



(11) **EP 1 516 973 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
23.03.2005 Bulletin 2005/12

(51) Int Cl.7: **E04B 2/70**

(21) Application number: **04077572.8**

(22) Date of filing: **16.09.2004**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL HR LT LV MK

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(30) Priority: **18.09.2003 BE 200300501**

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(54) **Building construction**

(57) Building-up construction, comprising a first and a second series of first and second building-up elements (10,20) respectively for placing one on top of the other, at least part of the first building-up elements (10) being provided to be placed on top of the second building-up element (20) at an angle or inversely, and a recess (2,2') being provided in a building-up element (10,20) of one series that is corresponding with a projection (3,3') that has been provided on a building-up element (20,10) of the other series, the projection (3',3) being provided with two contact surfaces (4,4' and 5,5') diverging in a first direction (arrow A) which, when placing the said building-up elements one on top of the other, will be in contact with the corresponding contact surfaces (5,5' and 4,4') of the recess (2,2') of the building-up element (10,20) of the other series, **characterized in that** the projections (3',3) are surrounded by the recesses (2,2') of at least two building-up elements (10,20) of the other series, and the two contact surfaces (4,4' and 5,5'), diverging in the first direction, of the projection (3',3) are also diverging in a second direction (arrow B) at right angles to the first direction (arrow A) and away from the building-up element (10,20).

Preferably, the structural construction (1) according to the invention is made of wood and is essentially used for swimming pools and garden houses.

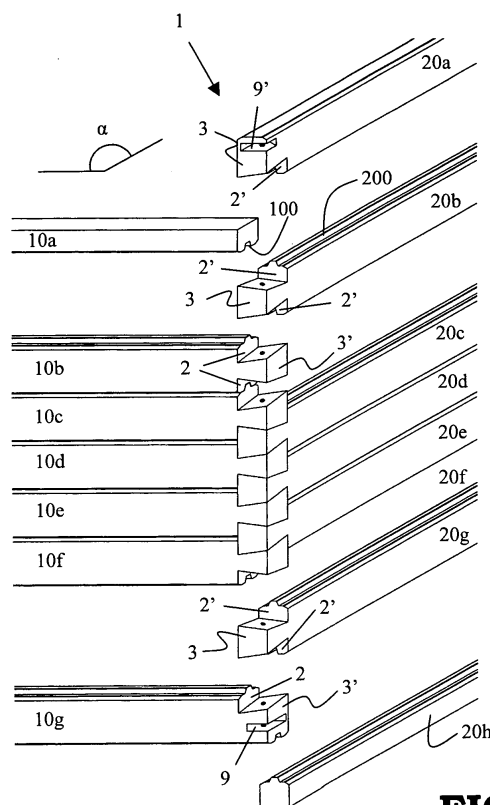


FIG. 1

Description

[0001] The invention relates to a building-up construction, comprising a first and a second series of first and second building-up elements respectively for placing one on top of the other, at least part of the first building-up elements being provided to be placed on top of the second building-up element at an angle or inversely, and a recess being provided in a building-up element of one series that is corresponding with a projection that has been provided on a building-up element of the other series, the projection being provided with two contact surfaces diverging in a first direction, which, when placing the said building-up elements one on top of the other, will be in contact with the corresponding contact surfaces of the recess of the building-up element of the other series.

[0002] The invention is especially used for swimming pools and garden houses. However, other applications are likewise possible.

[0003] For building-up a construction consisting, for instance, of planks, many connections are possible. A classic connection is a dovetail joint, which is used especially for its aesthetic aspect. For example, in U.S. 6,357,194 a dovetail joint ending in a point is discussed, which is a method for connecting two boards or other solid materials.

[0004] Other known constructions have a horizontally sliding connection, and are kept together by means of a bar of any possible material. For example, with known building-up constructions for swimming pools, identical wooden planks are stacked one on top of the other by means of a tongue-and-groove connection. The tongue here is made of stainless steel.

[0005] The disadvantage of such connections is that solidity is only obtained in case of vertical pressure or through the corner connection. However, there are also building-up constructions where the horizontal pressure is important, such as for instance, the wind-force with building constructions and the water pressure with aboveground wooden swimming pools.

