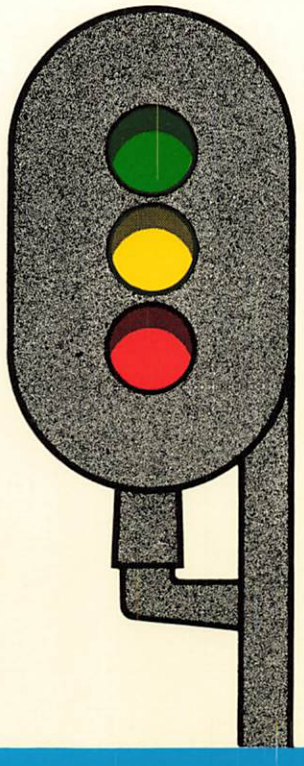
railway signalling and interlocking equipment



NEDERLANDSE MACHINEFABRIEK

„alkmaar" B.V.

P.O. BOX 50 - 1800 AB ALKMAAR - HOLLAND - TEL. 072-127070 - TELEX 57213

introduction

The "Nederlandse Machinefabriek "ALKMAAR" B.V." was founded in 1879.

Right from the start, railway safety devices occupied an important part in its productions programme, so there is in this special field experience for over ninety years.

Since 1960 the company forms part of the international group of Philips organizations — with their vast resources, accumulated experience, knowledge and technical skill — so that "ALKMAAR" still better can offer the customer an unified approach to projects and systems in the RAILWAY SIGNALLING field.

This catalogue gives a concise survey of the equipment available from "ALKMAAR" and is intended as a convenient source of ready reference.

If you are interested in obtaining more detailed information or advice about equipment for special projects or systems, please contact us. Call or write to your local Philips organization or representative or direct your inquires to:

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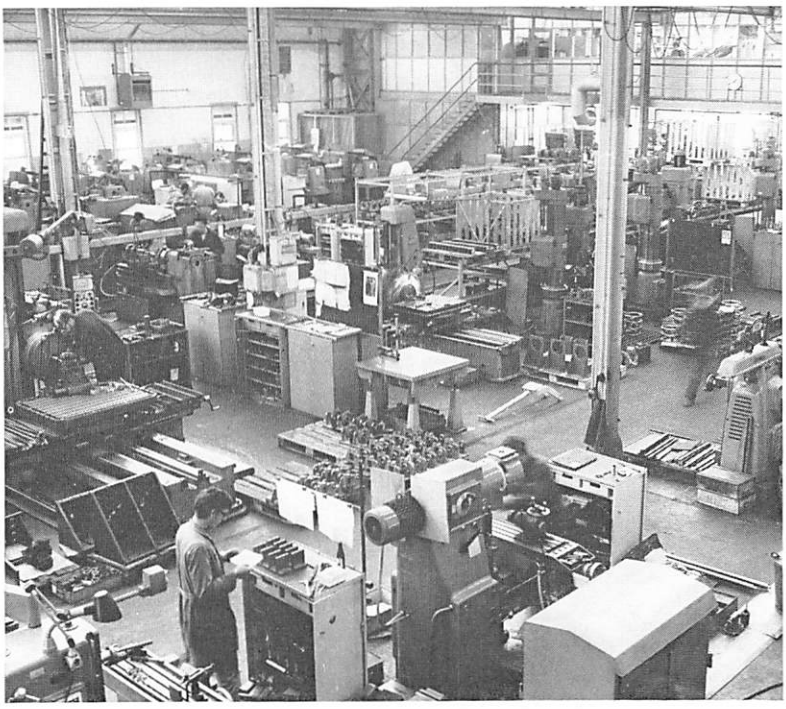
Foto K.L.M. Aerocarto N.V.



One of the machine workshops.

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Mechanical point machine and point lock
Annett lock and annett crank-lock
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Wire accessories

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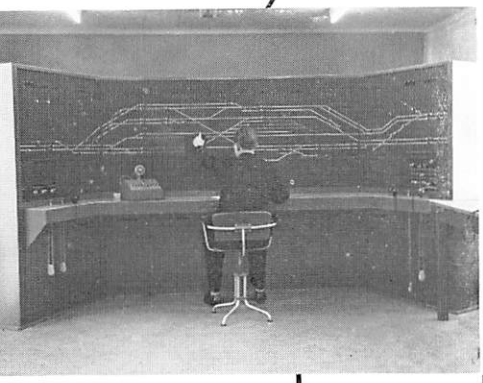
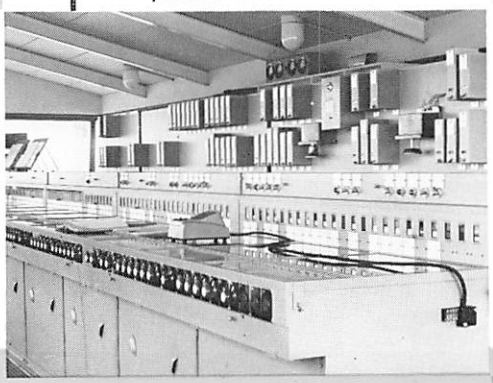
Control post

equipment for operation of points and signals.

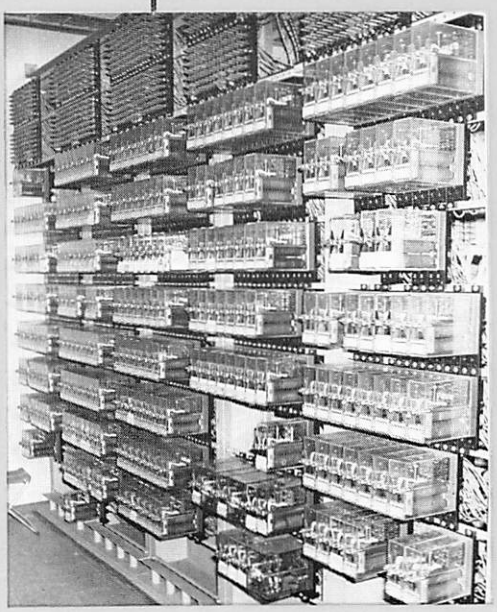


All relay interlocking

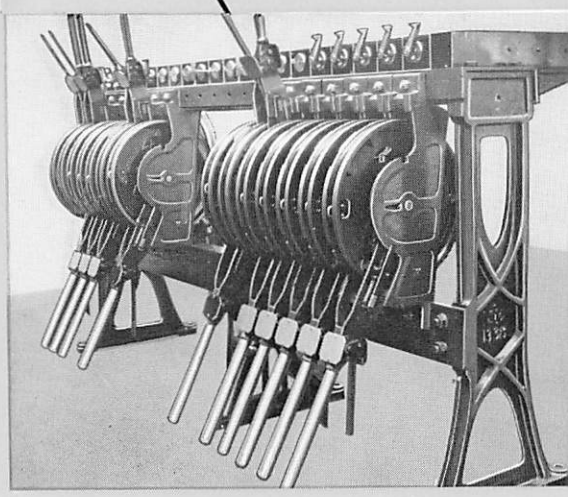
Electric power frame



Relays-room



Mechanical powerframe



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electrical operation of points and signals

NEDERLANDSE MACHINEFABRIEK

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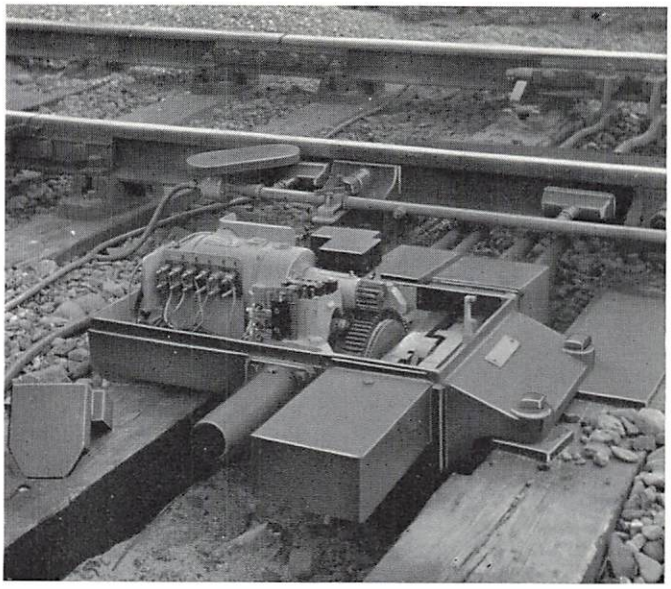
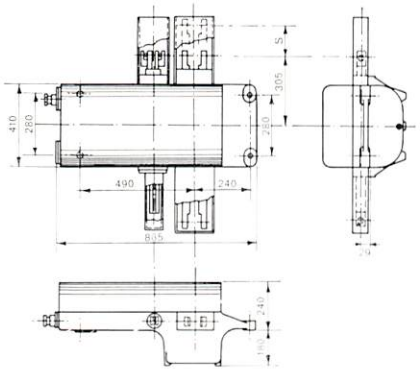
electric point machine, trailable type

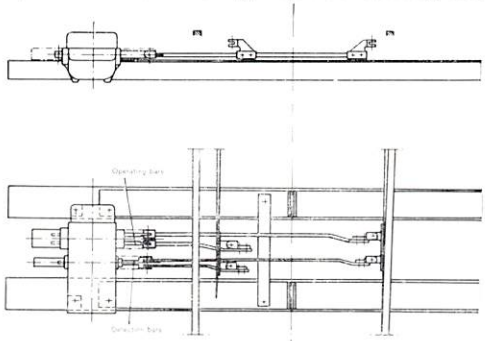


Electric point machine, trailable type, fitted with detector rods. (cover removed)

The electric point machine EWS of the trailable type has one operating bar and one detection bar for each point tongue. The machine is of the high-speed type (3.5 sec.).
The thrust exerted by each operating bar is equal to 250 kgs. (550 lbs). The closed tongue is locked and the open tongue is kept in position by means of a spring. The trailing force can be brought to a maximum of 500 kgs. (1100 lbs).
A friction clutch is protecting the motor when the point tongues are hampered in their movement.
The stroke of the point machine can be chosen in the range of 70 - 170 mm, the standard stroke is 131 mm.

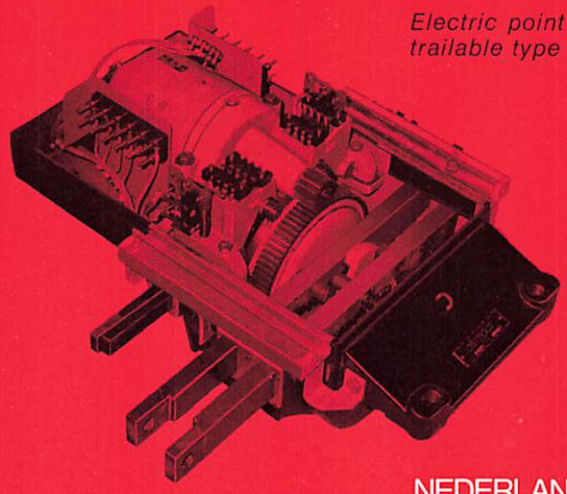


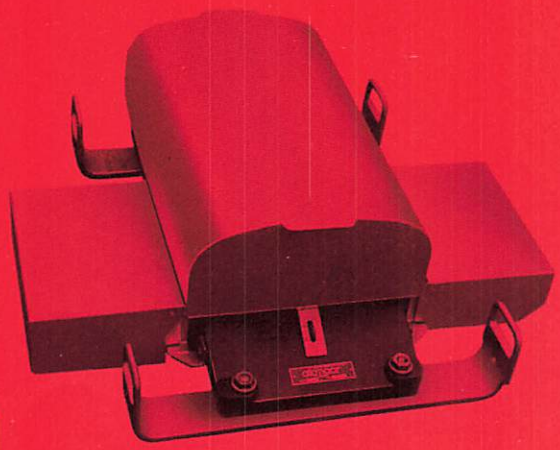
The standard motor is suitable for D.C. 110 Volts, but also other types of motor can be supplied.
In case of power failure, the machine can be operated by means of a hand crank.
The housing of the machine is made of cast iron, and is closed with a sheet-iron cover, which can be locked.
A motor-current cut-out is built in to prevent the operator from being injured during hand operation.



Arrangement of point machine, trailable type.

Electric point machine, trailable type EWS.





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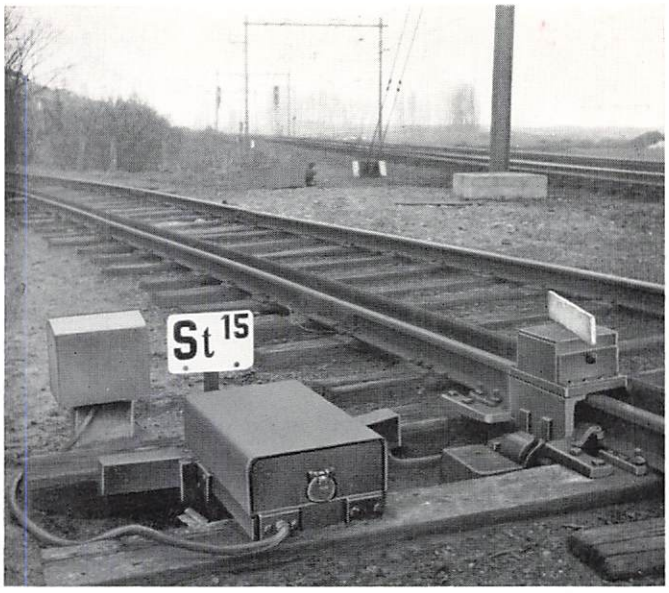
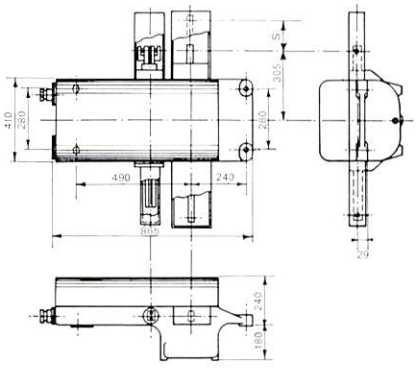
electric point machine, non-trailable type

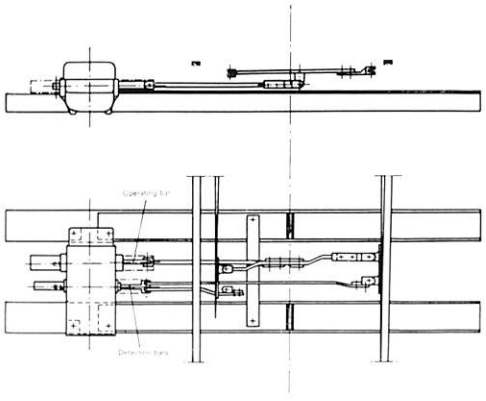


Electric point machine, non-trailable type, fitted with stop-derailer block.

