

12 **EUROPEAN PATENT APPLICATION**

21 Application number: 86303055.7

61 Int. Cl.⁴: **E 04 B 1/41**
E 04 B 2/00

22 Date of filing: 23.04.86

30 Priority: 23.04.85 GB 8510321
 29.01.86 GB 8602103
 25.02.86 GB 8604576

43 Date of publication of application:
 29.10.86 Bulletin 86/44

84 Designated Contracting States:
 AT BE CH DE FR GB IT LI LU NL SE

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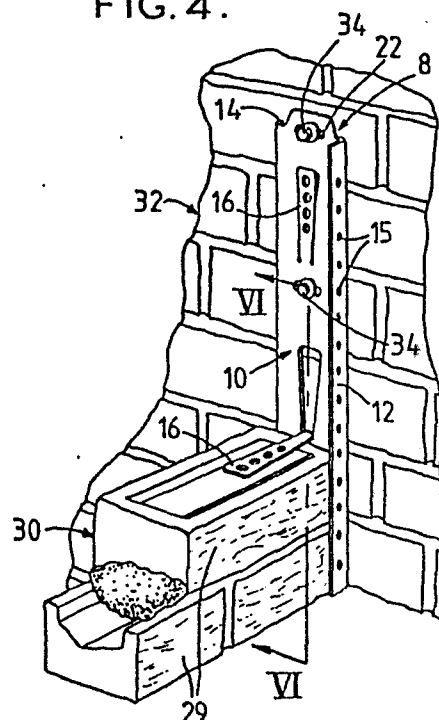
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54 **Wall construction device.**

57 A wall anchorage device for use in building an extension wall of bricks or building blocks onto a face of an existing wall structure (32) comprises an elongate plate (8; 8a) having a generally flat body portion (10) formed with an upstanding integral longitudinal flange (14) along one edge. In use, the plate is fixed in a vertical orientation to the face of the existing wall (32) so that the longitudinal flange (14) provides a guide for locating and aligning the end bricks or blocks (29) of the extension wall (30) as these are laid in position in abutting relationship with said body portion (10). The plate (8; 8a) is formed in said body portion (10) with a series of longitudinally directed integral elongate tongues (16; 16a, 16b) spaced apart at intervals and raised at a shallow angle to the plane of the body portion (10). These tongues (16; 16a, 16b) can be bent outwards after the plate is fixed in position during use so as to project substantially at right angles in a horizontal plane so that they can extend into and be embedded and keyed into the joints between adjacent courses of the extension wall (30) during construction thereby to serve as integral wall tie elements.

FIG. 4.



WALL ANCHORAGE DEVICE

This invention relates to the construction of walls, and it is particularly concerned with an improved design of wall anchorage device for use in building an extension wall of bricks or building blocks onto an existing wall structure and tying it in place in an angular relationship thereto.

For building an extension brick wall onto an existing brick wall and for tying or anchoring it in place, it is already known to provide a so-called wall plate of a kind comprising a longitudinally flanged elongate metal plate which is fixed vertically to the face of the existing wall and used as a guide to align and position the end bricks of the extension wall as these are laid in position in abutting relationship with the wall plate, with the extension wall being tied in position and bonded to the existing wall by associated wall tie elements which are anchored to the wall plate and which extend into and are embedded and keyed into mortar joints between adjacent courses of the extension wall. The use of such a wall plate and wall tie elements is for example disclosed in British patent specification No. 1604941.

Hitherto, wall ties used with such wall plates have been separate elements, for example standard butterfly type wire ties or profiled metal strip ties, which are clipped or interlockingly engaged with the wall plate. However, although these known arrangements can be functionally satisfactory, the need to provide separate wall tie elements which have to be positioned and anchored to the wall plate during the construction of the extension wall can be a disadvantage.

The present invention provides an improved form of wall anchorage device in the form of a wall plate of the kind referred to above having integral portions thereof adapted to form the requisite associated wall tie elements.

More particularly, the invention provides a wall anchorage device

for use in building an extension wall of bricks or building blocks to extend outwardly in angular relationship from a face of an existing wall structure, said anchorage device comprising an elongate plate having a generally flat body portion formed with upstanding integral longitudinal flange means along at least one edge thereof, said plate being adapted to be fixed in use in a vertical orientation to the face of the existing wall whereby the longitudinal flange means then provides a guide for locating and aligning the end bricks or blocks of the extension wall as these are laid in position in abutting relationship with said body portion, there being wall tie elements also provided which connect to said body portion and which can be arranged to extend into and to be embedded and keyed into jointing material between adjacent courses of the extension wall as it is being built thereby to tie said extension wall in position and bond it to the existing wall, characterised in that said plate is formed in said body portion with a series of longitudinally directed integral elongate tongues spaced apart at intervals and raised at a shallow angle to the plane of said body portion, which tongues can be bent outwards after the plate is fixed in position during use so as to project substantially at right angles in a horizontal plane thereby enabling them to extend into and to be embedded and keyed into the joints between adjacent courses of the extension wall during construction and to serve as said wall tie elements.

Preferably, the tongues of the device or so-called wall plate are suitably profiled and/or apertured to key most effectively in an interlocking manner into the jointing material or mortar of the extension wall and are spaced along the length of the plate at predetermined regular intervals corresponding to the distance between the adjacent courses of the extension wall or to a multiple thereof.

Generally, the tongues will have a length which is at least five times greater than the width at their root end. It is preferred to arrange the aforesaid series of integral wall tie tongues either in a single row or in two side-by-side rows in which all the tongues extend initially in the same general longitudinal direction. Also,

preferably, the design and material is such that the tongues can readily be bent out by hand to extend away from the plane of the body portion of the wall plate about a transverse axis lying at any position in the region adjacent their root ends, not necessarily
5 actually at their root ends, up to a point at least one third of the way along their length. The shallow angle with respect to the plane of the body portion at which the tongues are initially raised is preferably less than 10° and is conveniently in the range of 1° to 5° .

10 The body portion of the wall plate will also generally be formed with a number of apertures, transverse slots for example, along its length for accommodating fixing elements such as bolts for securing it to the face of the existing wall and/or for also keying in mortar or sealing material applied in this region. Furthermore, shallow stand-
15 off projections are preferably provided to space the main part of the body portion slightly away from the surface of the existing wall, thereby to assist in accommodating irregularities in the latter and leaving a space for filling with mortar. Where the body portion of the wall plate is provided with an upstanding longitudinal brick
20 locating flange along one edge only, the opposite longitudinal edge may also be bent over rearwardly to provide a shallow lip which acts as an additional stand-off or spacing projection and as a reinforcing beading. Moreover, when apertures are provided in the integral wall
25 tie tongues for keying with the mortar jointing in the extension wall these may be formed with a shallow raised rim to facilitate even more effective keying and bonding with the mortar.

