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(54) **A device for reducing movements of a roof underlay of a roof structure**

(57) A device for reducing movements of a roof underlay (11) of a roof structure, the device comprising attachment means (31) for attaching the device to a batten (13) of the roof structure; a contacting element (32) for contacting the roof underlay (11); and an interconnecting element (33) interconnecting the attachment means (31) and the contacting element (32). The attachment means

(31) comprises resilient members (31a, 31b) dimensioned to span the batten (13), and snapping ridges (31a', 31b') on the resilient members (31a, 31b) for interacting with edges of the batten (13) so as to allow the device to be attached to the batten by a snapping action of the resilient members (31a, 31b) and the snapping ridges (31a', 31b').

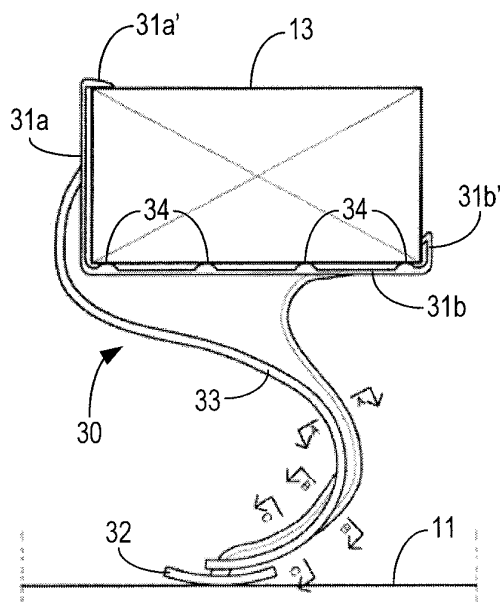


Fig. 3B

**Description**

## FIELD OF THE INVENTION

**[0001]** The invention relates to elements for use in the building industry, particularly components used for reducing movements of a roof underlay in a roof structure.

## BACKGROUND OF THE INVENTION

**[0002]** Roof structures often have structural elements such as rafters of wood as the carrying structural elements onto which battens are fixed that carry the outer roof. A roof underlay is often arranged between the rafters and the battens. The roof underlay serves as a vapour barrier and a wind stopper. In case the roof underlay is a flexible sheet material wind may cause the roof underlay to move and flutter which may generate noise and eventually also wear or tear the roof underlay. For that purpose motion damping devices are attached to battens or other structural elements of the roof structure and in contact with the roof underlay so as to reduce movements of the roof underlay. Such known devices are attached to a batten either using a nail or a piece of string or wire such as a metal wire. This is time consuming.

## SUMMARY OF THE INVENTION

**[0003]** The invention provides a device for reducing movements of a roof underlay of a roof structure which device has attachment means for attaching the device to a batten of the roof structure, a contacting element for contacting the roof underlay, and an interconnecting element interconnecting the attachment means and the contacting element. According to the invention the attachment means comprises resilient members dimensioned to span the batten, and snapping ridges on the resilient members for interacting with edges of the batten so as to allow the device to be attached to the batten by a snapping action of the resilient members and the snapping ridges. The user can simply snap the device onto the batten which will only take a few seconds and no tools are needed. If desirable the device may be removed or moved also without the use of tools.

**[0004]** Preferably, the interconnecting element is resilient whereby the device can adapt to the distance between the batten and the roof underlay and exert a mild force on the roof underlay. Advantageously the length of the interconnecting element can be adjusted according to the distance between the batten and the roofing underlay, preferably by having one or more sections that can be broken off by the user to make is shorter.

**[0005]** In order to prevent water to accumulate between the attachment means and the batten, the surfaces of the attachment means facing the batten have protrusions for contacting the batten so as to provide a space between the attachment means and the batten.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0006]**

5 Figure 1 is a schematical section through a roof structure seen in the direction of the arrows I-I in figure 2;

10 Figure 2 is a schematical section through the roof structure in figure 1 seen in the direction of the arrows II-II in figure 1;

Figure 3A shows a device according to the invention attached to a batten;

15 Figure 3B shows a section through the device in figure 3A taken along the line 3B-3B in figure 3A;

20 Figure 3C shows three sections through the device in figures 3A and 3B taken along the lines A-A, B-B and C-C, respectively in figure 3B; and

Figures 4, 5, 6 and 7 show alternative embodiments of the device of the invention.

