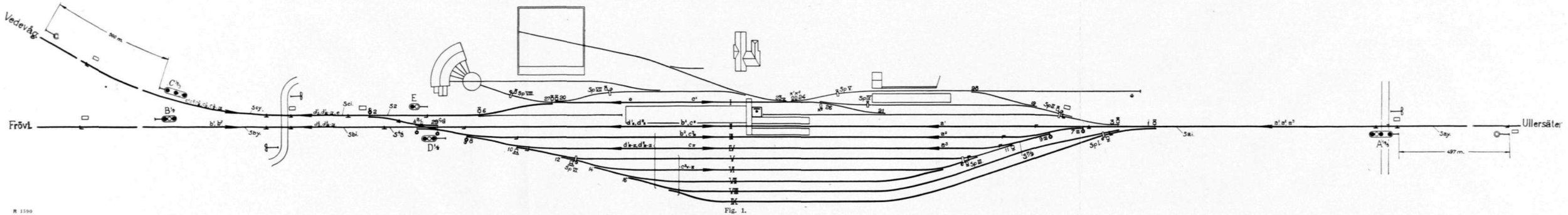
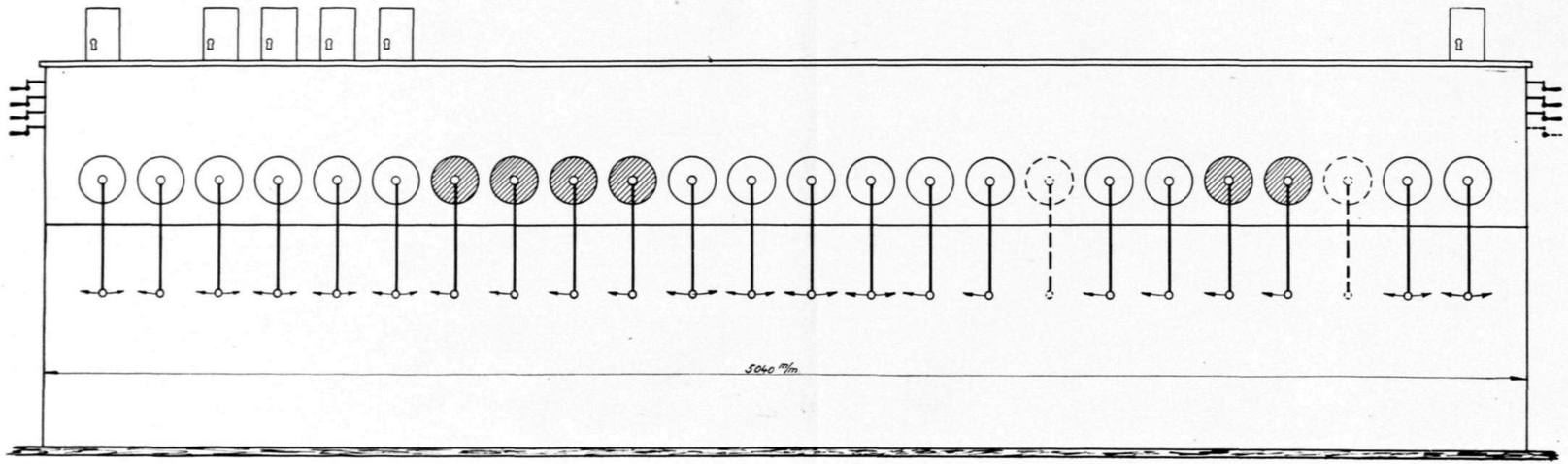


