trains 83 hours; taking and leaving cars 57 hours; engine failure 17 hours; trains ahead 16 hours; accidents 7 hours.

There are at this time in service on the Cleveland division about 40 freight train crews.

In a statement for the months of February and March, showing the degree of promptness with which "quick despatch" trains were moved on different divisions of the Baltimore & Ohio, the Cleveland division stands at the head of the list in both months.

THE WABASH REORGANIZATION PLAN

On April 28 the three committees, two representing the first refunding and extension mortgage bonds and one the stockholders, signed the reorganization plan of the Wabash, which provides for the formation of a new company and the raising of $27,720,000 cash to pay off receivers certificates, expenses of the receivership, and furnish working capital for the new company. Kuhn, Loeb & Company, New York, are to form a syndicate to underwrite this reorganization plan.

Under the plan the underlying $62,302,000 bonds will remain undisturbed, interest having been paid on these bonds by the receivers, and the $2,541,000 equipment obligations maturing after December 31, 1915, will remain undisturbed, as will also the debenture mortgage bonds, of which there is but $315,000 outstanding, not controlled by the joint reorganization committees. This makes a total of $65,158,000 undistributed obligations. The new company will issue $46,200,000 5 per cent profit sharing preferred (non-cumulative) stock A; $48,720,000 5 per cent convertible preferred (non-cumulative) stock B; $43,540,000 common stock, and $1,500,000 4 per cent notes due May 1, 1920. This is a total of $139,960,000 new securities, and a grand total of $205,118,000 to be issued or assumed by the new company. The old company had a capitalization of $198,160,000, exclusive of guarantees, floating debt, etc., and before the issue of receivers' certificates or other obligations of the receivers. The present total capitalization of the old company and the obligations incurred by the receivers, excluding, however, undetermined guarantees, is $222,319,377. The total charges, inclusive of receivers' certificates, are at present $5,795,278. Under the reorganization plan the total interest charges would be $3,183,915.

The various classes of securityholders and creditors affected are as follows, exclusive, of course, of the holders of underlying bonds which remain undisturbed:

First Refunding and Extension Mortgage Bondholders.—There is $40,600,000 of these first refunding and extension mortgage bonds outstanding and there is in addition $5,684,000 coupons in default on these bonds. Holders of these bonds under the new plan are to receive payment in cash for their January 1, 1912, interest coupon ($20 per bond, or a total of $812,000) and 120 per cent of the face value of their bonds in new convertible preferred stock B, the total amount being $48,720,000. The price which they pay for this is the surrender of their old bonds and the agreement which they must enter into to underwrite the raising of the needed $27,720,000 cash in the event that the preferred and common stockholders of the old company do not enter into the plan and pay the assessment as provided in the plan. In the event, therefore, that none of the stockholders submitted to the assessment, the first and refunding mortgage bondholder would have to surrender his bond and pay $682.76 per bond in cash, less $20 which he would receive in cash for the coupon due January 1, 1912, making a net cash payment of $662.76, for which he would receive $1,137.93 in new profit sharing preferred stock A, $1,200 in new convertible preferred stock B, and $1,072.41 in new common stock.

Preferred Stockholders.—There is outstanding $39,200,000 of old preferred stock. This stock under the plan is to pay an assessment of $30 per share in cash and give up the old preferred stock certificate with a par value of $100 and receive in exchange $50 par value of new profit sharing preferred stock A, amounting in all to $19,600,000, and $50 in new common stock, amounting in all to $19,600,000.

Common Stockholders.—There is $53,200,000 common stock outstanding on which an assessment of $30 in cash per $100 share is to be paid by the holders thereof and the stock certificates surrendered, and holders are to receive in exchange $50 per share in new profit sharing preferred A stock, a total of $26,600,000, and $45 per share in new common stock, amounting in all to $23,940,000.

Unsecured Creditors.—Creditors of the company are to receive 25 per cent of their claims in new convertible preferred stock B at par and 75 per cent in new common stock at par (the total amount of stock so issuable is not exactly determinable and is not included in any of the total figures for capitalization given above or below).

In the event that the stockholders do not submit to an assessment of $30 per share their equity is apparently wiped out and the burden of reorganization falls on the present holders of the first refunding and extension mortgage bonds. In the event that a part or all of these bondholders do not accept this burden, the only equity which they will have is their pro rata share of the difference between the price which the sale of the property subject to the underlying bonds will bring under foreclosure sale and the sum necessary to pay off the receivers' certificates. The upset price of the property subject to the underlying bonds has been fixed at $21,000,000 by the court and there are $15,950,000 receivers' certificates outstanding beside a judgment for $950,377, known as the Compton judgment. The fact that a syndicate headed by Kuhn, Loeb & Company is to underwrite this plan means that if the stockholders do not pay their assessment, and a part or all of the necessary cash is not raised by the first and extension mortgage bondholders, the underwriting syndicate will raise the cash, paying to dissenting bondholders their proportion of the residue after the sale as mentioned above, and will take the securities which would have been distributed to stockholders and bondholders under the plan had they paid their asessments.