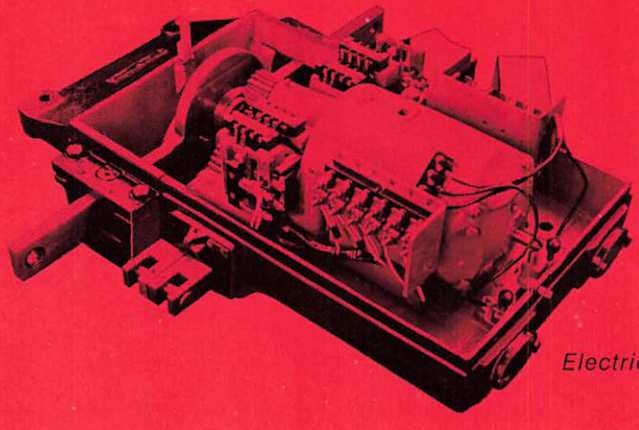
The point machine EWS-NOR is of the same design as the trailable type.
This point machine of the non-trailable type can be used for the operation of points and derailers.
This machine has only one operating bar, which is coupled to the connection rod of the two point tongues.

The housing of the machine is made of cast iron, and is closed with a sheet-iron cover, which can be locked.
A motor-current cut-out is built in to prevent the operator from being injured during hand operation.





Arrangement of point machine, non-trailable type.



Electric point machine, non-trailable, type EWS-NOR.

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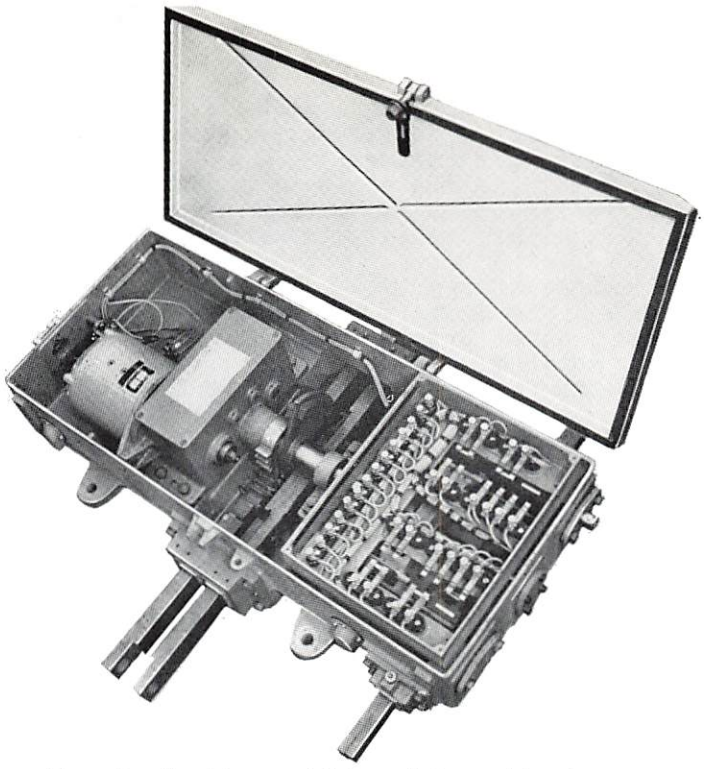
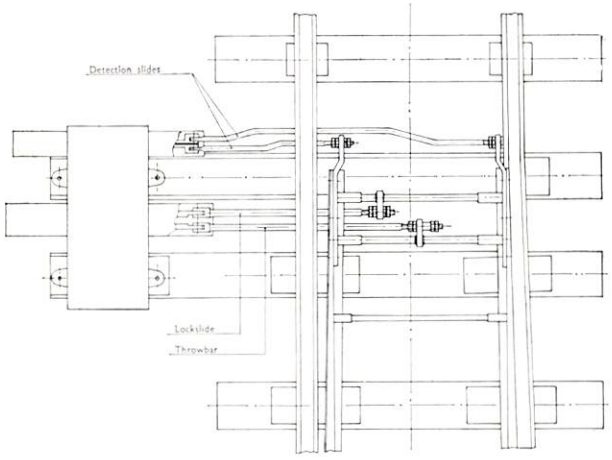
electric point machine type NTE 4



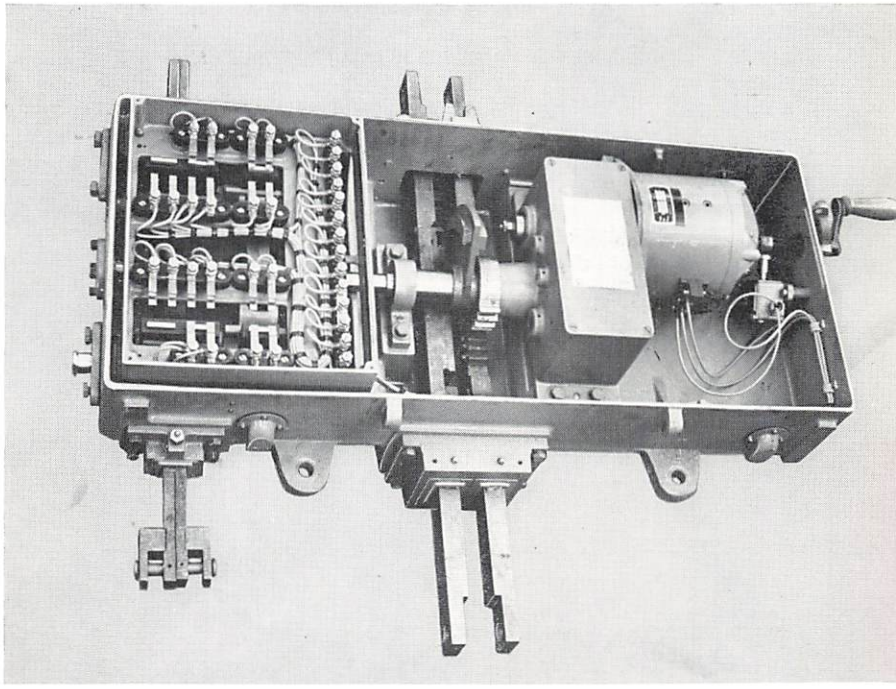
The point machine type NTE-4 is of the non-trailable type and can be used in powerframe and relay-interlocking systems for operating of points, derailers, etc.
The machine is suitable for left-hand and right-hand operation.
The non-adjustable stroke is 150 mm (6-inches) maximum.
The standaard motor is suitable for D.C. 110 Volts, but also motors of other types can be supplied.

The standard type of this point machine has one throwbar, one lockslide and two detection slides, which all are provided with protecting covers of sheet-iron.
For operating scotch blocks the machine can be supplied without lockslide and detection slides.

* **The point machine complies with the relevant B.S.S. specifications.**



Arrangement of point machine NTE 4



Electric point machine NTE 4, cover removed

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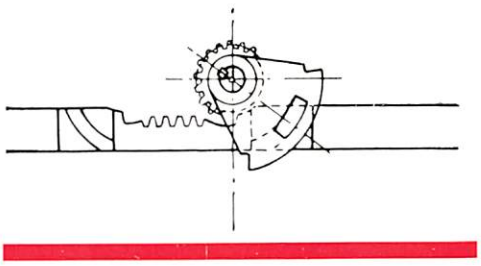
construction

The housing of the point machine is made of cast-iron and is closed by a zinc-coated sheet-iron cover which can be secured and padlocked.
The partition of the point machine in which are mounted the control and detection contactors, is a separate dismountable part which is closed by a sealed transparant cover.
An adjustable friction clutch is built-in in the gearbox and is protecting the motor when the point tongues are hampered in their movement.
The throwbar is driven by a pinion.
The pivots are provided partly with needle bearings to minimize the maintenance.
In the locked position, the machine can with-stand a force of 9000 kgs without damage.
The point machine with the exception of the motor can with-stand 3000 Volts A.C. for one minute.
The test voltage of the motor is 1500 Volts A.C.
A motor with a test voltage of 3000 Volts A.C. is available if ordered.
In case of power failure the machine can be operated by means of a hand crank.
A motor-current cut-out is built in to prevent the operator for being insured.

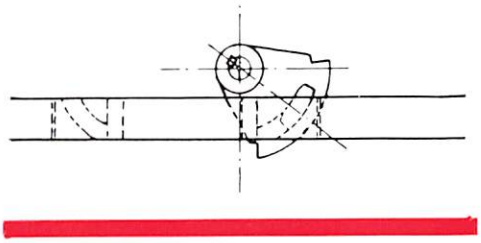
operation

The throwbar is driven by a pinion, only a part of the circumference of this pinion is provided with teeth.
At the end of the stroke the pinion continues its rotation and a lever, connected rigidly with the pinion, provided on either side with a locking dog, is locking the throwbar as well as the lockbar. The lockbar is locked positively.
The locking notches of the lockbar are adjustable.
See fig. A and B.
The control and detection device is built up of two pairs of contactors. One pair is actuated by the detection slides and is actuating the detection contacts and the shunt contacts, if any. See fig. C.
The shunt contacts can be proved by inserting them in the detection circuit.
The other pair of contacts is actuated by a small disc, mounted on the mainshaft and is actuating the motor-contacts as well as the other pair of contectors to indicate the locked position. See fig. D.
The contact springs are adjustable and their movement ensures a wiping contact.
The contactmaterial is brass, on request the contacts can be made of silver.

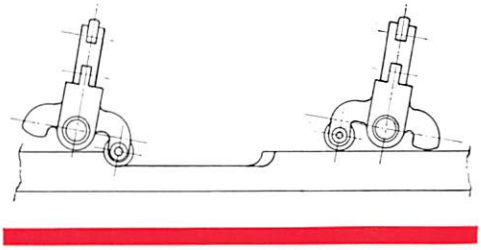
A



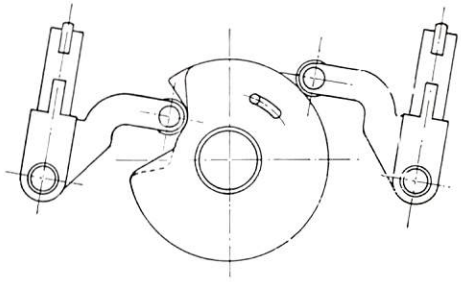
B

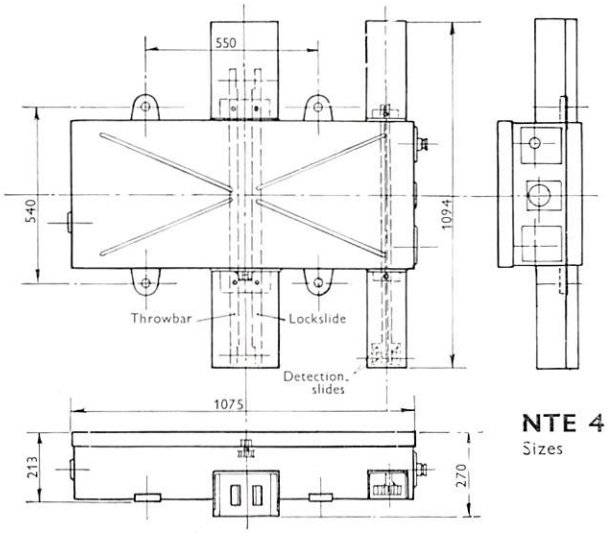


C



D





NTE 4
Sizes

characteristics

Motor Voltage (terminals) D.C.
110 Volts
With a load on the operating bar of 250 kg (550 lbs.):

Operating time	3 sec.
Operating current	7 A.
Maximum stroke	150 m.m. (6 inch.)
Weight	about 240 kg (530 lbs.)

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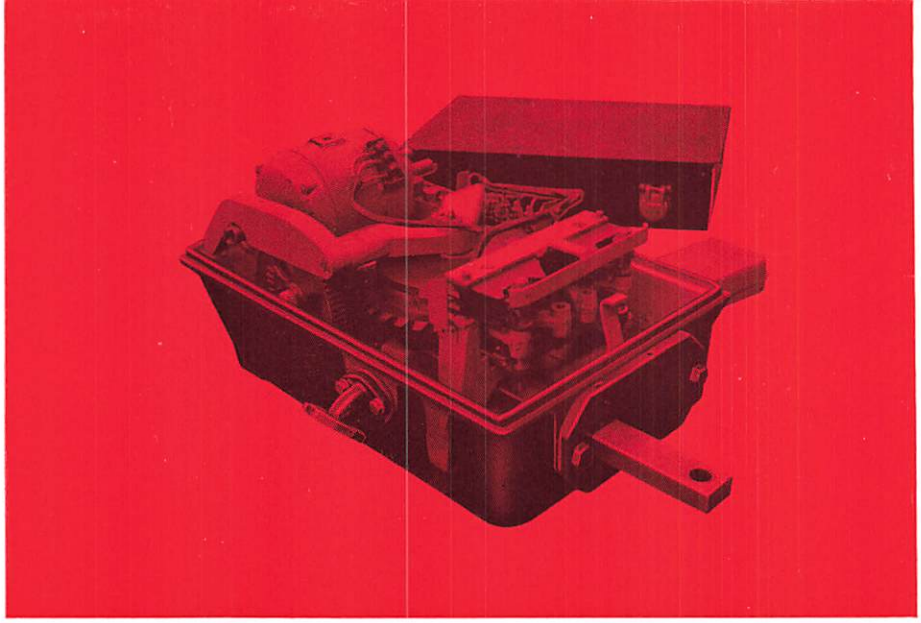
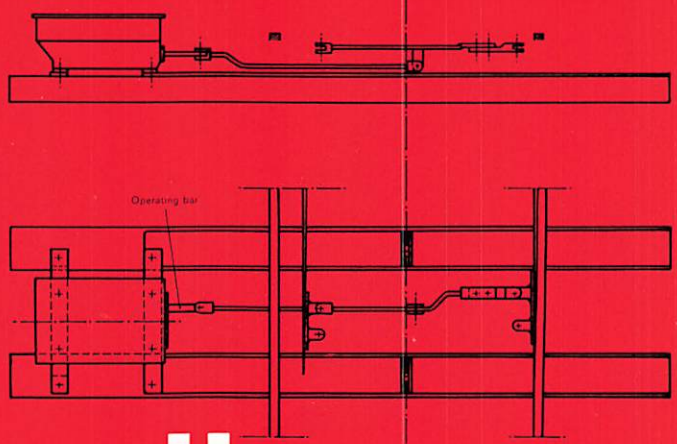


electric point machine for hump-yards type EWSS

The electric point machine type E W S S is of the trailable type and is used for electric point operation on hump-yards. The machine has one operating bar, which is coupled to the connecting rod of the tongues, and is suitable for left-hand and right-hand operation.
It is not provided with a locking device.
The operating time is about 1 second with a load on the throwbar of 200 kg. (440 lbs).
The housing of the machine is made of cast-iron, with a sheet-iron cover which can be locked.
If the current fails, the machine can be operated by means of a hand crank.
This crank can be inserted without removing the cover of the machine.
The machine is designed for mounting on two sleepers.

