Claims

1. A hose heater (1), in particular for sealing thermoplastic hoses and/or pipes, in particular hoses made of thermoplastic elastomer, having at least one heating element which can be heated, in particular inductively, the heating element having at least four, in particular more than six, mutually movable, in particular electrically, inductively and/or resistively heatable regions (2), and the heating element is arranged to be placed from a direction perpendicular to the longitudinal extension on a hose (10) having an outer diameter and to enclose the latter over its circumference at at least four spaced-apart points, bearing against at least 75% of its circumference, and wherein the heating element is designed to be deformable in this way, that a cross-section enclosed by it can be reduced by at least 30%, in particular by more than 50%, by compressing and/or drawing the heating element and/or can be reduced in its extension in one direction of the cross-section by at least 30%, in particular by more than 50%, wherein the mutually movable, in particular electrically, inductively and/or resistively heatable regions (2) are formed by, in particular in each case one, plate-shaped element(s) and, in particular, between at least two pairs of mutually adjacent plate-shaped elements there is in each case a joint and/or a material weakening which allow the angle of the plate-shaped elements of the respective pair to be changed with respect to one another, characterised in that the outer diameter of the hose onto which the heating element is adapted to be placed is in the range of 3 mm to 45 mm and in that the hose heater is adapted to maintain the reduced enclosed cross-section at least against a force of 1 N pushing the hose heater apart at least to the extent that the reduced enclosed cross-section does not increase by more than 10%.

2. A hose heater according to claim 1, wherein the heating element has, in particular circumferentially, in particular around the mutually movable, in particular electrically, inductively and/or resistively heatable regions (2), a thermal insulation, in particular in the form of ceramic elements, elements made of plastic and/or glass, in particular insulation plates, in particular one per region and/or plate.

3. A hose heater according to one of the preceding claims, wherein the heating element, which can be heated, in particular electrically, inductively and/or resistively, is arranged on at least half of the circumference of the cross-section in only one layer around the cross-section enclosed by it and/or is wound a maximum of one and a half times around the cross-section enclosed by it.

4. A hose heater according to one of the preceding claims, wherein the hose heater is designed flexibly and/or with at least three joints and/or material weakening and/or the regions are each designed rigidly and/or wherein the heating element is designed in such a way that the reduction

of the cross-section can be effected by changing the angles of attack of adjacent, in particular all adjacent, in particular electrically, inductively and/or resistively, heatable regions via the joints and/or material weakenings.

5. A hose heater according to any one of the preceding claims, wherein said at least one heating element and/or its portions and/or heatable plates, have a specific heat capacity of less than 1000 J/K/kg.

6. A hose heater according to one of the preceding claims, wherein the hose heater, in particular heating element and/or insulation, is designed to be cut through, in particular is designed in two parts with a gap lying therebetween, wherein the separation takes place in particular parallel to the cross-sectional plane.

7. A hose heater according to any one of the preceding claims, wherein each of the halves provided for separation is adapted to maintain its reduced cross-sectional shape at least against it pushing apart force of 1 N.

8. A hose heater according to any one of the preceding claims, wherein the hose heater, in particular the heatable plates, have holes and/or recesses which are arranged to allow thermoplastic material to pass through when compressed.

9. A thermoplastic hose, in particular hose made of thermoplastic elastomer, having at least one heating element, designed as at least one, in particular electrically, inductively and/or resistively heatable clip and/or at least one, in particular electrically, inductively and/or resistively heatable ring which encloses the hose, the ring and/or the clip enclosing at least 75% of the circumference of the hose over the circumference thereof at at least four spaced-apart points, and wherein the heating element is designed to be deformable in such a way that a cross-section enclosed by it can be reduced by at least 30%, in particular by more than 50%, and/or can be reduced in its extension in one direction of the cross-section by at least 30%, in particular by more than 50%, by compressing and/or drawing the heating element, wherein mutually movable, in particular electrically, inductively and/or resistively heatable regions (2) are formed by, in particular in each case one, plate-shaped element(s) and between at least two pairs of mutually adjacent plate-shaped elements there is in each case a joint and/or a material weakening which permit a change in the angle of the plate-shaped elements of the respective pair with respect to one another, characterised in that the heating element is adapted to maintain the reduced enclosed cross-section at least against a force of 1 N pushing the heating element apart at least to the extent that the reduced enclosed cross-section does not increase by more than 10%.

