PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Building Brick

I, ARTUR FISCHER, a German citizen, of Tumlingen, Kreis Freudenstadt, 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 building brick of the type adapted for interlocking engagement with other bricks by means of a re-entrant tongue and groove connection. Such a brick is intended more especially for toy building sets, but is also applicable to building generally.

The invention has for its object so to construct a brick that it has maximum resilience, and allows for larger manufacturing tolerances than in the case of hitherto known bricks of this type without the accuracy of the frictional fit of the tongues or tenons in the grooves being impaired. In this way the manufacture of the bricks can be rendered less expensive. This is very important since bricks of this type are mass-produced.

The present invention accordingly provides a building brick comprising a hollow open-ended body portion the cross-section which is such as to provide for interlocking engagement thereof with other bricks by means of a re-entrant tongue and groove connection, the said hollow body portion being closed at at least one end by means of an end cap which ins also adapted for interlocking engagement with other bricks.

Advantageously the cross-section of the hollow body portion is such as to define one or more longitudinally extending grooves the mouths of which are open towards the external surface of the brick, the said grooves being closed towards the interior of the said hollow body portion. The hollow body portion may also include, instead of or in addition to said grooves one or more longitudinally extending re-entrant tongues projecting from its outer surface, the said tongues having longitudinal slots open either to the interior or the exterior of the hollow body portion. The resilience of the tongues is considerably increased by these slots, and thus greater compensation for tolerances is achieved.

The wall thickness of the hollow body portion is preferably substantially uniform over the whole of its outer bounding walls and also in the region of any groove formed therein.

To increase the bending strength of the hollow body portion, such internal reinforcement ribs may be provided as are capable of being formed together with the hollow body portion in one operation.

The lateral outer surfaces of the said caps are preferably flush with the outer faces of the hollow body portion. In this way a brick can be provided which, due to the continuity in the longitudinal direction of its outer surfaces can easily be joined to other bricks so as to form structures with smooth external surfaces. The assembly of these bricks is further facilitated if the lateral surfaces of the cap are also provided with re-entrant grooves which register with the grooves of the hollow body portion.

The cap is advantageously provided with a plug portion for insertion into an open end of the hollow body portion, the said plug portion having lateral projections and the walls of the hollow body portion at said open end having corresponding recesses to enable snap engagement of the end cap with the hollow body portion. In this way the end caps can be joined to the hollow body portions very simply. However, they may also be joined to the hollow body portion by being force-fitted, glued, screw-connected or pegged.

The hollow body portion and the cap preferably consist of a non-deformable, tough

[Price 4s. 6d.]

resilient synthetic plastics material. The hollow body portions may be produced not only by injection-moulding, but also in greater lengths by the extrusion process. The hollow body portions and the caps may, however, also be produced from metal.

The invention offers the additional advantage of a saving in material and also of a reduced weight of the brick compared to a solid brick.

The invention is illustrated by way of example in the accompanying drawings, in which:—

Fig. 1 is a cross-section of a hollow body portion of a brick according to the invention, with four grooves;

Fig. 2 is a cross-section of a hollow body portion with two grooves and two tongues;

Fig. 3 is a perspective view of part of a hollow body portion and a cap according to the invention;

Fig. 4 is a view similar to that of Fig. 3 showing another hollow body portion and another cap;

Fig. 5 is a further similar view of a third hollow body portion and a third cap;

Fig. 6 is a side elevation of an end cap for a brick according to the invention;

Fig. 7 is a plan view, partly in section, of the cap of Fig. 6; and

Figs. 8, 9 and 10 are three further cross-sectional views of hollow body portions.

Referring to the drawings, Fig. 1 shows a hollow body portion 1 of a building brick of substantially square cross-section, there being provided in each of its outer surfaces a re-entrant groove 12 which extends the whole length of the hollow body portion. Fig. 2 shows a hollow body portion 101 with two grooves 112 and two tongues, 4, 4'. The grooves 112 also extend the whole length of the hollow body portion 101. The grooves 12, 112 are open only towards the external faces of the hollow body portion.

The hollow body portion of such a brick may have any other suitable cross-section. Thus bricks having a hollow body portion 201 of triangular cross-section, a hollow body portion 301 of round cross-section and a hollow body portion 401 of hexagonal cross-section are shown in Figs. 8 to 10.

Owing to their cross-sectional configuration, all these constructions ensure an adequate sliding fit when a tenon or tongue of corresponding shape is introduced into a groove 12 or 112, since the walls adjacent regions 15 and 16 or 115 and 116 of the hollow body portion are capable of yielding resiliently when the tenon is introduced, so that the grooves will grip the introduced tenon or tongue and thus provide compensation for tolerances.

