

(19)



(11)

EP 4 541 430 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
23.04.2025 Bulletin 2025/17

(51) International Patent Classification (IPC):
A62C 2/10 (2006.01) E06B 5/16 (2006.01)
A62C 2/24 (2006.01)

(21) Application number: **23204453.7**

(52) Cooperative Patent Classification (CPC):
A62C 2/10; A62C 2/247; E06B 5/161

(22) Date of filing: **18.10.2023**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
KH MA MD TN

(72) Inventors:
• **WRIGHT, Robert**
Waterlooville PO7 3DU (GB)
• **ROZENEK, Pawel**
Waterlooville PO7 3DU (GB)

(71) Applicant: **Coopers Fire Limited**
Waterlooville, Hampshire PO7 3DU (GB)

(74) Representative: **Schlich**
9 St Catherine's Road
Littlehampton
West Sussex BN17 5HS (GB)

(54) **SIDE GUIDE FOR FIRE AND/OR SMOKE CURTAINS**

(57) A side guide for a fire, smoke, or fire and smoke curtain assembly comprises a channel for fitting into or onto a wall and having a back and two sides sized to guide a bottom bar of a pleated curtain during deployment or retraction. The guide is also provided with a door sized to fit between the sides closing the channel, the door being connected to one side by external sprung hinges for holding the door in a normally open position, and having electromagnets positioned adjacent a second side within the channel or on an inside of the door and corresponding armature plates on an inside of the door or adjacent a second side within the channel for connecting to the electromagnets for holding the door closed against hinges. The electromagnets are provided as normally on, but immediately released on detection of a fire or failure of the electricity supply to enable deployment of the curtain.

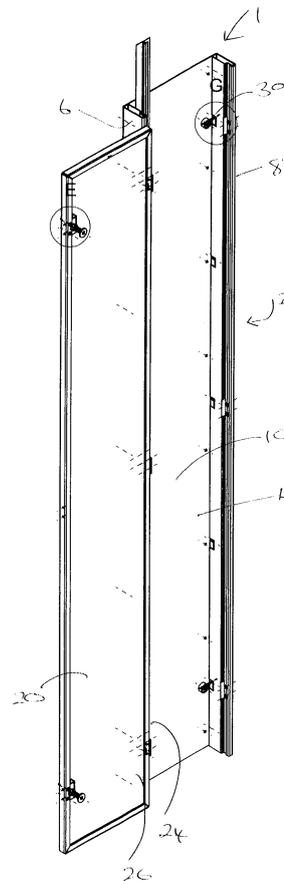


FIGURE 1

EP 4 541 430 A1

Description

Introduction

[0001] The present invention relates to side guides for smoke, fire or fire and smoke curtains.

Background to the Invention

[0002] For channelling smoke from a building towards an exit, for containing fire within a building, or for both, smoke, fire or smoke and fire curtains are often used. As heat and smoke rise, where a curtain is used to restrict and/or direct the flow of smoke, a curtain will not necessarily extend all the way to the floor. However, where the curtain is intended to prevent or at least slow the passage of fire, the curtain must extend to the floor. Whatever the purpose of the fire and/or smoke curtain, it is important that the curtain prevents or at least reduces fire and smoke from passing around its edges.

[0003] Fire, smoke or fire and smoke curtains may be provided on rollers, which are used to hold the curtain when not in use, and from which the curtain can be unwound for use or testing and subsequently rewound. Holding the curtain on a roller protects the curtain from damage during storage and provides for ease of deployment. The speed of rotation of the roller can be controlled to control the speed of descent of the curtain. However, the roller and the mechanism for deploying and retracting the curtain add considerably to the overall weight of the barrier, particularly where a long length of curtain is required, for example in an atrium.

[0004] As an alternative to providing a curtain on a roller, curtains may be pleated for storage, also known as concertina curtains. These with their storage and deployment mechanisms are generally lighter than curtains with rollers and thus can be used in situations where weight is an issue. Such curtains are stored in their pleated state, with loops attached to ends of the pleats through which wires are strung and connected to a bottom bar provided to weight the curtain. The wires are attached to spindles arranged to rotate to control the deployment and retraction of the curtain.

