THE LARGE FLOATING DERRICK.

In constructing the solid walls of the new water fronts of New York city, already described and illustrated in our pages, a derrick, capable of lifting a block of *béton* weighing 100 tuns, is used by the workmen. This powerful machine has been described and commented upon by many foreign journals, *Engineering* having given its readers full descriptions and illustrations. This form of derrick was designed and patented by Mr. Bishop, many years ago, and was used in the building of High Bridge aqueduct; some valuable details, however, have been added by Mr. G. H. Reynolds, of the Delamater Iron Works, where the specimen under consideration, of which Fig. 1 is a perspective view, was built.

The float is of rectangular form, one side being 65 feet, the other 70 feet; its depth is 13 feet. It is built chiefly of Georgia or hard pine timber, put together in a very substantial manner. In order to prevent any twisting or change of form, the float is stiffened by sixteen trusses, made similar to the well known Howe truss. The tower, which carries the ring post and booms, is made of twelve pieces of selected Georgia pine, 14 by 14 inches at the lower ends, 63 feet 3 inches in length, and 12 by 12 inches at the upper end; these legs are stiffened by struts and braces. The lower ends of these legs are fastened into a heavy cast iron circle. At their upper extremities, these legs are brought close together and are held by a casting of circular form, to which they are bolted. This casting is made with a recess which is filled with spherical rollers; these rest against a casting fitted to the ring post, so that its lateral pressure, where it passes into the tower, causes but little friction.

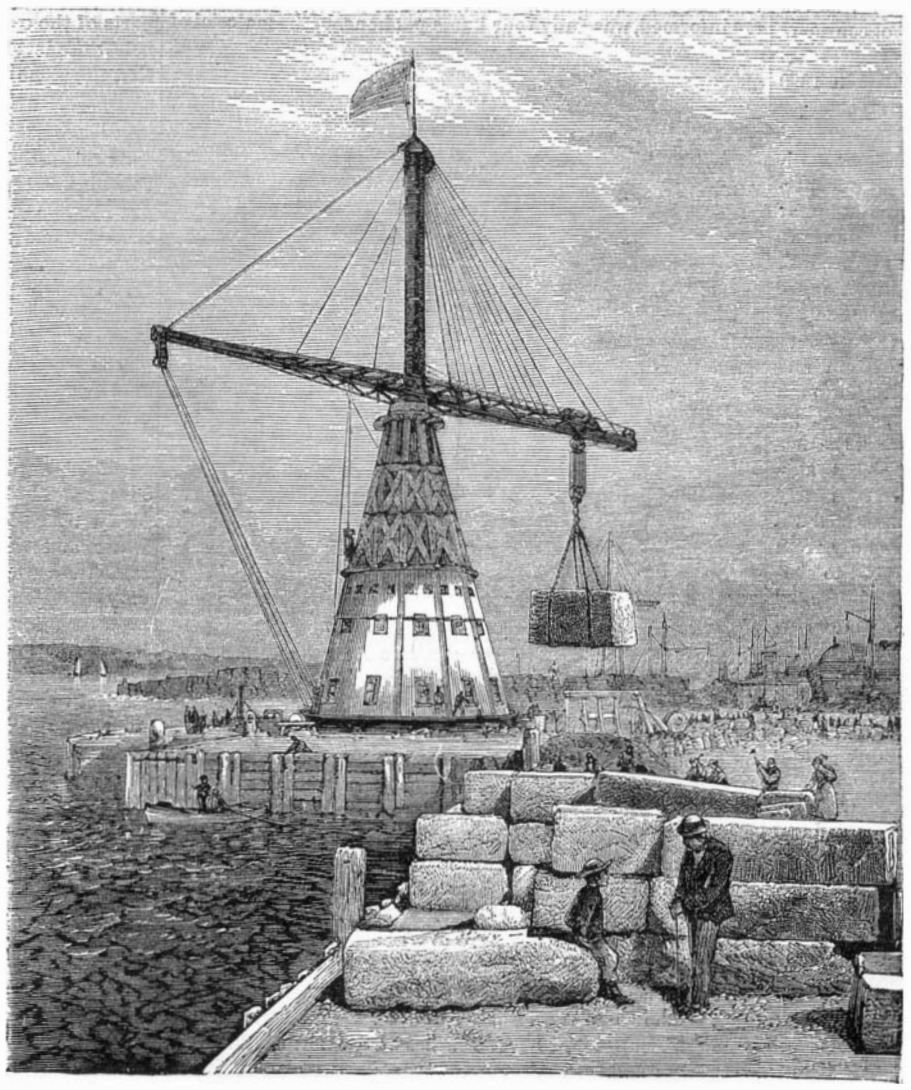
The front or hoisting boom of the derrick consists of two plate iron box girders 22 inches deep by 9¾ inches wide; the upper and lower members of these girders are of channel iron three quarter inch thick; the side plates, which are riveted to them, are three eighths inch in thickness. All the rivet holes are drilled. These girders are spaced 24 inches asunder, and are held in position at the ring post ends by being inserted in deep sockets formed in a heavy casting which encircles the post. The boom is supported by eighteen diagonal rods two inches and a half in diameter, made of iron warranted to stand 75,000 lbs. per square inch tensile strain; these rods converge near the top of the ring post and are secured to it. (See Fig. 2.)

