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(54) **ROLL-UP SMOKE CURTAIN**

(57) A subject of the invention is a roll-up smoke curtain that is one of fire protections which is particularly applicable to multi-storey buildings, especially to buildings with an inner courtyard.

A roll-up smoke curtain with a flexible coat that is fastened with its upper border to a horizontal winding shaft fixed with its ends to rotational mountings that are bearing-mounted in permanent supports, *characterised in that* at least one of the rotational mountings (3) of the winding shaft (2) is equipped with a mechanism (10, 10a) to interlock its rotational motion, that is connected to an interlock release (16, 17) mounted on a permanent support (4) of the mounting (3).

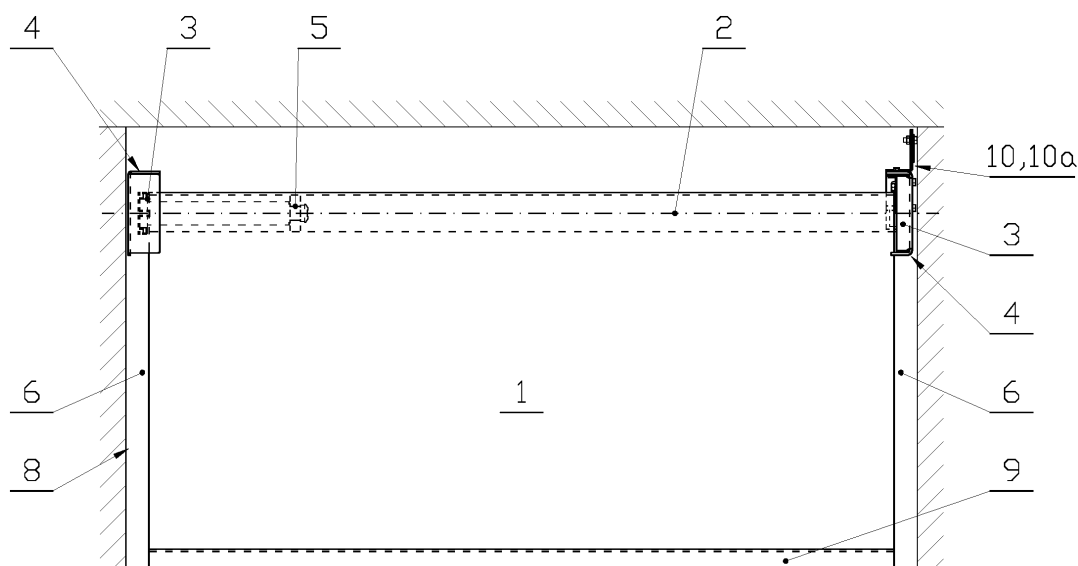


Fig. 1

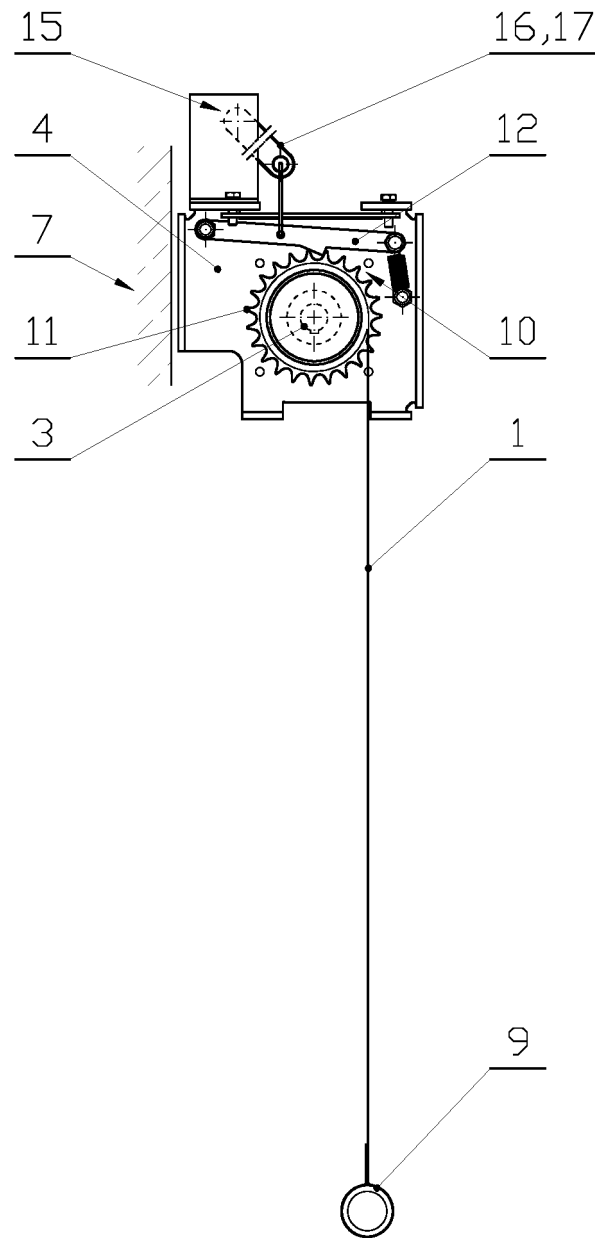


Fig. 2

Description

[0001] A subject of the invention is a roll-up smoke curtain that is one of fire protections which is particularly applicable to multi-storey buildings, especially to buildings with an inner courtyard.

[0002] A roll-up smoke curtain fastened with its upper border to a horizontal winding shaft is commonly known. Ends of this shaft are fixed in rotational mountings that are bearing-mounted in permanent supports. At least one of the mountings is driven by a motoreducer with a tubular motor. Suchlike curtains are mounted on individual levels of a multi-storey building with a substantially empty central space that is limited by an inner courtyard below and closed from above with a building roof wherein a smoke extraction system is installed. The curtains are situated in locations where, in case of fire, they can shut off smoke penetration from the central space of the building into its storeys not involved in fire. If fire and smoke occurs on any building storey, then all smoke curtains located on storeys situated higher are dropped by the action of smoke detectors installed in the building. The