[0005] In order to prevent smoke or fire from passing around the edges of the curtain, unless the curtain is provided as a closed system, and to guide deployment and retraction of the curtain, side guides are provided. Where the curtain is a pleated curtain, the side guide is sized to guide the bottom bar of the curtain, and sufficiently deep to hold the curtain one deployed.

[0006] However, such side guide can be unsightly when the curtain is retracted, and the building is in normal use.

[0007] While a previous attempt has been made to provide a cover for such channels, this has comprised a pair of doors, one from each side, that meet in the middle, and provided with gas struts to open and close them. This is difficult and expensive to manufacture and

provides a risk that the doors will not open and prevent the deployment of the curtain.

[0008] The object of the invention is to provide a side guide for a pleated curtain that is less unsightly.

Summary of the Invention

[0009] According to the invention there is provided a side guide for a fire, smoke, or fire and smoke curtain assembly comprising:-

a channel for fitting into or onto a wall and having a back and two sides sized to guide a bottom bar of a pleated curtain during deployment or retraction;
 a door sized to fit between the sides closing the channel;
 the door being connected to one side by external sprung hinges for holding the door in a normally open position;
 electromagnets positioned adjacent a second side within the channel or on an inside of the door; and
 corresponding armature plates on an inside of the door or adjacent a second side within the channel for connecting to the electromagnets for holding the door closed against hinges; and
 means for controlling the electromagnets to be normally on, but immediately released on detection of a fire or smoke to enable deployment of the curtain.

[0010] When the fire, smoke or fire and smoke curtain is not in use, not deployed and thus in the stored position, the door of the side guide can be closed, presenting a tidy finish to users of the building, and ensuring that the side guide remain free of any debris that may prevent its function and prevent deployment of the curtain.

[0011] Advantageously, the door may be painted or have another surface treatment to match surrounding décor.

[0012] Typically, the springs will be positioned at regular intervals along the one side of the channel. The number of springs provided will in part be dependent on the length of the channel. Preferably, 1-20 springs are provided, more preferably 2 - 15, and most preferably 3-8 springs are provided. Advantageously, the springs are placed outside relative to the channel and door. By placing the springs on the outside, the springs act to move the door away from the channel, leaving the whole width of the channel free for guiding a bottom bar of a pleated curtain. While the springs are visible on the outside of the channel, they are relatively small and not to unsightly. The springs can also be coloured in some way to match surrounding décor.

[0013] Preferably the springs are torsion springs, although other types of spring may be used.

[0014] Usually, the electromagnets are provided within the channel, with the wiring therefor also being contained by the channel. Alternatively, the electromagnets may be provided on the inside of the door. In this case, the wiring will typically be provided along the hinge side of the door

and connected from there to the magnets. The electromagnet or armature plate provided on the inside of the door is provided on a pin sized to ensure that the electromagnet or armature plate on the door can connect with the armature plate or electromagnet in the channel. This ensures that the magnet or armature plate does not take up space within the channel.

[0015] Typically, electromagnets at top and bottom of the guide only are required, although additional electromagnets and armature plates may be provided. Again the number of magnets and corresponding armature plates required will be in part dependent on the length of the channel.

[0016] In accordance with a second aspect of the invention there is provided a fire, smoke or fire and smoke curtain assembly comprising:-

- a fire, smoke or fire and smoke curtain; means for holding the curtain when not deployed and for deploying and retracting the curtain;
- a bottom bar for weighting the curtain for deployment; and
- a pair of side guides of the first aspect, for guiding deployment of the bottom bar.

Detailed Description of the Invention

[0017] To help understanding of the invention, a specific embodiment thereof will now be described by way of example and with reference to the accompanying drawings, in which:-

- Figure 1 is a perspective view of the side guide according to the invention with the door open;
- Figure 2 is a perspective view of the side guide of Figure 1 with the door closed;
- Figure 3 is a perspective view of a hinge on the outside of the door;
- Figure 4 is a perspective view of an armature plate on the inside of the door; and
- Figure 5 is a perspective view of an electromagnet on the inside of the channel.

