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(54) **Façade window, in particular a smoke window**

(57) An opening and closing system of the window has a remote releasing and locking mechanism of the bolts (5), actuated with the initial phase of the actuator's (8) piston rod (11) stroke, containing at least one slidable pusher (16), movable linearly along the frame (3) of the sash (2), the pusher (16) has an arm (16a), (16b) mating a pin (7) of a slidable slat (4) with a bolt (5), the stroke phase of the actuator's (8) piston rod (11) that actuates the bolts (5) is determined by the length of the guide (13) of the actuator's (8) piston rod (11) articulated joint axle (12) in the yoke (14), whereas the length of the stroke phase of the actuator's (8) piston rod (11) that actuates the bolts (5) corresponds to the length of the linear shift of the bolts (5) enabling them to be released or interlocked within the catches (6).

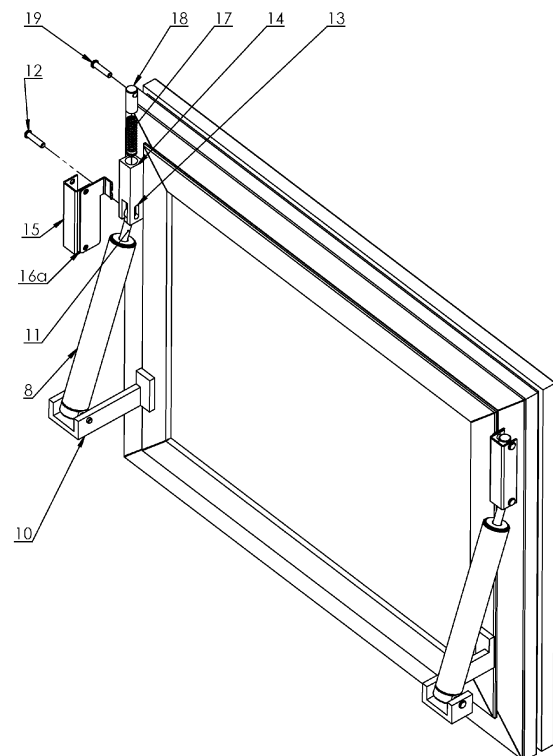


FIG. 11

EP 2 706 178 A1

Description

[0001] The invention concerns a façade window, in particular a smoke window, provided with a remote system for opening, closing and interlocking in the closed position. The window is designed in particular for using together with a smoke or temperature increase detecting system.

[0002] Different variants of smoke extractor closing panels are known, the most of them are designed for roof openings and mounted in horizontal position. A solution known from description GB 2 112 282 may be used to close a window in the vertical wall of the building. A smoke vent is presented which can be automatically opened when smoke is detected, and which can be closed by the application of air pressure to a pneumatic system. The pneumatic system includes a cylinder pivotally connected to a glazed sash mounted to pivot about a horizontal axis in the frame. The glazed sash is locked in the closed position by a pneumatic lock comprising a ball in a pneumatic cylinder. The ball cooperates with a recess in a latch member on the glazed sash. So long as air pressure is maintained in the supply line, the sash will remain locked by the ball in the closed position. If the air pressure in the supply line is removed and this line is connected to exhaust, the locking action of the ball will be released and the sash will be opened by the action of the spring.

[0003] A device for remote leaning out and locking in the closed position of a mobile frame, in particular a smoke flap or a window sash is known from description EP 2 119 854. The device consists of a linear actuator and a lock. The linear actuator is connected with a stationary and a mobile articulated joint between a stationary frame and a mobile frame in the plane perpendicular to the axis of inclination of the mobile frame. The lock comprises a stationary member and a mobile member secured respectively to both frames and interlocked in the closed position by a bolt controlled mechanically by the linear actuator movement at the final section of its stroke. The bolt of the lock constitutes a pin of the mobile joint guided by the linear actuator in the guide made in the mobile member. The mobile member has a spring loaded pawl, which holds the bolt in the extreme outer point of the guide, and has a releasing mandrel, which mates the bumper of the stationary member by lifting the pawl and releasing the bolt during the pressing down and locking phase of the mobile frame and during mounting of the bolt in the socket of the stationary member in the extreme inner point of the guide.

[0004] The aim of the invention is to introduce a system for remote actuating of the window provided with a peripheral interlocking unit by moving bolting slats situated around the sash frame.

[0005] The façade window, in particular a smoke window, comprises a window frame seated in a window opening and a movable sash secured in the window frame. The sash has slidable slats situated at least on a part of the periphery of the frame of this sash, with bolts

mating catches in the window frame thus interlocking the sash in the window frame in the closed position. The window is provided with an opening and closing system.

[0006] According to the invention the remote window actuating system is fitted with an executive member - a pusher, mating the bolts in order to unlock and lock the lock. The pusher is driven by an actuator, which performs two functions. One phase of the actuator's stroke - the first phase when the window is opened - unlocks the lock and enables the window to be opened, which is executed by the second phase of the actuator's stroke. When the window is being closed - the actuator's stroke causes the sash to move to the closed position and at the same time prepares the lock interlocking mechanism to operate after the actuator operation has been completed.

[0007] The essence of the solution according to the invention consists in that the window has a mechanism for remote releasing and interlocking of the bolts, actuated with the initial phase of the actuator's piston rod stroke, containing at least one slidable pusher which can be moved linearly along the sash frame.

[0008] The pusher has an arm mating the pin of the slidable slat provided with the bolt. The pusher is connected to a slide mounted on the axle of a yoke secured to the sash frame or to the window frame. The actuator's piston rod is connected in an articulated joint to the axle, the actuator being secured to the window frame or the sash frame and opening or closing the sash. The axle is slidably movable in a longitudinal yoke guide. The slide is pressed down to its extreme position towards the actuator with a spring seated in the yoke hole and interlocked with a bumper.