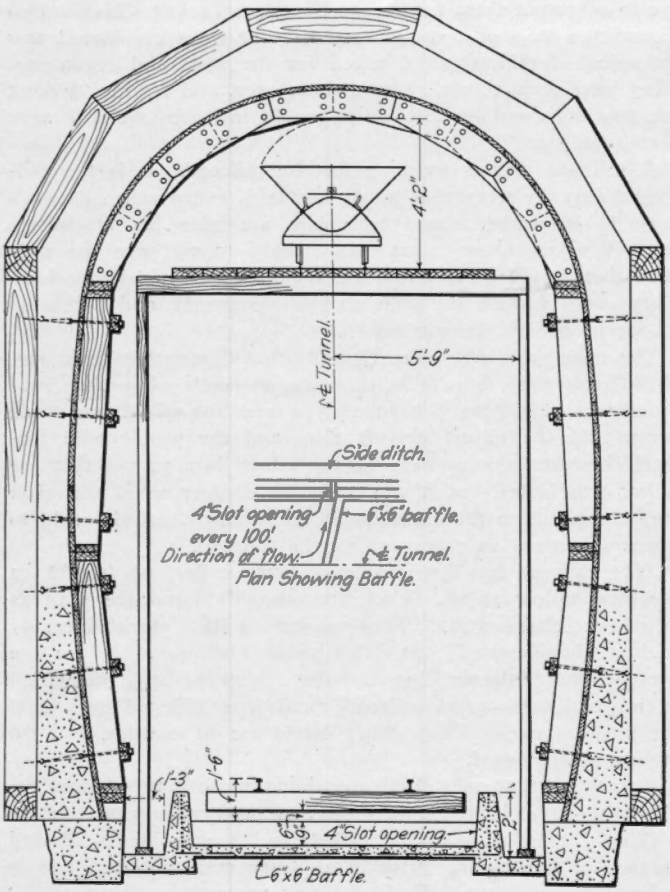
LINING TUNNELS ON THE NEW LEWISTOWN-GREAT FALLS LINE OF THE ST. PAUL

On the extension of the Chicago, Milwaukee & St. Paul from Lewistown, Mont., to Great Falls, described in the *Railway Age Gazette* of April 2, 1915, there are six tunnels aggregating 5,333 ft. in length, all of which are lined with reinforced concrete, except one 250 ft. long. The linings have a minimum overhead thickness of 15 in., and a sidewall thickness of 12 in. The accompanying drawing shows a typical cross section of the lining and the special concrete gutters which were provided to care for the drainage in tunnel No. 1. Tunnels No. 3, 4, 5 and 6 required no special provision for drainage. Wooden forms lined with sheet metal and built in sections 16 ft. long were used. These were wedged up to position at the bottom and after the concrete was poured and set the wedges were removed and rollers substituted to enable the form to be moved to a new position. Each form was allowed to remain in position for 48 hours after the concrete was poured before being moved.

At tunnel No. 1 the concrete plant consisted of three mixers, one being set in front of and above each portal on falsework and one at a shaft, 118 ft. deep, 750 ft. from the west end of the tunnel. The shaft was sunk by the forces which drove the tunnel and was finally lined with concrete for ventilating purposes. Gravel and cement were delivered at the tops of the banks adjacent to the mixers at the portals by wagons and were delivered from these points to the mixers by gravity chutes as required. The mixers discharged the concrete directly into steel dump cars which were operated on a double track placed on a staging. This staging was built as high as possible to permit the operation of trains through the tunnel. The dump cars delivered the concrete to a point opposite the form to be poured and discharged it di-

rectly into that portion of the form below the springing line. For that portion above this the concrete was poured into a shallow box from which it was shoveled into the form. The lagging above the springing line was made in sections about 3 ft. wide, so that it could be removed from the form centers to enable the arched portion of the lining to be placed more readily. The concrete mixer at the shaft discharged into small cars which were lowered in a cage down the shaft to the staging where the concrete was dumped into the delivery cars.