## 25 DETAILED DESCRIPTION OF THE INVENTION

**[0007]** In figures 1 and 2 is shown an exemplary roof structure. Rafters 10 support the remaining roof structure including a roof underlay 11, counter battens or spacers 30 12, battens 13 and an outer roof 14 e.g. roof tiles. The elements of the roof structure are shown slightly exploded but will be fixed to each other to form a stable roof structure. EP 1209298 B1 discloses a laminate, especially for use as roof underlay. In figure 1 a device 20 of the invention is attached to the batten 13 by means of 35 attachment means 21. A footplate 22 is in contact with the roof underlay 11 and a spring element 23 interconnects the attachment means 21 and the footplate 22 and the device will reduce movements of the roof underlay 11.

40 **[0008]** Figures 3A and 3B show a device 30 in an embodiment of the invention. The device 30 has attachment means 31a and 31b each having a protruding snapping ridge or hook 31a', 31b' at its end by means of which it is attached to a batten 13 of a roof structure e.g. the roof structure in figures 1 and 2. A footplate 32 is in contact 45 with a roof underlay 11, and an interconnecting element 33 interconnects the attachment means 31 and the footplate 32. The interconnecting element 33 is S-shaped and resilient. The entire device 30 is moulded in one piece 50 of a mouldable material, preferably a durable and resilient thermoplastic material such as thermoplastic vulcanisates (TPV), propylene based elastomers and thermoplastic elastomers such as SEBS, and thermoplastic TPU. The material may also contain polypropylene.

55 **[0009]** When the device 30 is to be attached to the batten 13 the user may first place one of the attachment means 31a or 31b with the corresponding protruding snapping ridge 31a' or 31b' on the batten 13 so that the

snapping ridge grips over an edge of the batten. Then the user will flex the attachment means 31a, 31b apart so as to snap the other one of the protruding snapping ridge 31a' or 31b' grips over the diagonally opposite edge of the batten. The surfaces the attachment means 31a and 31b facing the batten 13 have protruding ribs or beads 34 that provide a space between the attachment means and the batten which ensures that air has access to the space to prevent accumulation of moisture between the attachment means and the batten.

**[0010]** When attached to a batten as shown in figures 1, 3A and 3B the footplate 22, 32 is preferably in contact with the roof underlay 11 which in itself reduces any transverse movements of the roof underlay, i.e. movements transverse to the plane of the roof underlay. The interconnecting element 23, 33 is preferably resilient whereby some movement of the roof underlay is possible and dynamic forces between the footplate and the roof underlay are reduced. This reduces the risk of tearing the roof underlay.

**[0011]** Alternative embodiments are shown in figures 4 to 7 when attached to a batten like in figure 3B. The attachment means for attaching the devices 40, 50, 60 and 70 to a batten 13 corresponds to what is described above in connection with figures 3A and 3B. In figures 4 to 7 the interconnecting element has different configurations that allow its properties to be varies and optimised for the purpose. Thus e.g. the device can be manufactured with different length and dynamic properties such as resilience and stroke length. In each of the embodiments in figures 4 to 7 the interconnecting element has three footplates 42a-c, 52a-c, 62a-c and 72a-c, respectively at different distances from the batten. If a shortening of the interconnecting element is desired due to the actual distance between the batten and the roof underlay, one or two of the lower footplates can be broken off. For this purpose there is a weakening of the material in the form of a notch or indentation that allows a footplate and its associated connector to be broken off leaving the remaining footplate without protruding edges that might otherwise damage the roof underlay.

## Claims

1. A device (20, 30, 40, 50, 60, 70) for reducing movements of a roof underlay (11) of a roof structure, the device comprising

- attachment means (31) for attaching the device to a batten (13) of the roof structure;
- a contacting element (32) for contacting the roof underlay (11); and
- an interconnecting element (33) interconnecting the attachment means (31) and the contacting element (32);

**characterized in that** the attachment means (31)

comprises resilient members (31a, 31b) dimensioned to span the batten (13), and snapping ridges (31a', 31b') on the resilient members (31a, 31b) for interacting with edges of the batten (13) so as to allow the device to be attached to the batten by a snapping action of the resilient members (31a, 31b) and the snapping ridges (31a', 31b').

2. A device according to any one of the preceding claims wherein the interconnecting element (33) is resilient.
3. A device according to any one of the preceding claims wherein the interconnecting element (33) has a length that can be adjusted according to the distance between the batten (13) and the roofing underlay (11).
4. A device according to claim 3 wherein the interconnecting element (33) has a weakening allowing a portion (42a, 42b, 52a, 52b, 62a, 62b, 72a, 72b) thereof to be broken off.
5. A device according to any one of the preceding claims wherein surfaces of the attachment means (31a, 31b) facing the batten (13) have protrusions (34) for contacting the batten (13) so as to provide a space between the attachment means (31a, 31b) and the batten (13).
6. A device according to any one of the preceding claims being of a mouldable material and moulded in one piece.