[0018] The side guide 1 comprises a channel 2 that in use will be fitted into a wall or may be secured onto a wall. The channel is open at its front 4, and is provided with two sides, 6, 8 and a back 10. The channel 2 is sized to guide a bottom bar of a fire, smoke or fire and smoke curtain as the curtain is deployed from the ceiling or an elevated position. The side guide is suitable for use with curtains stored in pleats, otherwise known as a concertina curtain.

[0019] When not in use, when the curtain is retracted and stored, the channel can look unsightly in or on the wall and may collect debris, in particular at the floor, which may block the channel and prevent full descent of the curtain.

[0020] In order to overcome these issues, the channel is provided with a door 20, sized to fit between the sides 6,

8, and provide a closure for the channel 2.

[0021] The door 20 is urged into an open position, in which the door 20 does not hamper access to the channel 2 and thus does not prevent or get in the way of the descent of the bottom bar and curtain in the channel. This is achieved by a plurality of torsion springs 22, the ends of which are attached to the inside 24 of one side 6 of the guide 1, and the inside 26 of the door, with the spring being on the outside 28 of the channel, between the side 6 and door 20.

[0022] Springs 22 are positioned at regular intervals along the height of the door 20 and channel 2, with the number depending on the height of the channel. Typically, 3, 5, 7 or 9 springs will be provided, depending on the height of the door and the spring. For a long channel, for example in an atrium, further springs may be used, for example up to 20.

[0023] The springs 22 thus hold the door in a normally open position.

[0024] In order to close the door 20, electromagnetics 30 are provided. As shown, the electromagnetics 30 are provided adjacent the side 8 of the channel on the back 10 of the channel. The electromagnetics are connected to an electricity supply with wires 32 which run within the side 8 of the guide 1. The magnets are attached directly, or almost directly to the back 10 of the channel 2 to ensure that they take up as little room within the channel as possible and thus do not hamper the descent of the bottom bar. In some embodiments (not shown), the electromagnet may be set into the channel 2 so that the top of the magnet 30 is flush with the back 10 of the channel.

[0025] The electromagnetic are 24Vdc electromagnets, although other similar electromagnetics could be used. It has been found that providing electromagnets adjacent the top and bottom of the door only is sufficient. While one alone would hold the door, providing electromagnets top and bottom ensures that the door can be held "flush" with the sides of the guide for a neater finish. Additional electromagnets can also be used depending on the length of the channel. For example, for a long channel, say from an atrium, additional electromagnets may be used.

[0026] To connect to the electromagnetics 30, armature plates 34 are provided on the inside 26 of the door 20. The plates 34 are provided on threaded studs or pins 36 sized so that the plates reach and can make contact with the electromagnets on the back of the channel 1. Providing the pins as threaded enables their length to be adjusted easily to ensure the correct mating with the electromagnets and thus a flush closure of the door.

[0027] In an alternative, not shown, the electromagnets could be placed on pins on the inside of the door, and the armature plates provided on the back of the channel. However, the arrangement as described will be the most commonly used.

[0028] In a non-alarm or non-test state, the electromagnets 30 will usually be on and powered. In this state, if

a user pushes the door closed, it will remain closed due to the magnetic force of the electromagnet. However, in the event of an alarm or test, the power to the electromagnet will be turned off, releasing the armature plates from the electromagnets, and allowing the force of the spring to fully open the door. Equally, in the event of a power failure within the building, the power to the electromagnetic will be cut, resulting in opening of the door.

[0029] A corresponding system is applied to the curtain. Power is required to maintain the curtain in the retracted position, but in the event of removal of power, either as a result of an alarm being raised, a test being carried out, or power failure for any reason, which may be associated with a fire, the curtain is released and deployed. Its descent is controlled by the bottom bar within the side guide and slowed by friction. Thus, the release of the curtain and the door are controlled by corresponding systems, such that if the curtain is released, the door is also released and opens fully to allow deployment of the curtain.

[0030] The invention is not intended to be restricted to the details of the above-described embodiments. For example, the door may be painted, or any other surface finish applied, to match with the surrounding walls of the building.

