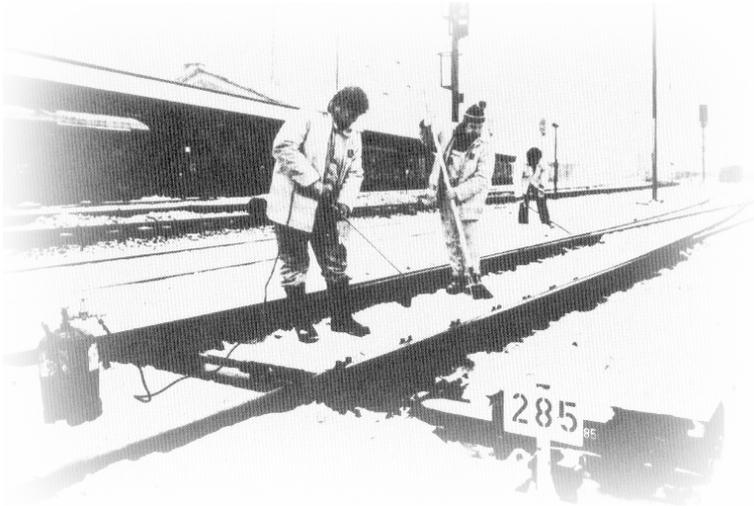


Competence in points heating systems



Why to choose Wolff Points Heating Systems ?



During the cold season of the year, even without great deals of snow, it is not unusual that switch blades of an un-heated point switch freeze on the stock rails or even on the slide chairs. This effect occurs at unfavourable places already at outside temperatures of less than $+3^{\circ}\text{C}$, favoured by cold due to evaporation. In that way the point switch is no longer adjustable and a disruption of operations will be the consequence. Personnel is needed to clear the point switch, but not sufficiently available at all times not to mention the financial extra expenses.

All these problems are solved with a Wolff Point Heating System standing for longevity and no maintenance. It's terminal head, either sealed or detachable, is fully waterproof (IP 65).

A Wolff point heating system cares automatically and reliably for freedom from snow and ice between stock rail and switch blade as well as in locking boxes and crossings with movable frogs.



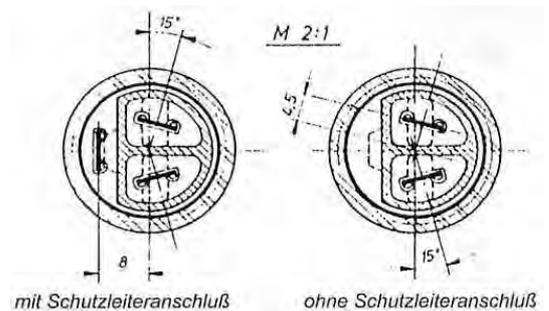
Our scope of supply

Our heating elements are of Swiss precision manufacture made by our longtime partner :



We supply:

- all heating elements used within the network of the DB AG, with and without cables, DB-skeleton contract No.: 564 / 00 / 92011137 cred.-No.: 394378
- all types of points heating systems:
 - stock rail-heating systems,
 - switch blade-heating systems,
 - locking box-heating systems,
 - crossing-heating systems
- 2-pole heating elements without protective conductor,
3-pole heating elements with protective conductor
and, on request, heating elements with
additional outside located earthing screw
- **SPECIAL FORMS** and **SPECIAL LENGTHS**
up to ca. 6000 mms of length



Our scope of supply

(cont.)

- All voltages as AC and DC , i.e.

