South Shore Line Uses Spring Switches on Heavy Traffic Lines

Number 20 turnouts permit high speed—Two spring rods for switch

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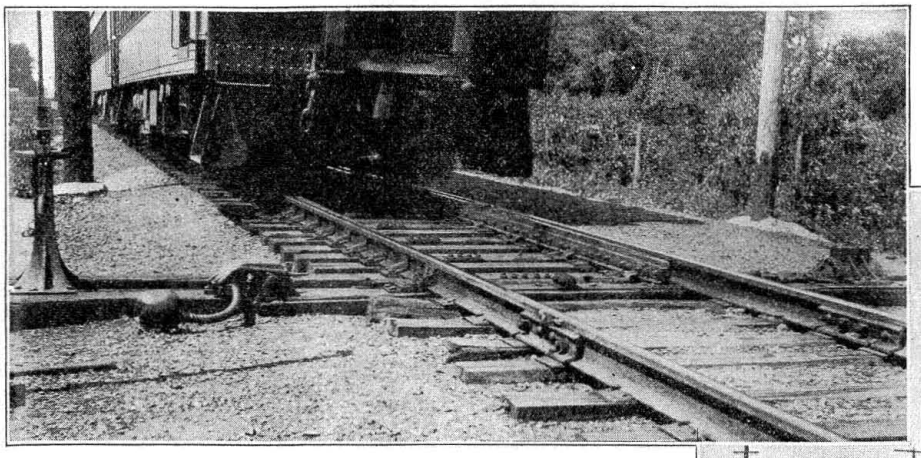
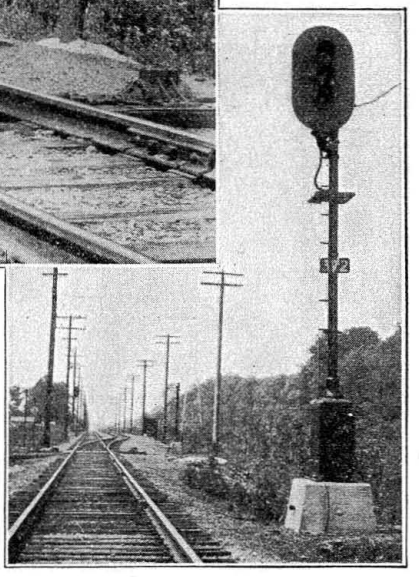


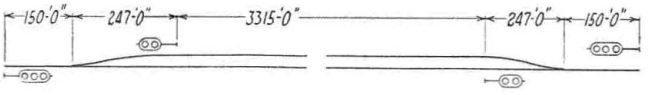
View of front of passenger train traveling 45 m.p.h. on main line through a spring switch



Color-light signal as facing point protection for spring switch Signal is 150ft. in approach at switch point

SEVERAL interesting developments in the application of oil buffered spring switches have been made on the Chicago, South Shore & South Bend, an electrified railroad that is handling a heavy passenger and freight traffic. On the 25-mile section of single track between Gary, Ind., and Michigan City, the "South Shore" is handling 44 passenger and 8 to 10 freight trains daily and in the summer season as high as 62 passenger trains on Sunday. Passenger trains consist of from 2 to 8 cars, and freight trains, up to 40 cars. The motor cars weigh 130,000 lb. and the trailers 93,000 lb. The dining cars weigh 112,000 lb. and the parlor cars 111,000 lb. Freight locomotives, of which there are eight, weigh 80 tons each. About 140 coaches pass through the high-speed sidings in a day or an average of three cars per train. The "South Shore" carries fast l.c.l freight with overnight service between points on its own lines, and interchanges at several points with steam roads. About 150 loaded cars of freight are handled daily and in the coal season as high as 400 cars.

Through passenger trains are scheduled to run between Gary and Michigan City in 31 min. or at the rate of 49 m.p.h. In order to maintain such schedules, the number of train stops and time lost in



Automatic signal protection at passing siding equipped with spring switches

waiting at meeting points, must be reduced to a minimum. The schedules are arranged so that opposing trains arrive at opposite ends of a passing track at approximately the same time.

A typical passing track, 4,060 ft. long, is located on the north side of the main line at Tamarack, 15 miles east of Gary. The switch at the east end is set normally to divert trains on to the passing track, and after running the length of the passing track, they trail out through the switch at the other end, which is set normally for the main line. Eastbound trains stay on the main line, trailing through the switch at the east end of the passing track. In order to permit trains to run in and out of these passing tracks at high speeds, No. 20 turnouts are used. These turnouts are taken normally at 45 m.p.h., but a test demonstrated that the turnout could be taken at speeds up to 60 m.p.h. with safety.