The invention also provides a method of building a wall of bricks or building blocks as an extension outwardly in angular relationship to a face of an existing wall structure, said method comprising
30 applying a wall anchorage device as hereinabove defined to said face and fixing thereto said anchorage device plate in a vertical orientation, laying at least partially the lower courses of the bricks or building blocks of the extension wall until the upper surface of the endmost brick or block of the course being laid, which brick or
35 block is butted up to the body portion of said plate, lies adjacent the level of the root end of the lowermost tongue in said body portion, bending said lowermost tongue outwards until it extends in a

substantially horizontal plane lying immediately above said upper surface of the endmost brick or block of the last laid course, applying jointing material and laying the next course of bricks or blocks whereby said lowermost tongue is embedded in said jointing compound and is sandwiched between the two last laid courses of bricks or blocks, and continuing in the same manner laying successive courses and bending outwards each successive tongue as the level of the upper surface of the endmost brick or block of the last laid course reaches a level adjacent the level of said each successive tongue so that said tongues are each arranged to serve as integral wall tie elements bonding the extension wall in place.

The wall plates may be used with the tongues all initially directed either upwardly or downwardly as hereinafter described so that where there is a single longitudinal locating flange along one edge only this may be placed either to the left or to the right hand side.

In the accompanying drawings various exemplary embodiments are illustrated of wall plates in accordance with the invention.

FIGURE 1 is a front elevational view of a length of the wall plate of a first embodiment shown partially broken away;

FIGURE 2 is a side edge view of the wall plate of FIGURE 1;

FIGURE 3 is a cross-sectional view on line III-III of FIGURE 1;

FIGURE 4 is a perspective fragmentary view showing the wall plate of said first embodiment being used in a first manner in constructing an extension brick wall;

FIGURE 5 is a view similar to FIG. 4 showing the wall plate being used in an alternative second manner in constructing an extension brick wall;

FIGURE 6 is a vertical section on line VI - VI of FIG. 4 showing schematically an ideal structure in which the courses of bricks in the extension wall are regularly spaced;

FIGURE 7 is a view similar to FIG. 6 but showing in a somewhat exaggerated form an arrangement when the courses of bricks in the

extension wall have irregular spacings;

FIGURE 8 is a fragmentary front elevational view of a length of the wall plate of a second embodiment;

FIGURE 9 is a cross-sectional view on line IX - IX of FIGURE 8;

5 FIGURE 10 is a front elevational view of a slightly modified wall plate of a further embodiment;

FIGURE 11 is an enlarged fragmentary front view of the lower end portion of the wall plate of FIGURE 10;

10 FIGURE 12 is a cross-sectional view on line XII - XII of FIGURE 11, showing also in broken lines the head of a fixing bolt in place and the surface of an existing wall as when in use;

FIGURE 13 is a cross-sectional view on line XIII - XIII of FIGURE 11; and

15 FIGURE 14 is a side elevational view of the portion of the wall plate shown in FIGURE 11.

Referring first to FIGURES 1 to 4 of the drawings, the wall plate 8 is a sheet metal structure, formed for example of stainless steel about 0.7 mm thick, comprising a main elongate flat plate-like body portion 10 provided along one longitudinal edge with an integral flange 12 upstanding at right angles to the plane of the body portion. The opposite longitudinal edge portion is turned over to provide a shallow rearwardly directed lip 14. The flange 12 has a series of plain holes 15.

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At regular predetermined intervals along its length which are multiples of the normal vertical spacing between courses of standard size building bricks or blocks, the body portion 10 is provided with a series of integral elongate tongues 16 which all extend in alignment in the same longitudinal direction forming, in this embodiment, a single row or column. Each tongue 16 has a slightly outwardly divergent tapering profile and is formed by punching or stamping the material of the wall plate so that the tongue is left integrally joined at its root end to the body portion 10 of the wall plate.

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35 Small holes 17 are formed at the root ends, as shown, to safeguard against cracks developing and initially each tongue lies slightly

raised at a shallow angle, conveniently within a range of 1° to 5° , to the plane of the body portion as shown in full lines in FIGURE 2. The material forming these tongues 16 is sufficiently ductile that when required for use these tongues 16 can readily be bent up, simply by
5 hand pressure, so as to project outwardly substantially at right angles as indicated in FIGURE 2, or they may be bent through an even greater angle, up to substantially 180° , as required in some cases according to the manner of use as hereinafter described.

10 The wall tie tongue portions 16 are also formed, in the region extending over the outer two-thirds of their length, with a number of holes or apertures 18 punched out to leave a surrounding shallow raised rim 20 giving each hole or aperture a bell-shaped mouth.

15 A further series of apertures in the form of short transverse slots 22 is provided in the body portion 10 throughout its length, one such slot being located between each adjacent pair of tongues 16, for receiving bolts, screws or similar fixing elements in order to secure the wall plate 8 to the face of an existing wall structure as
20 hereinafter described. Each of these slots 22 is also punched out to provide a bell-shaped mouth and a surrounding raised rim 24 which projects rearwardly of the body portion 10 so as to act, in use, as a stand-off projection to space the body portion from the face of the existing wall structure.

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Referring now to FIGURE 4, this shows a stage in the construction of an extension wall 30 at right angles to the face of an existing wall structure 32 using in one manner the wall plate 8 hereinabove described. In this operation, the wall plate 8 is first securely
30 fixed in a vertical position at the required location to the face of the existing wall structure 32 which is drilled and plugged to receive fixing elements, such as the bolt 34 indicated in the drawing, engaging in the slots 22. In setting up the wall plate 8, ideally it is positioned so that the transverse axes "T" defining the root ends
35 of the wall tie tongue portions 16 each lie at the level of a mortar joint between adjacent proposed courses of the extension wall and, as

indicated in FIGURE 4, these tongue portions initially extend upwards from their root ends. Also, as already indicated, the main body portion 10 of the wall plate 8 is set forwards slightly from the face of the wall 32 by the stand-off projections or spacers provided by the raised rim portions 24 around the fixing slots 22, and also by the shallow lip 14.

