CLAIMS

1. A fast charging system for forming an electrically conductive connection between a vehicle and a stationary charging station, the fast charging system having a contact device, a charging contact device, and a positioning device,

said contact device or said charging contact device being disposable on the vehicle,

said charging contact device comprising a charging-contact-element carrier,

said charging-contact-element carrier including a receiving opening formed along a longitudinal axis of the charging-contact-element carrier, the receiving opening having an entrance end and an exit end,

said charging contact device being electrically contacted using the contact device when in a contact position, the contact device located within the receiving opening when in the contact position,

said charging-contact-element carrier having charging contact elements, said charging contact elements each forming a strip-shaped charging contact surface mounted in parallel to the longitudinal axis, each strip-shaped charging contact surface having a leading end nearest the entrance end of the receiving opening and a trailing end nearest the exit end of the receiving opening,

said contact device comprising a contact element carrier having contact elements mounted on an exterior of the contact element carrier in at least one plane extending orthogonally to the longitudinal axis when in the contact position,

said contact elements each forming a contact surface which are smaller than the charging contact surfaces,

said contact elements being electrically contacted with the charging contact elements for forming contact pairs in each instance when in the contact position,

said contact pairs including one or more power contacts, a signal contact, and protective-ground contact; and

said contact device configured to be moved to the contact position by the positioning device,

wherein, when in the contact position, the fast charging system is configured to transmit high currents between the vehicle and the stationary charging station only when the protective-ground contact and/or the signal contact is formed.

2. The fast charging system according to claim 1,

wherein the leading end of the strip-shaped charging contact surfaces associated with the protective-ground contact are closer to the entrance end of the receiving opening than the leading end of the strip-shaped charging contact surfaces associated with the one or more power contacts; and

wherein the leading end of the strip-shaped charging contact surfaces associated with the one or more power contacts are closer to the entrance end of the receiving opening than the leading end of the strip-shaped charging contact surfaces associated with the signal contact.

3. The fast charging system according to any one of the preceding claims, wherein the trailing end of the strip-shaped charging contact surfaces associated with the protective-ground contact are closer to the exit end of the receiving opening than:

the trailing end of the strip-shaped charging contact surfaces associated with the one or more power contacts; and

the trailing end of the strip-shaped charging contact surfaces associated with the signal contact.

4. The fast charging system according to any one of the preceding claims, wherein the trailing end of the strip-shaped charging contact surfaces associated with the one or more power contacts are closer to the exit end of the receiving opening than the trailing end of the strip-shaped charging contact surfaces associated with the signal contact.

5. The fast charging system according to any one of the preceding claims:

wherein the strip-shaped charging contact surfaces associated with the protective-ground contact are longer in length along the longitudinal axis than the strip-shaped charging contact surfaces associated with the one or more power contacts; and

wherein the strip-shaped charging contact surfaces associated with the one or more power contacts are longer in length along the longitudinal axis than the strip-shaped charging contact surfaces associated with the signal contact.

6. The fast charging system according to any one of the preceding claims, wherein the charging contact elements are realized as conductor strips, said conductor strips mounted parallel to each other and the longitudinal axis.

7. The fast charging system according to any one of the preceding claims, wherein the contact elements are formed in the shape of bolts.

8. The fast charging system according to any one of the preceding claims, wherein the contact surface is punctiform.

9. The fast charging system according to any one of the preceding claims, wherein the contact device and the charging contact device each comprise a vertical axis, said respective vertical axes aligning flush when in the contact position.

10. The fast charging system according to claim 9, wherein a guiding device positions the respective vertical axes in a shared alignment when guiding the contact device and the charging contact device together.

11. The fast charging system according to any one of the preceding claims, wherein the contact device is disposed on a vehicle roof and the charging contact device is disposed on the stationary charging station or vice versa.

12. The fast charging system according to any one of the preceding claims, wherein the receiving opening forms a guide for the contact element carrier when guiding the contact element carrier and the charging-contact-element carrier together.

13. The fast charging system according to any one of the preceding claims, wherein the charging-contact-element carrier is formed as a longitudinal roof-shaped rail which is disposed in a moving direction of the vehicle.

14. The fast charging system according to any one of the preceding claims, wherein the positioning device comprises a pantograph or a rocker by means of which the contact device is positioned in a vertical direction with respect to the charging contact device.

15. A fast charging method for forming an electrically conductive connection between a vehicle and a stationary charging station, the method comprising:

(a) providing a contact device, a charging contact device, and a positioning device, said contact device or said charging contact device being disposable on the vehicle,

said charging contact device comprising a charging-contact-element carrier,

said charging-contact-element carrier including a receiving opening formed along a longitudinal axis of the charging-contact-element carrier, the receiving opening having an entrance end and an exit end,

said charging contact device being electrically contacted using the contact device when in a contact position, the contact device located within the receiving opening when in the contact position,

said charging-contact-element carrier having charging contact elements, said charging contact elements each forming a strip-shaped charging contact surface mounted in parallel to the longitudinal axis, each strip-shaped charging contact surface having a leading end nearest the entrance end of the receiving opening and a trailing end nearest the exit end of the receiving opening,

said contact device comprising a contact element carrier having contact elements mounted on an exterior of the contact element carrier in at least one plane extending orthogonally to the longitudinal axis when in the contact position,

said contact elements each forming a contact surface which are smaller than the charging contact surfaces,

said contact elements being electrically contacted with the charging contact elements for forming contact pairs in each instance when in the contact position, and

said contact pairs including one or more power contacts, a signal contact, and protective-ground contact;

(b) moving the contact position by the positioning device;

(c) moving the contact device or the charging contact device to establish the contact position; and

(d) when the protective-ground contact and/or the signal contact is formed, transmitting high currents between the vehicle and the stationary charging station.

16. The method according to claim 15, further comprising exiting the contact position by disconnecting the signal contact, then disconnecting the one or more power contacts, and then disconnecting the protective-ground contacts.