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(54) **A sound absorbing lamella and lamellar curtain**

(57) Provided herewith is a lamellar element (1), having the shape of a quadrangle including two long sides (3, 5), a first (7) and a second (9) short side, and attach-

ment means (17), wherein the lamella element (1) consists of a solitary flexible felt material layer. Also, a lamellar curtain (33) is provided, comprising a plurality of lamellar elements according to any of claims.

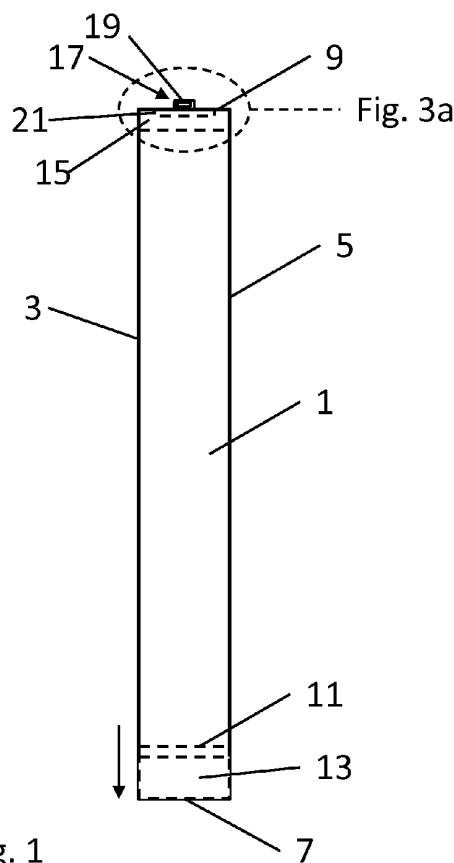


Fig. 1

Description

TECHNICAL FIELD

[0001] The present invention relates to a lamella and a lamellar curtain. More particularly the present invention relates to a sound absorbing and insulating lamella and lamellar curtain. The present invention also relates to a process for manufacturing the curtain.

BACKGROUND

[0002] It is today known that materials like plastic and fabric may be used in noisy environments, such as facilities with stone walls, schools or working spaces, to damper the sound level. Portions of the materials may e.g. be attached to the surface of, or arranged within, a panel or a wall by means of glue. Existing solutions are usually bulky and not very mobile, which makes installation cumbersome and expensive. Also, sound dampening and isolating properties are poor.

[0003] Furthermore, a disadvantage with this common way of damper the sound level is that when a fire breaks out and the temperature rises, these materials, including the glue; emit toxic substances which harm both people and the environment. They can also melt and drip on objects and people which and who will take great damage of the melt.

[0004] In the materials used today, different types of dye are used to complete the design so that the customer can choose from different colours. A disadvantage with these dyes is that when they are exposed to sun light the actual colour starts to fade away and the customer needs to replace the material with a new one. The material can also dry out which leads to cracks and holes. Furthermore, they commonly include hazardous chemicals which may be toxic.

[0005] Thus, there is a need for an improved solution for absorbing noise, which offers increased safety, flexibility and environmental friendliness.

SUMMARY

[0006] Accordingly, the present invention preferably seeks to alleviate or eliminate one or more of the above-identified deficiencies in the art and disadvantages singly or in any combination and solves at least the above mentioned problems by providing a lamellar element consisting of felt material.

[0007] An object of the present invention is to provide a novel technique for making a durable sound absorption element which is a natural feature to the interior design in e.g. a room, is safe, flexible and environmentally friendly.

[0008] According to a first aspect, a lamellar element is provided, having the shape of a quadrangle including two long sides, a first and a second short side, and attachment means, wherein the lamella element consists

of a solitary flexible felt material layer.

[0009] An advantage with this is that the lamellar contributes to an environment with an excellent sound level due to the shape of the lamella element and the felt material. Also, since the element consists of only one flexible layer it is cheaper and easier to manufacture than existing products and since no adhesive means needs to be used the element doesn't risk coming unstuck during handling and use. By not using any adhesive means the environment is not affected by any hazardous substances which otherwise may be set free during, e.g. temperature changes. For this particular application, felt material has proven to be a superior choice for improving the properties of the lamella, while at the same time it may reduce the number of additional layers whereby glue or other adhesives may be omitted.,

[0010] In an embodiment, the felt material comprises polyester.

[0011] This is advantageous, since polyester is easy to produce, is safe for the environment and is easy to handle. The polyester may come from recycled goods which contribute to a minimal impact on the environment and an environmental sustainable process.

[0012] In an embodiment the felt material consists of polyester.

[0013] This is advantageous, since the polyester then does not contain any additives which may be harmful and may come from recycled goods as described above.

[0014] In an embodiment, the felt material is tufted on at least one side.

[0015] This is advantageous, because it improves the sound dampening properties.

[0016] In a further embodiment the felt material comprises wool which is advantageous since wool is a material with a very good colour property which means that the lamella element will keep the lustre of every colour in spite of being effected by e.g. sun light, and not become discoloured. Wool is also very advantageous since it is a pure material with no adhesive means and chemicals which is hazardous to the surrounding environment.