The bricks 29 of the extension wall 30 are then laid course-by-course in the usual way with each end brick being butted up to the body portion 10 of the wall plate and aligned by abutting engagement with the retaining guide flange 12 at the one side. Upon reaching each wall tie tongue portion 16, however, the latter is bent outwards so as to extend in a substantially horizontal plane which will lie immediately above an end brick in a course of the extension wall. An example of this is clearly shown in FIGURE 4 in relation to the uppermost brick laid in the extension wall. Each integral wall tie tongue 16 is thus sandwiched between different courses of bricks in the extension wall, and it will be appreciated that as the jointing compound or mortar is applied it will surround these tongues and key into the holes or apertures 18. The raised rims 20 of these holes or apertures 18 in each tongue 16 enhances the keying effect and ensures that space is left to accommodate a sufficient thickness of mortar. The mortar will also generally penetrate into and key with adjacent holes 15 in the retaining guide flange 12 and into any open adjacent holes or apertures in the body portion 10.

By this means, the extension wall 30 is readily built-up in the correct position and orientation with respect to the existing wall structure 32, and is soundly tied in and bonded to the latter without need for any separate wall tie elements, thereby effecting a simplification in the number of parts required and in the construction operation itself.

It will of course be appreciated that the initial shallow inclination of the wall tie tongues 16 with respect to the plane of the body portion 10 enables their free ends readily to be grasped and

the tongues can be bent outwards into their "in-use" positions during the operation of building up of the extension wall, after the wall plate has been fixed to the existing wall. Generally it will be most convenient for storage and transport and for ease of use to defer the
5 outwards bending operation until the wall plate is in place and the extension wall is being constructed.

As so far described it has been assumed that the courses of the extension wall 30 have a perfectly regular spacing and that the wall
10 plate 8 is positioned such that the transverse axes defining the root ends of the tongues 16 lie at a level of the joint between two adjacent courses. This is the ideal situation in which the tongues 16 are each bent outwardly about their root ends in order to extend at right angles in the correct position to lie between two adjacent
15 courses of the extension wall and is illustrated in the fragmentary sectional view of FIGURE 6. On the other hand, in practice, the courses of the extension wall may possibly not be spaced with perfect regularity, perhaps using bricks of different dimensions and/or the wall plate may not be fixed in quite the correct position. Or, the
20 spacing of the tongues 16 may not match the spacing of the bricks. However, the sheet metal of which the wall plate is composed and the form of the tongue portions 16 is such that they can be readily bent not only at their root ends but also at any point in the region adjacent their root ends extending up to at least a third of the way
25 along their length. This is in fact indicated in FIGURE 2. Tests have shown, somewhat surprisingly, that a strong bond and good stability can be obtained in many cases even if the point at which the tongues are bent lies at least as far as one third along their length. If necessary, the tongues may sometimes even be folded with a double
30 bend. Thereby, irregularities in the vertical spacing of the courses in the extension wall and/or a certain degree of misalignment of the wall plate can be readily accommodated, as schematically indicated for example in FIGURE 7.

35 In the manner of using the wall plate 8 illustrated in FIGURE 4 it will be noted that the flange 12 lies on the righthand side of the

extension wall. Usually, in the finished structure, the flange 12 will be concealed by cladding but this may not be possible if the right-hand side of the extension wall is to be an exposed exterior face, and it may be desired to have the flange 12 on the opposite
5 left-hand side. This can readily be arranged simply by turning the wall plate into a reversed position before securing it to the existing wall 32. In this case, however, the tongue portions 16 will initially be directed downwards so that each of them needs first to be bent upwards through an angle of more than 90°, possibly even an angle
10 approaching 180°, before laying the bricks of the adjacent course or courses of the extension wall. These tongues are then bent back downwards into a substantially horizontal position, at right angles to the body portion 10, after laying the brick course immediately below. This alternative second manner of using the wall plate is illustrated
15 in FIGURE 5, and the bending of a tongue portion 16 from its initial position "A", beyond 90° to an upwardly directed second position "B", and then back to a 90° horizontal position "C" is indicated in phantom lines in FIGURE 2.

20 The wall plate 8 is preferably composed of a material such as stainless steel to avoid any corrosion problems and may of course be manufactured in a series of standard lengths which can if necessary be cut, or joined in overlapping aligned relationship, to suit the required height of the extension wall which is to be built. Sheet
25 metal thicknesses in the range of 0.5 mm to 1.00 mm are generally suitable and enable easy bending of the wall tie tongues.

Two such wall plates arranged in side-by-side mirror image relationship can be used to construct a thick extension wall.
30 Preferably, however, in such cases a wider form of wall plate with a plurality of rows or columns of integral tongue portions will be used. By way of example one design of such wider form of wall plate 8a is shown in FIGURES 8 and 9. This is basically the same as the wall plate 8 already described but there are two spaced columns or rows of
35 integral wall tie tongue portions 16a and 16b arranged in horizontal pairs as shown, and also horizontal pairs of fixing slots 22a, 22b,

are provided between each pair of tongues 16a, 16b. Otherwise the structure corresponds with that already described, corresponding parts being indicated by the same reference numerals, and is used in substantially the same way. It will be noted that in this embodiment
5 the tongues 16a and 16b of each adjacent pair again each extend in the same longitudinal direction and each have their root ends aligned in a common transverse plane so that when they are bent up at right angles to the body portion 10 they can both lie in side-by-side relationship in a common transverse plane.

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Instead of the body portion of the plates having fixing element apertures formed with a bell-shaped mouth providing a surrounding raised rim projecting rearwardly, in an obvious alternative modified form the body portion of the plate can be formed with a series of
15 dish-like depressions and the apertures for the fixing elements are formed in a substantially flat base portion of such dish-like depressions. An example of such modified construction is illustrated in FIGURES 10 to 14.

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The wall plate shown in FIGURES 10 to 14 is basically the same as that described in connection with FIGURES 1 to 3 and the same reference numerals are again used to indicate similar parts. For fixing the wall plate to the face of an existing wall, however, the body portion 10 is provided with short transverse slots 22' formed in
25 a substantially flat base 70 of each of a series of dish-like depressions 72 located along the length of the wall plate. Each dish-like depression 72 has a shallow peripheral sloping wall 74 and the flat base part 70 is set rearwards from the main plane of the body part of the wall plate by a distance approximately equal to the depth
30 of the edge lip 14 and together with the latter again act as stand-off projections to space the main body portion 10 from the face of the existing wall structure 32 when fixed to the latter.