[0006] The purpose of the invention is to provide a building-up construction not having the above-mentioned disadvantages and in which the building-up construction is resistant against the horizontal forces exerted by, among others, wind or water.

[0007] The purpose of the invention is achieved by providing a building-up construction, comprising a first and a second series of first and second building-up elements respectively for placing one on top of the other, at least part of the first building-up elements to be placed on top of the second building-up element at an angle or inversely, and a recess being provided in a building-up element of one series that is corresponding with a projection that has been provided on a building-up element of the other series, the projection being provided with two contact surfaces diverging in a first direction which, when placing the said building-up elements one on top

of the other, will be in contact with the corresponding contact surfaces of the recess of the building-up element of the other series, but in which the projections are surrounded by the recesses of at least two building-up elements of the other series, and the two contact surfaces, diverging in the first direction, of the projection are also diverging in a second direction at right angles to the first direction and away from the building-up element.

[0008] By the fact that the projection of the building-up element of the one series is surrounded by the recesses of at least two building-up elements of the other series is meant, that the projection of a building-up element of the one series is inserted into the recesses of the building-up elements of the other series and consequently the projection is surrounded by the walls of these recesses.

[0009] In this way, a building-up construction is obtained with the following advantages:

- stronger (against horizontal pressure);
- simple construction;
- absorption of the swelling and shrinking motions, and tolerances of dimensions.

The building-up construction is preferably provided with an additional reinforcement against horizontal water and/or wind pressure.

[0010] In a preferred embodiment of a building-up construction according to the invention, the projection is provided with a recess extending between the contact surfaces and provided for fitting a reinforcing element through two or more building-up elements.

[0011] In an advantageous embodiment of a building-up construction according to the invention, a reinforcing element is provided with tightening means for tightening the building-up elements against each other.

[0012] In a more advantageous embodiment of a building-up construction according to the invention, the reinforcing element is carried out as a spindle, and the tightening means are carried out as a nut provided around the said spindle and in at least one of the extreme building-up elements of the building-up construction, in which a groove is provided by providing the nut in the groove, the nut may be tightened for tightening the building-up elements against each other.

[0013] This has the advantage that the spindle may be adjusted in a simple manner and in this way the vertical tension of the construction may be adjusted. This adjustment can be necessary for materials having shrinking properties such as wood, or to obtain larger tolerances for the dimensions.

[0014] In a preferred embodiment of a building-up construction according to the invention, the angle between the building-up elements of the first series and the second series is an obtuse angle.

[0015] In a preferred embodiment of a building-up construction according to the invention, the said recess

provided in a building-up element of the first or the second series is constituted by a projection provided on the same building-up element.

[0016] Preferably, all intermediate building-up elements of the building-up construction of the first and the second series are made identical.

[0017] In a preferred embodiment of a building-up construction according to the invention, each projection is provided with an end surface that is provided such that, in the building-up construction, it is situated in the same plane as the outer face of a building-up element of the other series.

[0018] In this manner, the building-up construction will have a better finish and there will be no protruding beams, through which the safety is increased.

[0019] Preferably, the building-up elements of the first and second series respectively are placed one on top of the other by means of a groove-and-tongue connection.

[0020] This has the advantage that the building-up elements may be easily placed one on top of the other in the proper manner.

[0021] In the building-up construction according to the invention, the building-up elements are preferably made of wood.

[0022] The building-up construction according to the invention is essentially used for swimming pools.

[0023] This invention is further clarified in the following non-restricted description of a preferred embodiment of a building-up construction according to the invention.

