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(54) Hoist system for hinged structural members and a hinge and hoisting element therefor.

(57) The invention relates to a hoist system and to a hinge for hoisting structural members (2, 3), for instance roof elements, which are hinge connected by means of at least one hinge (11), wherein a hinge portion comprised in said hinge, extending sideways outside the hinge leaves (12, 13) that are connected to each other and that are each connected to one of said structural members, and a hoisting element (21) to be coupled via a coupling member to said protruding hinge portion (20), which element is to be attached via attachment means to a hoisting device, preferably the protruding hinge portion (20) is a part of a hinge pin (18) which couples the hinge leaves, and a locking member secures the hinge pin against a sideways displacement relative to the hinge leaves.

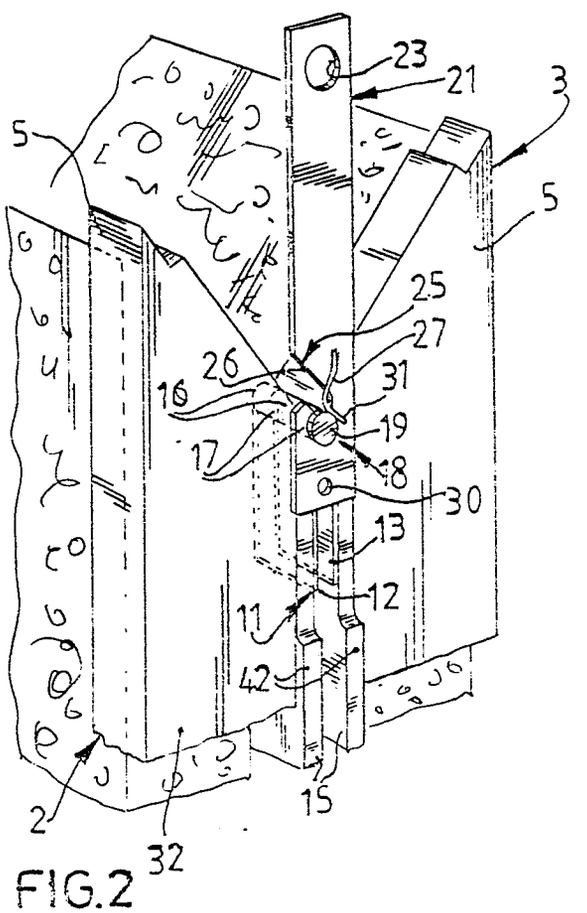

FIG.2

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Hoist system for hinged structural members and a hinge and hoisting element therefor

The invention relates to a hoist system for hoisting structural members, for instance roof elements, which are hinge connected by means of at least one hinge.

Hinged structural members, for example roof elements, are transported to the construction site in folded state, hoisted into their position and arranged in folded out state. This hoisting operation requires on the one hand the use of an attaching means for the hoisting element, which means is fastened to the structural members, and on the other additional operations for the disengaging of the hoisting element and, where necessary, the removal of the attaching means.

The invention has for its object to provide a hoist system whereby the use of separate attachment means for the hoisting element becomes unnecessary, because these attachment means are incorporated in the hinge, that is, a hinge portion extending sideways outside the hinge leaves and co-operating with a coupling member of the hoisting element. It has been found namely that the radial loading of this protruding hinge portion has no influence on the action of the hinge and that it forms a good hoisting point.

The protruding hinge portion is preferably a part of a hinge pin which couples the hinge leaves; more preferably the hinge pin part comprises the hinge pin head.

In order to avoid disengaging of the hinge leaves during hoisting or during transport of the structural members it is recommended that the hoist system is characterized by a locking member which secures the hinge pin against a sideways displacement relative to the hinge leaves.

In accordance with another embodiment or in combination with the other embodiment the protruding hinge portion is a part of a hinge loop. It is advantageous that another locking member secures the protruding hinge portion connected to the coupling member against a mutual disconnection from each other.

During disposition of the structural members it is recommended that a disengagement of hinge and hoisting element must be possible, this when a release force is exerted on the hoisting element which leads to a resulting force that is in a direction opposed to the hoisting force. The other locking member is preferably arranged such that it is a flexible spring clip. A hoisting element that is reliable and simple to design results when preferably the coupling member is a hook and the spring clip extends into the hook cavity.