To make sure that all voids adjacent to the segmental timbers were filled it was decided to force cement grout back of the concrete lining. To accomplish this, a plant consisting of a Ransome-Caniff grout mixer, a 40-hp. kerosene burning engine and a 10 in. by 10 in. single-stage air compressor was installed. The grout mixer was mounted on a small push car or set to one side of the track on the ground in the tunnel, as circumstances



Cross Section of Tunnel 1 Showing Side Drains and Method of Placing Concrete Lining

required, and from this the grout was conducted through a 2 in. air hose to 2 in. pipes previously placed in the crown of the arch. The pipes left in the crown of the arch to receive the grout were spaced about 5 ft. center to center and grout was forced into one pipe until it made its appearance at the next pipe but one when the connection of the air hose was made to the next pipe. The air pressure used was 60 lb. to 100 lb., according to the conditions. The plant was operated with five men and an engineer who succeeded in placing 280 batches of 2⅔ cu. ft. of grout each in 10 hours. An average of 230 batches per 10 hours was maintained throughout the five tunnels.

The same general scheme was used for lining all of the other tunnels with some minor differences due to local conditions. Tunnel No. 4, which was affected by an adjacent slide, required retimbering for a distance of 200 ft. at the east end, and to provide against the heavy lateral movement, induced by the slide, the wall timbers when reset were so placed as to provide an additional thickness of concrete of 18 in. In addition to this excavations were made between the wall timbers into which concrete was poured to form stiffener ribs. It was necessary at this tunnel to elevate the gravel for concrete 250 ft., which was accomplished with an inclined industrial track operated by a cable and hoisting engine. The concrete mixing plant at tunnel No. 4 consisted of one mixer mounted at each portal and the mixing of concrete for tunnels No. 3, 5 and 6 was handled with a single mixer at each.

In all of the tunnels excepting tunnel No. 4, which ran 8 cu. yd., the lining averaged 5 cu. yd. per foot of tunnel. At tunnel No. 1, where two 10-hr. shifts were used and three concrete mixers were in operation, as high as 58 ft. of lining was placed in 24 hours, and this rate of progress continued for three weeks toward the end of the work. At the other tunnels, excepting No. 4, 16 ft. of lining was completed every 10 hours with a single shift, and when two shifts were used that rate continued. The average cost of the concrete lining was about $16 per cu. yd.

This work was done by company forces under the general direction of C. F. Loweth, chief engineer, and E. O. Reeder, assistant chief engineer. F. B. Walker was assistant engineer in direct charge of the work.

COST OF TRAIN LIMIT LEGISLATION

A. J. Earling, president of the Chicago, Milwaukee & St. Paul, in a statement at the hearing before the committee on public utilities of the Illinois House of Representatives recently, in reference to proposed train limit legislation, presented a detailed estimate showing that a law limiting the number of cars hauled in one train to 50 would render valueless investments totaling $4,091,753.32, which have been made by his company on its 415 miles of line in the state of Illinois and would involve an increase in freight train miles in the state of 20.08 per cent., equivalent to an additional operating annual cost of $441,155.04. The investments consist of three items: expenditures made for improvements in the line to permit the hauling of heavier trains, the excess cost of locomotives having greater hauling capacity, and the increased cost of freight cars designed to be handled in longer trains.

For the purpose of this estimate the improvements in line only on the Chicago & Council Bluffs division were considered. These improvements are of five kinds: (1) increase in standards of track construction, (2) extensions of yard and passing tracks, (3) strengthening of permanent bridges, (4) increase in size of turntables, engine houses and other facilities, and (5) reduction in grades. Under the first head it was assumed that to haul the present business with lighter engines the same track mileage would be needed, but that the standards could be placed on a basis of 75-lb. rails, lighter fastenings, less ballast and fewer ties. The difference between the cost of the present track structure and the lighter track amounts to $589,950 for the 146 miles of double-track line considered. The estimated cost of yard and side tracks in excess of the lengths required for 50-car trains amounts to $1,056,200. In estimating the value of these extensions the cost of the necessary grading, track structure and right of way was included.

Under present operating conditions all structures are designed for Cooper's E-50 loading. If lighter locomotives hauling 50-car trains were in service, these bridges could be designed to carry not greater than Cooper's E-36 loading. As the ratio of the steel in structures for an E-36 loading and for an E-50 loading is about 0.8, the estimated excess investment is based on 0.2 of the cost of the steel work now in place and 25 per cent of the cost of the substructures, which could be smaller and lighter if they carried lighter structures. The reproduction cost of the present Mississippi river bridge at Savannah is estimated at $331,000 and as the original structure, built in 1880 for a lighter loading, cost approximately $225,000, one-half of the difference, or $53,000, is considered chargeable to the C. & C. B. division in