CLAIMS

1. A set of floor panels (1, 1') provided with a locking system comprising a tongue (10,30) at an edge of a first floor panel and a tongue groove (20) in an adjacent edge of a similar second floor panel for connecting the edges vertically c h a r a c t e r i s e d in that the tongue (10,30) and the tongue groove (40) are displaceable in relation to each other, the tongue comprises a protrusion extending horizontally beyond the upper part of the edge (31a,31b) and the tongue groove a protrusion and a cavity (33a, 33b) configured such that the adjacent edges can obtain a vertically unlocked position where the protrusion of the tongue matches the cavity of the tongue groove and a vertically locked position where the protrusion of said tongue vertically overlaps the protrusion of said tongue groove.

2. The set of floor panels as claimed in claim 1, wherein the tongue (30) and the groove (20) each comprise a protrusion and a cavity

3. The set of floor panels as claimed in claim 2, wherein the tongue and the groove each comprise several protrusions and cavities

4. The set of floor panels as claimed in claim 3, wherein the tongue and the groove are configured such that upper parts of the edges can be brought into contact with an essentially vertical motion and that the vertically locked position can be obtained by displacement along one of the edges.

5. The set of floor panels as claimed in any one of claims 1-4, w herein the tongue is a displaceable tongue (30) in a displacement groove (40) of the first panel

6. The set of floor panels as claimed in any one of claims 1 - 5, wherein the protrusion and cavities of the groove are provided at a lower lip (22) and that the lower lip is displaceable in relation to the second panel.

7. The set of floor panels as claimed in claim 5, wherein the panels are provided with first and second connectors (6,8,14,20,30) integrated with the floor panels and configured to connect adjacent edges, the first connector comprises a locking strip (6) with an upwardly directed locking element (8) at an edge of a floor panel and a downwardly open locking groove (14) at an adjacent edge of another floor panel for connecting the adjacent edges in a horizontal direction D2 perpendicular to the adjacent edges, the second connector comprises the displaceable tongue (30) at an edge of a floor panel, and a horizontally open tongue groove (20) in an adjacent edge of another floor panel for connecting the adjacent edges in vertical direction D1,

that the connectors are configured to be locked with an angling or a vertical motion,

that a pressing edge (32) of the displaceable tongue (30) is arranged in an initial position at an edge of a panel,

that the pressing edge is configured to be displaced essentially horizontally and essentially in one direction only and along the adjacent edge from the initial unlocked position to a final locked position.

8. The set of floor panels as claimed in claim 5, wherein the displaceable tongue (30) of a panel in a first row is configured to be pushed by a force, applied at the pressing edge (32), of a panel in a second row.

9. The set of floor panels as claimed in any one of the preceding claims, wherein the tongue (10, 30) is displaced essentially along and parallel with the adjacent edges.

10. The set of floor panels as claimed in any one of the preceding claims, wherein the width of the tongue (10, 30) varies in the length direction of the tongue.

11. The set of floor panels as claimed in claims 1 - 4, wherein the protrusions and cavities of the groove and/or the tongue are formed in one piece with the panel.

12. The set of floor panels as claimed in any one of the claims 1-8 wherein the protrusions and cavities of the groove are formed in a separate material connected to the edge.

13. The set of floor panels as claimed in any one of the preceding claims wherein at least one protrusion has a wedge shape in the horizontal and/or vertical direction.

14. The set of floor panels as claimed in any one of the preceding claims wherein an outer part of at least one protrusion has a width or thickness that is smaller than an inner part.

15. The set of floor panels as claimed in any one of the claims 5-10 wherein at least one protrusion has a wedge shaped cross section to obtain an increasing vertical

pressure when the displaceable tongue (30) is displaced along the joint.

16. The set of floor panels as claimed in any one of the claims 5-10, wherein the displacement groove (40) and the tongue groove (20) are offset vertically in relation to each other.

17. A set of floor panels (1, 1') provided with a locking system comprising a separate part (30) in one edge of a first floor panel (1) and a groove (20) in an adjacent edge of a similar second floor panel (1') for connecting the edges vertically and/or horizontally c h a r a c t e r i s e d in that the separate part (30) is displaceable along the adjacent edges and that the adjacent edges are configured to be locked vertically and/or horizontally by only a displacement of the separate part along and parallel to the adjacent edges.

18. The set of floor panels as claimed in claim 17, wherein the separate part (30) and the groove (20) each comprise protrusions (31a,31b) and cavities (33a, 33b) configured such that the adjacent edges can obtain an unlocked position where the protrusions of one of the adjacent edges match the cavities of the other of the adjacent edges and a locked position where some of the protrusions of respectively edges overlap each other vertically and/or horizontally

19. The set of floor panels as claimed in claim 18, wherein the separate part (30) is configured to be pushed by a force (P), applied at a pressing edge (32) of the separate part by a panel in a second row.

