INTELLECTUAL PROPERTY OFFICE OF SINGAPORE
PATENT AGENTS QUALIFYING EXAMINATION 2020

PAPER B: AMENDMENT OF A PATENT SPECIFICATION
8 December 2020, Tuesday
1330 – 1730 hrs

Maximum Time: 4 Hours (includes reading time) Maximum Marks: 100

INTELLECTUAL PROPERTY OFFICE OF SINGAPORE

INSTRUCTIONS TO CANDIDATES

1. This Question Paper consists of 27 pages, including this cover page.

2. Type your answers in English. Answers in any other language will not be marked.

3. You are given one hard copy of the Question Paper. The soft copy of the Question Paper is also provided in the given laptop.

4. Only answers and/or drawings typed or indicated in the Answer Script template provided by the Examination Secretariat will be considered. Candidates should not change the given format of the Answer Script or type in the margin.

5. The information provided in the Question Paper may be obtained from actual situations or modified therefrom for the purpose of this examination. You should accept the facts given in the paper and assume that the prior art given is exhaustive.

6. Your task is to prepare a draft response to the Written Opinion and an advice letter to the client.

7. Your draft response should include any amendments to the claims if necessary. The basis for any amendment proposed to the claims must be indicated. For the purpose of this Paper you do not need to propose any amendments to the description of the Patent Application.

8. In the advice letter to client, you should address any query raised by the client and identify the amendment (s) that give (s) the best protection to the client and give recommendations to client, including the option of using alternatives, if any.

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9. The documents provided in this Question Paper are:
    a. Cover Page (2 pages);
    b. Document A: Letter from Client (1 page);
    c. Document B: Written Opinion (4 pages);
    d. Document C: Client's application Singapore patent application SG 10201911111A (9 pages including drawings);
    e. Document D1: DE 10 2012 123456 (3 pages including drawings);
    f. Document D2: US 5,888,456 (4 pages including drawings); and
    g. Document D3: SG 10201512345X (4 pages including a drawing)

END

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Document A: Letter from Client (1/1)

Dear Patent Attorney,

Thank you for your letter enclosing the Written Opinion from IPOS, and also the documents cited by the Examiner.

I have reviewed the Written Opinion and, to be fair, I believe only D1 looks relevant to our meeting pod – I am not sure how window blinds (D2) and ventilators (D3) are relevant.

When these meeting pods were first designed, they were designed with the view of providing good sound-insulation properties so that meetings within the pod can be carried out without distraction from noise outside the pod. However, given the current coronavirus pandemic and the need for social distancing, these pods have now proven to be very useful in providing a safe meeting environment particularly at business events such as conferences and exhibitions. As such, the sound-insulation properties are not central to us now in contrast to its ability to allow airing of the pod during a meeting when the pod is occupied/unoccupied. As such, I would very much like to get a patent for our pods as I believe demand for them will continue into the future. Do we need to file another application for these “safe meeting environment” pods? The examiner appears to have allowed some claims, so can we just go along with what the examiner has suggested?

I recently attended an industry meeting organised by the Singapore Chinese Chamber of Commerce & Industry and, in conversations I had with people from the F&B industry, it occurred to me that these pods can be used as “COVID-safe” dining pods. Hence, the next question I have is whether is this also something I can capture within my claims as that could be an additional market to reach?

Finally, since we are going to actively market our pods as “COVID-safe”, one thing I noticed is that we do not have any claims to a pod having sanitising units for disinfecting the pod automatically after each use. Such units can be commercially obtained and easily installed. Can I include such claims to preserve this feature?

In any case, I am hoping that you can draft a response and assist with obtaining a clear report.

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Document B: Written Opinion (1/4)

Written Opinion

Application No. 10201911111A

5

Application filing date 30/05/2019	(Earliest) Priority Date 30/05/2018
Applicant: PODS 2 GO Pte Ltd	Applicant's or agent's file reference P.1234/SG
International Patent Classification (IPC) (as indicated in the search report): E04B7/16 A62C2/00 E04B1/82 E04H1/12	

1. This first Written Opinion is issued under Section 29(4) of the *Patents Act* with effect from 14/02/2014.
2. This opinion contains indications relating to the following items:
    i. Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
    ii. Clarity, Clear and Complete Disclosure, and Support
3. The search report used was issued by the Intellectual Property Office of Singapore
4. If no reply is filed, the Examination Report will be established on the basis of this opinion.
5. The date by which the Examination Report will be established is 6/4/2022

Intellectual Property Office of Singapore 1 Paya Lebar Link #11-03 PLQ1, Paya Lebar Quarter Singapore 408533 E-mail address: operation@iposinternational.com	Date of Written Opinion: 6 October 2020 Authorised Officer Lola Koon (Dr)

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Document B: Written Opinion (2/4)