In order to create the possibility that structural members can be disposed directly adjacent to one another while the hoisting element can nevertheless be removed from between structural members placed adjacent to one another, it is recommended that the hoisting element is a hoisting strip, the thickness of which is smaller than the width of spacers arranged on the surfaces facing each other of structural members to be placed adjacent to each other.

Another aspect of the invention relates to the hinge which comprises two hinge leaves connected to each other, characterized by a hinge portion protruding sideways of the hinge leaves.

Another aspect of the invention relates to a hoisting element comprising a coupling member for connecting to a hinge portion protruding sideways out of the hinge leaves of a hinge, and attaching means for attachment to a hoisting device.

Mentioned and other features will be further elucidated on the basis of two embodiments of the hoist system according to the invention, with reference to the annexed drawing, in which:

Fig. 1 is a section of a ridge detail of a roof with roof elements which are hinge connected with a hinge according to the invention;

fig. 2 shows on a larger scale a perspective view of detail II from fig. 1, whereby the structural members are folded together and the hinge according to the invention is connected to the hoisting element according to the invention;

fig. 3 shows a perspective, partly broken away view of the disengaging of the hoisting element and the hinge from fig. 2; and

fig. 4 is a perspective view similar to fig. 2 of another embodiment of the hoist system according to the invention.

Fig. 1 is a detail of the ridge of a rafter roof as described in the Netherlands patent application 87.00180 (not yet published). The rafter roof 1 comprises two roof elements 2 and 3, which each consist of rafters 5 arranged at mutual intervals on an inside plate 4, and insulating material, for example rockwool, fitted between the rafters. Attached transversely onto rafters 5 are tile battens 7 onto which hook roof tiles 8. A ridge tile 10 is fitted over a runner 9 attached with roof elements 2 and 3.

Roof elements 2 and 3 are hinge connected to each other by means of a hinge 11, of which the hinge leaves 12 and 13 are fastened into the rafters 5 with wood screws 14.

Fig. 2 shows in more detail the hinge 11 according to the invention. Hinge 11 comprises the hinge leaves 12 and 13 which are fastened with the wood screws 14 into the inner lengthwise surfaces 15 of rafters 5. Each hinge leaf 12 and 13 is provided with hinge loops 16 and 17 separating

each other which are in alignment and through which the hinge pin 18 is placed. Hinge pin 18 protrudes with a hinge pin part 20 ending in the hinge pin head 19 laterally outside hinge leaves 12 and 13 and sideways of the rafters 5 and forms the attachment means for a hoisting element 21 according to the invention to be described hereafter.

Using a locking member 22 as shown in fig. 4 the hinge pin 18 is secured against axial displacement out of the hinge loops 16 and 17.

The hoisting element 21 which has the form of a hoisting strip 21 comprises as attachment means a lifting lug 23 which can be connected to a hoisting device 24. The hoisting element is provided on the end away from the lifting lug 23 with a hook-shaped coupling member 25 opening towards the lifting lug 23. The coupling member consists of an angled slot 26 which forms the hook cavity and in which the protruding hinge pin part 20 is received.

Attached to hoisting element 21 is another locking member in the form of a spring clip 27, which extends into slot 26 and which secures against a disconnecting of the protruding hinge pin part 20 and coupling member 25. The roof elements 2 and 3 connected to each other via hinge 11 can thus be lifted without any risk to the construction position and be there disposed in spread position on the construction points 28. Hoisting element 21 can then be disconnected from the protruding hinge pin part 20 by hooking a release element 29 into a release lug 30 and by generating a resulting release force in a direction opposite to the original lifting force. Hinge pin 18 presses as a result of the release force against the free end 31 of spring clip 27, which end 31 bends away, leaving the slot 26 free for passage of the hinge pin part 20 (fig. 3). Subsequently, the hoisting element 21 can be removed from between the adjoining rafters 5 and 5' since the width of the hoisting element is smaller than the width of spacers 42 in the form of ribs which are arranged on facing surfaces of adjacently disposed roof elements 2, 3. It is remarked that both, or in the illustrated case only one of both, surfaces 32 of structural members that face each other need be provided with such spacers 42.

Finally, fig. 4 shows a variant.

