Three-Indication Distant Signals on Alsace-Lorraine Railways

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RECENTLY there has been introduced on the railways of Alsace-Lorraine a three-indication distant signal which has been approved for general use by the French Minister of Public Works and represents a step forward in the signaling of those lines, which is generally of a high character.

As Alsace-Lorraine was under German rule from 1871 until the conclusion of the late war, the whole of the signaling and operating of its railways is based on German principles and designs, and this will no doubt be continued in great measure notwithstanding the return of the two provinces to France. Not only would it be very costly to change the existing arrangements but the people of Alsace-Lorraine themselves will probably prefer to keep them, for German signaling is certainly superior to French, while the number of serious accidents in France of late years has been a matter for the gravest concern. It is impossible to understand the new signals and their application without having a general idea of German signaling and its code of indications and this will therefore be explained first, as far as is necessary for present purposes.

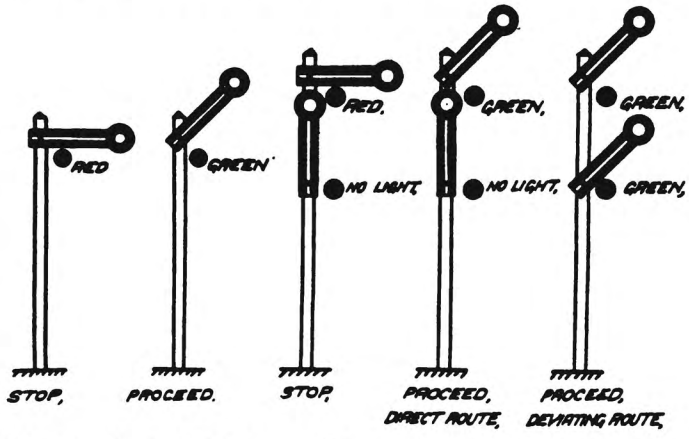

Fig. 1—Home Signal **Fig. 2—Junction Home Signal**

German Signaling Code*

So far as the running signals are concerned German signaling is exceedingly simple, there being but three types of signal, viz: the "home semaphore," the "junction semaphore" and the "distant disc." As right-hand running is standard in Germany (resulting in Alsace-Lorraine being different from the rest of France in this respect) the semaphores are right-handed, as shown in Fig. 1 and all operate from 0 to 45 degrees in the upper quadrant. By night, red indicates "stop" and green, "proceed," the latter color having been adopted in all semaphores (save in Bavaria) since January, 1893. Both blades and masts are invariably made of metal. Double-wire connections are always used and where necessary these are compensated automatically. The operator is not permitted to alter the adjustment of the wires. The plain one-blade semaphore is used for all purposes where a stop signal on straight track is required (for running movements) and sometimes, at intermediate block stations, the blades for both directions are mounted like train-order signals, but this practice is not recommended now.

Junction Signals

The junction signals are rather peculiar, being based on the theory, which has had a great vogue in Germany, that an engineman ought never to be required to pass a red light or a horizintal blade even when qualified by a green light or inclined blade near by. At first, on some private roads in North Germany, the original English junction signal, consisting of as many blades, one over the other, as there were routes, was employed, but the theory referred to, first officially advanced in 1878, obtained a hold and the result has been the adoption of the signal shown in Fig. 2, which we may suppose applied at a plain main-track junction, for the purposes of explanation. Two blades are provided, the lower of which, when the signal indicates "stop," is closed up vertically with the mast so as to be practically invisible and the lantern is covered by a blinder so that no light is seen,

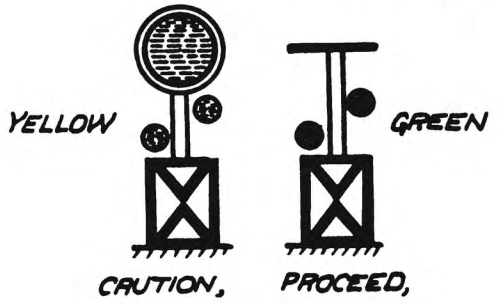

Fig. 3—Distant Signal

while the top blade is displayed horizontally and shows a red light. As a result, all running signals in Germany look exactly alike when at "danger." When cleared for the superior route the top blade is put to 45 degrees, with a green light, but the bottom blade remains stationary. For the inferior route the top blade is placed similarly and simultaneously the lower one moves to the same position, the signal giving two green lights.

