## IMPROVED FRICTION HOISTING ENGINES.

We illustrate herewith a series of improved hoisting engines, adapted for the removal of cargoes from vessels and stone from quarries, and for pile driving, and all the various uses to which such machinery is usually applied.

Fig. 1 represents a double drum and double cylinder. The engines are each of 8 horse power, and work independently of each other. The apparatus allows of work being carried on at both hatches in a vessel at once. It is also especially adapted for use in the erection of large buildings where there are two hod elevators, operated at one time, for hoisting building material. The apparatus is mounted on wheels so that it can easily be moved from place to place. The engines have plain slide valves, worked by an eccentric direct from the main shaft. There are locomotive slides and crosshead of simple construction. Both engines are supplied with steam from the same boiler, which, in common with other generators used on these machines, is made of the best charcoal hammered iron $\frac{5}{16}$ inch thick, with longitudinal seams double riveted, heads $\frac{3}{8}$ inch thick, with best fire box and flange iron in the furnace. The boiler is supplied with water by a steam pump attached to it on one side, and an injector on the other. We are informed that, by this machine, 1,980 tons of merchandise, consisting of bag sugar, linseed, jute, etc., were discharged from a vessel in 31 hours, and that 400 hogsheads of sugar were hoisted out in 3 hours' time.

Fig. 2 represents an improved double cylinder and double drum pile-driving machine for dock builders' and contractors' use. Both engines are connected to the same shaft at right angles. The steam cylinders are 7x12 inches, one drum being used for running the hammer, the other for hoisting the piles. There is also a winch on the end of the lower drum shaft, for the purpose of handling the machine or timber, or for any extra work needed. This engine, it is claimed, will strike, with a 2,500 lbs. hammer, from 15 to 20 blows per minute, lifting the hammer from 12 to 20 feet high at every blow. It is also useful in working a boom derrick when the load is to be raised by one drum, and the boom raised or lowered and swung by the other. The weight is held by the improved ratchet on the end of the drum, as shown in the engraving.

These machines can be seen at work in various localities in New York and Philadelphia. The manufacturer states that one of the 40 horse power double cylinders, 10x16 inches, has raised a weight of 30 tons over 22 feet high, and lowered it successfully by the friction gearing, at the marble yards at the foot of Corlears street, East river, in this city. Fig. 3 shows a section of the friction drum, patented through the Scientific American Patent Agency, January 19, 1875. The drum is cast in one piece. The large gear is made with holes or pockets in the side to receive plugs of hard wood, that are fitted in and turned off to receive the cone flange of the drum. The spiral spring between the gear and drum forces the drum off the wood when relieved by the screw and pin at the other end. This can be used separate from the engine by the application of a belt on the pulley on the lower shaft, for hoisting in warehouses, stores, coal yards, or in any place where there can be power attached. The friction gearing serves as a brake in lowering fast or slow, at the option of the operator.

Fig. 4 represents a single machine mounted on trucks, and adapted to all kinds of light or heavy hoisting. The engine can be run as a stationary engine, by applying a governor to the steam pipe and taking power from the flywheel by a belt. At the same time it may be used for any kind of hoisting, the weight being held by a brake band, applied to the drum when the engine is in motion. The manufacturer also builds a special mining engine, with large grooved drums for using wire rope; also an improved self-propelling boom engine, for hoisting stone or marble on the walls of high buildings, a mast 100 feet high being carried on the end of the engine, for the purpose described.

For further particulars, address the patentee, J. S. Mundy, 7 Railroad avenue, Newark, N. J.

