CLAIMS

1. Building panels provided with a locking system for vertical locking of a first (1) and a second building panel (1') by a vertical displacement of the panels (1,1') relative each other, the building panels comprising:

a sidewardly open tongue groove (20) is provided at an edge of the first building panel (1), and a strip (6) protrudes below the tongue groove (20) and outwardly beyond an upper part of the edge of said first building panel (1);

a displaceable tongue (30) is provided in a sidewardly open displacement groove (40) at an edge of the second building panel, the displaceable tongue (30) comprises a main body extending along the edge of the second panel and a tongue locking surface (31) located at an upper and outer part of the tongue, the tongue locking surface is configured to cooperate for vertical locking with a groove locking surface (21) of the tongue groove (20) c h a r a c t e r i s e d in

that the displaceable tongue comprises an inner part (34) spaced inwardly from an upper part of the edge of said second panel (1'),

that the inner part comprises a tongue pressing surface (32) configured to cooperate with a strip pressing surface (33) on the strip (6), such that the displaceable tongue (30) is displaced into the tongue groove when the tongue pressing surface and the strip pressing surface (32,33) are displaced vertically against each other to obtain a locking of the first and the second building panel (1,1') in a vertical direction.

2. The building panels as claimed in claim 1, wherein said displaceable tongue (30) is asymmetric and comprises a protrusion (34) and the second panel (1') comprises a cavity (35) for housing the protrusion.

3. The building panels as claimed in claim 2, wherein the protrusion (34) comprises a part (38) that is flexible.

4. The building panels as claimed in claim 2 or 3, wherein the cavity (35) is larger than the protrusion (34) such that there is a space S of about at least about 1-3 mm.

5. The building panels as claimed in any one of the claims 2-4, wherein the strip (6) comprises a locking element (8) configured to cooperate with a downwardly open locking groove (14), formed on the second panel, for locking of the first and the second building panel (1,1') in a horizontal direction.

6. The building panels as claimed in claim 5, wherein the tongue pressing surface (32) is provided on the protrusion (34) and the strip pressing surface (33) is provided on the locking element (8).

7. The building panels as claimed in claim 6, wherein the strip pressing surface (33) is provided at an inclined surface of the locking element (8) directed towards the first edge.

8. The building panels as claimed in claim 5, wherein the strip pressing surface (33) is provided at an upper part of the locking element (8).

9. The building panels as claimed in any one of the claims 5-8, wherein the cavity (35) extends from the displacement groove (40) to the locking groove (14).

10. The building panels as claimed in any one of claims 5-9, wherein the displacement groove (40) extends vertically above the locking groove (14).

11. The building panels as claimed in any one of claims 5-10, wherein an upper part (8a) of the locking element (8) is located vertically below the tongue locking surface (31) of the displaceable tongue (30)

12. The building panels as claimed in any one of claims 5-11, wherein an upper part (14a) of the locking groove (14) is located vertically below the tongue locking surface (31) of the displaceable tongue (30).

13. The building panels as claimed in any one of claims 5-12, wherein an upper most part of the locking element is located in a lower half of an intermediate core of the first building panel.

14. The building panels as claimed in any one of the preceding claims, wherein the tongue and the strip pressing surface (32,33) are inclined against a horizontal plane (HP) with an angle (A1) of about 25 to 75 degrees.

15. The building panels as claimed in any one of the preceding claims, wherein the displacement groove (40) is inclined and comprises an inner part that extends downwards.

16. The building panels as claimed in any one of preceding claims, wherein the first and the second building panel (1,1') are locked vertically by a first

and a second pair of cooperating surfaces, the first pair comprises the tongue locking surface (31) and the groove locking surface (21), the second pair comprises an upper part of the strip (6') and a lower part of the edge (37) of the second panel (1').

17. The building panels as claimed in any one of the preceding claims, wherein said groove locking surface (21) and tongue locking surface (31) are inclined against a horizontal plane.

18. The building panels as claimed in any one of preceding claims, wherein the groove locking surface (21) and the tongue locking surface are inclined with an angle (A2) of about 10 to about 60 degrees.

19. The building panels as claimed in any one of preceding claims, wherein the displaceable tongue (30) comprises a flexible friction element (38).

20. The building panels as claimed in any one of the preceding claims, wherein the displaceable tongue (30) comprises at least two protrusions (34) extending from the main body (36), wherein each protrusion comprises said tongue pressing surface (32) at an outer part of the protrusion, wherein each tongue pressing surface is configured to be in contact during locking with a locking element provided on the strip.

21. The building panels as claimed in any one of the preceding claims, wherein the building panel (1,1') is a floor panel.