Written Opinion

Application No.
10201911111A

Statement with regard to novelty, inventive step or industrial applicability

Novelty (N)	Claim(s)	4, 6	YES
	Claim(s)	1 to 3, 5, 7 to 8	NO
Inventive Step (IS)	Claim(s)	NONE	YES
	Claim(s)	1 to 8	NO
Industrial Applicability (IA)	Claim(s)	1 to 8	YES
	Claim(s)	NONE	NO

1. Citations:

D1 – DE 10 2012 123456

D2 – US 5,888,456

D3 – SG 10201512345X

2. Novelty (Section 14 of the *Patents Act*)

D1 discloses (text and reference in parentheses applying to this document):

A ceiling panel (roof structure) for a pod room (an enclosed space/room within a building), the ceiling panel comprising one or more cover components (fins) movable between an open configuration and a closed configuration (Figs. 1-3), wherein the one or more cover components are adapted to acoustically insulate the pod room in the closed configuration (implicit that the roof in its closed configuration is forming an acoustical barrier). The one or more cover components comprise a plurality of pivotable louvres (fins) in which the louvres contact one another to define the closed configuration, and non-contacting positions which define the open configuration. The non-contacting positions of the louvres define the open configuration produce a

specified percentage open area (Figs. 1-3). An actuation mechanism (chain drive 13, motor 14) configured to move the one or more cover components from the closed configuration to the open configuration in response to a trigger.

D3 discloses a detection unit (fusible link 35) configured to provide the trigger to the actuation mechanism in response to the detection of a pre-determined condition.

Therefore, all the features of claims 1-3, 5, 7-8 are disclosed.

3. Inventive Step (Section 15 of the *Patents Act*)

Since all the features of claims 1-3, 5, 7-8 are disclosed, they are not inventive. The features of claim 4 and 6 are not disclosed by the cited prior art documents.

However, D2 discloses sound absorptive coatings 16 and 18. Therefore, it is well known to improve the acoustical performance of a louvre structure by providing a low density cladding.

D3 discloses automatic control systems.

Hence, claims 4 and 6 are not inventive.

4. Industrial Applicability (Section 16 of the *Patents Act*)

The present invention can be used in industry, thus, claims 1 to 16 are industrially applicable.

5. Clarity and Support (Section 25(5)(b) and Section 25(5)(c) of the *Patents Act*)

1. Claim 3 is dependent on Claim 1. The term “louvres” in dependent Claim 3 has no antecedent in Claim 1. In addition, the phrase “specified percentage open area” is unclear, i.e. it does not clearly define the invention.

2. The terms “higher” and “lower” are unclear as they are not relative to defined limits.

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Document B: Written Opinion (4/4)

3. Claim 5 lacks support and clarity because it is not clear how the ceiling panel can comprise the actuation mechanism, and there is no mention of the term “trigger” in the in the description.

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Document C – Singapore Patent Application SG 10201911111A (1/9)

A CEILING PANEL

Technical Field

The invention relates to a ceiling panel for a pod room, and a ceiling system incorporating one or more ceiling panels.

Background of the invention

Fixed partition rooms require planning, building regulation approval, and permanent connections to the infrastructure of the building in which the fixed partition rooms are installed.

On the other hand, pod rooms can conveniently be unpacked, assembled and plugged in.

Summary of the invention

According to a first aspect of the invention, there is provided a ceiling panel for a pod room, the ceiling panel comprising one or more cover components movable between an open configuration and a closed configuration, wherein the one or more cover components are adapted to acoustically insulate the pod room in the closed configuration.

By "ceiling panel", it is meant to comprise a unit or section which is to define part or all of a ceiling or roof of a pod room. The ceiling panel constitutes one of a number of ceiling panels which together form a system, that includes an actuation mechanism for moving said panels. The ceiling panel and their associated cover components move as a result of the actuation mechanism. Further details of the actuation mechanism and how it operates are set out below.

Advantageously, while the ceiling panel provides a guaranteed acoustic performance when in a closed configuration, it can be opened to allow for necessary air flow when required. Alternatively, sound insulation properties aside and when used as part of a system which includes a detection unit, the ceiling panel can be configured to open or close in response to certain pre-determined conditions.

Document C – Singapore Patent Application SG 10201911111A (2/9)

In various embodiments, the cover components comprise louvres that can be pivoted between contacting positions in which the louvres contact one another to define the closed configuration, and non-contacting positions which define the open configuration. The non-contacting positions of the louvres can define the open configuration in terms of a specified percentage open area. The louvres may be slats which are fixed at intervals relative to one another.

In various embodiments, the louvres can be made of a higher density material and a lower density material.

According to a second aspect of the invention, there is provided a ceiling system comprising one or more ceiling panels according to the first aspect of the invention.