[0017] In an embodiment, the long sides of the lamellar element being substantially longer than the first and second short sides and wherein the length of the long sides and the length of the short sides have a ratio between 1:17 and 1:21.

[0018] This is advantageous, because this elongated shape is easy to handle and provides for increase flexibility of use.

[0019] In yet another embodiment, the attachment means is arranged at the second short side of the lamella element.

[0020] The attachment means may be a hanger, arranged in a second pocket at the second short side, or a hook-and-loop fastening strip, attached to the lamellar element in proximity to the second short side.

[0021] The lamella element may further comprise a weight arranged at the first short side.

[0022] In an embodiment, the lamellar element further

comprises a shape stabilizing element.

[0023] This is advantageous, because the lamellar element may then be bent with a desired curvature, as defined by the shape stabilizing element.

[0024] According to a second aspect of the invention, a lamellar curtain is provided, comprising a plurality of lamellar elements according to the first aspect, mounted on a rod element with the attachment means.

[0025] The lamellar element according to the first aspect is advantageous, since it has a high capacity for absorbing noise, and is also safe, flexible and environmental friendly.

[0026] Thus, according to a third aspect of the invention, use of a lamellar element according to the first aspect, or a lamellar curtain according to the second aspect, for reducing sound in a room is provided.

[0027] The lamellar element also has a good ability to absorb light and heat.

[0028] Thus, according to a fourth aspect of the invention, use of a lamellar element according to the first aspect, or a lamellar curtain according to the second aspect, for reducing light in a room is provided.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029] Embodiments of the present invention will be described in the following with reference to the accompanying, schematic drawings which illustrates non-limiting examples of the inventive concept, in which:

Fig. 1 shows a front view of a lamella of a first embodiment.

Fig. 2 shows a side view of the lamella shown in Fig. 1.

Fig. 3a shows a front view of an enlarged fastening device shown in Fig. 1.

Fig. 3b shows a front view of a fastening device according to a second embodiment.

Fig. 4 shows a front view of a lamella according to another embodiment.

Fig. 5a shows a view of a lamellar curtain with lamellae shown in Fig. 1.

Fig. 5b shows a front view of the lamellar curtain shown in Fig. 5a where the lamellar has been slightly rotated.

Fig. 5c show a front view of the lamellar curtain shown in Fig. 5a where the lamellae have been rotated approximately 90°

Fig. 5d shows a view of the lamellar curtain shown in Fig. 5a where the lamellae are arranged so that they may overlap each other.

Fig. 6 shows a front view of the lamellar curtain where the fastening device is the one shown in Fig. 3b.

Fig. 7 shows a view of a lamellar curtain of another embodiment with the lamellae shown in Fig. 4.

Fig. 8 shows a front view of yet another embodiment of a lamellar curtain with the fastening device shown in Fig. 3b.

DETAILED DESCRIPTION OF EMBODIMENTS

[0030] In an embodiment according to Fig. 1 a sheet element is provided, from now on called lamella 1, which has the shape of a quadrangle including two long sides 3, 5 and two short sides 7, 9. The lamella 1 consists of a solitary layer of felt material, preferably made from polyester which has many desirable features for the purpose of this invention which will be described later.

[0031] At the first, or lower, end of the lamella 1 a first pocket 11 is situated. The first pocket may contain a weight 13 which by means of gravity helps the lamella 1 to expand straight down, in the direction of the arrow, when it is arranged such that its lower end doesn't touch any surface or object. The first pocket 11 has been created by folding the end of the lamella 1 at the first short side 7 upwards and then sewing it on to the surface of the lamella 1. The weight 13 may have any possible type of shape and may be made of a plastic, metal or any other suitable material.

[0032] At the second, or upper, end of the lamella 1 a second pocket 15 is situated which is created in the same way as the first pocket 11, but with the exception of now folding the end of the lamella 1 at the second short side 9 downwards. Inside the second pocket attachment means 17 is arranged. The attachment means 17 could in this embodiment be resembled by a hanger 19, 21 which includes an upper part 19 which has a hole for connecting the attachment means 17 to a corresponding attachment means (not shown) of e.g. a rail (not shown), and a lower part 21 which preferably has a curved shape, like e.g. the shape of a lower part of a coat hanger, but may also be of any other possible shape. Preferably the upper part 19 and the lower part 21 are produced as one piece but they may also be attachable to each other. The upper part 19 may also be of another suitable shape, e.g. a hooking element or the like.

[0033] Fig. 2 shows a side view of the presented lamella 1 where also the folded parts that define the first and the second pocket 11, 15 are shown.

[0034] In Fig. 3a the hanger 19, 21 described above is shown. The hanger 19, 21 is preferably slipped into the second pocket 15 through one of its sides 23a, 23b. The upper part 19 of the hanger 19, 21 is then slipped through a hole 25 in the polyester felt of the second pocket 15. An alternative procedure, if the sides 23a, 23b of the second pocket 15 are closed, may be to stick the hanger 19, 21 into the hole 25 of the second pocket 15.

[0035] An alternative embodiment of attachment means 17 is shown in Fig. 3b. In this embodiment a strip of hook-and-loop fastener of Velcro® type, i.e. a fastening strip 27 is attached to the back side of the lamella 1, in proximity to the short side (9). A corresponding fastening strip (not shown) is attached to the element (not shown) to which the lamella 1 will be hung on. The second pocket 15 is in this case optional since the user perhaps later want to use the hanging device 17 shown in Fig. 3a.