Special Features of Switch Construction

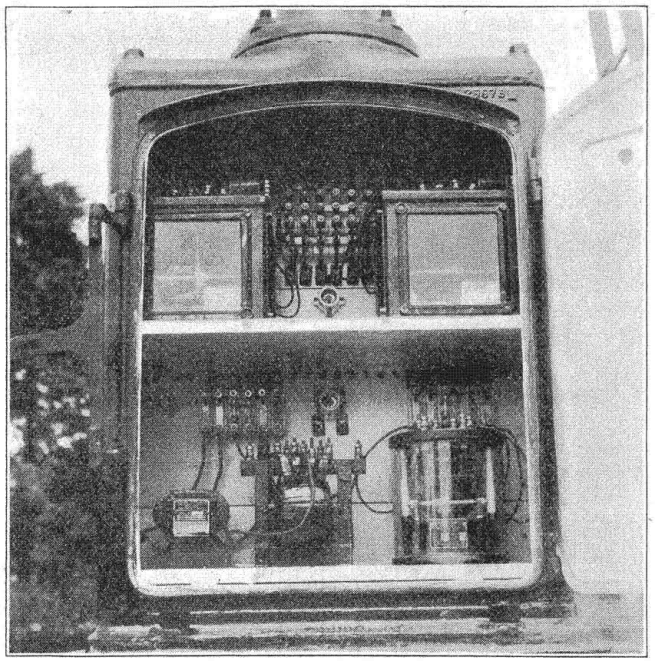
The main line as well as the passing tracks are of 100-lb. rail. Morden adjustable rail braces are used on the front switch ties with an insulated gage plate. Morden 5/8-in. detector bar braces (14 on each point) are used. Tie plates and rail braces are used on the 15 or 16 ties back to the end of the switch point. The switch points are 30 ft. long and are reinforced with steel measuring 1¾ in. square and 28 ft. long. The reinforcing is required to prevent whipping of the points when the switch is being trailed through.

Four adjustable gage rods are used, with a Morden spring rod connection on the first rod connected to the operating rod of the switch stand, and another spring rod on the gage rod connected to the fixed plate. This second spring is used for the purpose of holding the switch stiff and tight against the rail and to prevent bending of the point. The two switch ties are 7 in. by 9 in. by 18 ft. long, with the switch stand on one side of the track and the oil buffer on

the other. The buffer is mounted on pieces of boiler plate ½ in. by 6 in. by 3 ft., each boiler plate being secured to the ties with five 5-in. lag screws. The buffer is placed on the boiler plate and held by four ¾ in. by 9 in. bolts extending through the plate and tie. Pale semaphore oil is used in the buffers, which are so adjusted that about 19 sec. time is required for the switch to close after a train passes.

Automatic Signals Afford Protection

Automatic block signals are provided for the entire line, and special signaling is also arranged to protect movements over the spring switches. A special facing point protecting signal is located 150 ft. in advance of the switch point. A switch circuit controller connected to the normally-closed point will cause the signal to indicate "red" if the point is open ⅛ in. or more. A motorman receiving a red indication at one of these signals is required to stop and investigate the condition of the switch. This signal also operates as one of the automatic block signals, the track circuit control extending by way of the passing track. In some cases, following trains running close together are required to close up and get in the same passing track to meet an opposing train. With the leading train in the passing track, the second train receives a signal of "red" over "yellow," giving the



The signals, track and control circuits on the South Shore are operated by alternating current

motorman assurance that the switch point is in the correct position and giving him authority to enter the passing track prepared to stop short of the train ahead of him. A green signal indicates that the switch is closed and track clear.

The regular head-block signal, to hold trains at a station when a train is approaching from the next siding, is located back of the switch at a point opposite the clearance point of the siding. This signal, in addition to the regular control, is controlled through the switch circuit controller so that if the switch is not in the correct operating condition or is blocked, the signal will indicate "stop."

Following the installation of four of these typical passing tracks with spring switches, the "South Shore" made extensive tests and results have been so satisfactory that two other layouts are planned for early installation.

Results Obtained

Under the present schedule, with an hourly service between South Bend and Chicago, regular trains meet at Wilson, Shops and Warren. In addition to this service, it was found that on Saturdays, Sundays and holidays, half-hour service between Michigan City and Chicago was necessary during certain periods of the day. This service was placed in effect as needed and considerable difficulty was encountered in getting these half-hour trains through on time, without delay to the trains on regular hourly schedules, as one meeting point was at Keiser Siding, located approximately eight miles west of Michigan City, which did not prove to be satisfactory. The moving of Keiser Siding approximately one mile eastward, with spring switches at both ends, has provided an ideal meeting point and the fact that no trains are required to stop and throw switches has made it possible for half-hour service to be operated successfully with practically no delay.

Freight service, as well, has been benefited by this high-speed siding. With passenger trains operating on an hourly service, it has always been necessary for a freight train leaving Michigan City shops to follow any of the westbound passenger trains, which are scheduled to leave 44 min. after the hour. Heretofore, freight trains, leaving the shops immediately following a passenger train, have been able to go to Power Siding, a distance of five miles through city streets, with several safety stops to be made, at which point they were required to clear the next eastbound train (due at 28 min. after the hour).

After having cleared the eastbound train at Power Siding, if on time, the freight train would then, under favorable conditions, proceed to Wilson, which is a high-speed passing track similar to the new Keiser Siding, but considerably longer, at which point it would clear the following eastbound as well as the westbound trains, the eastbound train being due at 9 min. after the hour at the west end of the siding, and the westbound train at 14 min. after the hour. Clearing of two trains at Wilson invariably meant that the freight train backing over, would delay either one of the trains for a short period of time.

With the new siding, it is now possible for a freight train to leave the shops at Michigan City and proceed to the new Keiser Siding, clear the eastbound passenger train at 24 min. after the hour and go to Wagner, which is the first siding beyond Wilson. In some cases, under the most favorable conditions, or by train order, a freight train can clear an eastbound passenger train at Keiser, and then go to Gary for the second eastbound train which is due to leave that point at 58 min. after the hour. Freight trains which previously consumed from three to four hours between Michigan City and Gary now make the trip in from one hour and 15 min. to two hours.

The largest private telephone and telegraph plant in the world is owned and operated by the Pennsylvania. More than 140,000 miles of copper wire makes it possible for the railroad to get in instantaneous communication with any part of its system. More than 116,000,000 local and long distance telephone calls are handled each year. In addition, about 32,000,000 telegraphic messages are handled. These figures do not include the use of the telephone and telegraph in such work as train dispatching.