[0009] The piston rod stroke phase that actuates the bolts is determined by the length of the guide of the actuator's piston rod articulated joint axle in the yoke. The piston rod stroke that actuates the bolts corresponds to the length of the linear shift of the bolts enabling them to be released or interlocked with the catches.

[0010] During opening of the window the bolts are unlocked in the initial phase of the actuator's piston rod stroke under the influence of the force exerted by the piston rod compressing the spring. After opening of the sash the bolts are shifting back under the influence of the force exerted by decompressing spring.

During closing of the window the bolts are shifting to the unlocking position in the final phase of the actuator's piston rod stroke in order to enable complete closing of the sash. After closing of the window the bolts are shifting back under the influence of the force exerted by the decompressing spring.

[0011] The actuator's housing is secured in a holder to the window frame or to the sash frame, in addition for an inward opening window the yoke with the slide is secured to the window frame, and the actuator's housing - to the sash frame, whereas for an outward opening window - they are secured the other way round.

[0012] The pusher is guided in a slot between the sash frame and the window frame. For an inward opening

window the pusher arm acting on the bolt is bent about an angle, whereas for an outward opening window - the arm is straight and offset. The pusher may constitute a monolithic slide profile. The slide constitutes a yoke cover.

[0013] The supply system for an outward opening window has pneumatic angular joints situated on angular connections of the frame sides equipped with air ducts and holes with sealing couplings.

The supply system for an inward opening window has pneumatic hinged joints situated on angular connections of the frame sides consisting of two parts pivot mounted on the axle, equipped with air ducts and holes with sealing couplings.

[0014] The actuator constitutes a pneumatic, hydraulic or electrical cylinder.

The window opening and closing unit is controlled manually - with a pneumatic, hydraulic or electrical control system, or automatically with a pneumatically, hydraulically or electrically controlled central unit.

The window opening and closing unit is controlled with a system for smoke, high temperature or radiation frequency detection.

[0015] The introduction of a bolt lock to a smoke window allows the sash frame to be fully pressed against the window frame and its tight locking. A solution like this ensures good thermal insulation of a façade window. The solution according to the invention enables a remote opening and closing system to be applied for a multipoint peripheral window interlocking unit.

[0016] The solution according to the invention is presented in the embodiment shown in the drawings, where individual figures present:

Fig. 1 - an inward opening window in a perspective view,

Fig. 2 - an inward opening window in a front view,

Fig. 3 - a drive mechanism of an inward opening window in the longitudinal cross-section A-A of Fig. 2, in closed position,

Fig. 4 - a drive mechanism of an inward opening window in the longitudinal A-A cross-section of Fig. 2, in initial opening position,

Fig. 5 - a drive mechanism of an inward opening window in the partial cross-section B-B of Fig. 2,

Fig. 6 - an outward opening window in a perspective view,

Fig. 7 - an outward opening window in a front view,

Fig. 8 - a drive mechanism of an outward opening window in the longitudinal cross-section D-D of Fig. 7, in closed position,

Fig. 9 - a drive mechanism of an outward opening window in the longitudinal cross-section D-D of Fig. 7, in initial opening position,

Fig. 10 - a drive mechanism of an outward opening window in the partial cross-section F-F of Fig. 7,

Fig. 11 - a drive mechanism and its components in an exploded view,

Fig. 12 - a part of the window in section perspective view, with locking mechanism, without a window frame but with its catches,

Fig. 13 - an angle pusher in a perspective view,

Fig. 14 - an offset pusher in a perspective view.

[0017] The window comprises a window frame 1 seated in a window opening and a movable sash 2 with its frame 3 secured in the window frame 1.

[0018] The window sash 2 at least on a part of its frame 3 periphery has slidable slats 4 with bolts 5 mating corresponding stationary catches 6 in the window frame 1. The slats 4 have pins 7 for their linear movement. An angular shifting module, not shown in the drawings, is situated at the corner connection of the frame 3 sides. The pins 7 as well as the bolts 5 and the catches 6 may be multiplied on the whole frame 1 and sash 2 periphery.

[0019] The slats 4 with the bolts 5 along with the catches 6 constitute a multipoint interlocking lock. After the slat 4 has been shifted, the bolt 5 is blocked with the catch 6 and the sash 2 is immobilized in the window frame 1 in the closed position.

[0020] The window is fitted with a remote opening and closing system, driven by a pneumatic actuator 8. The actuator's 8 housing 9 is secured in the holder 10 to the window frame 1, or to the sash frame 3, whereas the end of its piston rod 11 is secured respectively opposite to the sash frame 3 or to the window frame 1. For an inward opening window the end of the piston rod 11 of the actuator 8 is secured to the window frame 1, and the holder 10 of the actuator 8 - to the sash frame 3, while for an outward opening window - they are secured the other way round.

[0021] The end of the piston rod 11 of the actuator 8 is seated in an articulated joint on the axle 12 movable in a slidable manner in an oblong guide 13 of the yoke 14. The yoke 14 is secured respectively to the sash frame 3 or to the window frame 1 according to the aforementioned direction of the window opening.

[0022] A movable slide 15, at the same time constituting the yoke 14 cover, is mounted on the axle 12. The slide 15 is fitted with a pusher 16, which may constitute either a separate part secured to the slide 15 or its monolithic profile. The pusher 16 is situated slidably in the slot between the window frame 1 and the sash frame 3. The pusher 16 mates the pin 7 of the slat 4 of the sash frame 3. For an inward opening window the pusher arm 16a acting on the pin 7 is bent about an angle, whereas for an outward opening window - the pusher arm 16b is straight and offset.