A further improvement to the sliding fit and the compensation of tolerances is achieved in the case of the tongues 4, 4' which extend the whole length of the hollow body portion, since the tongues are provided either with a slot 5 open to the interior of the hollow body portion 101, or with an external slot 6, see Fig. 2. The hollow body portion 1 (see Fig. 3) is also provided with transverse bores (not shown) and bearing surfaces 7 serving for the accommodation of bearing shafts. The transverse bores extend through the walls of the body portion from the base of one groove 12 to the base of the opposite groove 12. To improve its bending strength, internal reinforcement ribs 14, 114 may be provided which are formed in one piece with the hollow body portion 1, 101 of the brick. Each rib 14, 114 preferably extends from the base of one groove 12 or 112 to the base of the opposite groove, or to the foot of the opposite tongue 4, 4'.

To enable the hollow body portion to be joined at its ends to other bricks, caps 8, 108, 208 are provided at the open ends of the hollow body portion. Thus, the caps together with the hollow body portion make up the complete brick. The cap 8 shown in Figs. 6 and 7 has projections 13 capable of snap-engaging matching recesses 9 provided in the hollow body portion 1 in order to interlock the cap 8 with the hollow body portion 1. However, the sealing cap may also be joined to the hollow body portion by glueing, force-fitting, screw-connection or pegging. In that case the parts 9 and 13 are not required.

The cap 8 is provided with grooves 2 which register with the grooves 12 of the hollow body portion, see Fig. 3. The cap 8 is also provided with a projecting re-entrant tenon 3 and preferably with a square end face.

Fig. 4 shows a cap 108 with a re-entrant transverse groove 10 which, at each of its ends, merges into a widened portion 11 large enough for a tenon 3 to be introduced in a direction at right angles to the groove 10 or 12. This makes it possible, in the case of a row of bricks joined end to end, subsequently to attach laterally projecting bricks into the grooves 12. The tenons of the bricks to be attached are simply introduced into one of these widened portions 11 and then the whole brick is slid sideways until its tenon engages the grooves 12.

The hollow body portion 1 of a brick may be closed at at least one end by means of a roof-shaped cap 208 (see Fig. 5). This enables other bricks to be attached to such a brick end to end and at an angle to the longitudinal axis of the brick such as would be desirable, for example, when building arches or vaulted roofs.

The hollow body portion and the end cap of the bricks described above are preferably produced from a non-deformable tough resilient synthetic plastics material. They can be manufactured not only by injection moulding, but also by extrusion, especially if hollow

bodies of increased length are required. They may also be made from metal.

The hollow brick of the invention is applicable to toy building sets, and also quite generally in building, when produced with the required dimensions.

WHAT I CLAIM IS:—

1. A building brick comprising a hollow open-ended body portion the cross-section of which is such as to provide for interlocking engagement thereof with other bricks by means of a re-entrant tongue and groove connection, the said hollow body portion being closed at at least one end by means of an end cap which is also adapted for interlocking engagement with other bricks.

2. A brick as claimed in claim 1, in which the cross-section of the hollow body portion is such as to define one or more longitudinally extending grooves the mouths of which are open towards the external surface of the brick, the said grooves being closed towards the interior of the said body portion.

3. A brick as claimed in claim 1 or 2, in which the said hollow body portion includes one or more longitudinally extending re-entrant tongues projecting from its outer surface, the said tongues having longitudinal slots open either to the interior or the exterior of the body portion.

4. A brick as claimed in any one of claims 1—3, in which the wall thickness of said hollow body portion is substantially uniform over the whole of its outer bounding walls and also in the region of any groove formed therein.

5. A brick as claimed in any one of claims 1—4, in which the said hollow body portion is provided with transverse bores for the reception of bearing shafts.

6. A brick as claimed in any one of claims 1—5, in which the cross-section of the hollow body portion is of polygonal, more especially square, general outline, and the body portion is adapted, on all of the bounding surfaces of the polygon, for interlocking engagement with other bricks by means of a tongue and groove connection.

7. A brick as claimed in any one of claims 1—5, in which the cross-section of the hollow body portion is of generally circular outline.

8. A brick as claimed in any one of claims 1—7, in which the hollow body portion is provided with internally extending reinforcement ribs.

9. A brick is claimed in claim 8, in which the said ribs extend between opposite internal surfaces of the hollow body portion.

10. A brick as claimed in any one of claims 1—9, in which the said end cap is so attached to the hollow body portion that the lateral outer surfaces of the cap are flush with the external surfaces of the body portion.

11. A brick as claimed in any one of claims 1—10, in which lateral surfaces of the end cap incorporate re-entrant grooves which register with corresponding longitudinal grooves in the hollow body portion.

12. A brick is claimed in any one of claims 1—11, in which an end cap thereof incorporates a transverse re-entrant groove in its end face.

13. A brick as claimed in claim 12, in which the ends of the transverse re-entrant groove are provided with openings equivalent in width to the maximum width of the re-entrant groove, to enable correspondingly shaped re-entrant tenons to be introduced into said groove from the end face of the brick, the said openings extending to the lateral surfaces of the end cap and registering with the ends of longitudinal re-entrant grooves in the hollow body portion to enable tenons likewise to be introduced therein.