[0024] In this description, reference is made by means of reference numbers to the attached figures, where:

- figure 1 is representing a perspective front view of part of the building-up construction according to the invention;
- figure 2a is representing a perspective front view of part of a building-up element from the first series;
- figure 2b is representing a perspective front view of part of part of a building-up element from the second series;
- figure 3a is representing a top view of part of a solid building-up element;
- figure 3b is representing a side view of part of a solid building-up element;
- figure 3c is representing a bottom view of part of a solid building-up element;

[0025] As represented in figure 1, a building-up construction (1) according to the invention, consisting of a first series of first building-up elements (10), which may be placed one on top of the other and a second series of second building-up elements (20), which may be placed one on top of the other, the first building-up elements (10) and the second building-up elements (20) being provided to be placed mutually on top of one another

at an angle. The first and the second building-up elements (10,20), in order to be easily placed on top of one another, are provided with a groove (100)-and-tongue (200) connection. In the figure, this groove (100)-and-tongue (200) connection is carried out as a single connection. It may also be carried out as a multiple connection. Another possibility is that the building-up elements (10,20) are carried out in solid way. Preferably, the angle between the first and the second building-up elements (10,20) is an obtuse angle.

[0026] As represented in the figures 1, 2a and 2b, a recess (2) has been provided in a building-up element of the one series, for instance in a first building-up element (10b) of the first series, corresponding to a projection (3) which is provided in a building-up element of the other series, for instance in a second building-up element (20b) of the second series. As represented in figure 1, the projection (3) of a second building-up element (20e) of the second series in the building-up construction is surrounded by the recesses (2) of at least two first building-up elements (10e,10f) of the other series. On the other hand, the projection (3') of a first building-up element (10d) of the first series is surrounded by the recesses (2') of at least two building-up elements (20d, 20e) of the second series. In figure 1, each projection (3,3') is surrounded by two building-up elements (10,20) of the first or second series. However, in order to obtain another view, two different building-up elements may be placed on top of one another and thus constitute a surrounding for a projection (3,3'), which is not represented in the figure.

[0027] As represented in the figures 2a and 2b, the projection (3) has the geometrical shape of a parallelepiped and is provided with two contact surfaces (4,4') diverging in the first direction (see arrow A). When placing a first and a second building-up element (10,20) on top of one another, these contact surfaces (4,4') are in contact with the corresponding surfaces (5,5') of the recess (2) of the building-up element (20a) of the second series. Furthermore, these contact surfaces (4,4') are diverging in a second direction (arrow B) away from the building-up element (20a) and at right angles to the first direction (arrow A).

[0028] In this preferred embodiment, the recess (2) is constituted by a projection (3') which is also part of a first building-up element (10). In addition to this, all intermediate building-up elements (10,20) are carried out to be identical. By the intermediate building-up elements (10b - 10f and 20b - 20g) are meant the building-up elements situated between the lower building-up element of the first and the second series (10g,10h) and the upper building-up element of the first and the second series (10a,20a). However, the extremities of each intermediate building-up element (10b - 10f and 20b - 20g) are carried out to be each other's mirror images, as also represented in the figures 2a and 2b. The end faces (6,6') of the projections (3,3') are carried out such that each end face (5,5') in the building-up construction is

situated in the same plane as the outer face (7,7') of a building-up element of the other series. In other words, the end face (6) of the projection (3') of a first building-up element (10) of the first series is in the building-up construction situated in the same plane as the outer face (7') of a second building-up element (20) of the second series, and the end face (6') of the projection (3) of the second building-up element (20) from the second series is situated in the same plane as the outer face (7) of the first building-up element (20) of the first series. In this way, there are no projecting parts in the building-up construction (1).

[0029] As represented in the figures 3a to 3c, the dimensions of the building-up elements (10,20) in the preferred embodiment as described here, have specific proportions with respect to one another, in order to obtain a sufficiently strong, easy to build and aesthetically nice building-up construction (1). The width of the building-up element (10,20) is therewith represented by a and the width of the building-up element (10,20) is represented by b.

[0030] When building up this preferred embodiment of a building-up construction (1) according to the invention, as represented in figure 1, first the lower building-up element (20h) of the second series and the lower building-up element (10g) of the first series are placed next to one another on the building surface. Then a next building-up element (20g) of the second series is placed on the lower building-up element (10g) of the first series, in such a manner, that contact surface (5') of the projection (3) of the building-up element (20g) of the second series will get into contact with the contact surface (4') of the lower building-up element (10g) of the first series. Then, in the same manner, the next building-up element (10f) of the first series is placed upon the building-up element (20g) of the second series.

