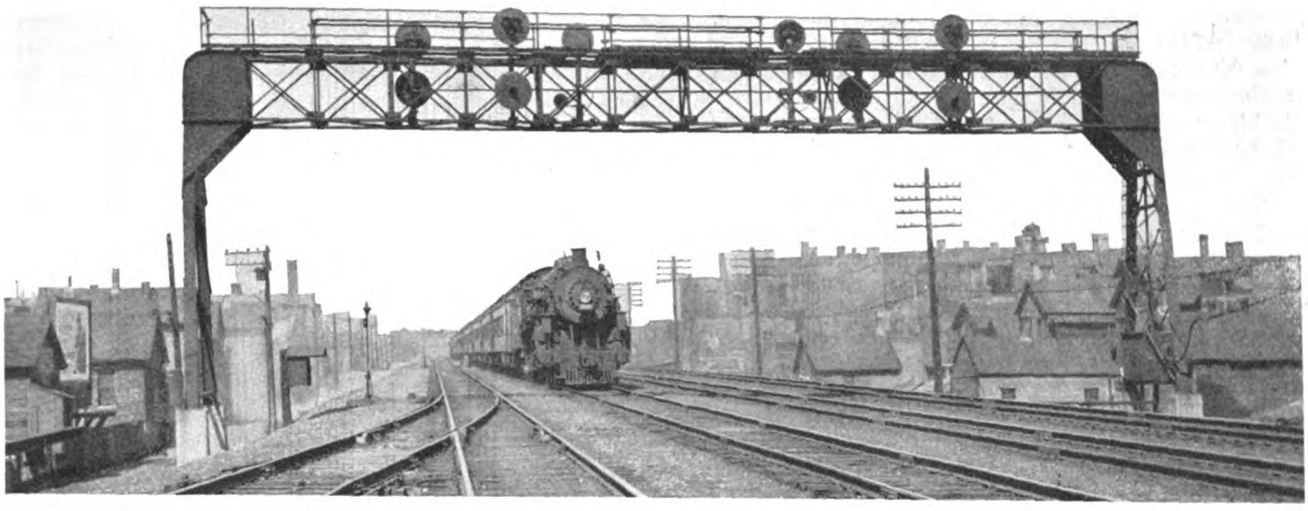


Southbound Train on Track No. 2—Note Northbound "Entrance" Signal for Track No. 5 at Left

Either-Direction Signals Relieve Serious Terminal Congestion

Improved operation secured on joint line of N. Y. C. and C. R. I. & P. in Chicago

By Leroy Wyant
Signal Engineer, Chicago, Rock Island & Pacific

THE Chicago, Rock Island & Pacific and the New York Central have recently placed in service a rearrangement of track facilities and signaling on the four- and six-track line which they operate jointly from Englewood (63rd street) to the La Salle Street station, Chicago. Heretofore the passenger traffic has been concentrated on the two center tracks and the new facilities have relieved the serious passenger train congestion in this territory.

In addition to all New York Central and Rock Island passenger trains those of the Nickel Plate also use these tracks. The coach yards of the Rock Island are located on the west side of the main line between 51st and 53rd streets and the New York Central coach yards on the east side between 40th and 44th streets, which locations require extra movements of equipment over the main line between the La Salle Street station and these yards.

The following data indicate the volume of traffic in this territory:

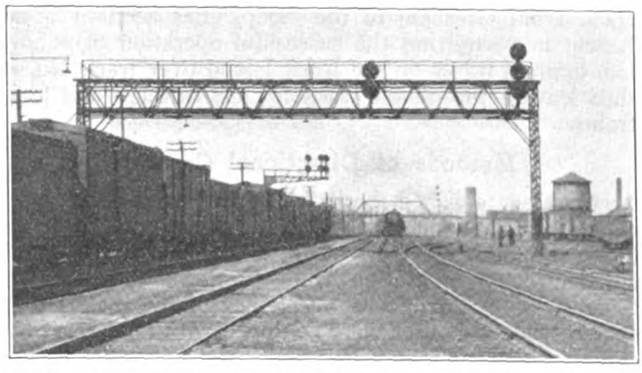
24-hour check:

Through passenger trains	76
Suburban trains	135
Coaches	53
Light engines	153
Freight trains	68
	485

Peak movement, one direction:
5:00 p. m. to 6:30 p. m.—

Through passenger trains	5
Suburban trains	20
Coaches	2
Light engines	7
Freight trains	7
	41

With only the double-track line for passenger train operation, any delay for crossover movements at the coach yards, at the Englewood or La Salle stations or at the several railroad crossings in this territory resulted in delays to several following trains. Estimates showed that a very large expenditure would be required for two additional tracks from 39th street to the station and the rearrangement of yards. As the entire terminal situation is unsettled, principally on account of a river



Looking North Toward the 61st Street Junction—C. R. I. & P. Tracks at Left and N. Y. C. Tracks at Right

straightening project; it was not considered that such an expenditure was justified at this time.

