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## (54) Sandwich Building Element and its Manufacturing Method

(57) The invention is related to a sandwich building element (1) a method for producing it and use of these. The sandwich building element (1) of the invention comprises a mineral wool core (2) coated with a surface layer (3) of metal. The sandwich element (1) has on at least one location of the surface layer at least one interruption (X) (3), and at least one cut (4) in the mineral wool core (2) for enabling bending of the sandwich element (1) into desired angle in said location.

EP 1 690 996 A2

## Description

**[0001]** This invention relates to a sandwich building element comprising a mineral wool core between surface layers of metal, which element at one ore more positions can be bent to the desired angle.

**[0002]** This invention also relates to a process for manufacturing a sandwich building element according to the above.

**[0003]** This invention further also relates to the use of the above mentioned sandwich building element and of the above mentioned process.

**[0004]** Ready-bent building elements occupy a lot of space during transportation to the construction or installation site and therefore produce unnecessarily high transport costs. Some examples of such building elements are corner elements for applications as external walls, internal walls, encapsulation of e.g. pipes, pillars, etc. The applications are many.

**[0005]** Ready-bent building elements also raise the risk of transport damages as well as damages at the construction site, and it is more difficult to design the standard packaging for the transportation for these.

**[0006]** There is hence a great need to reduce unnecessary transport costs and the elevated risk for transport damages in the building elements industry.

**[0007]** The purpose of the present invention is therefore to eliminate unnecessary transport costs and to reduce the risk of transport damages as well as damages at the construction site, especially as regards sandwich building elements comprising a mineral wool core between surface layers of metal, since this is an important field of business to the inventors and the holder of the present invention.

**[0008]** In order to be able to,eliminate said unnecessary transport costs, the sandwich building element according to the invention is characterised by that the sandwich element on at least one side has at least one interruption in the surface layer, which interruption(s) extends over the whole side in question, and at least one cut in the mineral wool core for enabling bending of the sandwich element into the desired angle.

**[0009]** Because of said intention to eliminate said unnecessary transport costs, the process according to the invention is characterised by that the sandwich element on at least one side is provided with at least one interruption in the surface layer, which interruption(s) extends over the whole side in question, and at least one cut in the mineral wool core for enabling bending of the sandwich element into the desired angle.

**[0010]** Furthermore a use according to the invention of the sandwich building element according to the invention is characterised by that the sandwich building element after transportation in essentially planar position to the contruction site is bent and locked at the desired angle (s) at the construction site.

**[0011]** According to another use according to the invention, the process according to the invention is used for manufacturing a sandwich building element according to the invention.

**[0012]** The benefits of the invention are hence that the transport costs and the risk of transport damages as well as damages at the construction site for sandwich building elements comprising a mineral wool core between surface layers of metal is noticeably reduced. Because of the fact that ready-angled elements occupy more space and that it is not possible to load anything else on the same package cargo, the transport costs will be higher for angled than for non-angled elements. Thanks to the invention, one can now obtain much lower packaging costs for the standard packaging of the elements, because they are not angled until after the transportion to the construction site. Other significant advantages of the invention are that one makes savings in the transport design and that it furthermore is much easier to design the standard packaging for the transport.

**[0013]** In the following are described preferred embodiments of the invention.

**[0014]** In one preferred embodiment of the sandwich building element according to the invention, the sandwich building elementet is characterised by that the cut(s) is (are) cuneate. The cuts may however have any other form.

**[0015]** In another preferred embodiment the sandwich building element according to the invention is characterised by that the angle and the depth of each cut and the number of cuts are chosen depending on the desired bending angle.

**[0016]** In another preferred embodiment the sandwich building element according to the invention is characterised by that there for the inner corner of each bending is available a corresponding corner moulding or angel moulding with a corresponding length and angle as well as locking members for locking the sandwich element at the angel in question. The locking members may for example be conventional screws.

**[0017]** In another preferred embodiment the sandwich building element according to the invention is characterised by that the mineral wool core of the sandwich building element is made of rock wool. Also other kinds of mineral wool may however be used.

**[0018]** A preferred embodiment of the process according to the invention is characterised by that the cut(s) are shaped cuneatly. This can for instance be done with a compass saw, but also other cutting tools can be used.

**[0019]** Another preferred embodiment of the process according to the invention is characterised by that the angle and the depth of each cut and the number of cuts are chosen depending on the desired bending angle.

**[0020]** Another preferred embodiment of the process according to the invention is characterised by that each bending is provided with a corresponding corner moulding with a corresponding angle and locking members for enabling locking of the sandwich element at the angel in question. If the angle of the sandwich element is 90°, then the corner moulding's angle is hence also 90°.

**[0021]** Another preferred embodiment of the process according to the invention is characterised by that the mineral wool core is made of rock wool.

**[0022]** A single sandwich element can according to the invention also be provided with several places of cuts which enable forming of several corners or angles of different angle sizes where the angles can be acute as well as blunt. At these different places of cuts, the number, angles, depth as well as shape of the cuts may take different forms according to specific needs.

