(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 129 347**
B1

(12) # EUROPEAN PATENT SPECIFICATION

(45) Date of publication of patent specification: **08.04.87**

(51) Int. Cl.[4]: **E 04 B 1/56**

(21) Application number: **84303450.5**

(22) Date of filing: **22.05.84**

(54) **Method of butt jointing timbers in a building and splice plate for performing the method.**

(30) Priority: **18.06.83 GB 8316644**

(43) Date of publication of application:
27.12.84 Bulletin 84/52

(45) Publication of the grant of the patent:
08.04.87 Bulletin 87/15

(84) Designated Contracting States:
BE DE FR NL

(56) References cited:
DE-A-3 133 014
GB-A-2 070 184

W. RUSKE: "Holzskelettbau", 1980, Deutsche Verlagsanstalt, Stuttgart (DE), page 30, "VERBINDUNGSMITTEL"

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EP 0 129 347 B1

Courier Press, Leamington Spa, England.

Description

This invention relates to a method of butt jointing timbers and to a method of renovating timbers in a building, and to a splice plate for performing the method.

As a building becomes older, there is a risk of various forms of decay or damage occurring to timbers such as joists, roof trusses or timber studs. This decay or damage may have such varied causes as wet or dry rot, fungal attack, woodworm and similar pests, fire or impact.

As a typical example of the use of the invention, reference will be made in the following description to renovating floor joists where these have rotted adjacent a wall. However, it will be understood that this is only one example of many uses for the invention.

Timber is expensive, particularly for load bearing timbers such as joists which need to be of large cross-section.

Often, only part of a timber needs to be removed and replaced but this has hitherto been difficult and time-consuming work, requiring considerable skill and involving a substantial amount of replacement timber.

Taking the example of floor joist renovation, referred to above, after the floor boards have been lifted, the deteriorated portion of each joist is cut out, and a substitute length of timber used to replace it.

Traditionally, this substitute has been secured side-by-side with the remaining portion of the original joist by bolts. To achieve this, the substitute timber has had to be offset laterally, necessitating repositioning of the joist support point and it needs to be about one metre longer than the deteriorated portion it replaces, to permit the overlap. This extra timber is expensive and adds unwanted extra weight. Both the substitute and the remaining original joist need to be drilled to take the bolts, which involves both extra time and the use of tools.

It is known, for example from our prior British patent GB—B—2070184, to connect timber joists together by means of metal brackets nailed to the timbers. Similar jointing of sound timbers is shown at reference 18 in Figure 2 on page 30 of the publication "Holzskelettbau" by W. Ruske dated 1980.

Such connections are relatively localised and are intended for use in connecting sound timber joists at points of contraflexure within a building, where the total bending moment or force on the joint tends to zero.

In refurbishment of buildings, replacement timbers may need to be connected at much less favourable positions where heavy loading or bending moments or forces are experienced. Even when badly deteriorated parts of the timber have been removed, the remaining part may not have as great a strength as it had when it was new and sound. For these reasons, conventional localised connections may not be satisfactory.

Prior proposals for replacing deteriorated timber have been made in DE—A—3 133 014, involving the use of a curable composition supported by reinforcing rods cemented into longitudinal and transverse bores in the sound parts of the timber. Use of such methods involves skilled work, expensive materials and delays which occur during preparation of the timber and during setting of the curable composition.

It is an object of the present invention to provide a new or improved method of butt jointing timbers in a building, which overcomes or reduces these disadvantages, a method of renovating timbers, and a splice plate which can be used for performing the methods according to the invention.

According to a first aspect of the invention, there is provided a method of renovating timbers in a building comprising:—

cutting away a deteriorated portion of an original timber;

taking a substitute timber of the same length;

placing said substitute timber in the place formerly occupied by the deteriorated portion;

taking a plurality of metal splice plates;

and securing each splice plate to both the substitute timber and the remaining portion of the original timber with the ends of said substitute and said remaining portion in contact with each other;

each splice plate having at least two mutually perpendicular flanges, each flange abutting a respective surface of each of said substitute and remaining portion and the splice plate being secured by fasteners passing through at least one of said flanges directly into each of the timbers.

According to a further aspect of the invention there is provided a method of butt jointing two timbers in a building comprising the steps of:—

taking four splice plates, each splice plate having at least two mutually perpendicular flanges;

and securing each splice plate to both said timbers with the ends of the timbers positioned in contact with each other; each flange abutting a respective surface of each of said timbers; and the splice plates being secured by fasteners passing through at least one of said flanges directly into each of said timbers.

In either of the foregoing methods there may be included the step of cutting a slot into one or more surfaces of the timbers to generate internal surfaces of the timbers against which one or more of said flanges may abut.

The timbers may be slotted on a central longitudinal plane.

The fasteners preferably comprise nails.