Claims

1. A side guide for a fire, smoke, or fire and smoke curtain assembly comprising:-
 - a channel for fitting into or onto a wall and having a back and two sides sized to guide a bottom bar of a pleated curtain during deployment or retraction;
 - a door sized to fit between the sides closing the channel; the door being connected to one side by external sprung hinges for holding the door in a normally open position;
 - electromagnets positioned adjacent a second side within the channel or on an inside of the door; and
 - corresponding armature plates on an inside of the door or adjacent the second side within the channel for connecting to the electromagnets for holding the door closed against hinges; and
 - means for controlling the electromagnets to be normally on, but immediately released on detection of a fire to enable deployment of the curtain.
2. The side guide according to claim 1, wherein the door is painted or has another surface treatment to match surrounding décor.
3. The side guide according to claim 1 or claim 2, wherein the springs are positioned at regular intervals along the one side of the channel.
4. The side guide according to claim 1, claim 2 or claim 3, wherein the springs are outside relative to the channel and door. By placing the springs on the outside, the springs act to move the door away from the channel, leaving the whole width of the channel free for guiding a bottom bar of a pleated curtain.
5. The side guide according to any preceding claim, wherein the springs are torsion springs.
6. The side guide according to any preceding claim, wherein the electromagnets are provided within the channel, with the wiring therefor being contained within the guide.
7. The side guide according to any one of claims 1 - 5, wherein the electromagnets are provided on the inside of the door.
8. The side guide according to any preceding claim, wherein the electromagnet or armature plate provided on the inside of the door is provided on a pin sized to ensure that the electromagnet or armature plate on the door can connect with the armature plate or electromagnet in the channel.
9. A fire, smoke or fire and smoke curtain assembly comprising:-
 - a fire, smoke or fire and smoke curtain;
 - means for holding the curtain when not deployed and for deploying and retracting the curtain;
 - a bottom bar for weighting the curtain for deployment; and
 - a pair of side guides according to any preceding claim, for guiding deployment of the bottom bar.