16 2/3 Hz	231 V
50 Hz	230 V / 400 V
DC	600 V / 650 V / 750 V

as well as all possible interim voltage values

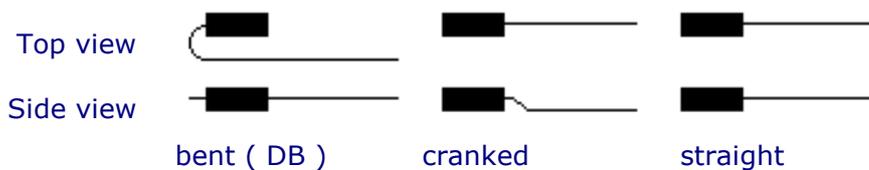
- various specific powers from approx. 200 W/m up to 450 W/m,
in exceptional cases higher and lower powers are available.
On application of heating elements in grooved rail areas, power of more than 250 W/m are not recommended due to the reason that the poor heat transmission within the protection pipe or the heating chamber of the grooved rail point switch will lead into an overheating of the heating element

- material qualities designed to user specification

1. CN 18/8 the rugged and economically priced standard quality for rough application in the area of Vignole rails
2. MONEL 400 the salt and acid resistant quality for those areas where grit and de-icing agents are used, especially if channel rails are concerned

- different forms of heating elements:

1. Flat heating elements F12, cross-section flat-oval, 13,2 mms x 5,3 mms, bent, cranked by half the head diameter or straight,



2. Round heating element R8, cross-section round, 8,2 mms, straight, with or without outer earth screw

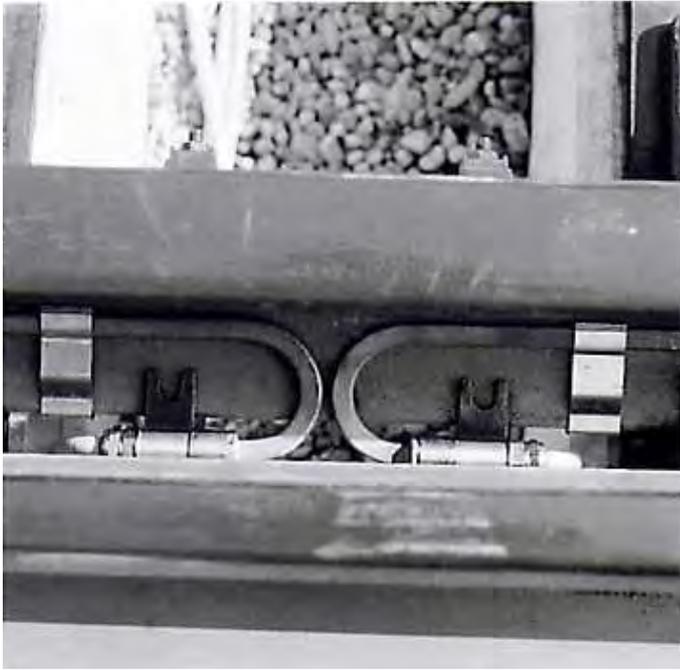
we also supply:

- all mounting material, i.e. clamping yokes, connecting head fasteners, clamps, screws, etc.
- accessories, i.e. terminal boxes, cables, cable protecting tubes, cable hoses, etc.
- electronic components, i.e. moisture and temperature control, temperature monitor, snow detector, tension control, power relais, transformer-switching relais, etc.
- spare parts and repairs for FRABA-equipment

and moreover

- **clamping yokes for automatic operation cables at the rail**
- **universal-flange-groove rails**
- **rail drainage boxes**

The system



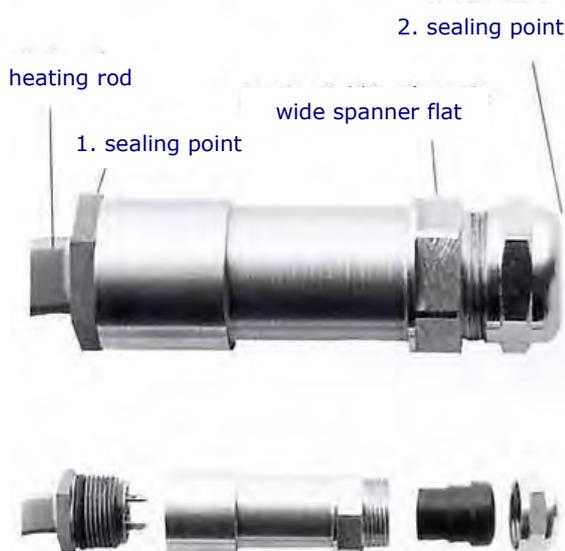
The Backer ELC heating elements are mounted on the base of the rail by means of special clamp straps made of corrosion-resistant chrome-nickel steel. The chosen surface pressure guarantees an optimum in heat transfer.