However, since any proposed scheme embraced the use of four tracks as running tracks for passenger trains, it was decided to go ahead at once and use the present four tracks for both passenger and freight trains, arranging for switching movements to be made at periods during the day that did not conflict with the maximum passenger train rush. As the preponderance of traffic is inbound

during the morning and outbound at other periods it was decided to equip the two outside tracks, No. 2 and No. 5, (tracks No. 3 and 4 were the existing passenger mains) with automatic signals to direct train movements in either direction. The result of this arrangement is that, if desired, as many as three tracks can be used at one time for movements inbound or outbound.

The two tracks, No. 2 and No. 5, were relaid with new rails and reballasted, and the bridges were strengthened to conform with high-speed running track standards. As the semaphore signals on the two center tracks, No. 3 and No. 4, had been previously replaced with light signals, it was decided to provide the either-direction signals of the same type for tracks No. 2 and No. 5.

Terminal Divided Into Zones

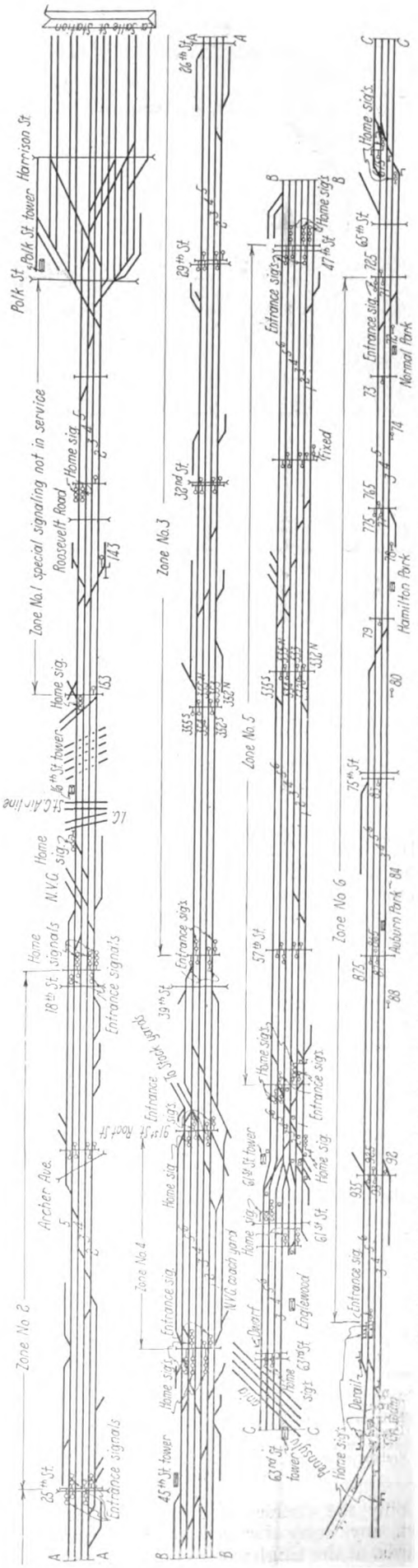
All train movements in this territory are directed by signal indication without written train orders. Therefore, special control methods were required to establish the traffic direction on tracks No. 2 and No. 5 for either-direction operation. The location of the interlocking plants and switchmen's houses at busy main-line crossovers naturally fixed the limits of the intervening automatic-signal zones, as shown on the diagram. Zone No. 1 extends from the La Salle Street station interlocking at Harrison street to the interlocking at the 16th street crossing of the Illinois Central, while zone No. 2 extends from the 16th street interlocking to the 25th street crossovers. Zone No. 3 extends from 25th street to 40th street where the crossovers and turnouts entering the north end of the N. Y. C. coach yard are located, and the next zone, No. 4, includes the territory from 40th street to the interlocking at 45th street, which handles the switches and crossovers for the leads to the stock-yard and for the south end of the N. Y. C. coach yard. Zone No. 5 extends from this interlocking to the interlocking at 61st street, which handles the various switches and crossovers where the joint track operation ends.

