CLAIMS

1. Cantilever contact probe (31) comprising a probe body (40) inserted between a descending probe section (31b) and an ascending probe section (31c), said descending probe section (31b) extending along a predetermined longitudinal axis (HH) inclined with respect to a reference plane (π) corresponding to a plane of a wafer of devices under test (35) when said contact probe is mounted in a cantilever probe head (30), said cantilever contact probe (31) further comprising at least one end portion (31a), formed in said descending probe section (31b), bent with respect to said longitudinal axis (HH) starting from a bending point (PG1) and ending with a contact tip (36A) of said cantilever contact probe (31) adapted to abut onto a contact pad (35A) of a device under test (35) of said wafer, characterized in that said body (40) is suitably shaped and comprises at least one base portion (40a) provided with an upper portion (40d) extending, starting from said base portion (40a), along a longitudinal extension axis (A) of said shaped body (40), orthogonally to said reference plane (π) and a top portion (40e), connected to said upper portion (40d) and having a greater diameter (D2) than a diameter (D1) of said upper portion (40d), said upper and top portions (40d, 40e) being substantially shaped so as to form a T, said upper portion (40d) being the stem of said T and said top portion (40e) being the crosspiece of said T.

2. Cantilever contact probe (31) according to claim 1, characterized in that said ascending probe section (31c) is connected to said shaped body (40) at said top portion (40e) and said descending probe section (31b) is connected to said shaped body (40) at said base portion (40a).

3. Cantilever contact probe (31) according to claim 1 or 2, characterized in that said base portion (40a) of said shaped body (40) comprises at least one pair of arms (40b1, 40b2) extending, from opposite parts of said base portion (40a) along a transversal extension axis (BB) of said shaped body (40) orthogonal to said longitudinal extension axis (AA) and parallel to said reference plane (π).

4. Cantilever contact probe (31) according to claim 3, characterized in that each of said arms (40b1, 40b2) comprises a

respective projection (40c1, 40c2) which extends orthogonally starting therefrom, along said longitudinal extension axis (AA) of said shaped body (40) in the direction of said top portion (40e).

5. Cantilever contact probe (31) according to one or more of the preceding claims, characterized in that said base portion (40a) of said shaped body (40) has a substantially rectangular-shaped longitudinal section and a maximum transversal dimension along said transversal extension axis (BB) which is greater than said diameters (D1, D2) of said upper and top portions (40d, 40e).

6. Cantilever contact probe (31) according to one or more of the preceding claims, characterized in that said shaped body (40), comprising at least said base portion (40a), said upper portion (40d) and said top portion (40e), is made as a single piece.

7. Cantilever contact probe (31) according to one or more of the preceding claims, characterized in that it comprises a further bending point (PG2) defined in said ascending probe section (31c) close to said top portion (40e) of said shaped body (40), said ascending probe section (31c) being substantially orthogonal to said reference plane (π) and ending with a further contact end (36B) of said cantilever contact probe (31).

8. Cantilever contact probe (31) according to one or more of the preceding claims, characterized in that said shaped body (40) comprises an opening (38).

9. Cantilever contact probe (31) according to claims 3 and 8, characterized in that said opening (38) is formed close to one of said arms (40b1, 40b2) having an extension which is greater than the other one of said arms (40b1, 40b2).

10. Cantilever contact probe (31) according to one or more of the preceding claims, characterized in that it further comprises at least one damping portion (50, 51) formed at said descending probe section (31b) and/or at said ascending probe section (31c).

11. Cantilever contact probe (31) according to claim 10, characterized in that said at least one damping portion (50) is formed along said descending probe section (31b), preferably shaped as a pantograph portion connected to said end portion (31a) and to said

descending probe section (31b) at respective bending points (PG1a, PG1b) and essentially comprises four sides (50a-50d) having variable sections arranged substantially as a parallelepiped and defining an empty space (50e) therewithin.

12. Cantilever contact probe (31) according to claim 10 or 11, characterized in that said at least one damping portion (51) is formed at said ascending probe section (31c) and is essentially shaped as a spring portion connected to said shaped body (40) at said further bending point (PG2) and comprises said further contact end (36B) of said cantilever contact probe (31).

13. Cantilever probe head (30) comprising a support structure (32) adapted to house a plurality of cantilever contact probes (31), protruding in a cantilever manner from said support structure (32) on a device under test (35), characterized in that each cantilever contact probe (31) is realised according to any of the preceding claims and comprises a shaped body (40) intended to insert into corresponding housing seats (41) formed in said support structure (32) and adapted to retain in a precise manner said cantilever contact probes (31) in said cantilever probe head (30).

14. Cantilever probe head (30) according to claim 13, characterized in that said support structure (32) comprises at least one first portion (32A) and one second portion (32B), both preferably ring-shaped, overlapping each other and provided with respective housing seats (41) of said shaped body (40) of each of said cantilever contact probes (31).

15. Cantilever probe head (30) according to claim 13 or 14, characterized in that said support structure (32) further comprises at least one third portion (32C) placed at at least one arm (40b1, 40b2) of said shaped body (40) of each of said cantilever contact probes (31) and provided with an indentation adapted to house said at least one arm (40b1, 40b2).