The invention also provides a splice plate for securing together timbers in performance of a method set out above, comprising a single sheet metal member having two mutually perpendicular flanges one flange being of a narrow width, less than or equal to one half the thickness of the timbers to be joined, the other flange being of a greater width, less than or equal to one half the width of the timbers, the length of the plate being

substantially greater than the width of the timbers, at least the wider flange having a plurality of fastener receiving apertures at each end portion, and stiffening ribs or depressions disposed in a central portion devoid of apertures, whereby abutting end poritons of the timbers to be joined together can be substantially surrounded by a set of four such plates and rigidly secured together by fastening through said pluralities of apertures.

The invention also provides a jointing kit comprising four splice plates as set out above.

Viewed from a further aspect, the invention provides a splice plate for securing together timbers comprising a sheet metal member of channel section having two parallel flanges connected by a web of a narrow width equal to the thickness of timbers to be joined, the two parallel flanges being of a greater width, less than or equal to one half the width of the timbers and the length of the plate being substantially greater than the width of the timber, at least the parallel flanges having a plurality of fastener receiving apertures at each end portion, and stiffening ribs or depressions disposed in a central portion devoid of apertures, whereby abutting end portions of the timbers to be joined together can be substantially surrounded by a pair of such plates and rigidly secured together by fastening through said pluralities of apertures.

This aspect of the invention further provides a jointing kit comprising two splice plates as set out in the preceding paragraph.

Methods and apparatus embodying the invention will now be described by way of example only, with refence to the accompanying drawings, in which:—

Figure 1 is a front elevational view of a first embodiment of splice plate;

Figure 2 is a top plan view of the plate of Figure 1;

Figure 3 is a side elevation of the same plate;

Figure 4 is a sectional view of a renovated timber, which has been secured together using splice plates as shown in Figures 1 to 3;

Figure 5 is a sectional view of renovation using a first alternative form of splice plate;

Figure 6 is a sectional view of renovation using a second alternative form of splice plate.

Figure 7 is a side elevational view of a further alternative form of splice plate.

Figure 8 is a section of the splice plate of Figure 7 taken on the line 7—7.

Figure 9 is a perspective view of the splice plate of Figures 7 and 8 in use in a butt joint.

Figure 10 diagramatically illustrates butt joints which can be secured using the splice plate.

Referring firstly to Figures 1 to 3 of the drawings, a splice plate 10 is made of galvanised steel sheet, stainless steel sheet or other strong and corrosion resistant sheet metal. It comprises a first flange 11 and a narrower second flange 12, meeting at right angles at a junction line 13.

In this embodiment each flange is provided with a plurality of apertures 14, to receive nails, which will be used to secure together timbers for renovation. Careful examination of the pattern of apertures will shown that these are arranged so that no three adjacent apertures are aligned. The plate will be subjected to tensile stress in use, and alignment of the apertures could lead to failure by tearing along a line of apertures. The offset pattern of holes helps to prevent such failure. It may also reduce the risk of splitting timbers secured using the splice plate.

The central portion 15 mf the splice plate is devoid of apertures. Building Regulations require that timbers should not be nailed within a certain distance of their ends, to reduce risk of splitting, which could make the nails insecure. The central portion 15 will overlie the ends of two abutting timbers in use.

In this central region, there are provided stiffening formations in the form of ribs 16 or depressions in the material of the plate, these ribs 16 being made in both first and second flanges 11 and 12.

The version of splice plate shown in Figures 7 and 8 of the drawings is similar to that decribed above with certain exceptions. Where similar parts are shown, they are given the same reference numerals.

The first difference in the embodiment shown in Figures 7 and 8 is that the narrow second flange 12 does not have apertures similar to the apertures 14 shown in Figure 2 and does not have a central stiffening rib 16. It has been found in practice that these can be omitted without detriment to the functioning of the splice plate to be described below and their omission leads to simpler manufacturing.

A second difference is in the shape of the stiffening formations indicated at 26 and 27 in the drawings. Instead of a single generally Z shaped stiffening rib, a pair of straight stiffening ribs 26, 27 are provided, again lying in the central region of the splice plate which is devoid of apertures. However, the ribs 26, 27 are located adjacent the junciton line 13 between the first and second flanges 11 and 12. This provides increased stiffening at the point where it is most needed. This will be referred to again in the description of the use of the splice plate below.

It will be seen that the ribs 26 and 27 are off-set on opposite sides of the centre line of the splice plate. The reason for this is to avoid the ribs obstructing a hammer which is used to nail fasteners in the group of apertures indicated at 28 which surround the stiffening formation.

The stiffening formations are intended to stiffen the splice plate, to make it more resistant to the bending moments and shear forces which will be exerted on it in use. To explain this, the method of use of the splice plate needs to be considered, in relation to the chosen example of renovation of rotten timber joists adjacent a wall.