The Rock Island has three running tracks from the 61st street interlocking to the Gresham (89th street) interlocking. The third track of this layout being a continuation of track No. 5. This track was rebuilt and signaled for either direction operation at the same time as the improvements were made north of Englewood. This change, which gave the Rock Island an express track from Gresham to the "loop," has been of great benefit in permitting the successful operation of suburban express trains on the Rock Island over track No. 5, thus leaving the double track for the through and local trains.

Methods of Directional Control

Having established the limits of the zones, it was decided to use modified absolute permissive single-track block signaling for tracks No. 2 and No. 5, to permit either-direction operation from Englewood to the La Salle street station. The telephones in the towers and switch tenders' houses were equipped with loud speakers and telephone sets were installed at all important crossovers and switches. With this arrangement, whenever a towerman, switch tender or trainman talks to a similar employee at another tower or station everyone along the line involved in the handling of trains hears the conversation and immediately plans the movements under his control to conform with the move discussed over the telephone. In case the proposed movement interferes with those already started at any point, the operator at such a point immediately discusses the situation with the other employees concerned and a movement best suited to conditions is agreed upon.

The line-up of the entering signal indications estab-



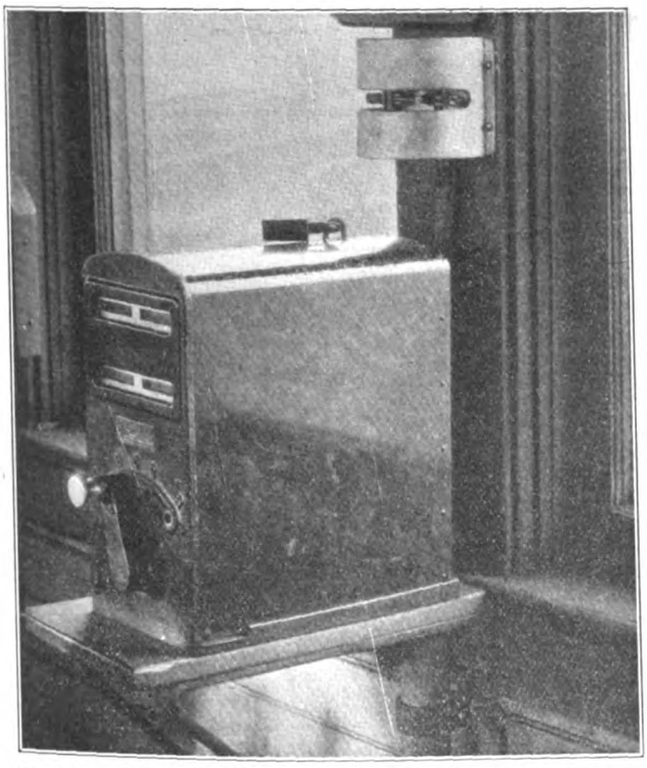
Condensed Track and Signal Plan of Terminal Showing Reverse Traffic Zones in Consecutive Order from Right to Left

lishes the direction in which traffic is to move. The control circuits for the signals in one direction in a zone are carried through lever circuit controllers in the towers or switch tenders' houses at each end of the zone. The actual clearing of the entering signal likewise is controlled by the lever controllers at either end of the zone and the arrangement is such that the two levermen must co-operate in order to clear an entrance signal.

The entering signal is distinguished from regular automatic signals by a second light signal unit and by the absence of a number plate. In case an engineman is stopped at an entering signal indicating stop he must stay until authorized to proceed, either by the signal being cleared or by a telephone clearance from the leverman, telephones connected to the loud-speaker system being located at all entering signals. In case of a failure of communication the train may proceed when preceded by a flagman to the next point of communication. In other words, the requirements are the same as for a train leaving a station on single track. Having once established the direction of operation, following movements can be made without action on the part of the leverman. When a leading train clears the first block, the entering signal operates to the caution indication, thus permitting a following train to enter the block.

Rules Governing Special Operation

Changing track No. 5 from a freight and switching track to a passenger track required a definite rule concerning movements from and to this track and switching