Arrangement of the hump-yard point machine EWSS



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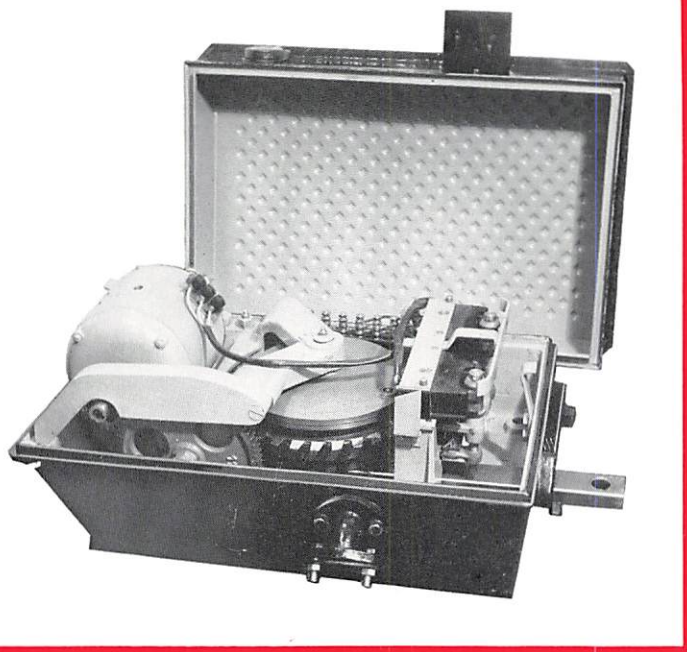
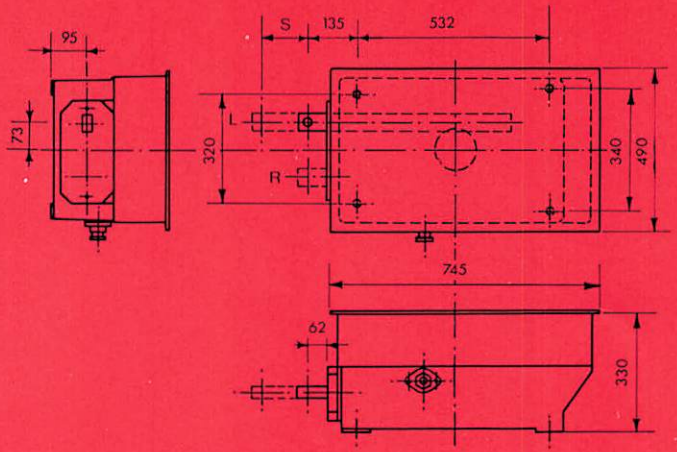


If required, the point machine can be provided with one detectionbar for each point tongue of the point.
The closing of the detection contacts depends on the position of the detectionbars, because the point machine as well as the point tongues must be in the correct position.

operation

The points are thrown by the machine, whereas the machine is controlled by reversing a lever or knob of the control machine in the signal cabin.
The operating bar, coupled to the point tongues is kept in its position by an adjustable spring in the friction clutch.
The trailing force to be exerted on the operating bar can be brought to a maximum of 400 kg. (880 lbs).
The operating bar of the point machine is driven by a pinion on the friction clutch, which is driven from a gearing by an electric motor.
The adjustable friction clutch is protecting the motor when the point tongues are hampered in their movement, and minimizes the physical effect of the stopping of the mechanism in its end-positions.

The standard motor is made for D C 110 Volts, but also a motor for D C 220 Volts can be supplied.
The standard stroke of the machine is 131 m.m.s., but it can be supplied with a suitable stroke.
The contacts are placed on a separate frame, protected by a cover against dust etc. They are of a very strong construction and self-cleaning by a rolling contact.
For the standard wiring of the machine a connecting cable with 5 conductors between control machine and point machine is sufficient to transmit all operating and detecting currents.
When ordering point machines for use in existing signalling systems the requirement for the control and indication circuits should be clearly stated, in order that the wiring of the machine can be made in accordance with these requirements.



characteristics

Motor Voltage (terminals)	DC 110 Volts
Mean operating force	200 kg (440 lbs)
Operating time	about 1 second
Maximum operating force	250 kg (550 lbs)
Trailing force	400 kg (880 lbs)
Standard stroke	131 m.m.s.

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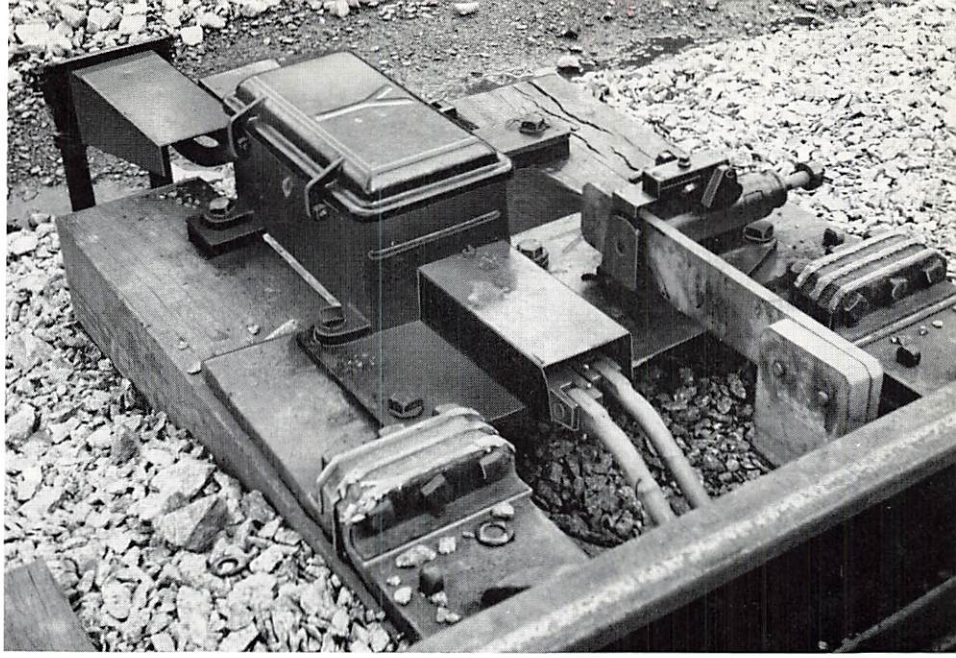
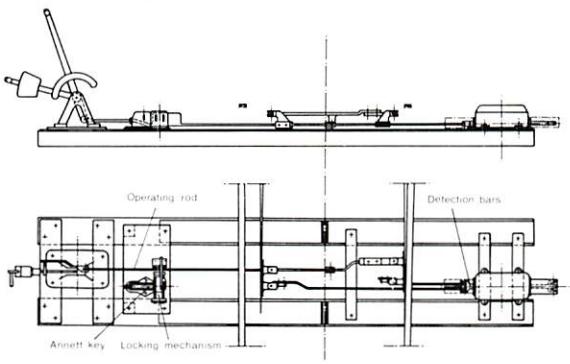


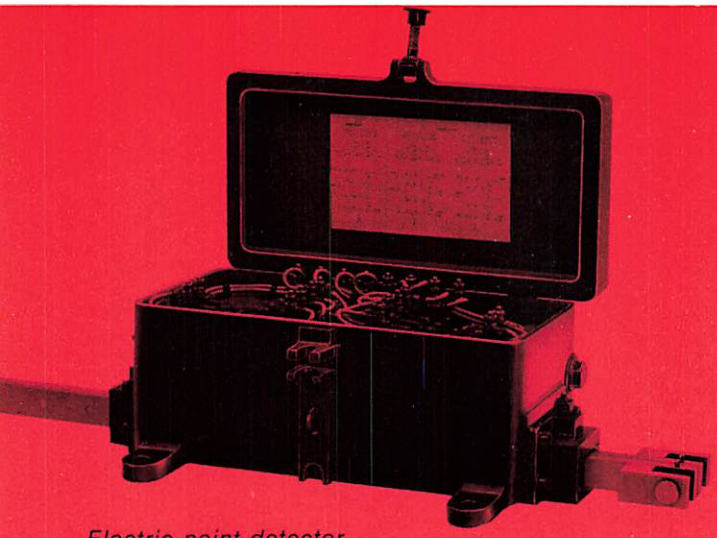
electric point detector ETC 4

The electric point detector ETC-4 can be used to detect the position of hand-operated and mechanically operated points.
The contact mechanism is housed in a cast-iron case with similar cover, which can be secured and padlocked.
The detector is suitable for left-hand and right-hand operation.
The stroke of the detector can be adjusted in the range of 95 - 145 mm.
The wiring is neatly arranged and is mounted together with the contact fingers and the terminals on a removable plate.
If the points are provided with a facing point lock, the point detector is constructed with an additional bar to detect the position of this lock.

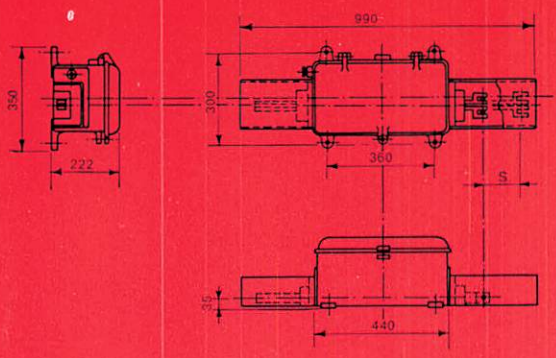
On request the machine can be supplied with a 12-pole plug connector of robust construction.
A deviation from the end position of 1.5 mm of the closed tongue can be detected.



Arrangement of an electric point detector, hand lever, handlocking mechanism and Annett lock.



Electric point detector, type ETC-4, with open cover.



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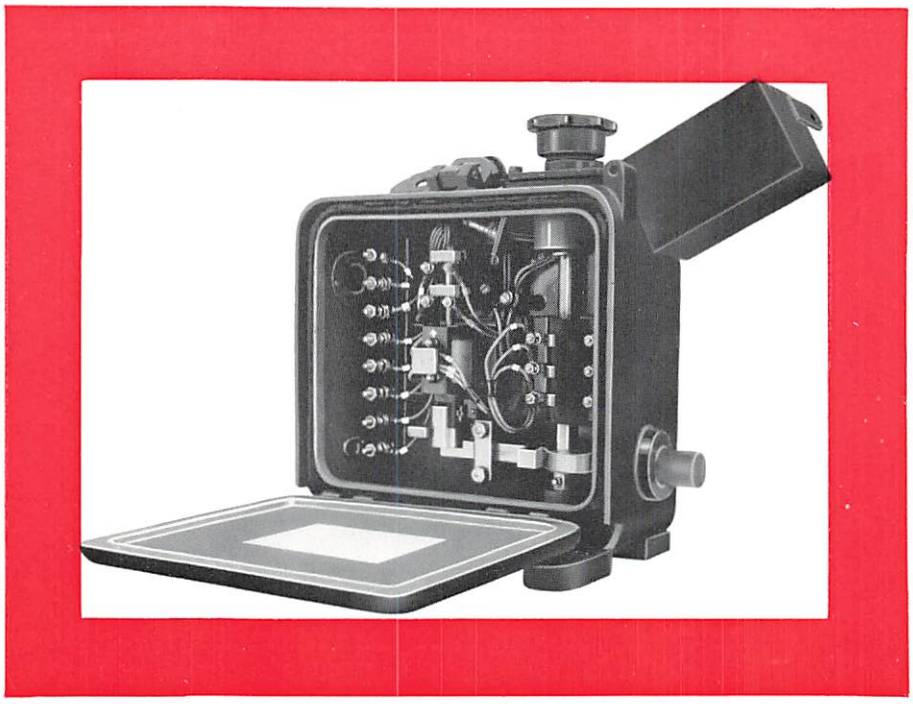
electric point lock EG 2

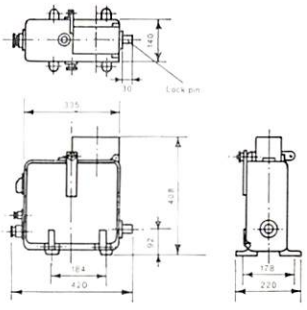


The electric point lock type EG 2 is used for the locking of hand operated points and scotch blocks.

The mechanism is enclosed in a cast iron case with gasketted cover. This and the sheet metal cover protecting the knob can be padlocked.

There are two normal detection contacts, in addition to those required for operation.
If required, up to 5 additional contacts can be arranged on the operating contactor.

The standard type is equipped with a coil suitable for 24 V DC or 110 V AC operation.
At request a coil for another voltage can be fitted.



Electric point lock, type EG 2 fitted to a turn-out.

Operation: A preliminary movement of the operating knob causes and indication to show in the signal cabin. When a release is given, a lamp in the point lock is illuminated, and the coil is energised, allowing the knob to be turned to the unlocked position, in which an economical contact breaks the coil circuit.

