



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

THE RAILWAY AND ENGINEERING REVIEW

JANUARY-DECEMBER, 1913

VOLUME 53.

**Published at 1407 Ellsworth Building
Chicago**

Topeka & Santa Fe, fine of \$100 on each of two counts of suit; total, \$200. Chicago & Northwestern railroad, fine of \$100 on each of two counts; total, \$200. The latter railroad was charged with violating the safety appliance act by use of a broken coupling. The Baltimore & Ohio and Santa Fe railroads were fined for violating the interstate commerce law prohibiting the working of railroad crews for continuous periods exceeding sixteen hours.

New Suit Against Anthracite Companies.

The United States government commenced a new prosecution of the "anthracite trust," at Trenton, N. J., February 13, by filing a civil suit against the Delaware, Lackawanna & Western R. R. and the Delaware, Lackawanna & Western Coal Co., charging violations of both the Sherman anti-trust law and the commodities clause of the interstate commerce act. It is understood this move may be followed by one or more similar suits against other anthracite carrying railroads and their allied coal companies. The government's petition in equity alleges the coal carrying roads and their affiliated coal companies, including the defendants, make and control the free on board prices of anthracite at the terminals of New York, the chief distributing center, which regulates the prices in other markets. Arrangements and contracts between the two defendant corporations, which have practically common stockholders, are declared to be simply de-

by the railroad companies, and considered by the arbitration board after hearings have been closed. II.—Testimony and documentary evidence introduced, and considered by arbitration board, without witnesses being placed under oath, and no legal means for penalizing false testimony as perjury. III.—The railroads' desire to secure proposed legislation preventing strikes, increase in freight rates, etc., are not matters to be decided in an arbitration of a wage dispute, but are matters to be considered by congress, or by the Interstate Commerce Commission. IV.—Awards are not based upon testimony and evidence submitted by the railroads and employees in the railroads' plan of arbitration at the regular hearings, but upon information secured by the individual members of the board, during the several months intervening between the closing of the hearings and the publication of the award. V.—Opportunity is not given the employees to controvert false evidence and testimony, considered by members of the board after hearings are closed. VI.—To accept any such plan of arbitration would be a deliberate betrayal of the rights and interests of locomotive firemen by their representatives."

The Week in Congress.

Representatives of electric railroads appeared before a joint committee of the senate and the house, on Friday, February 7, and presented a demand

mission for investigation of parcel post was organized, with Senator Bristow as chairman. Debate on the Connecticut River dam bill was resumed in the senate, with agreement to vote on it during this legislative day. Further conference with the house was demanded on the legislative, executive and judicial appropriation bill carrying the Commerce court provision. On Wednesday, the house, sitting in joint session with the senate, witnessed the counting of the presidential electoral vote. Senator Root urged repeal of the free toll provision of the Panama canal act before the inter-oceanic canal committee. Senator Root spoke, on Thursday, in favor of the Connecticut river dam bill. The house disagreed to the conference report on the legislative, executive, and judicial appropriation bill and sent it back for further conference. Chairman Adamson of the interstate commerce committee told the Connecticut River dam bill advocates his committee would not recommend action in the house at this session.

Progress on the Pan American Ry.

At a meeting in Washington, D. C., on Feb. 4, of the Pan-American Railway Committee, presided over by Ex-Senator Henry G. Davis, and at which Gen. Geo. W. Davis and Charles M. Pepper also were present, the progress of construction was discussed, and, among other things, Mr. Andrew Carnegie said that the linking of the Americas by rail



New O.-W. R. R. & N. Co. Lift Bridge at Portland, Ore. Fig. 1—Upper and Lower Decks in Normal Position.

vices to avoid the prohibitions of the interstate commerce act and are said to have resulted in giving the coal company a monopoly of the 8,000,000 to 9,000,000 tons of coal annually produced along the lines of the Lackawanna railroad. The United States District court is asked to enjoin the railroad from transporting coal mined or bought by it, and from delivering such coal to the coal company under existing agreements which the court is petitioned to adjudge as constituting a combination in restraint of trade.

The Threatened Strike of Locomotive Firemen.