Turning to Figure 9 of the drawings, the splice plate of Figures 7 and 8 is shwon in use. Figure 4 shows a section through the plate of Figures 1 to 3 in use. Where a joist has rotted adjacent a wall, the deteriorated portion is cut out. A substitute

timber 29 of the same cross-section as the original joist 30 is cut to the same length as the deteriorated original portion which has been removed. The substitute timber is then placed in the same position as that removed, using the same joist hanger 31 if a suitable one is in use or using a new hanger in the original position. As a further alternative, the joist can be built directly into the masonry (not shown).

The substitute timber 29 occupies exactly the same position as the deteriorated portion which it replaces and abuts the remaining portion 30 of the original joist, where it is secured by means of the splice plates 10 described. In Figure 9, these are in the form shown in Figures 7 and 8 but they could be as shown in Figures 1 to 3.

Four splice plates, are used to secure together the timbers 29, 30. Similarly, a timber is shown in section at 25 in Figure 4. Each of the two flanges 11 and 12 is arranged in firm engagement with a respective face of the abutted timbers 29, 30, and nails passing through the apertures 14 are used to secure the flanges of the splice plates directly to these faces of the timbers. In Figure 9, only the larger flange 11 is nailed. Figure 4 also shows also the narrow second flange 12 nailed in place.

It will be seen that no drilling of the timbers is needed, in contrast to the prior method which involved the use of bolts passing through side-by-side timbers. The only tool required is a hammer, and the securing of the timbers is relatively quick and needs much less skill than the previously-used method. Since no overlap is provided between the remaining original and substitute timbers, the method is economical in the use of timber.

The substitute timber may be swung laterally or downwardly into a position where it is brought into abutment with one or more splice plates 10 secured to the remaining original timber 30, which serve to support it until the other splice plates 10 are added and the assembly is nailed firmly together.

When portions of floor joists are secured together using the splice plates shown, the downward loading on the joists as a whole exerts a bending moment on the junction between the original and substitute portions 30 and 29. The lower face tends to be placed in tension, while the upper face is in compression.

The compressive strength of the joint between the joist portions relies mainly on the compressive strength of the joist timbers themselves in their abutting position. The tensile strength is derived from that of the metal splice plates 10. The stiffening ribs are positioned close to the junction 13 of the flanges 11 and 12 to minimise any tendency for the plate to buckle under this loading.

Figure 10 illustrates forms of joint which can be secured using the splice plate. In the upper two of the illustrations, there is no gap left between the two timbers to be secured together. The timbers are either abutted at upright faces or at mating oblique faces.

However, the lowest of the three illustrations showing a pair of timbers which merely make contact at the upper faces is acceptable provided that the gap between the lower faces of the timbers is restricted to a fairly small size, for example a maximum of 20 mm for a joist of 98 mm nominal depth. Joints between joists which make contact only at their lower face are not preferred since the performance of the splice joint is reduced. This is because of the reduction in the compressive strength of the joint, which as previously stated relies mainly on the strength of the joist timbers themselves in their abutting position at the upper face of the joint.

Although the splice plates shown in Figures 1 to 4 and in Figures 7 and 8 may have particular usefulness in assisting correct positioning of the substitute timber during renovation, other forms of splice plate may be used.

Figure 5 shows a modified splice plate 17, similar to that of Figures 1 to 4 except that it has a channel-section, effectively combining two of the splice plates 10. This form of splice plate 17 is of course limited to use with a particular width of timber, since the base 18 must be of the same width as the timber, so that the side flanges 19, 20 of the channel abut the side faces of the timber 25. However, the extra metal width in the horizontal planes of the top and bottom of the joists gives this version of splice plate some extra strength to resist heavy bending moments.

In Figure 6, the timbers are slotted at 21 on a central upright plane, and a T-shaped splice plate 22 is used, (or two of the angle shaped splice plates 10 are used back-to-back) with the upright web 23 of the T inserted into the slot. The web 23 need not be provided with holes as their positions would not be visible from the face of the timbers. Long nails are driven through the timber, penetrating the web 23 within.

The horizontal (as shown) cross-pieces of the T, (or the second flanges 12 of the angle-section splice plates 10) are nailed directly to the top and bottom faces of the timbers.

This version of splice plate provides extra strength on the central longitudinal axis of the timbers at their junction, without obscuring their side faces and without any limitation to the width of timbers which can be secured together.

Claims

1. A method of renovating timbers in a building comprising the steps of:—

cutting away a deteriorated portion of an original timber;

taking a substitute timber of the same length;

placing said substitute timber in the place formerly occupied by the deteriorated portion;

taking a plurality of metal splice plates;

and securing each splice plate to both the substitute timber and the remaining portion of the original timber with the ends of said substitute and said remaining portion in contact with each other;

each splice plate having at least two mutually perpendicular flanges, each flange abutting a respective surface of each of said substitute and said remaining portion and the splice plate being secured by fasteners passing through at least one of said flanges directly into each of the timbers.

