

New Press-Button Interlocking Control Machine

H I N S U L A N D E R, L M E R I C S S O N S S I G N A L A K T I E B O L A G, S T O C K H O L M

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In conjunction with the ordering by the Swedish State Railways of twenty-five press-button interlocking control machines, Signalbolaget put in hand a re-designing of the press-button interlocking control machines as formerly manufactured. The construction of press-button interlocking control machine thus arrived at, which displays a number of essential improvements in respect of facility for alterations and enlargements, is described in the following article.

The press-button interlocking control machines supplied by LM Ericsson's Signalaktiebolag in the course of years have without exception been made in single examples. There had been no manufacture of several apparatus at a time. The apparatus therefore have been individual to a rather high degree. A typical apparatus from this period of manufacture is shown by Fig. 1. Briefly, the apparatus consists of a sheet-metal box on the front of which a number of operating and indicating devices are fitted in prescribed order.

It often happens, however, that a station is enlarged or altered. In that event the interlocking plant must also be altered and adapted to the new lay-out of the station. The old mechanical interlocking machines were fairly easy to alter by putting in fresh cranks and levers in reserve positions or by replacing cranks and levers by fresh ones having different functions. The procedure was similar with the older electrical interlocking machines, where new switches could be fitted in reserve positions or put in place of old ones. This build-up of the apparatus by means of a number of more or less standardized components — cranks, levers or switches — fitted into a frame, not only facilitated alteration and extension, but simplified manufacture to a high degree, while it also made it possible to keep stocks of parts for manufacture.

The situation was quite different with the press-button interlocking machine. Of course, certain stocks of parts for the operating devices could be held, but any alteration or extension of an apparatus was a rather troublesome procedure, as fresh holes had to be bored in the front plate and so on. Nor was any stock of semi-finished apparatus possible as the finished apparatus was

Fig. 1 & 2
Press-button interlocking machines
left, as formerly constructed, right, in the new design

X 7274

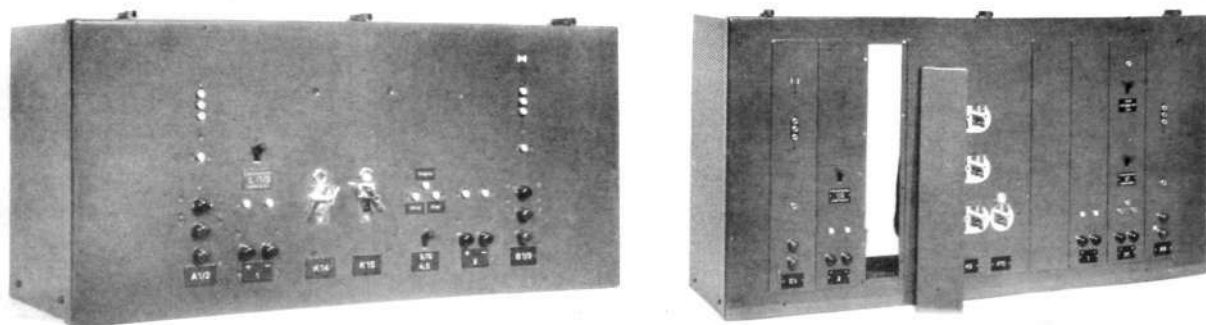
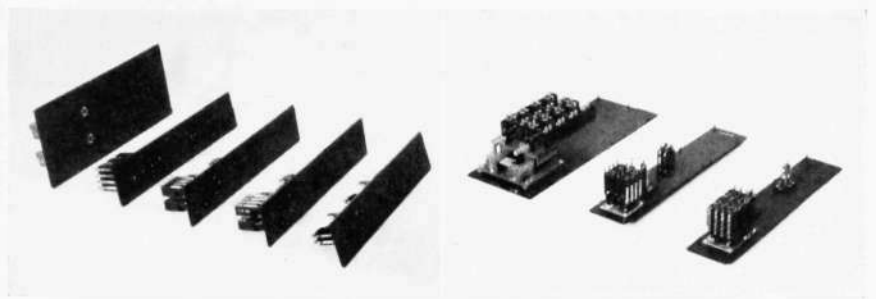


Fig. 3 & 4

X 7273

Insets

left, front views; right, back views; extreme left in both illustrations, insets of double width



as a rule dependent on the lay-out of the station. Moreover the apparatus were usually ordered one at a time and the turnover was not of such a size as to make re-designing a paying proposition.