14. A brick as claimed inany one of claims 1—13, in which an end cap thereof is provided on its end face with a projecting re-entrant tenon.

15. A brick as claimed in any one of claims 1—14, in which the end cap includes a plug portion for insertion into an open end of the hollow body portion, the said plug portion having lateral projections and the walls of the hollow body portion at said open end having corresponding recesses to enable snap engagement of the end cap with the hollow body portion.

16. A brick as claimed in any one of claims 1—14, in which the end cap is attached to the hollow body portion by gluing, screw connection or pegging.

17. A brick as claimed in any one of claims 1—16, in which the end face of the said end cap is either at right angles or is inclined to the longitudinal axis of the hollow body portion.

18. A brick as claimed in any one of claims 1—17, in which the hollow body portion and the cap or caps are manufactured from a non-deformable tough resilient synthetic plastics material either by injection moulding or, more especially in the case of the hollow body portion, by extrusion.

19. A brick as claimed in any one of claims 1—17, in which the hollow body portion and the end cap or caps are made of metal.

20. A building brick substantially as des-

bodies of increased length are required. They may also be made from metal.

The hollow brick of the invention is applicable to toy building sets, and also quite generally in building, when produced with the required dimensions.

WHAT I CLAIM IS:—

1. A building brick comprising a hollow open-ended body portion the cross-section of which is such as to provide for interlocking engagement thereof with other bricks by means of a re-entrant tongue and groove connection, the said hollow body portion being closed at at least one end by means of an end cap which is also adapted for interlocking engagement with other bricks.

2. A brick as claimed in claim 1, in which the cross-section of the hollow body portion is such as to define one or more longitudinally extending grooves the mouths of which are open towards the external surface of the brick, the said grooves being closed towards the interior of the said body portion.

3. A brick as claimed in claim 1 or 2, in which the said hollow body portion includes one or more longitudinally extending re-entrant tongues projecting from its outer surface, the said tongues having longitudinal slots open either to the interior or the exterior of the body portion.

4. A brick as claimed in any one of claims 1—3, in which the wall thickness of said hollow body portion is substantially uniform over the whole of its outer bounding walls and also in the region of any groove formed therein.

5. A brick as claimed in any one of claims 1—4, in which the said hollow body portion is provided with transverse bores for the reception of bearing shafts.

6. A brick as claimed in any one of claims 1—5, in which the cross-section of the hollow body portion is of polygonal, more especially square, general outline, and the body portion is adapted, on all of the bounding surfaces of the polygon, for interlocking engagement with other bricks by means of a tongue and groove connection.

7. A brick as claimed in any one of claims 1—5, in which the cross-section of the hollow body portion is of generally circular outline.

8. A brick as claimed in any one of claims 1—7, in which the hollow body portion is provided with internally extending reinforcement ribs.

9. A brick is claimed in claim 8, in which the said ribs extend between opposite internal surfaces of the hollow body portion.

10. A brick as claimed in any one of claims 1—9, in which the said end cap is so attached to the hollow body portion that the lateral outer surfaces of the cap are flush with the external surfaces of the body portion.

11. A brick as claimed in any one of claims 1—10, in which lateral surfaces of the end cap incorporate re-entrant grooves which register with corresponding longitudinal grooves in the hollow body portion.

12. A brick is claimed in any one of claims 1—11, in which an end cap thereof incorporates a transverse re-entrant groove in its end face.

13. A brick as claimed in claim 12, in which the ends of the transverse re-entrant groove are provided with openings equivalent in width to the maximum width of the re-entrant groove, to enable correspondingly shaped re-entrant tenons to be introduced into said groove from the end face of the brick, the said openings extending to the lateral surfaces of the end cap and registering with the ends of longitudinal re-entrant grooves in the hollow body portion to enable tenons likewise to be introduced therein.

14. A brick as claimed inany one of claims 1—13, in which an end cap thereof is provided on its end face with a projecting re-entrant tenon.

15. A brick as claimed in any one of claims 1—14, in which the end cap includes a plug portion for insertion into an open end of the hollow body portion, the said plug portion having lateral projections and the walls of the hollow body portion at said open end having corresponding recesses to enable snap engagement of the end cap with the hollow body portion.

16. A brick as claimed in any one of claims 1—14, in which the end cap is attached to the hollow body portion by gluing, screw connection or pegging.

17. A brick as claimed in any one of claims 1—16, in which the end face of the said end cap is either at right angles or is inclined to the longitudinal axis of the hollow body portion.

18. A brick as claimed in any one of claims 1—17, in which the hollow body portion and the cap or caps are manufactured from a non-deformable tough resilient synthetic plastics material either by injection moulding or, more especially in the case of the hollow body portion, by extrusion.

19. A brick as claimed in any one of claims 1—17, in which the hollow body portion and the end cap or caps are made of metal.

20. A building brick substantially as des-

* C L M S *

cribed herein with reference to any one of Figs. 1—5, Figs. 6 and 7 or any one of Figs. 8—10 of the accompanying drawing.

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