The hinge pin 18 is provided with an annular groove 33 located between the successive hinge loops 16 and 17 and in which a spring clip 22 is accommodated which extends between the hinge loops 16 and 17, thus preventing axial displacement of hinge pin 18.

The hinge 11 that is fastened to the structural members 34 and 35 protrudes with a hinge portion 20 consisting of hinge loop 45 and its hinge pin part 20 laterally outside hinge leaves 12 and 13 and outside structural members 34 and 35 and is connected to a hoisting element 36 according to the invention which is provided for this purpose with a coupling member in the form of a hole 37, the diameter of which is greater that that of the hinge pin head 19. The other locking element 38 consists in this case of a mouth 40 furnished with resilient lips 39, the diameter of which is substantially equal to that of the hinge pin which can be accommodated therein by way of a temporary deflection of the lips 39, thus coupling the hoisting element 36 to the protruding hinge portion 20. For disengagement of the hoisting element 36 from hinge portion 20 after hoisting the locking member 38 is provided with a rope 41 using which a force can be exerted on lips 39 such that they again undergo deflection, which results in portion 20 being freed from the mouth 40. The hoisting element 36 can then be removed from hinge pin 18.

Although described principally for roof elements that are hinge connected to each other, it will be apparent to one skilled in the art that other structural members, e.g. wall elements, can be connected in the same way with a hinge according to the invention that co-operates with the hoisting element according to the invention. All that is essential is that the hoisting element can be temporarily coupled to a protruding part, adapted for this purpose, of the hinge, particularly an adapted hinge pin and/or an adapted hinge loop.

Claims

1. Hoist system for hoisting structural members, for instance roof elements, which are hinge connected by means of at least one hinge, **characterized by** a hinge portion comprised in said hinge, extending sideways outside the hinge leaves that are connected to each other and that are each connected to one of said structural members, and a hoisting element to be coupled via a coupling member to said protruding hinge portion, which element is to be attached via attachment means to a hoisting device.

2. Hoist system as claimed in claim 1, **characterized in that** the protruding hinge portion is a part of a hinge pin which couples the hinge leaves.

3. Hoist system as claimed in claim 2, **characterized in that** the hinge pin part comprises the hinge pin head.

4. Hoist system as claimed in claim 1 or 2, **characterized by** a locking member which secures the hinge pin against a sideways displacement relative to the hinge leaves.

5. Hoist system as claimed in claims 1-4, **characterized in that** the protruding hinge portion is a part of a hinge loop.

6. Hoist system as claimed in claims 1-5, **characterized by** another locking member that secures the protruding hinge pin part connected to the coupling member against mutual disengagement.

7. Hoist system as claimed in claim 6, **characterized in that** the other locking member is disposed such that disengagement of the protruding hinge pin part and the hoisting element is only possible in the case of a release force directed against the hoisting force.

8. Hoist system as claimed in claim 6 or 7, **characterized in that** the other locking member is a flexible spring clip.

9. Hoist system as claimed in claim 8, **characterized in that** the coupling member is a hook and the spring clip extends into the hook cavity.

10. Hoist system as claimed in any of the foregoing claims, **characterized in that** the hoisting element is a hoisting strip, the thickness of which is smaller than the width of spacers arranged on the surfaces facing each other of structural members to be placed adjacent to each other.

11. Hinge comprising two hinge leaves connected to each other, **characterized by** a hinge portion protruding sideways of said hinge leaves.

12. Hinge as claimed in claim 11, **characterized in that** the protruding hinge portion is a part of a hinge pin which connects the hinge leaves.

13. Hinge as claimed in claim 12, **characterized in that** the hinge pin part comprises the hinge pin head.

14. Hinge as claimed in claim 11, **characterized in that** the protruding hinge portion is part of a hinge loop.

15. Hoisting element comprising a coupling member for connecting to a hinge portion protruding sideways from the hinge leaves of a hinge, and attaching means for attachment to a hoisting device.