The position was quite changed, however, when the Swedish State Railways, after thorough consideration of the advantages and disadvantages of the press-button interlocking machines, ordered 25 press-button switchgear plants all together in the autumn of 1941. This made it possible to undertake a thorough redesigning of the apparatus in order to eliminate as far as possible all troubles that had arisen.

One of the new apparatus, intended for Näliden station, is shown in Fig. 2.

A number of openings — in this case ten — have been provided in the front plate. Each of these openings, which have a height of 425 mm and a width of 80 mm, is covered by a plate, known as an inset. These insets are so constructed that any inset can be fitted in any opening whatever. There is one exception to this rule, in that a number of insets which are fitted with certain mechanical devices have been made with a width that is two or three times the normal width.

Fig. 3, 4 and 5 show a number of different insets. On Fig. 3 and 4 can be seen right to the left an inset of double width. Such an inset carries two control locks equipped with contact devices. These locks are mechanically dependent on each other through a rod which moves forwards or backwards when the bolt of the far lock moves up or down. In this position, the reverse of that shown on the illustration, the rod blocks the bolt of the nearest lock. Fig. 4 and 5 show how the insets are attached to the interlocking machine cabinet.

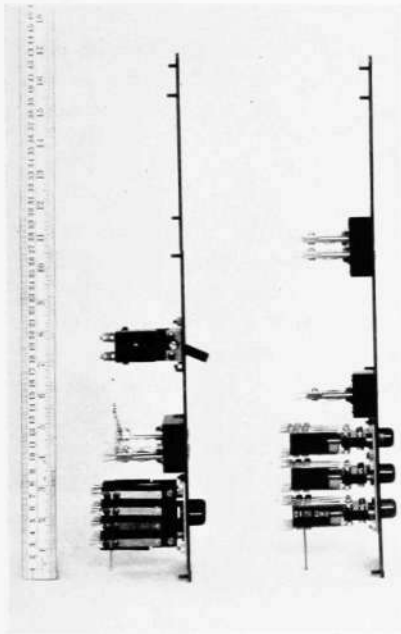


Fig. 5

X 4208

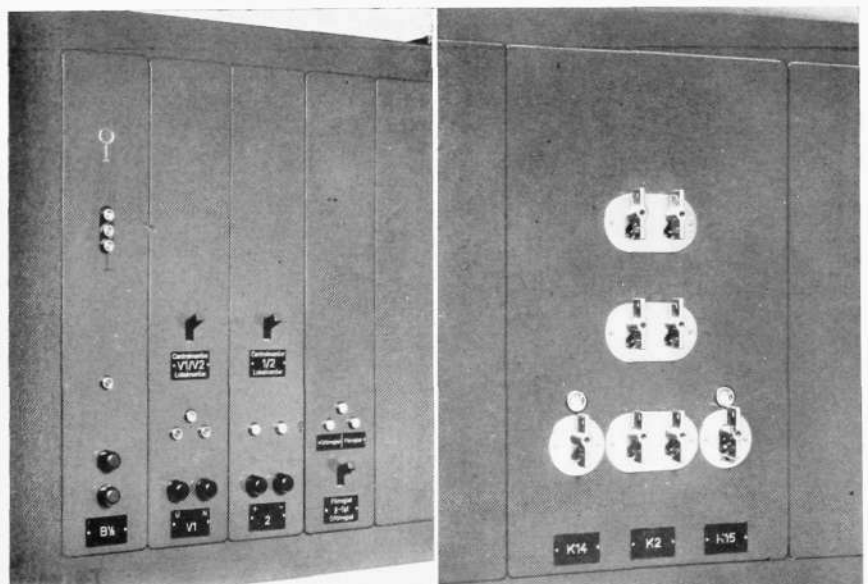
Insets

viewed from the side; the left-hand inset intended for operatin and indicating level-crossing booms, the right-hand one for two-light signal