In various embodiments, the ceiling system further comprises an actuation mechanism configured to move the one or more cover components from the closed configuration to the open configuration. The actuation mechanism may be configured to bias one or more of the cover components towards the open configuration, and further configured in a first powered state to hold the one or more cover components in the closed configuration against the bias, and in a second unpowered state to allow the one or more cover components to move towards the open configuration under the bias.

In various embodiments, the ceiling system further comprise a detection unit for detecting movement and/or heat.

Brief description of the figures

In the Figures:

Figures 1A, 1 B and 1 C show a round pod room having a ceiling system in a closed configuration;

Figures 2A, 2B and 2C show the pod room of Figure 1 with the ceiling system in an open configuration; and

Figure 3 shows detection units of the ceiling system.

Detailed description of the invention

Figures 1A, 1B and 1C show a pod room 10 having a ceiling system 100 in a closed configuration, and Figures 2A, 2B and 2C show the pod room 10 with the ceiling system 100 in an open configuration. As shown in these figures, the pod room 10 is a round pod, although other suitable shape configurations such as squares or rectangles can be constructed. The ceiling system 100 comprises a plurality of ceiling panels 102, each of which comprises one or more cover components 104 movable between the open and closed configurations.

The cover components 104 comprise a plurality of pivotable louvres that are able to pivot between positions in which the louvres contact and overlay one another to define the closed configuration, as shown in Figures 1A, 1B and 1C, and non-contacting positions which define the open configuration, as shown in Figures 2A, 2B and 2C. In various embodiments, the maximum the louvres can open through is about 90 degrees until they reach a substantially vertical orientation in order to create at least 70% open area in the ceiling system.

In an embodiment, each louvre has about 37mm width, about 12mm thickness and about 37mm pitch. When in the open configuration, these louvres achieve a 67% open area. In an alternative embodiment, each louvre may have about 248mm width, about 40mm thickness and about 207.5mm pitch. When in the open configuration, these louvres achieve a 72% open area. These larger louvres achieve a greater specified percentage open area, but they extend into the space of the pod room and reduce the useable space inside.

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Each louvre may comprise a core made of a higher density material and an outer cladding made of a lower density material. In various embodiments, the higher density material may have a density of at least 500 kg/m^3 and preferably at least 700 kg/m^3. A lower density would include any value below 500 kg/m^3. Either of the higher density or the lower density material may comprise a sound absorbent material having a fractional absorption coefficient of 0.6 or more. Furthermore, either one of the higher density or the lower density material may comprise a sound insulating material. The overlapping portions adjacent louvres are configured to improve the acoustic seal in the closed configuration.

As indicated above, the ceiling panel 102 constitutes one of a number of ceiling panels which together form a ceiling system 100. This ceiling system 100 comprises an actuation mechanism 103, which includes a spring release (not shown) configured to bias the cover components 104 towards the open configuration. The actuation mechanism 103 further comprises an electromechanical actuator (not shown) configured in a powered state to hold the cover components 104 in the closed configuration against the bias of the spring release, and in an unpowered state to allow the spring release to move the cover components 104 towards the open configuration.

In addition, the ceiling system 100 may further comprise a detection unit configured to respond to the detection of a pre-determined condition by cutting power to an actuation mechanism of one or more of the ceiling panels 102, causing the actuation mechanism to enter the unpowered state, and allowing the spring release to move the louvres 104 to the open configuration.

For example, with reference to Figure 3, the detection unit comprises a smoke detector 116 configured to respond to the detection of smoke. In another example, the detection unit comprises a movement detector 118 configured to respond to the detection of an presence/absence of movement in the pod room 10. For example, the movement detector 18 can be configured such that the louvres may be closed when the movement detector 118 senses movement of people in the pod room 10 to acoustically insulate the room. Alternatively, movement detector 18 can be configured such that the louvres may be opened when the

movement detector 118 senses movement of people in the pod room 10. In such a scenario, the movement detector 118 cuts the power and the louvres will automatically open by means of the spring release. In a further example, the detection unit comprises a heat detector 120 configured to respond to the detection of a temperature within the pod room 10 reaching a pre-determined threshold.

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Claims

1. A ceiling panel for a pod room, the ceiling panel comprising:
one or more cover components movable between an open configuration and a closed configuration, wherein the one or more cover components are adapted to acoustically insulate the pod room in the closed configuration.

2. The ceiling panel according to claim 1, wherein the one or more cover components comprise a plurality of pivotable louvres, the louvres being pivotable between contacting positions in which the louvres contact one another to define the closed configuration, and non-contacting positions which define the open configuration.

3. The ceiling panel according to any one of claims 1 or 2, wherein the non-contacting positions of the louvres which define the open configuration produce a specified percentage open area.

4. The ceiling panel according to any one of the preceding claims, wherein the cover component comprises a core made of a higher density material and an outer cladding made of a lower density material.

5. The ceiling panel according to any one of the preceding claims, further comprising an actuation mechanism configured to move the one or more cover components from the closed configuration to the open configuration in response to a trigger.