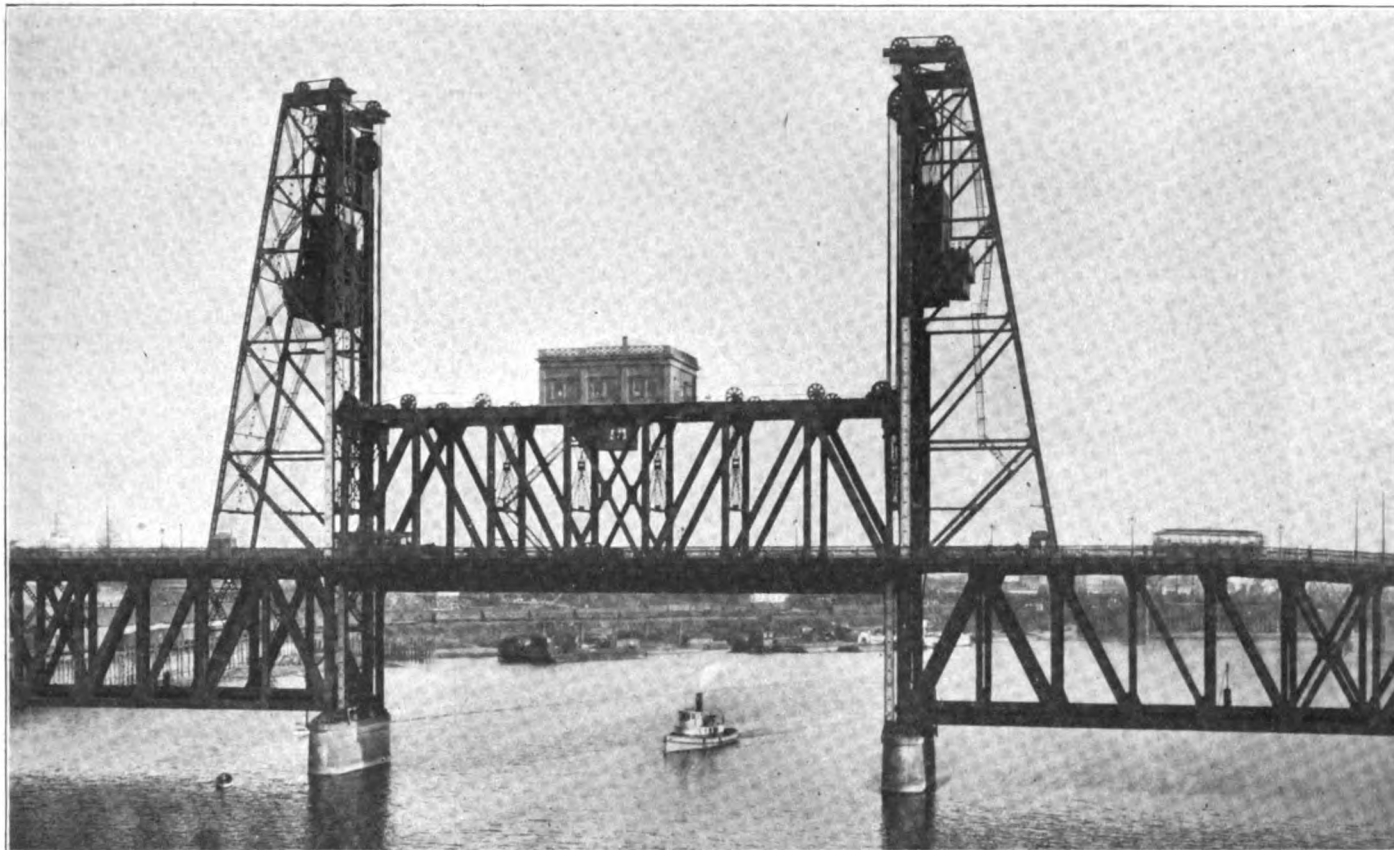
The outcome of the strike vote taken by the firemen's brotherhood on 54 eastern railroads was decisively in favor of a strike, which may be called now at any moment on order of the leaders. The railroads are still standing on their contention for submission of the controversy to an arbitration commission similar to that which settled the wage demands of the locomotive engineers. The firemen are still holding out in their refusal of this proposition. The latest statement from the latter source gives the following, entitled: "Why Firemen Refuse to Arbitrate Under the Railroads' Plan": "I.—Awards are based upon false evidence, prepared