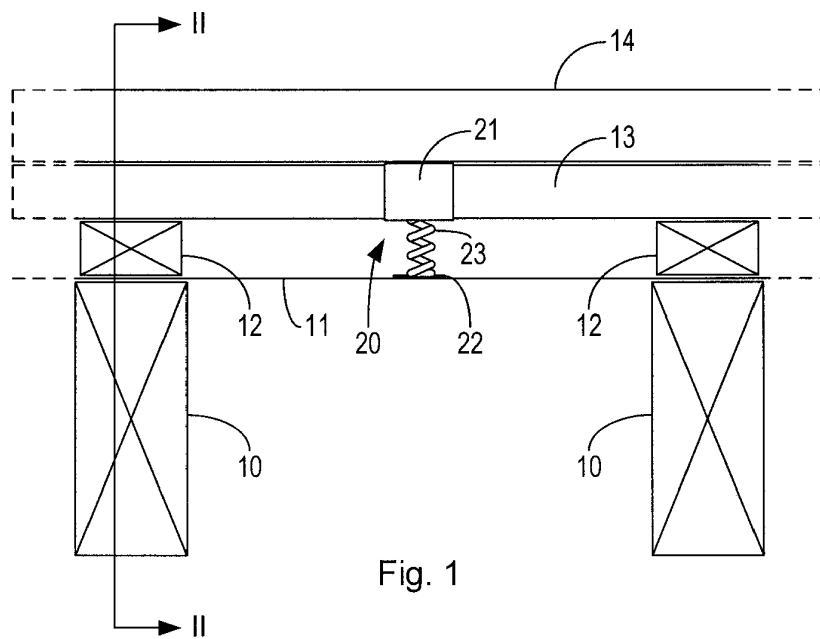


Fig. 1

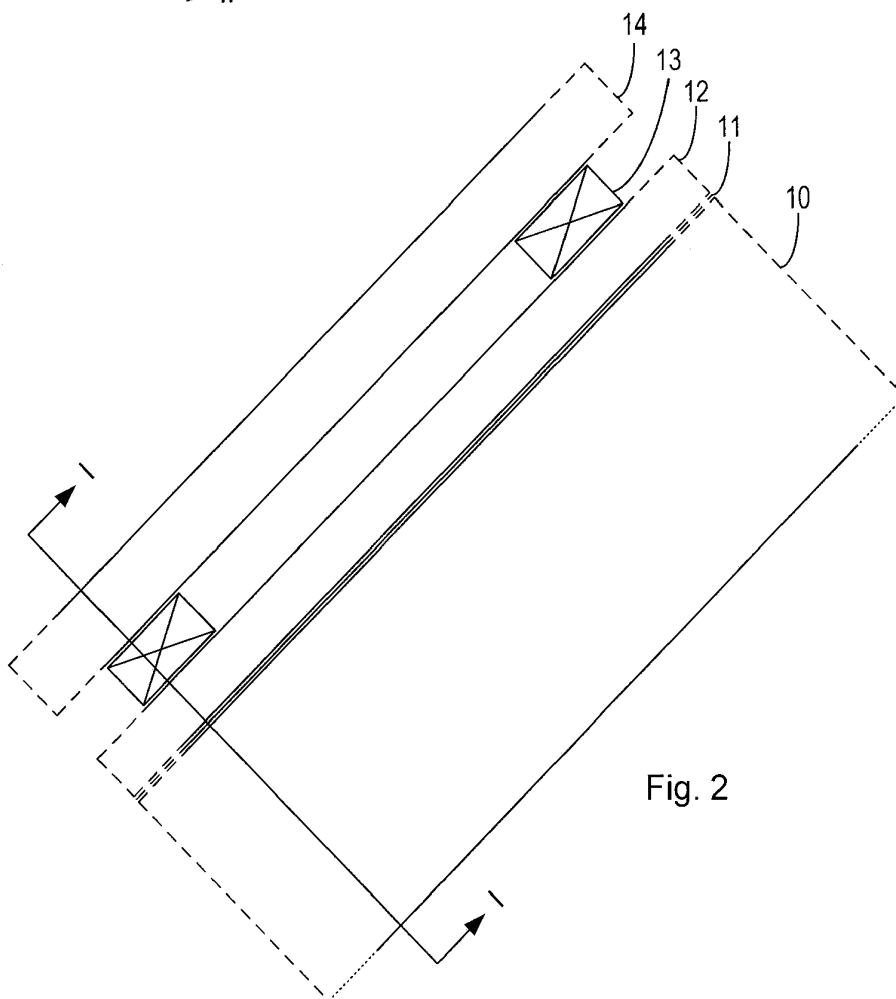


Fig. 2

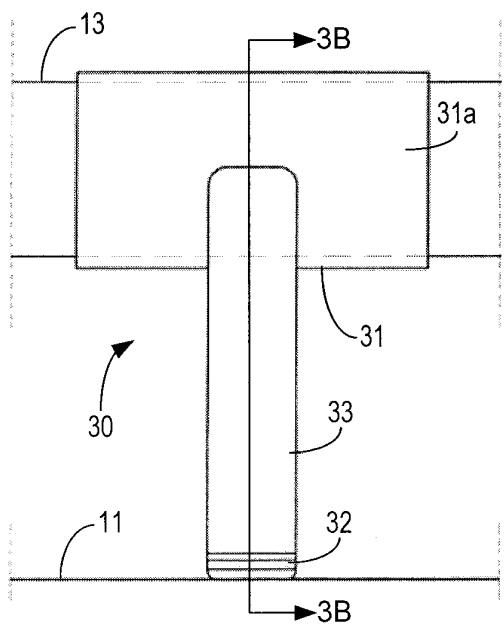


Fig. 3A

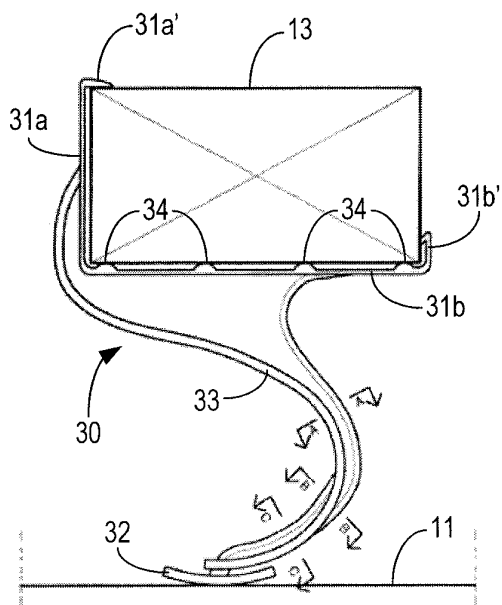


Fig. 3B

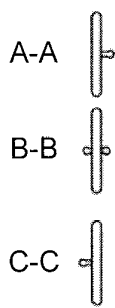


Fig. 3C

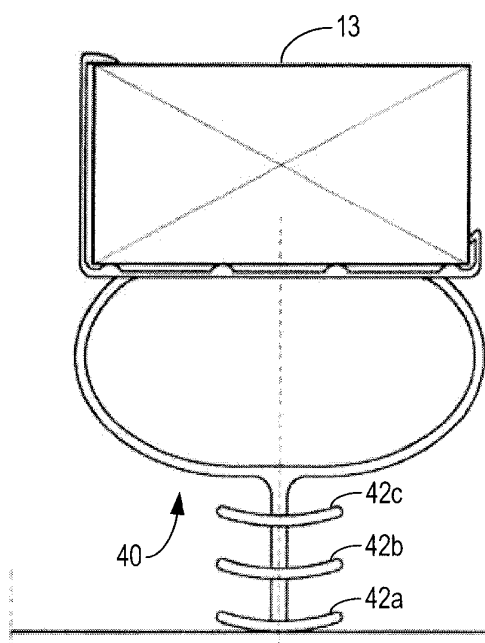


Fig. 4

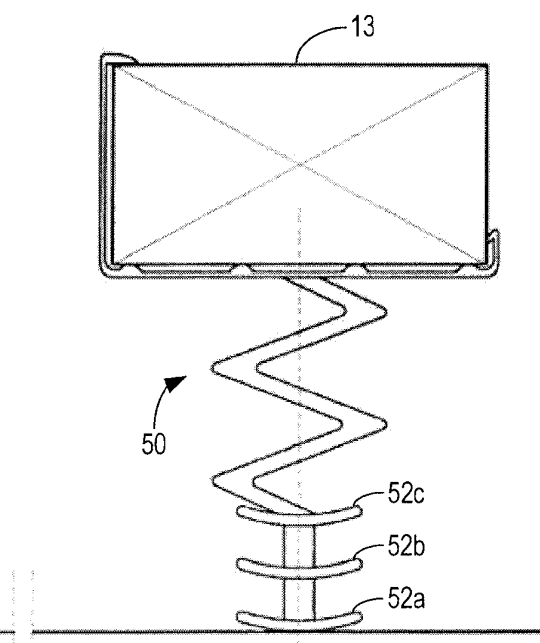


Fig. 5

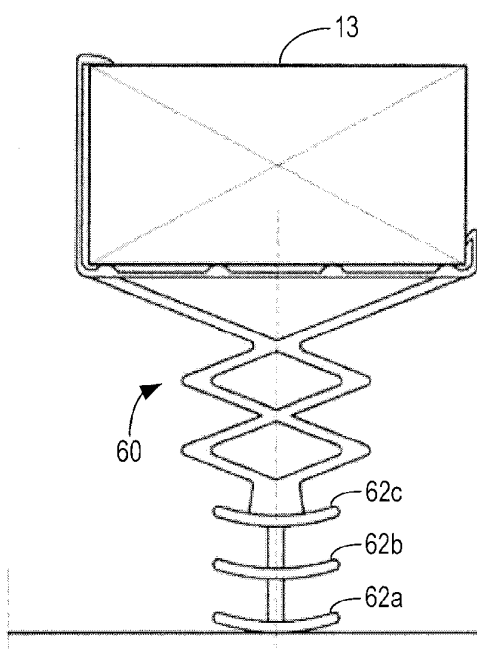


Fig. 6

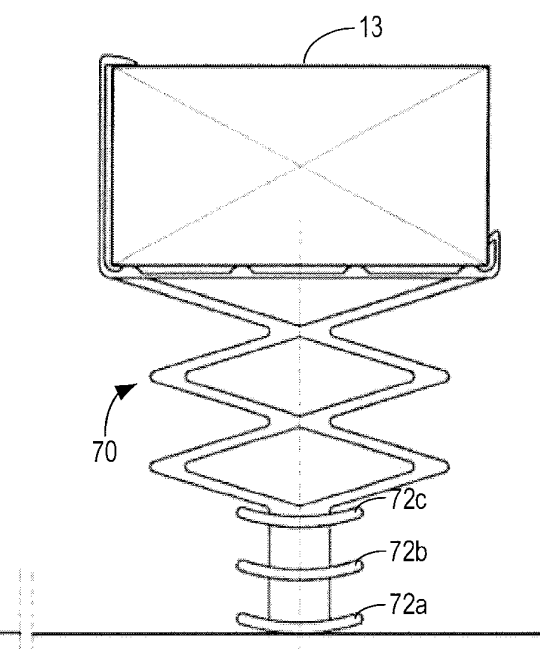


Fig. 7



EUROPEAN SEARCH REPORT

Application Number  
EP 10 16 3795

