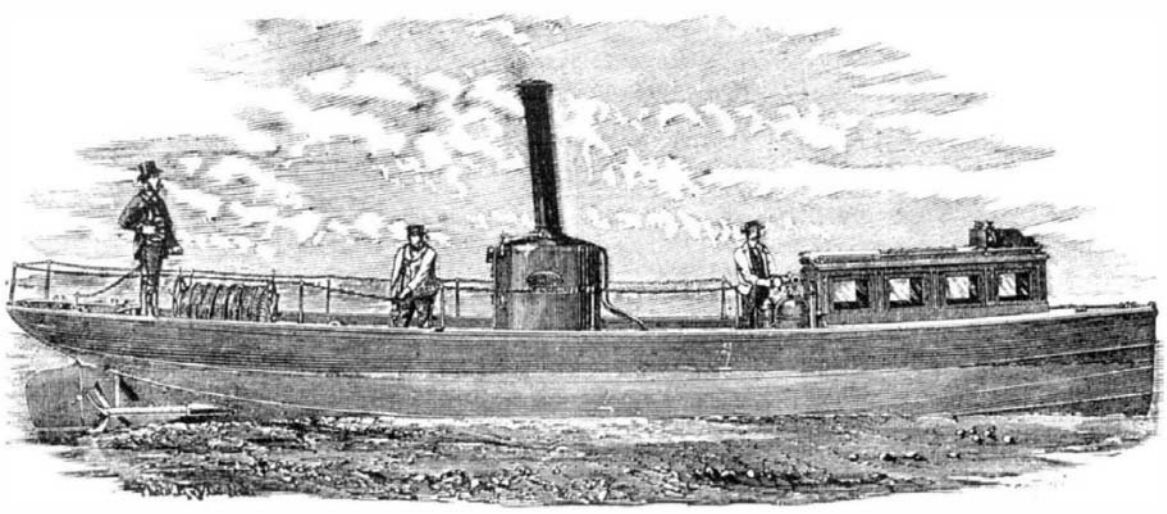
FLOATING FIRE ENGINES.

We have heretofore called attention to the value of floating engines for extinguishing fires, especially to cities (like New York) having a large proportion of water front to the square mile. Messrs. Merryweather & Sons, of London, Eng., have been very successful in constructing these engines; and we illustrate, herewith, a vessel built for the Wear commissioners for protecting the shipping and docks of Sunderland and the adjacent ports from fire. It is intended, also, to use the engine for pumping purposes in general, such as for emptying sunken vessels, supplying ships with fresh water, etc.



MERRYWEATHER'S FLOATING FIRE ENGINE.

The boat is built of iron, and s 40 feet in length, with 9 feet 6 inches beam. It is propelled by a pair of independent vertical engines, each working a screw; this arrangement being adopted in order that the vessel may be steered in and out amongst the shipping. The draft is about 2 feet forward, and 2 feet 6 inches aft; the total depth is 4 feet 9 inches. The vertical engines are driven from the same boiler as the steam fire engine, and the speed averages 10 statute miles per hour; the diameter of screws is 28 inches.

In the fore part of the vessel is a cabin with sleeping accommodation for three or four firemen if necessary, and at the after part is a large hose reel fixed longitudinally, which will carry some thousands of feet of fire hose; there are in addition capacious fresh water tanks—these are fixed under the seats and platform, and are all connected. The steam cylinders are each 8⅞ inches diameter, with 24 inch stroke; the pumps have a similar stroke, and are 6½ inches diameter; the twisted bar motion, for which the makers' engines are so well known, is carried out in the above float. This engine, when in full work, is capable of discharging 1,100 gallons per minute through an open hose when used for pumping purposes; it also pumps, when in action as a fire engine, through a jet 1⅞ inches diameter to a horizontal distance of nearly 300 feet. Arrangements are made whereby two, four, six, or twelve jets may be thrown advantageously. The pump is entirely of gun metal, and consists of one solid casting weighing about 7 cwt.; the valves have a clear unobstructed waterway; the pump buckets are self-lubricating; and the valves being beneath the barrels, there is no fear of the latter being damaged by grit, sand, or other foreign matter. The valves, which are also of gun metal, are faced with india rubber attached with copper screw bolts. We may speak a word in favor of this class of valve, when we state that engines of this make in the royal dockyards, and in the service of the Liverpool, the Manchester, and the London Brigades, have run for 8 and 10 years without a renewal of the facings. The boiler is fitted with the Field tubes. Surrounding the outer row of tubes is a water space, which is well stayed to the fire-box. The boiler is fed by hand pump, feed pump on engine frame, arrangement for feeding direct from the main pump, and also by a Giffard's injector. It is capable of raising steam to 100 lbs. pressure within ten minutes from lighting the fire and from cold water. Had Liverpool been provided with such arrangements, says *Engineering*, to which we are indebted for the illustration, we should probably not have heard of the total destruction of the noble landing stage.