2. A method of butt jointing two timbers in a building comprising the steps of:—

taking four splice plates, each splice plate having at least two mutually perpendicular flanges;

and securing each splice plate to both said timbers with the ends of the timbers positioned in contact with each other; each flange abutting a respective surface of each of said timbers; and the splice plates being secured by fasteners passing through at least one of said flanges directly into each of said timbers.

3. A method according to claim 1 or claim 2 further including the step of cutting a slot into one or more surfaces of the timbers to generate internal surfaces of the timbers against which one or more of said flanges may abut.

4. A method according to claim 3 wherein the timbers are slotted on a central longitudinal plane.

5. A splice plate for securing together timbers in performance of the methods according to any one of Claims 1 to 4, comprising a single sheet metal member (10) having two mutually perpendicular flanges (11, 12) one flange (12) being of a narrow width, less than or equal to one half the thickness of the timbers (25; 29, 30) to be joined, the other flange (11) being of a greater width, less than or equal to one half the width of the timbers (25; 29, 30), the length of the plate (10) being substantially greater than the width of the timbers, at least the wider flange (11) having a plurality of fastener receiving apertures (14) at each end portion, and stiffening ribs or depressions (26, 27) disposed in a central portion (15) devoid of apertures, whereby abutting end portions of the timbers (29, 30) to be joined together can be substantially surrounded by a set of four such plates (10) and rigidly secured together by fastening through said pluralities of apertures (14).

6. A jointing kit comprising four splice plates according to Claim 5.

7. A splice plate for securing together timbers in performance of a method according to Claim 1, comprising a sheet metal member of channel section (18) having two parallel flanges (19, 20) connected by a web (18) of a narrow width equal to the thickness of timbers (25; 29, 30) to be joined, the two parallel flanges (19, 20) being of a greater width, less than or equal to one half the width of the timbers (25; 29, 30) and the length of the plate being substantially greater than the width of the timber, at least the parallel flanges (19, 20) having a plurality of fastener receiving apertures (14) at each end portion, and stiffening ribs or depressions (26, 27) disposed in a central portion (15) devoid of apertures, whereby abutting end portions of the timbers 5 to be joined together can be substantially surrounded by a pair of such plates and rigidly secured together by fastening through said pluralities of apertures.

8. A jointing kit comprising two splice plates according to Claim 7.

Patentansprüche

1. Verfahren zum Erneuern von Holzbauteilen in einem Gebäude, umfassend folgende Schritte:

Wegschneiden eines baufälligen Abschnitts eines ursprünglichen Holzbauteils;

Nehmen eines Ersatzholzbauteils gleicher Länge;

Positionieren des Ersatzholzbauteils an der vorher von dem baufälligen Abschnitt eingenommenen Stelle;

Nehmen einer Mehrzahl metallischer Stoßbleche;

und Festlegen jedes Stoßblechs sowohl an dem Ersatzholzbauteil als auch an dem verbliebenen Abschnitt des ursprünglichen Holzbauteils, wobei die Enden des Ersatzholzbauteils und des verbliebenen Auschnitts einander berühren; wobei jedes Stoßblech wenigstens zwei zueinander senkrechte Flansche aufweist und jeder Flansch an einer entsprechenden Fläche des Ersatzholzbauteils bzw. des verbliebenen Abschnitts anliegt und das Stoßblech mittels Befestigungselementen festgelegt wird, die durch wenigstens einen der Flansche hindurch direkt in jedes Holzbauteil geführt sind.

2. Verfahren zum Stoßverbinden von zwei Holzbauteilen in einem Gebäude, umfassend die folgenden Schritte:

Nehmen von vier Stoßblechen, die jeweils wenigstens zwei zueinander senkrechte Flansche aufweisen;

und Festlegen jedes Stoßblechs an beiden Holzbauteilen, wobei die Enden der Holzbauteile in Kontakt miteinander liegen; wobei jeder Flansch an einer jeweiligen Fläche jedes Holzbauteils anliegt; und wobei die Stoßbleche mittels Befestigungselementen festgelegt sind, die durch wenigstens einen der Flansche hindurch direkt in jedes Holzbauteil geführt sind.

3. Verfahren nach Anspruch 1 oder 2, ferner umfassend den Schritt, daß in eine oder mehrere Flächen der Holzbauteile Schlitze geschnitten werden zur Bildung von Innenflächen der Holzbauteile, an denen einer oder mehrere der Flansche anliegen können.

