CLAIMS

1. A coupling device (100; 300) for a system (1000; 2000) of couplable prefabricated panels, comprising a first and a second prefabricated building panel (200), each having a respective groove (250), wherein the coupling device (100; 300) comprises:

- a foil key (110; 310) extending over a first reference plane (xy) defined by a transversal axis (x) and a longitudinal axis (y);
- a metallic coupling element (120; 320) extending from said first reference plane (xy), the metallic coupling element (120; 320) comprising:
    - a first (120A; 320A) tapered element extending to a first predefined height on a first side of said first reference plane (xy);
    - a second (120B; 320B) tapered element extending to a second predefined height on a second side of said first reference plane (xy) opposite to said first side,

  said first and second tapered elements (120A, 120B; 320A, 320B) having a first and a second mutually facing bases (129; 329), respectively, each extending along a first and a second length on the first reference plane (xy);

wherein said first and second tapered elements (120A, 120B; 320A, 320B) each comprises a first wing and a second wing (121, 122, 123, 125; 321, 322, 323) symmetrical with respect to a second reference plane (yz) defined by the longitudinal axis (y) and a vertical axis (z; 150; 350) perpendicular to said first reference plane (xy), the first and the second wing each comprising a plurality of fast-connected portions, defined on a third reference plane (xz), which is defined by the transversal axis (x) and

the vertical axis (z; 150; 350) , as follows:

- a first linear portion (123; 323) extending from said first and second base (129; 329), respectively, with an angle $10 < \beta < 45°$ with respect to said vertical axis (z; 150; 350);
- a second elbow portion (122; 322) extending from said first linear portion (121; 321);

wherein the foil key (110; 310) is configured to rotate said coupling element (120; 320) from a rest position, wherein each tapered element is configured to be inserted in the respective groove (250) with said first length substantially oriented along said respective groove (250) so that each tapered element is free to move along the respective groove, to a locked position, wherein each tapered element is inserted in the respective groove (250) with said second length substantially oriented along said respective groove (250) so that each tapered element is constrained to the respective groove along said first reference plane (xy), and vice versa;

and wherein the coupling device is characterized in that:

- the first and the second tapered elements (120A; 320A; 120B; 320B) are symmetrical with respect to the first reference plane (xy);
- the first and the second tapered elements(120A; 320A; 120B; 320B) are fast connected to said foil key (110; 310);
- the first wing and the second wing (121, 122, 123, 125; 321, 322, 323) each comprise a third linear portion (121; 321) extending from said second elbow portion (122; 322) up to a first free end (121S; 321S) with an angle $\gamma \cong 90° - \beta$ with a tolerance of $\pm 2°$ with respect to said vertical axis (z,150; 350);

wherein said first free end (121S; 321S) is rounded-shaped on both sides transversely to its respective main direction of extension.

2. A coupling device (100; 300) according to claim 1, wherein said coupling element (120; 320) is made of metal sheet.

3. A coupling device (100; 300) according to claim 1 or 2, wherein said foil key (110; 310) is made of metal, preferably of metal sheet.

4. A coupling device (100; 300) according to one or more of claims 1 to 3, wherein:

the plurality of portions additionally comprises a fourth projecting portion (125) which protrudes from said first linear portion (123), away

from said vertical axis (z; 150), up to a second free end (125S);

- said second free end (125S) is rounded-shaped transversely to its respective main direction of extension.

5. A coupling device (100; 300) according to claim 4, wherein the third linear portion (121) and the fourth projecting portion (125) form an angle $\alpha \cong \beta$ therebetween.

6. A coupling device (100; 300) according to one or more of claims 1 to 5, wherein the first (120A; 320A) and the second (120B; 320B) tapered elements are formed in a single piece.

7. A coupling device (100; 300) according to one or more of claims 1 to 5, wherein the first (120A; 320A) and the second (120B; 320B) tapered elements are formed in two separate pieces, fast connected along said first and second base (129; 329) through said foil key (110; 310).

8. A coupling device (100; 300) according to claim 7, wherein a fifth coupling portion (127A, 127B) is comprised for each tapered element (120A, 120B), the fifth coupling portion projecting with respect to said base (129), the fifth coupling portion crossing a corresponding opening of the foil key (110) and being folded about the base (129) of the tapered element (120A, 120B) symmetrical to said first reference plane (xy).