[0036] Fig. 4 shows an alternative embodiment of the

lamella 1. The structure with the first pocket 11, the weight 13, the second pocket 15 and attachment means 17 might be the same as described above. The additional feature of this embodiment is that a third pocket 29 is introduced somewhere between the first pocket 11 and the second pocket 15 on the lamella 1. The third pocket 29 may be placed on one surface of the lamella 1 or arranged like a hole, running through the lamella 1 and may contain a shape stabilizing element 31, e.g. a bar which may be shaped as the desired bending of the lamella 1. An example of this use is when a lamella 1 is supposed to be hung on a curtain rod which has the shape of a semicircle, then the desired appearance of the lamella 1 would be to follow the shape of the curtain rod. The shape stabilizing element 31 may also be introduced into the first and the second pocket 11, 15 so that the lamella 1 has the same shape across its entire longitudinal extension. The bending of the shape stabilizing element 31 may be more or less, depending on its purpose.

[0037] Fig. 5a-d shows a lamellar curtain 33 which comprises a number of the lamellae shown in e.g. Fig. 1 mounted on a rod element 35, here in the shape of a curtain rod, in its connection devices (not shown) which is able to slide along the rod 35. The rod element 35 may also be a rail or the like. The lamellar curtain 33 is shown in its possible environment, covering a wall W. It may also be placed in front of a window, a balcony door, between work spaces or why not in the backyard. It is preferred to hang the lamellar curtain 33 about 30-40 cm. from the wall, when the purpose is to have optimal sound absorption in the surrounding area. Fig. 5a shows the lamellar curtain 33 in a closed state where the lamellae 1 cover the intended part of the wall W or a whole façade opening, such as a window (not shown). Fig. 5b shows the lamellar curtain 33 in a semi-closed state, where the lamellae 1 have been turned around their own axis C. The benefit with being able to rotate the lamellae 1 is so that the maximum absorption of sound is achieved since the source of the sound may be located anywhere in the area. Fig. 5c show the lamellar curtain 33 in an open state where maximum light is allowed to pass the lamellae 1 when e.g. the lamellar curtain 33 are arranged in front of a window. Fig. 5d shows an optional arrangement of the lamellae 1 of the lamellar curtain 33 where the lamellae 1 are allowed to lap over each other by attaching them to one or more rod elements 35 or rails (not shown). The possibility to rotate the lamellae 1 around its longitudinal axis is preferably accomplished by the hanger 17, which may include a ball joint or any other suitable joint configured to allow such rotation.

[0038] Fig. 6 shows a lamellar curtain 33 with the same appearance as above but with the hanging device 17 shown in Fig. 3b, the fastening strip 27. In Fig. 6 the corresponding fastening strip 37 on the curtain rod 35 is also shown.

[0039] Fig. 7 shows a lamellar curtain 33 comprising a number of lamellae 1 shown in Fig. 4 and Fig. 8 shows a lamellar curtain 33 comprising only one lamella 1 which

is much wider than the lamellae 1 previously shown. Each lamella 1 may be customized produced regarding width and length since many of its unique properties is within the felt material, but an often used width of a lamella is 120-130 mm and length is 2300-2500 mm.

[0040] The lamellar curtain 33 may also consist of lamellae 1 that are extending in a horizontal direction (not shown), attached to each other by aligning their long sides 3, 5 to each other. Then the lamellae 1 would function e.g. as a Venetian blind.

[0041] The material of the lamella 1 is a polyester felt material, where felt is defined by a fabric of matted, compressed fibers, with advantageous characteristics regarding e.g. sound absorbing and insulating. The polyester felt is a light weight material with a preferred weight of 300 g/m² to 500 g/m², such as 360 g/m².

[0042] Manufacturing of felt is known to a person skilled in the art, but in this context felt may for example be manufactured by carding polyester fibers and subsequently treat the material with needles. The material is then heat treated and cut into the desired shape.

[0043] At least one but preferably both surfaces of the lamella 1 and the polyester felt are tufted, which gives the surface even better sound absorbing characteristics compared to materials used today. The structure of the felt makes it very easy to adapt to different applications, regarding size, shape and placement. The polyester felt is not rigid, like many other compressed felts that are often used, which makes it very easy to transport and handle since its weight is much lower than the materials used today. Many of the materials used today also has to be very thick to achieve the desired requirements regarding sound absorption which means that material has to include many layers and binders, compressing the felt material as rigid plates, while the polyester felt used in this invention only has one flexible layer which preferably has a thickness of 1 mm to 5 mm, such as 2 mm to 4.5 mm.

[0044] The materials used today as a sound absorbing barrier or curtain are different types of plastics or fabrics. To attach the layers together the manufactures often use glue. In case of a fire these materials catch fire or melt. When plastic and binders, such as glue, melt, toxic substances are released and the material starts to drip which is very dangerous for e.g. a fire fighter trying to put out the fire or rescue people left in the building. Thus is may be advantageous not to have any binders in the felt. Also different types of dye used in the materials to make it look good, consist of hazardous substances which harm its surrounding when they are released. The polyester felt used in the present invention only consists of the polyester felt which doesn't drip or catch fire during a fire. Also the polyester felt only consist of non-toxic substances which means that the felt never may release any substances that may contaminate its environment.

