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trified, *i.e.*, Stage III. This curve is based on average readings over short periods; that is to say, momentary variations, which are liable to be very severe on such a system, are not taken into account. The load factor, which is the relation between the actual output in units and the possible output if the maximum load were maintained throughout the 24 hours, is 33 per cent.

Under these conditions it is obvious that a type of prime mover should be adopted which can economically deal with such large variations of load; that is, a prime mover which has a large over-load capacity beyond its normal or economical load. The functions of such a prime mover are exactly fulfilled by the steam turbine, and this is recognized to be the most efficient machine for producing power for such a load. Compared with the reciprocating steam engine, its steam consumption is less, it requires considerably less attendance, and its use represents a substantial saving in oil consumption and repairs. I can, from actual experience of both types of plant, speak of the great economy, both in capital cost and in the above respects, which results from the use of the steam turbine.

The largest power stations erected, both in Europe and America, during the last five years have been equipped with steam turbines, and have shown a considerable economy compared with stations not so equipped. I, myself, have had considerable experience of the use of large steam turbines, as the Carville power station on the Tyne was the first power station in England to use them. This station to-day contains eight 7,000-h.p. turbines, and is producing electric power as economically as, if not more economically than, any other station in the world.

(To be continued.)

KINZIE STREET BASCULE BRIDGE OF THE CHICAGO & NORTH-WESTERN.

Wells street station, the Chicago passenger terminal of the Chicago & North-Western, is a short distance east of the north branch of the Chicago river. The entrance to this station for all trains of the North-Western has been over a riveted

Strauss design was adopted. This bridge, which is a double track, single leaf, trunnion type, was recently opened for service.

The new bridge was located on the south side of the old swing span with the trunnion pier on the east, or station, side of the river. To give space for building this pier a part of the east arm of the swing bridge had to be cut off to allow it to clear.the new pier and bridge. The method of doing this, of counterweighting the shortened arm, and of putting in the



Portal View of Kinzie Street Bridge.

necessary temporary trestle work, etc., in the shortest possible time while traffic over the bridge was suspended, was described in the *Railway Age* September 6, 1907, page 323.

The trunnion pier of the bridge was carried down 115 ft. to bed rock, and was built by the pneumatic caisson process. The rest pier is founded on piles. The bridge itself is extremely compact in design. The large concrete counterweight, which weighs 1,200 tons, and has been painted black to harmonize with the rest of the structure, is pivotally connected to the tail end of the truss and is guided by the usual links



General View; Kinzie Street Bascule Bridge of the Chicago & North-Western.

lattice double track, swing span, known as Kinzie street bridge. In order to provide a 100 ft. clear channel in the river it became necessary about a year ago to replace this bridge with one of longer span. As all of the suburban trains of the North-Western, as well as the through trains, use this station, about 260 trains a day cross this bridge, exclusive of switching movements; and in season the river traffic causes on an average 1,000 movements of the bridge each month. These conditions could be served best by a bascule bridge, and the

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forming the characteristic parallel motion of the Strauss design. The trunnions are located at the top chord and are 28 in. in diameter. The counterweight pins are 12 in. and the link pins 7 in.

The operating machinery is at the very top of the tower and is housed within a fireproof enclosure. The driving pinions operate two pin racks connected to the span at the first panel point ahead of the trunnions and a spur-gear equalizer synchronizes the movement of the two racks. The two motors are

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50 h.p. each and have solenoid brakes. There is also a hand brake, and an automatic emergency brake which is both a hand and power brake. This brake is set automatically by the bridge itself when it reaches a certain limiting position.

The machinery is controlled from the operator's house, which is of reinforced concrete and is located at the level of the top chord of the leaf. The usual standard electrical equipment of controllers, switchboard, signals, etc., is provided. There are two independent sources of electric power, both 500 volt direct current, as well as a hand power and a pneumatic drive, these reserves being provided because of the great importance of keeping the bridge always in service. Despite the great size and weight of the leaf, it can be swung easily by the hand gear. The locking mechanism includes a front support for taking the live load off of the trunnions, and a truss lock at the rest pier end. These are driven by a 3-h.p. lock motor located at the center of the leaf, and the mechanism is such as to automatically cut out the motor when the parts reach

W. C. Curtis was resident engineer. The Great Lakes Dredging & Dock Co. built the substructure and the Toledo Massillon Bridge Co. was the general contractor for the superstructure, the erection being sublet to the Kelly-Atkinson Construction Co. The Strauss Bascule & Concrete Bridge Co. furnished the design and the general plans and specifications for the superstructure.

MR. HARRIMAN SUSTAINED IN REFUSAL TO ANSWER.

In the cases of Edward H. Harriman and Otto H. Kahn, the Supreme Court of the United States on Monday last held that the Interstate Commerce Commission is not entitled to press questions relative to private transactions, even though they involve dealings in the securities of interstate railways when the investigation of which such questions are a part has been begun upon the Commission's initiative. The opinion of the court was announced by Justice Holmes and dealt with the

refusal of Messrs. Harriman and Kahn to make reply to questions put by the Commission in the course of an inquiry concerning the dealings of Mr. Harriman as president of the Union Pacific in the stocks of other railway companies, the inquiry being that on the "Alton deal" in 1906. Justice Holmes said that the Commission's inquiries should be confined to cases in which complaint had been made. He said that privacy should be properly regarded in proceedings begun by the Commission for its own purposes. The decision does not curtail the power of the Commission to compel the attendance and testimony of witnesses in cases where formal complaint of violation of law is concerned, but in the absence of such complaint the institution of such proceedings is held by the court to be without authority of law. The Federal Court at New York had ordered Harriman to answer the Commission's questions as to his ownership of 103.401 shares of preferred stock in the Chicago & Alton, purchased by the Union Pacific and deposited with Kuhn, Loeb & Co., under an agreement to sell at terms to be fixed by Messrs. Harriman, Stewart and Mitchell; also regarding his interest in other stocks. The opinion of the



Side View of Kinzie Street Bridge.

their operative positions. The rail joints are mitred and are self locking.

When the new bridge was ready and was lowered into service the old one was floated off to one side and dismantled. Except for the interruption to rail traffic mentioned at the outset, and a few hours interruption to river traffic during the flotation of the old bridge, traffic was maintained without hindrance on both railroad and river throughout the work. The bridge has been in service for several weeks and is giving entire satisfaction. It takes about 45 h.p. and one minute of time to operate it. The design provides for a duplicate structure to be built adjacent to the present bridge within five years.

The work was done under the direction of E. C. Carter, chief engineer of the Chicago & North-Western, W. H. Finley, assistant chief engineer, having general charge of the work in the office and field. The plans of the substructure were made under the direction of I. F. Stern, engineer of bridges.

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Kinzie Street Bridge During Construction,

to the controversy, goes on to say that while many broad questions were discussed in the argument, the court confined itself to comparatively narrow ground. The Interstate Commerce Commission contended that it might make any investigation that it deemed proper, not merely to discover any facts tending to defeat the purposes of the Interstate Commerce Act, but to aid it in recommending any additional legislation relating to the regulation of commerce that it might conceive to be within the power of Congress to enact; that in such an investigation it had power, with the aid of the courts, to require any witness to answer any question that might have a bearing upon any part of what it had in mind.

As to the power of Congress, Justice Holmes says that whatever it might be there was no attempt in the Interstate Commerce Act to do more than to regulate the interstate business of common carriers, and the primary purpose for which the commission was established was to enforce the regulations

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