20. The set of floor panels as claimed in any one of the claims 17-19, wherein the width of the separate part (30) varies in the length direction of the tongue (30).

21. The set of floor panels as claimed in any one of the claims 17-20 wherein at least one protrusion has a wedge shaped cross section to obtain an increasing vertical and/or horizontal pressure when the separate part is displaced along the joint.

22. The set of floor panels as claimed in any one of the claims 17-21 wherein an outer part of at least one protrusion has a width or thickness that is smaller than an inner part.

23. A method to install floor panels with a mechanical angling locking system at long edges (5a, 5b) and a mechanical locking system at short edges (4a, 4b) comprising a tongue (10,30) and a tongue groove each provided with protrusions and cavities wherein the method comprises the steps of:

- Bringing a new and a second panel into a position were upper parts of their short edges are in contact, in which position the new and a second panels are in the same plane and in a second row with the long edges offset and with the short edges unlocked vertically and preferably locked horizontally.

- Displacing one of the panels along the short edges until the long edges are aligned and some of the protrusions at one of the short edges vertically overlaps some of the protrusions at the other of the

short edges to lock the short edges vertically and horizontally.

- Bringing the aligned long edges into contact with a long edge of a first panel in a first row
- Angling down the second and the new panel along the aligned long edges to lock the long edges of the first, the second and new panel vertically and horizontally.

24. The method as claimed in claim 23 wherein the second and new panels are in an angled position in relation to the first panel in the position when the short edges are in contact.

25. The method as claimed in claim 24 wherein the upper parts of the long edges of the first and second and panels are in contact in the position when the short edges are in contact.

26. The method as claimed in claim 25 wherein the method comprises the step of bringing the upper parts of the short edges into contact by an essentially vertical motion.

27. The method as claimed in claim 26 wherein the method comprises the step of locking the short edges horizontally by the vertical motion.

28. A method to install floor panels with a mechanical angling locking system at long edges (5a, 5b) and a mechanical locking system at short edges comprising a tongue groove (40) and a displaceable tongue (10,30) whereby the said tongue and tongue groove each comprises

protrusions (31a,31b) and cavities (33a, 33b) configured such that adjacent short edges can obtain a vertically unlocked position where the protrusions of one of the adjacent short edges match the cavities of the other adjacent short edge and a vertically locked position where some of the protrusions of respectively adjacent short edges vertically overlap each other wherein the method comprises the step of:

- connecting long edges of a second (1) and a new panel (1') in a second row (R2) to a long edge of a first panel (1'') in a first row (R1) with angling
- positioning the second and the new panel in essentially the same plane and with their adjacent short edges (4a, 4b) in contact
- displacing the displaceable tongue (30) along the adjacent short edges to a position where some of the protrusions, of respectively adjacent short edge, overlap each other to lock the adjacent short edges vertically.

29. A method to install floor panels with a mechanical locking system at long edges comprising protrusions (31a, 31b) and cavities (33a, 33b) and a mechanical locking system at short edges comprising a displaceable locking element allowing horizontal snapping of short edges whereby said long edges can obtain a vertically and/or horizontally unlocked position where the protrusions of one long edge match the cavities in another adjacent long edge and a vertically and/or horizontally locked position where some of the protrusions, of respectively long edge,

overlap each other vertically and/or horizontally wherein the method comprises the steps of:

- locking, at least partially vertically and horizontally, the long edge of a first (1'') panel in a first row (R1) to a long edge of a second panel (1) in a second row (R2)
- connecting the long edge of a new (1') panel in the second row (R2) to the first panel (1'') in the first row (R1) by bringing the upper parts of the adjacent long edges in contact
- displacing the new panel along the long edge of the first panel to a position where some of the protrusions of the new and the first panel overlap each other and until a short edge of the new panel snaps into an adjacent short edge of the second panel

30. A method to produce protrusions (31a, 31b) and cavities (33a, 33b) located after each other along an edge of a floor panel with a rotating tool (72, 73) having an axis of rotation (AR) wherein the method comprises the step of:

a) Bringing an edge of the floor panel in contact with the tool.

b) Displacing the edge of the panel in relation to the tool essentially parallel with the axis of rotation.

31. A method as claimed in claim 30 wherein the tool is a screw shaped cutter (72).

32. A method of uninstalling floor panels (1,1') with long and short edges provided with a locking system on the short edges comprising a displaceable tongue (30) at one edge of a first floor panel (1) and a tongue groove (20) in an adjacent edge of a similar second floor panel (1') for connecting the short edges vertically (D1), the tongue and the groove each comprises protrusions (31a, 31b) and cavities (33a, 33b) configured such that the short edges can obtain a vertically unlocked position where the protrusions of on of the adjacent short edges match the cavities in the other of adjacent short edges and a vertically locked position where some of the protrusions, of respectively adjacent short edges, overlap each other vertically wherein the method comprises the steps of:

- applying a pressure force (P) at an edge (32) of the displaceable tongue in vertically locked position
- displacing the displaceable tongue to obtain the vertically unlocked position
- separating the short edges from each other by angling upward one of the panels along its long edge.