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The fixing elements used for securing the wall plate to the existing wall will generally be headed screw-threaded fasteners such as the bolt 34 indicated in broken lines in FIGURE 12 and a flat

washer 35 will be fitted under the head of this bolt, the dish-like depressions 72 being sufficiently large for such washer (e.g. 30mm diameter washer) to be accommodated wholly therein and to lie against the flat base 70.

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Although by way of example in the illustrated embodiments the spacing between the tongues 16 has been shown as corresponding generally to the depth of two courses of bricks, in fact for use at least in the United Kingdom the spacing will generally be set to correspond to the depth of three courses of standard size bricks or one course of standard size building blocks.

If desired, the wall plates could have a retaining guide flange along each longitudinal edge, and many other detail modifications can be made within the scope of the invention, especially in relation to the arrangement and form of the apertures and of the integral wall tie tongues.

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Claims

1. A wall anchorage device for use in building an extension wall of bricks or building blocks to extend outwardly in angular relationship
5 from a face of an existing wall structure, said anchorage device comprising an elongate plate (8; 8a) having a generally flat body portion (10) formed with upstanding integral longitudinal flange means (14) along at least one edge thereof, said plate being adapted to be fixed in use in a vertical orientation to the face of the existing
10 wall (32) whereby the longitudinal flange means (14) then provides a guide for locating and aligning the end bricks or blocks (29) of the extension wall (30) as these are laid in position in abutting relationship with said body portion (10), there being wall tie elements also provided which connect to said body portion and which
15 can be arranged to extend into and to be embedded and keyed into jointing material between adjacent courses of the extension wall (30) as it is being built thereby to tie said extension wall in position and bond it to the existing wall, characterised in that said plate (8; 8a) is formed in said body portion (10) with a series of
20 longitudinally directed integral elongate tongues (16;16a,16b) spaced apart at intervals and raised at a shallow angle to the plane of said body portion, which tongues (16;16a,16b) can be bent outwards after the plate is fixed in position during use so as to project substantially at right angles in a horizontal plane thereby enabling
25 them to extend into and to be embedded and keyed into the joints between adjacent courses of the extension wall (30) during construction and to serve as said wall tie elements.

2. A wall anchorage device as claimed in Claim 1 wherein the root
30 ends of the tongues (16;16a,16b) are spaced along the length of the plate (8;8a) at predetermined regular intervals corresponding to the distance expected between adjacent courses of the extension wall (30) or to a multiple thereof.

35 3. A wall anchorage device as claimed in Claim 1 or 2 wherein the tongues (16;16a,16b) are apertured (18) and/or have a divergent

tapering profile so as to key into the jointing material of the extension wall (30) in an interlocking manner.

4. A wall anchorage device as claimed in any of the preceding claims wherein said tongues (16) are all arranged along the body portion of the plate (8) in a single row in which they all extend initially in the same general longitudinal direction.

5. A wall anchorage device as claimed in any of Claims 1 to 3 wherein said tongues (16a,16b) are all arranged in transversely aligned pairs along the body portion of the plate (8a) providing two side-by-side rows in which they all extend initially in the same general longitudinal direction.

6. A wall anchorage device as claimed in any of the preceding claims wherein the plate (8;8a) is composed of sheet-metal having a thickness within the range of 0.5 - 1.0 mm and the tongues (16;16a,16b) are sufficiently ductile as to be manually bendable about a transverse axis at any position between their root ends and a point at least one third of the way along their length.

7. A wall anchorage device as claimed in Claim 6 wherein the thickness of the sheet-metal of which the plate (8;8a) is composed is approximately 0.7 mm.

8. A wall anchorage device as claimed in any of the preceding claims wherein the tongues (16;16a,16b) each have a length which is at least five times the width at their root end.

9. A wall anchorage device as claimed in any of the preceding claims wherein the angle to the plane of the body portion (10) of the plate at which the tongues (16;16a,16b) are raised in their initial condition before use lies in the range of 1° - 5°.

10. A method of building a wall of bricks or building blocks as an extension outwardly in angular relationship to a face of an existing

5 wall structure, said method comprising applying a wall anchorage device as claimed in any of the preceding claims to said face and fixing thereto said anchorage device plate (8,8a) in a vertical orientation, laying at least partially the lower courses of the bricks or building blocks (29) of the extension wall (30) until the upper surface of the endmost brick or block of the course being laid, which brick or block is butted up to the body portion 10) of said plate, lies adjacent the level of the root end of the lowermost tongue (16;16a,16b) in said body portion, bending said lowermost tongue
10 outwards until it extends in a substantially horizontal plane lying immediately above said upper surface of the endmost brick or block (29) of the last laid course, applying jointing material and laying the next course of bricks or blocks whereby said lowermost tongue (16;16a,16b) is embedded in said jointing compound and is sandwiched
15 between the two last laid courses of bricks or blocks, and continuing in the same manner laying successive courses and bending outwards each successive tongue as the level of the upper surface of the endmost brick or block of the last laid course reaches a level adjacent the level of said each successive tongue so that said tongues are each
20 arranged to serve as integral wall tie elements bonding the extension wall (30) in place.

11. A method of building an extension wall as claimed in Claim 10 wherein the anchorage device plate (8;8a) is fixed to the face of the
25 existing wall (32) with the tongues (16;16a,16b) in the body portion thereof initially directed upwardly before being bent.

12. A method of building an extension wall as claimed in Claim 10 wherein the anchorage device plate (8;8a) is fixed to the face of the
30 existing wall (32) with the tongues (16;16a,16b) in the body portion (10) thereof initially directed downwardly, and wherein said tongues are then bent upwards about their root ends each through an angle substantially greater than 90° so as to be directed upwardly before laying at least each lower adjacent course of bricks or blocks (29) of
35 the extension wall (30) and before finally bending each said tongue back downwards and outwards so as to extend in a substantially

horizontal plane in order to serve as a said wall tie element.

13. A method of building an extension wall as claimed in any one of Claims 10 to 12 wherein at least some of said tongues (16;16a,16b), in
5 being bent outwards so as to extend in substantially horizontal planes in order to serve as said wall tie elements are bent about a transverse axis spaced from their respective root end.

14. A method of building an extension wall as claimed in Claim 13
10 wherein said transverse axis about which said at least some tongues (16;16a,16b) are bent each lie in a region of respective tongue that is intermediate the root end thereof and a point one third of the way along the length of said respective tongue and closer to said point than to said root end.