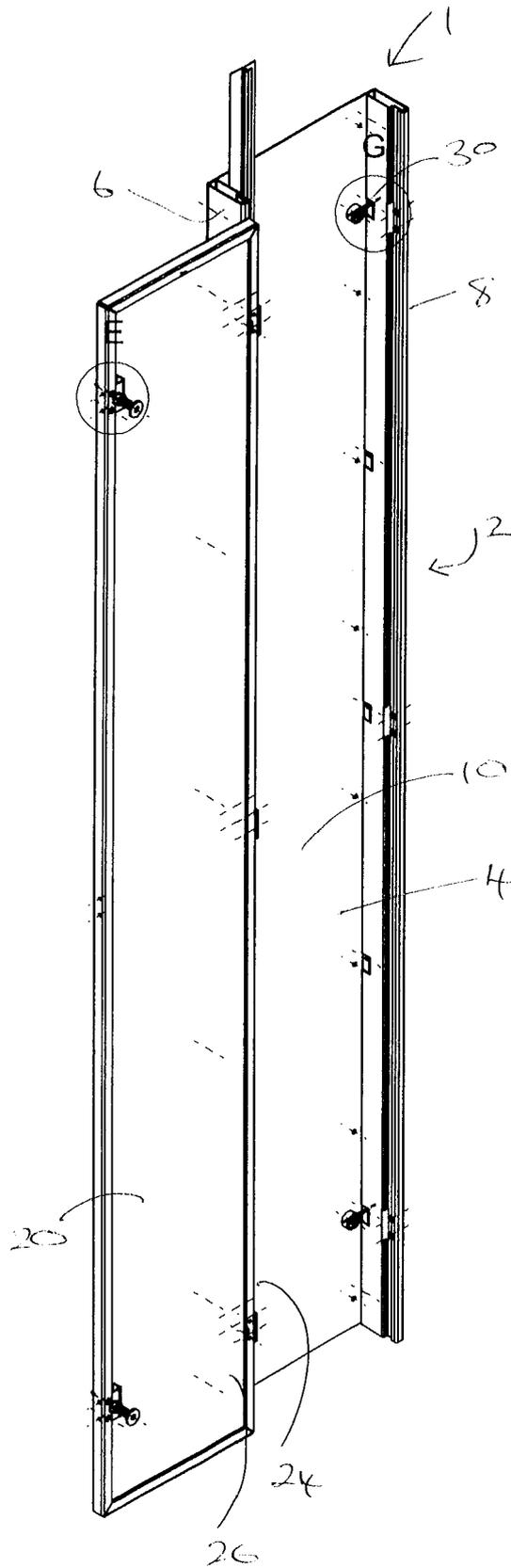


FIGURE 1

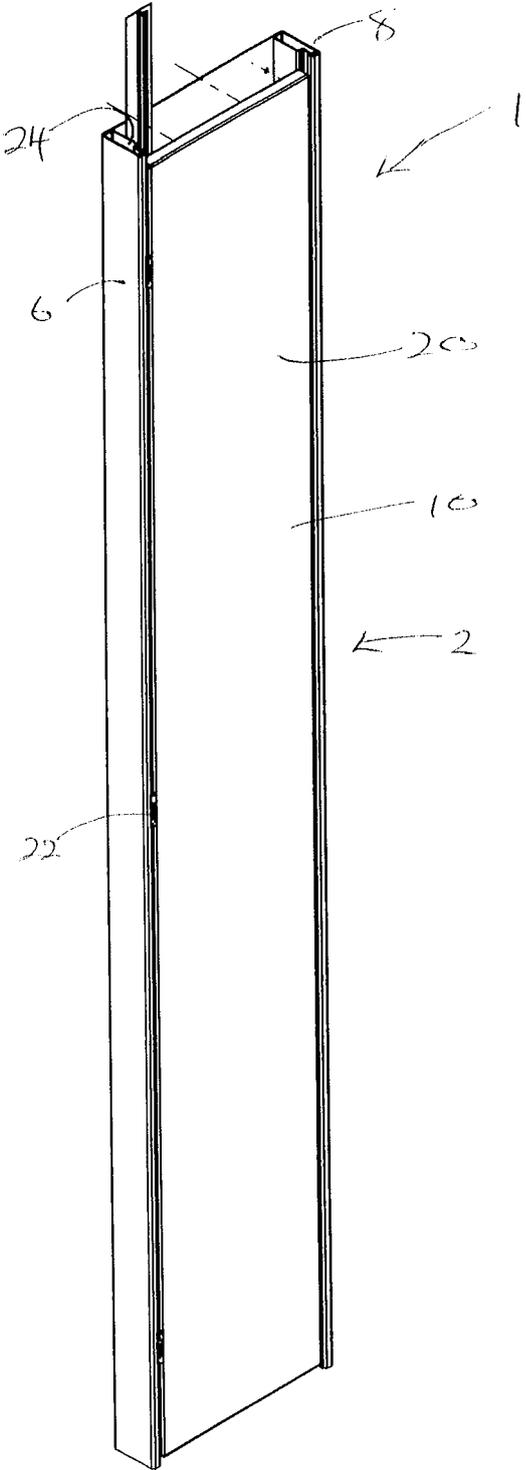


FIGURE 2

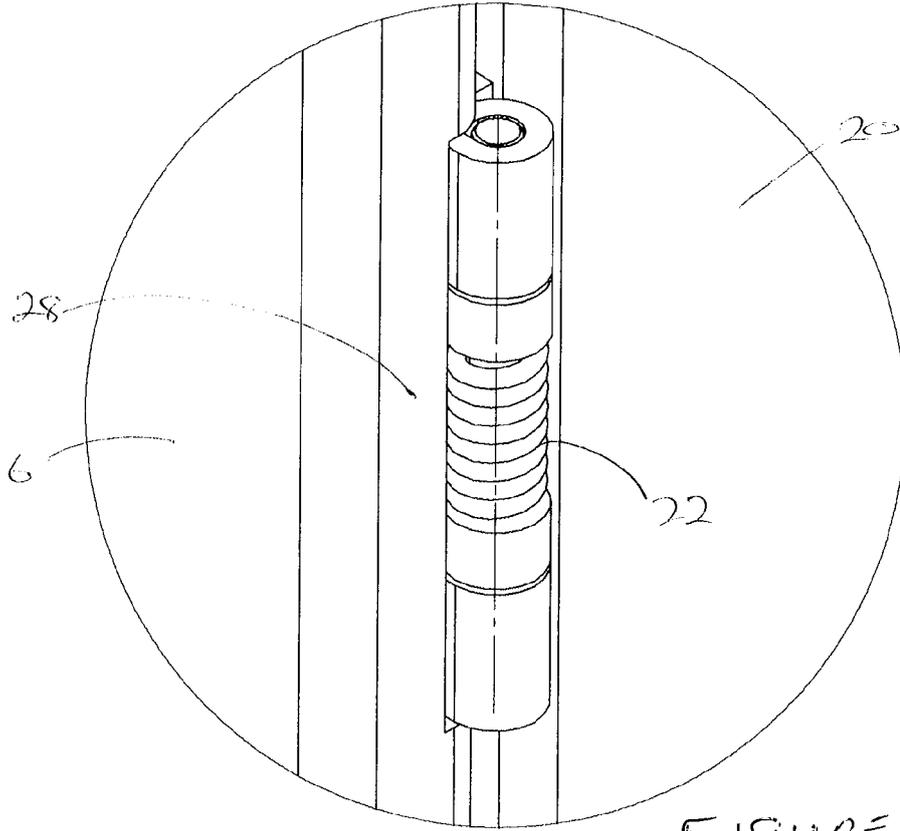


FIGURE 3

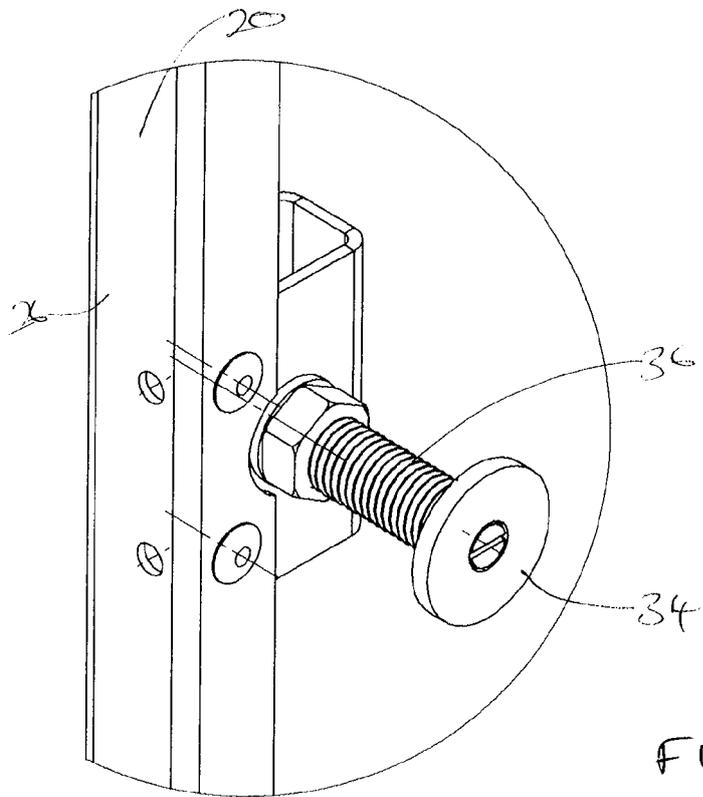


FIGURE 4

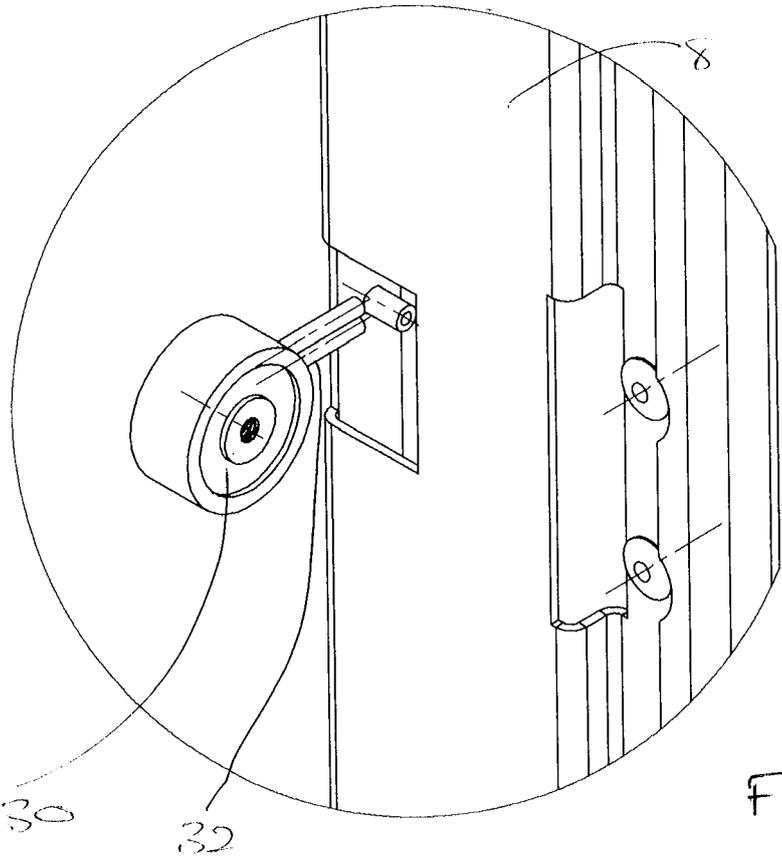


FIGURE 5



EUROPEAN SEARCH REPORT

Application Number
EP 23 20 4453

5

10

15

20

25

30

35

40

45

50

55

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	US 2016/265269 A1 (COOPER ANDREW P [GB] ET AL) 15 September 2016 (2016-09-15)	1-7, 9	INV. A62C2/10 E06B5/16 ADD. A62C2/24
A	* figures 1-6 * * paragraphs [0030] - [0032], [0034], [0036] *	8	
A	----- US 5 848 631 A (DEGIOVANNI FELICE P [US] ET AL) 15 December 1998 (1998-12-15) * the whole document *	1-9	
A	----- US 4 077 474 A (HATTORI TADASHI) 7 March 1978 (1978-03-07) * the whole document *	1-9	
