

PATENT SPECIFICATION

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DRAWINGS ATTACHED

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(54) FACING PLATE

(71) I, ARTUR FISCHER, a German Nationality, of D—7241 Tümlingen, Grünmettstetterstrasse 133, Germany, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a facing plate for walls made up from individual components provided with grooves, the facing plate having tenons which engage with the grooves of the wall components.

It is well known to provide walls made up from individual components with facing plates. Thus it is known, for example, to provide grooves on the outer surfaces of the wall components in which tenons of the facing plates are inserted. These grooves may be of rectangular cross-section, and the tenons may be dimensioned in such a way that they are resiliently deformed as they are pressed into the grooves. However, not only the tenons, but also the grooves may be of re-entrant shape, in which case the tenons can be inserted at the ends of the grooves and then slid longitudinally along them. The former mode of connection results in a positive connection due to the bearing force and the latter mode results in a positive connection due to the matching shape of the re-entrant parts. This latter connection can also be achieved by introducing into a re-entrant groove two tenons spaced apart from, and diametrically opposite, one another, each tenon resiliently bearing on one groove wall. However, the grooves and the tenons may also be arranged such that only one projection is inserted in any one groove and at least two grooves make a positive connection with the tenons inserted therein.

Since insertion of re-entrant tenons in re-entrant grooves by slipping the projections longitudinally into the grooves is often impossible because the grooves' exits are not accessi-

ble, the tenons are shaped in such a way that they can snap-engage the grooves at right angles to their longitudinal axis while being resiliently deformed.

Whether the connection to be made is a positive connection due to bearing force or due to matching shape, it is always necessary for the tenons to be capable of yielding resiliently. In the case of a positive connection due to bearing force, resilient deformation is maintained while the connection lasts, whereas, in the case of a positive connection due to matching shape, such deformation usually ceases either entirely or at least partly when a tenon is pushed right into a groove. Since the facing plates are to bear on the outer surfaces of the wall components directly, resilient deformation of the tenons should take place directly adjacent the surface of the facing plates. However, in this region the tenons are stiffest, so that a sufficient degree of resilient deformation or yielding, as required especially during snap-engagement with re-entrant grooves, cannot be achieved or can only be achieved with great effort.

If the facing plates are to be applied to wall components provided with re-entrant grooves for this purpose, it is customary to provide the facing plates with re-entrant projections which completely fill the grooves of the wall components when inserted. Owing to inaccuracies and unfavourable material properties it often happens that projections having excessive cross-sectional dimensions cannot be inserted in the grooves at all or only with great difficulty. On the other hand, it may also happen that this cross-section is too small, so that shake-proof connection of the facing plates is no longer ensured.

According to the present invention there is provided a facing plate, for a wall consisting of individual grooved elements, having resilient tenons arranged in recessed portions of one of its surfaces, the facing plate being capa-

ble of being fastened to the wall by engagement of the tenons with a corresponding groove or grooves in the wall.

5 In this way the roots of the tenons i.e. the points at which the tenons are connected to the facing plate, are removed from the plate surface. With such a design it is possible, even in the case of tenons which extend only slightly beyond the plate surface, to obtain sufficient elasticity at plate surface level for the snap-engagement of the tenons in re-entrant grooves to take place even in cases where the re-entrant portions of the tenons have to be very deep, in view of the large forces involved.

15 Facing plates of synthetic material can be manufactured by the injection moulding process. The re-entrant shape of the connecting tenons normally requires a complicated tool to enable the tenons to be removed from the mould. In the present case, however, due to the increased elasticity of the tenons a simple tool may be used, during the use of which the tenons are resiliently deformed in the same way they are deformed when the facing plates have to be removed from the wall components.

25 Depending on the size and formation of the tenons, the facing plates on which they are provided are suitable for employment on buildings in the conventional way and also for covering toy models made up of wall components. In particular, the facing plates are suitable for toy models made up from bricks which are connected by means of re-entrant grooves and re-entrant tenons provided thereon.

35 In a preferred embodiment a pair of resilient tenons are arranged in a common recessed portion, the tenons being inclined outwardly from one another so that, on insertion into a re-entrant groove, they contact resiliently the walls of the grooves. Advantageously, the distance between the groove rims is greater than the corresponding dimension of the pair of tenons in the region of the groove rims when the facing plate is fastened to the wall.