4. Verfahren nach Anspruch 3, wobei die Holzbauteile in einer mittigen Längsebene mit Schlitzen versehen werden.

5. Stoßblech zum Fixieren von Holzbauteilen bei der Durchführung der Verfahren nach einem der Ansprüche 1—4, umfassend ein einzelnes Metallblechteil (10) mit zwei zueinander senkrechten Flanschen (11, 12), wobei der eine Flansch (12) geringe Breite hat, die geringer oder gleich der halben Dicke der zu verbindenden Holzbauteile (25; 29, 30) ist, und der andere Flansch (11) größere Breite hat, die geringer oder gleich der halben Breite der Holzbauteile (25; 29, 30) its, wobei die Länge des Blechs (10) erheblich größer

als die Breite der Holzbauteile ist, und wobei wenigstens der breitere Flansch (11) mehrere Löcher (14) zur Aufnahme von Befestigungselementen an jedem Endabschnitt sowie Verstärkungsrippen oder -vertiefungen (26, 27) in einem lochfreien zentralen Abschnitt (15) aufweist, so daß aneinanderstoßende Endabschnitte der zu verbindenden Holzbauteile (29, 30) von einem Satz von vier solchen Blechen (10) im wesentlichen umschlossen und mittels Befestigen durch die Mehrzahl Öffnungen (14) hindurch starr aneinander festgelegt werden können.

6. Verbindungssatz, umfassend vier Stoßbleche nach Anspruch 5.

7. Stoßlech zum Befestigen von Holzbauteilen aneinander bei der Durchführung eines Verfahrens nach Anspruch 1, umfassend ein Metallblechteil mit Kanalprofil (18) mit zwei parallelen Flanschen (19, 20) die durch einen Steg (18) geringer Breite, die gleich der Dicke der zu verbindenden Holzbauteile (25; 29, 30) ist, miteinander verbunden sind, wobei die beiden parallelen Flansche (19, 20) größere Breite haben, die geringer oder gleich der halben Breite der Holzbauteile (25; 29, 30) ist, und die Länge des Blechs erheblich größer als die Breite des Holzbauteils ist, wobei wenigstens dei parallelen Flansche (19, 20) mehrere Löcher (14) zur Aufnahme von Befestigungselementen an jedem Endabschnitt sowie Verstärkungsrippen oder -vertiefungen (26, 27) in einem lochfreien zentralen Abschnitt (15) aufweisen, so daß aneinanderstoßende Endabschnitte der zu verbindenden Holzbauteile von einem Paar dieser Bleche im wesentlichen umschlossen und mittels Befestigen durch die Mehrzahl Öffnungen hindurch starr aneinander gesichert werden können.

8. Verbindungssatz, umfassend zwei Stoßbleche nach Anspruch 7.

Revendications

1. Procédé de rénovation de pièces de bois dans un bâtiment suivant lequel:

on coupe et dégage une partie détériorée d'une pièce de bois primitive;

on prend une pièce de bois de remplacement de même longueur;

on place la pièce de bois de remplacement dans l'emplacement qu'occupait précédemment la partie détériorée;

on prend un ensemble de plusieurs plaques métalliques d'éclissage;

et on assujettit chaque plaque d'éclissage à la fois à la pièce de boris de remplacement et à la partie restante de la pièce de bois primitive, les extrémités de ladite pièce de bois de remplacement et de ladite partie restante étant en contact l'une avec l'autre;

chaque plaque d'éclissage comportant au moins deux ailes à angle droit l'une par rapport à l'autre, chaque aile venant appuyer contre une surface respective de ladite pièce de bois de remplacement et de ladite partie restante et la plaque d'éclissage étant assujettie par des éléments de fixation traversant au moins l'une desdites ailes et pénétrant directement dans chacune des pièces de bois.

2. Procédé d'assemblage bout à bout de deux pièces de bois dans un bâtiment suivant lequel:

on prend quatre plaques d'éclissage, chaque plaque comportant au moins deux ailes à angle droit l'une par rapport à l'autre;

et on assujettit chaque plaque d'éclissage aux deux pièces de bois avec les extrémités de ces dernières positionées en contact l'une avec l'autre; chaque aile venant appuyer contre une surface respective de chacune desdites pièces de bois: et les plaques d'éclissage étant assujetties par des éléments de fixation tranversant au moins l'une desdites ailes et pénétrant directement dans chacune des pièces de bois.

3. Procédé selon la revendication 1 ou la revendication 2, suivant lequel, en outre, on taille une rainure dans une ou plusieurs surfaces des pièces de bois pour ménager dans les pièces de bois des surfaces internes contre lesquelles l'une ou plusieurs des ailes peuvent prendre appui.

4. Procédé selon la revendications 3 suivant lequel les pièces de bois sont rainurées suivant un plan longitudinal central.