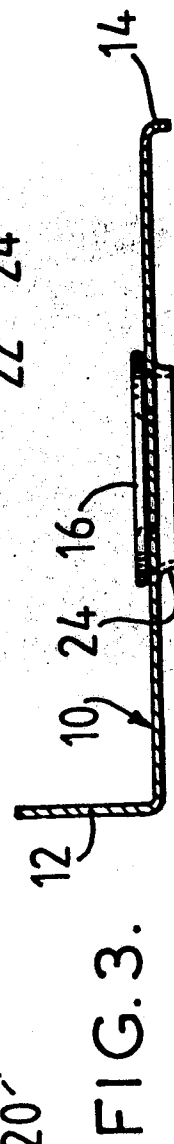
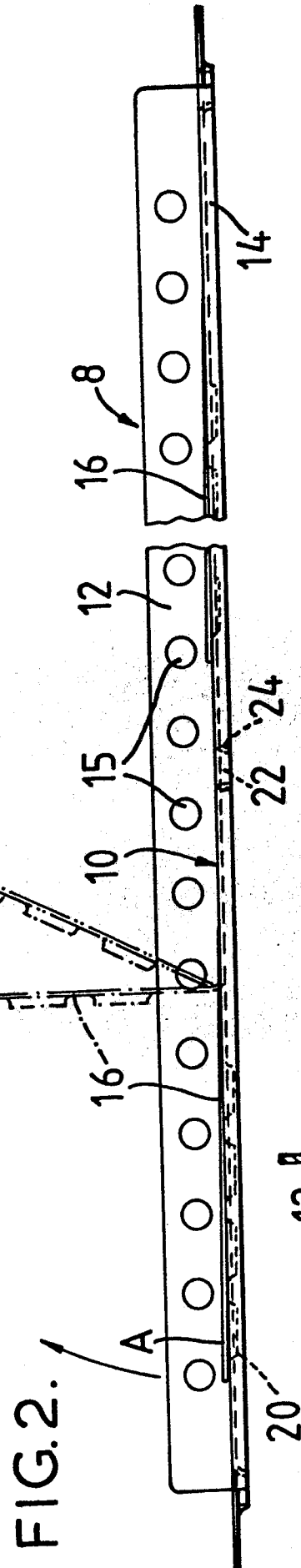
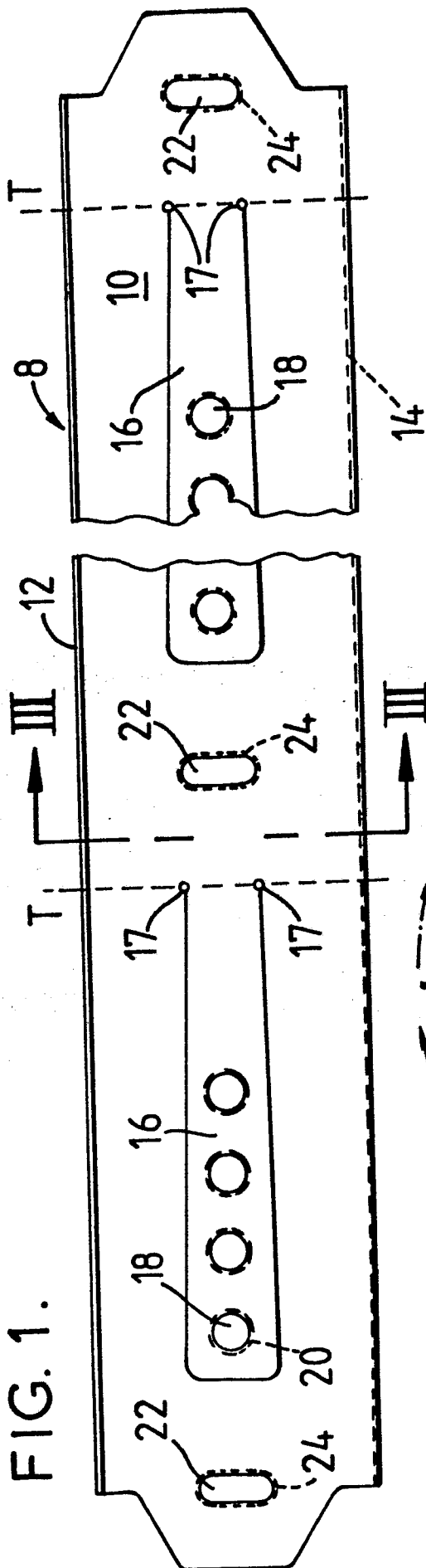


FIG. 4.