for better compensation for carrying mails in cities. Conferees of the senate and house considered the Lever and Page bills for agricultural and vocational school extension with a view to forming a compromise measure. Senator Martin asked that the judiciary committee be discharged from further consideration of Clayton anti-injunction bill. The "shipping trust" investigating committee of the house resumed its hearings, listening to testimony on coastwise and gulf traffic. Senator Borah, on Saturday, proposed an amendment to the Connecticut River dam bill to make common carriers of water power companies carrying electricity interstate. The Kenyon-Sheppard bill and the Webb bill, both prohibiting the interstate shipment of liquor when in conflict with the laws of "dry" states, met a variety of legislative experiences. The result was the elimination of the Kenyon-Sheppard bill and the substitution of the Webb bill, which latter measure, after various vicissitudes was finally passed by the senate on Monday, and by the house without change, on Tuesday. On Tuesday the senate committee held a hearing on the La Follette-Adamson bill, at which a number of railroad officials gave their views on valuation of the physical property of the railroads, under the direction of the Interstate Commerce Commission. A joint com-

would be of great value as a peace agency. In Central America only 18 miles of line remain to be constructed to make practicable a railway journey from New York to Guatemala City. Construction from there is well under way to San Miguel, Salvador. From this point to the Panama Canal, 600 miles away, links have been constructed and plans for others are well advanced. In South America only 175 miles are still to be constructed between Buenos Ayres and Lake Titicaca, and the line has been completed from the latter point to Cuzco, Peru, 2000 miles from Buenos Ayres. In Bolivia, Chili, Colombia, Peru and Ecuador progress has been made. The committee will make a full report to the next Pan-American conference, which probably will be held in some South American capital during the coming year.

Russian Railway Parcel Delivery.

The Nicolai Railway, operating between St. Petersburg and Moscow, in Russia, has introduced a new service on its line, to be known as the small-parcels division. Small parcels lightly but securely packed will be accepted for transportation, and the formalities connected therewith reduced to a minimum, according to particulars transmitted in a recent report by John H. Snodgrass, United States



New O.-W. R. R. & N. Co. Lift Bridge at Portland, Ore. Fig. 2—Lower Deck Raised; Upper Deck Normal.

consul general at Moscow. Receipt and delivery of parcels will be conducted by the St. Petersburg Railway Artel at St. Petersburg, Vyshny-Volotchok, Tver and Moscow, and later the number of stations will be increased as experience is gained and business indicates. Parcels are acceptable in any form of wrapping or packing whereby the contents are secured. The cost of transportation is the existing tariff for personal baggage, the cost of which for 9 pounds avoirdupois is 18 cents for 400 miles. The cost of delivery to the house, according to the schedule of the artel, is 10 to 28 cents per parcel, depending upon the distance of the addressee from the station. Parcels are accepted for delivery daily, Sundays and holidays not excepted, from 10 a. m. to 10:30 p. m., and must be delivered to districts included in the transportation tariff schedule not later than 3 p. m. on the day following, and in outlying sections not later than 7 p. m. on the day following. There is no doubt, locally, that this parcel express business will rapidly develop and will not be limited to the Nicolai Railway.

The Pennsylvania R. R. is reported to have undertaken to force the drying of paint on passenger cars at its Altoona shops, by the construction of a steam-heated compartment of such size as to accommodate a passenger car complete. The time required by the drying process is understood to have been reduced in this manner to a question of a few hours.

The regular monthly meeting of the Railway Club of Pittsburg will be held at the Monongahela house, Pittsburg, Pa., on Friday evening, February 28, at 8 o'clock. Mr. Gilbert E. Ryder, representing the Locomotive Superheater Co., of New York, will read a paper on "The Operation and Maintenance of Superheater Locomotives."

New Lift Bridge of the O.-W. R. R. & N. Co. at Portland.

The Oregon-Washington R. R. & Navigation Co. has recently put into service, at Portland, Ore., a new vertical lift bridge crossing the Willamette river. The bridge is a double-deck structure, in three spans, the center one being a lift span 220 ft. long, providing for a navigable channel of that width. The upper deck carries two street roadways, a double-track street car line and two sidewalks. The lower deck carries two tracks for the

steam railroad. The structure is of the Waddell & Harrington vertical-lift type and is so designed that the lower deck may be raised independently of the upper one, by a telescoping arrangement, so as to permit small craft to pass under the structure without interfering with street traffic on the upper deck. As a large percentage of the passing vessels are tugs and other low craft, this arrangement avoids a great deal of interference with street traffic that would necessarily take place with any type of movable bridge that would require lifting of the entire structure to clear the channel.