[0023] The slide 15 is pressed down to its first extreme position towards the actuator 8 with a spring 17 seated in the hole of the yoke 14 and interlocked with a bumper 18 blocked by means of a mandrel 19.

[0024] The slide 15 is actuated by the axle 12 of the piston rod 11 of the actuator 8 and is linearly moved along the yoke 14 to its other extreme position from the actuator 8. The pusher 16 is moved together with the slide 15.

The pusher's 16 stroke is determined by the length of the guide 13 of the yoke 14. This length in turn corresponds to the distance of bolt's 5 shift from the catch 6 in order to unlock the window lock.

[0025] The supply system has pneumatic angular joints, situated on angular connections of the frame sides, equipped with air ducts and holes with sealing couplings. The supply system for an inward opening window has pneumatic hinged joints situated on angular connections of the frame sides, consisting of two parts pivot mounted on the axle, equipped with air ducts and holes with sealing couplings.

[0026] The window opening and closing unit may be controlled manually - by a pneumatic, hydraulic or electrical control system. The window opening and closing unit may also be controlled automatically - by a pneumatically, hydraulically or electrically controlled central unit or by a system for smoke, high temperature or radiation frequency detection.

[0027] The window is actuated in two stages, with two phases of the actuator's 8 piston rod 11 stroke.

In the window closed position the spring 17 presses down the slide 15 to its first extreme position to the actuator 8, the pusher 16 through the pin 7 holds the bolt 5 of the slat 4 immobilized within the catch 6, the window is locked.

[0028] After the control signal has been received, the actuator 8 is put in motion. The initial phase of stroke of the actuator's 8 piston rod 11 causes the spring 17 resistance to be overcome and a shift of the slide 15 along with the pusher 16 to its other extreme position from the actuator 8 on the length of the guide 13 in the yoke 14. In this position the bolts 5 are released by a movement of slats 4 actuated with the pusher 16 and the lock is unlocked. The further phase of the stroke of the actuator's 8 piston rod 11 causes the window to be opened. During opening of the window with the piston rod 11 of the actuator 8, the spring 17 gradually moves the slide 15, covering the yoke 14.

[0029] After opening of the window the slide 15 is held by the spring 17 in its extreme position, closer to the actuator 8.

[0030] During closing of the window the spring 17 is gradually compressed. After the sash frame 3 has been pressed down to the window frame 1, the spring 17 is compressed, so the slide 15 and the pusher 16 are in their other extreme position, further from the actuator 8, and the bolts 5 are in their unlocked position. After the action of the actuator 8 has stopped, the spring 17 returns to its former position moving the slide 15, so also the pusher 16 towards the actuator 8. By a shift of the pusher 16 - the slats 4 are shifted, the bolts 5 are locked within the catches 6 and the lock is closed. It causes the window sash 2 to be pressed down to the window frame 1.

Claims

1. Façade window, in particular a smoke window, comprising a window frame seated in a window opening and a movable sash secured in the window frame, having at least on a part of the periphery of the frame of this sash slidable slats with bolts mating corresponding catches in the window frame locking the sash in the window frame in the closed position, said window provided with an opening and closing system, **characterised in that**

- it has a remote releasing and locking mechanism of the bolts (5), actuated with the initial phase of the actuator's (8) piston rod (11) stroke,
- containing at least one slidable pusher (16), movable linearly along the frame (3) of the sash (2),
- the pusher (16) has an arm (16a), (16b) mating a pin (7) of a slidable slat (4) with a bolt (5),
- the pusher (16) is connected to a slide (15) mounted on the axle (12) of a yoke (14) secured to the sash frame (3) or to the window frame (1),
- the piston rod (11) of the actuator (8) secured to the window frame (1) or the sash frame (3) and opening or closing the sash (2) is connected to the axle (12) in an articulated joint,
- the axle (12) is slidably movable in a longitudinal yoke (14) guide (13).
- the slide (15) is pressed down to its extreme position to the actuator (8) with a spring (17) seated in the yoke (14) hole and interlocked with a bumper (18),
- the stroke phase of the actuator's (8) piston rod (11) that actuates the bolts (5) is determined by the length of the guide (13) of the actuator's (8) piston rod (11) articulated joint axle (12) in the yoke (14),
- in addition the length of the stroke phase of the actuator's (8) piston rod (11) that actuates the bolts (5) corresponds to the length of the linear shift of the bolts (5) enabling them to be released or interlocked within the catches (6),
- during opening of the window the bolts (5) are unlocked in the initial phase of the actuator's (8) piston rod (11) stroke under the influence of the force exerted by the piston rod (11) compressing the spring (17), after opening of the sash (2) the bolts (5) are shifting back under the influence of the force exerted by decompressing spring (17),
- whereas during closing of the window the bolts (5) are shifting to the unlocking position in the final phase of the actuator's (8) piston rod (11) stroke in order to enable complete closing of the sash (2) and after closing of the window the bolts (5) are shifting back under the influence of the force exerted by the decompressing spring (17).