[0045] Another beneficial feature of the polyester felt is its ability to absorb light. The lamella 1 may then also be a used when bright sun light is disturbing or when a room has to be dark which may be desirable in a bed

room, a movie room or for medical purposes. When the lamella is exposed to sun light its surface structure and colour will stay the same which means that the felt will always look new and fresh.

[0046] The polyester felt is also an excellent heat insulator. It keeps the warm air inside the building and if placed near a window or the like it absorbs the cold air so that it doesn't enter the room. It is also resistant against moisture and mold and it doesn't leave any dust which all are preferred characteristics if there are allergists present.

[0047] In an alternative embodiment of the present invention the felt material may comprise of one flexible layer of wool, preferably 100% wool, wherein the wool provides the element with some additional advantageous features. One example is its colour properties which means that what ever colour the lamella element may have the wool makes sure that the colour of it doesn't fade or discolour due to, e.g. the effect of sunlight upon the lamella. The lamella element may then be kept longer and still look new which will decrease the costs for interiors in an office or the like. Another advantageous feature of wool is that it is a clean product with no binders, adhesive means or chemicals which may be hazardous to the surrounding environment.

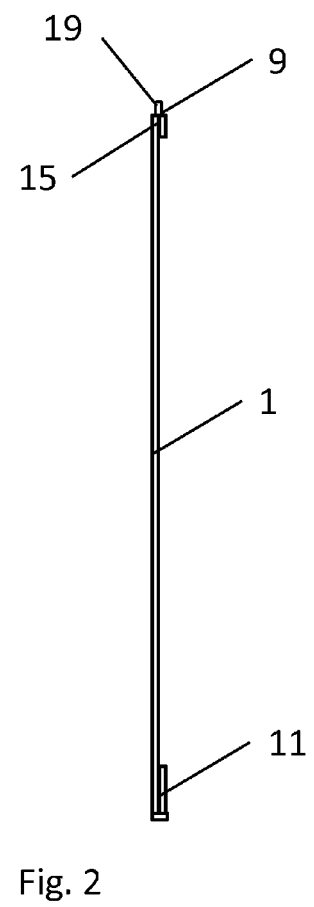
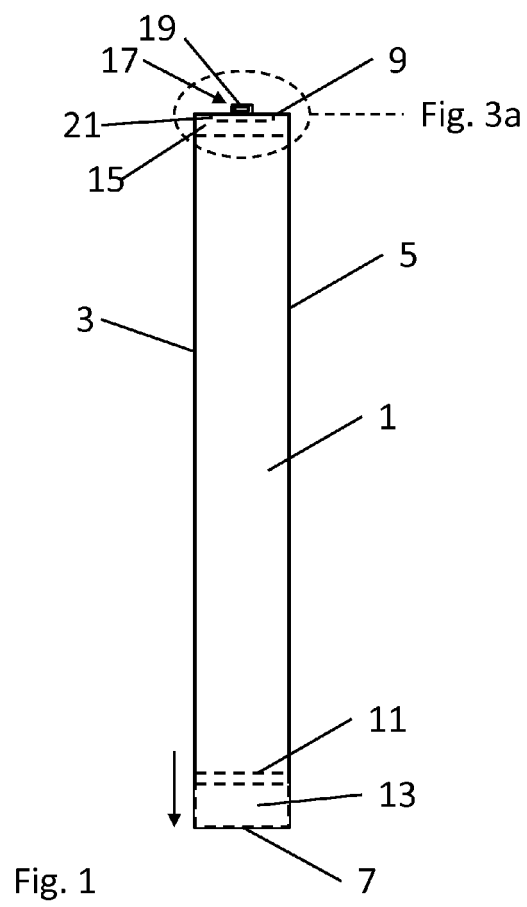
[0048] Finally, although the present invention has been described above with reference to specific embodiments, it is not intended to be limited to the specific form set forth herein. Rather, the invention is limited only by the accompanying claims and, other embodiments than the specific above are equally possible within the scope of these appended claims.

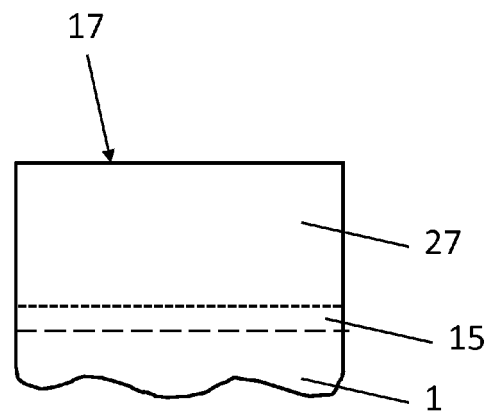
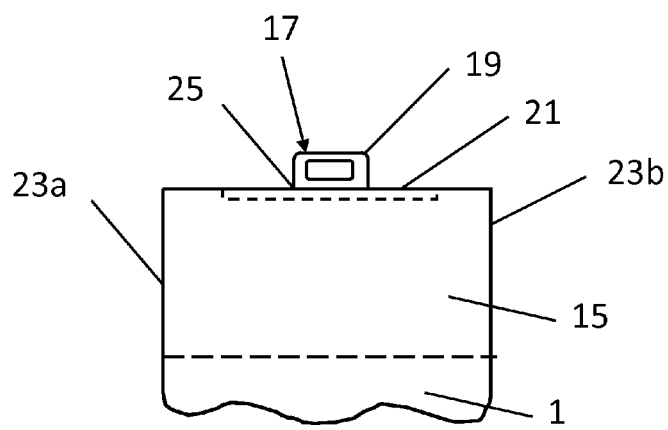
Claims