22. The building panels as claimed in any one of the preceding claims, wherein the upper and outer part of the displaceable tongue in an unlocked position is located in the displacement groove (40).

23. The building panels as claimed in any one of the preceding claims, wherein the innermost part of the displaceable tongue (30) is below the outermost part of the displaceable tongue.

24. The building panels as claimed in any one of the preceding claims, wherein the tongue pressing surface (32) is located vertically below the tongue locking surface (31).

25. The building panels as claimed in any one of the preceding claims, wherein the strip is flexible such that it bends downwards during locking.

26. The building panels as claimed in any one of the preceding claims, wherein the displaceable tongue (30) is gradually inserted into the tongue groove (20) from a tongue part, which is adjacent to an installed long edge (2), to another tongue part, which is adjacent to a free long edge.

27. The building panels as claimed in claim 1, wherein the strip (6) comprises a locking element (8) configured to cooperate with a downwardly open locking groove (14), formed on the second panel, for locking of the first and the second building panel (1,1') in a horizontal direction.

28. The building panels as claimed in one of the preceding claims, wherein the displaceable tongue is an injection-moulded tongue.

CLAIMS

1. Building panels provided with a locking system for vertical locking of a first building panel and a second building panel by a vertical displacement of the panels relative each other, the panels comprising:

a sidewardly open tongue groove provided at an edge of the first building panel, and a strip protruding below the tongue groove and outwardly beyond an upper part of the edge of said first building panel, the strip comprising a locking element configured to cooperate with a downwardly open locking groove formed on the second building panel, for locking of the first and the second building panels in a horizontal direction;

a displaceable tongue provided in a sidewardly open displacement groove, the sidewardly open displacement groove in an edge of the second building panel and the sidewardly open displacement groove extends vertically above a top of the locking groove, the displaceable tongue comprises a main body extending along the edge of the second panel and a tongue locking surface located at an upper and outer part of the tongue, the tongue locking surface cooperating for vertical locking with a groove locking surface of the tongue groove;

the displaceable tongue comprises an inner part spaced inwardly from an upper part of the edge of said second panel;

the inner part comprises a tongue pressing surface configured to cooperate with a strip pressing surface on the strip, such that the displaceable tongue is displaced into the tongue groove when the tongue pressing surface and the strip pressing surface are displaced vertically against each other to obtain a locking of the first and the second building panel in a vertical direction.

2. The building panels as claimed in claim 1, wherein said displaceable tongue is asymmetric and comprises a protrusion and the second panel comprises a cavity for housing the protrusion.

3. The building panels as claimed in claim 2, wherein the protrusion comprises a part that is flexible.

4. The building panels as claimed in claim 2, wherein the cavity is larger than the protrusion such that there is a space of at least about 1-3 mm between the protrusion and a boundary of the cavity when the protrusion is housed in the cavity.

5. The building panels as claimed in claim 1, wherein the tongue pressing surface is provided on the protrusion and the strip pressing surface is provided on the locking element.

6. The building panels as claimed in claim 5, wherein the strip pressing surface is provided at an inclined surface of the locking element directed towards the first edge.

7. The building panels as claimed in claim 1, wherein the strip pressing surface is provided at an upper part of the locking element.

8. The building panels as claimed in claim 2, wherein the cavity extends from the displacement groove to the locking groove.

9. The building panels as claimed in claim 1, wherein an upper part of the locking element is located vertically below the tongue locking surface of the displaceable tongue when the first and the second building panels are locked in a vertical direction.

10. Building panels provided with a locking system for vertical locking of a first building panel and a second building panel by a vertical displacement of the panels relative each other, the panels comprising:

a sidewardly open tongue groove provided at an edge of the first building panel, and a strip protruding below the tongue groove and outwardly beyond an upper part of the edge of said first building panel, the strip comprising a locking element configured to cooperate with a downwardly open locking groove formed on the second building panel, for locking of the first and the second building panels in a horizontal direction;

a displaceable tongue provided in a sidewardly open displacement groove, the sidewardly open displacement groove in an edge of the second building panel, the displaceable tongue comprises a main body extending along the edge of the second panel and a tongue locking surface located at an upper and outer part of the tongue, the tongue locking surface cooperating for vertical locking with a groove locking surface of the tongue groove;

the displaceable tongue comprises an inner part spaced inwardly from an upper part of the edge of said second panel;

the inner part comprises a tongue pressing surface configured to cooperate with a strip pressing surface on the strip, such that the displaceable tongue is displaced into the tongue groove when the tongue pressing surface and the strip pressing surface are displaced vertically

against each other to obtain a locking of the first and the second building panel in a vertical direction,

wherein an uppermost part of at least a portion of the locking groove is located vertically below the tongue locking surface of the displaceable tongue.