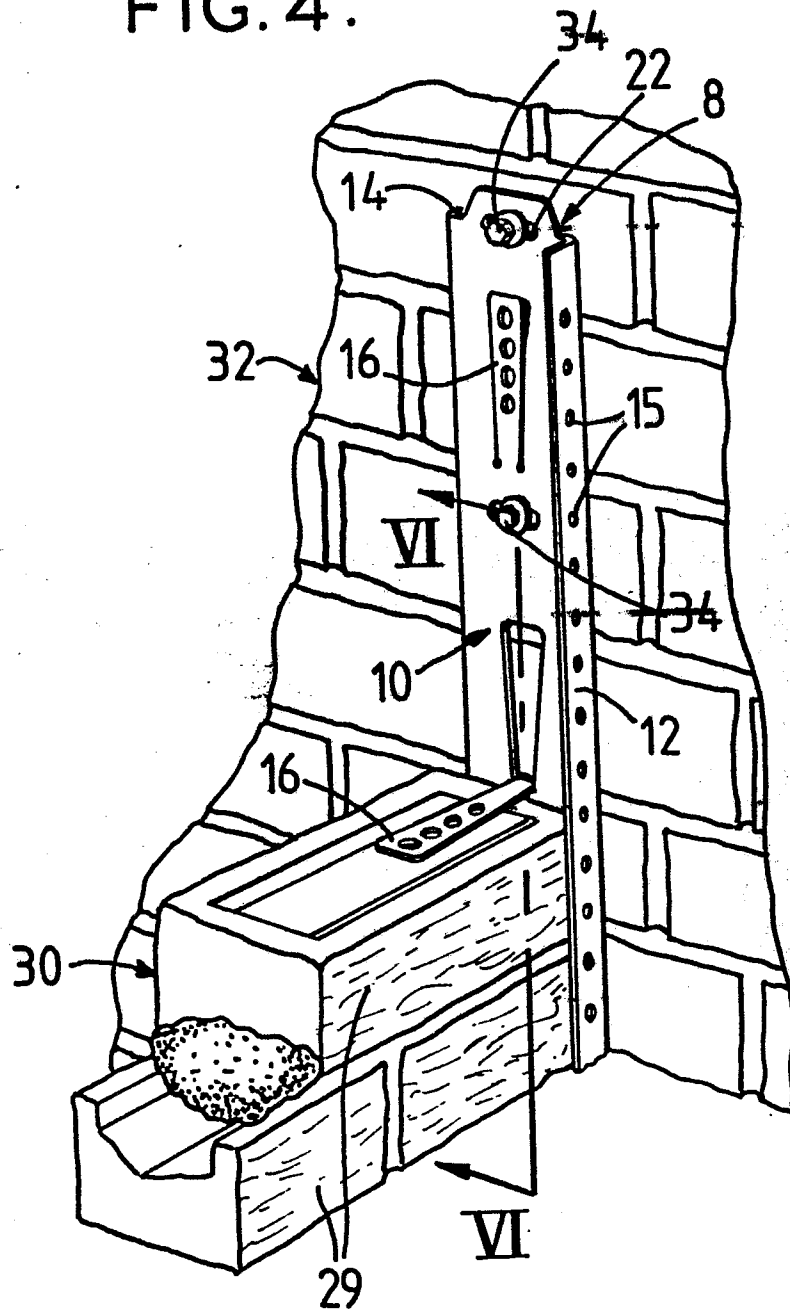


FIG. 5.

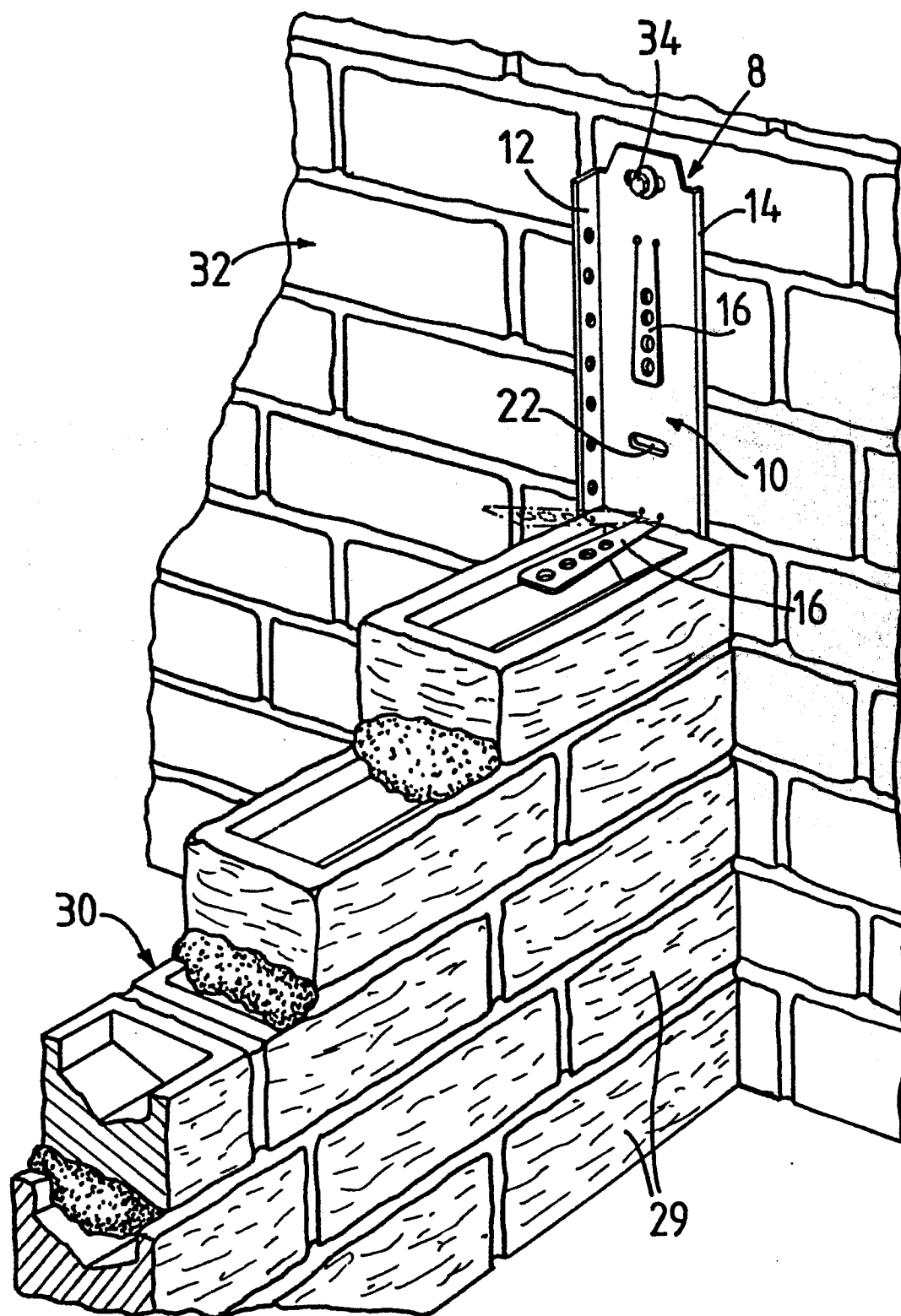


FIG. 6.

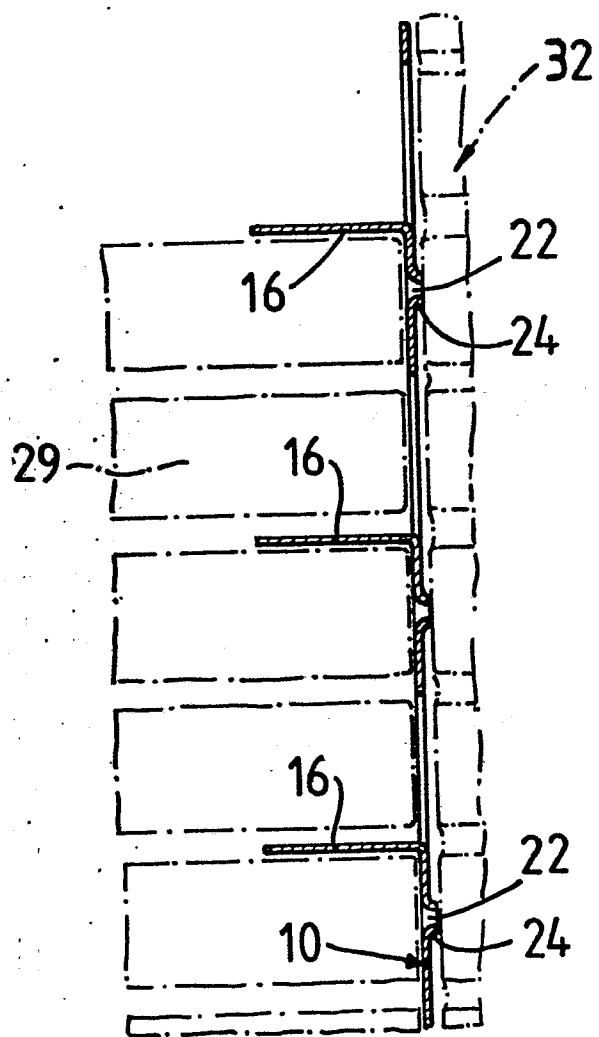


FIG. 7.