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 95/21974 A1 (POLYSHEET AS [DK]; SOELBECK PETER [DK]) 17 August 1995 (1995-08-17) * page 1, line 4 - line 24 * * page 2, line 2 - line 23; claims 1-3; figures 1,1a *	1-6	INV. E04D12/00
A	DE 35 15 419 C1 (HOLZAPFEL WALTER DIPL-ING) 14 August 1986 (1986-08-14) * column 4, line 45 - column 5, line 14; claim 1; figures 1-4 *	1-6	
A	GB 2 318 593 A (MARTIN DAVID FREDERICK [GB]) 29 April 1998 (1998-04-29) * the whole document *	1-6	
A	DE 93 09 379 U1 (HEBEL AG [DE]) 3 November 1994 (1994-11-03) * page 4, line 23 - page 7, line 2; figures 1-3 *	1-6	
A	EP 1 316 654 A1 (MONARFLEX AS [DK]) 4 June 2003 (2003-06-04) * paragraph [0033] - paragraph [0042]; figures 1,2 *	1-6	TECHNICAL FIELDS SEARCHED (IPC) E04D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 12 August 2010	Examiner Giannakou, Evangelia
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EPO FORM 1503 03.02 (PC4C01)

ANNEX TO THE EUROPEAN SEARCH REPORT  
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**REFERENCES CITED IN THE DESCRIPTION**

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- EP 1209298 B1 [0007]