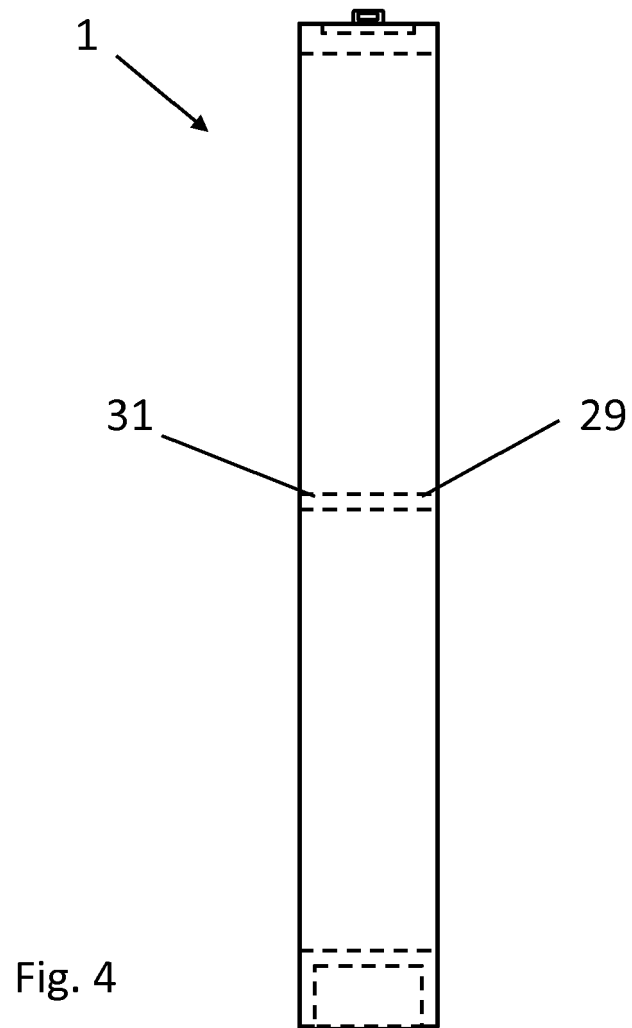
1. A lamellar element for sound absorbing, having the shape of a quadrangle including two long sides (3, 5), a first (7) and a second (9) short side, and attachment means (17), wherein the lamella element consists of a solitary flexible felt material layer.
2. The lamellar element according to claim 1, wherein the felt material comprises polyester.
3. The lamellar element according to any of claims 1 or 2, wherein the felt material consists of polyester.
4. The lamellar element according to claim 1, wherein the felt material comprises wool.
5. The lamellar element according to any of the preceding claims, wherein the felt material is tufted on at least one side.
6. The lamellar element according to any of the preceding claims, wherein the long sides (3, 5) being substantially longer than the first and second short

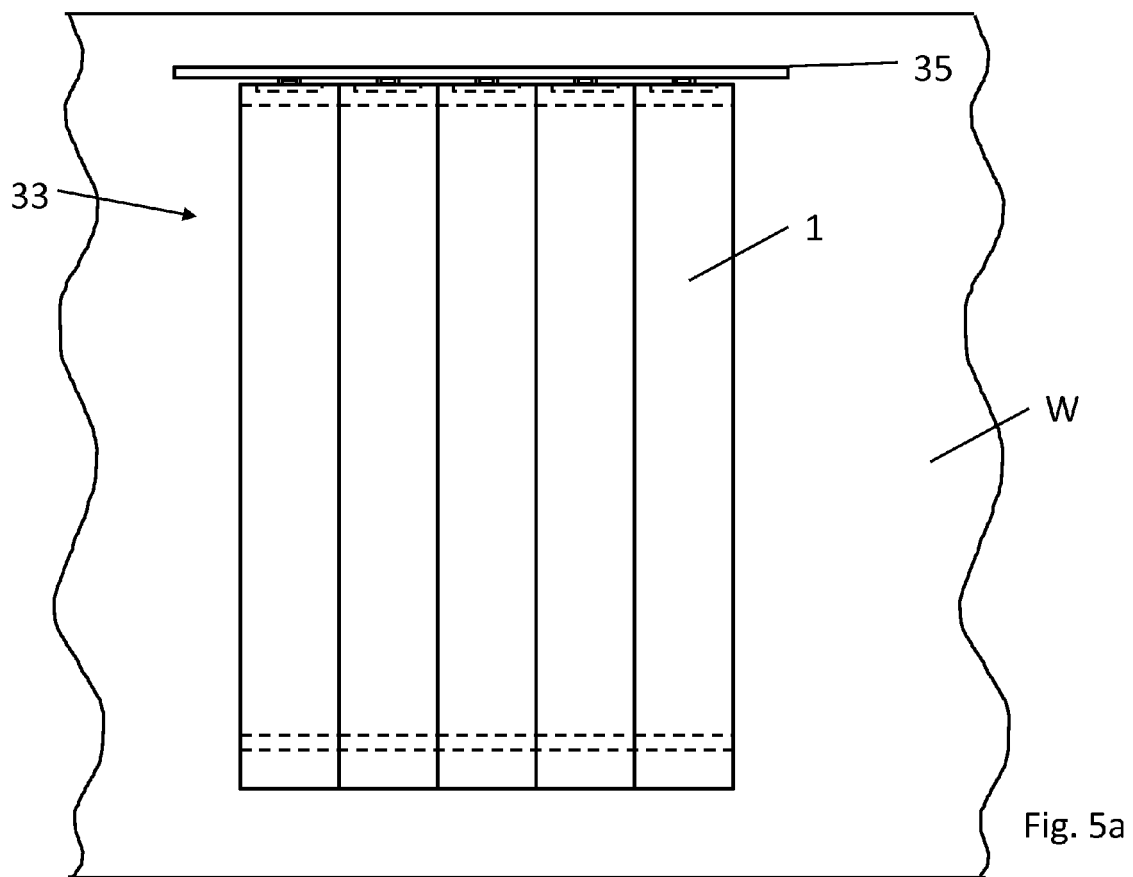
sides (7, 9) and wherein the length of the long sides (3, 5) and the length of the short sides (7, 9) have a ratio between 1:17 and 1:21.