The lower deck is suspended from the upper one, the hanging struts which carry it passing inside and telescoping with the posts of the upper deck. The lower deck is therefore not supported directly upon a trussed structure, the floor beams being at-

tached to the hanging posts which are pulled up inside those of the upper deck when the lower deck is raised. This lower deck normally stands 26 ft., in the clear, above low water, and it can be raised 46 ft., so as to clear 72 ft. above low water, without moving the upper deck. In the accompanying illustrations Fig. 1 shows both the lower and upper decks in normal position, and Fig. 2 shows the lower deck raised, with the upper deck in normal position. The upper deck can be raised 94 ft., taking the lower deck with it, to clear low water, 166 ft. The roadway on this upper deck is normally about 80 ft. above low water. Before the upper deck can be lifted the lower deck must be lifted and locked to it. After this has been done both can be lifted together. The lower deck is supported at each panel point by four 1¼-in. cables, and the end floor



New O.-W. R. R. & N. Co. Lift Bridge at Portland, Ore. Fig. 3—Upper and Lower Decks Telescoped and Lifted.



New O.-W. R. R. & N. Co. Lift Bridge at Portland, Ore. Fig. 4—Top View of Tower and Lifting Pulleys.

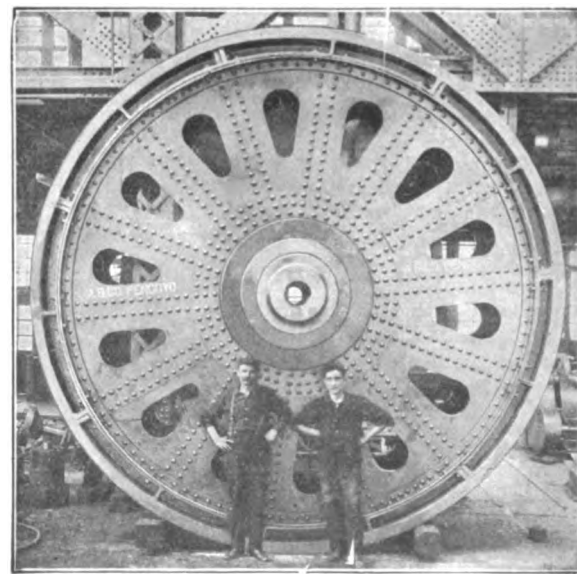
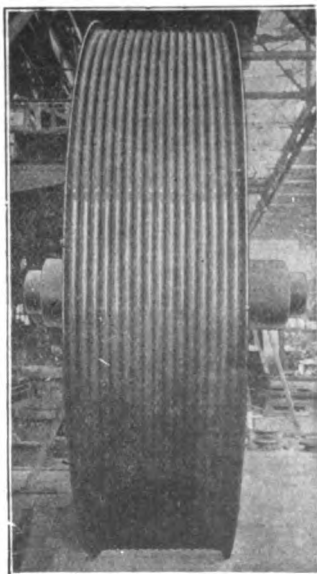
beams are supported at each corner by two $1\frac{1}{4}$ -in. cables. Altogether there are 56 cables supporting the lower deck.

The upper deck is carried upon heavy riveted trusses spaced 34 ft. c. to c. A double-track electric car line passes between the trusses, and on each side of the span there is an 11-ft. roadway and a 6-ft. sidewalk on cantilever brackets outside of the trusses. The total width of the upper deck is 72 ft., from hand rail to hand rail. The upper deck is carried by sixty-four $2\frac{1}{4}$ -in. cables at the ends, 16 of these cables being at each corner.

The lower deck weighs 510 tons and is counterbalanced with concrete blocks, each panel point having its own counterweight. The upper deck weighs 1710 tons and is counterbalanced at each end by monolithic concrete blocks. All of the counterweights for both decks hang from the high towers at either end of the structure. Figure 3 shows the upper and lower decks telescoped together and lifted to full height. Figure 4 is a top view of the towers showing the counterweights, the lifting cables, pulleys, etc. The pulleys for the upper deck are 14 ft. in diameter and 6 ft. 4 in. wide, and are made by riveting together plates and shapes, as shown in Fig. 5. The 16 counterweighted ropes at each corner of this span pass over the 14-ft. tower sheaves and are attached to the counterweights by means of equalizers, so that each cable takes the intended share of the stress.