[0031] Because the projection (3,3') of a building-up element (10,20) is enclosed by at least two building-up elements (10,20) of a same series (as described above) and the projection (3,3') has the shape of a parallelepiped with in a first direction (arrow A) and in a second direction (arrow B), at right angles to the first direction and away from the building-up element (10,20), the building-up construction (1) can only be realized by building up and not by sliding the building-up elements into one another. In this manner, a strong whole is obtained, resisting horizontal pressures such as water pressure and air pressure.

[0032] In order to increase the resistance of the building-up construction (1) still more to wind or water pressure, the building-up construction (1) is provided with a reinforcement. In the preferred embodiment as represented in figure 1, between the contact surfaces (4,4' and 5,5') of the projections (3,3'), a recess (8,8') is provided, in which the reinforcing element (not represented in the figure) may be installed. Preferably, this reinforcing element is running through all building-up elements (10a - 10g and 20a - 20h). The reinforcing element is

provided with tightening means (not represented in the figure) to tighten the building-up elements (10,20) against each other. In this preferred embodiment, the reinforcing element is carried out as a threaded spindle.

The tightening means are carried out as a nut provided around the threaded spindle. To install this nut, the lower building-up element (10g) of the first series and/or the upper building-up element (20a) of the second series is provided with a groove (9,9'), in such a manner that the nut may be tightened to tighten the building-up elements (10,20) against each other. In this preferred embodiment, both in the lower building-up element (10g) of the first series and in the upper building-up element (20) of the second series a groove (9,9') has been provided.

The reinforcing element may likewise consist of a bar, a screw or suchlike. Moreover, the reinforcing means may also consist of a glue being applied between the contact surfaces (4,5 and 4',5') of the projections (3,3'). In this case, of course no recess (8,8') has to be provided in the projections (3,3').

A combination of two or more reinforcements as discussed above is also within the possibilities.

By providing reinforcing means, swelling and shrinking motions and tolerances of the dimensions may be absorbed. When a threaded spindle with a nut is used as a tightening system, moreover, building up the building-up elements around this spindle may be carried out easily, and the vertical tension of the building-up construction may be adjusted in a simple manner.

[0033] Preferably, the building-up elements (10,20) are made of wood, but they may be manufactured from other material. This building-up construction (1) according to the invention is especially used for swimming pools and garden houses. However, the building-up construction (1) may also be used for other applications.

Claims

1. Building-up construction, comprising a first and a second series of first and second building-up elements (10,20) respectively for placing one on top of the other, at least part of the first building-up elements (10) being provided to be placed on top of the second building-up element (20) at an angle or inversely, and a recess (2,2') being provided in a building-up element (10,20) of one series that is corresponding with a projection (3,3') that has been provided on a building-up element (20,10) of the other series, the projection (3',3) being provided with two contact surfaces (4,4' and 5,5') diverging in a first direction (arrow A) which, when placing the said building-up elements one on top of the other, will be in contact with the corresponding contact surfaces (5,5' and 4,4') of the recess (2,2') of the building-up element (10,20) of the other series, **characterized in that** the projections (3',3) are surrounded by the recesses (2,2') of at least two build-

ing-up elements (10,20) of the other series, and the two contact surfaces (4,4' and 5,5'), diverging in the first direction, of the projection (3,3') are also diverging in a second direction (arrow B) at right angles to the first direction (arrow A) and away from the building-up element (10,20).