45 In another preferred embodiment a pair of resilient tenons having re-entrant portions are provided one in each of two adjacent recessed portions, and the tenons are inclined towards each other so that on insertion of each tenon into a respective re-entrant groove, the tenons contact resiliently corresponding walls of the grooves.

55 If the tenons are designed according to the invention, it becomes possible for them to adapt themselves elastically to the given dimensions of the re-entrant grooves. As a result, secure, shake-proof connection of the facing plates and the wall components is achieved even in the case of large manufacturing tolerances. Owing to the fact that the distance between the groove rims is larger than the corresponding dimension of the pair of tenons in the region of these rims, the tenons may be easily introduced into the grooves because jam-

ming in the region of the groove rims no longer occurs.

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In order to improve friction still further and to facilitate insertion, the re-entrant portions of the tenons are rounded in the regions where they bear against the groove walls the radius of curvature of these rounded portions being less than that of the groove walls. In this way the area of contact is reduced.

75 Advantageously the grooves provided in the wall components are of generally circular cross-section and the regions at which the re-entrant portions of the tenons bear resiliently against the walls of the groove are situated between the central longitudinal axis of the circular groove and the rims of the groove. This ensures that the facing plates bear firmly on the wall components.

80 The surfaces of the re-entrant portions of the tenons are inclined towards one another beyond the regions at which they bear resiliently against the walls of the groove, and the free ends of the tenons are spaced apart by a distance equal to, or slightly less than, the distance between the rims of the groove. This makes it possible for the tenons to snap-engage the groove in a direction at right angles to its longitudinal axis. This facility is of special interest when longitudinal insertion of the tenons in the groove is prevented by special circumstances, such as by other components which obtrude the exits of the grooves longitudinally.

90 The facing plates of the invention are especially valuable in application to toy models made up from bricks that can be connected by means of re-entrant connecting tenons and likewise re-entrant grooves. Here, the facing plates may serve as an outer cover for such models or, on the other hand, as base-plates in the building of such models.

105 In this field of application the formation of the tenons as proposed by the present invention is of particular advantage because it is especially important for the child that connection should be made without too much of an effort by easy insertion. Moreover, it is often necessary for facing plates which have already been inserted to be subsequently displaced by a certain distance. Because of the resilient contact between the tenons and the groove walls, the so-called stick-slip effect can be largely avoided. This effect is produced as a result of the maximum difference between static and sliding friction. At first the child has to overcome static friction, a force larger than the friction experienced during sliding. However, since the child does not readily notice the transition from static to sliding friction, it is possible for the facing plate to be displaced further than originally intended, due to the stronger effort need in order to overcome static friction. This unfavourable effect can be minimised by the resilient contact between the projections and the groove walls.

The invention will now be described in greater detail, by way of example, with reference to the accompanying drawings, in which:

5 Figure 1 is a perspective view of a facing plate having two tenons;

Figure 2 is a cross-section of a facing plate connected to a wall component, the facing plate having two tenons engaging a single groove of the wall component;

Figure 3 shows another facing plate connected to a wall component, the facing plate having two tenons each of which engages a different groove of the wall component; and

15 Figure 4 is a cross-sectional view similar to that of Fig. 2, but on a larger scale and showing tenons of a modified form.

Referring to the drawings, the facing plate 1 illustrated in Fig. 1 has a recess 3 on one of its surfaces 2. A pair of tenons 4 is arranged in the recess 3. Each of these tenons 4 is of re-entrant shape on one side, so that two tenons together form a doubly re-entrant element.

25 Figure 2 shows a wall component 5 having a re-entrant groove 7 of generally circular cross-section, the re-entrant groove 7 being engaged by two diametrically opposite tenons 4. As these tenons 4 are introduced into the groove 7, they are compressed due to their resilience. When the widest part of the tenons 4 has passed the groove rims, the tenons snap-engage the groove 7. After snap-engagement the tenons 4 more resiliently slightly further apart, so that a durable positive connection, due to matching shape, is obtained between the facing plate 1 and the component 5.

Figure 3 shows a facing plate 1 having two recesses 3 in its surface 2, each containing a single tenon 4. A wall component 6 has two grooves 7, one for each tenon 4 of the facing plate 1. The tenons 4 are of re-entrant shape on one side only, the re-entrant portions of the tenons facing one another. To connect the facing plate with the component 6, the tenons 4 snap-engage the grooves 7 in a similar manner to that described above. Since the re-entrant portions of the tenons 4 face one another, a positive connection, due to matching shape, is obtained also in this case.