Beyond that it allows an unavoidable linear extension of the heating elements without limitation.

The strong fixing of the connecting heads prevents the heating elements from creeping (see description below).

Preferred types of heating elements:

2200 mm	230 V /	900 W	2pol.	gebogen
2870 mm	230 V /	900 W	2pol.	gebogen
3720 mm	230 V /	1200 W	2pol.	gebogen
4700 mm	230 V /	1500 W	2pol.	gebogen
1100 mm	230 V /	250 W	2pol.	gekröpft
1100 mm	230 V /	450 W	2pol.	gekröpft



The absolute watertightness of the connecting heads made of chrome-nickel steel does not allow humidity or dirt to penetrate.

The connecting head sleeve is inside plasticized for electric insulation.

A wide spanner flat and **only two sealing points** are two more advantages of the Electrolux-heating elements.

The end of the heating element is waterproof filled up with synthetic resin.

The conductor is connected with the heating element by means of plugs of 6,3 mms. This allows to change a broken cable or heating rod at any time.



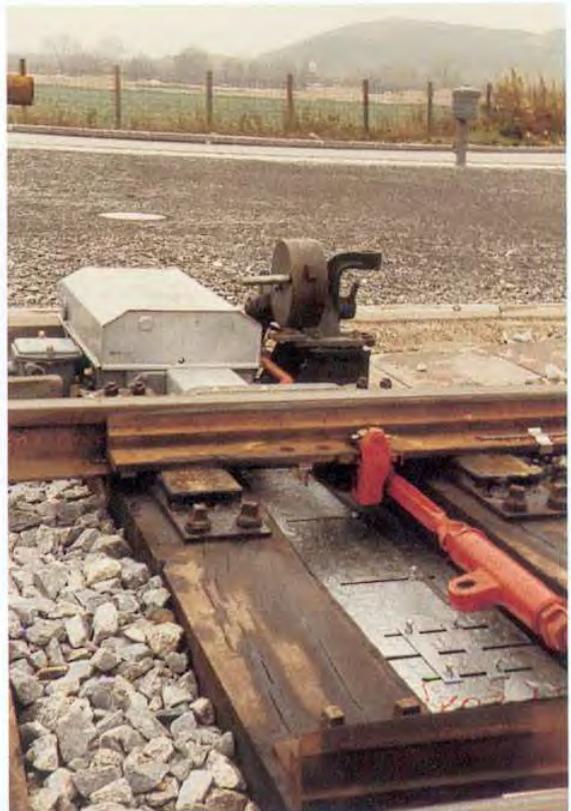
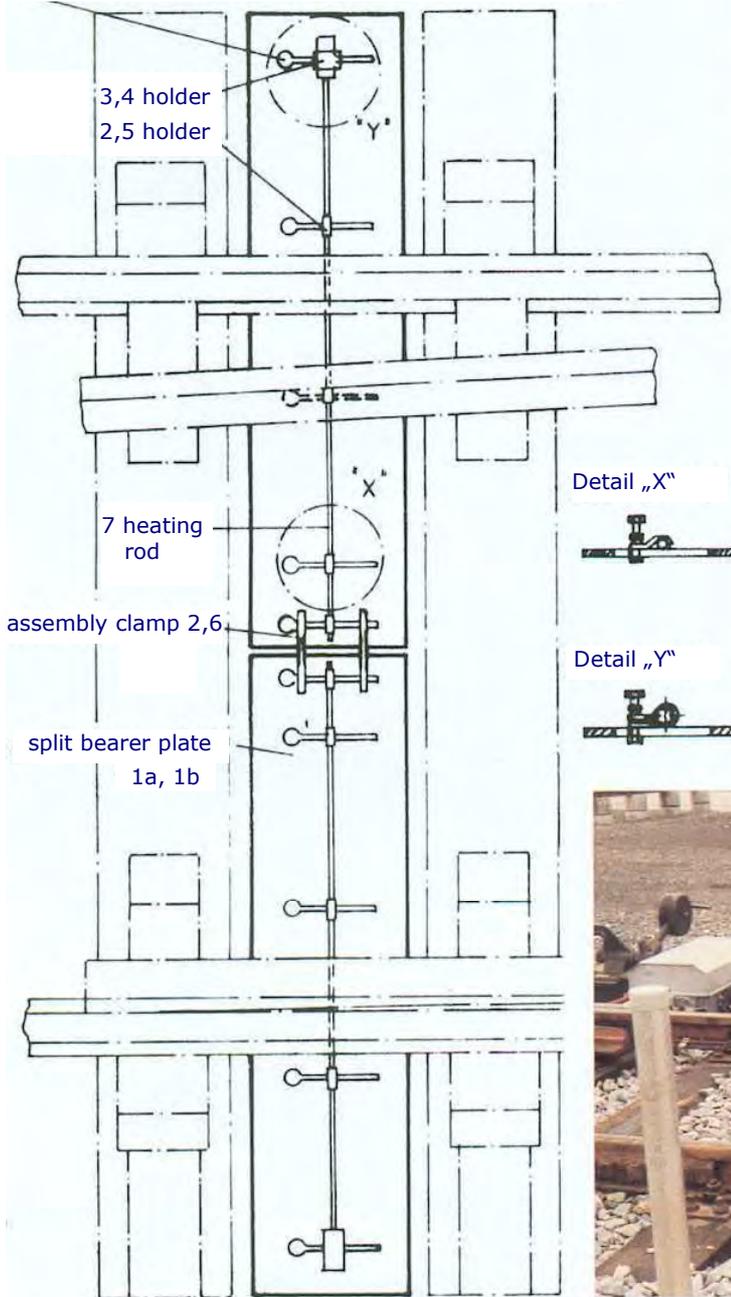
- ① Connecting head fastener made of GGG 40, material no. 00219200,
- ② High strength screw M 10 x 210 mms, galvanized
- ③ Connecting head rest made of chrome-nickel steel 18/10 material no. 00219201
- ④ Nut M10, self-locking, DIN 980