**[0023]** A sandwich element according to the invention can be achieved e.g. by at first producing in a conventional way a sandwich element comprising a mineral wool core between continous surface layers of metal, and then by according to conventional methods cutting out and removing the cut-out sheet or strip of metallic surface layer as well as cut-out mineral wool.

**[0024]** The invention is in the following described by way of examples and by referral to enclosed drawings, wherein

figure 1 is a cross-sectional figure of a sandwich building element ready to be transported to the construction or installation site,

figure 2 is a cross-sectional figure of a ready-bent and locked sandwich building element,

figure 3 is a perspective figure of three sandwich building elements according to figure 1 piled upon each other for instance during transportation.

**[0025]** In figure 1 is shown a preferred embodiment of the invention i.e. a sandwich building element 1 comprising a mineral wool core 2 between surface layers 3 of metal. The sandwich element 1 shows on one side an interruption X (X = width of the interruption) in the metallic surface layer 3. In this embodiment the sandwich element 1 shows four cuts 4 in the mineral wool core 2, which form a zic-zac-shaped cut profile with three sharp crests 4a and four sharp throughs 4b. The angle between the side legs of the apex of a crest 4a or the apex of a through 4b is in this example 22,5° (does not totally agree with the figure). This cut 4 enables bending of the sandwich element 1 into an angle of 90°. Figure 1 also shows that the sandwich element 1 has male elements 6 and female elements 5 for connecting of several sandwich elements 1 to each other. The dimensions of the sandwich element 1 are chosen depending on the construction purpose.

**[0026]** In figure 2 is shown a sandwich element 1 according to figure 1, which after transportation in planar position to the construction site at the construction site is bent into the desired angle of 90° and is firmly locked at this angle with a corner or angle moulding 7 and locking members 8 (e.g. screws). This corner moulding 7 has the same length (i.e. has the length Y, see figure 3) as the length Y of the interruption X between the two opposing edges.

**[0027]** For locking the element 1 in the desired angle of 90° the corner moulding 7 is firmly screwed with screws 8 to the element 1 at first on one side of the interruption X. Then the free second part of the element 1 (i.e. that part which resides on the other side of the interruption X) is bent against the corner moulding's 7 free-standing other side and thereafter this other side of the corner moulding 7 is firmly screwed to the element 1 with screws 8. In this manner the element 1 is hence locked at the desired angle of 90°. Figure 2 also shows that the outer corner has an essentially round shape, while the inner corner has the shape of a rectangular (90°) angle.

**[0028]** In figure 3 is shown an example on how sandwich elements 1 according to figure 1 can be transported from the production site to the construction site in order to there then be bent into the desired angle (in this example an angle of 90°), installed and locked in position according to figure 2.

**[0029]** Figure 3 also shows that the interruption X has the length Y and extends itself linearly and with even width over the whole side from one edge to its opposing edge. The interruption X, which extends itself between the two opposing edges, in other words has the length Y.

**[0030]** These examples should by no means be understood or construed as limiting the spirit and the scope of protection of the invention, but should only be used for understanding a possible embodiment of the invention.

## Claims

1. Sandwich building element (1) comprising a mineral wool core (2) between surface layers (3) of metal, **characterised in, that** the sandwich element (1) on at least one side has at least one interruption (X) in the surface layer (3), which interruption(s) extends over the whole side in question, and at least one cut (4) in the mineral wool core (2) for enabling bending of the sandwich element (1) into desired angle.

2. Sandwich building element (1) according to claim 1, **characterised in, that** the cut(s) (4) is (are) cuneate.

3. Sandwich building element (1) according to any of the preceding claims, **characterised in, that** the angle and the depth of each cut (4) and the number of the cuts (4) are chosen depending on the desired bending angle.

4. Sandwich building element (1) according to any of the preceding claims, **characterised in, that** there for each bending is available a corresponding corner moulding (7) with a corresponding angle and locking members (8) for locking the sandwich element (1) at the angel in question.

5. Sandwich building element (1) according to any of the preceding claims, **characterised in, that** the mineral wool core (2) of the sandwich building ele-

ment (1) is made of rock wool.

6. Process for manufacturing a sandwich building element (1) comprising a mineral wool core (2) between surface layers (3) of metal, **characterised in, that** the sandwich element (1) on at least one side is provided with at least one interruption (X) in the surface layer (3), which interruption(s) extends over the whole side in question, and at least one cut (4) in the mineral wool core (2) for enabling bending of the sandwich element (1) into the desired angle.

7. Process according to claim 6, **characterised in, that** the cut(s) (4) is (are) are shaped cuneatly.

8. Process according to any of the claims 6 or 7, **characterised in, that** the angle and the depth of each cut (4) and the number of cuts (4) are chosen depending on the desired bending angle.

9. Process according to any of the claims 6 - 8, **characterised in, that** each bending is provided with a corresponding corner moulding (7) with corresponding angle and locking members (8) for enabling locking of the sandwich element (1) at the angel in question.