5. Plaque d'éclissage destinée à l'assujettissement de pièces de bois l'une à l'autre lors de la mise en oeuvre des procédés selon l'une quelconque des revendications 1 à 4, comprenant une pièce unique en tôle (10) présentant deux ailes (11, 12) à angle droit l'une par rapport à l'autre, l'une d'elles (12) ayant une faible largeur, inférieure ou égale à la moitié l'épaisseur des pièces de bois (25; 29, 30) devant être raccordées, l'autre (11) ayant une plus grande largeur, inférieure ou égale à la moitié de la largeur des pièces de bois (25; 29, 30), la longueur de la plaque (10) étant sensiblement plus grande que la largeur des pièces de bois, au moins l'aile (11) de plus grande largeur présentant un ensemble de plusieurs trous (14) dans chacune de ses parties terminales pour la réception d'élément de fixation, et des nervures ou dépressions de renforcement (26, 27) disposées dans une partie centrale (15) dépourvue de trous, ce ci de façon que les parties terminales aboutantes des pièces de bois (29, 30) devant être raccordées l'une à l'autre puissent être sensiblement entourées par un ensemble de quatre telles plaques (10) et être assujetties l'une à l'autre de façon rigide par fixation à travers lesdits ensembles de trous (14).

6. Kit de raccordement comprenant quatre plaques d'éclissage selon la revendication 5.

7. Plaque d'éclissage destinée à l'assujettissement de pièces de bois l'une à l'autre lors de la mise en oeuvre d'une procédé selon la revendication 1, comprenant une piéce en tôle (18) profilée en U à deux ailes parallèles (19, 20) reliées par une âme (18) de faible largeur égale à l'épaisseur des pièces de bois (25; 29, 30) devant être raccordées, les deux ailes parallèles (19, 20) étant de plus grande largeur, inférieure ou égale à la moitié de la largeur des pièces de bois (25; 29, 30), et la longueur de la plaque étant sensiblement supérieure à la largeur des pièces de bois,

au moins les ailes parallèles (19, 20) présentant un ensemble de plusieurs trous (14) dans chacune de ses parties terminales pour la réception d'éléments de fixation, et des nervures ou dépressions de renforcement (26, 27) disposées dans une partie centrale (15) dépourvue de trous, ceci de façon que les parties terminales aboutantes des pièces de bois devant être raccordées l'une à l'autre puissent être sensiblement entourées par un ensemble de deux telles plaques et être assujetties l'une à l'autre de façon rigide à travers lesdits ensembles de trous.