9. A coupling device (100; 300) according to one or more of claims 1 to 8, wherein the first (320A) and the second (320B) tapered elements comprise a through

slit (328) in the direction of said vertical axis (z; 350) and adapted to insertingly receive a metal reinforcing element (360), preferably made of metal sheet, wherein, in the first and second wing, said through slit (328) completely crosses the first and the second base (329), the first linear portion (323) and the second elbow portion (322), while it partially crosses the third linear portion (321) along a perpendicular direction with respect to said vertical axis (z; 350), the through slit (328) having a through slit end which falls before the first free end (321S).

10. A coupling device (100; 300) according to claim 9, wherein, when the reinforcing element (360) is inserted in the through slit, an edge (362) of the reinforcing element oriented towards said first free end (321S) is at a distance d > 0 from the through slit end, the distance d being sized to provide a maximum moving back of the first and second wing in the direction of said first length in the locked position.

11. A coupling device (100; 300) according to claim 9 or 10, wherein said perpendicular direction coincides with the direction of said first length.

12. A coupling device (100; 300) according to one or more of claims 9 to 11, wherein the reinforcing element (360) comprises fastening means (361) for fastening the metal reinforcing element to said first (320A) and second (320B) tapered element, the fastening means (361) being configured to fasten the reinforcing element (360) after the insertion of the metal reinforcing element in said through slit (328).

13. A coupling device (100; 300) according to claim 12,

wherein the fastening means (361) comprise two tongues which are inelastically extendible in a direction perpendicular to said metal reinforcing element (360) so as to

counteract with the first or second base (329) outside said through slit (328).

14. A coupling device (100; 300) according to one or more of claims 9 to 13, wherein said first (320A) and second (320B) tapered elements are formed as a single piece with a first (310A) and a second (310B) foil semi-keys, respectively, which are mutually fastened on the side of said first and second bases (329) through said reinforcing element (360) so as to form said the at least one coupling device (300).

15. A coupling device (100; 300) according to one or more of claims 1 to 14, wherein said foil key (110; 310) has a first surface and a second surface which is opposite to said first surface, there being provided, on each of said first and second surfaces, at least a boss (126; 326).

16. A coupling device (100; 300) according to one or more of claims 1 to 15, wherein $16<\beta<28°$.

17. A coupling device (100; 300) according to one or more of claims 1 to 15, wherein said foil key (110; 310) has a first surface and a second surface which is opposite to said first surface, there being provided, on each of said first and second surfaces, a protruding element (370A; 370B).

18. A system (1000; 2000) of couplable prefabricated panels, comprising a first and a second prefabricated building panel (200) and at least one coupling device (100; 300) configured to couple said first prefabricated panel with said second prefabricated panel (200), the first and the second prefabricated panels (200) having a first and a second groove (250), respectively,

wherein said at least one coupling device (100; 300) is the coupling element according to any claim 1 to 17 and wherein said first free end (121S; 321S) is rounded-shaped on both sides transversely to its respective main direction of extension so that, when the first and the second prefabricated panels are in the locked position, each first protruding wall (210) abuts against said first free end (121S; 321S).

19. A system (1000; 2000) of couplable prefabricated panels according to claim 18, wherein the at least one coupling device (100; 300) is according to claim 4, and wherein said second free end (125S) is configured to abut against said second protruding wall (220) in the locked position.

20. A system (1000; 2000) of couplable prefabricated panels according to claim 18 or 19, wherein the at least one coupling device (100; 300) is according to claim 15, and wherein configured at least a boss (126; 326).is configured to contact a front wall (230) which is adjacent to said second protruding wall (220) and perpendicular to said vertical axis (z; 150; 350).

21. A system (1000; 2000) of couplable prefabricated panels according to any claim 18 to 20, wherein the at least one coupling device (100; 300) is according to claim 17, and wherein the protruding element (370A; 370B)

is configured to contact a curved wall (221) provided between said second protruding wall (220) and said front wall (230) and perpendicular to said vertical axis (z,150; 350).

22. Method for coupling a first and a second prefabricated panel (200), each having a respective groove (250) along a respective groove direction, by means of the system according to any claim 18 to 21, said coupling device (100; 300) comprising a foil key (110; 310) extending over a first reference plane (xy) defined by a transversal axis (x) and a longitudinal axis (y) and a coupling element (120; 320) extending from said first reference plane (xy),

comprising the following steps:

bringing the first and the second prefabricated panel (200) close together, so that the respective groove directions are parallel and the first and second groove (250) face each other;

inserting the coupling element (120; 320) inside the grooves (250), so that the longitudinal axis (y) is perpendicular to said respective groove directions;

rotating the coupling device (100; 300) about the vertical axis (z) so that the longitudinal axis (y) is at an angle of 0-30° relative to said respective groove directions and at least two-thirds of the foil key (110; 310) lies between the first and second prefabricated panels (200).