All the machinery is placed on the float within the tower, and the levers which control the various movements mentioned are brought conveniently together on a stage 35 feet above the deck.

The following are the chief dimensions of this structure:

	feet.	in.
Length of float	71	
Breadth of float	66	
Depth of float	13	
Length of hoisting boom	60	3
Length of back boom	50	3⅛
Length from end to end of boom	110	6⅜
Hight of tower	62	3
Hight of ring post above tower	49	8
Total length of ring post	62	
Hight from bottom of float to top of ring post	127	3

The derrick, says *Engineering*, has been skillfully planned; it has many novelties and mechanical refinements to which are due the marked success with which it works under very heavy loads. We may mention, for instance, the ingenious arrangement of the wire rope guys of the back boom, equally distributing, as they do, the heavy strain over a large sector of the traversing circle.



THE NEW YORK FLOATING DERRICK. Fig. 1.

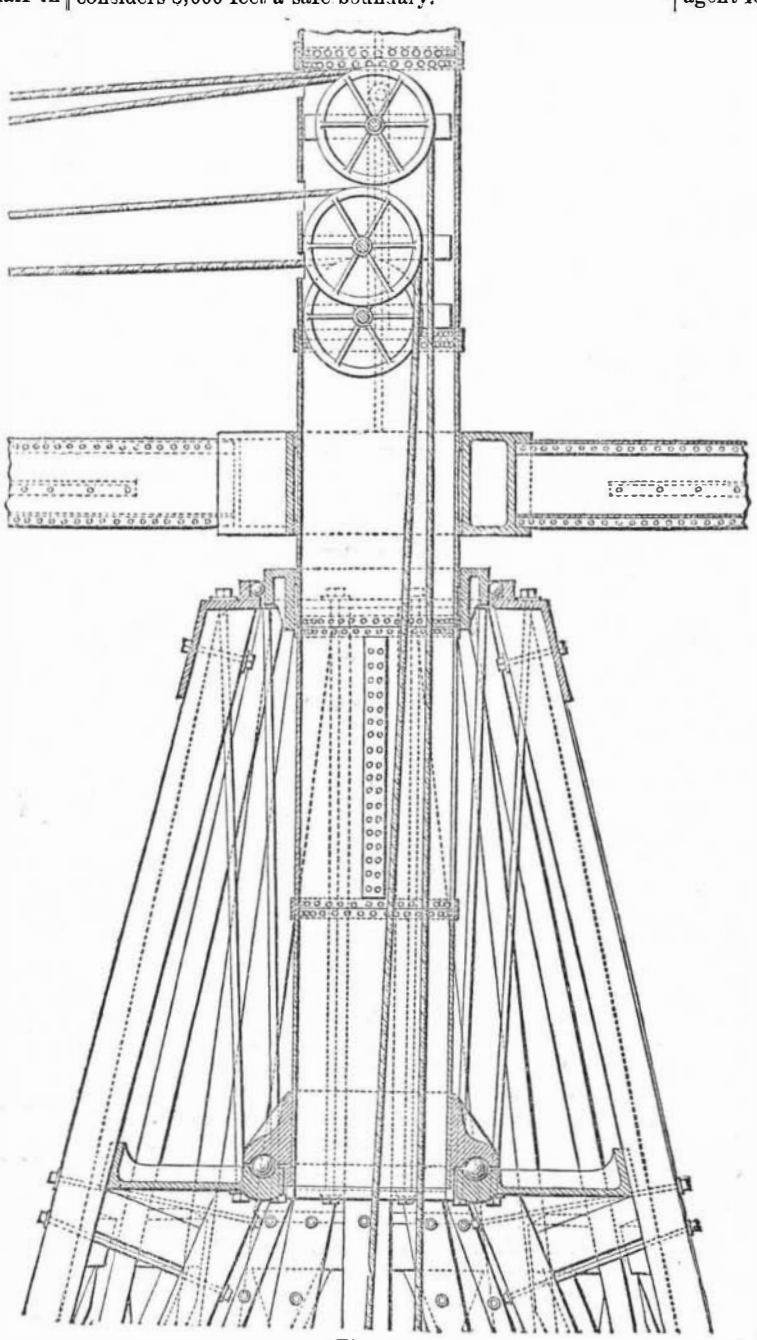


Fig. 2.

Working in Hot Atmospheres.