6. The ceiling panel according to claim 5, wherein the actuation mechanism is configured to bias one or more of the cover components towards the open configuration, and further configured in a first powered state to hold the one or more cover components in the closed configuration against the bias, and in a second unpowered state to allow the one or more cover components to move towards the open configuration under the bias.

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7. A ceiling system comprising one or more ceiling panels according to any one of the preceding claims.

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8. The ceiling system according to claim 7, further comprising a detection unit configured to provide the trigger to the actuation mechanism in response to the detection of a pre-determined condition.

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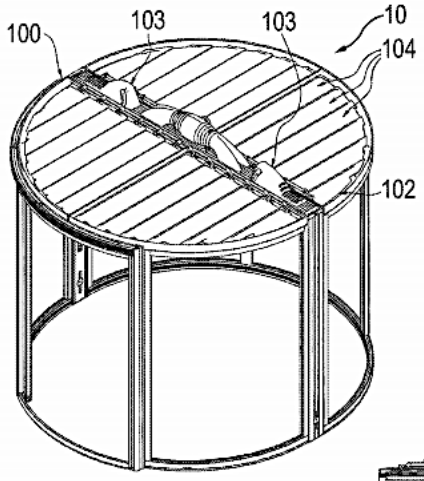

FIG. 1A

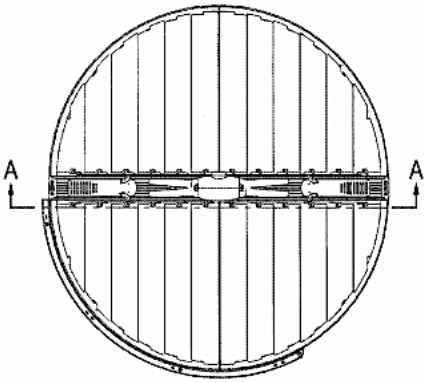

FIG. 1B

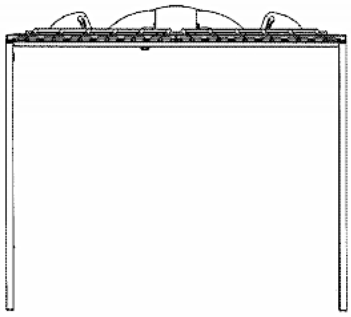

FIG. 1C

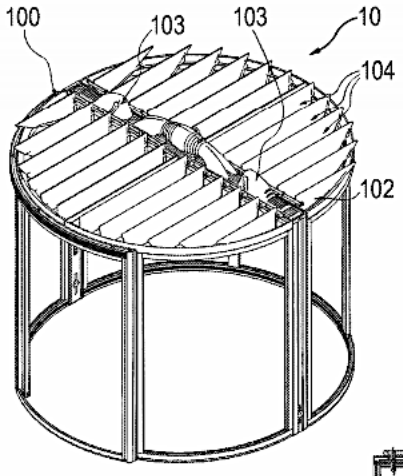

FIG. 2A

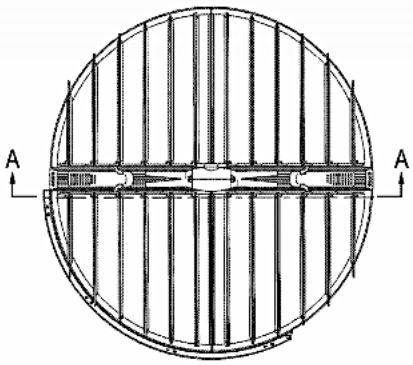

FIG. 2B

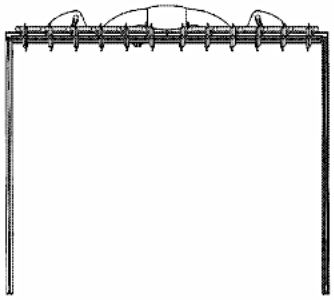

FIG. 2C

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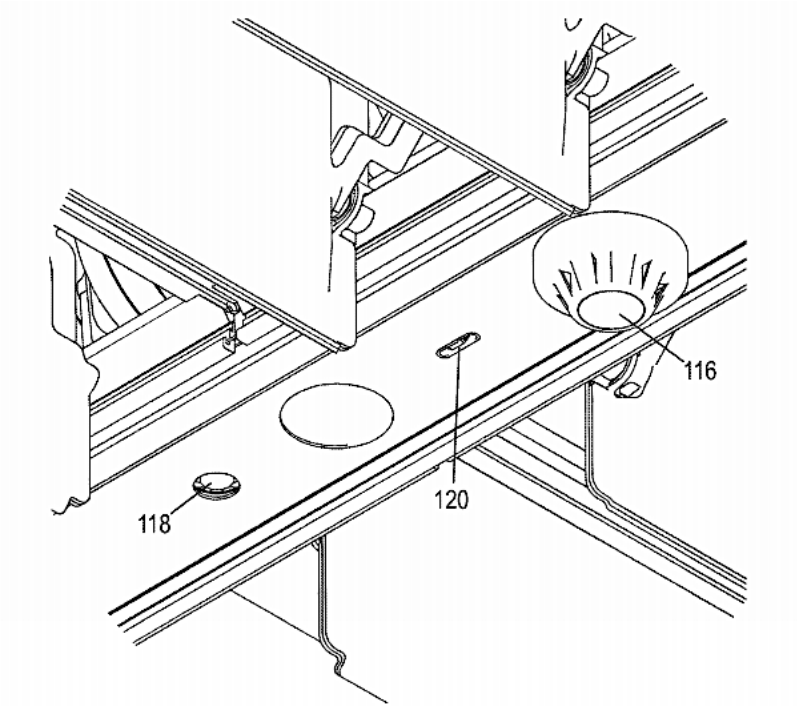