Only one double-wire connection is required which is worked in opposite directions to get the two signs, the blades being actuated by circular cam-plates at the base of the mast, the plate for the lower blade having an idle slot in one direction. Two levers in the tower are used, one to each sign. At some places, to indicate another inferior route, a third blade is provided, which is put in gear by pulling an additional lever. This is also normally closed up with the mast. More than three blades are, however, never seen and the present practice is to avoid the three-blade signal as much as possible. In Fig. 4, the application of the signal is shown.

While possessing some advantages this signal, in the writer's opinion, suffers from greater disadvantages.

*Signaling practice is fairly uniform throughout Germany, except in Bavaria, where some important differences exist, but these will not be considered here.

The late Monsieur Weissenbruch, a great authority, considered it the one really absurd thing in German signaling and believed that it had hindered the development of German practice very much. The theory underlying it is purely academic, while there is the serious objection that the extinction of a light may result in a high-speed signal appearing when not intended. This has been acknowledged in Germany and some engineers have advocated working the signal in the exactly opposite manner, a plan actually adopted in the latest Norwegian State Railways' code. Nevertheless, in spite of its defects, this signal is used also in Switzerland and Austria.

Distant Signals

Distant signals are invariably disc signals in Germany, never semaphores, as it is considered a great advantage to employ totally different forms for "caution" and "stop" signals. No doubt this is true theoretically, but in practice it is questionable whether there is as much in this as is supposed, seeing that semaphore distant signals have been quite satisfactory elsewhere. Originally a green circular disc with white border was used which turned face to the train and by showing one green light indicated "caution" and turned over on edge horizontally with one white light meant "proceed." With the adoption of green for "proceed" in the semaphores in 1893

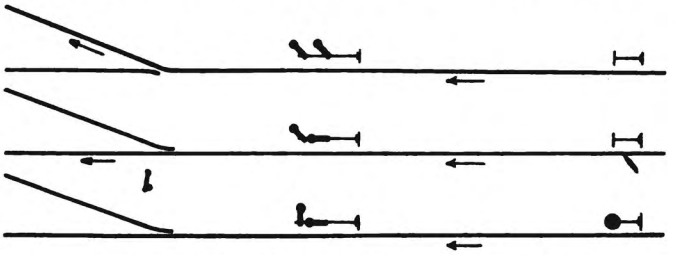

Fig. 4—Arrangement of Junction Signaling

this signal was retained, involving the anomaly of green meaning "caution" in one signal and "proceed" in another, which was very unsatisfactory. It was even worse than the English use of red for both "caution" and "stop," still seen on many lines. Accordingly in 1901 trials were made on the Saxon State Railways with a new form of distant signal having a yellow disc and displaying two yellow lights for "caution" and two green for "proceed," the lights being placed obliquely as seen in Fig. 3. This signal having given excellent results it was decided in 1910 to adopt it generally, all lines to be equipped by the end of 1919, at the latest.

Disc signals are, however, objectionable in that they do not give a positive "proceed" indication, the disc simply vanishing from view. To avoid this as much as possible it was decided, after trials of various designs, to place rectangular marker-boards, painted black and white, as shown in Fig. 3, a short way in front of each signal, serving to indicate the signaling point when the disc cannot be seen. The yellow light used is of a striking shade called "Firegold": it is remarkably distinct and seems to sparkle.

As a rule these distant signals are not operated by a separate lever but by the same lever and transmission operating the home signal, the two signals changing simultaneously. Electro-gas distant signals are used considerably.

Great care is always taken in placing distant signals and they are not allowed to be put anywhere but on the right hand side of the track, the discs being brought whenever possible level with the engineman's line of vision. Unlike English distant signals, they are only repeaters of a succeeding semaphore and do not apply to a series of stop signals. We may now consider distant signals at junctions.

Junction Semaphore and Distant Disc

A distant signal working with an ordinary semaphore calls for no comment. At a junction, however, the matter is not quite so simple. Figure 4 illustrates the standard working in use for many years. It will be seen that whenever the home signal is cleared (with one