8. Kit de raccordement comprenant deux plaques d'éclissage selon la revendication 8.

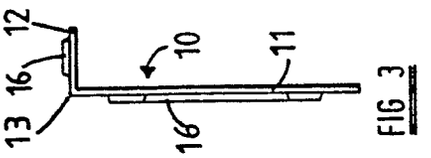

FIG 3

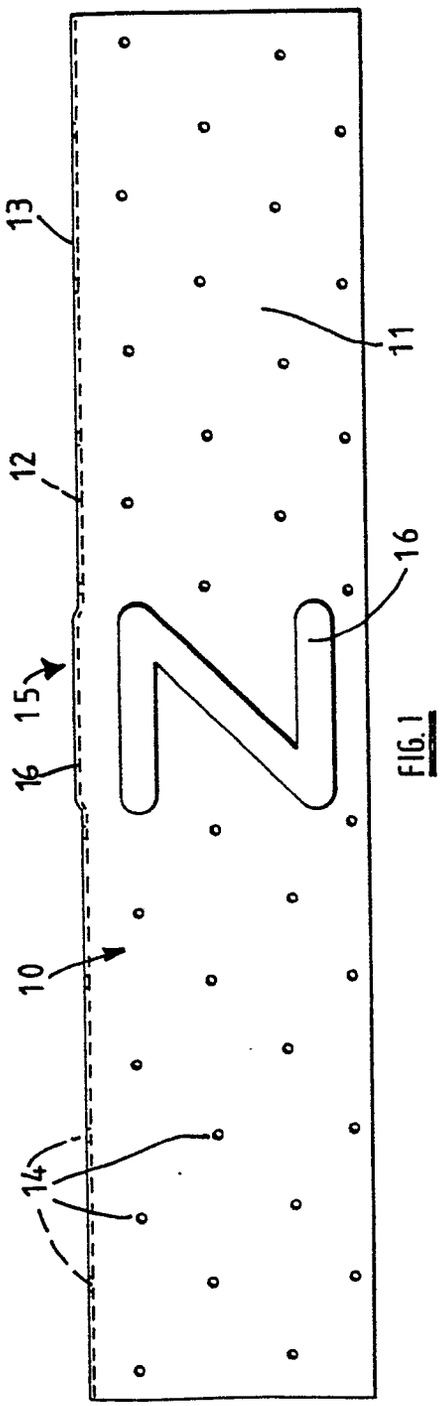

FIG. 1

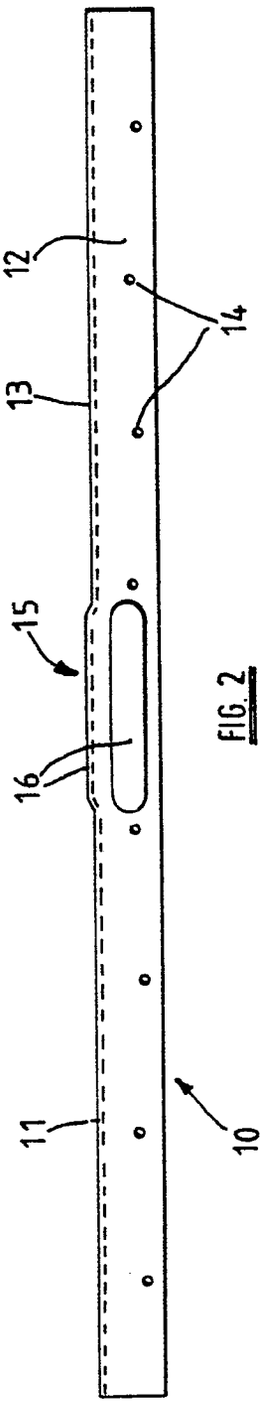

FIG. 2

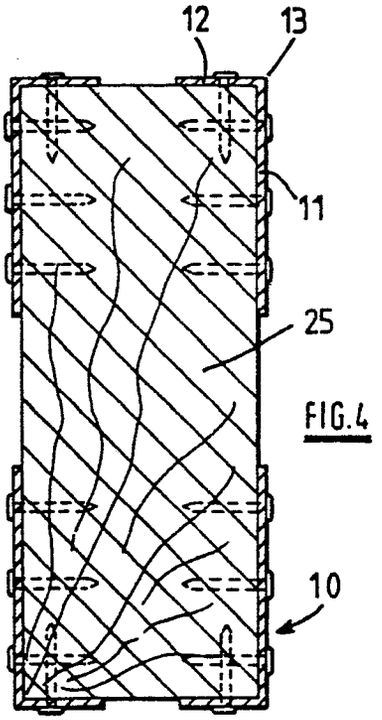

