

REVOLVING HERCULES CRANE.

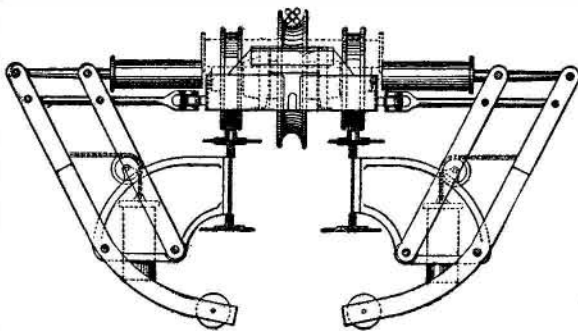
There is little doubt the construction of harbors has been greatly facilitated, and consequently their number much increased, by those gigantic appliances for lifting and setting blocks, the various genera of which appliances have received the names of Mammoth crane, Titan, and Hercules. Messrs. Stothert & Pitt, of Bath, were early in the field in the construction of these giants, and, indeed, they have made nearly all that have been constructed in England for the leading harbor engineers, including Sir John Coode, Sir J. Hawkshaw, Mr. P. J. Messent, and Mr. W. Parkes. This company has supplied the block setting apparatus for the harbors of St. Helier's, Jersey; Madras, Kurrachee, and Mandavee, in India; East London, Port Alfred, and Port Elizabeth, in South Africa; Goa, the capital of Portuguese India; and Colombo, that of Ceylon; Gisborne, New Zealand; and Hartlepool and Tynemouth, in England.

The Hercules illustrated below is the latest development of this type of machine. It was made, under the direction of Mr. James Walker, M. Inst. C. E., for the Isle of Man Harbor Commissioners, and is now at work extending the Victoria pier at Douglas, where it forms a striking object that cannot fail to be noticed by every visitor to the island. This appliance is designed for setting 15 ton concrete blocks at any point within a circle of 150 ft. diameter. There were some special circumstances which governed the design, notably the necessity of having the block yard at a distance, and of bringing the blocks by water, so that there should be no interruption to the traffic of the harbor. The Hercules unloads the blocks from a steam barge, stacking them on the pier behind itself; and, in order to save the tides and to clear the barges quickly, the machine has been made to work at a very high rate of speed. For instance, a complete revolution of the jib can be accomplished in a minute and a half.

The depth of water in Douglas harbor is very great, so that the total range of lift of the machine is required to be 95 ft., the horizontal travel along the jib being 55 ft. This horizontal motion is an absolutely essential feature in block setting machines, for enabling the divers to adjust the blocks in place with accuracy. In order to facilitate setting under water, there is also an arrangement on the snatch block by which the diver can twist the concrete block by means of a worm wheel and ratchet handle. All the motions of crane, except that for lifting, are worked by friction clutches, and are so arranged that any two of them may be worked simultaneously, thus greatly facilitating the work of unloading the blocks from the barges. The jib of the crane consists of two horizontal girders carrying the rails on which the jenny runs. These girders are braced together by built-up brackets of U form, the object being to preserve the girders from any tendency to twist owing to the one-sided pull of the

tie rods, and at the same time to afford a passage for the jenny. The lifting chain is supported along the jib by Pitt's patent chain porters, which consist, as shown by the engraving, of an arrangement of rollers butting together and forming one complete roller in their normal position; but when the jenny passes they are separated, and, by the action of a pivoted parallel motion and pendulum weight, are dropped from under the chain and again brought up under it when the jenny has passed.

The superstructure is carried by fourteen steel rollers arranged in two segments. Over the front segment is a kingpost, 21 feet high, built up of girders and bracing, and to the top of this the front and back tie rods are attached. The back tie rods carry a

**PITT'S CHAIN PORTER.**

strong framework of girders covered with rolled iron checker plates forming a platform, on which are placed the lifting machinery, boiler, feed pump, feed tank, etc., and to the under side of the platform are slung about eighteen tons of counter ballast. The lifting barrel is 4 feet 3 inches in diameter, and is cast with a spiral groove, so as to take the whole of the chain in one coil without overlapping. The engine is fitted with two cylinders of 10 inches diameter by 14 inches stroke, and steam is supplied by a vertical cross tube boiler. The principal gearing is machine moulded and works very smoothly. All the handles are brought together in a handle box arranged like the levers in a railway signal box, so that the whole machine is under the complete control of one man. The truck of the machine is formed with a clear height of 17 feet 2 inches, this great height being given for permitting the crane to be run back over the stacked blocks. It is built up of wrought iron girders and carries on the top a steel race on which the superstructure runs, the whole pivoting on a center pin. The truck travels on twelve wheels fitted with heavy double flanged steel tires. The whole machine is self-propelling, and the motive power is sufficient to traverse the whole with a load of fifteen tons. With this crane, unlike most lifting appliances, every load is the

maximum, a circumstance which requires that the design, material, and workmanship be all of first class quality. All the plates throughout were planed at the edges, and all the holes drilled.