The operating machinery is located at the center of the span and is carried on top of the trusses of the upper deck. It consists of a train of gears

(Fig. 6) driven normally by two railway type electric motors, connected in series, on a 600-volt circuit. These motors drive four operating drums, and each operating drum has four $1\frac{1}{4}$ -inch cables wound upon it. Two uphaul cables lead from this operating drum to the corners of the span and thence



New O.-W. R. R. & N. Co. Lift Bridge at Portland, Ore. Fig. 5—Side and End Views of One of the Four Main Sheaves.

to the top of the tower, where they are fastened to the steel work. The downhaul cables lead over sheaves at the corners of the span and are connected to the bottom of the tower. For the lower deck all counterweight cables pass under a driving sheave located at each corner of the span. These sheaves are driven by a longitudinal shaft geared direct to the operating motors at the center of the span, these motors being in a set that is independent of those which lift the upper deck. The arrangement of the machinery, however, is such that either set of motors, or any combination of the four motors, can be used to hoist either deck. Each of these motors is rated normally at 200 h.p., but as they are operated in series they normally develop only 100 h.p. One motor alone, however, operating upon 150 amperes, at 600 volts, will hoist either deck. When all the machinery is in operation there is about 5200 tons in the moving load, including the two decks, counterweights, cables, sheaves and other moving parts, and the coefficient of friction has been found to be about 2 per cent.

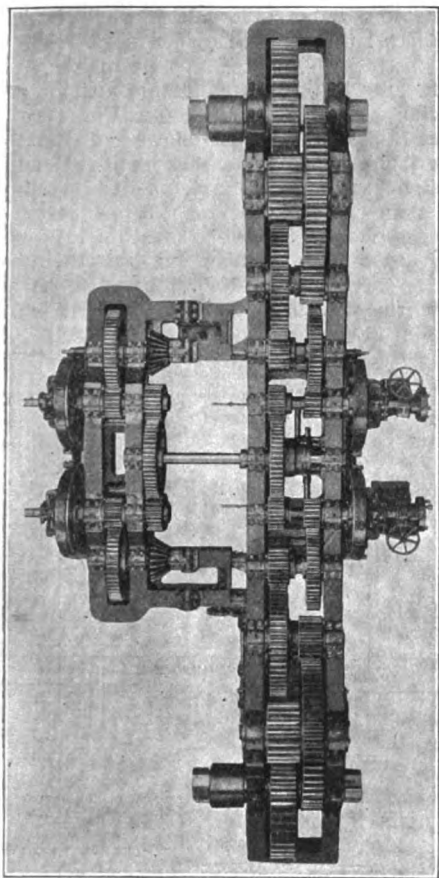
The bridge carries a 14-inch gas main which, by a telescoping arrangement, remains in continuous service during operation. This main is carried over the top of the trusses of the upper deck. On each corner post of the tower there is a painted scale which shows the clear height above low water at which the bridge may be resting at any moment. This is for the information of vesselmen approaching the bridge, each of whom is supposed to know the amount of headroom necessary for passing the structure safely.

The towers are $249\frac{1}{2}$ ft. high, from the tops of the piers on which they rest, and the piers are 23 ft. above low water, making the total height of the towers $272\frac{1}{2}$ ft. above low water. The piers were carried down 142 ft. below the water surface to a cemented gravel and boulder foundation. The excavation for these piers was by the open sink method. This was done by means of a six-compartment timber crib in each case, the crib being shod with a steel cutting edge.

From the west end of the bridge the tracks pass to the union passenger station. At the east end the tracks diverge for connections both north and south. An interlocking plant on shore controls the movements of the lift span. Normally the operating machinery is disconnected from the power circuit. The arrangement is such that the signalman must have his signals and derails set to danger before he can give power to the bridge tender to unlock his locks preparatory to operating the lift spans.

The bridge was designed by Waddell & Harrington, consulting engineers, of Kansas City, Mo., and it was built by the American Bridge Co. The lift cables were supplied by the American Steel & Wire Co.

