Claims:

1. A method for welding components, which can be travelled upon, of a track by flash butt welding in a welding device, comprising the steps of straight flashing, preheating, flashing and upsetting, wherein the upsetting process generates a welding region, whereupon the welding region, from the welding heat, is subjected to a cooling step (5) in which an austenitic structure of the welding region is converted into a pearlite structure, whereupon the welding region is subjected to a reheating step (6) in which the welding region is heated to above the Ac1 conversion temperature, wherein the heating is performed by electrical resistance heating in the welding device using the welding power source that is used for the straight flashing, preheating and flashing, whereupon a region of the component coming into contact with a wheel, particularly a rail head is subjected to accelerated cooling (7) in the welding region, and a region not coming into contact with the wheel, particularly a rail foot, is subjected to slower cooling in the welding region than the region of the component coming into contact with a wheel, particularly a rail head.

2. The method according to claim 1, characterized in that a direct current is passed through the welding region for the electrical resistance heating .

3. The method according to claim 1 or 2, characterized in that the cooling step (5) is carried out to a temperature of the welding region of less than 500 °C.

4. The method according to claim 1, 2 or 3, characterized in that the duration of the cooling step (5) is 120-240 seconds.

5. The method according to any one of claims 1 to 4, characterized in that the reheating step (6) is started immediately after completion of the cooling step (5) and preferably at a fixed temporal distance from the welding step at a temperature of the welding region of between 400 °C and 500 °C.

6. The method according to any one of claims 1 to 5, characterized in that the duration of the reheating step (6) is a maximum of 30 seconds.

7. The method according to any one of claims 1 to 6, characterized in that the reheating step (6) is carried out at an average heating rate of 13-20 °C/sec.

8. The method according to any one of claims 1 to 7, characterized in that the welding region is heated to a temperature of >850 °C, preferably to a temperature of 900-950 °C, in the reheating step (6).

9. The method according to any of claims 1 to 8, characterized in that the accelerated cooling (7) is carried out to a temperature of less than 500 °C, preferably less than 400 °C, particularly preferably less than 350 °C, the duration of the accelerated cooling (7) preferably being 80-150 seconds.

10. The method according to any one of claims 1 to 9, characterized in that the accelerated cooling (7) is effected

by forced convection, in particular by blowing, of a cooling gas, preferably air.

11. The method according to any one of claims 1 to 10, characterized in that the rails consist of a hardenable rail steel having a carbon content of > 0.75 %.

12. A welding device for welding components, which can be travelled upon, of a track by flash butt welding, comprising a welding power source, a feed device for pressing the track components against one another and a programmable control unit for controlling a time sequence of current pulses of the welding power source and a feed movement of the feed device, characterized in that the control unit is configured to control the feed device and the welding power source in a welding phase in order to carry out the steps of straight flashing, preheating, flashing and upsetting, a welding region being generated by the upsetting process, to control the welding power source in a subsequent reheating phase in order to carry out a reheating step (6), and to start the reheating step (6) after a cooling step (5) in which the welding region is cooled from the welding heat, further comprising a cooling device for accelerated cooling of the welding region, wherein the control unit interacts with the cooling device in such a way that the region coming into contact with a wheel, particularly a rail head, is subjected to accelerated cooling (7) in the welding region after the reheating step, and a region not coming into contact with the wheel, particularly a rail foot, is subjected to slower cooling in the welding region than the region of the component coming into contact with a wheel, particularly a rail head.

13. The welding device according to claim 12, characterized in that the cooling device is designed to blow a gas or gas mixture on at least one section of the welding region for the accelerated cooling (7) thereof.

14. The welding device according to claim 13, characterized in that at least one flow rate of the gas or gas mixture or its pressure is controllable by the cooling device.

15. The welding device according to any one of claims 12 to 14, characterized in that the control unit is configured to carry out the accelerated cooling (7) to a temperature of less than 500 °C, preferably less than 400 °C, particularly preferably less than 350 °C, wherein the duration of the accelerated cooling (7) is preferably 80-150 seconds.