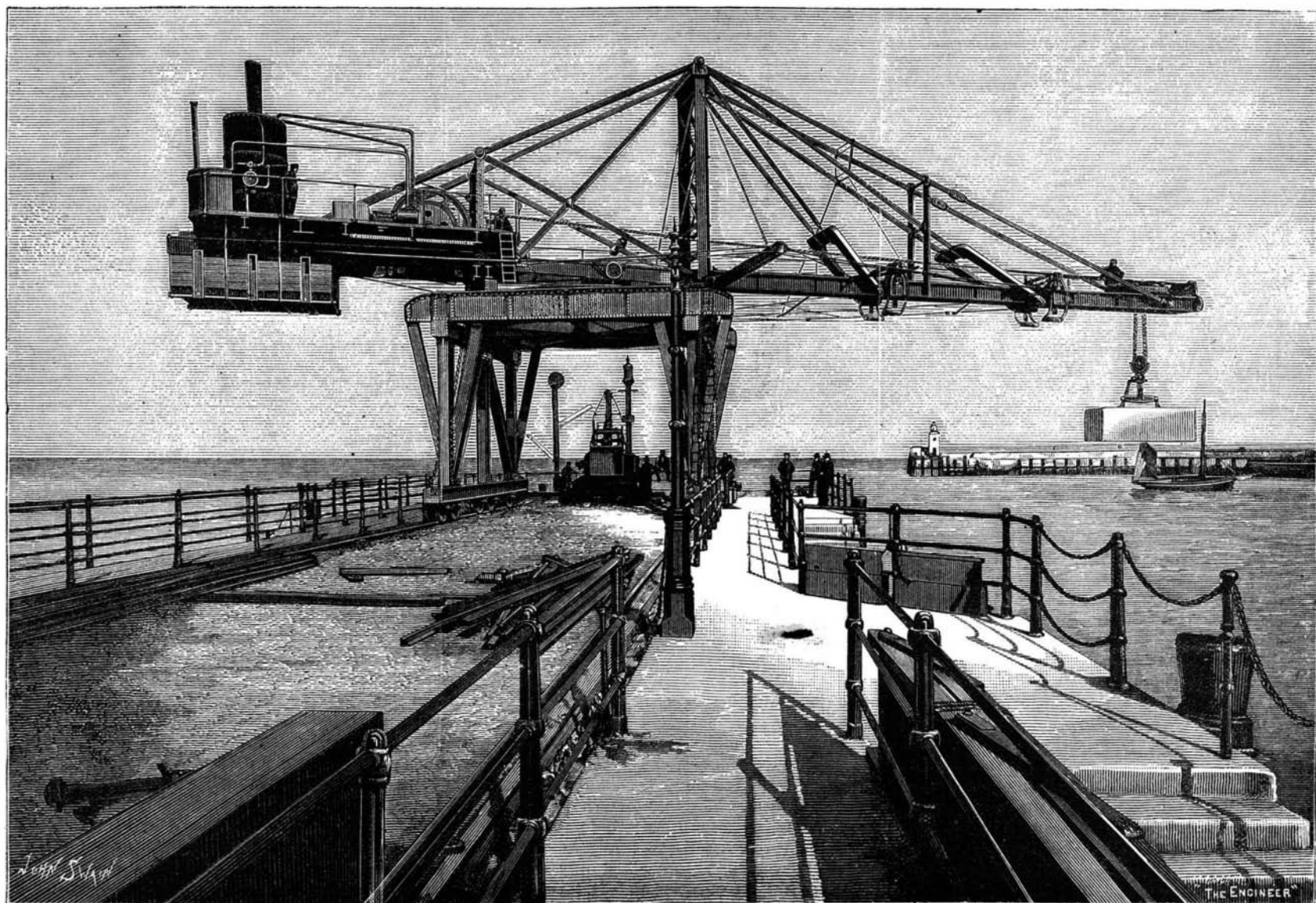
The crane was tested in Messrs. Stothert & Pitt's works with a 20-ton load, and again with 20 tons after erection at Douglas. We understand that it has given the most satisfactory results in actual work, and that Mr. Walker, the engineer, and the Isle of Man Harbor Commissioners have expressed their entire approval of the manner in which the work has been carried out. We are informed that as many as 530 tons of blocks have recently been set by helmet divers in one working day. The whole machine is a very fine example of a specially designed lifting appliance, and reflects great credit upon all who have been concerned in its design and manufacture.—*The Engineer*.

Instantaneous Photography.

At a recent meeting of the Berlin Physical Society, Dr. König gave an account of experiments which he had made with Ottomar Anschütz on the instantaneous photography of projectiles. After exhibiting and explaining the instantaneous photographs which Anschütz had made during the last few months, such as those of the funeral procession of the late Emperor Frederick, of episodes at the maneuvers, wild beasts at the Zoological Gardens in Breslau, of the several positions of a soldier marching on parade and of a lady dancing, he described the arrangements necessary for photographing a cannon ball traveling at the rate of 400 meters per second. The cannon ball was projected in front of a white screen illuminated by direct sunlight, occupying in its passage one-fortieth second. During this time four negatives were taken. The firing of the cannon, the momentary exposure of the plate, and the recording of time on the chronograph were provided for by electric currents. The experiments were made at Magdeburg at the Gruson rampart, and had to be completed in one day. Only one successful picture of the projectile was obtained, but the possibility of such experiments and of the accurate determination of the several time intervals was sufficiently indicated.

The Largest War Ship.

The Re Umberto, lately launched for the Italian government, is one of the largest war vessels in the world, her displacement being 13,298 tons, or 1,358 tons more than the Trafalgar or the Nile. She is 400 feet long by 76 feet 9 inches broad, and draws 29 feet of water. The armor on her barbettes is 19 inches thick, and she is fitted with a 3 inch steel protective deck as well. Her main armament will be four 104 ton guns and twelve of 4½ tons, while her engines are expected to give a speed of 18 knots.

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