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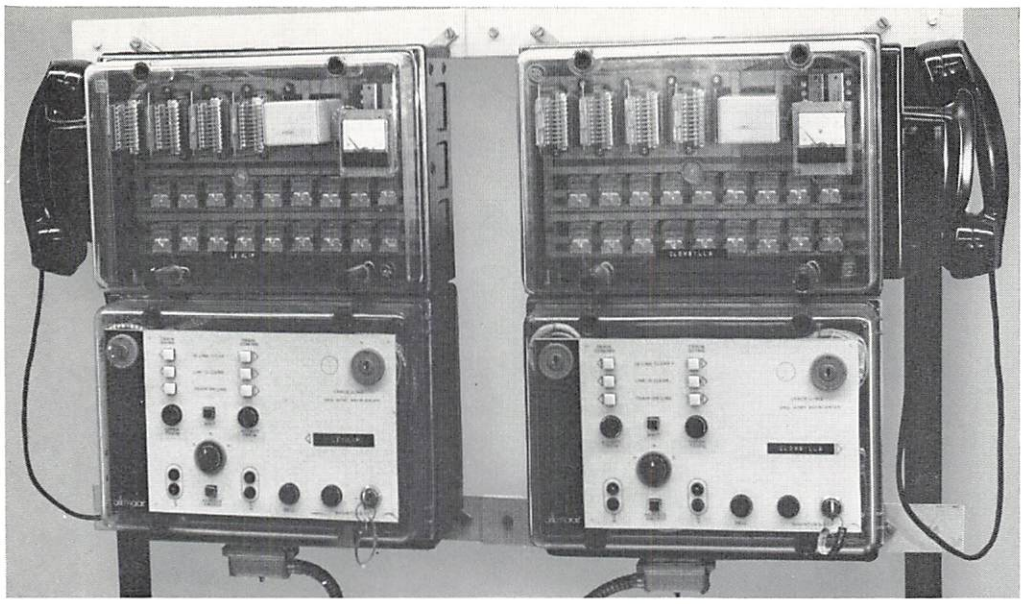
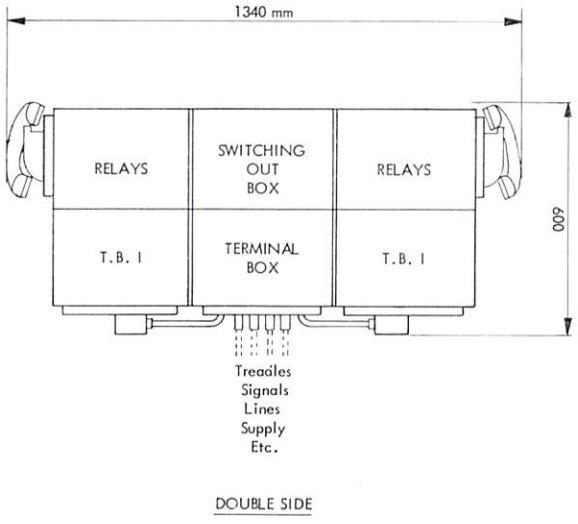
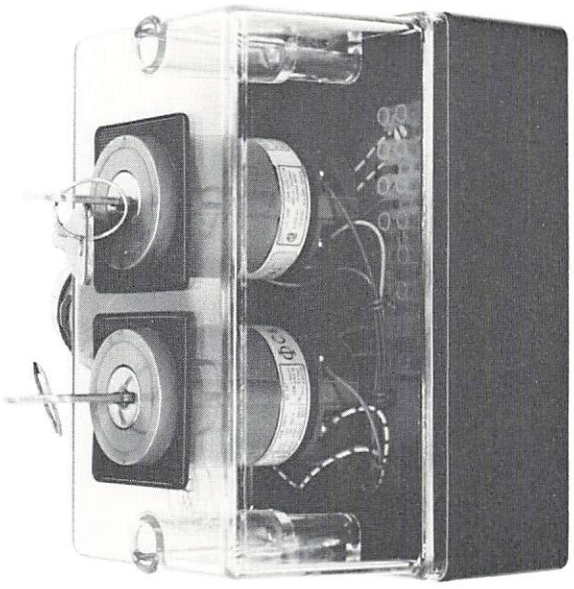




DOUBLE SIDE



tokenless block systems

The tokenless block system can be used for the protection of single lines between two stations. Especially, when the original protection is executed with some type of token instrument, the speed of through-trains can be increased considerably because there is no exchange of tokens at the intermediate stations.

Only one pair of conductors is used between two adjacent instruments.

For switching-out purposes, some additional equipement is available using the same pair of wires, another advantage in respect of a token instrument.

Clearance can be cancelled in a failsafe way, without the break of seals a.s.o.

The instruments are provided with a telephone.

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colour-light signals

NEDERLANDSE MACHINEFABRIEK

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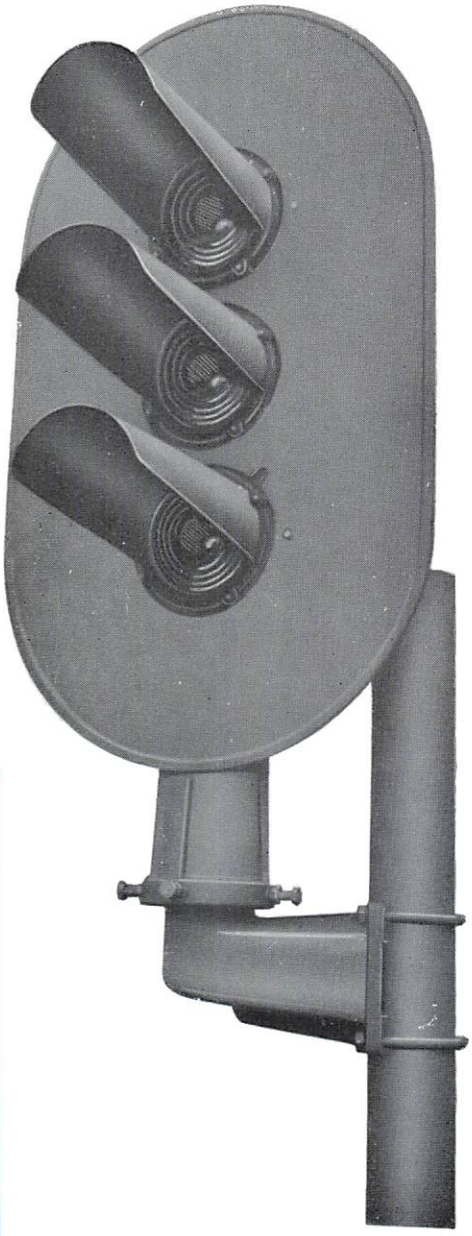
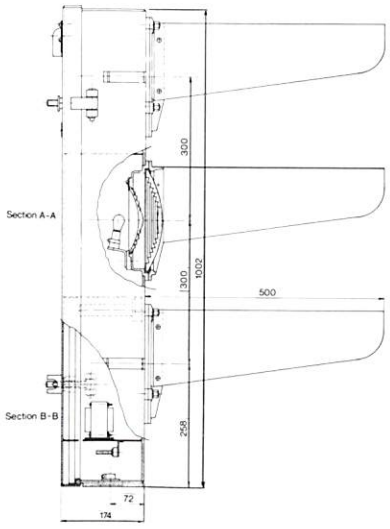
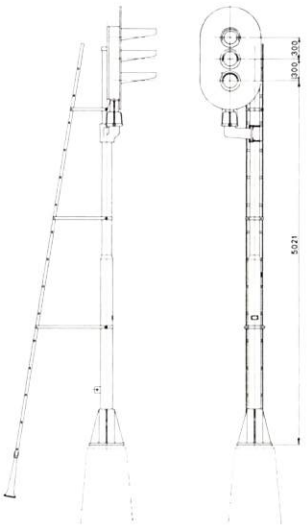
colour-light signal
type LMA





Section of 3-aspect colour-light signal



Signal post with 3 colour-light

The multi-aspect long range colour-light signals are suitable for use as main running signals and comprise 2, 3 or 4 colour-lights units.
They are of a weatherproof and robust construction.
The are suitable for top of post mounting or bracket mounting.
The housing of the signal is of sheet-iron.
The optical systems consist of a clear outer lens of 213 mm (8¾ inch) diameter, stepped inside and provided with a dispersion disc for close-up indication, and a coloured inner lens of 140 mm (5½ inch) diameter, stepped at the opposite side.

The colours are in accordance with the A.A.R. specifications.

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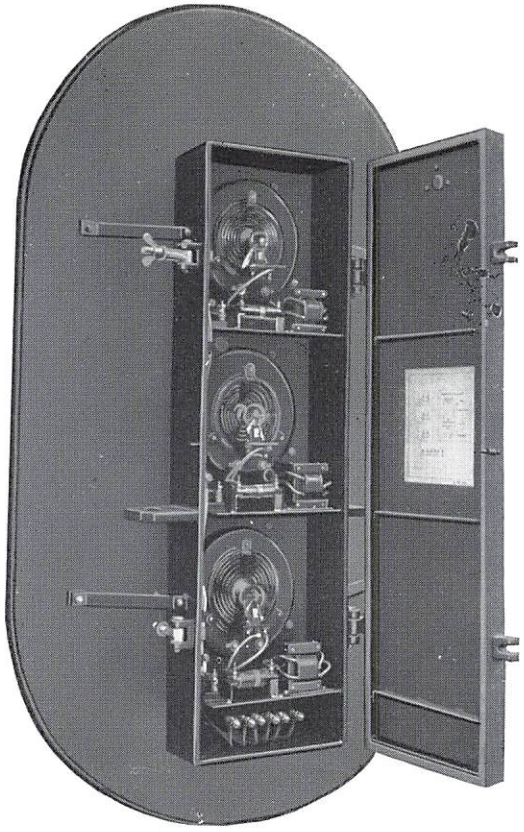
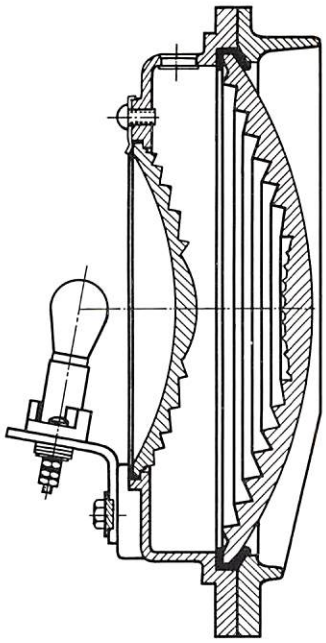
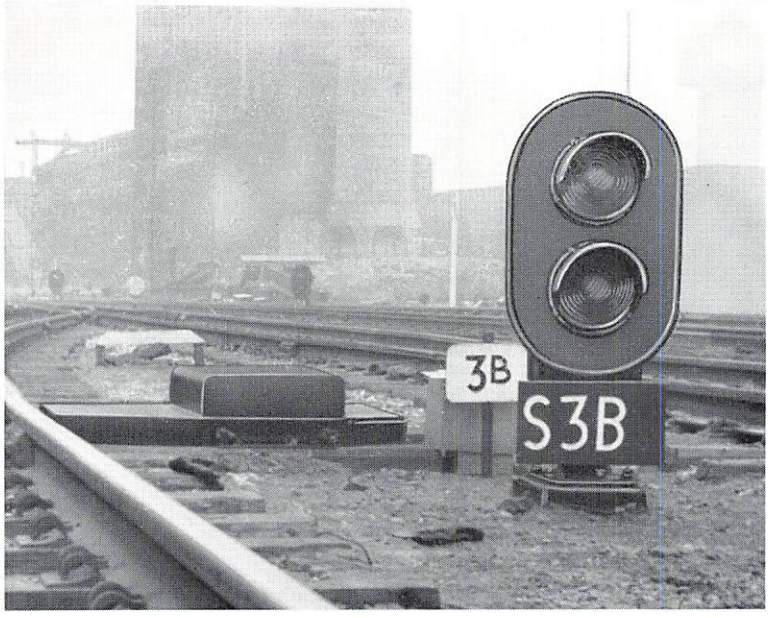


3 colour-light signal with open door (back side)



Section of an optical system.

The signals are equipped with sheet-iron sun hoods and a black painted background.
The optical axes of multi-aspect signals will be lined before leaving the factory. Besides the optical systems with lampholder, the colour-light signal contains a transformer with 110 V or 220 V primary, 50 or 60 cycles, 2,5 A, 12 V secondary and an adjustable resistance to regulate the lamp voltage.



2-aspect colour-light signal on a short post

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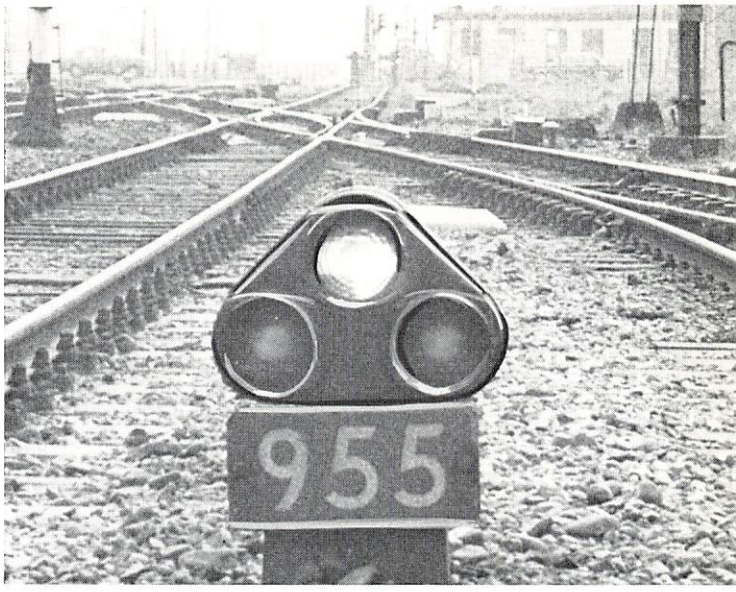
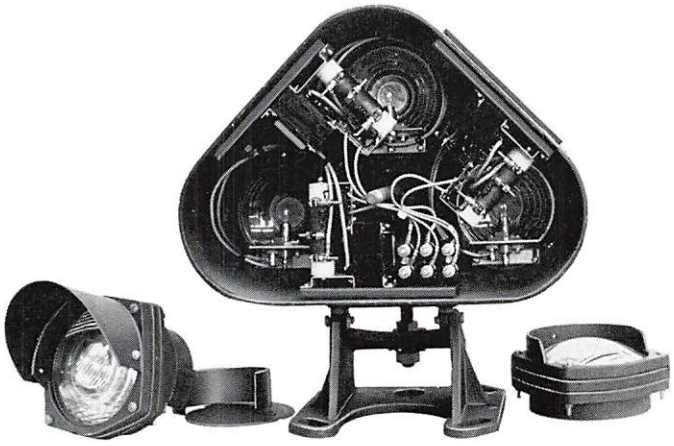
shunt-signal type SS

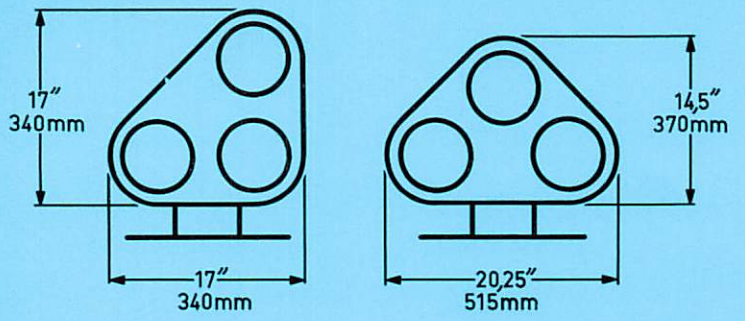




The signal is built in the form of a right angle triangle and can be mounted with any one of the three sides as base. Thus as a position light signal it can be arranged to show horizontal and vertical, or horizontal and inclined aspects, either left or right hand.