curtains mounted on the storey involved in fire are not dropped then to allow free smoke escape to the central building space. In practice, such a solution is fallible in cases when curtain shaft drives are made of elements of low thermal resistance, for example of aluminium or plastics. Under the action of high temperature, these elements fuse or burn and, as the result, the curtains with damaged drives roll out automatically, drop and break smoke efflux from the storey involved in fire. Such a situation is inadmissible as smoke is health and life threatening in case of people staying in a fire zone and it should be removed quickly and effectively.

[0003] A purpose of the invention is to develop a smoke curtain protected against uncontrolled unrolling and lowering under the influence of fire in the building involved in fire.

[0004] A roll-up smoke curtain according to the invention has a flexible coat fastened with its upper border to a horizontal winding shaft fixed with its ends to rotational mountings that are bearing-mounted in permanent supports. According to the invention, the curtain is characterized in that at least one of the rotational mountings of the winding shaft is equipped with a mechanical interlock of its rotational motion, that is connected to an interlock release mounted on a permanent mounting support. In a basic embodiment of the invention, the roll-up curtain has a single interlock of rotational motion of the winding shaft that is created in one of its rotational mountings. If necessary, the roll-up curtain has two interlocks of rotational motion of the winding shaft that are created in its both rotational mountings. In a preferable embodiment of the invention, the interlock of rotational motion of the winding shaft is a ratchet mechanism that consists of a gear wheel connected to the rotational mounting and a rocking ratchet lever with a ratchet projection engaging with the gear wheel of the rotational mounting under pres-