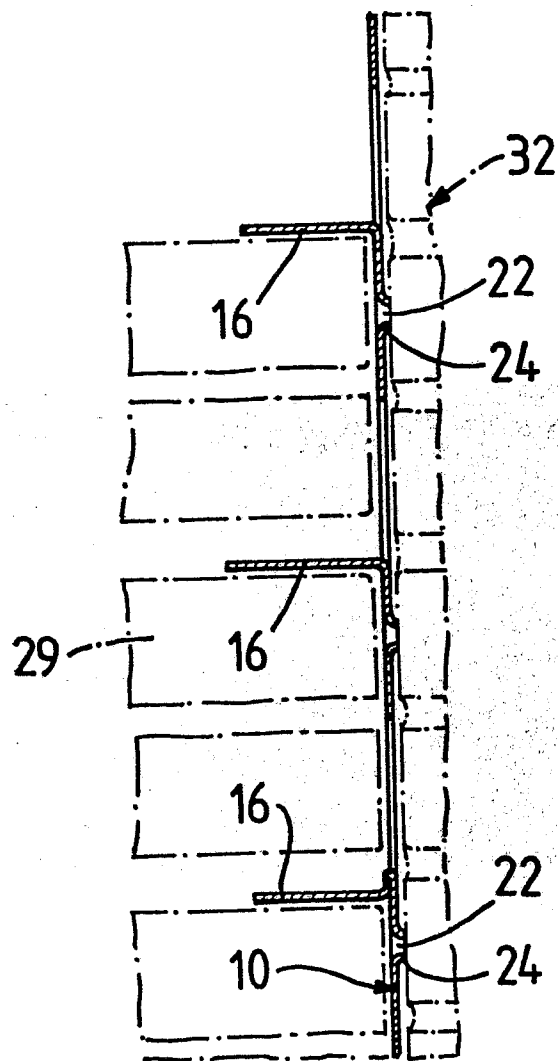


FIG. 8.

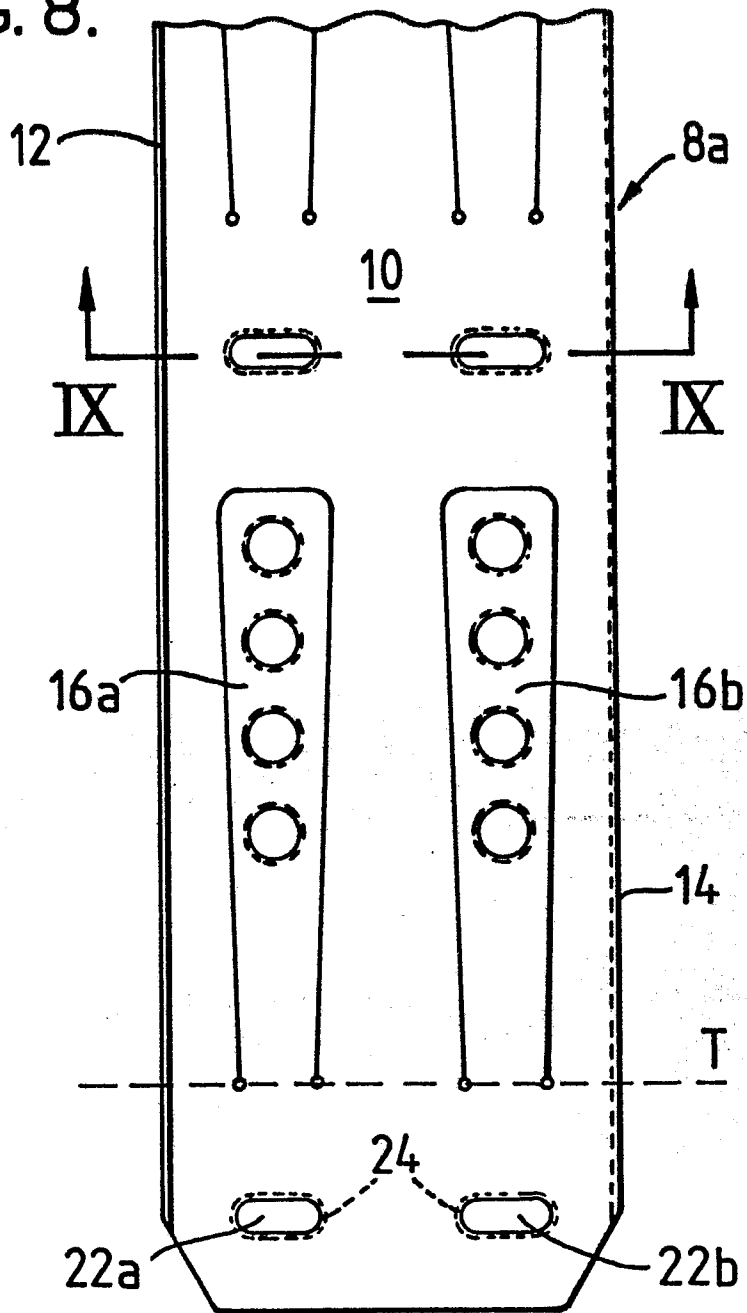
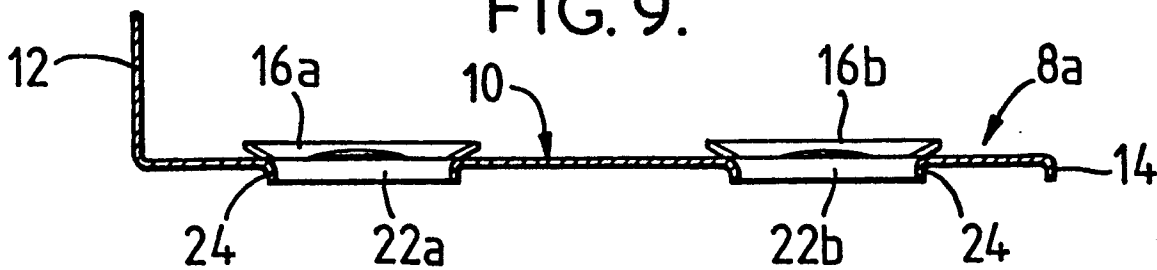


FIG. 9.