FIG. 3

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Document D1 – DE 10 2012 123456 (1/3)

Priority date: 29 October 2010

Filing date: 14 March 2011

Publication date: 29 April 2012

ROOF STRUCTURE FOR A BUILDING INTERIOR

The invention relates to a roof structure for a building interior. In particular, the roof structure can be configured between opened and closed configurations, and is useful in emergency situations that require the roof structure to open and allow air to flow into the interior of the building. As such, the roof structure of the invention may be used together with a fire protection system, such as a sprinkler system, which can be activated in response to such an emergency.

In various embodiments, the roof structure comprises a plurality of parallel fins that are rotatably supported about an axis and by rotation, or tilting of the fins, the roof structure can be configured between opened and closed configurations where the opened configuration exposes the building interior. In the closed configuration, the plurality of parallel fins partially overlap each other to form a closed sealed surface. When rotated in a vertical position, the roof will achieve a maximum opening arrangement. In various embodiments, when in the vertical position, the plurality of parallel fins can slide and stack against each other at an end to create a fully opened roof structure.

The plurality of parallel fins may be rotated by any suitable means, for example by an electric motor, or even rotated mechanically (not fully powered), by manually unlocking a spring-loaded mechanism and operating a crank to rotate the fins.

In order that the invention may be fully understood and readily put into practical effect, there shall now be described by way of non-limitative examples only preferred embodiments of the invention, the description being with reference to the accompanying illustrative figures.

Figs. 1, 2 and 3 show a side view of the roof structure in accordance with an embodiment of the invention.

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Document D1 – DE 10 2012 123456 (2/3)

With reference to Fig. 1, a plurality of parallel fins 1 are disposed at the roof of a building 7. The fins 1 are rotatably supported about an axis 21 parallel to a longitudinal axis. Fig. 1 shows the parallel fins 1 in a closed configuration. Such a configuration, the parallel fins 1 partially overlap each other to form a closed sealed surface. By rotation, or tilting of the fins 1, the roof structure of the building 7 can configured to open or close.

The skilled person will appreciate that the amount of rotation of the fins 1 can be adjusted to achieve any desired amount of exposure of the building's interior, i.e. the fins 1 may be rotated at a slight or small degree to result in a slight open gap between the fins 1 or, as can be seen in Fig. 2, be rotated vertically for maximum opening.

The plurality of parallel fins 1 can slide and stack against each other 3 at an end of the building 7 to create a fully opened roof structure as shown in Fig. 3. The parallel fins 1 are connected to a chain 13. For simplicity, only one connection is shown on vertical fin 1' to the chain 13 in Fig. 2. The chain 13 may be driven by a motor 14. When activated, the motor 14 will cause the chain 13 to moves vertical fins which collect and are stacked in place at one end of the building 7 for storage.

The use of fins 1 has the advantage, that the opening of roof structure can be carried out quickly. Further it is also possible, by selecting the position of the axis of the fins 1, the amount of exposure of the roof can be achieved.

[Claims are omitted]

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Document D1 – DE 10 2012 123456 (3/3)