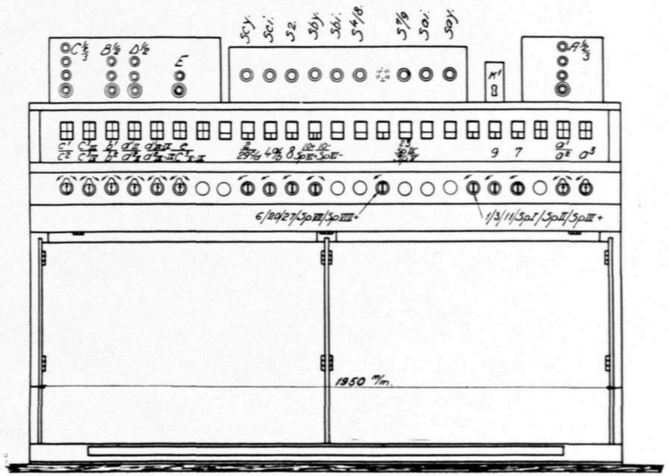
R 1590

Fig. 1.



R 1589

Fig. 2.



R 1588

Fig. 3.

Electric Interlocking Plant at Vanneboda Station.

By G. Pervall.

At the end of the year 1927 tenders were invited for an interlocking plant for Vanneboda Station, on the Grängesberg—Oxelösund Railway. The station, whose track system is shown on the sketch, fig. 1, is a junction for the large ore shipments from the various ore fields in the Bergslagen District to the port of Oxelösund, and serves as a junction for passenger traffic to and from the surrounding part of Bergslagen. The tender concerned a mechanical plant, but for purposes of comparison tenders for an electric plant were also invited, because on account of the size and traffic conditions of the station it was impossible to decide without any further ado which type of plant would be most advantageous. The railway has already a large number of mechanically operated plants, which have been quite satisfactory and with which the staff are quite conversant. The stations which have been equipped with such installations are, however, smaller than Vanneboda. On the other hand, there did not exist any electrically operated plant, and, consequently no staff capable of running such.

In order to get an economically practicable mechanical interlocking plant, a locking machine of detached crank type and with signals of the semaphore type was also a sine qua non for Vanneboda. The scheme for the electrical interlocking plant also necessitated its being capable of being housed in a low building, suitably located between the platform tracks and in such a way that the train dispatcher would be personally able to look after it in the course of his duties, whereas for shunting purposes the centrally operated points would be manipulated by local devices. To facilitate inspection of the permanent way tracks were to be put down at both ends of the station for checking whether the line was open and setting the signals against the trains. The signals in this instance were to be made in the shape of daylight signals with the lamps of the main signals normally fed from the existing 127-volt alternatic current electric light net. The motor current battery was to serve as an emergency power source in case of a breakdown in the supply of alternating current.

Fig. 2 and 3 represent sketches on the same scale, showing the two frames suggested. The length of the electric interlocking machine (fig. 3), a normal 24-lever frame, is 1950 mm., and the length of the crank apparatus (fig. 2) is 5040 mm. As will be seen from the sketch, the electric interlocking machine contains 7 spare places for future enlargement, whereas the possibility of spares in the crank apparatus is limited to 2 cranks and one track lever.

On comparing the two types of plant the railway management, after the costs for certain work which the railway itself was to carry out, e. g. laying down of line-drums etc. for the mechanical, and the erection of a cabin for the electrical plant, that the initial costs of the two plants were on the whole equal. It was found, however, that the train dispatcher himself was not to manipulate the mechanical interlocking plant, but a separate operator or operators would

R 1584 Fig. 4. Interlocking Machine.

be required for this purpose, enchancing the running or working expenses of the mechanical plant as compared with the electrical. The railway management consequently decided to have the electrical plant on account of its being the more economical. The choice proved its merits already from the beginning inasmuch as a desideratum of laying down further tracks could easily be accomplished, which would have been impossible if a mechanical plant had been erected, because the local capacity of the crank-apparatus design in this respect was already fully utilized.

From the machine, shown in fig. 4 are operated those points which are to occupy different positions for the most frequently occurring tracks and are locked by the aid of electrical locking devices, fig. 5 the points and switches which are operated locally and require locking for the various tracks. The locking devices are provided with point contacts, they are integral parts of the apparatus, and are connected with lock-magnets on appurtenant lever in such a way that the latter cannot be put over unless the points are in a lockable and proper position.