2. Window as claimed in claim 1 **characterised in that** the actuator (8) housing (9) is secured in a holder (10) to the window frame (1) or to the sash frame (3), in addition for an inward opening window the yoke (14) along with the slide (15) is secured to the window frame (1) and the actuator's (8) housing (9) - to the sash frame (3), whereas for an outward opening window - they are secured the other way round. 5
3. Window as claimed in claim 1 **characterised in that** the pusher (16) is guided in the slot between the sash frame (3) and the window frame (1). 10
4. Window as claimed in claim 1 **characterised in that** for an inward opening window the pusher arm (16a) acting on the bolt (5) is bent about an angle, whereas for an outward opening window - the pusher arm (16b) is straight and offset. 15
5. Window as claimed in claim 1, **characterised in that** the pusher (16) constitutes a monolithic slide profile (15). 20
6. Window as claimed in claim 1, **characterised in that** the slide (15) constitutes a yoke (14) cover. 25
7. Window as claimed in claim 1, **characterised in that** the actuator (8) constitutes a pneumatic, hydraulic or electrical cylinder. 30
8. A window as claimed in claim 1 **characterised in that** the supply system for pneumatic cylinder has pneumatic angular joints, situated on angular connections of the frame (3) sides, fitted with air ducts and holes with sealing couplings. 35
9. A window as claimed in claim 1 **characterised in that** the supply system for pneumatic cylinder of an inward opening window has pneumatic hinged joints situated on angular connections of the frame (3) sides, consisting of two parts pivot mounted on the axle, fitted with air ducts and holes with sealing couplings. 40
10. Window as claimed in claim 1 **characterised in that** the window opening and closing unit is controlled manually - with a pneumatic, hydraulic or electrical control system. 45
11. Window as claimed in claim 1 **characterised in that** the window opening and closing unit is controlled automatically - with a pneumatically, hydraulically or electrically controlled central unit. 50
12. Window as claimed in claim 1 **characterised in that** the window opening and closing unit is controlled with a system for smoke, high temperature or radiation frequency detection. 55