FIG.1

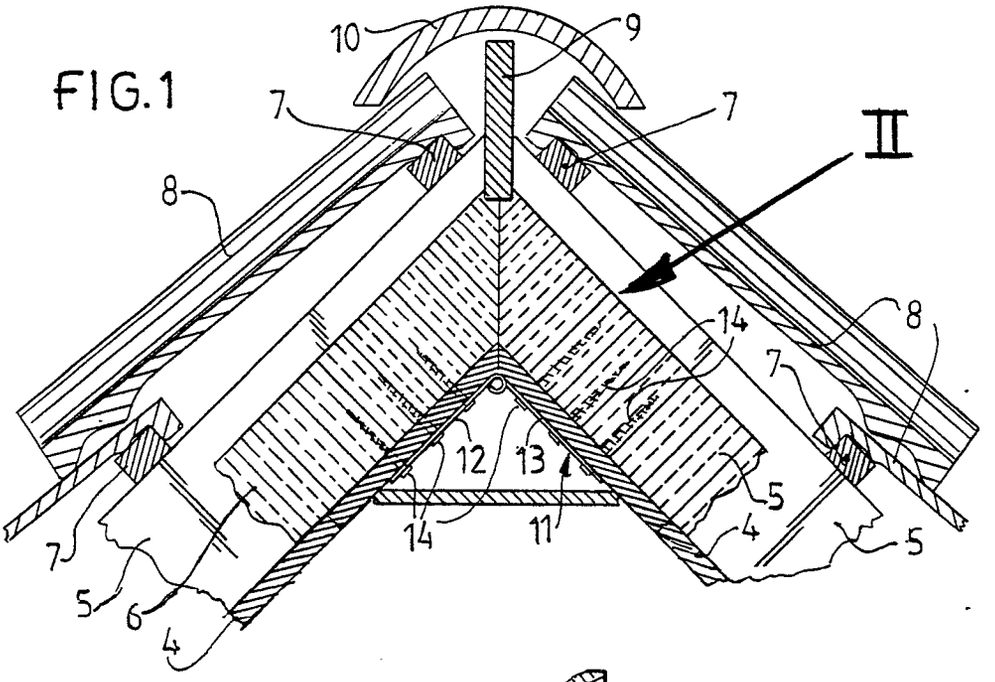
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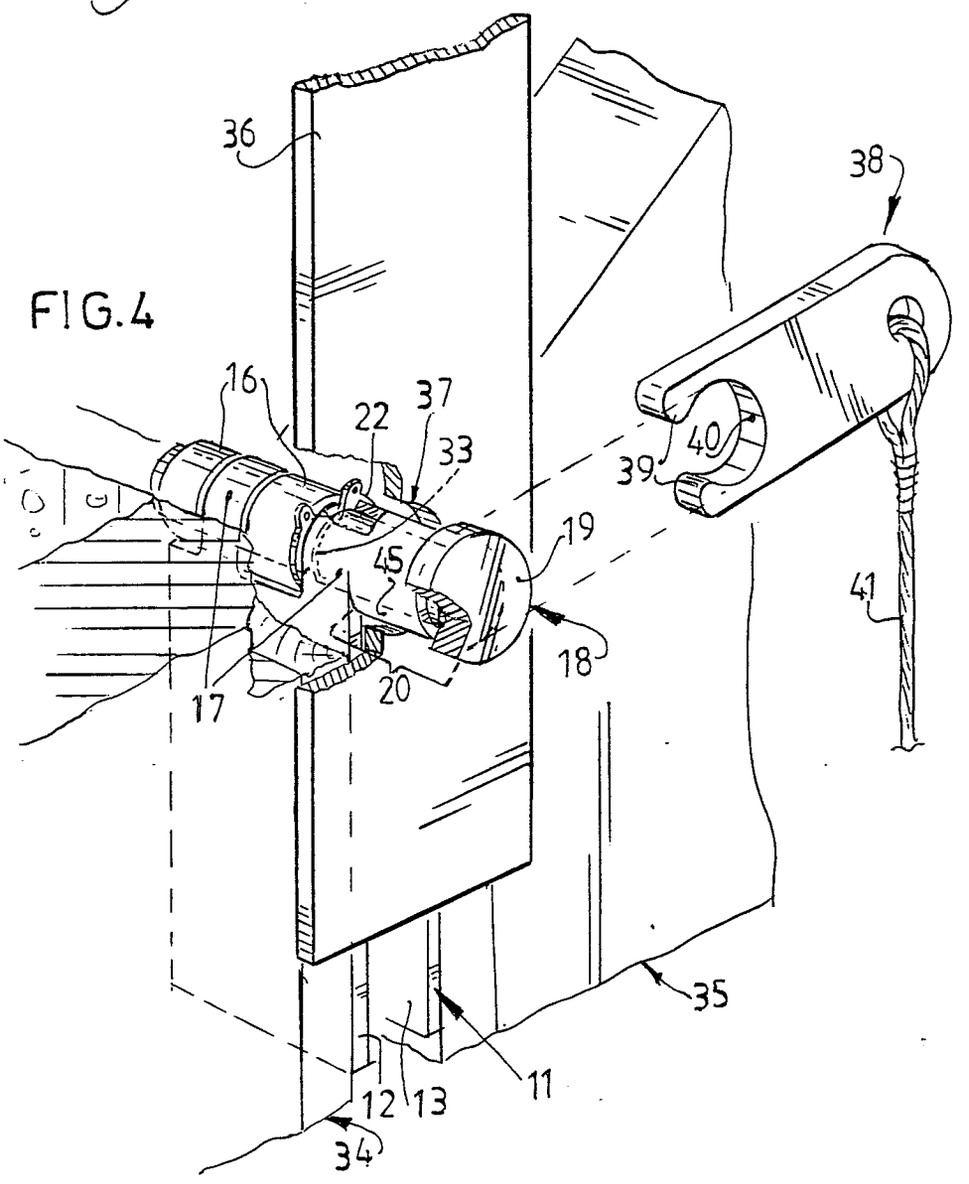