11. The building panels as claimed in claim 1, wherein an upper most part of the locking element is located in a lower half of an intermediate core of the first building panel.

12. The building panels as claimed in claim 1, wherein the tongue pressing surface and the strip pressing surface are inclined relative to a horizontal plane with an angle of about 25 to 75 degrees.

13. The building panels as claimed in claim 1, wherein the displacement groove is inclined and comprises an inner part that extends downwards.

14. The building panels as claimed in claim 1, wherein the first and the second building panels are locked vertically by a first and a second pair of cooperating surfaces, the first pair comprises the tongue locking surface and the groove locking surface, the second pair comprises an upper part of the strip and a lower part of the edge of the second panel.

15. The building panels as claimed in claim 1, wherein said groove locking surface and said tongue locking surface are inclined relative to a horizontal plane.

16. The building panels as claimed in claim 1, wherein the groove locking surface and the tongue locking surface are inclined relative to a horizontal plane with an angle of about 10 to about 60 degrees.

17. The building panels as claimed in claim 1, wherein the displaceable tongue comprises a flexible friction element.

18. The building panels as claimed in claim 1, wherein the displaceable tongue comprises at least two protrusions extending from the main body, wherein each protrusion comprises said tongue pressing surface at an outer part of the protrusion, wherein each tongue pressing

surface is configured to be in contact during locking with the locking element provided on the strip.

19. The building panels as claimed in claim 1, wherein the building panels are floor panels.

20. The building panels as claimed in claim 1, wherein the upper and outer part of the displaceable tongue in an unlocked position is located in the displacement groove.

21. The building panels as claimed in claim 1, wherein the innermost part of the displaceable tongue is below the outermost part of the displaceable tongue.

22. Building panels provided with a locking system for vertical locking of a first building panel and a second building panel by a vertical displacement of the panels relative each other, the panels comprising:

a sidewardly open tongue groove provided at an edge of the first building panel, and a strip protruding below the tongue groove and outwardly beyond an upper part of the edge of said first building panel;

a displaceable tongue provided in a sidewardly open displacement groove, the sidewardly open displacement groove in an edge of the second building panel, the displaceable tongue comprises a main body extending along the edge of the second panel and a tongue locking surface located at an upper and outer part of the tongue, the tongue locking surface cooperating for vertical locking with a groove locking surface of the tongue groove;

the displaceable tongue comprises an inner part spaced inwardly from an upper part of the edge of said second panel;

the inner part comprises a tongue pressing surface configured to cooperate with a strip pressing surface on the strip, such that the displaceable tongue is displaced into the tongue groove when the tongue pressing surface and the strip pressing surface are displaced vertically against each other to obtain a locking of the first and the second building panel in a vertical direction,

wherein the entire tongue pressing surface is located vertically below the tongue locking surface.

23. The building panels as claimed in claim 1, wherein the strip is flexible such that it bends downwards during locking.

24. The building panels as claimed in claim 1, wherein the displaceable tongue during locking is gradually inserted into the tongue groove from one part of the tongue, which is adjacent to an installed long edge of an adjacent panel, to another part of the tongue, which is adjacent to a free long edge of the first panel.

25. The building panels as claimed in claim 1, wherein the displaceable tongue is an injection-moulded tongue.

26. Building panels provided with a locking system for vertical locking of a first building panel and a second building panel by a vertical displacement of the panels relative each other, the panels comprising:

a sidewardly open tongue groove provided at an edge of the first building panel, and a strip protruding below the tongue groove and outwardly beyond an upper part of the edge of said first building panel, the strip comprising a locking element configured to cooperate with a downwardly open locking groove formed on the second panel, for locking of the first and the second building panels in a horizontal direction;

a displaceable tongue provided in a sidewardly open displacement groove, the sidewardly open displacement groove in an edge of the second building panel and the sidewardly open displacement groove extends vertically above a top of the locking groove, the displaceable tongue comprises a main body extending along the edge of the second panel and a tongue locking surface located at an upper and outer part of the tongue, the tongue locking surface contacting a groove locking surface of the tongue groove for vertical locking;

the displaceable tongue comprises an inner part spaced inwardly from an upper part of the edge of said second panel;

the inner part comprises a tongue pressing surface configured to cooperate with a strip pressing surface on the strip, such that the displaceable tongue is displaced into the tongue groove when the tongue pressing surface and the strip pressing surface are displaced vertically against each other to obtain a locking of the first and the second building panel in a vertical direction.

27. The building panels as claimed in claim 1, wherein the displaceable tongue further comprises a protrusion and the second panel comprises a cavity for housing the protrusion, and the cavity extends farther from a vertical joint plane than a surface of the locking groove that faces the vertical joint plane.