Creeping of heating elements caused by vibrations is not possible due to this special method of fastening.

The system

(cont.)

Slit 200mm long for shifting of heating rod



Verwendbar für:		DB BZA München den 23.6. 1986 (26) Simonszent		4 Elh 00.09.05			
elektrische Weichenheizung electric points heating system		Maße ohne Toleranzangabe:		Ausg.	01		
				Datum	20.6.86		
				Maßstab			
				Elektrische Beheizung der Spitzen- -Mittelverschlußfächer electrical heating of point-interlocking			
		Datum				Name	
		Bearb.				Scictel	
		Gepr.					
		Norm.					
				Dieter Wolff GmbH Waldstraße 22 82110 Germering			
A	Ausgabe 01	06.86	2616	002263			
Zust	Änderung	Datum	Name	Urspr.	Ers. d.		
				Ers. f.	Ers. d.		
				Blatt 01 01 Bl.			

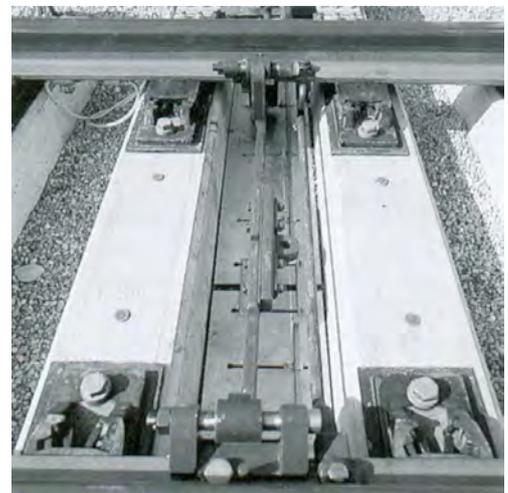
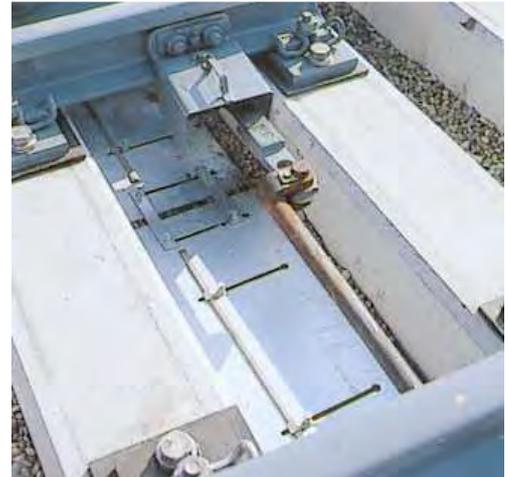
Electrical heating of the point-interlocking and central interlocking spaces

