Claims

1. Lead forming device for forming an electronic component lead, comprising:
- two cooperating opposite tool parts relatively movable towards and away from each other;
- a first clamp half attached to one of the tool parts and a second clamp half attached to the opposite tool part for clamping at least part of the lead;
- at least one first forming punch movably connected to one of the tool parts and at least one second forming punch movably connected to the opposite tool part; and
- a drive arranged for independently controlling cooperative movement of the first and second forming punches,
wherein the at least one first forming punch and the at least one second forming punch are configured to consecutively bend the electronic component lead while the lead remains clamped by the first clamp half and the second clamp half.

2. Lead forming device according to claim 1, wherein the at least one first forming punch is arranged to bend at least part of a lead in one first direction; and wherein the at least one second forming punch is arranged to bend at least a part of the lead in one second opposite direction.

3. Lead forming device according to any of claims 1 – 2, wherein the at least one first forming punch is located adjacent to the first clamp half, and
wherein the at least one second forming punch is located adjacent to the second clamp half and/or wherein the at least one first forming punch comprises at least two forming punches located adjacent to each other and/or wherein the first and second clamp halves are movable in a direction substantially parallel to a direction of cooperative movement of the first and second forming punches.

4. Lead forming device according to any of claims 1 – 3, wherein the at least one first forming punch comprises a convex bending surface and the at least one second forming punch comprises a concave bending surface or the other way around.

5. Lead forming device according to any of claims 1 – 4, comprising at least one trimming punch for trimming the lead.

6. Lead forming device according to any of claims 1 – 5, comprising at least one third forming punch movably attached to one of the tool parts for bending the lead.

7. Lead forming device according to any of claims 1 – 6, wherein the first clamp half and the second clamp half each comprise an at least partially flat lead contacting surface and/or wherein at least one of the first clamp half and the second clamp half is arranged to at least partially form the lead.

8. Lead forming device according to any of claims 1 – 7, wherein the first clamp half and the second clamp half are provided with multiple contact surfaces for clamping multiple leads and/or wherein the first and/or second forming punches are provided with multiple contact surfaces to bend multiple leads.

9. Lead forming device according to any of claims 1 – 8, wherein the first clamp half and the second clamp half are arranged to directly contact at least part of the electric component lead and/or wherein at least part of a lead clamping surface of the second clamp half is located opposite at least part of the first forming punch forming a die-like surface and wherein another at least part of the lead clamping surface of the second clamp half is located opposite at least part of the first clamp half forming a clamp-like surface; and

wherein the die-like surface and the clamp-like surface are not located in a same plane.

10. Lead forming assembly comprising a lead forming device according to any of claims 1 – 9, wherein the lead forming device comprises:

- a lead trimming and/or preforming section, comprising an upper trimming clamp half movably attached to the first tool part, a lower trimming clamp half movably attached to the second tool part, and the at least one trimming punch;
- a lead forming section, comprising the first and second clamp halves and the at least one first and at least one second forming punches; and

- a final forming section, comprising an upper final forming clamp movably attached to the first tool part, a lower final forming clamp movably attached to the second tool part, and the at least one third forming punch.

11. Use of a lead forming device according to any of claims 1 – 9 or a lead forming assembly according to claim 10, for forming at least one electronic component lead.

12. Method for forming an electronic component lead, comprising the following steps:

a) providing an electronic component comprising at least one lead;

b) clamping the at least one lead on opposite sides of the lead at a clamping location adjacent to the electronic component and away from a tip of the lead;

c) bending the lead in a first bending direction at a first bending location located between the clamping location and the tip of the lead; and

d) bending the lead in a second bending direction at a second bending location between the first bending location and the tip;

wherein steps c) and d) are performed subsequently.

13. Method according to claim 12, wherein the first bending direction is opposite to the second bending direction.

14. Method according to claim 12 or claim 13, wherein steps c) and d) are performed subsequently while the lead remains in a clamped position and/or wherein prior to step b) the lead is cut and/or wherein after step d) the lead is further bent in the first bending direction.

15. Method according to any of claims 12 – 14, wherein during step c) the lead is bent around at least part of a surface of at least one clamp half clamping the at least one lead together with another clamp half at the clamping location and/or wherein during step d) the lead is bent around a surface of a punch bending the lead in the first bending direction at the first bending location.