or to illuminate the interior of the jet with all the colors of the prism by interposing colored glasses between the lamp and blackened tube exterior to the apparatus. The only essential precaution to take is to use water at the temperature of the room in which one is operating, in order that no moisture may be deposited upon the lens. In experiments designed to render the jet visible near the orifice, in order to study the contractions of the stream, it is indispensable to render the liquid turbid by means of some solution or other or by dust. The light will thus be dispersed at the jet's exit from the orifice, and the liquid will become luminous at the upper part.

A fact that may be always observed with this apparatus is that slight blows against the vessel, near the orifice, made with a hard body, break the jet in the very plane of the orifice and produce therein true fissures, which are easily seen and which are very brilliant. Sometimes these fissures do not close immediately, but continue in the stream for some instants.—*D. Colladon, in La Nature.*



COLLADON'S FOUNTAIN.

CANVAS bags, it is said, can be made as impervious to moisture as leather by steeping it in a decoction of one pound of oak bark with fourteen pounds of boiling water, this quantity being sufficient for eight yards of stuff. The cloth from which the bags are made has to soak twenty-four hours, when it is taken out, passed through running water, and hung up to dry.