The German Federal Railways Central Office at Munich (work division 2616) has granted technical authorisation for our proposal of supply, in accordance with drawing Elh 00.09.05 and has released it for installation.

Two heating elements of 1.100 mms length, each with 250 respect. 450 W, without protective earth, with straight, separable junction head, are mounted on two divided base plates, which are laid on the ballast bed in the space between sleepers under rods and locking pieces. Owing to the weight of the plates additional fastening to the wooden or concrete sleepers is not necessary.

The base plates are provided with 200 mms long slots. The heating elements are fastened with clamps and screws to the base plate. Screws are fitted with their heads upwards. The two stop and locking nuts have the effect that even with already installed base plates the carrier can still be shifted. The base plates are connected with two mounting links.

Melt and rain water can flow away immediately into the ballast bed. In this way sufficient drainage is achieved which is of considerable benefit owing to the narrowness of the space between sleepers.



Advantages :

- continous heating for rods and closing device
- precise arrangement of heating elements
- steady warming of the ballast bed, thereby:
 - no renewed glaciation of defrosting water
- no fastening at the sleepers
- no change of space between the sleepers
- easy change of heating elements without loss of screws



Reference list

- I) Qingzang Railway (P.R.CHINA) delivery of the complete point-heating equipment of Golmud – Lhasa section (1.150km, 32 point-heating stations), highest and technically most challenging railway track in the world.
- II) The DB Netz AG, the DBG Deutsche Bahn Gleisbau GmbH, the DB AG Anlagen und Haus Service (AHS) with their branches and operational locations, the DB Projekt Knoten Berlin GmbH, the PBDE Berlin and Nuremberg, the Swiss Federal Railways (through the agency of Electrolux AG, CH-5001 Aarau), the state railways of Spain, Czech Republic, Belgium, Luxembourg, Norway.
- III) The transportation authorities in Amsterdam, Antwerpen, Augsburg, Berlin, Bielefeld, Bochum, Bonn, Braunschweig, Bremen, Bursa (Turkey) through Siemens, Chemnitz, Cottbus, Dresden, Düsseldorf, Erfurt, Frankfurt/Main, Frankfurt/Oder, Görlitz, Halberstadt, Halle/Saale, Hannover, Karlsruhe, Kassel, Köln, Krefeld, Leipzig, Ludwigshafen, Magdeburg, Mannheim, Minden, Mülheim, München, Nürnberg, Oslo, Potsdam, Riga, Rostock, Saarbrücken, Stuttgart, Würzburg, Zwickau.
- IV) The manufacturers of switches BWG Butzbacher Weichenbau, Butzbach; Schreck-Mieves, Dortmund; VWG Vereinigte Weichenbau, Bochum; WBG Weichenwerk Brandenburg und Gotha; VAE Eisenbahnsysteme, Zeltweg; and others more.
- V) Association of German Transport Companies, industrial and iron and steel works, permanent-way assembler, the electrical industry, track construction companies, the permanent-way companies and specialised traders.