The light units are of doublet lens construction, the outer clear lens being 162 mm ($6\frac{3}{8}$ inch.) dia. Their special design reduces reflections and phantoms to a minimum. Wide angle lenses are available.

In spite of its small dimensions, the signal has space available for three transformer-resistance units, if required, for the normal 25 watt, 10.3 volt lamps.



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route or speed indicator

The photograph shows a 3-colour-light signal with speed indicator on a double insulated track, provided for reverse operation.
Beside the track on the leftside the relay-boxes.

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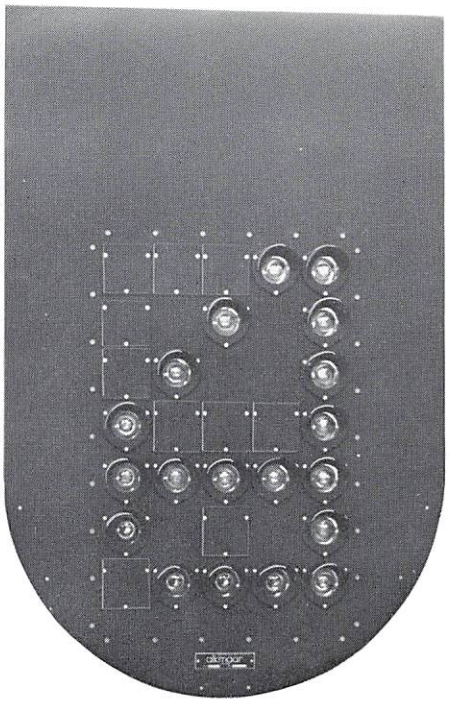
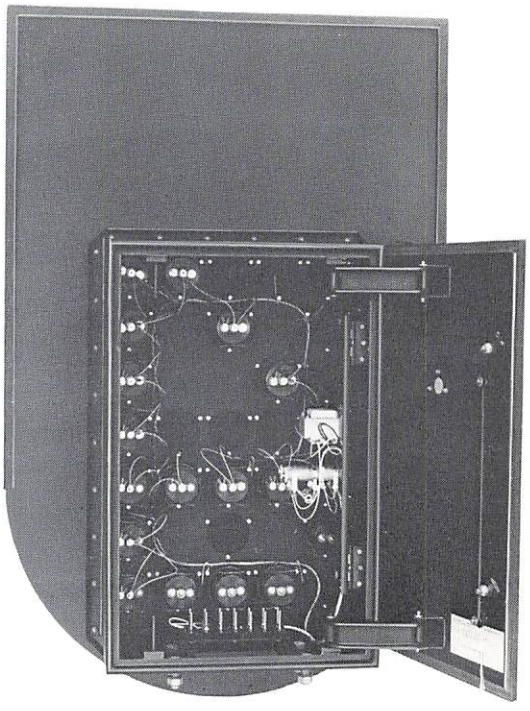
speed indicator

Speed indicator with figure 4 (front side).



Speed indicator with open door (back side) showing the interior.



The speed indicator enables an illuminated figure or letter to be easily visible over a distance of 300 meters (1000 ft) in bright sunlight.
Combinations of the individual light units can be illuminated to show any letter or figure required.
The indicator consists of a sheet metal housing 483 mm (19 inch) wide, by 753 mm (29½ inch) high, on the front plate of which 35 light units can be mounted in a pattern of five vertical rows with seven positions each.

The required indication is obtained by illuminating the appropriate lamps. The front plate is extended to form a background.
The indicator is provided with a gasketted reinforced sheet metal door, permitting easy access to the individual light units.
Lamps of 12 V 3 W with bajonet lamp sockets are normally used.
The indicator is suitable for top of post mounting or bracket mounting.

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The photograph shows a formation of three relay cases (2 types) for an automatic safety installation at a level crossing.

relay cases

The cases are constructed of well finished sheet iron. They can be placed on concrete bases and are of a dismountable construction. The cases are closed by two doors in the front and two doors in the back. The doors are locked by a key-lock.
In the production programme there are many types of relay-cases, so a wide range of cases is available, other data are given on request.

Relay-case for a 4 aspect colour-light signal.

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safety installations for highway-crossings

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automatic safety installations for level crossings

Level crossing can be protected automatically. That means crossing road traffic is warned of a coming train by a system that is controlled by that train.
There are two different systems:
a. The automatic flashing-light installation with flashing lights and warning bells, giving the best possible warnings to road traffics on less important crossings.
b. The half-arm barrier installation, a very modern system.
Both systems, which have little difference in principle, give the highest protection to the road traffic and obstruct that traffic as little as possible. The systems are fail-safe and require little maintenance.

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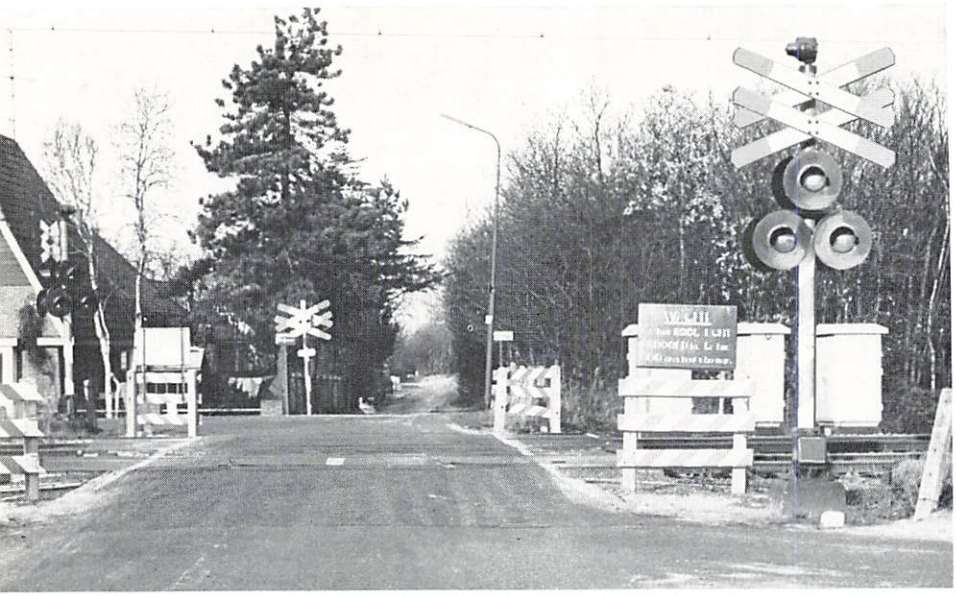
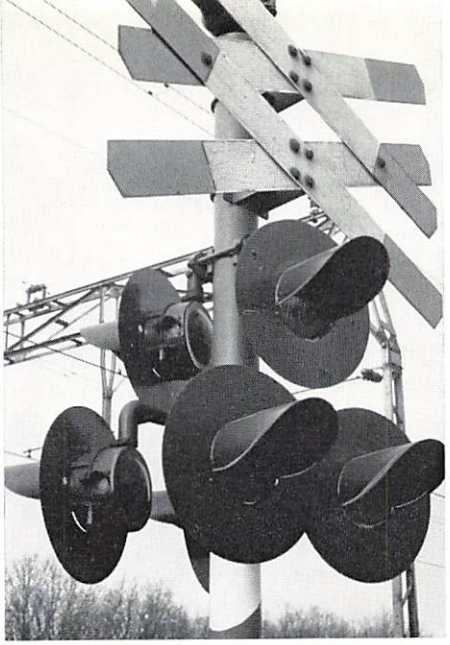


Level-crossing protection by flashing lights, type A.K.I.



Flashing lights and warning bell on level crossing.

automatic flashing-light installation

The foto shows an automatic flashing-light installation type AKI (as used by the Netherland Railways).

White flassing-lights (frequency 45 p.m.) on either side of the track indicate that the road traffic can cross the line(s).
The danger indication by an approching train is given by red flashing-lights (frequency 90 p.m.) and one or more bells.

The combination is built up from standard components.
Lamps and bells are 12 V.
Diameter of the spread-lenses of the flashing-lights is 213 m.m. ($8^3/_4$ inch)

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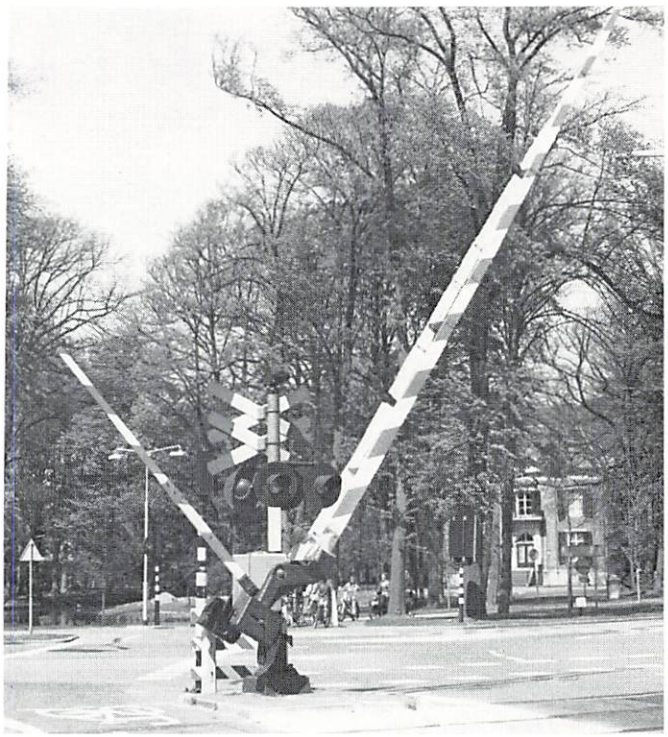
automatic half-arm barrier installation

An automatic half-arm barrier installation has the following features to serve safety:

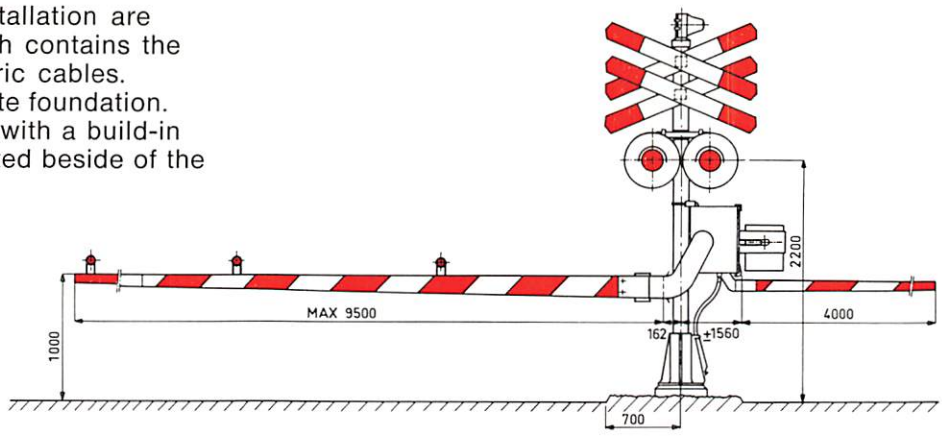
- There is a moving indication in front of the approching road traffic;
  flashing lights on the central posts and on the barriers increase this effect.
- In case of any failure of the system, the barriers go down.
- Proceeding prematurely after passing of the train while an opposite train is approching — as occurs on crossings installed with flashing-lights only — is opposed.
- The road traffic can not be fenced in.

Where completely automatic operation of barriers is required, the automatic half-arm barrier installation type AHOB is used.
They only shut-off one side of the road (the half of the road traffic).
The installation can be supplied with flashing-lights and bells like the AKI.
The two red flashing lights on the central posts of the installation will start flashing a number of seconds before the barriers are lowered and remain switched on as long as the gates are not in the clear are ringing.
position again. At the same time one or more bells
The barriers, of a wood construction, can be provided with gate-arm lamps if required.
They can be supplied with a max. lenght of 9 m (30 ft.).

A second, shorter barrier to close a subway (footpath) having a max. length of 4 m (13 ft.) can be fitted to the mechanism.