2. Building-up construction according to claim 1, **characterized in that** the building-up construction (1) is provided with an additional reinforcement against horizontal water and/or wind pressure. 10
3. Building-up construction according to claim 2, **characterized in that** the projection (3,3') is provided with a recess (8,8') extending between the contact surfaces (4,4' and 5,5') and provided for fitting in a reinforcing element through two or more building-up elements (10,20). 15
4. Building-up construction according to claim 3, **characterized in that** the reinforcing element is provided with tightening means for tightening the building-up elements (10,20) against each other. 20
5. Building-up construction according to claim 3 and 4, **characterized in that** the reinforcing element is carried out as a spindle, and the tightening means are carried out as a nut provided around the said spindle and that in at least one of the extreme building-up elements (10g,20a) of the building-up construction (1) a groove (9,9') is provided, in which by providing the nut in the groove (9,9'), the nut may be tightened for tightening the building-up elements (10,20) against each other. 25
30
6. Building-up construction according to any one of the claims 1 up to and including 5, **characterized in that** the angle between the building-up elements of the first series and of the second series (10,20) is an obtuse angle. 35
40
7. Building-up construction according to any one of the claims 1 up to and including 6, **characterized in that** the recess (8,8') provided in a building-up element of the first or the second series (10,20) is constituted by a projection (3,3') provided on the same building-up element (10,20). 45
8. Building-up construction according to any one of the claims 1 up to and including 7, **characterized in that** all intermediate building-up elements (10b - 10, 20b - 20g) of the building-up construction (1) of the first and the second series are made identical. 50
9. Building-up construction according to any one of the claims 1 up to and including 8, **characterized in that** each projection (3,3') is provided with an end surface (6,6') that is provided such that, in the build- 55

ing-up construction (1), it is situated in the same plane as the outer face (7,7') of a building-up element (20,10) of the other series.

10. Building-up construction according to any one of the claims 1 up to and including 9, **characterized in that** the building-up elements of the first and the second series (10,20) respectively are placed on top of the other by means of a groove (100)-and-tongue (200) connection.
11. Building-up construction according to any one of the preceding claims, **characterized in that** the building-up elements (10,20) are made of wood.
12. Building-up construction according to any one of the preceding claims, **characterized in that** the building-up construction (1) is used for swimming pools.
13. Building-up construction according to any one of the claims 1 up to and including 11, **characterized in that** the building-up construction (1) is used for garden houses.