FIG.4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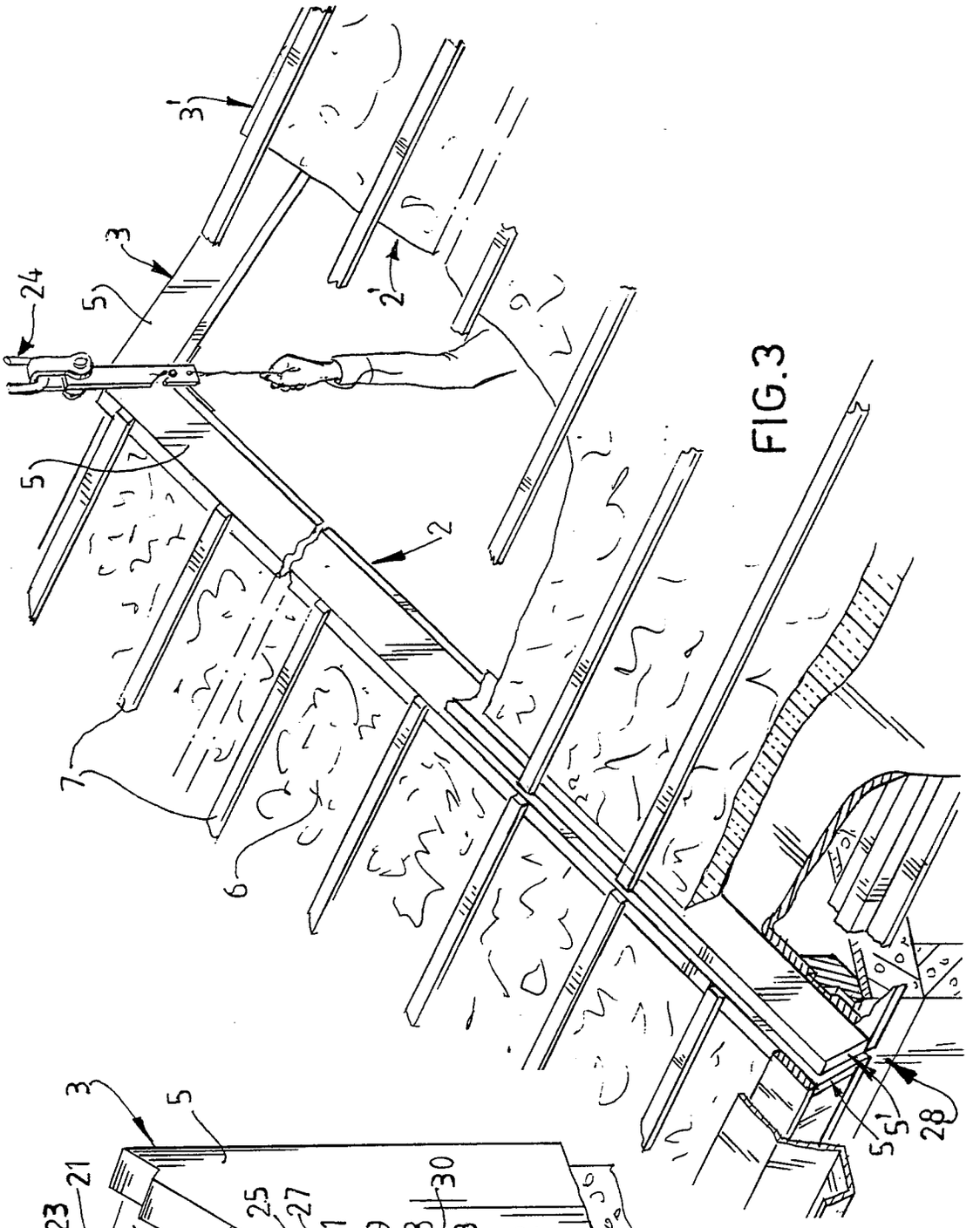
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FIG.3