In relation to the subject of how high a temperature men can endure and work in, a writer in the *British Journal of Science* notes the following interesting cases: During the re-heating of furnaces in an iron works in England, the men worked when the thermometer, placed so as not to be influenced by the radiation of heat from the open doors marked 120°. In the Bessemer pits, 140° was reached, and yet the men continued a kind of labor requiring great muscular effort. In some of the operations of glass making, the ordinary summer working temperature is considerably over 100°; and the radiant heat to which the workmen are subjected far exceeds 212°. In a Turkish bath, the shampooers continue four or five hours at a time in a moist atmosphere at temperatures ranging from 105° to 110°. A case is mentioned of a person in the same establishment working for half an hour in a heat of 185°. In enamel factories, men work daily in a heat of over 300°. On the Red Sea steamers, the temperature of the stoke hole is 145°, and some men will labor there for half an hour without a drop of perspiration, while others are carried out fainting.

These examples of continuous work at 110, 120, 140 and 145 degrees correspond to depths in mines of 3,650, 4,250, 5,450 and 5,750 feet. The author thinks, therefore, that the limit of 4,000 feet, fixed by the English commissioners as the extreme workable depths of mines, is too small, and he considers 8,000 feet a safe boundary.

Reward Offered for Self-Acting Railway Couplings.

The confederation of the administration of German railways has determined to award prizes—one of 3,000 thalers ($2,250) another of 1,000 thalers ($750)—for the invention of a contrivance by means of which the coupling of railway carriages can be effected without the necessity of any one stepping between the carriages. The inventions submitted for competition must have been tried practically by one of the railways belonging to the confederation previous to the sending in of the papers, and the proposition for the award of the prize must emanate and be supported by one of the said railways. The premium does not debar the inventor from patenting the invention and enjoying the benefit of the patent. The papers must so explain the invention by illustrations, drawings, models, etc., that an opinion can be easily formed of its quality, practicability and working; and must be sent in, carriage paid, to the head office of the confederation, Berlin, Prussia, before the 1st of July, 1874. The examination of the competing plans as well as the decision, whether general or in the form of an award of prizes, will be undertaken and decided by an examining committee, consisting of twelve members, appointed by the confederation.

Cinder Fuel.

M. Chary has recently made experiments with the view of utilizing cinders which have dropped through the grate. He suggests passing condensed air over red hot cinders, whereby carbonic oxide is formed, which gives a flame of several feet in length, well adapted for boiler heating. The greatest difficulty lay in the ultimate removal of the refuse cinder. From his short experience in this direction, he calculates that 2 lbs. of cinders, sorted by hand, give a heating effect equal to that obtained by 1 lb. of coal. It has been argued that the mode of separation was of the greatest practical importance. The wet process was not to be recommended, on account of the extensive drying grounds required, and the fact that after all the pieces had to be used in a damp state. A current of air has been suggested as an agent for separating, or, as it were, winnowing the bits. Another authority on the subject states that the amount of incombustible matter in the cinder amounts to 10·5 per cent by volume, or 26·7 per cent by weight.

Cutaneous Exudation of the Water Newt.

E. A. Ormerod gives the following observations in the *Journal of the Linnean Society:* The common *Triton cristatus* of our ponds and ditches appears, in its natural state and when undisturbed, to be scentless, but when alarmed or irritated it emits an odor strongly resembling that of bruised poppy heads, which is clearly perceptible in the open air. If the animal be exposed to the vapor of chloroform a viscid fluid exudes from the pores of the skin, collecting over the wet surface after death in a kind of slime which, when touched by an abraded portion of the hand, causes momentarily acute pain; this acrid fluid can be made to exude from the tuberculated parts of the skin by gentle pressure with the finger. This fluid, moreover, has an acrid taste, produces a feeling of numbness in the tongue, and causes a sensible degree of inflammation in the mucous membrane of the lips and mouth, which lasts for some hours and is accompanied by a sense of dizziness and stupor. An analysis of the slime showed it to be similar in composition to serum as regards its chief constituents; the exact nature of the acrid principle was not ascertained, but it appears to have no alkaloid character and to be highly volatile, corresponding in these particulars with the exudation from the skin of the common toad described by Dr. John Davy. The effect of the exudation when discharged direct from the skin of the triton upon the subject of experiment seems usually to be far more powerful than when applied artificially, and fully to justify the popular prejudice against these creatures. On the tritons themselves the effect appeared to be painful and stupefying. On a healthy cat there was copious discharge of saliva and foam, and violent and audible action of the jaws. When placed on a human tongue the first effect was a bitter astringent feeling in the mouth, with irritation of the upper part of the throat, numbness about the teeth in contact with the fluid, and a strong flow of clear saliva, followed by foaming and violent action of the muscles of the mouth; these symptoms were followed by headache, general discomfort, and, in half an hour, slight rigor.