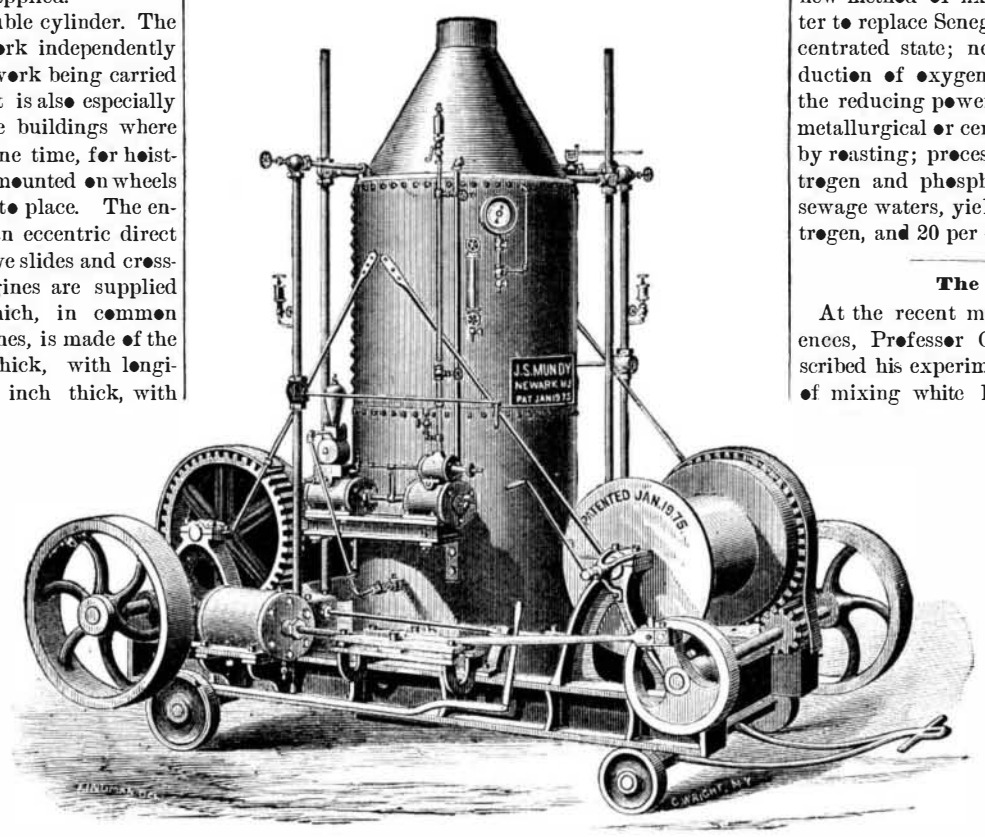


Fig. 1.—MUNDY'S DOUBLE DRUM PORTABLE HOISTER.

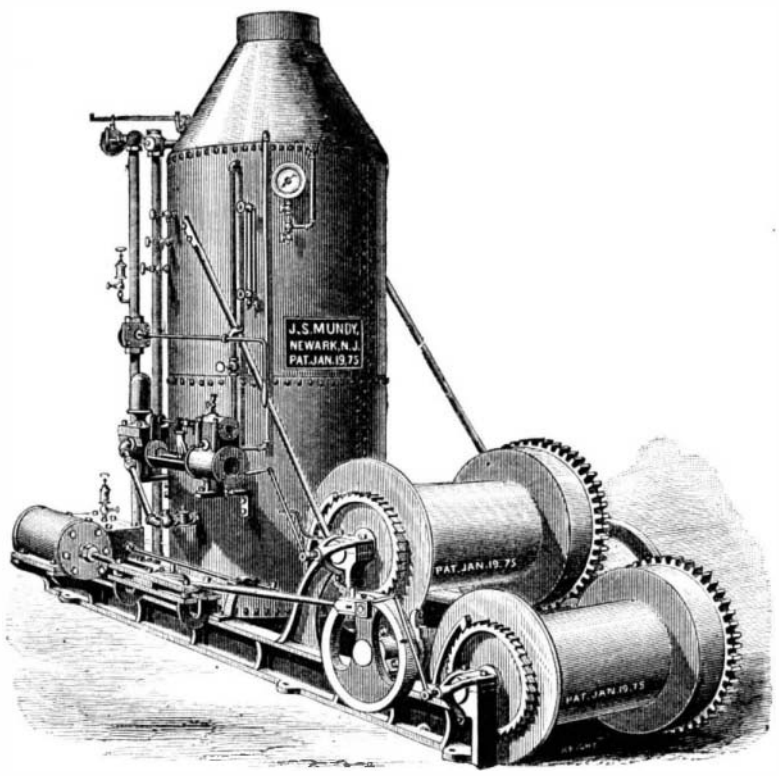


Fig. 2.—MUNDY'S DOUBLE PILE-DRIVING MACHINE.

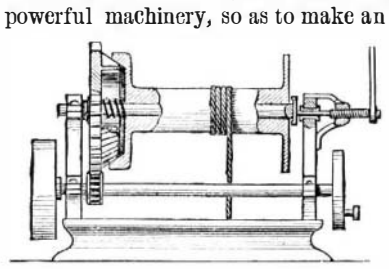

Fig. 3.—MUNDY'S FRICTION DRUM.

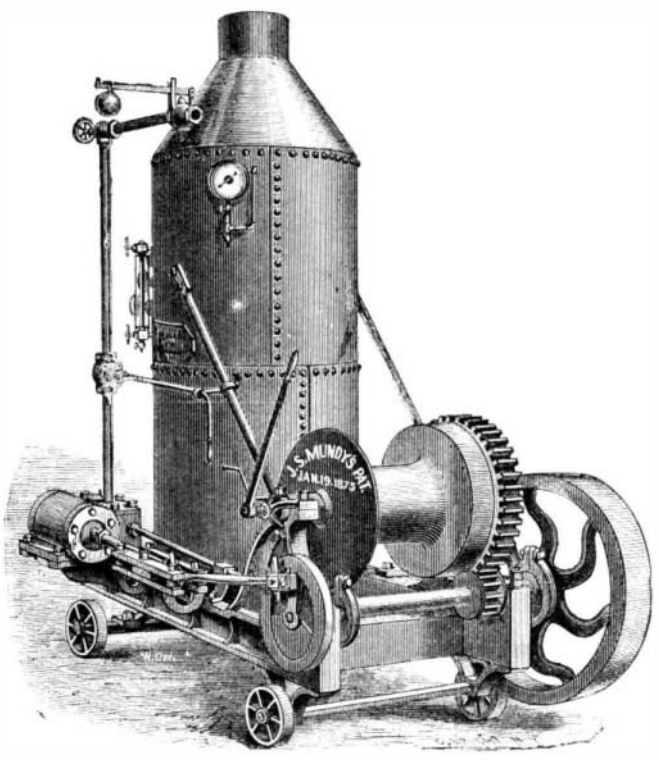


Fig. 4.—MUNDY'S PORTABLE HOISTING MACHINE.