sure of a spring. One of the ratchet lever ends is connected pivotally to the permanent support and, in addition, the ratchet lever has a connection with a rocking arm of an interlock release. Preferably, a free end of the ratchet lever has a connection with the permanent support through a tension spring. To maintain the ratchet mechanism in a disconnected condition, the rocking arm of the interlock release is connected to the central sector of the ratchet lever by means of a lateral connector, preferably in shape of a flexible string. In another embodiment of the invention, the interlock of rotational motion of the winding shaft is a friction mechanism that consists of a friction disc fixed on the rotational mounting of the winding shaft and friction jaws pressed against this disc with springs, the friction jaws being connected to the rocking arm of the interlock release by means of strings. The winding shaft interlock release is the best-known fuse-link or the known electromagnetic lock.

[0005] Thanks to the solution according to the invention, the roll-up smoke curtain is protected effectively against unforeseen rolling off the winding shaft and lowering.

[0006] The subject of the invention is shown as an embodiment in the drawing wherein Fig. 1 is a front view of the roll-up smoke curtain in unrolled condition, Fig. 2 is a vertical cross-section of the curtain according to Fig. 1, Fig. 3 is a horizontal cross-section of the curtain with one interlock, Fig. 4 is a horizontal section of the curtain with two interlocks, Fig. 5 is an enlarged front view of the ratchet mechanism of the winding shaft motion interlock, Fig. 6 is an enlarged front view of the friction mechanism of the winding shaft motion interlock.

[0007] A roll-up smoke curtain according to the invention has a flexible coat **1** of a fireproof material fastened with its upper border to a horizontal winding shaft **2** fixed with its ends to rotational mountings **3** that are bearing-mounted in permanent supports **4**. One of the mountings **3** is equipped with a drive in shape of a motoreducer **5** with a tubular motor. The unrolled coat **1** of the curtain shades a communication opening **8** in a building wall **7**, side borders **6** of the coat **1** being close to this opening borders. An oblong weight **9** that supports unrolling and lowering the coat **1** is mounted on its bottom border. As shown in Fig. 3, the curtain has a single interlock **10**, **10a** of rotational motion of the winding shaft **2**, in shape of the ratchet mechanism **10** or the friction mechanism **10a** that is created in one of its rotational mountings **3**. According to Fig. 4, the curtain is equipped with two interlocks **10**, **10a** of rotational motion of the winding shaft **2**, in shape of the ratchet mechanism **10** or the friction mechanism **10a** that is created in both of its rotational mountings **3**. The ratchet mechanism **10** consists of a gear wheel **11** that is connected permanently to the rotational mounting **3** of the shaft **2** and a rocking ratchet lever **12** with a ratchet projection **13** engaging with the gear wheel **11** under pressure of a tension spring **14**. One of the ends **12a** of the ratchet lever **12** is connected pivotally to the permanent support **4** while a free end **12b** of this lever has a connection with the permanent support **4** through

a tension spring **14**. In addition, the ratchet lever **12** has a connection with a rocking arm **15** of the interlock release of the shaft **2**, in shape of a fuse-link **16** or an electromagnetic lock **17**. The rocking arm **15** of the known fuse-link **16** or the known lock **17** is connected to the central sector of the ratchet lever **12** by means of a lateral connector in shape of a flexible string **18**. According to Fig. 6, the interlock of rotational motion of the winding shaft **2** has a shape of the friction mechanism **10a** that consists of a friction disc **19** fixed on the rotational mounting **3** of the shaft **2** and friction jaws **20** pressed against this disc with compression springs **21**. The friction jaws **20** are connected by means of a pair of strings **18a** with the rocking arm **15** of the interlock release of the shaft **2** in shape of the fuse-link **16** or the electromagnetic lock **17**, the strings **18a** girding the support rollers **22**.