Fig.1

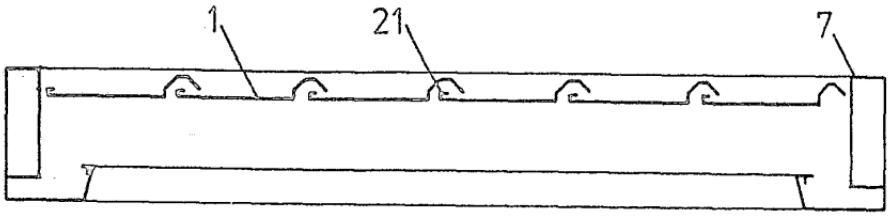


Fig.2

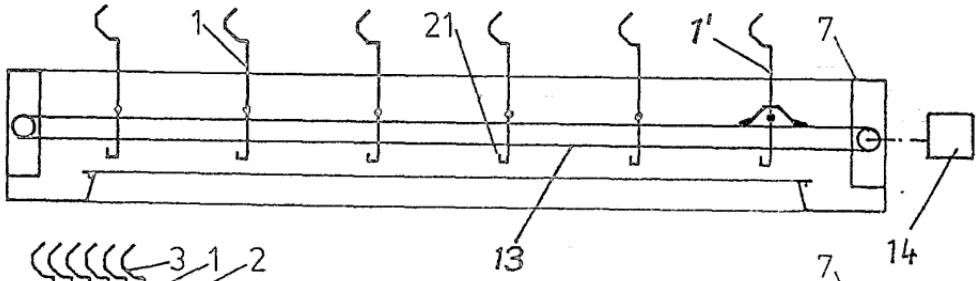
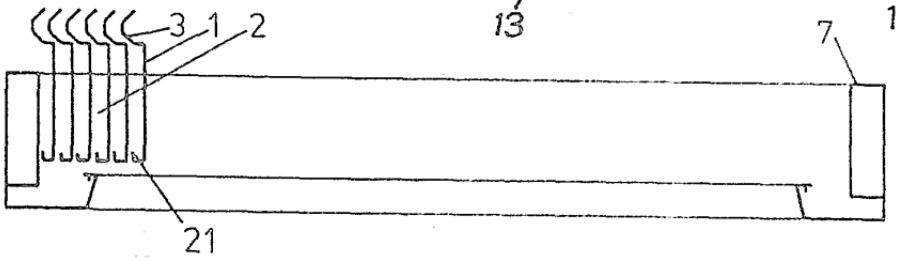


Fig.3



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Document D2 – US 5,888,456 (1/4)

Priority date: 14 August 2016
Filing date: 14 December 2016
Publication date: 14 February 2018

SOUND ABSORBENT SLATS FOR WINDOW BLINDS

Technical Field

This invention relates to slats for use in commonly known constructions of Venetian blinds, such blinds including two or more ladder tapes or cords which support the slats in a generally horizontal attitude, provision being made for adjusting the ladder tapes to change the attitude of the slats between a generally horizontal position and a generally vertical position. The actual mechanical construction of such blinds is well-known in the art, and forms no part of this invention, the invention being directed to the manner of formation of the slats to be incorporated into such a Venetian blind construction, or, into any commonly known construction of vertical blind.

Background of the invention

It is known to form slats for Venetian blinds or vertical blinds from continuous strips of aluminium or plastics material, or coated paperboard material.

However, the employment of such techniques results in an axially continuous surface of the strips which has an aesthetically austere appearance, and also, one which is quite highly reflective to both light and sound. This can manifest itself in dazzle due to high reflection when sun strikes the slats, and, an increase in the noise level in rooms employing such Venetian blinds.

Summary of the invention

This invention relates to such strip material as employed as slats in window blinds, and has for its object to provide slats produced in strip form, which not only have an enhanced aesthetic appearance, but which are also capable of dissipating reflected light or sound.

Document D2 – US 5,888,456 (2/4)

While the dissipation or reflected light can be enhanced to some extent by texturing the strip material, by embossing it prior to the painting thereof in order to produce a textured surface, this in no way will enhance the sound dissipation characteristics of the strip material.

In order to overcome these disadvantages, and, in accordance with the present invention, the strip material is coated on one or both of its faces with a sound absorbent material which is adhesively or mechanically bonded to the surface of the strip.

Furthermore, the blind according to the present invention serves to not only provide a sound insulating effect but also provide a temperature-holding and heat-insulating effect as well as a light-controlling effect, owing to the materials used in the laminate.

Detailed description of the invention

In order that the invention may be fully understood and readily put into practical effect, there shall now be described by way of non-limitative examples only preferred embodiments of the invention, the description being with reference to the accompanying illustrative figures.

FIG. 1 is a perspective view illustrating the manner in which a large sheet of substrate material can be cut into strips for use in the assembly of a window blind;

FIG. 2 is a cross-section of one of the strips showing appliques applied to both faces of the strip; and

FIG. 3 is a cross-section similar to that of FIG. 2 and showing an alternative manner of encapsulating the strip material.

The strips can be formed, as illustrated in FIG. 1, by shearing individual strips 10 from a large sheet of material 12 having a length or width of the selected width of the Venetian blind to be assembled.

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Without regard to whether the strips are supplied in continuous coil form, or, they are supplied in discrete strip form, the coating or encapsulation steps of the present invention can be performed prior to the supply of the strips to the jobber.