### New Ocean Steamer.

The Niagara, a new iron steamer for the Havana trade, built for J. E. Ward & Co., New York city, was lately launched from the yard of John Roach & Co., Chester, Pa. The model of this ship is said to be very fine, and she is to be engined with powerful machinery, so as to make an expected speed of thirteen knots. The following are her dimensions: Length, 294 feet; breadth of beam, 38 feet 8 inches; depth from hurricane deck, 31 feet, and from main deck, 23 feet 9 inches, with a displacement of 2,400 tons. She is furnished with one compound engine of 1,650 horse power, the cylinders being 34 and 60 inches in diameter, with 54 inches stroke, driving a four-bladed screw of Hirsch's patent, calculated to give the vessel a speed of 13 knots an hour. Her boilers, four in number, are of the cylindrical tubular pattern, 10 feet in length by 11 feet 10 inches in diameter, tested to a working pressure of 80 lbs. to the square inch. She will be brigantine rigged, and spread about 2,500 yards of canvas. The steering apparatus, and the capstan for heaving up the anchor and warping the vessel, will be operated by steam. The saloon and staterooms will be elaborately finished. The vessel is divided into five water compartments and three decks. Cost upon completion, $350,000. A sister ship to the Niagara, the Saratoga, is in course of construction at the same yard, and will be ready for launching about July 1.

### Industrial Prizes.

Among various subjects, in connection with which the Industrial Society of Rouen has just offered prizes, are the following: A substance capable of replacing albumen of eggs in all its applications to printing of tissues, and considerably cheaper; new source of albumen, either in natural products containing it, or by transformation of other proteic matters; a new dark color as intense and solid as aniline black, but not weakening the cloth, and capable of being printed with any other colors without alteration at the point of contact; a method for volumetric determination of commercial glycerine; a solid blue coloring matter, applicable like indigo but cheaper; new process for fixing indigo blue by steaming; new method of fixing aniline colors; a new thickening matter to replace Senegal gum; production of ozone in the concentrated state; new application of ozone; industrial production of oxygen; rapid and exact means of determining the reducing power of a coal or any carbon; utilization, in metallurgical or ceramic arts, of iron pyrites, desulphurized by roasting; process of concentration or precipitation of nitrogen and phosphoric acid in fecal matters, urines, and sewage waters, yielding a manure of at least 5 per cent nitrogen, and 20 per cent phosphoric acid.

### The Mathematics of Light.

At the recent meeting of the National Academy of Sciences, Professor O. N. Rood, of Columbia College, described his experiments in testing mathematically the effect of mixing white light with light of different colors. He used brilliantly colored disks made to revolve rapidly, and substituted in part of each disk white for color, measuring the amount of substitution and its specific effects. Thus mingled with white, the lighter shades of vermilion became purplish; of orange, more red; of yellow, more orange; of greenish yellow, unchanged; of yellowish green, more green; of green, blue; of cyanogen blue, less greenish and more bluish; of cobalt blue, more violet; of ultramarine, violet; of violet, unchanged; of purple, less red and more violet. Exactly the same results followed when violet was used instead of white to reduce the colors. Hence mixture with white has an effect similar to moving all the colors towards the violet end of the spectrum. Professor Rood regards these and other experiments of a qualitative nature, as indicating that violet is one of the primary colors. The mathematical results attained were laid before Mr. Charles S. Pierce, who subjected them to further analysis, and found that they confirmed Fechner's law, that "the sensation is proportional to the logarithm of the excitation." A diagram has been made showing the effect upon any of the spectrum colors of admixture with white; the diagram is constructed on the mathematical theory; the observed results in practice correspond.

### Electro-Magnetic Plant.

A curious plant, called the *phytologica electrica*, and possessing strong electro-magnetic qualities, has been recently discovered in Nicaragua, according to the New York *Herald*. The hand is lamed by touching it, and the magnetic influence is felt to a distance of eight feet. The magnetic needle is disturbed, and the nearer the middle of the plant is approached the stronger becomes the agitation, until finally it assumes a circular movement. The intensity of the phenomenon varies according to the time of day, and at night is scarcely perceptible. It reaches its highest point about two o'clock in the day. Stormy weather increases its activity. No insects or birds are known to approach it.

THE Rev. S. S. Whitmee, of Australia, in an extremely able and interesting lecture on "the Ethnology and Philology of Polynesia," contended that over all Polynesia there are two distinct types of people, a brown race connected with the Malays, and a negro race, with the Papuans. There is a third much mixed race, name and origin unknown.