			TECHNICAL FIELDS SEARCHED (IPC)
			A62C E06B
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		19 March 2024	Paul, Adeline
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone		T : theory or principle underlying the invention	
Y : particularly relevant if combined with another document of the same category		E : earlier patent document, but published on, or after the filing date	
A : technological background		D : document cited in the application	
O : non-written disclosure		L : document cited for other reasons	
P : intermediate document	 & : member of the same patent family, corresponding document	

1
EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 23 20 4453

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

19-03-2024

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2016265269 A1	15-09-2016	AU 2014335924 B2	14-09-2017
		CA 2927465 A1	23-04-2015
		DK 3057668 T3	20-11-2017
		EP 3057668 A2	24-08-2016
		ES 2643325 T3	22-11-2017
		GB 2520623 A	27-05-2015
		HK 1223321 A1	28-07-2017
		NO 3057668 T3	20-01-2018
		PT 3057668 T	22-11-2017
		SG 11201602963V A	30-05-2016
		US 2016265269 A1	15-09-2016
		WO 2015055990 A2	23-04-2015
-----	-----	-----	-----
US 5848631 A	15-12-1998	NONE	
-----	-----	-----	-----
US 4077474 A	07-03-1978	AU 1101376 A	18-08-1977
		BR 7600921 A	14-09-1976
		CH 596845 A5	31-03-1978
		DE 2605598 A1	26-08-1976
		FR 2300582 A1	10-09-1976
		GB 1492003 A	16-11-1977
		IT 1053958 B	10-10-1981
		US 4077474 A	07-03-1978
-----	-----	-----	-----

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82