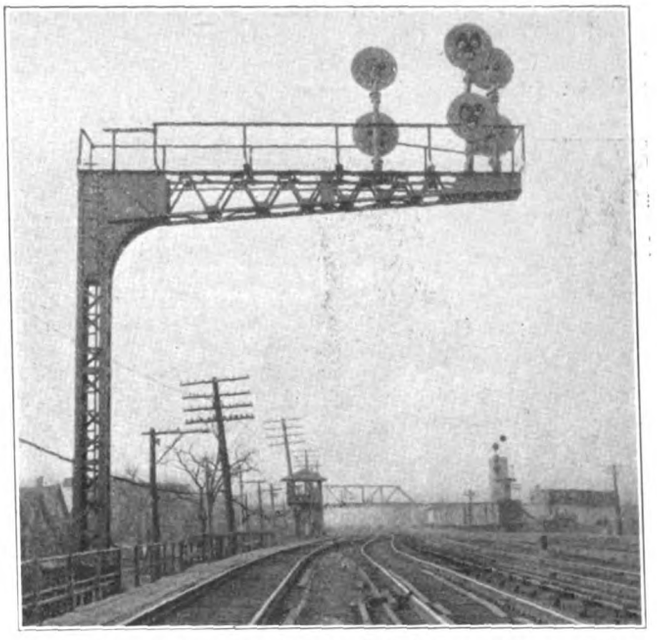
Desk Lever in Englewood Tower for Traffic Locking on Track No. 5 South to Gresham

or industrial track connections. However, the conditions were identical with any main line single track and, therefore, the regular rule, as follows, applies:

> No switches leading to or from track No. 5 shall be opened without permission of parties controlling the block occupied or to be occupied. No movement shall be made in the reverse direction to that authorized by entrance signal or parties controlling the block, without further permission.

On the section from Englewood to Gresham the Rock Island decided to use the more common method of traffic locking to control the direction of traffic. With this method only the opposing entrance signals are check locked. The intermediate signals operate as ordinary double-track automatic-block signals. Both of the methods of directional control are working satisfactorily, each having certain advantages and disadvantages.

A separate loud-speaker telephone system is in service from Englewood tower, south, including the Gresham tower. These two levermen discuss the movements of



Looking North Toward Tower at 61st Street—Note Either-Direction Interlocking Signals for Track No. 5

trains due. For example, if no train is occupying track No. 5 between these points and the route is to be lined up for a southbound train; the Gresham leverman moves the handle of his desk lever to the "release" position, which unlocks the lever at Englewood providing all intermediate blocks are clear, permitting the leverman at that point to move his lever to the right, which changes the southbound entering signal to the proceed indication. No action is necessary for following train movements but if traffic is to be reversed the track must be clear and both levermen co-operate to change the line-up. As long as the track is occupied traffic direction cannot be changed but the entering signal, if at proceed, can be changed to stop.

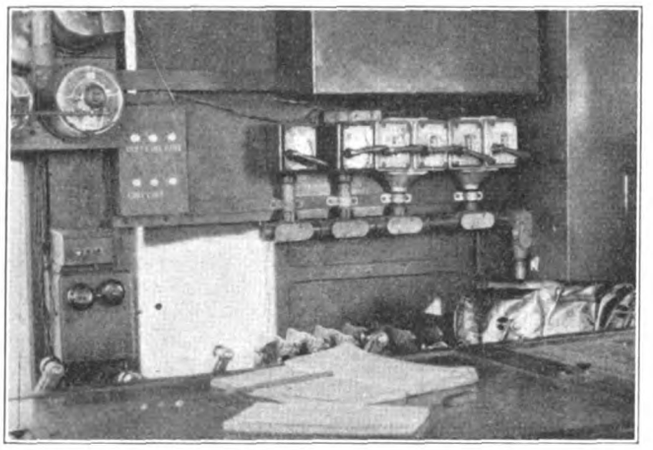
Special Conditions Handled Satisfactorily

Before placing the new signaling in service a careful analysis was made of the unusual conditions to be met in single-track operation without train orders in a congested terminal zone. The use of additional employees as train directors was considered. However, it was finally decided to try the system with a limited number of trains using track No. 5 without train directors, but the trains using track No. 5 were scheduled in the time card as doing so. As anticipated at that time, conditions varied too rapidly during the rush hours to permit scheduling the trains on certain tracks. Therefore, within a few months after the system was placed in service, it was decided to eliminate all scheduling of trains on these additional tracks, leaving towermen under the frequent supervision of operating officers. So far as the Rock Island is concerned, it has been practically concluded that

train directors are not necessary, thus requiring no additional operating help and the only additional maintenance help was one signal maintainer through the entire zone.