Animals as Motor Powers.

M. Marey gives some observations on the employment of animals as motor powers. He proves, by an instrument, that the movement of animated beings takes place by jerks, whence result shocks, and consequently a waste of labor. As an illustration of this theory, M. Marey cites the effort necessary to draw a burden behind one. If the necessary force be transmitted by means of a rigid or almost unextensible strap, for instance, of leather, the movement is jerky and more difficult than if it were transmitted by an elastic strap. It would, therefore be better to attach horses to the shafts with india rubber traces. He also gives in the paper (which was read before the French Association for the Advancement of Science), as an illustration, the manner in which boats are always dragged along the towing paths by long ropes. It would be impossible, or at least very distressing, to employ short ones. The length of the rope, which alternately tightens or slackens by slow oscillations, has in this case the same effect as india rubber or other elastic material. Mr. Marey's instrument, by which these facts were ascertained, is an elaborate and ingenious piece of workmanship.

THE CRYSTALLIZATION OF GLASS.

An engineer of a glass bottle manufactory at Blanzy, France, recently substituted for the crucibles, ordinarily employed in melting the glass, a large cistern furnace heated by gas. An accident occurring rendered it necessary to withdraw the fire; and on scraping the glass from the inclined portions, a quantity of magnificent crystalline formations were found, produced during the cooling of the vitreous contents. These masses, a representation of one of which is given herewith, were sent to M. Peligot for examination, and that scientist has pronounced them different from any similar formations yet noticed in glass furnaces. The crystals are entirely isolated, and are not mixed with transparent glass. They are prisms of from 0·6 to 0·9 inch in length. The explanation given for the phenomenon is that the dentification is due to a separation of the vitreous elements, which gives rise to a definite silicate, crystallizing in the midst of the residual mass. This seems to be proved by an analysis of the crystals, in which soda is almost entirely absent, and magnesium present in large proportion. We extract the engraving from *La Nature*

CRYSTALLIZATION OF GLASS.

Compound Engines.

Nothing is more common than the removal of a pair of ordinary engines from a steamer, their replacement with compound engines, and a laudation of the excellent results obtained, which are invariably attributed to the fact that the steam does its work in two cylinders instead of one. It is not often that we are favored with a means of arriving at any really valuable conclusion in such a case, because some factor is always absent. A notable exception is afforded by the case of the steamship Alexander, the property of a firm whose steamers trade between St. Petersburgh, Revel, Helsingfors, and Lubeck. She was originally fitted with ordinary engines of 80 nominal horse power. Messrs. Crichton were instructed to convert these into compound engines, retaining as much of the old machinery as possible. Cylinders wholly new were of course required. The old engines worked with 15 pounds steam, and consumed 36 cubic feet of coal per hour, with a speed of 9 knots and 60 revolutions in regular work. The engines were built by Earle Brothers, of Hull, fifteen years ago, and the Alexander was also built by the same firm. The engines were exceedingly trustworthy, and in their long life have cost very little for repairs.

A most important change was made in the screw, the pitch being considerably reduced. As to the results of the alteration, they may be briefly stated: With a pressure four times as great as that originally used, the engines make 90 revolutions per minute, and the boat goes at 10 knots, with 20 cubic feet of coal, per hour.