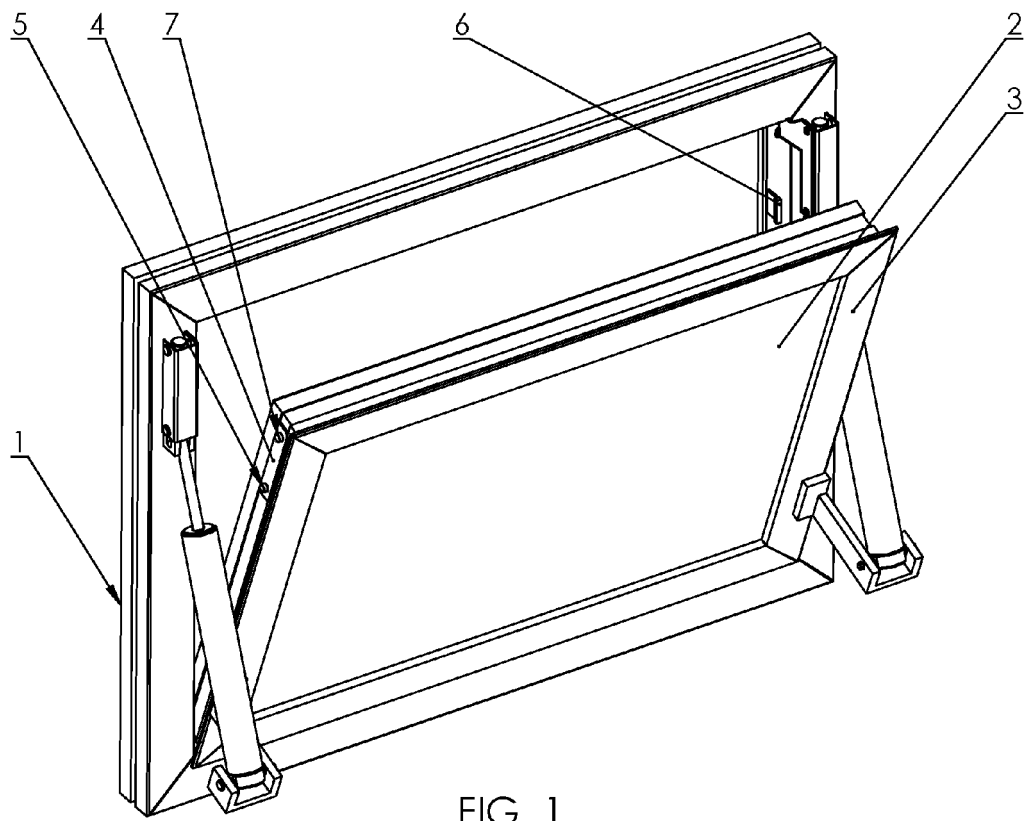


FIG. 1

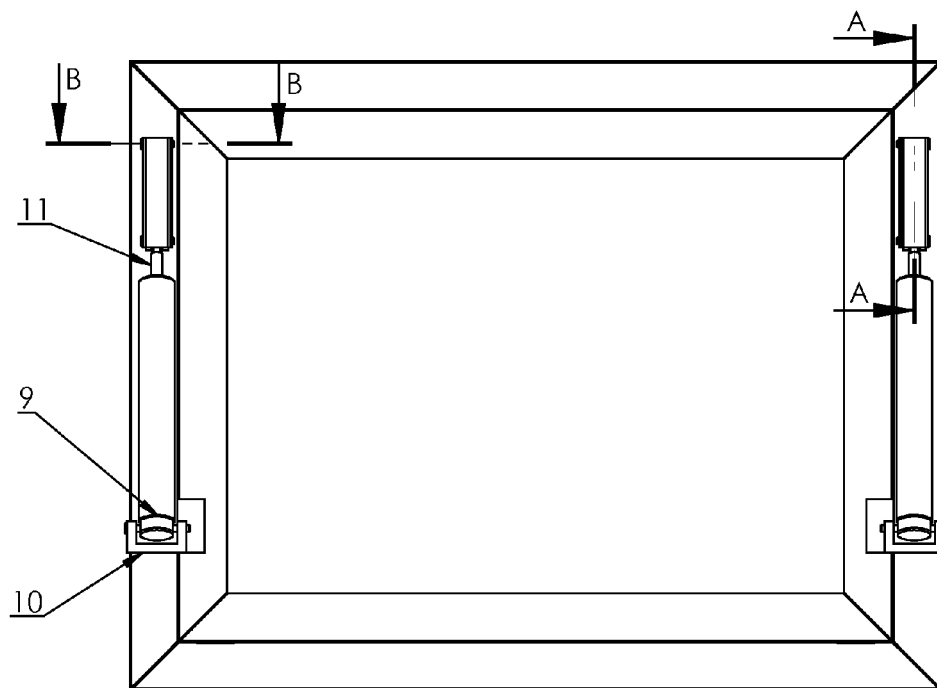


FIG. 2

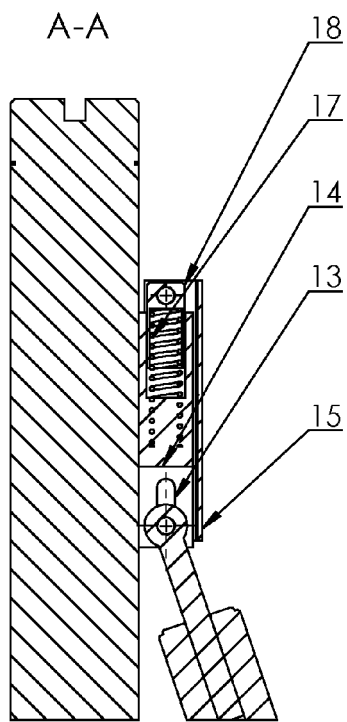


FIG. 3

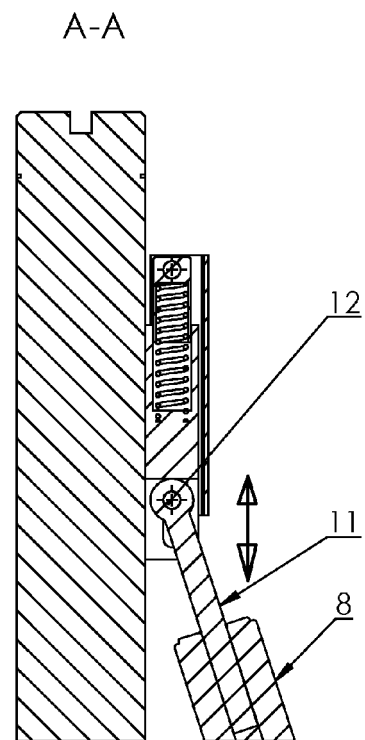


FIG. 4

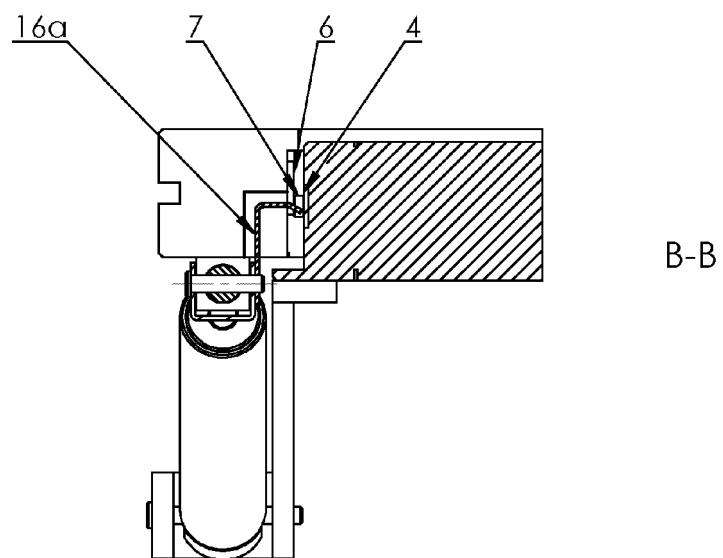


FIG. 5

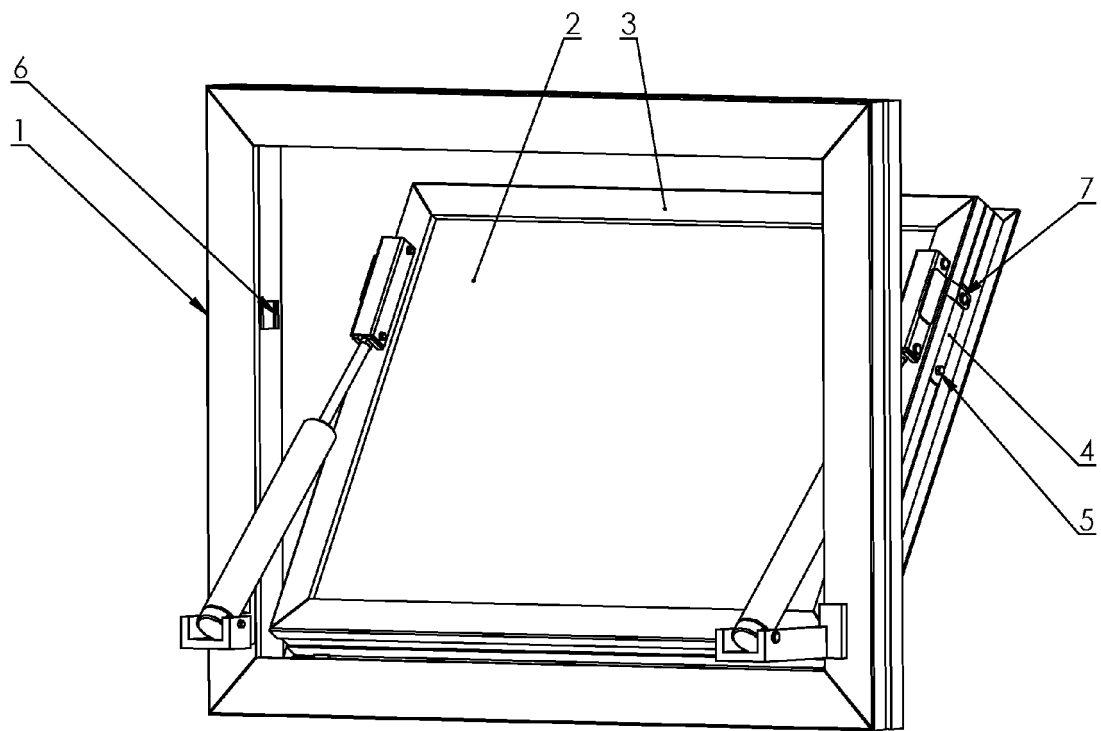


FIG. 6

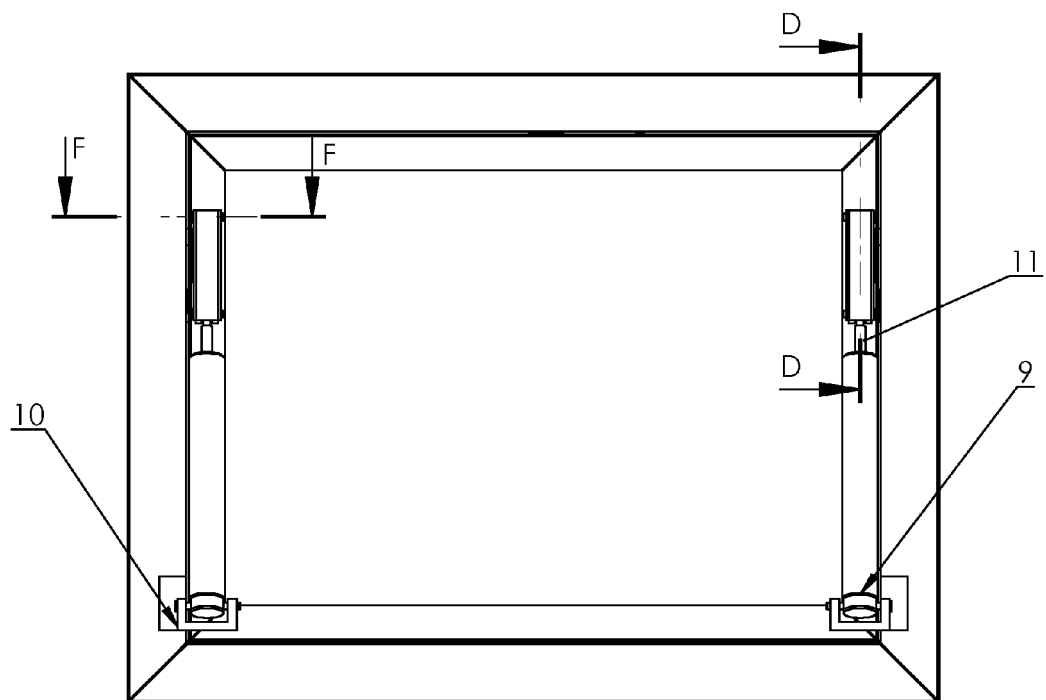


FIG. 7

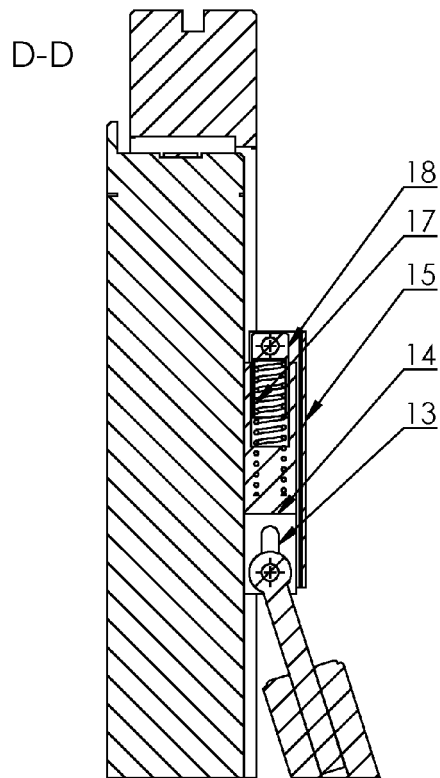


FIG. 8

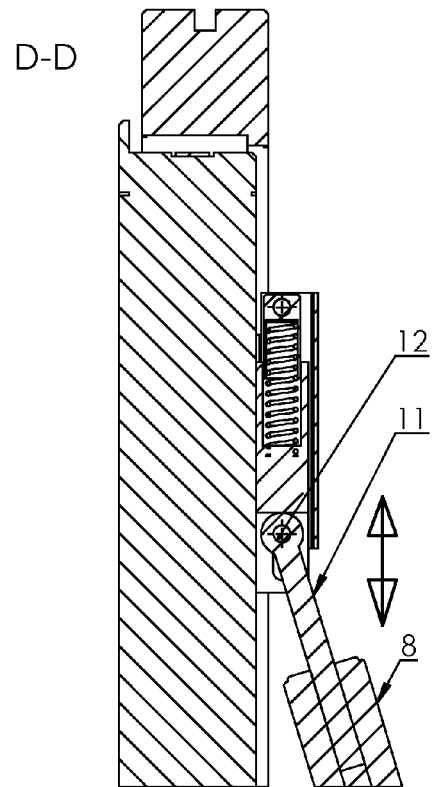


FIG. 9