7. The lamella element according to any one of the preceding claims, wherein the attachment means (17) is arranged at the second short side (9) of the lamella element.
8. The lamellar element according to any of the preceding claims, wherein the attachment means is a hanger (19, 21), arranged in a second pocket (15) at the second short side (9), or a hook-and-loop fastening strip (27), and attached to the lamellar element in proximity to the second short side (9).
9. The lamellar element according to any of the preceding claims, further comprising a weight (13) arranged at the first short side (7).
10. The lamellar element according to any of the preceding claims, further comprising a shape stabilizing element (31).
11. A lamellar curtain, comprising a plurality of lamellar elements according to any of claims 1 to 9, mounted on a rod element (35) with the attachment means (17).
12. Use of a lamellar element, according to any of the claims 1-9, or a lamellar curtain, according to claim 10, for reducing sound in a room.
13. Use of a lamellar element, according to any of the claims 1-9, or a lamellar curtain, according to claim 10, for reducing light in a room.









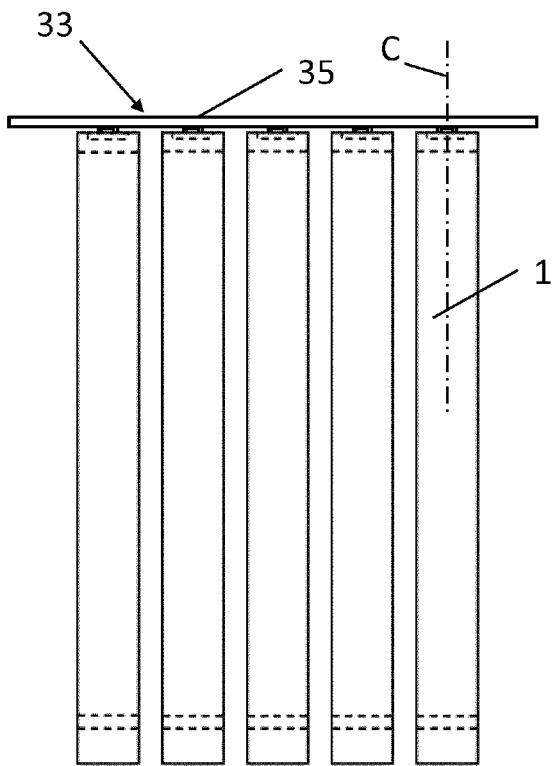


Fig. 5b

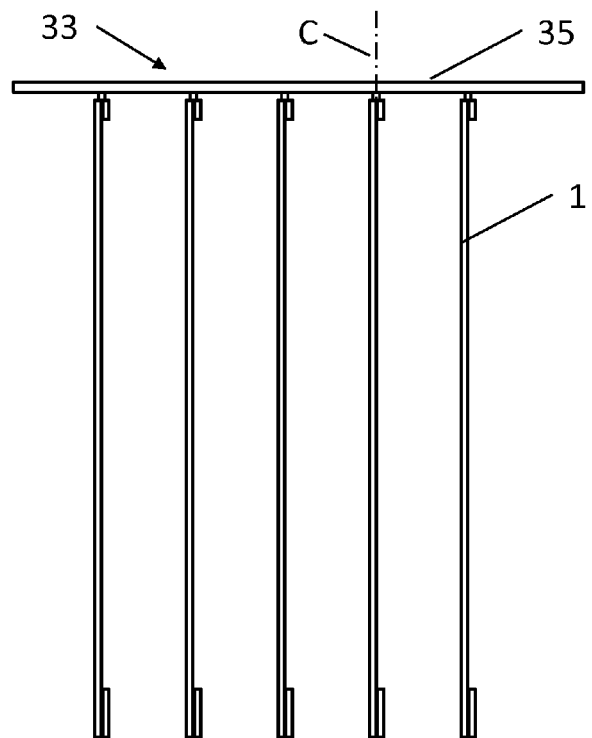


Fig. 5c

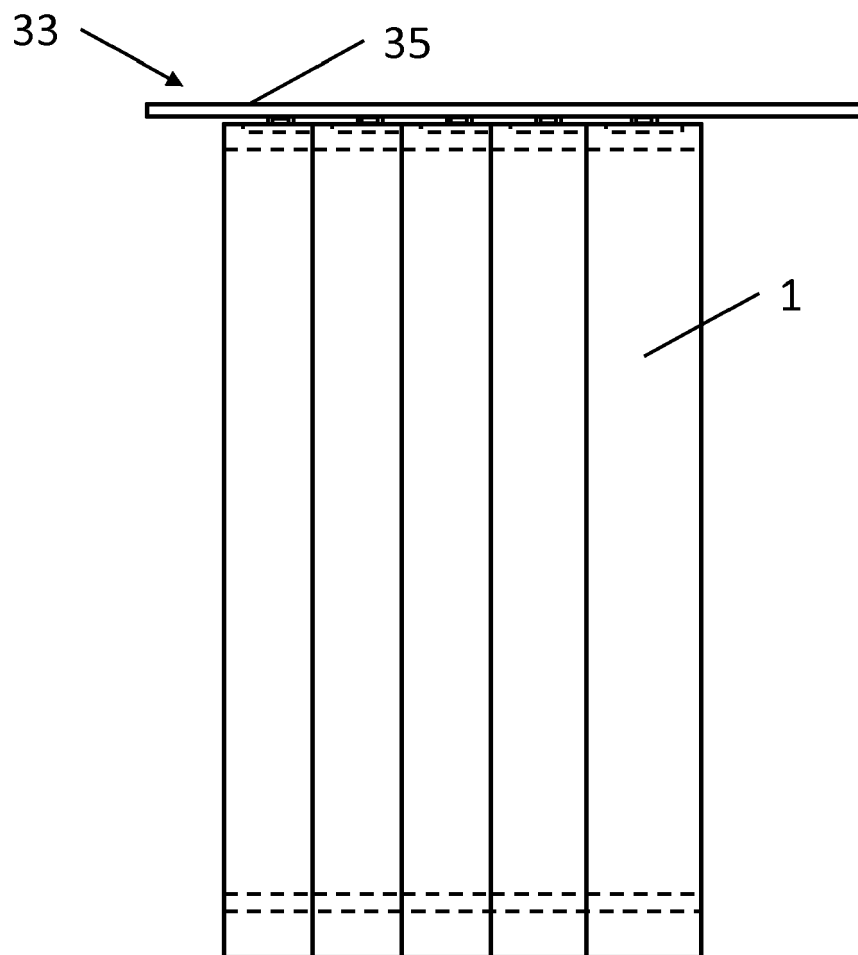


Fig. 5d

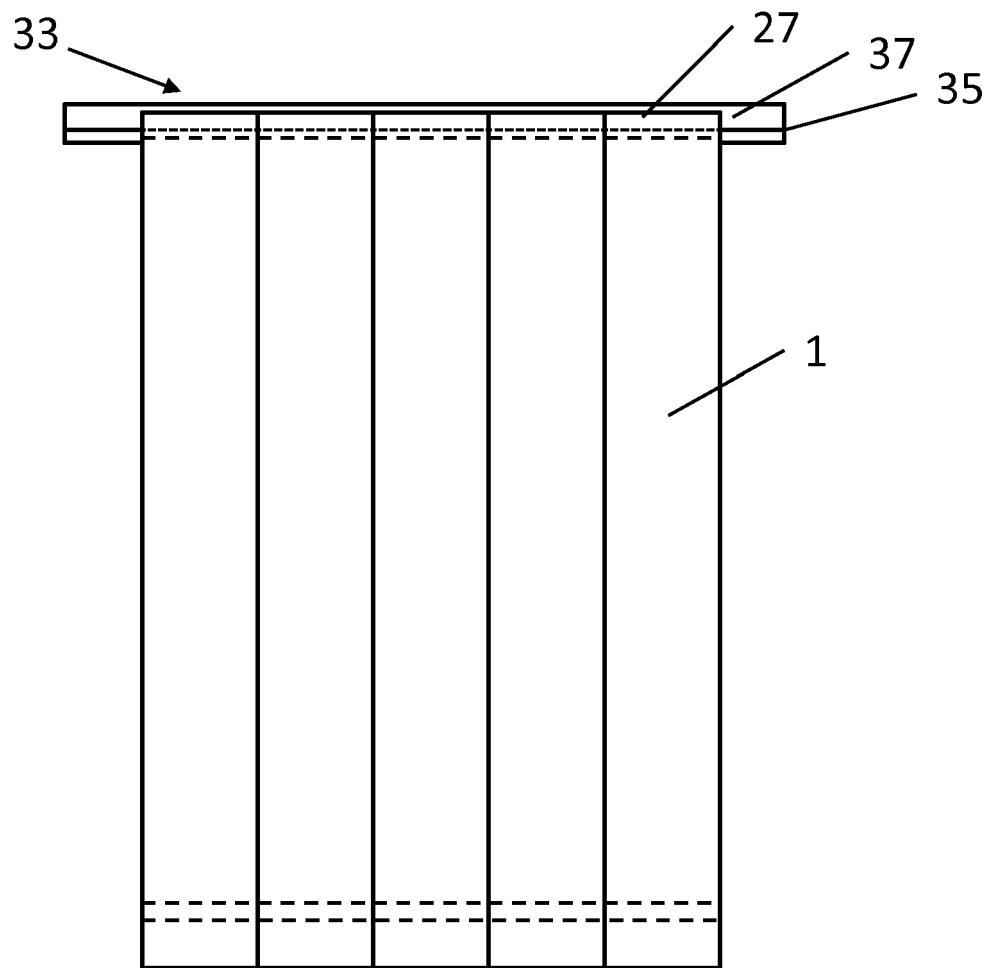


Fig. 6

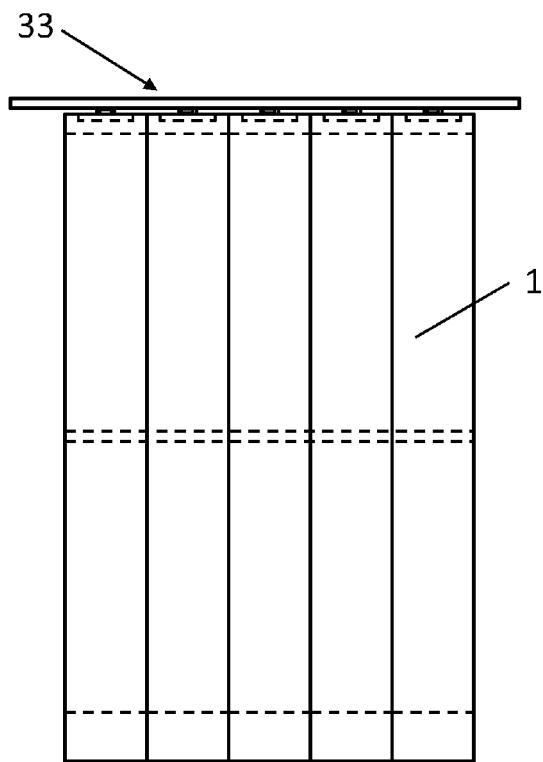


Fig. 7

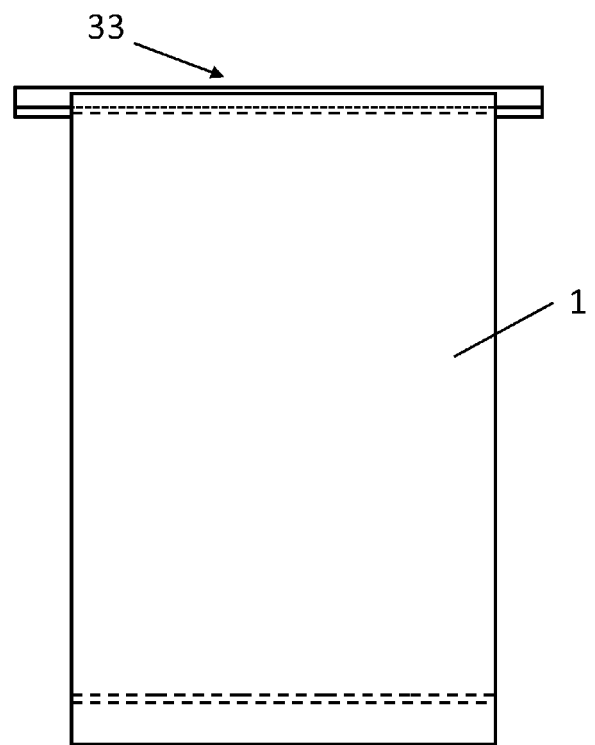


Fig. 8



EUROPEAN SEARCH REPORT

Application Number
EP 13 15 1853

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	NL 2 000 479 C2 (COULISSE B V [NL]) 11 August 2008 (2008-08-11)	1-7,12,13	INV. E06B9/36
Y	* figures 1,2,5a * * page 1, line 32 - line 34 * * page 4, line 23 - line 28 * -----	8-11	E06B9/386
Y	WO 99/11899 A1 (STEYN LOURENS [AU]) 11 March 1999 (1999-03-11) * figures 1,2 * * page 1, line 6 - page 2, line 19 * -----	8-10	
Y	GB 1 374 428 A (LOUVERDRAPE VERTICAL BLINDS LT) 20 November 1974 (1974-11-20) * figures 2-4 * -----	11	
			TECHNICAL FIELDS SEARCHED (IPC)
			E06B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 15 February 2013	Examiner Cornu, Olivier
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 13 15 1853

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The members are as contained in the European Patent Office EDP file on
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15-02-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
NL 2000479	C2	11-08-2008	NONE
WO 9911899	A1	11-03-1999	NONE
GB 1374428	A	20-11-1974	NONE

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