In FIG. 2, the light and sound absorptive coatings 16 and 18 are shown as appliqued to the strip, and secured thereto by any suitable bonding material. If the strip 10 is in continuous coiled form, then, the respective coatings 16 and 18 similarly can be in continuous strip form and be appliqued to the strip 10 during or immediately prior to the coiling of the composite strip. This will place the respective coatings 16 and 18 under compression, thus further assisting in the bonding of those facings to the strip 10. Alternatively, the facings 16 and 18 can be applied to a large sheet 12 and bonded thereto prior to the cutting of the sheet into strips 10 as discussed with respect to FIG. 1. This will have the advantage that, if the surfacings are patterned, the respective strips 10 emerging from the cutting operation will be pattern matched, and can be assembled into a pattern matched configuration by the jobber.

Numerous materials suggest themselves as materials suitable for use as the surfacings 16 and 18. They could, for example, be a thin felt, or a woven material, or of a foamed plastics material, or of natural or synthetic leather having either a polished or a suede finish on its outwardly presented surface. Also, and as will be appreciated, the respective surfacings 16 and 18 may themselves be comprised of a laminate, for example, of a printed plastics material facing and a foam plastics material substrate.

If the covering material is capable of being thermally formed, then, the modification of FIG. 3 can be employed. In FIG. 3, the surfacings 16 and 18 of a suitable thermo-formable plastics material are applied and bonded to the respective opposite faces of the strip 10, the surfacings being of greater width than that of the strip 10. The lateral edges of the surfacings 16 and 18 then can be welded to each other, for example, by electrosonic welding techniques for them to completely encapsulate the strip 10.

[Claims are omitted]

PAPER B: AMENDMENT OF A PATENT SPECIFICATION
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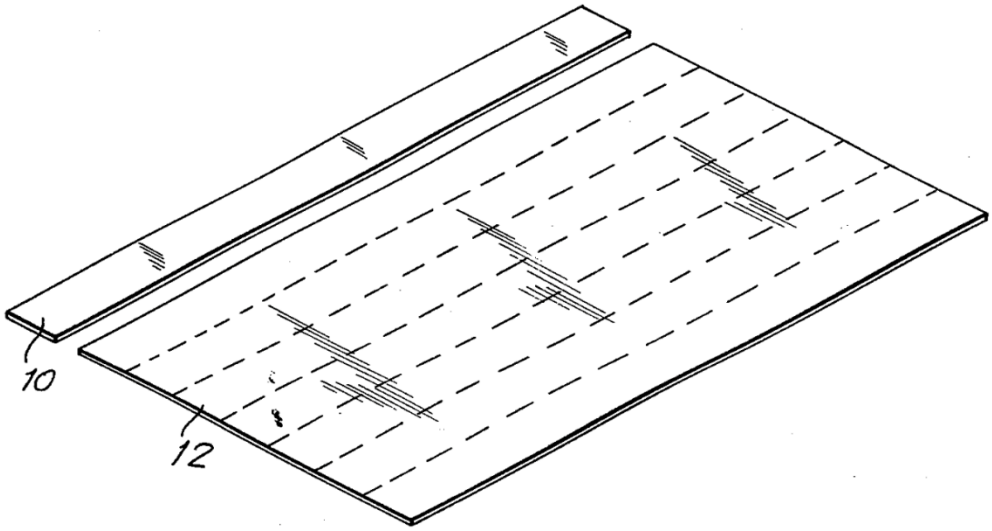

Fig 1

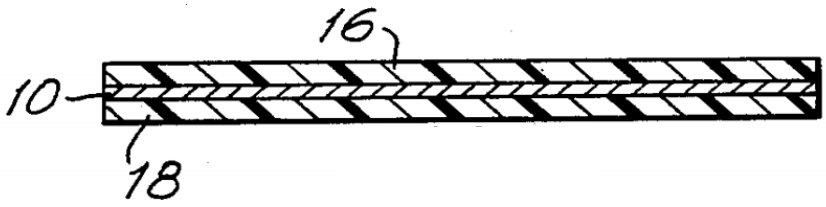

Fig. 2

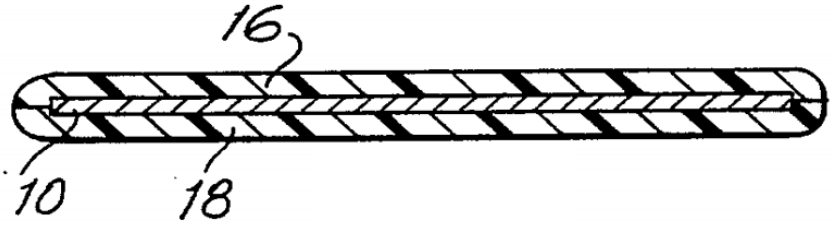

Fig. 3

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IMPROVEMENTS IN VENTILATORS

The present invention comprises improvements in ventilators and concerns controllable, fire ventilators which are required to open automatically in response to a fire condition, to vent heat, smoke and/or gases from a building, and to provide selectable day-to-day ventilation upon the operation of suitable controls.