Owners of steamers on the Volga river, in Russia, are much interested in the question of installing refrigerators on the river boats to transport



New O.-W. R. R. & N. Co. Lift Bridge at Portland, Ore. Fig. 6—The Holsting Gear.

fish, fruit and meats. Some of the members of the Moscow exchange committee have also suggested bringing perishable food products down the rivers Oka and Moskva. The Moscow refrigerator committee will have a meeting shortly, when this matter will be closely examined.

The Union Pacific-Southern Pacific Dissolution Plan.

The plan for dissolution of the Union Pacific and the Southern Pacific companies, which was submitted to United States Attorney General Wickersham by the officials of the Harriman lines and aproved by him, was submitted to the Federal Circuit Court of Appeals, at St. Louis, Mo., February 12. Presiding Judge W. H. Sanborn and District Judge W. L. Smith heard the plan. The attorneys for the government and for the Harriman interests will present arguments on the plan to the court February 24.

The terms of this plan are as announced last week, and published in the Railway and Engineering Review, February 8. It was submitted to Mr. Wickersham, who announced his approval of it on February 9. The attorney general's statement given out in this connection, is as follows:

"The result of the whole transaction will be to create ideal competitive conditions between the Union Pacific and the Southern Pacific for transcontinental business between eastern points and Portland and San Francisco and to relieve the states of California and Oregon of the monopoly of railroad control which has been the occasion of such widespread public dissatisfaction in the past. The attorney general feels that the approval and the carrying out of this plan will accomplish results of inestimable benefit to the public and results far more satisfactory than there was any reason to anticipate could have been secured.

"The plan in brief, provides for the disposition of 1,266,500 shares of stock of the Southern Pacific Co., which the Supreme court requires the Union Pacific to dispose of, by offering the same for subscription to and among the stockholders of the Union Pacific and the Southern Pacific companies, the holder of every four shares of stock of the Union Pacific Co. to have the right to subscribe for one of such Southern Pacific shares, and the holder of every three shares of Southern Pacific to have the right to subscribe for one of such shares.

"The larger proportion given to the Southern Pacific stockholders was insisted upon by the attorney

general for the purpose of insuring a wider distribution among the Southern Pacific shareholders and to guard against the securing of any undue control of the Southern Pacific Co. by the stockholders of the Union Pacific.

"The result of the distribution, if all the shareholders should avail of their subscription rights, will be that the present stockholders of the Southern Pacific Co. will own 71 per cent of its capital stock, while the stockholders of the Union Pacific will only hold 29 per cent. The stock is so offered for subscription at a price practically equal to par, payable in four installments, extending over a period of nine months.

"One of the conditions of the plan is that the amount of stock so offered shall be underwritten by a responsible underwriting syndicate, and such underwriting is being arranged by the firm of Kuhn, Loeb & Co. and the National City Bank as syndicate managers.

"Out of the proceeds of such sale of stock the Union Pacific Railroad Co. is to pay the Southern Pacific Co. for the entire capital stock of the Central Pacific Railroad Co., now held by the Southern Pacific Co., the total construction amounting to upward of \$104,000,000, and the existing leases of the Central Pacific to the Southern Pacific Railroad are to be canceled.

"Provision is also made for the lease in perpetuity by the Central Pacific to the Southern Pacific of the line connecting the Southern Pacific road in California with the Oregon and California line, making direct connection from San Francisco to Portland, Ore., and for the grant by the Southern Pacific to the Central of equal running rights with Southern over the Benicia line between Sacramento and Oakland and between Redwood and San Francisco, thus affording the Union Pacific, by way of the Central Pacific, a direct line for its transcontinental traffic over the short line between Omaha and San Francisco. There are various provisions for the joint, equal use by the two companies of the terminals at junction points, and other details not necessary to be mentioned here."

Continuing in a long discussion of the dealings which led up to the agreement, Mr. Wickersham reviewed the main points of the Supreme court's dissolution decree and the acts of congress under which the Union and Central Pacific railroads were built. He asserted that the agreement is in strict conformity with the decision holding the merger of the Union and Southern Pacific railroads unlawful, and the congressional acts, which provided for "such continuity of the Union Pacific and Central Pacific from the Missouri river to San Francisco as was contemplated by the acts of congress under which they were constructed."