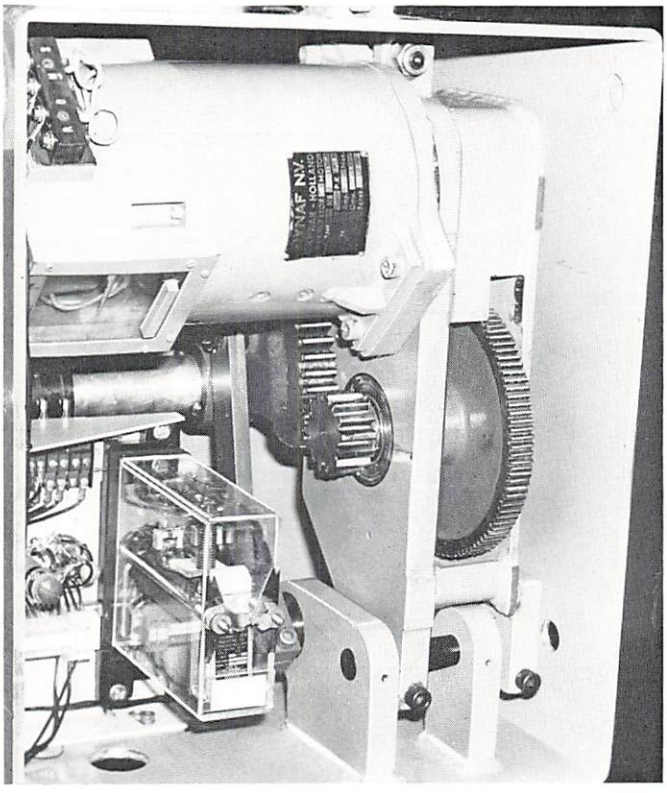


The centralposts of the safety installation are mounted in a cast-iron base, which contains the terminals for connecting the electric cables.
The base can be fitted on a concrete foundation.
The barrier is mounted on a case, with a build-in driving mechanism, which is mounted beside of the central post.

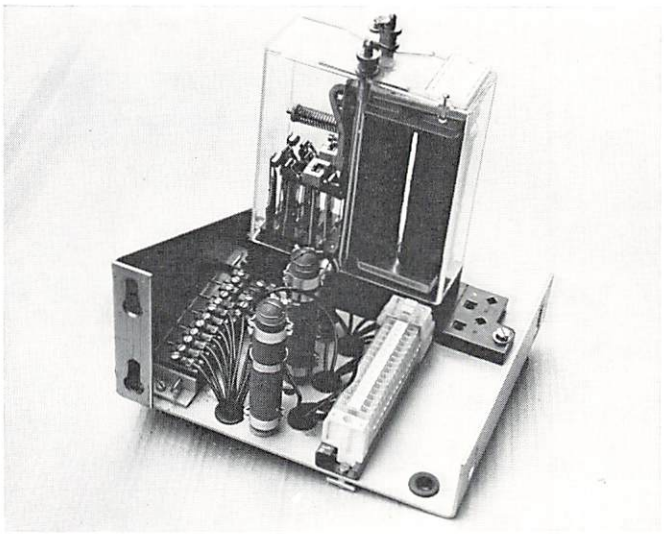


technical details

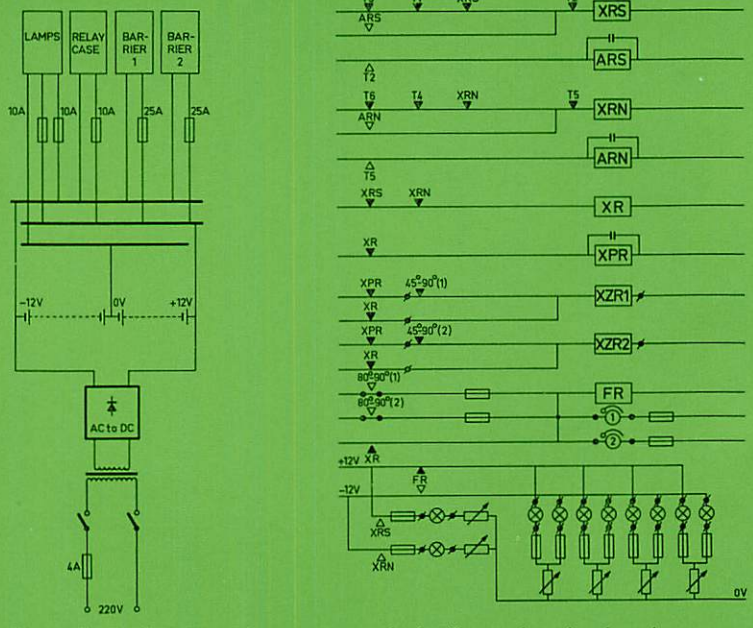
Open gearbox of a half-arm barrier installation.



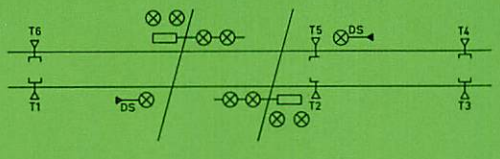
Relay-unit.



This gearbox contains near the driving mechanism an easy dismountable electric motor connected with a gear-unit, a relay-unit with a relay of the plug-in type.
The motor voltage is 12 or 24 Volts D.C.
From the gearbox a flexible connection-tube goes to the base for protecting the wiring.



Simplified diagram of an automatic half-arm barrier level crossing safety installation.



All equipment necessary for a complete installation as added signals and bells, A.C. or D.C. track circuits, insulated track, relay cases, etc. can be supplied.

Principle diagram of an AHOB safety installation controled by trains on insulated track

Automatic half-arm barrier installation with flashing lights on a double track.

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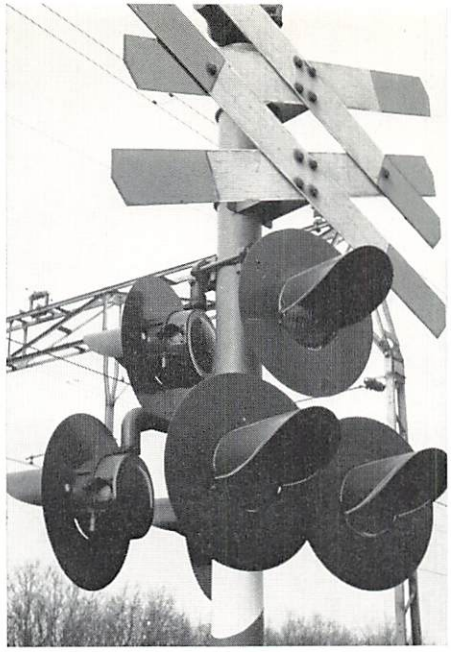
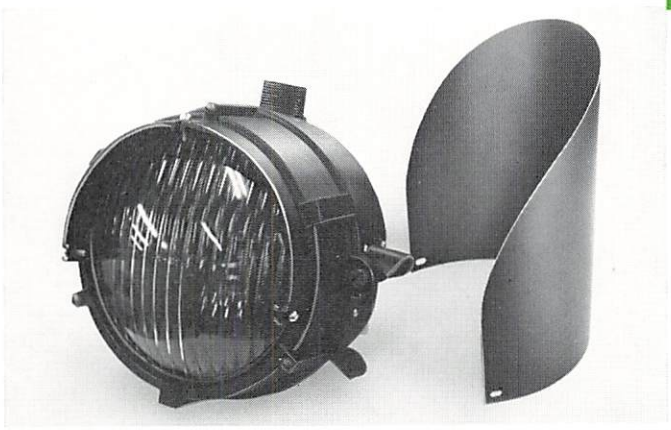
flashing-light units type XC and sound-bell

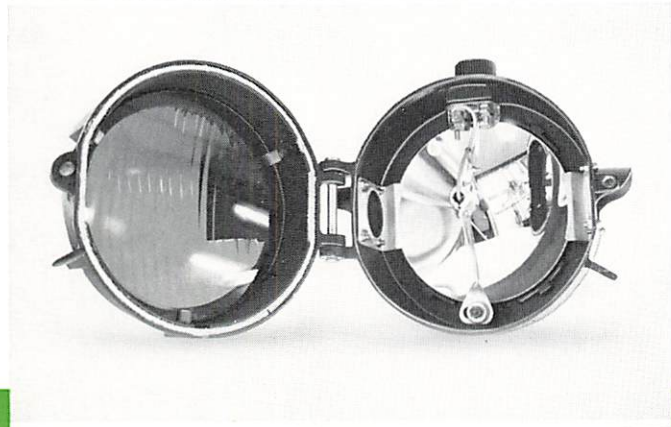


Close-up view of flashing-light signal type AKI equipped with six type XC units and bell.

1



2



The case and the door of lamp unit are die cast light-metal as single parts.
Clamp type mounting elbows on the cases provide positive vertical and horizontal adjustment of the light beams.
Door gaskets of resilient wicking material assure a watertight closure.
The red signal roundel is $8^{3}/_{8}$ inch. in diameter.
Side lights are $1^{3}/_{4}$ inches in diameter. The bajonet base lamp is for 6-12 Volts.
Sunhood and background are of sheet steel. The signal lamps are carefully adjusted at the factory and all units are secured in proper focus before shipment.

3

1 Type XC unit, front view, and sheet iron sunhood.
2 Type XC with door open to show accessibility of interior parts.
3 Sound bell of a level crossing installation (door open on backside).
Tension 9-16 Volts.
Housing, door and bell are of cast iron.

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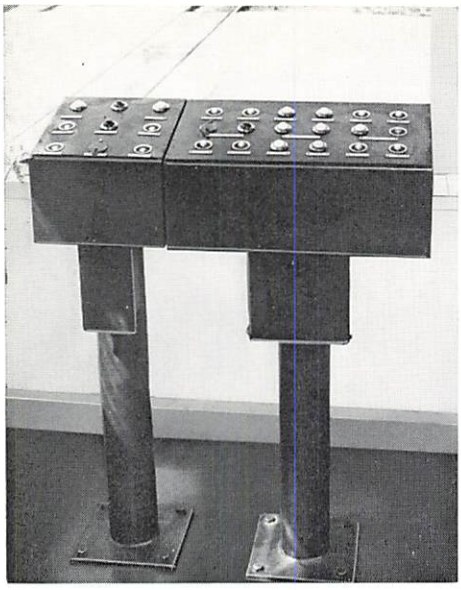
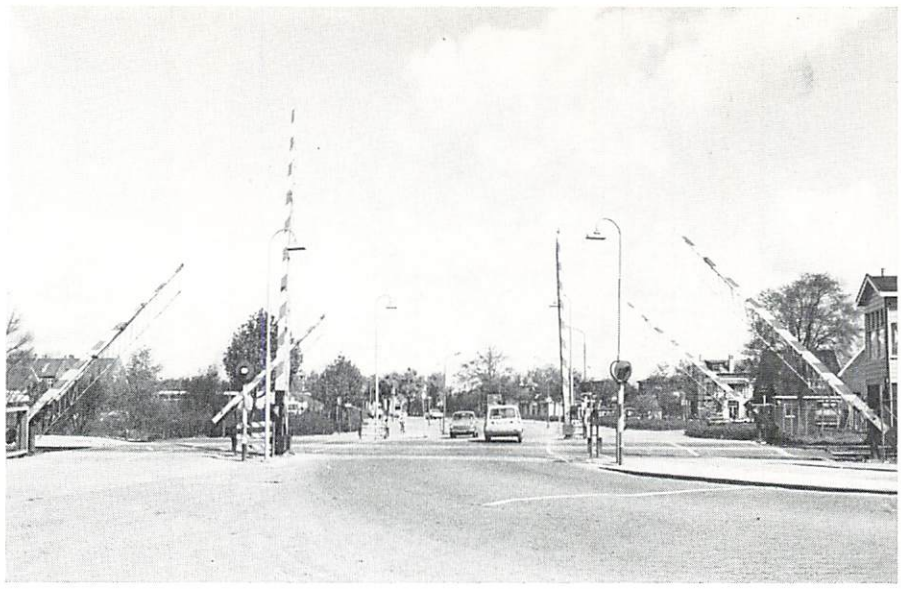


Operating desk for electrically operated wooden lifting barriers, type EBOH.



Highway crossing, closed by 6 wooden lifting barriers, type EBOH.

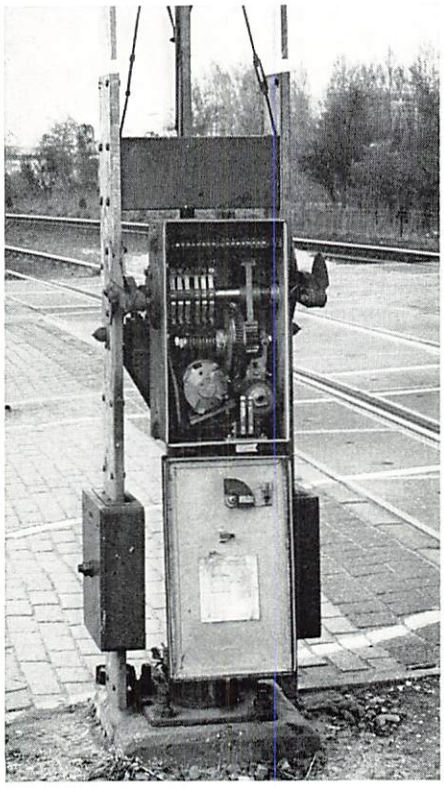
electrically operated lifting barriers type EBOH

Electrically operated wooden lifting barriers type E.B.O.H. have been designed for use at railway crossings.

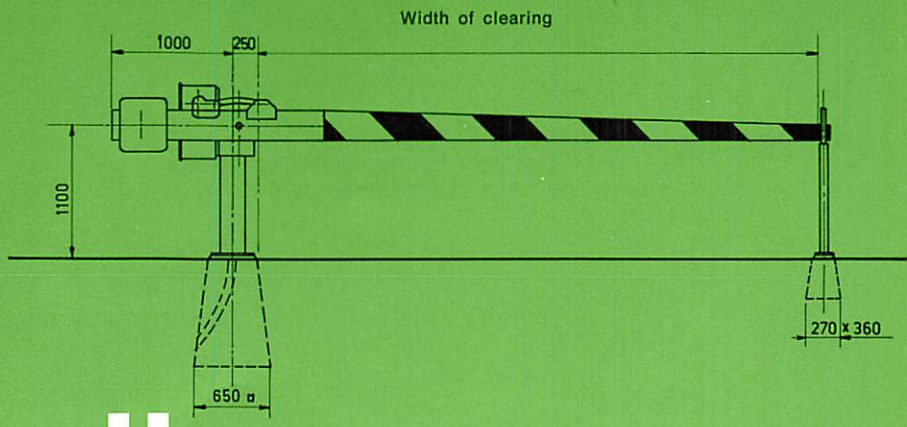
As the gates are electrically controlled, the time for lifting and lowering has been restricted to a minimum. The operating switch can be fitted on a control panel in an operating room or outside.