33. A method to connect a displaceable tongue (30) to a displacement groove (40) in a panel edge whereby the displaceable tongue is a part of a tongue blank (TB) comprising several displaceable tongues (30) wherein the method comprises the steps of:

- separating the displaceable tongue (30) from the tongue blank (TB).

- connecting the displaceable tongue (30) into the displacement groove (40) of a panel edge by inserting the displaceable tongue sideways along the edge.

34. A method as claimed in claim 33 wherein the tongue blank (TB) is positioned essentially perpendicularly to the main plane of the panel.

35. A tongue blank (TB) comprising several displaceable tongues (30) adapted to be inserted to an edge of a floor panel (30) c h a r a c t e r i s e d in that the displaceable tongues are arranged in several rows with at least two tongues in each row.

36. An equipment to produce a locking system comprising a separate part (30) inserted into an edge of a panel, the equipment comprises a double-end tenoner with several cutting tools, an inserting device (59) with a pusher (46) adapted to insert the separate part into the panel edge, a transportation device adapted to displace a panel relative the cutting tools and the inserting device, and a control system (65) c h a r a c t e r i s e d in that the inserting device is integrated with the double end tenoner as one production unit and that the pusher and the transportation device are connected to the same control system that controls the transportation device and the pusher.

CLAIMS

1. A set of floor panels provided with a locking system comprising a tongue at an edge of a first floor panel and a tongue groove in an adjacent edge of a similar second floor panel for connecting the edges vertically, wherein the tongue and the tongue groove are displaceable in relation to each other, the tongue comprises a protrusion extending horizontally beyond the upper part of the edge and the tongue groove a protrusion and a cavity configured such that the adjacent edges can obtain a vertically unlocked position where the protrusion of the tongue matches the cavity of the tongue groove and a vertically locked position where the protrusion of said tongue vertically overlaps the protrusion of said tongue groove, and wherein the tongue is a displaceable tongue in a displacement groove of the first panel.

2. The set of floor panels as claimed in claim 1, wherein the tongue and the groove each comprise a protrusion and a cavity.

3. The set of floor panels as claimed in claim 2, wherein the tongue and the groove each comprise several protrusions and cavities.

4. The set of floor panels as claimed in claim 3, wherein the tongue and the groove are configured such that upper parts of the edges can be brought into contact with an essentially vertical motion and that the vertically locked position can be obtained by displacement along one of the edges.

5. The set of floor panels as claimed in any one of claims 1-4, wherein the protrusion and cavities of the groove are provided at a lower lip of the groove in said adjacent edge of the second floor panel.

6. The set of floor panels as claimed in any one of claims 1 to 5, wherein the panels are provided with first and second connectors integrated with the floor panels and configured to connect adjacent edges, the first connector comprises a locking strip with an upwardly directed locking element at an edge of a floor panel and a downwardly open locking groove at an adjacent edge of another floor panel for connecting the adjacent edges in a horizontal direction D2 perpendicular to the adjacent edges, the second connector comprises the displaceable tongue at an edge of a floor panel, and a horizontally open tongue groove in an adjacent edge of another floor panel for connecting the adjacent edges in vertical direction D1,

that the connectors are configured to be locked with an angling or a vertical motion,

that a pressing edge of the displaceable tongue is arranged in an initial position at an edge of a panel,

that the pressing edge is configured to be displaced essentially horizontally and essentially in one direction only and along the adjacent edge from the initial unlocked position to a final locked position.

7. The set of floor panels as claimed in any one of claims 1-4, wherein said first panel is a panel in a first row

and the displaceable tongue is configured to be pushed by a force applied at the pressing edge, of a panel in a second row.

8. The set of floor panels as claimed in any one of claims 1 to 7, wherein the tongue is displaced essentially along and parallel with the adjacent edges.

9. The set of floor panels as claimed in any one of claims 1 to 8, wherein the width of the tongue varies in the length direction of the tongue.

10. The set of floor panels as claimed in any one of claims 1 to 9, wherein the protrusions and cavities of the groove are formed in one piece with the panel.

11. The set of floor panels as claimed in any one of claims 1-10 wherein the protrusions and cavities of the groove are formed in a separate material connected to the edge.

12. The set of floor panels as claimed in any one of claims 1 to 11 wherein at least one protrusion has a wedge shape in the horizontal and/or vertical direction.

13. The set of floor panels as claimed in any one of claims 1 to 12 wherein an outer part of at least one protrusion has a width or thickness that is smaller than an inner part.

14. The set of floor panels as claimed in any one of claims 1 to 13 wherein at least one protrusion has a wedge shaped cross section to obtain an increasing vertical pressure when the displaceable tongue is displaced along the joint.

15. The set of floor panels as claimed in any one of claims 1 to 14, wherein the displacement groove and the tongue groove are offset vertically in relation to each other.