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FIG.10.

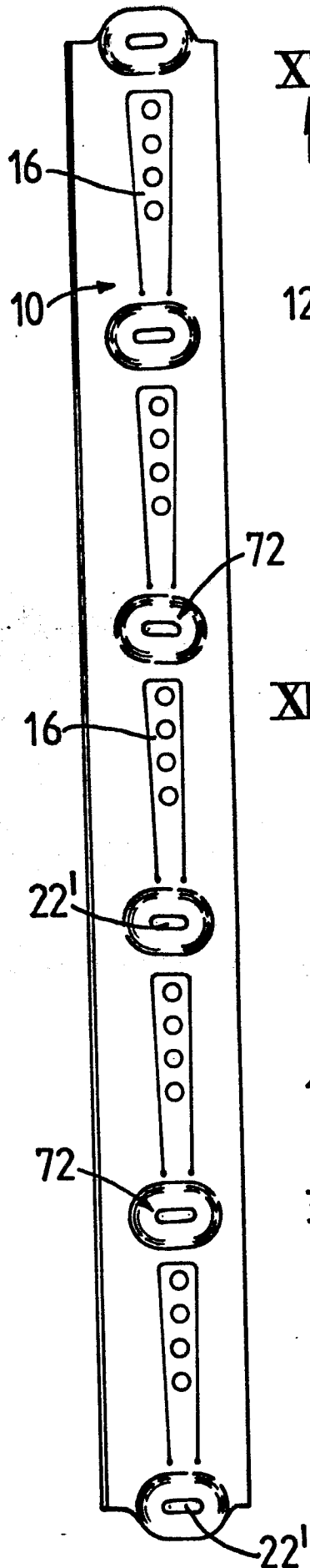


FIG.11.

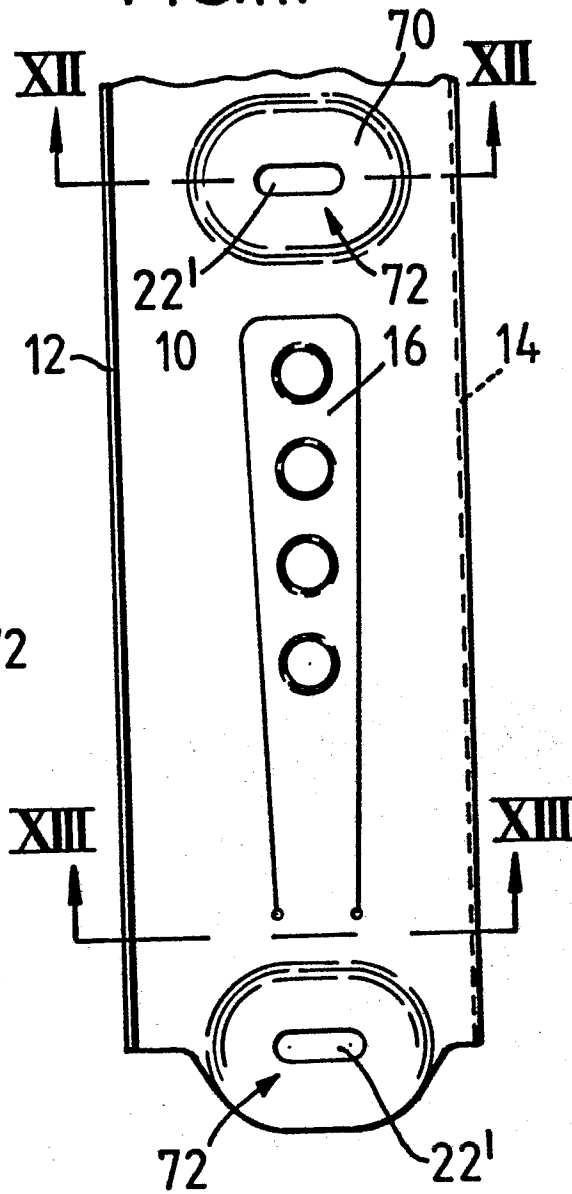


FIG.14.

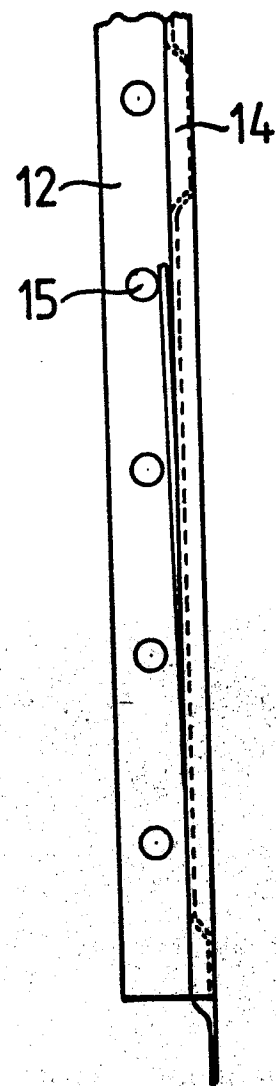


FIG.12.

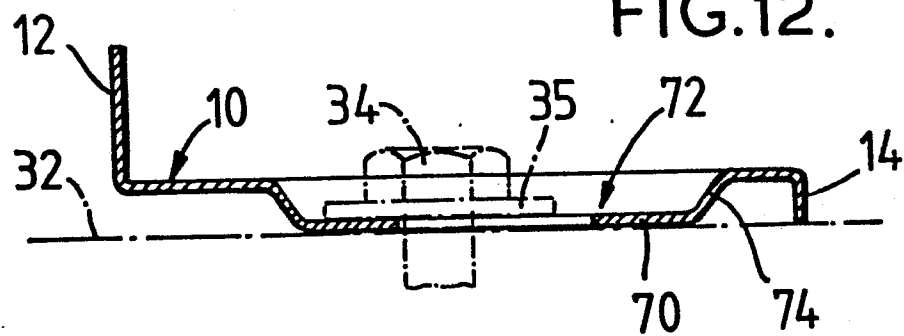


FIG.13.