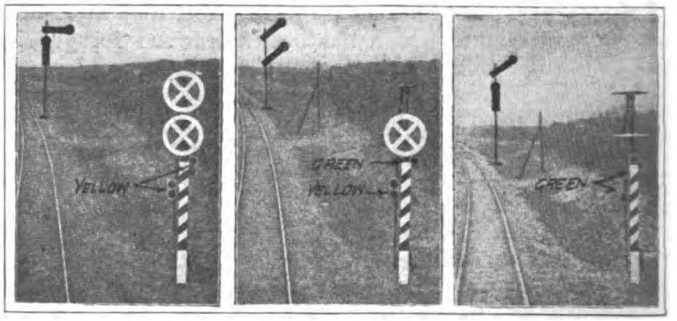

Fig. 5—Martens' Double-Disc Signal

blade or two) the distant signal follows suit and thus the engineman cannot be sure until he sees the home semaphore whether it is the direct or deviating route that is open, which is rather unsatisfactory, especially when a train must be re-routed for some reason. There is an operating department rule which states that when a train which usually goes by the direct route has to be deviated the home signal must not be cleared until the train has stopped unless the driver has been advised of the alteration by telegram at a previous stopping place. This is a very cumbersome rule; moreover, rules are not always observed. It is true that the home signal stands some distance in the rear of the facing-switch, which is route-locked, giving the engineman some time in which to act and if need be reduce speed. However,

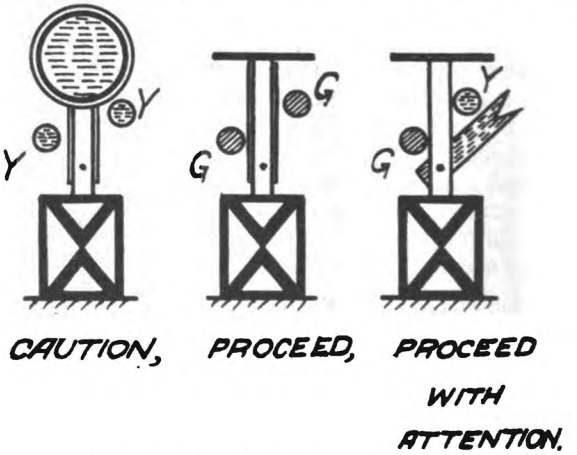

Fig. 6—New Alsace-Lorraine Signal

German engineers have admitted that this arrangement is unsatisfactory for some years and many proposals have been put forward for a three-indication distant signal to reflect the exact state of the junction home signal at all times. The chief of these was made by Dr. H. A. Martens and his signal was tried experimentally, having been made by the firm of Fiebrandt & Co., Bromberg. It consists of two discs, one over the other, both being shown for "caution" and both being cleared for "proceed." To show "proceed over deviation at junction" only one disc was shown, the upper of the two

lights alone being changed to green. It was worked by the same wire transmission as the home signal. This signal conformed to the German idea of "blades for stop signals; discs for caution signals." Proposals for three-indication distant signals with blades were also brought forward by other engineers. So far, the writer believes, no steps have been taken officially in Germany to introduce a distant-signal on these lines, although discussions on the subject are proceeding. Martens' signal is shown in Fig. 5.

Alsace-Lorraine Distant Signal

The new Alsace-Lorraine distant signal may be said to be of the combination type, employing both disc and blade, and except for the color of the disc, and the night signals, it resembles that adopted some years back by the Swedish State Railways. It is illustrated diagrammatically in Fig. 6 and has been built under the direction of W. Lienhard, signal engineer, Strasbourg. It consists of the ordinary German yellow disc signal with the addi-