50 Figure 4 shows a facing plate 1 and wall component 5 similar to those of Figure 2, but the tenons 4 of the facing plate 1 are of different shape as described below. The groove 7 has rims 8 and 9, the distance between these rims being larger than the corresponding dimension of the tenons 4 in the region of these groove rims 8 and 9 when the facing plate 1 and the wall component 5 are held together, as shown in Figure 4. The tenons 4 are rounded to engage the areas 10 and 11 of the groove 7. The radius of curvature of these rounded areas is less than that of the groove walls in these areas so that mutual contact is reduced to a minimum. The areas of contact 10 and

11 are situated between the centre 12 of the groove 7 and the groove rims 8 and 9. In order to enable the tenons 4 to snap-engage the groove 7 in a direction normal to its longitudinal axis, the outer surfaces 13 and 14 of the tenons 4 turn towards one another, so that at their ends 15 and 16 their mutual distance apart is less than the distance between the groove rims 8 and 9.

It will be understood that the invention is not limited to the embodiments described above. It would be possible, for example, for the tenons to be mutually displaced in the longitudinal direction of a groove. Moreover, it would still fall within the scope of the present invention to provide four tenons instead of two, each being at right angles to the adjacent tenon so as to form a symmetrical, tenon-like projection. The number of tenons provided on a facing plate is irrelevant with respect to the present invention and depends on given design requirements and on the forces involved.

WHAT WE CLAIM IS:—

1. A facing plate, for a wall consisting of individual grooved elements, having resilient tenons arranged in recessed portions of one of its surfaces, the facing plate being capable of being fastened to the wall by engagement of the tenons with a corresponding groove or grooves in the wall.

2. A facing plate as claimed in claim 1, having a pair of resilient tenons having re-entrant portions and being arranged in a common recessed portion, the tenons being inclined outwardly from one another so that, on insertion into a re-entrant groove, they contact resiliently the walls of the grooves.

3. A facing plate as claimed in claim 1, having a pair of resilient tenons having re-entrant portions, one tenon being provided in each of two adjacent recessed portions, in which the tenons are inclined towards each other so that on insertion of each tenon into a respective re-entrant groove, the tenons contact resiliently corresponding walls of the grooves.

4. A facing plate as claimed in claim 2 in which the distance between the groove rims is greater than the corresponding dimension of the pair of tenons in the region of the groove rims when the facing plate is fastened to the wall.

5. A facing plate as claimed in claim 4, in which the re-entrant portions of the tenons are rounded in the regions where they bear against the groove walls, the radius of curvature of these rounded portions being less than that of the groove walls.

6. A facing plate as claimed in claim 4 or 5, in which the re-entrant portions of the grooved elements are of generally circular cross-section.

7. A facing plate as claimed in claim 6, in which the regions at which the re-entrant



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2. A facing plate as claimed in claim 1, having a pair of resilient tenons having re-entrant portions and being arranged in a common recessed portion, the tenons being inclined outwardly from one another so that, on insertion into a re-entrant groove, they contact resiliently the walls of the grooves.

3. A facing plate as claimed in claim 1, having a pair of resilient tenons having re-entrant portions, one tenon being provided in each of two adjacent recessed portions, in which the tenons are inclined towards each other so that on insertion of each tenon into a respective re-entrant groove, the tenons contact resiliently corresponding walls of the grooves.

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7. A facing plate as claimed in claim 6, in which the regions at which the re-entrant



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4 portions of the tenons bear resiliently against the walls of the groove are situated between the central longitudinal axis of the circular groove and the rims of the groove.

5 8. A facing plate as claimed in any one of claims 4 to 7, in which the surfaces of the re-entrant portions of the tenons are inclined towards one another beyond the regions at which they bear resiliently against the walls
10 of the groove.

15 9. A facing plate as claimed in claim 7, in which the free ends of the tenons are spaced apart by a distance equal to, or slightly less than, the distance between the rims of the groove.

10. A facing plate, for a wall consisting of individual grooved elements, substantially as hereinbefore described with reference to, and as illustrated by, Figures 1, 2 and 4 of the accompanying drawings.

11. A facing plate, for a wall consisting of individual grooved elements, substantially as hereinbefore described with reference to, and as illustrated by, Figure 3 of the accompanying drawings.

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