EUROPEAN FLOATING AND DOCK CRANES.

BY FRANK C. PERKINS.

In Europe considerable attention has been paid to the floating crane, and for dockyard work both stationary jib cranes and portable cranes have been extensively used. These cranes have been operated in various ways, steam power being chiefly preferred, while in some cases hydraulic cranes and compressed air cranes have been installed and given good satisfaction. Of recent years electric motors have been applied to cranes of all kinds, and have been found to be most economical in operation.

Floating cranes have the advantage of mobility, and for this reason are of especial value for harbor and dock work. They avoid the necessity of large ships being towed by a flotilla of small tugs to one of the few powerful stationary cranes, in order to take on one or only a few bulky pieces, the weight of which is too great for the general kind of dock cranes. Until recently floating cranes were constructed only in the shape of shear-leg cranes, which it is claimed naturally restricted their use considerably, and to remedy this defect a complete revolving crane was built on a pontoon. One of these cranes, noted in the accompanying illustration, is used in Hamburg harbor by the Hamburg-American Line.

The framework is very simple, and the projection of the crane can be adjusted from 8 to 17.5 meters. This adjustment makes the crane extremely useful and practical, as it enables the jib, without moving the position of the pontoon, to reach without difficulty between the deck superstructures and the masts and to lift or lower the cargo as required.

In order to keep the pontoon on sufficiently even keel when carrying the various loads, the crane has been provided with an adjustable counterweight, which latter is manipulated by the operator. But even if this counterweight should be wrongly manipulated on account of the carelessness of the operator, the pontoon crane remains comparatively stable. The driving power consists of two double-cylinder steam engines, symmetrically mounted on either side of the framework. The reversible hoisting engine has a stroke of 240 millimeters and a cylinder diameter of 180 millimeters. A second engine having the same dimensions is used for driving three sets of gear, which regulate the adjusting of the jib and counterweight, and the slewing of the crane.

Two working speeds are provided for the lifting gear, one for loads of from 15 to 30 tons, which has a rate of 3 meters per minute, and the other for smaller loads with double this speed. The crane revolves once in two minutes, and the reach is controlled by a long, heavy screw which engages a large nut, the screw being rotated by means of massive bevel gears, as shown in our engraving.

The steam boiler is located within the pontoon, and the steam is transmitted to the engines at a pressure of 8 atmospheres, by a pipe passing through the central pivot. The pontoon is 14 meters wide and 2.7 meters high, while the total length is about 30 meters.

In spite of the many adherents of electrically-operated cranes, the steam crane is the prevailing type in Europe. Considerable interest attaches to the powerful 150-ton derrick crane erected at the wharf of Blohm & Voss at Hamburg, Germany, which is shown in our front-page engraving, mounting a heavy gun on the battleship "Kaiser Karl der Grosse."