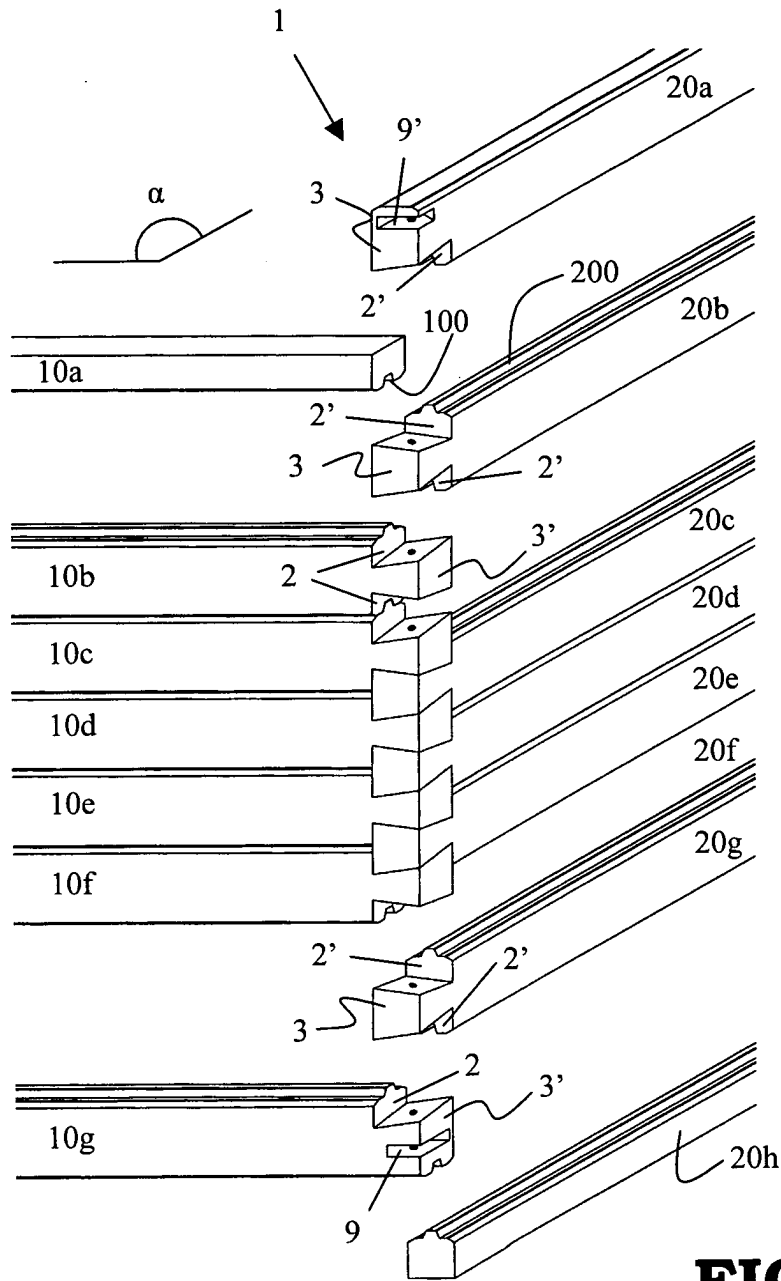


FIG. 1

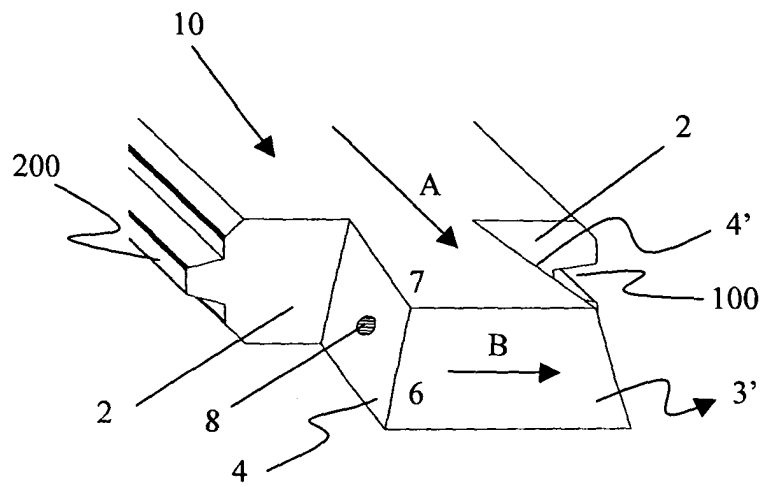


FIG. 2a

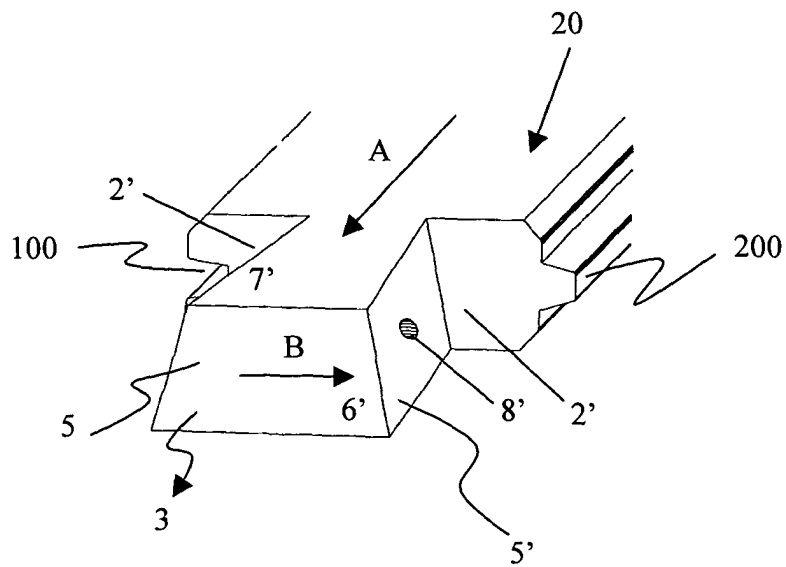


FIG. 2b

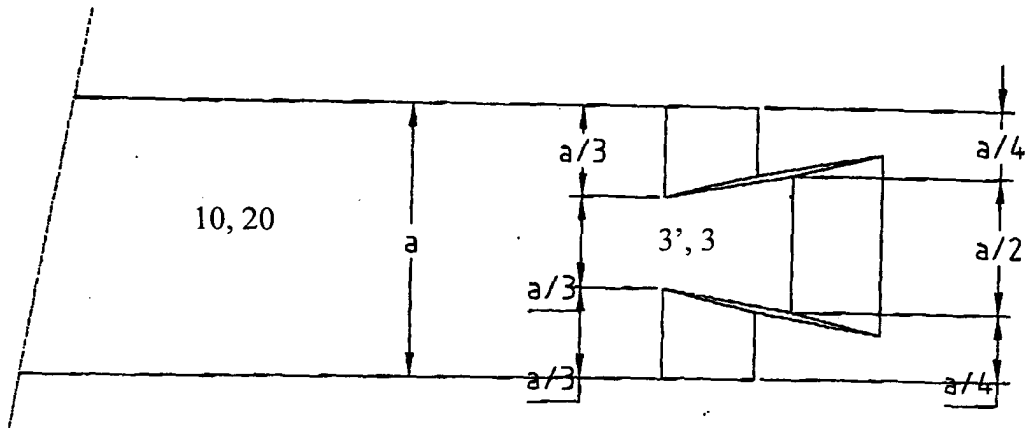


FIG. 3a

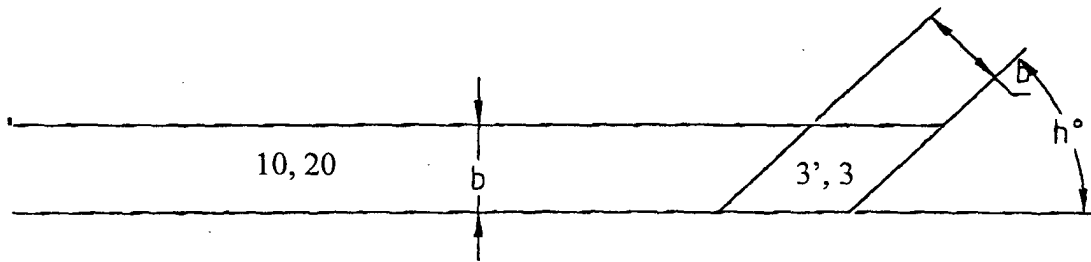


FIG. 3b

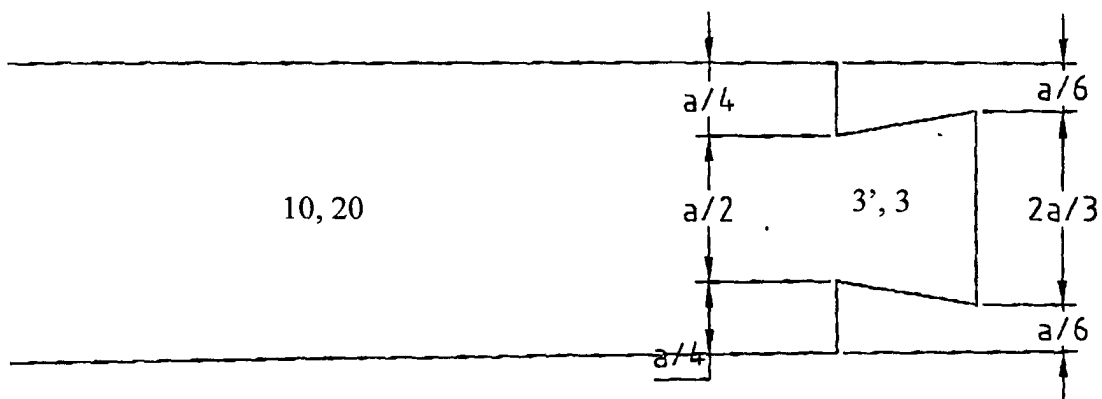


FIG. 3c



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 07 7572

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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			E04B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 30 November 2004	Examiner Fordham, A
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EPO FORM 1503 03/02 (P04/C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 04 07 7572

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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