16. Cantilever probe head (30) according to claim 14, characterized in that said first portion (32A) of said support structure (32) comprises at least one first housing seat (41d) for the passage and

retention of said upper and top portions (40d, 40e) of said shaped body (40) of said cantilever contact probes (31).

17. Cantilever probe head (30) according to claim 16, characterized in that said first housing seat (41d) has a cross section equal to the union of cross sections of said upper and top portions (40d, 40e) of said shaped body (40).

18. Cantilever probe head (30) according to claim 16 or 17, characterized in that said first portion (32A) of said support structure (32) further comprises a pair of second housing seats (41c1, 41c2) having a cross section corresponding and complementary to a cross section of said projections (40c1, 40c2) of said arms (40b1, 40b2) of said shaped body (40), said projections (40c1, 40c2) being contained in said second housing seats (41c1, 41c2) during the normal working of said cantilever probe head (30).

19. Cantilever probe head (30) according to one or more of claims 16, 17 or 18, characterized in that said second portion (32B) of said support structure (32) comprises suitable openings (41e), placed at said first housing seat (41a), for the passage of said top portion (40e) of said shaped body (40).

20. Cantilever probe head (30) according to one of claims 13 to 19, characterized in that it further comprises at least one support plate (37) connected to said second portion (32B) of said support structure (32) and provided with holes (37A) suitable for the passage of said ascending probe sections (31c) provided with said further contact ends (36B) of said cantilever contact probes (31).

21. Cantilever probe head (30) according to claim 20, characterized in that said support plate (37) is made of an insulation material and is integral with said second portion (32B) of said support structure (32) or with said PCB board (33).

22. Cantilever probe head (30) according to one of claims 20 or 21, characterized in that said second portion (32B) of said support structure (32), provided with said support plate (37) is mounted in pressing contact with said PCB board (33), said further contact ends (36B) of said cantilever contact probes (31) at said ascending probe

sections (31c) abutting onto contact pads (33A) of said PCB board (33).

23. Cantilever probe head (30) according to any of claims 13 to 22, characterized in that it comprises a plurality of modules (60), each provided with a support structure (32) from which cantilever contact probes (31) protrude, which end with respective contact tips or ends (36A, 36B), said modules (60) having sizes which can be compared to those of a single device under test (35).

24. Cantilever probe head (30) according to claim 23, characterized in that said plurality of modules (60) is distributed so as to cover an area of said PCB board (33) equal to that of said wafer of devices under test (35).

25. Cantilever probe head (30) according to claim 23 or 24, characterized in that each of said modules (60) comprises at least one contact portion (61), suitably provided with at least one hole (61A) adapted to house at least one fixing element (62).

26. Cantilever probe head (30) according to one or more of claims 23 to 25, characterized in that each of said modules (60) further comprises alignment pins (63) having suitable shapes which are complementary to as many housings.

27. Cantilever probe head (30) according to one or more of claims 23 to 26, characterized in that it further comprises a support structure associated with said PCB board (33) for housing said modules (60), provided with said housings for said alignment pins (63) of said modules (60).

28. Cantilever probe head (30) according to one or more of the preceding claims, characterized by comprising contact probes (31) having respective second end portions (31c) with a different size, so as to modify a distribution of said contact pads (33A) of said PCB board (33).

29. Method of assembling a plurality of cantilever contact probes (31) realised according to one of claims 1 to 12 in a cantilever probe head (30) according to one of claims 13 to 28, comprising the steps of:

inserting each of said cantilever contact probes (31) into said cantilever probe head (30) by inserting said upper and top portions (40d, 40e) of said shaped body (40) of each of said cantilever contact probes

(31) into a corresponding section having a greater diameter than said first housing seat (41d) formed in said first portion (32A) of said support structure (32) of said cantilever probe head (30) until they pass through said openings (41e) formed in said second portion (32B) of said support structure (32) of said cantilever probe head (30), along a first movement direction (Dir1), which is orthogonal to said reference plane (π) and by inserting said projections (40c1, 40c2) of said arms (40b1, 40b2) of said shaped body (40) into corresponding second housing seats (41c1, 41c2) formed in said first portion (32A) of said support structure (32) of said cantilever probe head (30) along said first movement direction (Dir1), and

fitting said cantilever contact probes (31) into said cantilever probe head (30) by moving said shaped body (40) of each of said cantilever contact probes (31) transversally along a second movement direction (Dir2), which is orthogonal to said reference plane (π), said upper portion (40d) going to be housed into a lower-diameter section of said first housing seat (41d), so as to block said cantilever contact probes (31) in said cantilever probe head (30)

said upper portion (40d) of said probe body (40) of each of said cantilever contact probes (31) having a height which is lower than or equal to a thickness of said second portion (32B) of said support structure (32) so as to ensure a mechanical coupling between said shaped body (40) and said support structure (32) of said cantilever probe head (30).

30. Method of assembling according to claim 29, wherein said step of inserting each of said cantilever contact probes (31) into said cantilever probe head (30) comprises inserting ascending sections thereof (31c) into respective first T-shaped housing seats (41d) at a crosspiece of said T having sizes equal to a diameter (D2) of said top portion (40e) of said shaped body (40) of each of said cantilever contact probes (31) and subsequent lateral displacement for fitting said upper portion (40d) of said shaped body (40) at a stem of said T having sizes equal to a diameter (D1) of said upper portion (40d).