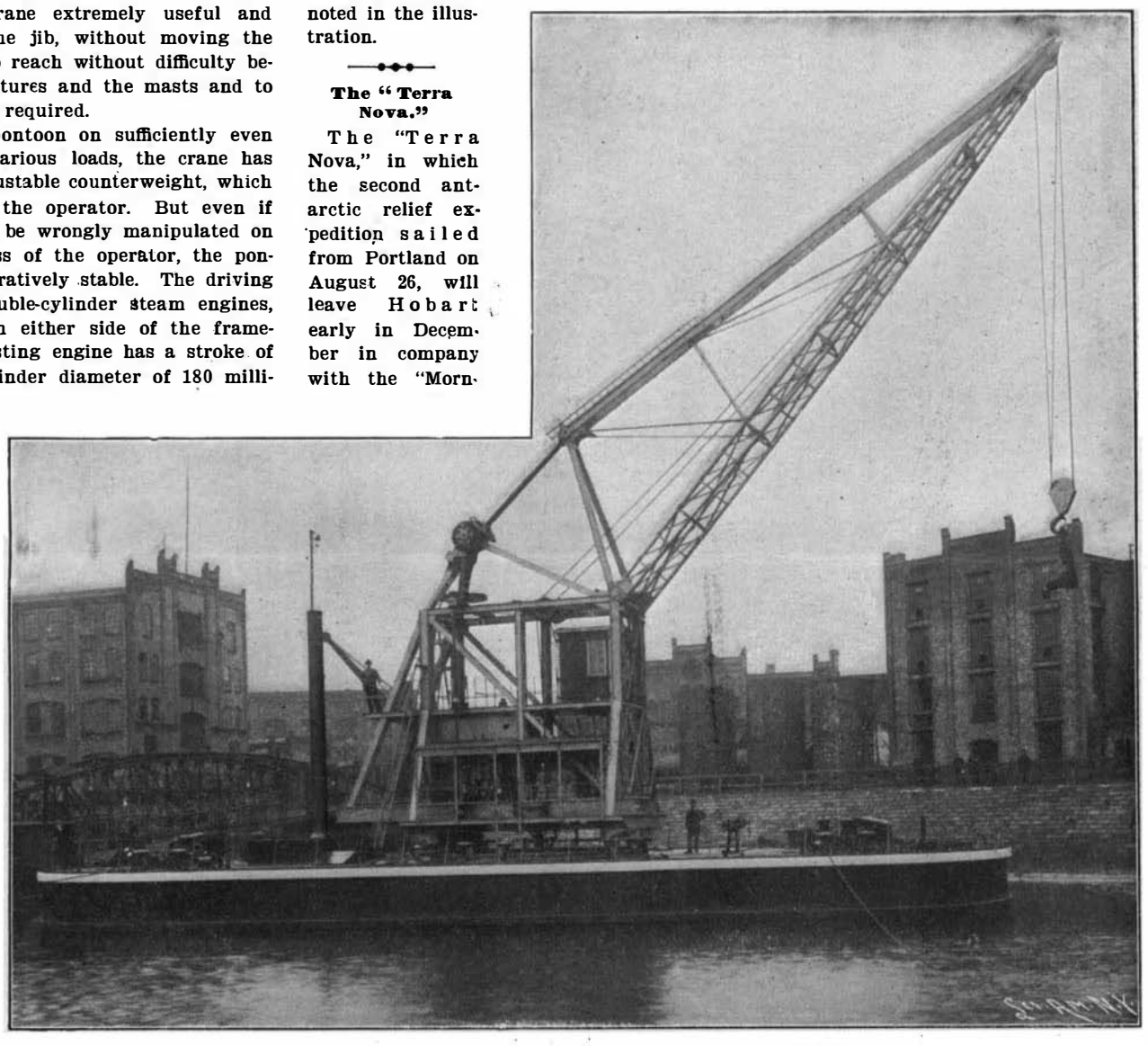
The crane was constructed at Duisburg by the Duisburger Maschinenbau-Actien-Gesellschaft, and is used for serving ships lying alongside the quay or in the floating dock.

This type of crane has many distinct advantages over the hammer cranes, with horizontal jib, and it is especially suitable for wharves where a full revolution of the crane of 360 degrees is not required, or is, in consequence of local conditions, impossible. Little space is taken up by the three-legged frame, and traffic on the dock is not disturbed or impeded in the least, while even locomotive cranes with large jibs may pass under the principal leg of the crane without difficulty when they are required for auxiliary service.

One of the advantages of this crane lies in the fact that it is provided with an adjustable jib, whereby the height of the ship to be served is of no consequence, as the masts are easily avoided, and any part of the ship between the masts may be reached. The crane is much lighter because of the absence of a counterweight, and the great height of the pulleys—45.25 meters with the jib drawn in—renders it possible to reach the highest parts of the ships, even if they lie in the dock.

When this crane is operated with a load of 150 tons, and at the highest projection of jib of 20 meters, the speed is 1.3 meters per minute; but with a load of 75 tons and the same projection the rate is increased to 2.6 meters per minute, or double the speed under full load. When the small hook is used with a load of 30 tons, the highest projection being 32.5 meters, the rate of operation is 6 meters per minute, and double this speed, or 12 meters per minute, is attained with a load of 10 tons.

The crane is worked by two double-cylinder steam engines, one of which drives the gear for lifting, the other transmitting the power for slewing, and altering the radius of the jib. The energy produced by slewing is mostly consumed by a friction clutch built into the shaft of the revolving gear, which excludes any compression on the frame or the driving gear. The crane is lighted by an electric arc light mounted on the top of the frame, as will be noted in the illustration.



A FLOATING 30-TON JIB CRANE IN HAMBURG HARBOR.

The "Terra Nova."