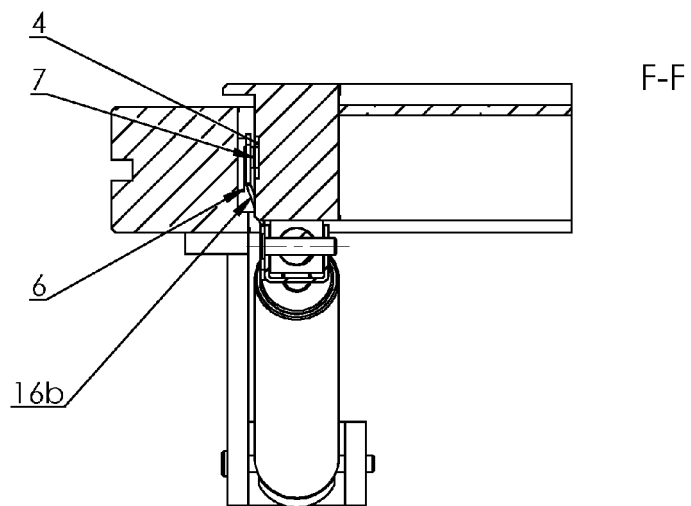


FIG. 10

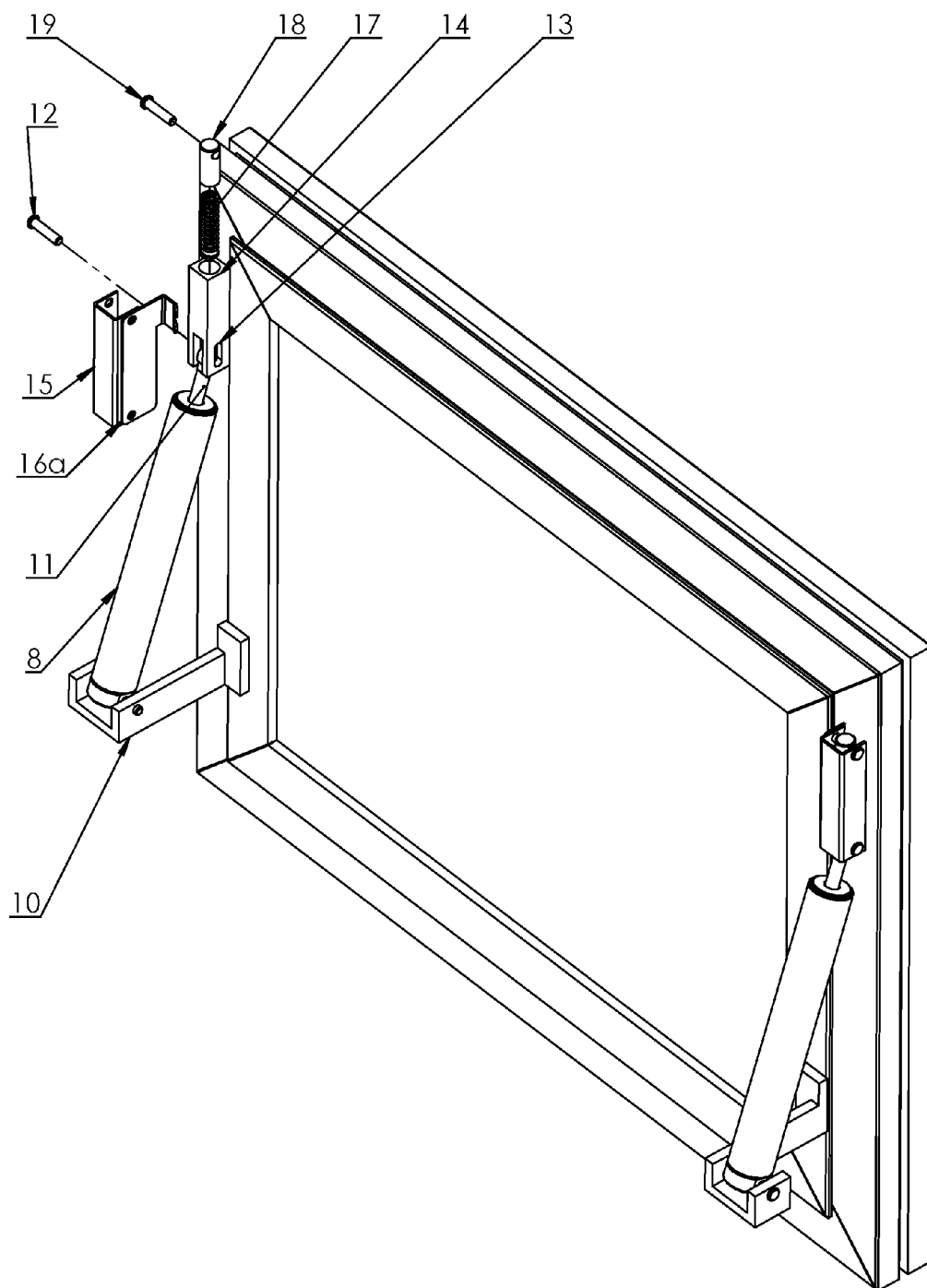


FIG. 11

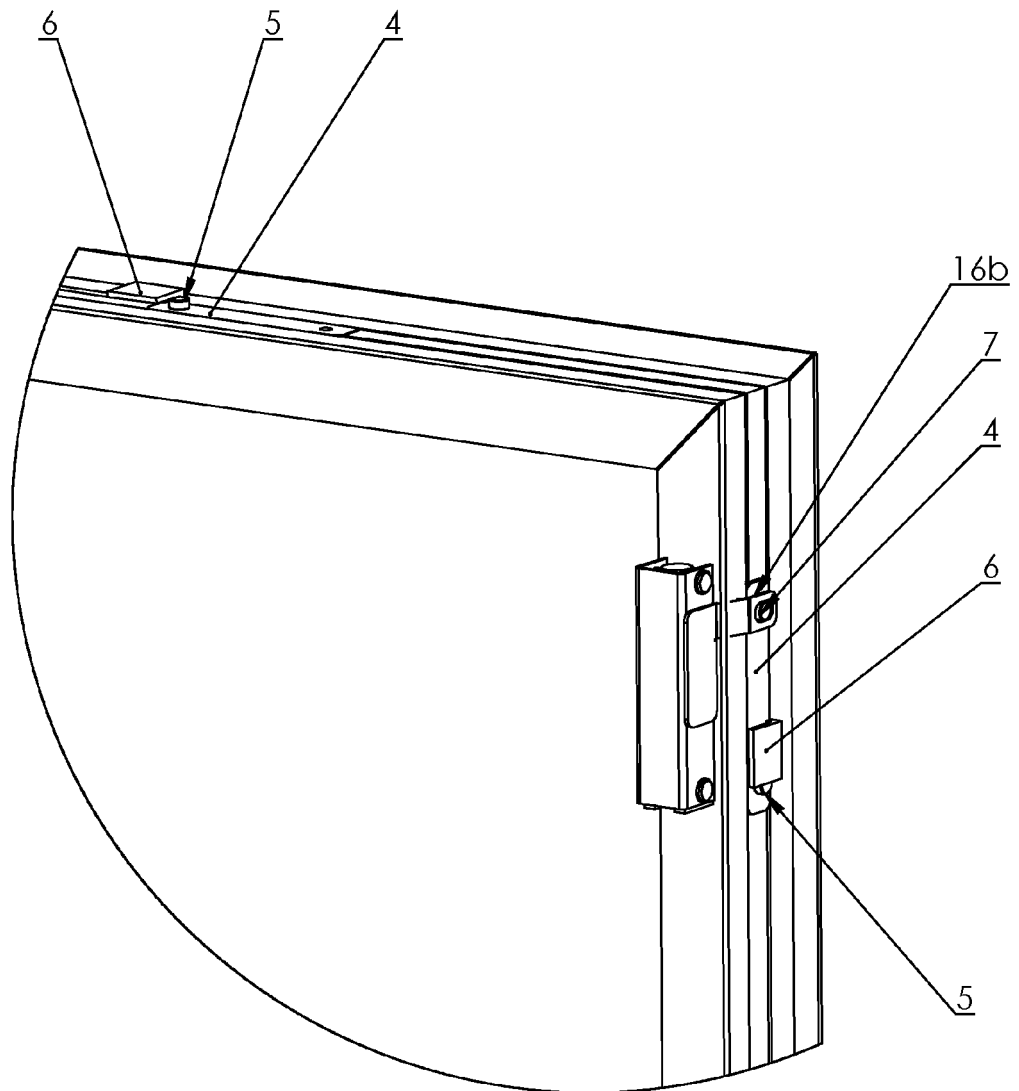


FIG. 12

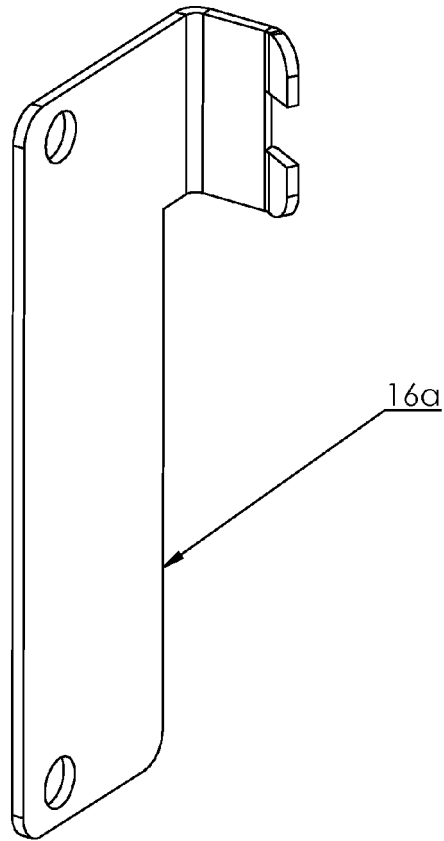


FIG. 13

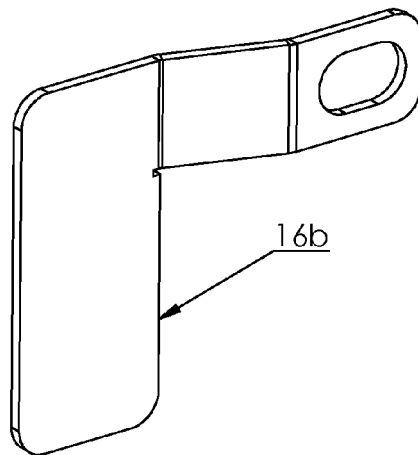


FIG. 14



EUROPEAN SEARCH REPORT

Application Number
EP 12 18 3466

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	DE 295 12 996 U1 (STUERMANN GMBH & CO [DE]) 13 February 1997 (1997-02-13)	1-7, 10, 11	INV. E05F1/00
Y	* page 2, line 11 - line 33 * * page 11, line 19 - page 15, line 11; figures 1-7 * * page 17, line 30 - page 19, line 9; figures 15-17 *	8-12	E05F15/20 E05F15/04
Y, D	----- GB 2 112 282 A (K G SMOKE DISPERSAL LIMITED) 20 July 1983 (1983-07-20) * page 1, line 1 - page 4, line 112; figures 1-5 * -----	8-12	
			TECHNICAL FIELDS SEARCHED (IPC)
			E05F A62C E05B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 1 February 2013	Examiner Rémondot, Xavier
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 12 18 3466

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The members are as contained in the European Patent Office EDP file on
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01-02-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 29512996	U1	13-02-1997	NONE

GB 2112282	A	20-07-1983	NONE

REFERENCES CITED IN THE DESCRIPTION

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- EP 2119854 A [0003]