FIG.4

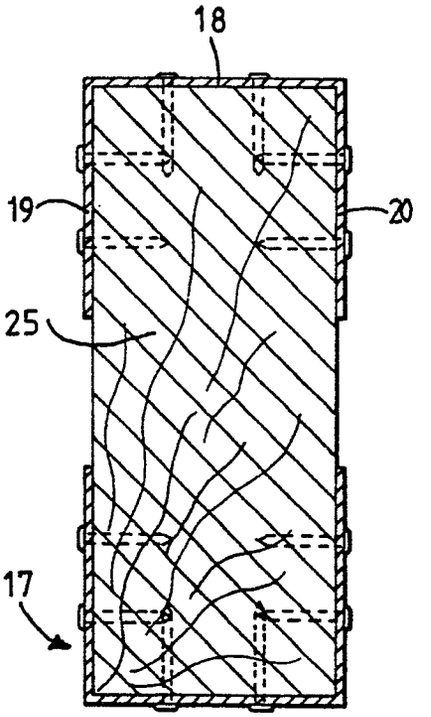

FIG.5

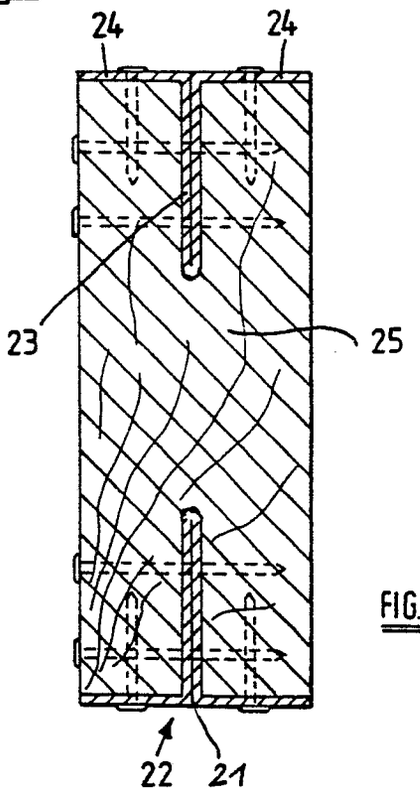

FIG. 6

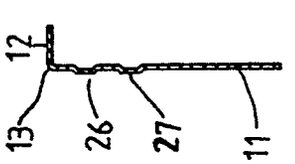

FIG 8

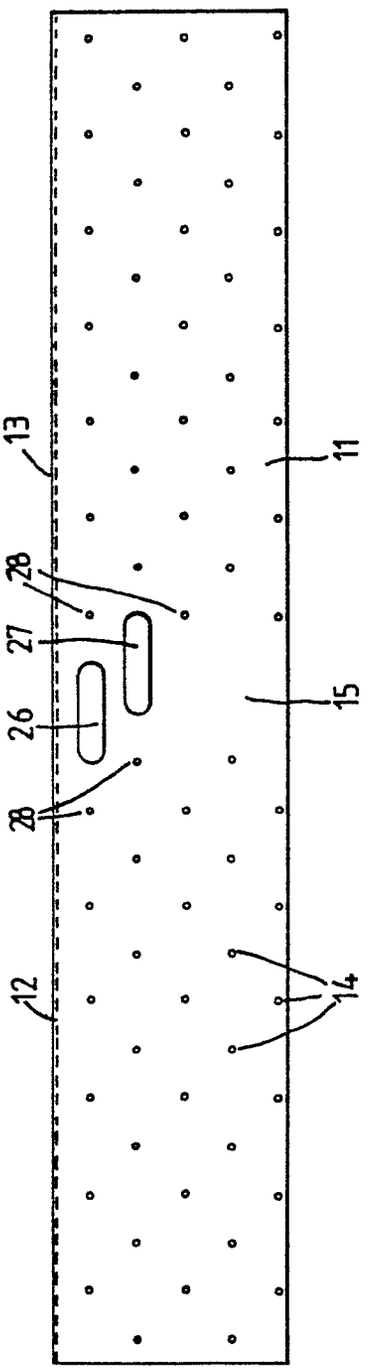

FIG 7

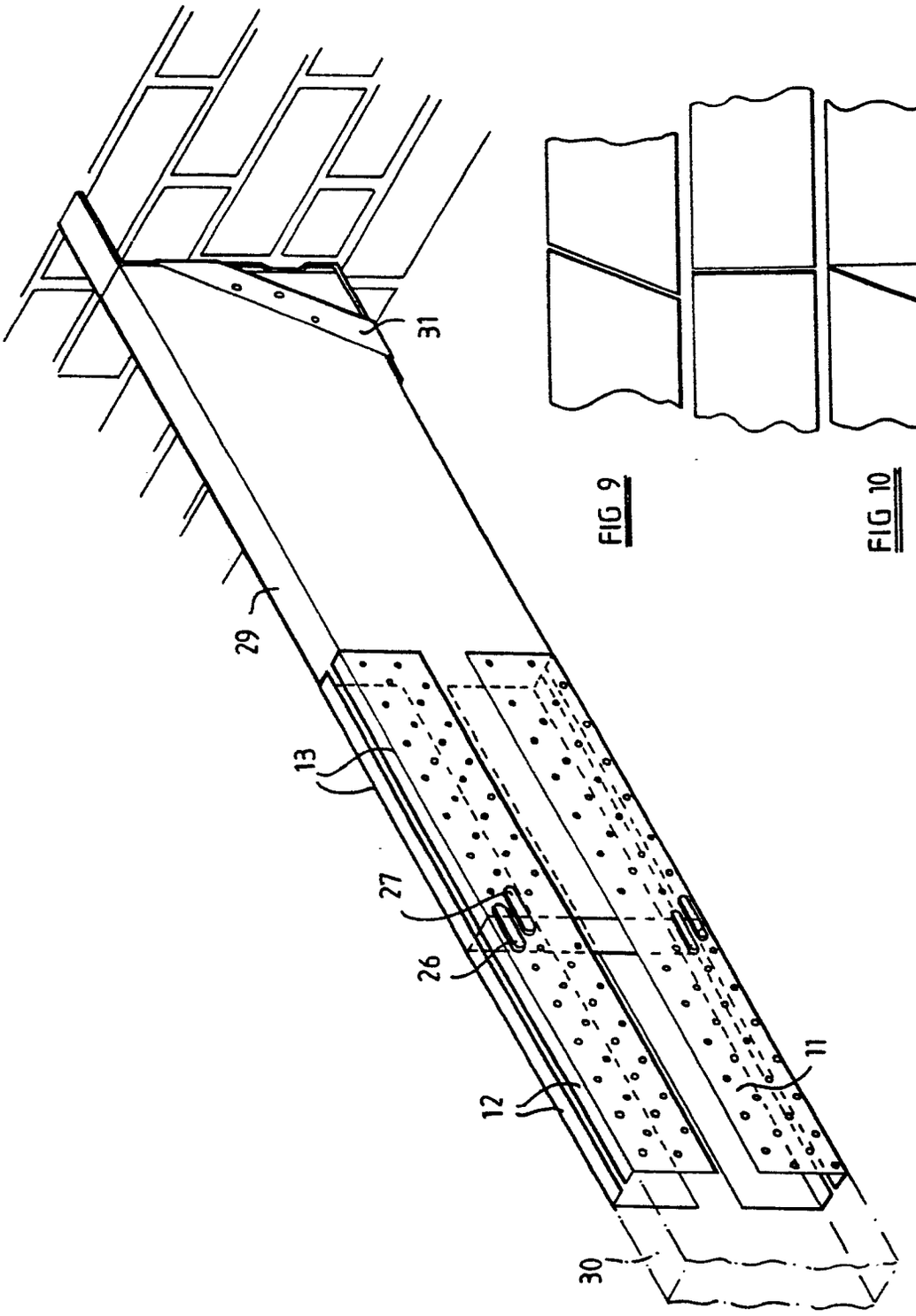

FIG 9

FIG 10