Operating Results Satisfactory

A concrete example of the flexibility of train operation can be cited for a recent morning when three northbound trains between Gresham and La Salle street station were operated as follows: A local suburban train started out of Gresham on track No. 3, making stops at the three suburban stations between that point and Englewood. A through passenger train, which would normally run on track No. 3 was routed over track No. 5, on which it was able to overtake and pass the local before it had reached Englewood. While the through train was standing at Englewood to discharge passengers



Interior of Tower at 45th Street Interlocking Showing Special Switches on Wall for Controlling Either-Direction Signaling

and baggage, an express suburban train, following on track No. 5, approached the Englewood plant and was routed over on track No. 6 to pass around the through train standing at the Englewood station without stopping, and then ran on to the La Salle street station on track No. 3. The through train finished its station work and followed the express, and in due time the local came along. Thus the order of the three trains was just reversed and all were kept moving without delays, arriving at the main station on time.

An early objection to the proposed method of operation was that late stock trains would be held out of the terminal on penalty time. However, it has been found that by regulating the number of cars, stock or other freight trains can be run in between passenger trains during the morning rush, without serious inconvenience. The tracks leading to the stock yard turn off to the west at 40th street and the connection to the N. Y. C. coach yard to the east. These switches and main-line crossovers are handled by switch tenders in service for the 24-hour period.

Other Similar Installations Planned

As a result of this new method of operation, terminal congestion in the station has been relieved and train delays between Englewood and the La Salle station have been decidedly reduced. The use of this either-direction signaling system on track No. 5, for example, has proved so satisfactory that the Rock Island is now installing a similar arrangement on the westbound track of the double-track line from Joliet, Ill., to Blue Island, a distance of 24 miles, so that the preponderance of eastbound traffic in the morning can be handled over both tracks. The same system is to be used also on the eastbound track of a 10-mile section of double track on the Kansas division, so that passenger trains can run around freight trains on a long hill. Train movements will be directed by signal indication without train orders on both installations.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended May 21 amounted to 1,016,803 cars, a decrease of 22,267 cars as compared with the corresponding week of last year and an increase of 29,497 cars as compared with 1925. Livestock loading showed an increase of 1,490 cars as compared with last year but all other commodity classifications showed slight decreases, coal showing a falling off of 3,630 cars, forest products a decrease of 4,924 cars, and miscellaneous freight a decrease of 7,637 cars. Increases were reported, however, as compared with last year's figures, from the Pocahontas, Southern and Northwestern districts, while the other districts showed reductions. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

Week Ended Saturday, May 21, 1927

Districts	1927	1926	1925
Eastern	243,034	250,234	236,707
Allegheny	209,122	211,941	201,790
Pocahontas	60,960	57,055	50,026
Southern	153,161	148,697	142,717
Northwestern	156,970	158,099	154,703
Central Western	123,021	138,864	128,057
Southwestern	70,535	74,180	73,306
Total Western Districts	350,526	371,143	356,066
Total All Roads	1,016,803	1,039,070	987,306
Commodities			
Grain and Grain Products	38,266	39,633	38,796
Live Stock	28,376	26,886	26,684
Coal	161,588	165,218	152,580
Coke	10,540	11,868	9,423
Forest Products	72,206	77,130	75,704
Ore	61,495	62,121	62,729
Mdse., L. C. L.	261,500	265,745	258,514
Miscellaneous	382,832	390,469	362,876
May 21	1,016,803	1,039,070	987,306
May 14	1,029,126	1,029,748	985,879
May 7	1,024,416	996,216	983,034
April 30	1,026,440	995,408	984,073
April 23	955,215	973,158	961,186
Cumulative total, 21 weeks	20,326,169	19,839,025	19,449,531

Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended May 21 totaled 61,536 cars, a decrease from the previous week's loadings of 514 cars, and a decrease from the loadings for the same week last year of 2,163 cars.

	Total for Canada			Cumulative Totals to Date	
COMMODITIES	May 21, 1927	May 14, 1927	May 22, 1926	1927	1926
Grain and Grain Products	6,781	7,664	10,343	157,175	140,490
Live Stock	1,826	1,857	1,857	40,226	40,746
Coal	6,135	6,097	5,169	125,042	88,880
Coke	311	319	387	6,943	8,852
Lumber	4,183	4,212	3,924	67,702	67,791
Pulpwood	1,825	1,674	1,961	87,276	65,759
Pulp and Paper	2,237	2,145	2,448	44,511	51,466
Other Forest Products	3,026	3,012	2,750	64,902	68,699
Ore	1,528	1,793	1,818	28,999	29,503
Merchandise, L. C. L.	17,801	17,894	16,819	334,076	312,641
Miscellaneous	15,883	15,383	16,223	254,239	244,632
Total Cars Loaded	61,536	62,050	63,699	1,211,091	1,119,459
Total Cars Received from Connections	38,882	39,251	38,304	784,459	750,571