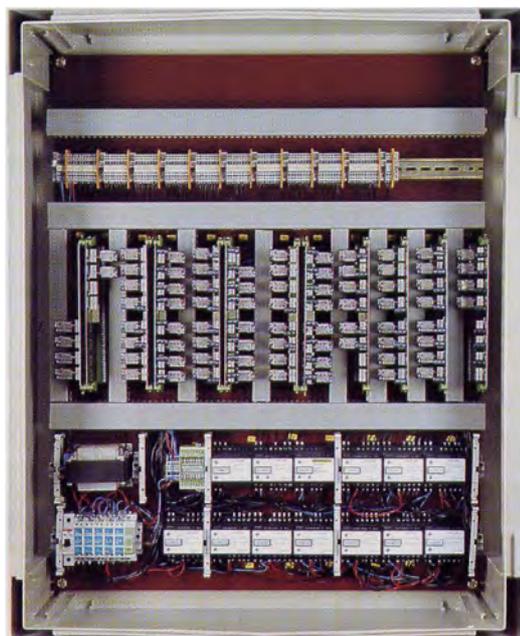
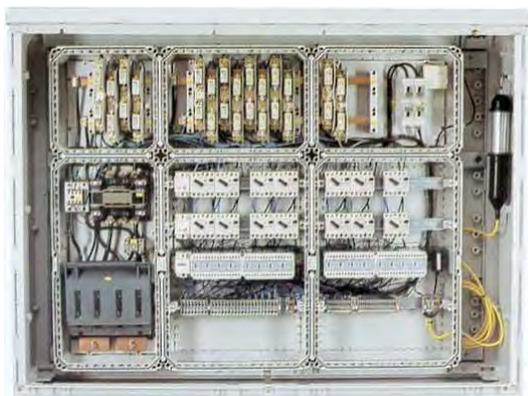
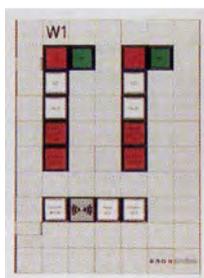
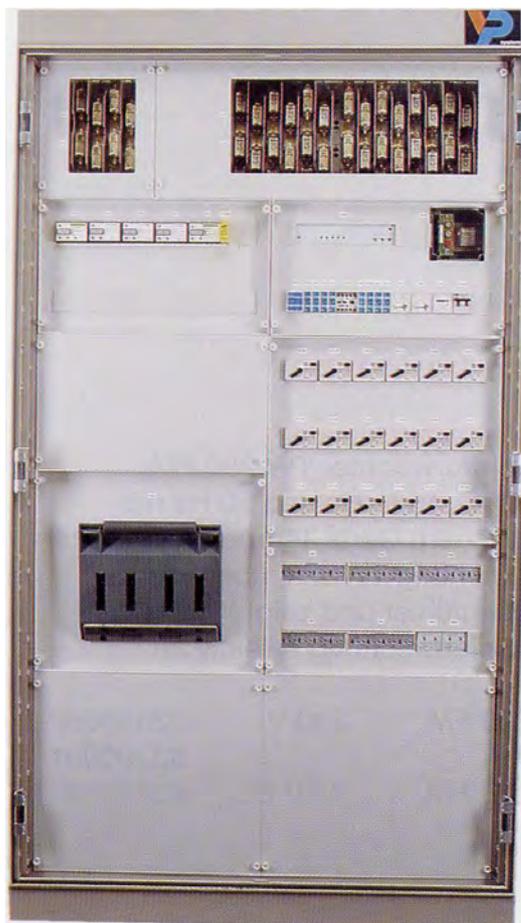
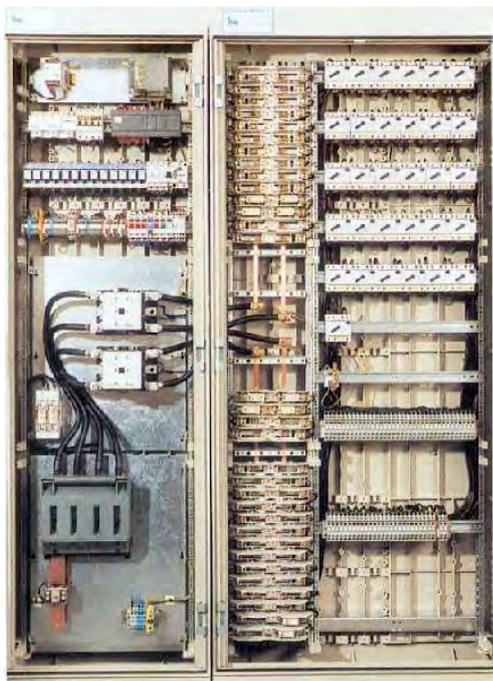
Long lasting business relations with satisfied customers all over Europe evidence the quality of our products. It is not our aim to be the cheapest bidder at all costs. In fact, we want to supply our customers with most economical products for the lifetime of their systems.