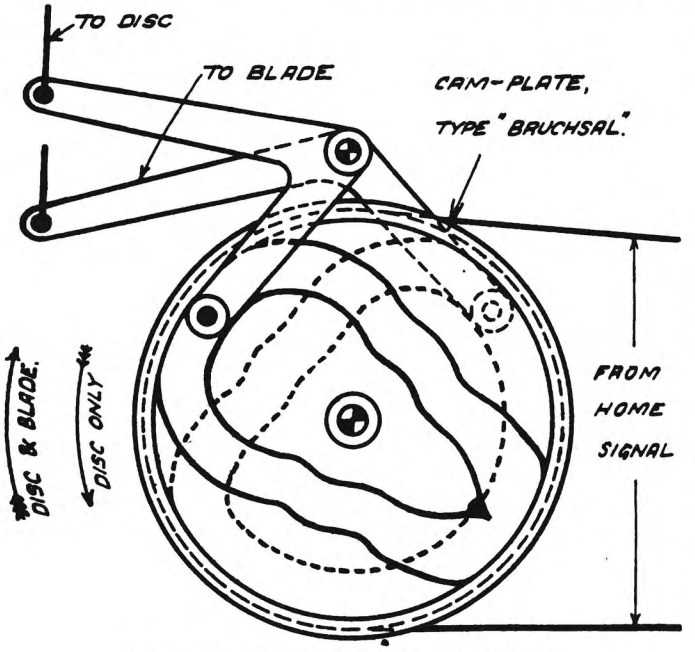

Fig. 7—Cam-plate Operating Mechanism

tion of a fishtailed blade, also painted yellow, mounted behind the mast and obscured by it when in its normal vertical position. When the semaphore to which the distant signal applies is cleared for the direct route the disc is moved on edge giving the usual "proceed" signal, the blade remaining obscured, but when the semaphore is cleared for the deviating route the clearing of the disc brings out the blade to the 45 degree position at the same time, as seen in the figure. For night signals the German double-yellow and double-green are used for "caution" and "proceed," but for "proceed with attention" the lower light only changes to green, the upper one remaining yellow, the reverse of Dr. Martens' signal.

Although giving three indications the new signal is worked by the same double-wire transmission as the home signal and no additional wires are required beyond those in use for the ordinary two-indication signal, the movement of the transmission in opposite directions selecting the indication that is required just as with the double-bladed junction semaphore itself. Figure 7 gives an idea of the arrangement used. The cam-plates at the base of the mast have slots composed of raised ridges on them and are disposed in such a manner as to operate the disc only or both disc and arm together according to the direction in which the plates are rotated and the same arrangement is employed for the junction semaphore. This cam-plate method of operation is standard in German signaling—or at all events in Prussian signaling—and the great advantage of it is that it ensures an absolutely accurate stroke being imparted to the blade or disc and so eliminates "doubtful" signals. The indications are always accurately given, which is an important

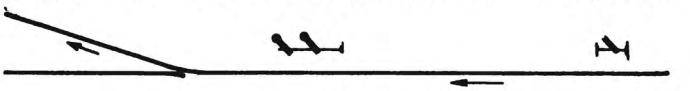

Fig. 8—Application of Alsace-Lorraine Signal

matter from the engineman's point of view. The new signal is understood to be giving satisfaction and, as explained, has been formally approved for general use. It is interesting to observe that there is a certain resemblance in practice between this signal and the three-position distant semaphores now in use in Belgium, which likewise show a green and a yellow light simultaneously to indicate that the relative home signal has been cleared for a diverging route, and which have also been found very useful aids to traffic working.

Head-on Collision on M-K-T

ON January 8, 1924, there was a head-on collision between two passenger trains on the Missouri-Kansas-Texas, near Hillendahl, Tex., which resulted in the death of one mail clerk and four employees, and the injury of 64 passengers, three persons carried under contract, and seven employees. An abstract of the report of the Bureau of Safety regarding this accident follows:

In the vicinity of the point of accident this is a single-track line over which trains are operated by time-table and train order, no block-signal system being in use.

Northbound passenger train No. 26 consisted of two baggage cars, one combination mail and passenger car, two coaches and two Pullman sleeping cars, hauled by engine 351, and was in charge of Conductor Carney and Engineman Thomason. At Houston, train order No. 61, Form 31, was received reading as follows:

> No 26 Eng 351 wait at Hillendahl until 9:00 p. m. for No. 23 Eng 278

Train No. 26 left Houston, according to the train sheet, at 8:30 p. m., on time, passed Eureka, 6.2 miles from Hillendahl and the last open office, at 8:45 p. m., four minutes late, passed Hillendahl, and collided with train No. 23, while traveling at a speed estimated by the crew to have been between 40 and 50 miles an hour.

Southbound passenger train No. 23 consisted of one baggage car, one combination baggage and mail car, two coaches and one Pullman sleeping car, was hauled by engine 278, and was in charge of Conductor Graham and Engineman De Rossett. At Sealy, 37.9 miles from Hillendahl, the crew received a copy of train order No. 61, previously quoted, the train departing from that point at 8:08 p. m., and collided with train No. 26 at a point 3.83 miles south of Addicks, while traveling at a speed estimated to have been between 40 and 55 miles an hour. Considerable testimony was taken concerning the time at which the accident occurred, but the best evidence is that afforded by the multiplex operator in the Western Union Telegraph office at Houston showing that wire No. 201 failed at 8:57 p. m. It is believed that train No. 26 passed Hillendahl before the time named in the wait order, and that this was due to the fact that the wait order had been misread by the engine crew and also by the conductor.