The wooden lifting barrier type E.B.O.H. can be supplied with a maximum length of 9 m (29.5 ft). The minimum length is 3.5 m (11.5 ft). Any length between the minimum and maximum is available with intervals of 25 cm (10 in.). For dimensions larger than 9 m (29.5 ft) two barriers at both sides of the road are necessary. The barriers can be fitted with a skirt if required, which is manufactured in aluminium, and a fixed stop post at the end of the barrier can be arranged. The boom is strikingly painted in red and white.

For the operation an electric motor is located in a gear box, mounted on the barrier base, which is to be fitted on a concrete foundation. The motor voltage can be 120 Volts D.C. or 220/380 Volts — 3 phase.



Open gear box with built-in driving mechanism of EBOH.



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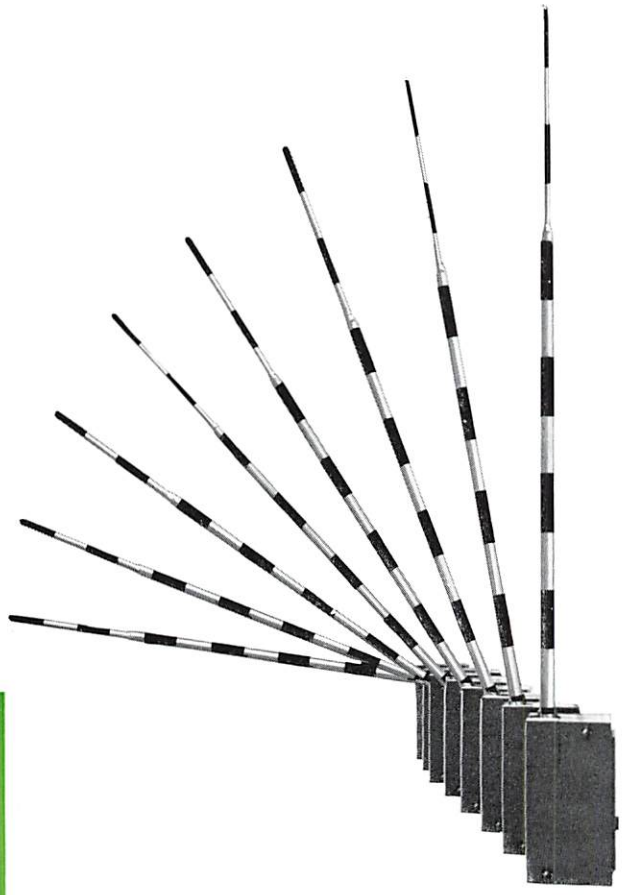
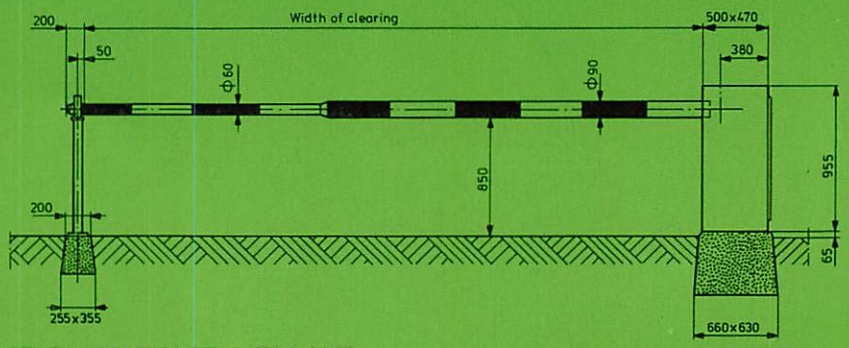
Electrically operated light-metal lifting barriers, type TAB, on a platform.

electrically operated lifting barriers type TAB

Electrically operated light-metal lifting barriers type TAB have been constructed for use at railway platforms, entrances of railway territories and railway parking places.
These light-metal lifting barriers have no counter-weights, so that they only need little room.
The time for lifting and lowering is approximately 6-8 seconds.
The operating knob may be mounted on the barrier frame as well as in the signal cabin or in any desired place.
The lifting barrier type TAB can be supplied with a maximum length of 6 m (20 ft). For a width of 6-12 m (20-40 ft) two barriers must be installed.
If required, a stop post at the end of the barrier can be supplied.
For the operation an electric motor is mounted in the barrier column. This frame must be placed on a concrete foundation.
The motor voltage is 220/380 Volt - 3 phase, other voltage can be supplied if required.



The column, and if desired the stop post are painted green. The boom however is strikingly painted in red and white.



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mechanical point and signal equipment

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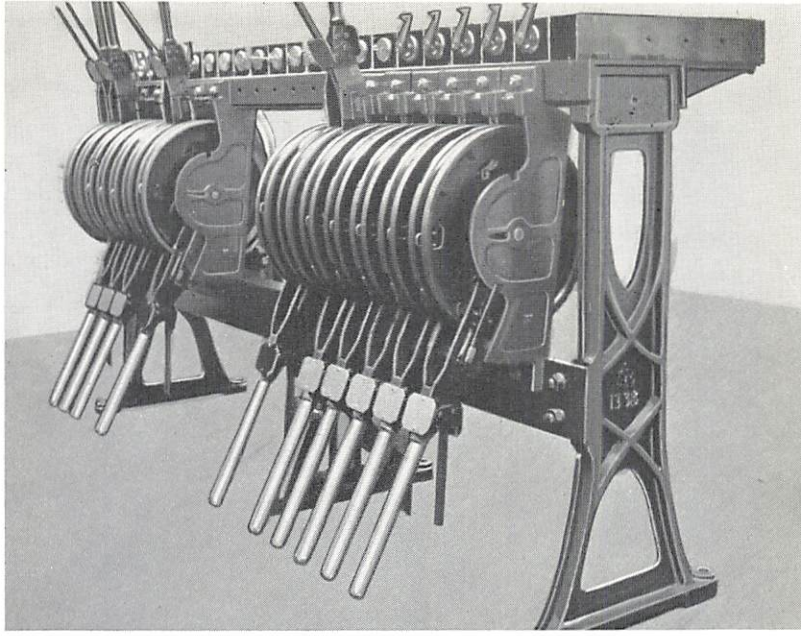
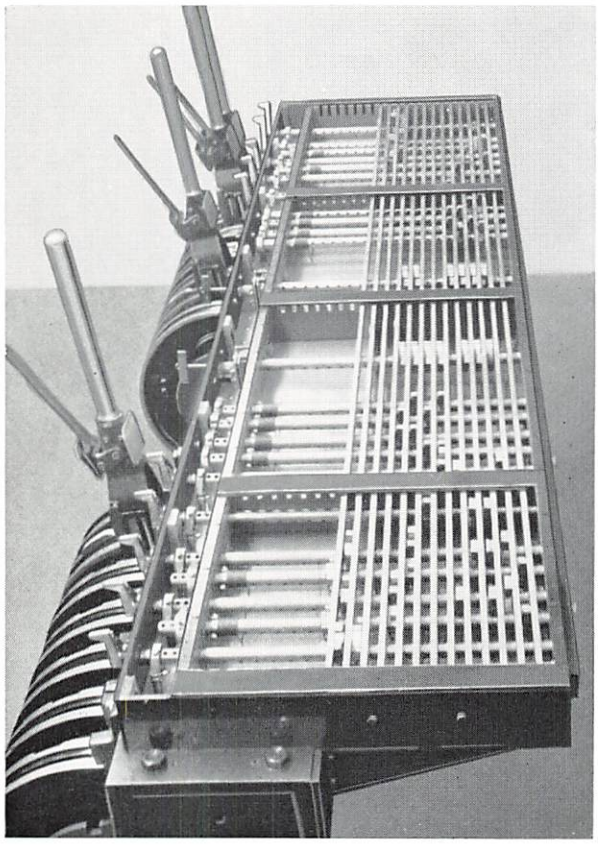
machines for mechanical control



Mechanical control machine.

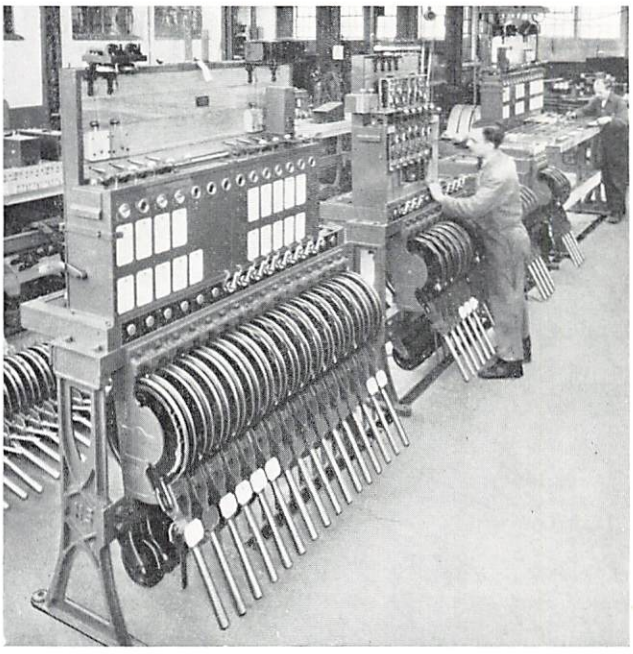
Lever frames for mechanical control of points and signals are manufactured in different sizes, viz from 4 levers to 20 or 21 levers, stepped up by 2 levers. These units may be combined to larger control machines.

Mechanical control machine, top view. (cover removed)



The interlocking of point and signal lever is obtained by means of locking slides, which are mounted above the point and signal rotary levers. Alterations in the interlocking scheme can be carried out easily. The distance between the levers is 100 mm (3 15/16 in.).
The stroke of the wire connected to the rotary lever is 500 mm (19 11/16 in.).
The rotary point levers are trailable. The mechanical lever frame can be provided with electrical contacts for locking, signals, points, etc.

Control machine with block apparatus in our workshop.



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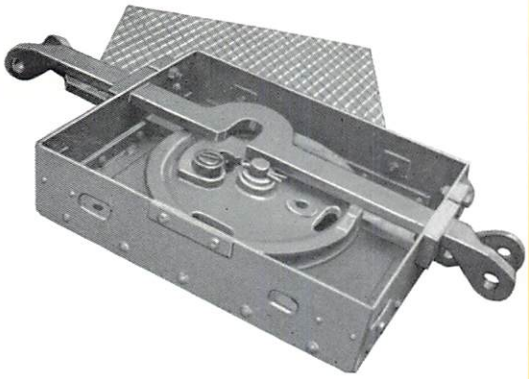
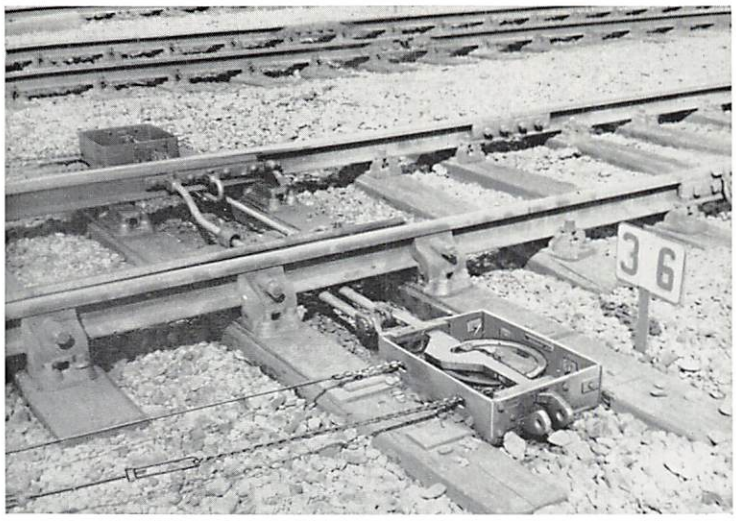
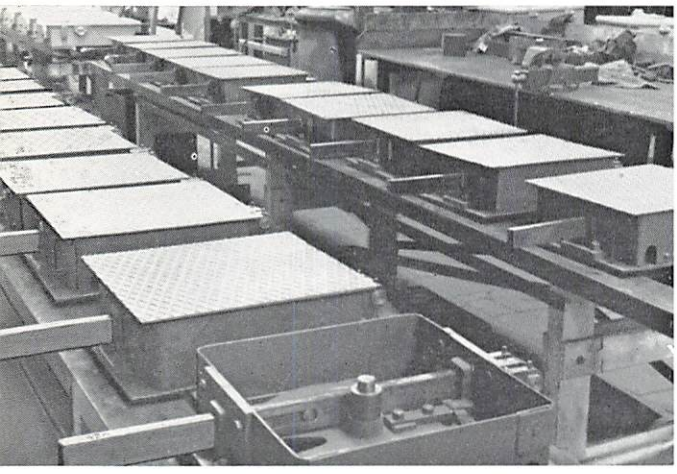


Mechanical point machine.

Mechanical point machine and point lock affixed to points, cover plate removed.

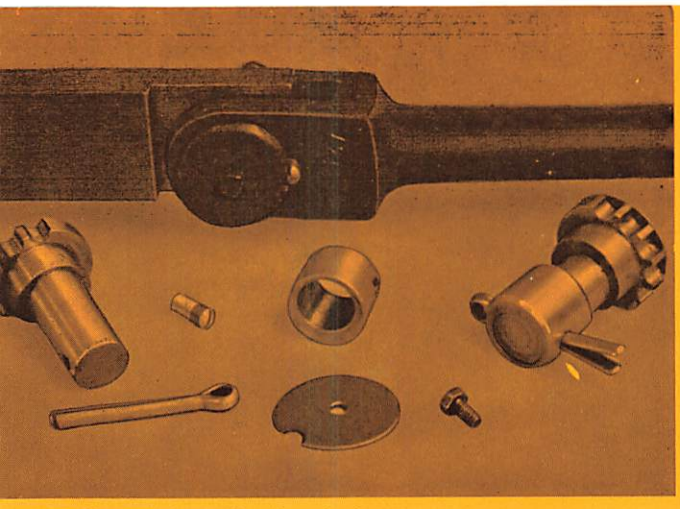




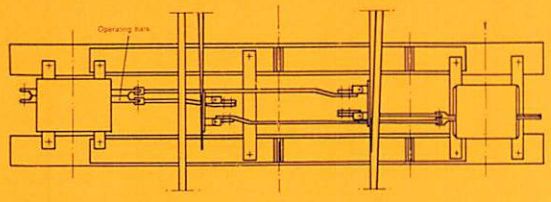
Mechanical point locks.

mechanical point machine and point lock

These mechanical point machines are of the trailable type and can be used in combination with a mechanical point lock.
The closed tongue is secured inside the mechanical point machine.
In the connection of the point machine and the point, eccentric bolts are built in, in order to regulate the position of the point tongues.