The "Terra Nova," in which the second antarctic relief expedition sailed from Portland on August 26, will leave Hobart early in December in company with the "Morning." The two ships will make their way south as swiftly as possible, and as soon as the "Discovery" is reached, active efforts will be made to blast her free of the ice, so that she can get away before the next cold season sets in. In case it is impossible to free the "Discovery," Capt. Scott and his men will be transferred to the "Terra Nova" and his ship left to be ground to pieces in the clutches of the antarctic ice, a lonely monument to the last great antarctic expedition.

The "Terra Nova" is the largest whaler afloat, and has been especially modified for ice work. She is built of oak strengthened with greenheart, and her bow is almost solid timber. Her total length is 187 feet, with a 31-foot beam. She was built eighteen years ago, and has engines of 120 horse power.

The famous Lincoln car, which has been in the possession of the Union Pacific Railroad for thirty-seven years, was sold recently to persons who will exhibit it at the St. Louis exposition. For many years the car has stood on a siding in the Union Pacific yards in Omaha, without attracting more than passing attention. It was part of the railroad exhibit at the Chicago and Omaha expositions. The car was built at the military shops at Alexandria, Va., in 1864, and was ironclad, armor being set between the inner and outer walls. It carried the remains of the martyred President to Springfield, and was then sold to the Union Pacific road.

The American Mining Congress.

The American Mining Congress recently held its sixth annual session at Deadwood, S. D. President Richards advocated the creation of a Department of Mines and Mining co-ordinate with the Department of Agriculture and the recently created Departments of Arts and Labor.

Secretary Shaw also spoke. He said in part:

"It is an error to rate the importance of our many industries according to their relative productiveness Our factories and workshops produced $13,000,000,000 gross in 1900; agriculture, $4,000,000,000; forestry, $2,000,000,000, and mines, $1,000,000,000, about equally divided between metallic and non-metallic products. Yet it must occur to all that manufacture—apparently our greatest wealth-producing industry—is dependent upon iron, copper, lead, and other metals, and equally upon coal and other non-metallic minerals. Our manufacturing interests would dwindle into insignificance but for our mines. Manufacture is equally dependent upon agriculture for cotton, flax, wool, and other products of the field and herd. Our commercial, industrial, and financial supremacy is, therefore, not dependent upon any one fact, or interest, or condition, but upon all combined.

"We produce practically 30,000,000 tons of iron ore—as much as any other two countries, and one-third of the world's output. We produce 40 per cent of the world's output of iron and steel. During the first half of 1903 we produced nearly 10,000,000 tons of pig iron. We produce more coal than Great Britain; more than twice as much as Germany, and nearly double that of all countries except Great Britain and Germany. We grow three-fourths of the world's cotton fiber, and our ability to produce this staple is far above the present product.

"A people's prosperity is not measured by its capacity to produce more than by its capacity to consume, and this capacity to consume is in turn dependent upon the earning capacity of the individual, and the earning capacity of the individual is again dependent upon native and acquired ability. So, if America be great, it is because God in His wisdom stored the mountains with the richest minerals, overlaid the valleys with a most fertile soil, and then gave it to people competent, in some slight degree at least, to improve their opportunities."

The Late Mr. Bishop's Costly Jade Book.

The personal estate of Heber R. Bishop included manuscripts on jade, which are to be published at an outlay of at least $75,000. The copies are to be limited to one hundred, and it is stipulated that they shall be distributed only to certain museums and libraries in this country and Europe.

Gallic Acid in Chinese Rhubarb.

E. Gilson states in Rev. Pharm. that gallic acid is present in Chinese rhubarb, both free and combined, together with cinnamic acid. He is also of the opinion that the tannin of rhubarb is not a simple body, as has been stated. He has separated from it three pure crystalline bodies which may be classed among the tannins; these comprise a glucoside, glucogallin, $C_{15}H_{10}O_{10}$, which is split up by hydrolysis into a molecule of glucose and of gallic acid; another glucoside of special interest, tetrarin, $C_{32}H_{32}O_{12}$, which by hydrolysis splits up into glucose, gallic acid, cinnamic acid; and a new substance, an aldehyde, rheosmin, $C_{10}H_{12}O_2$. This last occurs in long needles, which melt at 79.5 C., and has the strong characteristic odor of rhubarb. The fourth constituent of rhubarb, tannin, is a catechin.—Rev. Pharm.

