(4) Release Route Locking.—This form of electric locking effects the consecutive release of each switch as and after the rear of the train has passed it, and is only used in large and complicated terminals to save time.

(5) Check Locking.—This is the form of electric locking between adjacent interlocking towers which are so near each other as to call for co-operative action of the signalmen in them.

Route Levers, as known in Europe, have never become popular in the United States, it being considered an essential operating requirement that the plant should permit of any possible route combination of switches being given so as to cover irregular movements and emergencies.

Switch Locks.—The use of track circuits in place of detector bars has become usual in complicated terminals and is considered as being safer than any mechanical devices for this purpose, it being possible with such circuits to prevent the movement of the switches while the train is passing over them, and may be arranged so that the train is wholly clear of any adjoining track or switch before another train can be permitted to pass that point. In plants where the spacing of the switches is such as to permit it, mechanical detector bars, either inside or outside of the rail, are still generally used, though it is evident that, with the increasing use of heavier rail sections which have materially wider heads, such use must be limited to bars of the inside type.

Auxiliary Apparatus at Passenger Terminals

In heavily worked, large, and complicated terminals a miniature track model is generally provided on the interlocking machine for the information and convenience of the levermen. Formerly, this model was arranged to show the movement of the switches corresponding to the movement of the levers, but with the greater perfection of the return indication apparatus which controls the operation of completing the stroke of the lever, the model has been used to indicate the occupation of tracks or of two or more sections of a track as may be needed. An indication is often provided showing the failure of any train to wholly clear an adjoining track.

One of the most complete and elaborate installations of this later type is that provided for the operation of the new union terminal at Washington, D.C. Each standing track in the station has an independent track circuit fed through a resistance from a single supply circuit, the track relays all being in the tower at the outer end of the yard. In the tower and over the interlocking machine is arranged a large track model, covered with ground glass, on which the track arrangement of the station is outlined. So long as a track is unoccupied and is not fouled by cars on an adjoining track, that particular track on the model is illuminated from behind the glass. As soon as it is occupied by a car or train the lights are extinguished. It will be seen from this that these indications are given from a closed circuit, which is used preferably on account of its indicating at once any derangement in the circuits and is generally considered to be the only safe way in which track circuits for this or any other purpose can be used.

This station is also provided with a very complete system of communication between the director of the interlocking tower, the train conductors on the different departure platforms and the gateman controlling the admission of passengers to those platforms. In the interlocking tower, in front of the director, there is a bank of indicator lights arranged one above the other, three for each track, the upper light being the return indication from the train conductor, the middle light an indication to the conductor and the gateman, and the lower light an indication from the gateman. Adjoining each gate there are two incandescent glow lights on the circuit, one above the other, connected in such a way that the gateman, by inserting a special key, can complete a circuit to the tower.

At four points, distributed along the platform, are located boxes on the columns supporting the umbrella shed, each box having two glow lights, one above the other, the boxes being so arranged that the conductor of a train, by inserting a special key, can likewise complete a circuit with the tower. The method of using this system of communication is as follows:

One minute before the departure time of the train, the conductor inserts his key in one of the boxes on the platform and turning it closes the circuit which lights the upper light for the corresponding track in the bank of lights in front of the tower director and likewise lighting the upper of the two glow lights at the gate. If the director is ready to have the routes given for this train, he presses a button which puts out the top light given by the conductor and lights the one next below it and lights the top light in each of the boxes along the platform and puts out the upper and lights the lower of the two lights at the gate. When the time has arrived for the train to go, the gateman closes his gate and with his key puts out the light at the gate. This also puts out the upper and lights the lower of the tower indicator lights, in this way advising the conductor and the towerman simultaneously that the train may leave. The conductor may then give his usual starting signal to the engine runner to go, which he then does, provided the proper fixed signal is clear. This arrangement provides a very simple and accurate system for transmitting the required information and works perfectly.

The use of diagrams for facilitating the full utilization of tracks along passenger platforms has been investigated, but enquiry of the roads in this country having the largest terminals develops the fact that no such diagrams are used or are considered as being necessary for the distribution of trains at platforms, experience having proved that the familiarity of the director in the tower with the station lay-out and the information which he receives in advance as to the trains to be handled is such that the desired results can be better obtained by relying upon his skill.

Developments in Signal Practice

It will be interesting to present a discussion which has been under consideration by those interested in signaling of the various railways of the United States during the last three years. In general, the practice in America has been to give the indications of fixed semaphore signals for both interlocking and automatic block signals in the lower right-hand quadrant, usually by two positions the home signal being horizontal for "stop" and diagonally downward or vertically downward for "proceed," and the distant or caution signal (the end of the blade being of a different form from that of the home signal, being notched or fish tailed, whereas the end of the home signal is square) indicating in the horizontal position "caution" and diagonally downward or vertically downward indicating "clear."

The extensive application of automatic semaphore block signals and the attempt to carry the block working through more or less complicated interlockings has led to considerable diversity of practice on different lines, and the automatic block semaphore, both home and distant, being of the same form as the home and distant semaphores for interlocking plants has led most naturally to a possible confusion on the part of the engine runner in the interpretation to be given for a given signal indication, especially when in its normal position, which, for an interlocked semaphore indicates "stop and stay" and for an automatic block signal semaphore indicates "stop and proceed with train under control."