10. Process according to any of the claims 6 - 9, **characterised in, that** the mineral wool core (2) is made of rock wool.

11. Use of a sandwich building element (1) according to any of the claims 1 - 5 so that the sandwich element (1) after transportation in essentially planar position to the construction site is bent and locked at the desired angle(s) at the construction site.

12. Use of a process according to any of the claims 6 - 11 for manufacturing a sandwich building element (1) according to any of the claims 1-5.

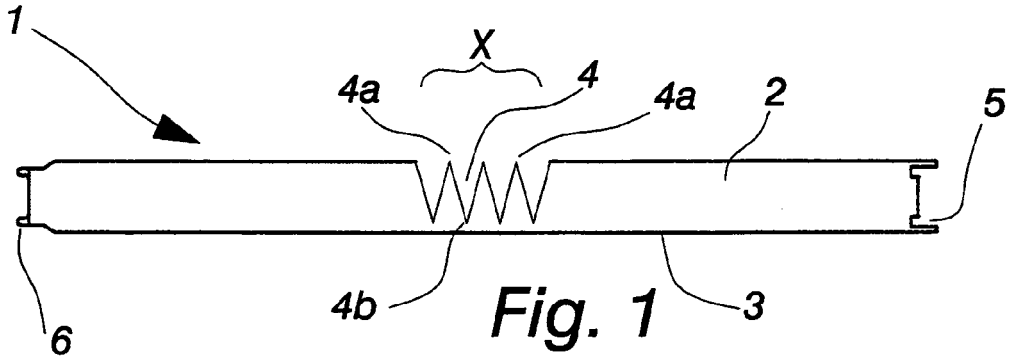


Fig. 1

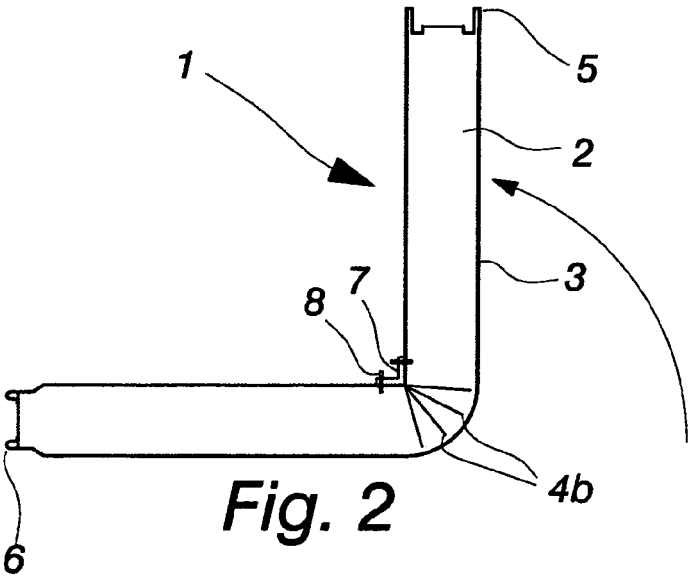


Fig. 2

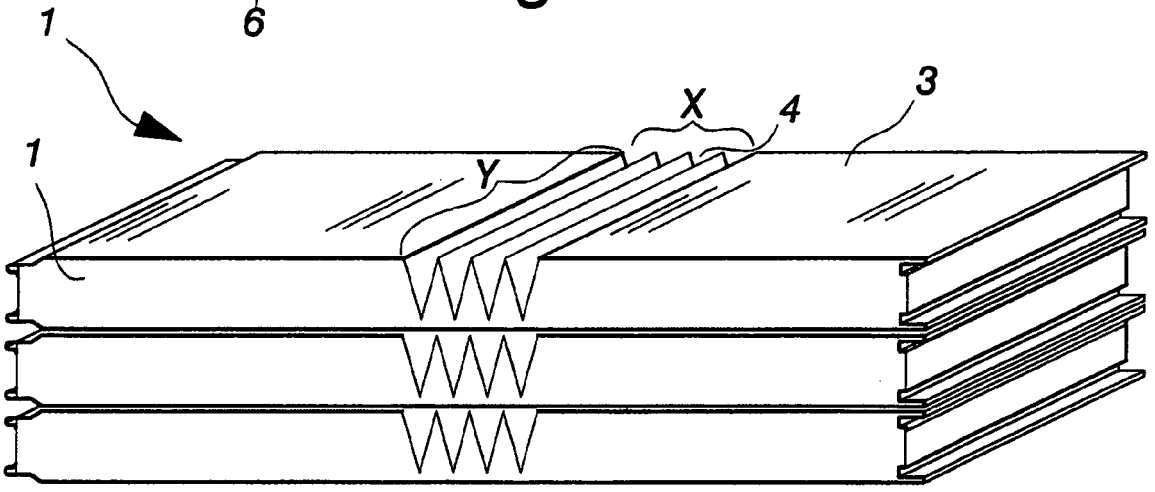


Fig. 3