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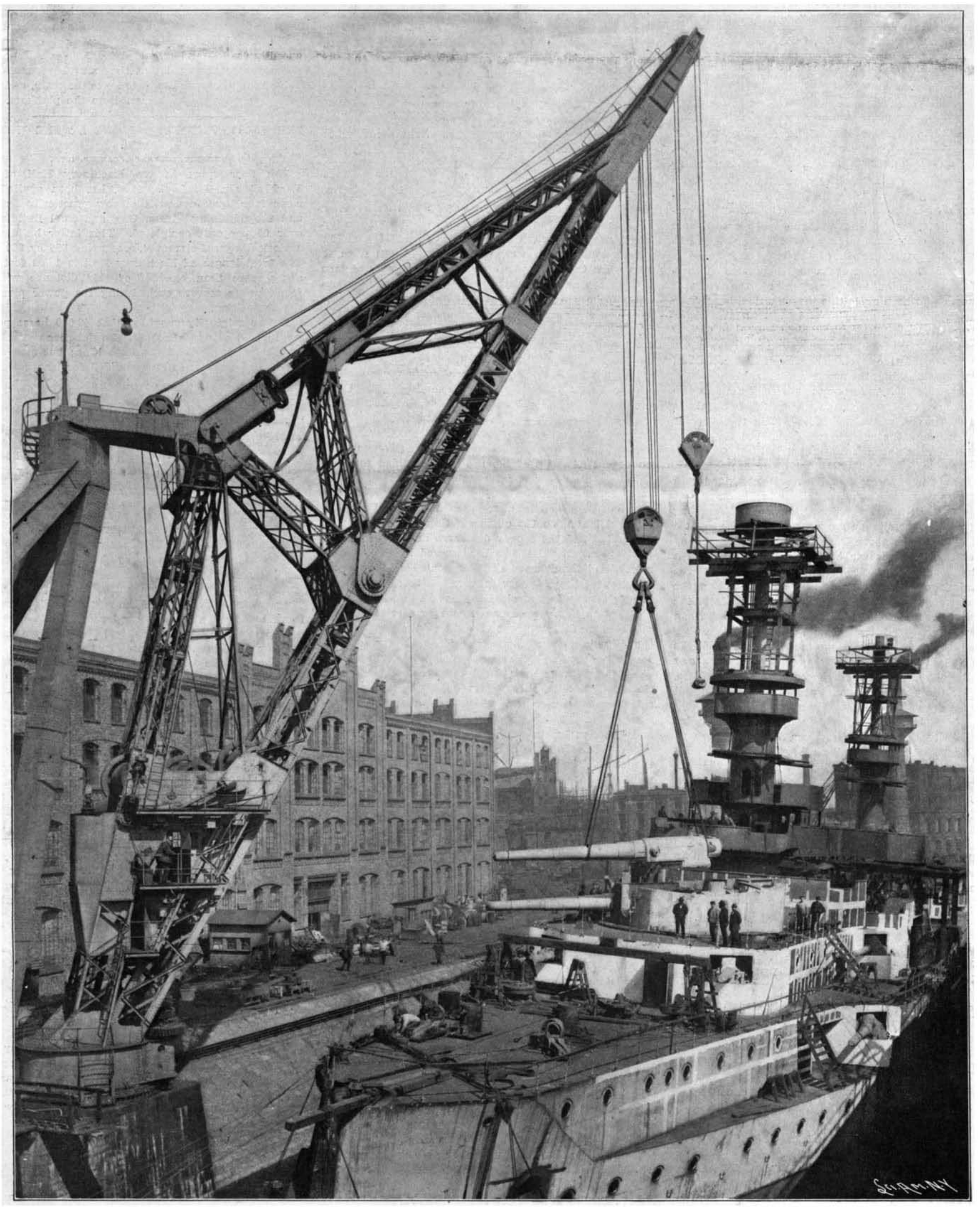

THE GREAT 150-TON DOCK CRANE AT HAMBURG, GERMANY, MOUNTING A 9.45-INCH GUN ON THE "KAISER KARL."—[See page 239.]

Maximum lift, 145 feet. Speed with 150-ton load, 5 feet per minute; with 10-ton load, 40 feet per minute.