President Taft Recommends Government Railroad Building in Alaska.

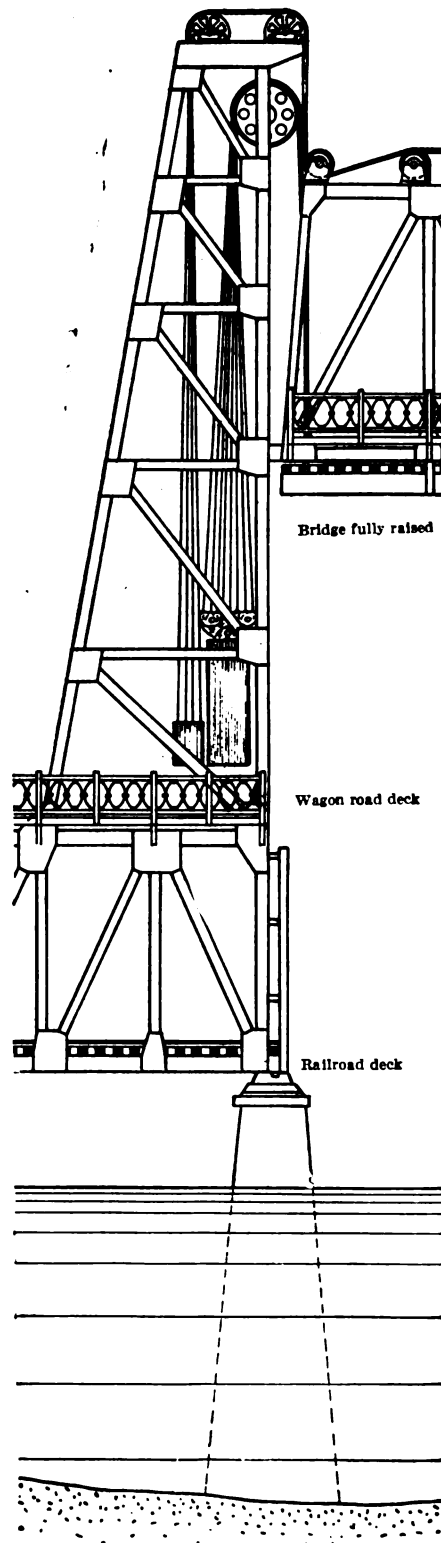
President Taft sent to congress, on Thursday, February 6, a message on government railroad construction in Alaska. The President was in receipt of the report of the special commission appointed to investigate and make recommendations on means for developing the resources of interior Alaska, noted in these columns last week; and it was the information from this source, together with his own views on the subject, which Mr. Taft transmitted to congress. He recommended the construction by the government of two independent railroad systems in Alaska, involving 733 miles of new road at a cost of about \$35,000,000. The recommendations are the most important in the interest of the commercial development of this great northwest territory that have ever been made, and are of great significance to the railroad interests of this country, as well.

While the President believes that government ownership of the railroads is the only solution of the problem for the development of Alaska, he is of the opinion that the roads ought to be operated by private interests under lease. He proposes that the equipment now being used on the Panama canal shall be transported to Alaska for the building of these railroads.

The commission reports that the first railway system should lead from Cordova by way of Chitina to Fairbanks and the second from Seward around Cook

Inlet to the Iditarod. The first system would be connected with the Bering coal fields and the second would tap the Matanuska field. The plans of the commission contemplate the use of railway lines already constructed in Alaska.

The President says in his message: "The commission finds that railway connections with open ports on the Pacific are not only justified but imperative if the fertile regions of inland Alaska and its mineral resources are to be utilized; but that with such rail connections a large region will be opened up to the homesteader, the prospector and the miner. So far as limited time available has permitted, the commission has investigated and in its report describes all of the railway routes which have been suggested for reaching the interior, including the ocean terminals of these routes. The relative advantages and disadvantages of these routes are compared. The principal result of this comparison may be stated to be that railroad development in Alaska should proceed first by means of two independent railroad systems, hereafter to be connected and supplemented as may be justified by future development. One of these lines should connect the valley of the Yukon and its tidewater; and the



New O.-W. R. R. & N. Co. Lift Bridge at Portland, Ore. Fig. 7—Tower and Lifting Details.