Out of the points 23, 24 and 26 located immediately outside the interlocking plant, as well as the scotch blocks Sp IV and Sp V the two scotch blocks and point 23 are provided with point contacts which are connected with a relay equipped with an optical signal in the machine, enabling control of the proper position when a track depending upon the said point and scotch block is to be put over. Points 24 and 26, which are facing points for the said track, are locked by key-locks which cooperate not only reciprocally but also with a key-lock on top of the interlocking machine, this key-lock being provided with contacts for obtaining the necessary electrical dependence between the points and the signal lever corresponding to the track.

As has been stated in the preceding, the main signals are erected as electric daylight signals and are controlled by means of signal control lamps placed in separate housings on top of the interlocking machine (see fig. 3 and 4). To prevent the lamp in the light signal from becoming extinguished, the control lamp is provided with a shunt-resistance. Fig. 6 shows the home signals B 1/2 and C 1/2/3, which are made with masts of reinforced concrete. Automatic bells with the use of insulated tracks have already previously been arranged at the two level crossings at the outer ends of the station. These tracks have also been utilized in the plant for the purpose of being able to control together with tracks specially laid down for the same, that the parts of the tracks at the outer ends of

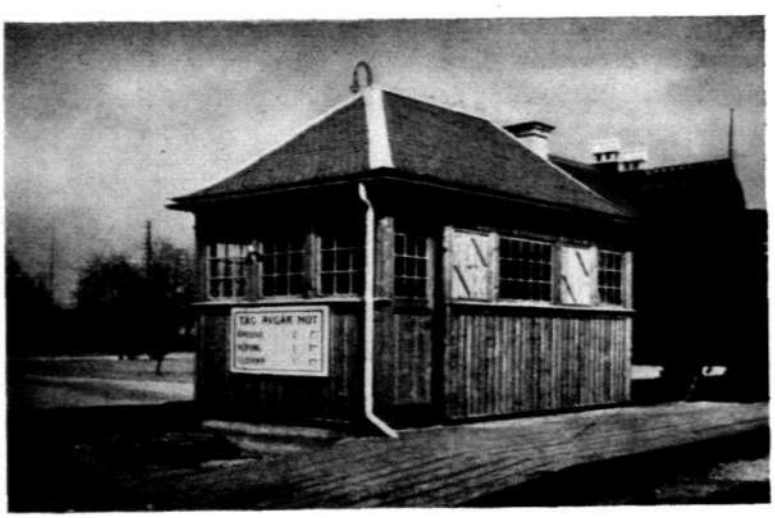
R 1585 Fig. 5. Electrical Locking Device with Locally Operated Scotch Block.

R 1586 Fig. 6. Home Signals B 1/2 and C 1/2/3.

the station are clear of vehicles. All track lines can be controlled by the track relays, Scy, Sci etc., provided with optical signals, these relays being housed in the casing on top of the machine. The relays are under normal conditions currrentless, but are supplied with current via the pedal contact which is an integral part of the machine, when the tracks have to be controlled. The necessary dependence is obtained by contacts on the track relays, so that no signal can be set for clear if a track-line on the corresponding track is occupied by vehicles. The track-lines laid down through the centrally operated points are also used for locking a respective point-lever to prevent its change over while any vehicle is passing the point or is in it.

The direct current necessary for the plant is supplied by two Nife accumulators, a motor current — and a control current battery which are charged by means of mercury rectifiers from the existing alternating current net.

The plant has now been in operation since the spring of 1928, and has all the time proved to fully come up to the desiderata of the buyer in so far as reliability, convenient and easy operation both in dispatching trains and shunting are concerned, as well as low charges for operation and maintenance are concerned.



R 1587 Fig. 7. Cabin.