10. A hose sealing device actuator comprising means for receiving a hose heater comprising at least one, in particular electrically, inductively and/or resistively, heatable heating element, wherein the heating element comprises at least four, in particular at least six, mutually movable, in particular electrically, inductively and/or resistively, heatable regions (2), heatable regions (2) which can be moved with respect to one another, in particular electrically, inductively and/or resistively, and the heating element being set up to enclose a hose (10) with an external diameter in the range from 3 mm to 45 mm, resting against the latter over its circumference at at least four points which are spaced apart from one another, and the heating element being designed in such a way that it can be deformed, in particular non-reversibly and/or non-elastically, that a cross-section enclosed by it can be reduced and/or flattened by at least 30%, in particular by at least 50%, in particular according to one of the preceding claims 1 to 8 with a hose accommodated therein and means, in particular comprising by means of at least one hydraulic and/or pneumatic cylinder, arranged for deforming the accommodated hose heater in such a way that the cross-section enclosed by it is reduced by at least 30%, in particular by more than 50%, wherein the hose closure device actuator comprises at least one means for effecting inductive and/or resistive heating of the heating element, in particular at least one induction coil for inductive and/or one heating device for resistive heating of the heating element, characterised in that the hose closure device actuator comprises at least one induction coil for inductive and/or one heating device for resistive heating of the heating element, and in that the hose closure device actuator

    a. has a joint on which two jaws and/or legs are arranged, both of which have at least one heating device and/or induction coil(s), or

    b. is made in two parts, the two parts being made rigid and reversibly connectable to each other and each having means for deformation and at least one heating device and/or induction coil(s), or

    c. is C-shaped or U-shaped, opposite end portions each having means for deformation and at least one heating device and/or induction coil(s).

11. A hose sealing device actuator, in particular in the form of pliers and/or two jaws connected to a hinge, for sealing thermoplastic hoses, in particular hoses made of thermoplastic elastomer, comprising at least one heating element which can be heated, in particular electrically, inductively and/or resistively, wherein said at least one heating element has at least four, in particular at least six, heatable regions which are movable relative to one another, and the heating element is arranged to be placed from a direction perpendicular to the longitudinal extent on a hose (10) having an external diameter in the range from 3 mm to 45 mm, and to surround at least 75% of its

circumference, bearing against the hose over its circumference at at least four spaced-apart points, and wherein the hose closure device actuator is set up to move said at least one heating element, in particular by means of at least one hydraulic and/or pneumatic cylinder, in such a way that a cross-section enclosed by it, in particular of a thermoplastic hose, can be reduced by at least 30%, in particular by more than 50%, and/or can be reduced in its extension in one direction of the cross section by at least 30%, in particular by more than 50%, the hose closure device actuator having in particular at least one induction coil for electrical, inductive heating and/or a heating device for resistive heating of the heating element.

12. A hose sealing device actuator according to claim 10 or 11, comprising at least one cutting device for cutting a hose and/or at least one temperature sensor.

13. A hose sealing system comprising at least one hose heater, in particular having a plurality of different inner diameters, according to one of the preceding claims 1 to 8 and/or at least one hose, in particular having a plurality of different inner diameters, according to the preceding claim 9 and at least one, in particular exactly one hose sealing device actuator according to the preceding claim 10, 11 or 12.

14. A method for sealing a thermoplastic hose, in particular a hose made of thermosplastic elastomer, in particular according to claim 9, comprising the following steps:

    - at least partial enclosure of a section of the hose with at least one, in particular electrically, inductively and/or resistively, heatable heating element and/or use of a thermoplastic hose with a heatable, in particular electrically, inductively and/or resistively, heating element enclosing it, wherein the heating element at least partially abuts the circumference of the hose, and enclosing the hose and/or the heating element on at least two opposite sides at and/or adjacent to the section of the hose with a means for compressing the hose, in particular according to one of the preceding claims 10 to 12 and characterised by heating the heating element and heating the hose with the heated heating element, in particular until at least at the circumference, in particular over the entire thickness of the hose wall, the Shore A hardness of the section is reduced by at least 30% and/or at least at the circumference, in particular over the entire thickness of the hose wall, the glass temperature and/or glass transition temperature is reached,

    - compressing the hose with the means for compressing the hose, in particular while the heating of the heating element and/or the heating of the section with the heated heating element is continued, and

    - removing the means of compression and in particular also the heating element.

15. The use of at least one, in particular electrically, inductively and/or resistively heatable heating element for sealing a thermoplastic hose, in particular a hose made of thermoplastic elastomer, in particular according to claim 9, wherein a section of the thermoplastic hose is and/or is enclosed with said at least one, in particular electrically, inductively and/or resistively heatable heating element, and characterised in that , said at least one heating element is heated and thus the section is heated, in particular until at least at the circumference, in particular over the entire thickness of the hose wall, the Shore A hardness of the section is reduced by at least 30% and/or at least at the circumference, in particular over the entire thickness of the hose wall, the glass temperature and/or glass transition temperature is reached, and compressing the hose in and/or adjacent to the section, in particular while the heating of the heating element and/or the heating of the section with the heated heating element is continued.