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Interlocking Railway Signals.

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In order that the details of interlocking may be clearly understood, I will first draw attention to some of the different signals now in use, each one performing its own function. At stations and junctions it is often necessary to have several semaphore arms on one post either fixed one above the other or side by side, and one post is often made to carry several semaphore arms on each side of it; the arms on one side of the post govern trains proceeding in one direction, while those on the other refer to trains running in the other direction, the rule of the rail corresponding generally to the rule of the road, therefore the driver of any train approaching a signal mast has only to consider the arms, say, on the left or near side, which are painted red, and has nothing to do with those on the right side, which are painted white. In cases where several arms are fixed one above the other the top arm usually refers to the main line, the second to the top to the most left hand road, the third to the next and so on down.

A great improvement on this arrangement, and one which is coming into very general use in this country, is to have the semaphore arms side by side, and frequently the arm which applies to the main line is fixed somewhat higher than the others. According to this arrangement several short posts are fixed on a bracket supported by the main mast, and each the short posts carry a semaphore arm and lamp. This arrangement of what are called "bracket signals" is a very good one, and drivers readily understand the direction in which they are about to be turned. For instance, suppose a driver is approaching a station or junction, and the line on which he is travelling diverges, say, into three other lines, on all of which it is possible and proper for him to run, he would see displayed near the point of junction three posts, each carrying one signal arm side by side. If, therefore, the most left hand arm is lowered the driver is told that he is going in the most left hand direction, and so on from left to right.

These semaphore signals in the present elaborate system are known as "distant," "homes," "starting," and "advance starting" signals. The distant signal arm is notched or fish-tailed, and is fixed at a distance of from 1,000 to 3,000 ft. from the home signal, according as the line is on a gradient or level and also to suit the line curves. The home signal is fixed at a point where the train should stop. The starting signals are

usually placed at the end of the platform of the station, they indicate when cleared that the driver start his train. Advance starting signals are fixed at varying distances in advance of the ordinary starting signal, usually about 1,000 ft. These advance starting signals are used to permit trains to advance from the station when the next section of the line is not clear for them to proceed, but when it is necessary for them to draw ahead from the platform in order to permit another train to draw up. The disc type of signal is now

should always convey the proper information. It is of the most vital consequence that the signals should be unmistakable and should always convey such instructions as ought to be observed and obeyed so as to ensure the safety of the train. The signals are used not only to tell drivers whether they must stop or proceed, but also to tell them in which direction they are about to be turned by the signalman who operates the signals and switches. It is very desirable to convey this information correctly to the driver so that he may be perfectly assured that the signalman is going to send him to the place he has to go to. For some time it was contended that as drivers of trains had no power of guiding themselves and deciding in which direction they should proceed, it was therefore quite unnecessary to tell them in which direction the signalman was about to send them, but this has long been recognized as a mistaken notion, and it is now universally admitted that it is necessary and desirable to tell drivers clearly the direction in which they are about to be turned, as should any error be made by the signalman the driver has an opportunity of discovering it and pulling up his train. Moreover, should he notice that he is about to be turned on to a road which is already occupied by some other train it is possible for him to pull up before a collision takes place.



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almost universally confined to shunting purposes, and is fixed near the ground so that it may not be at all conspicuous, more especially at night, when it is difficult to distinguish one light from another.

When it is remembered that the semaphore or other mechanical signals are the means by which, independent of train orders, instructions are given to engine drivers, or other persons in charge of a train, to regulate the progress of the train from place to place, it is at once apparent how important they are, and how necessary it is that they

Previous to 1841 signals of various forms were in use, but in 1841 Sir Chas. Gregory introduced a semaphore somewhat similar to the one I have illustrated in the drawing, but worked by two levers, one to operate the semaphore arm and the other to operate the lamp, so that the day and night signals worked independent of each other. These semaphore arms were worked by means of levers fixed at the foot of the mast. As distant signals came to be introduced they were worked by means of levers fixed upon the ground in some convenient position adjacent to the home, or as they were first called "station signals," these levers being connected to the distant signals by means of wires.

As traffic on railways increased and the complication of lines became greater, it became apparent that some improvement was necessary in order to facilitate the work of the signalman and prevent delays to trains. To achieve this object the point and signal levers were brought together so as to be readily accessible to the operator without his having to run from point to point or from point to signal as had hitherto been the case. This concentration of point and signal levers, although no doubt adding greatly to convenience in working, was found very unsafe, and it