Eccentric adjusting bolts. Bolt attached to point rod.



Arrangement with mechanical point machine and point lock.

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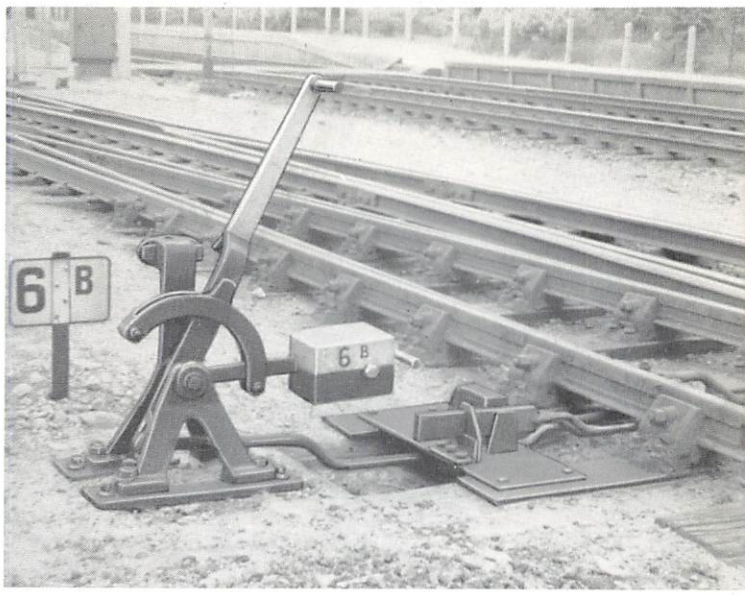
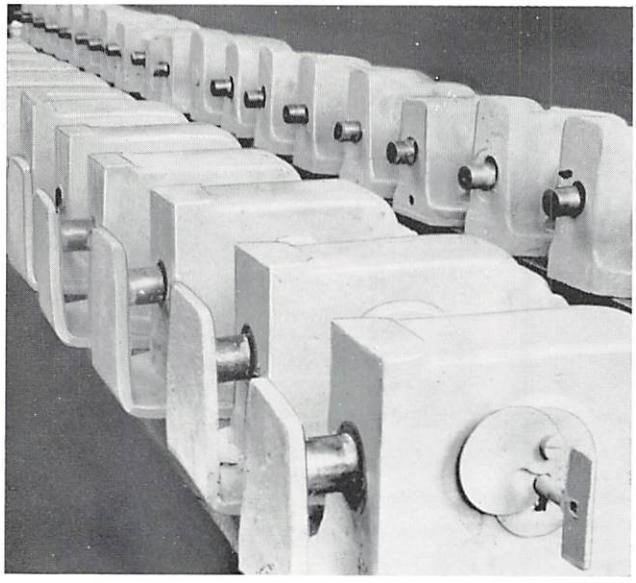


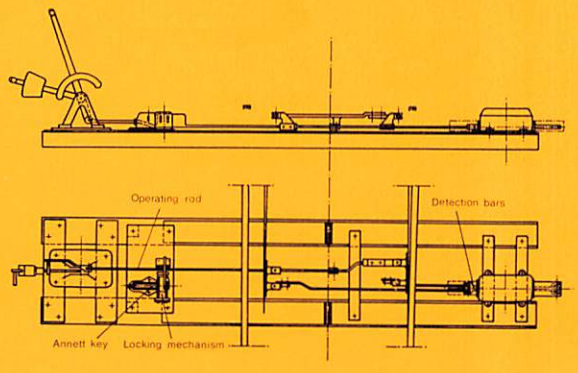
Annett lock, affixed to hand-operated points.

annett lock and annett crank-lock

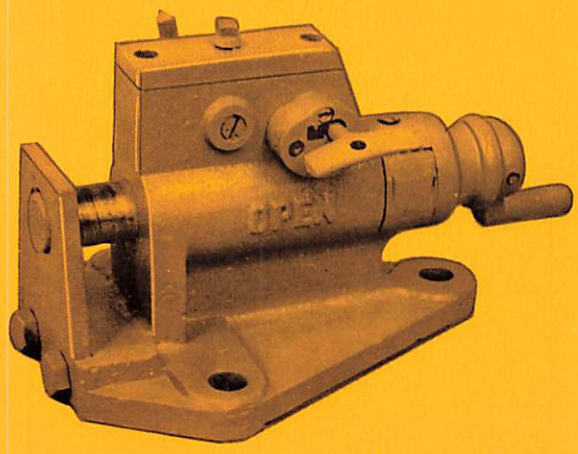
Hand-operated points may be secured with an Annett lock or Annett crank-lock. Both can be taken up in the interlocking.
They are of a robust construction, the housing of the locking mechanism is made of cast iron, all non-cast iron parts are sherardized to give a good protection under severe climatologic conditions.



Annett locks.



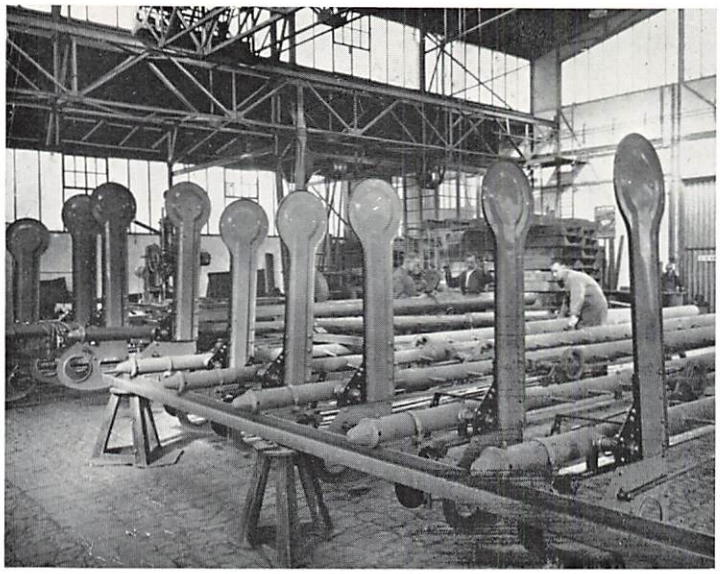
Arrangement with Annett lock, hand lever, hand-locking mechanism and electric point detector.



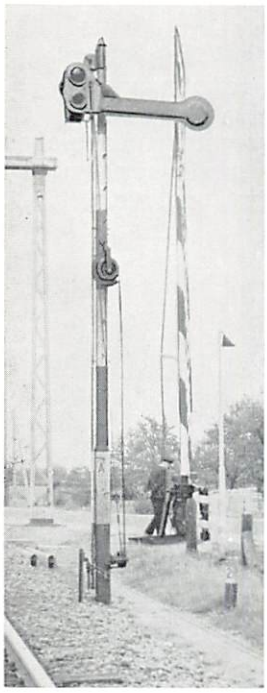
Annett crank-lock.

NEDERLANDSE MACHINEFABRIEK ALKMAAR B.V. ALKMAAR HOLLAND

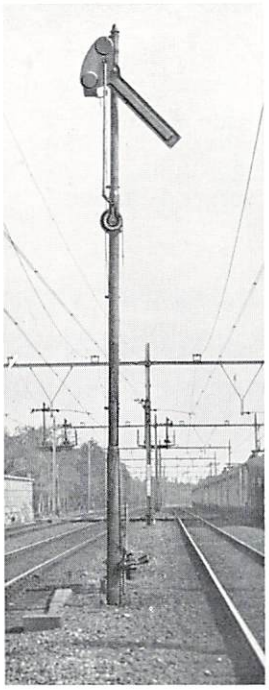
semaphore signals for mechanical and for electrical operation



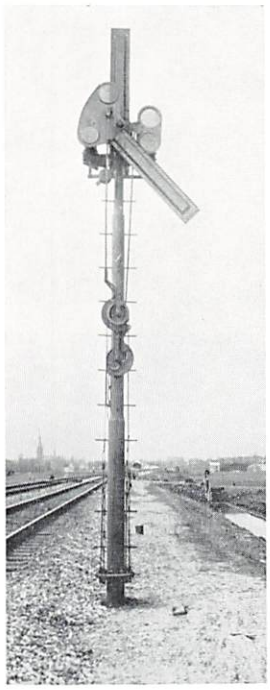
Mounting of signals in the factory.



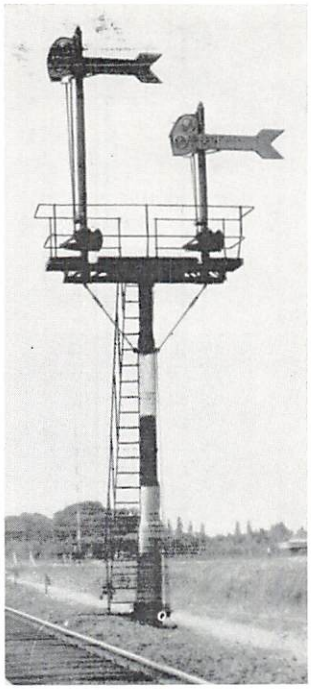
Main signal.



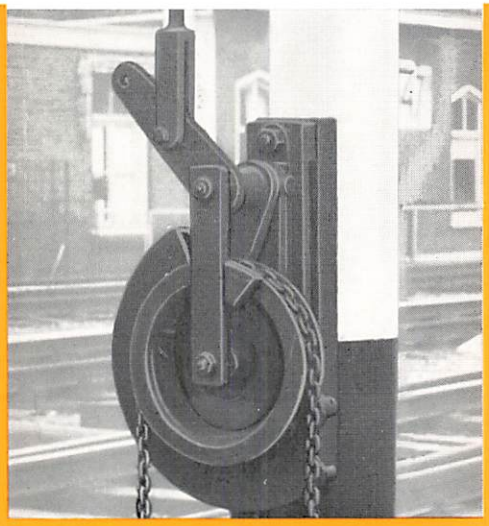
Distant-signal.



Junction distant-signal.



Junction signals on bracket post.



Mechanical-operation mechanism.

The semaphore signals are manufactured according to our own design or in accordance with the instructions given by railway companies.
They may be supplied with electric lighting and for either mechanical or electrical operation.

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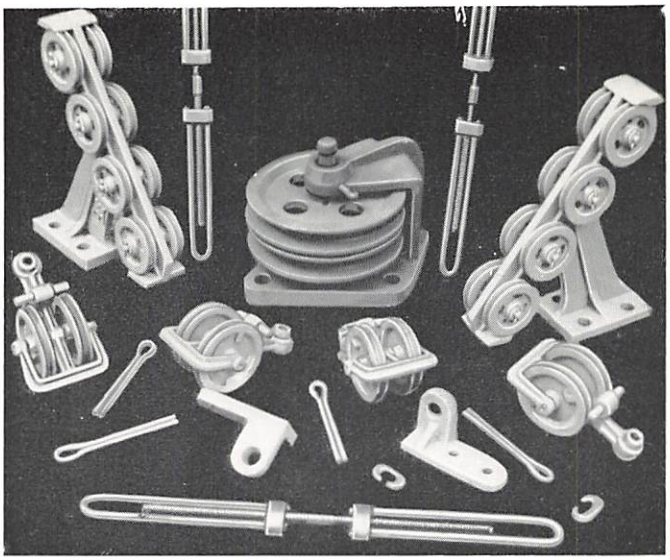
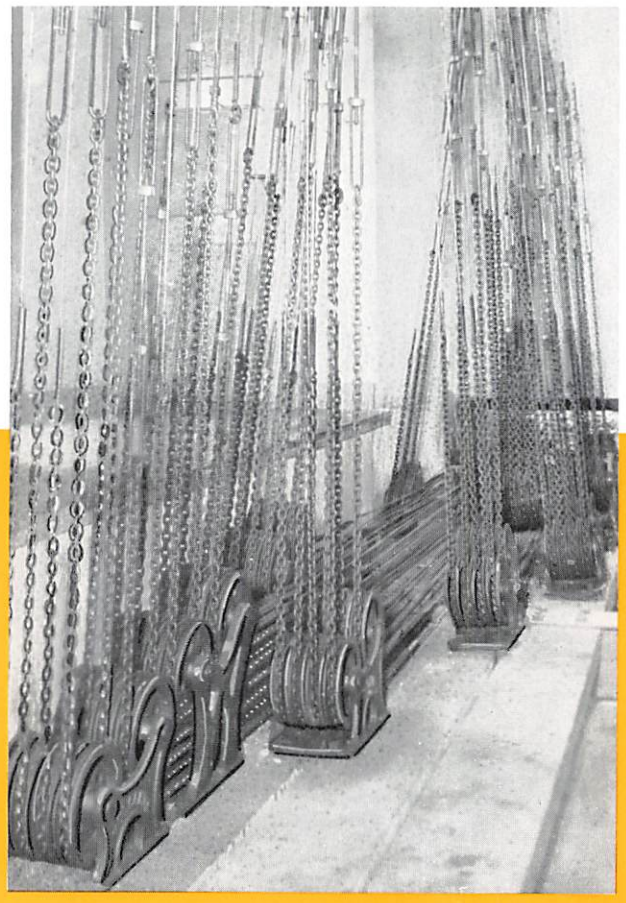
wire accessories



Wire-guide wheel supports, horizontal and vertical, wire-adjusting screws, etc.

We supply all materials needed for wire installations: steel wire (galvanized), chains; couplings; wire eyelets and wire-adjusting screws; wire pulleys; wire-guide carriers; wheel carriers; stakes and yokes for wire pulleys; cases for wheel carriers and tubes (galvanized) for underground wire runs, a.s.o.

Wire arrangement beneath signal box.



Above-ground wire arrangement.

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