Fig. 6 & 7

X 5907

Insets fitted



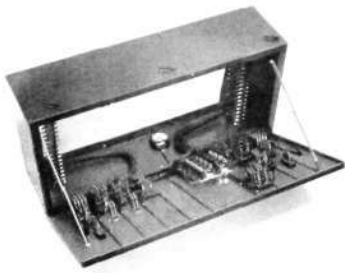


Fig. 7 X 5908
Press-button interlocking machine with front let down

On the edge of the plate may be seen the welded fixing screws. The two right-hand insets on Fig. 4 are reproduced in Fig. 5 as viewed from the side. The lefthand inset on this fig. is intended for operating a pair of drop barriers. It carries a double press-button for operating a lamp strip with three lamps for indication and a switch for permitting local operating of the gates. The right-hand inset is intended for operating a two-light signal. It carries three single press-buttons for operating, a lamp strip with one lamp which shows whether the train route concerned is locked or not and a lamp strip with two lamps for repeating the signal lights.

The three insets described above may be regarded as representative of current types. The devices on an inset are restricted to single and double press-buttons, lamp strips with one to five lamps, one or two way switches and control locks with or without contacts.

Fig. 6 shows part of one of the interlocking machines intended for the State Railways. As may be seen the insets have been freed from all visible screws. All operating and indicating devices are attached to the insets by means of screws welded on them.

Of the five insets shown on Fig. 6, that furthest to the left serves for the operation of a three-light entrance signal, the next for operating a pair of drop barriers, then one for switching a set of points and the last for locking a number of points and block sections. Far to the right may be seen a reserve position covered by a dummy plate. On Fig. 7 is shown an inset with width corresponding to three openings and carrying a control lock K_2 for locking points and block sections together with two other control locks K_{14} and K_{15} with contact devices, the former for unattended operation and the latter a train route lock. Mechanical dependence is arranged between the different locks.

Fig. 8 shows another of the apparatus included in the delivery to the State Railways, with front let down. As may be seen the connections are conveniently arranged with leads to the terminal blocks located at the ends, to which on mounting the circuits from relays etc. are connected. The interlocking machine of the type described are made in two sizes, a small one, Fig. 2 and 8, with space for ten and a larger for sixteen insets. Fig. 9 illustrates a large interlocking machine intended for Håkantorp station.

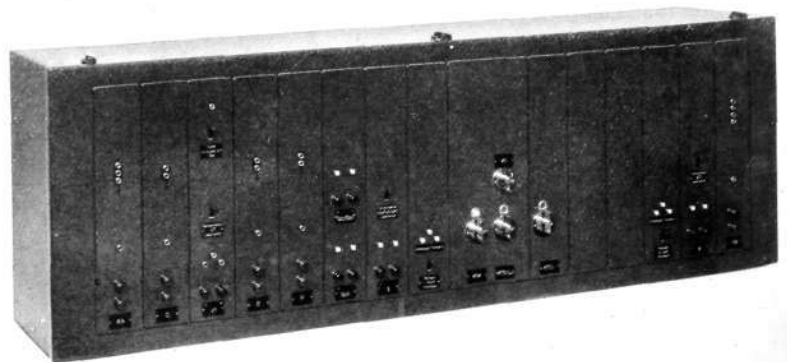


Fig. 8 X 5909
Press-button interlocking machine of large type with space for sixteen insets