Our motto : The reminiscence of our product´s quality has a more lasting effect than the joy at a low price!



Wolff point heating system at Eibsee station submontane of germany´s highest mountain the Zugspitze
Picture with kind permission of Bayrische Zugspitzbahn

Our experience ...



... in development and production of points
heating control units, inverters and mosaic
control-units....

... as well as our experience ...



... in installation and assembly of complete points heating systems, even under rail traffic constitutes the solid basis of our advisory skills to the benefit of our customers.

That's why we are unique and inimitable!

Details of assembly and impressions



Heating element in springy moving frog UIC 60 - 10000/4000 - high-speed line Madrid - Seville



Position of heating element in free space between sliding seats and rail web



Stock rail heating in a vignole-rail point assembled with connecting head fasteners



Switch blade gliding over connecting head; bottom view



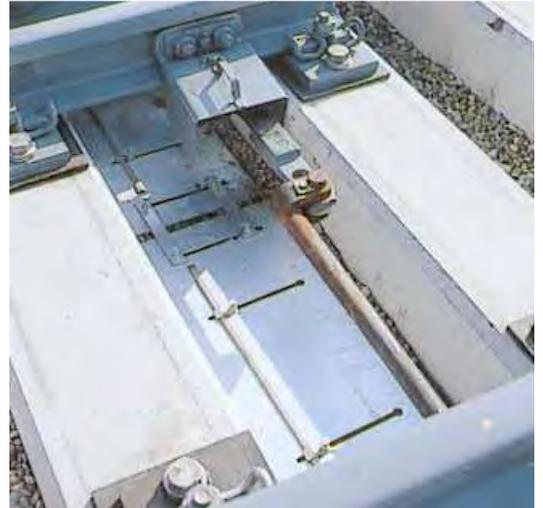
Related mounting guidelines on pages E1 and E2

Details of assembly and impressions

(cont.)



Steam locomotive impressions at mount Arlberg between the cities of St. Anton and Innsbruck (Austria)



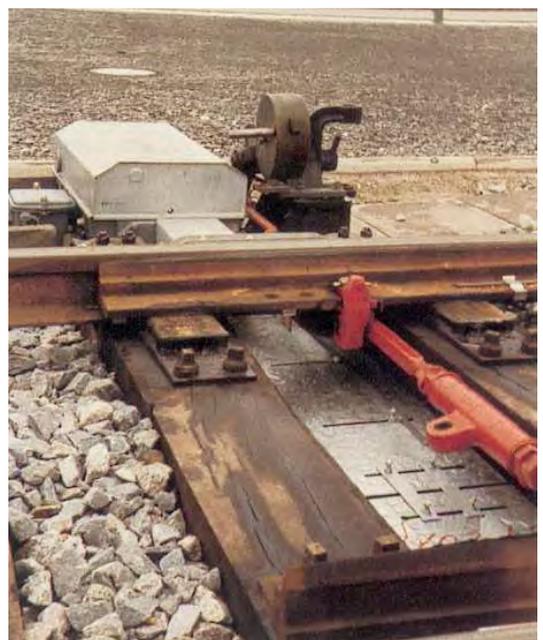
Point interlocking heating system on concrete sleepers



Switch blade heating and point interlocking heating system at wooden sleepers



Point interlocking heating system placed underneath the switch rodding and embedded on ballast





**Details of assembly
and impressions**
(cont.)

Heating elements of Backer ELC at Oberalp-pass at the Matterhorn Gotthard Railway



Wolff point heating system at Eibsee station submontane of Germany's highest mountain the Zugspitze