Such ventilators customarily employ opening means such as a spring or springs, or weights, normally urging the ventilator to open, and releasable retention means releasable in response to the onset of a fire condition, and normally holding the ventilator closed. In this manner, it is ensured that the ventilator opens automatically in an emergency, i.e. when it is required to act as a fire ventilator. To enable the ventilator to be selectively controlled for day-to-day ventilation purposes, the retention means is most conveniently incorporated into the day-to-day ventilator controls and conventionally takes the form of a fusible link which parts at a predetermined elevated temperature to sever the controls and allow the ventilator to open under the action of its opening spring or springs or its opening weight.

In use of a ventilator of this general kind, a problem sometimes arises in that a failure of the day-to-day controls allows the ventilator to open unnecessarily, such as to permit the escape of warmth from the building and perhaps more seriously to allow rain water to enter the building and spoil articles, such as merchantable goods, stored in the building.

To mitigate this problem, the present invention provides a controllable fire ventilator as hereinbefore described having dual day-to-day controls each capable of holding the ventilator closed, one of the controls being operable to move the ventilator from an open to its closed position, and both controls being operable to allow the ventilator to open.

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Preferably, the dual controls are arranged in tandem and preferably also, the controls are powered controls, each having its own power source.

Specific embodiments of the present invention will now be described by way of example with reference to the accompanying FIG. 1 which is a cross-section of a ventilator according to the present invention incorporating dual controls.

The ventilator of the present invention is of the louvred type comprising a frame 10 defining a ventilation opening 11 controlled by a bank of pivotable louvres 12 movable between a closed position, closing the ventilation opening 11 of the ventilator, and an open position allowing the exhaust of heat, smoke and fumes through the ventilation opening.

The louvres 12 are each pivoted to the frame 10 as at 14, for opening and closing movement, in unison, by movement of control bars (not shown) under the action of opening springs 13 connected between the frame 10 of the ventilator and a control linkage member 16 interconnecting the control bars.

The essential feature is to have an opening spring or springs connected between the frame and the control linkage at a suitable point or points. Of course, as is equally well known the control linkage may incorporate instead of an opening spring or springs, an opening weight, the weight, when released, moving under gravity to open the ventilator.

The louvred ventilator has dual ventilator controls each capable of holding the ventilator closed. The dual ventilator controls are capable of holding the ventilator closed and may be pneumatically and electrically powered controls. The pneumatically powered control, which could be substituted with an hydraulically powered control or a manual control, takes the form of a pneumatic piston and cylinder unit 20 mounted on the framed 10, the cylinder of which is supplied with compressed air to close the ventilator, the piston then moves the control linkage member 16 via a control cable 22 connecting the piston rod 21 with the member 16, the cable passing around a pulley 24.

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If the supply of compressed air to the cylinder of the unit 20 should fail for any reason the ventilator would normally be opened by the springs 13.

To prevent this, an electro-magnetic control 30 is provided comprising an electro-magnetic device 31 mounted on the frame 10 and an electro-magnetic keeper plate 33 attached to the cable 22. So long as the electro-magnetic device 31 remains energised, the keeper plate 33 is retained by the device and the springs 13 are not able to open the ventilator.

If the electrical power supply to the device 31 should fail, the ventilator is unable to open so long as compressed air is supplied to the unit 20.

There is a double assurance therefore that the ventilator will not open unintentionally due to a power failure for example.

The piston and cylinder unit 20 may be used to adjust the ventilator to any desired open position between fully open and closed. In order to adjust the ventilator from the closed position to an open position, the electro-magnetic device 31 is de-energised and may be re-energised once the ventilator has been adjusted to an open position in order to hold the ventilator closed once it has been re-closed by operation of the unit 20.

To obtain an automatic opening in response to the onset of a fire condition the cable control incorporates a fusible link 35 that is designed to melt at a specific temperature, thus resulting in the automatic opening.

[Claims are omitted]

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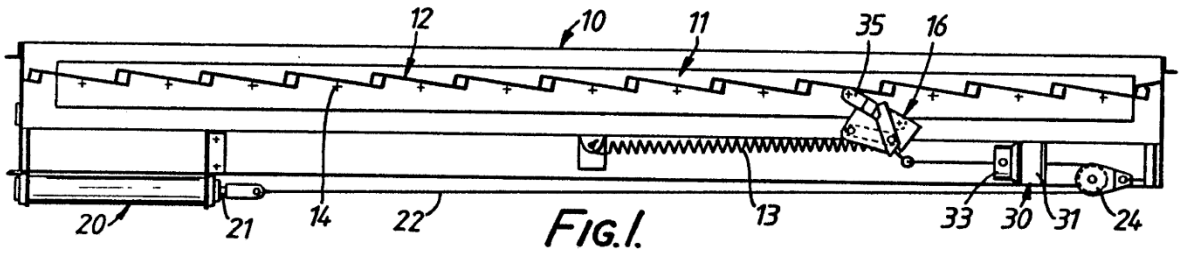

FIG. 1.

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