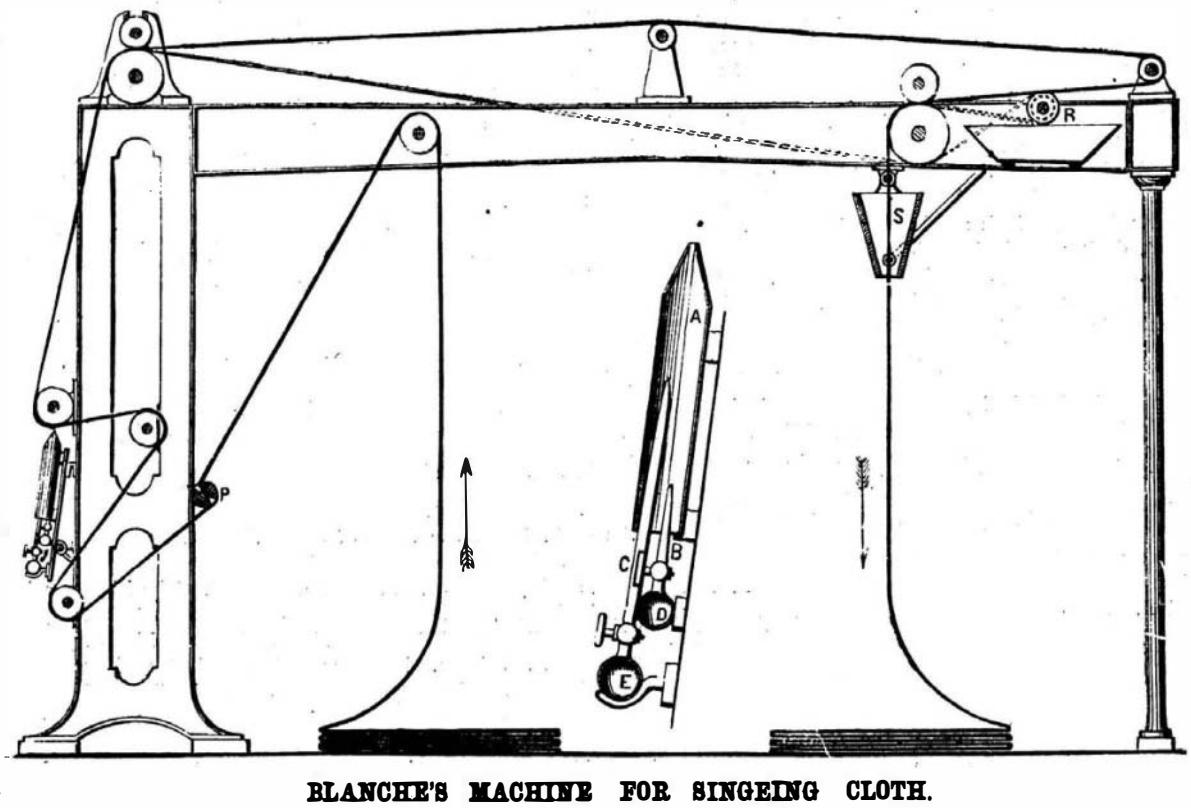
The boiler is so much smaller than the old one, and so much less coal is required for a voyage, that the midship bulkhead has been moved further aft, and 5,000 cubic feet of cargo space have been gained. The vibration, before excessive, has been greatly reduced.

The benefits thus gained will, by some persons, be attributed to compounding. They are really independent of that principle, and better results would have been got by the use of two simple cylinders, new boilers, high pressure and expansion, and a screw of proper pitch. The change might have been effected by fitting two liners into the old cylinders to reduce their diameter sufficiently, and the surrounding space between the cylinder and the liner could have been utilized as a steam or air jacket.

We understand that Messrs. Crighton are about to alter a sister ship, the Nicolai, in the same way.—*The Engineer*.

NEW CLOTH-SINGEING MACHINE.

The annexed diagram exhibits the essential features of a new machine for singeing fabrics, recently invented in France, by M. Blanche. It is claimed to use but 141. cubic feet of gas per hour in singeing cloth 2 yards and 7 inches in width, thus effecting an economy of some 40 per cent on the apparatus commonly used for this important operation in textile manufacture. The arrows indicate the movement of the cloth. At the left of the vertical standard is a stretcher, P. R is a brush which cleans the surface after the singeing, and at S is an arrangement for governing the folding. The burner used is shown enlarged in section. and consists in air jet, C, and a gas jet, B, which mingle at the extremity of the conical tube, A. The tubes for the gas and compressed air are represented at D and E. The flame from the burner may be accurately adjusted, so that the singeing may take place, after dyeing, without any disengagement of smoke or odor. Two men at the crank work the machine with facility.



BLANCHE'S MACHINE FOR SINGEING CLOTH.