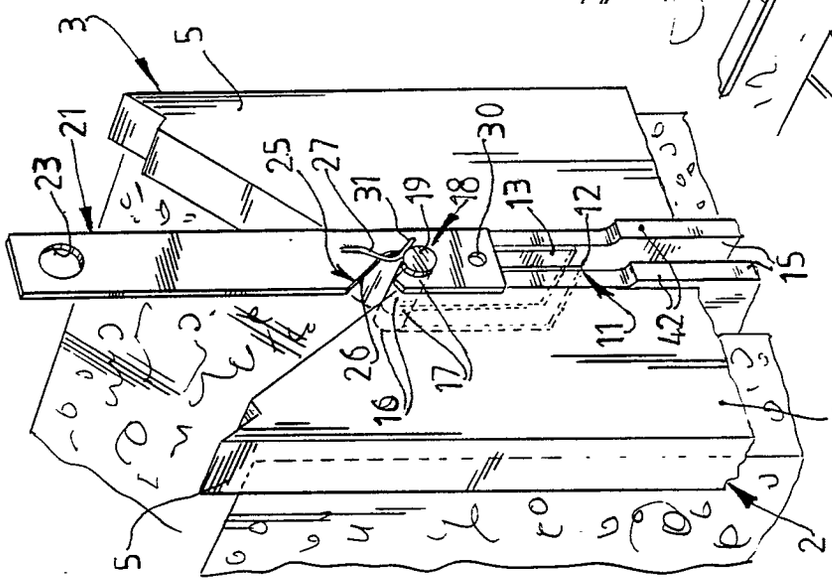
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FIG.2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 88 20 0892

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.4)
Y	DE-A-2 064 201 (M. MENZEL) * Figures 1,2,4,8,9; page 6, lines 3-11 * ---	1,2	E 04 G 21/14 B 66 C 1/66
A		4	
Y	CAHIERS DU CENTRE SCIENTIFIQUE ET TECHNIQUE DU BATIMENT-CSTB, no. 242, 27th June 1983, pages 2-5, constat de traditionalité no. 5/82-426, CSTB, Paris, FR; E. FARHI: "Constat de traditionalité sur le procédé de caisson rotulé de toiture" * Page 3, figure 5, paragraph 2.6; page 4, figure 7, paragraph 4.1, lines 10-12 * ---	1,2	
A	FR-A-2 305 564 (S.A. BERMAHO & BALENCY-BRIARD) * Figures 1,5; page 3, line 30 - page 4, line 13 * ---	1,5,10, 14,15	
A	US-A-4 379 579 (MAHAN et al.) * Figures 1,2; column 2, lines 4-64 * ---	6,7	TECHNICAL FIELDS SEARCHED (Int. Cl.4) E 04 G E 04 B B 66 C
X	EP-A-0 149 492 (LUNKE & SOHN GmbH) * Figure 1; page 5, lines 25-36 * -----	11-13	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	03-08-1988	SCHEIBLING C.D.A.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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