[0008] After operation of the ratchet mechanism **10** as a result of release of the interlock release in shape of the fuse-link **16** or the lock **17**, the rocking arm **15** of the release leans out down under the action of the spring **14** and causes engagement of the projection **13** of the ratchet lever **12** with the gear wheel **11** of the mounting **3** of the winding shaft **2**. In effect, the shaft **2** is immobilized to prevent undesirable unrolling the coat **1**. The friction mechanism **10a** operates similarly since the release of the fuse-link **16** or the lock **17** results in inclination downwards of the rocking arm **15** of the release under the action of the springs **21** and pressing the friction jaws **20** against the friction disc **19** to immobilize the shaft **2** as a consequence.

Marking list

[0009]

- 1 - curtain coat
- 2 - winding shaft
- 3 - shaft mounting
- 4 - mounting support
- 5 - motoreducer
- 6 - side coat border
- 7 - building wall
- 8 - wall hole
- 9 - coat weight
- 10 - ratchet mechanism
- 10a - friction mechanism
- 11 - gear wheel
- 12 - ratchet lever
- 12a - lever end
- 12b - lever end
- 13 - ratchet projection
- 14 - tension spring
- 15 - arm
- 16 - fuse-link
- 17 - electromagnetic lock
- 18 - string
- 18a - string
- 19 - friction disc

- 20 - friction jaw
- 21 - compression spring
- 22 - support roller

Claims

1. A roll-up smoke curtain with a flexible coat that is fastened with its upper border to a horizontal winding shaft fixed with its ends to rotational mountings that are bearing-mounted in permanent supports, **characterised in that** at least one of the rotational mountings (**3**) of the winding shaft (**2**) is equipped with a mechanism (**10**, **10a**) to interlock its rotational motion, that is connected to an interlock release (**16**, **17**) mounted on a permanent support (**4**) of the mounting (**3**).
2. The roll-up curtain according to the claim 1, **characterised in that** it has a single mechanism (**10**, **10a**) to interlock rotational motion of the shaft (**2**), created in one of its rotational mountings (**3**).
3. The roll-up curtain according to the claim 1, **characterised in that** it has two mechanisms (**10**, **10a**) to interlock rotational motion of the shaft (**2**), created in its two rotational mountings (**3**).
4. The roll-up curtain according to the claim 1 or 2 or 3, **characterised in that** the interlock is a ratchet mechanism (**10**) that consists of a gear wheel (**11**) connected to the rotational mounting (**3**) of the shaft (**2**) and a rocking ratchet lever (**12**) with a ratchet projection (**13**) that is engaged with the gear wheel (**11**) of the rotational mounting (**3**) under pressure of a spring (**14**), one of the ratchet lever ends being connected pivotally to the permanent support (**4**) and, in addition, the ratchet lever (**12**) has a connection with a rocking arm (**15**) of the interlock release (**16**, **17**).
5. The roll-up curtain according to the claim 4, **characterised in that** the free end of the ratchet lever (**12**) is connected to the permanent support (**4**) through a tension spring (**14**) and can lean out.
6. The roll-up curtain according to the claim 4, **characterised in that** the rocking arm (**15**) of the interlock release (**16**, **17**) is connected to the central sector of the ratchet lever (**12**) through a lateral connector (**18**).
7. The roll-up curtain according to the claim 6, **characterised in that** the lateral connector has a shape of a flexible string (**18**).
8. The roll-up curtain according to the claim 1 or 2 or 3, **characterised in that** the interlock is the friction

mechanism (10a) that consists of a friction disc (19) fixed on the rotational mounting (3) and friction jaws (20) pressed against the friction disc with springs (21), the friction jaws (20) being connected by means of strings (18a) with the rocking arm (15) of the interlock release (16, 17). 5

9. The roll-up curtain according to the claim 1 or 8, **characterised in that** the interlock release of rotational motion of the shaft (2) is the fuse-link (16). 10

10. The roll-up curtain according to the claim 1 or 8, **characterised in that** the interlock release of rotational motion of the shaft (2) is the electromagnetic lock (17). 15

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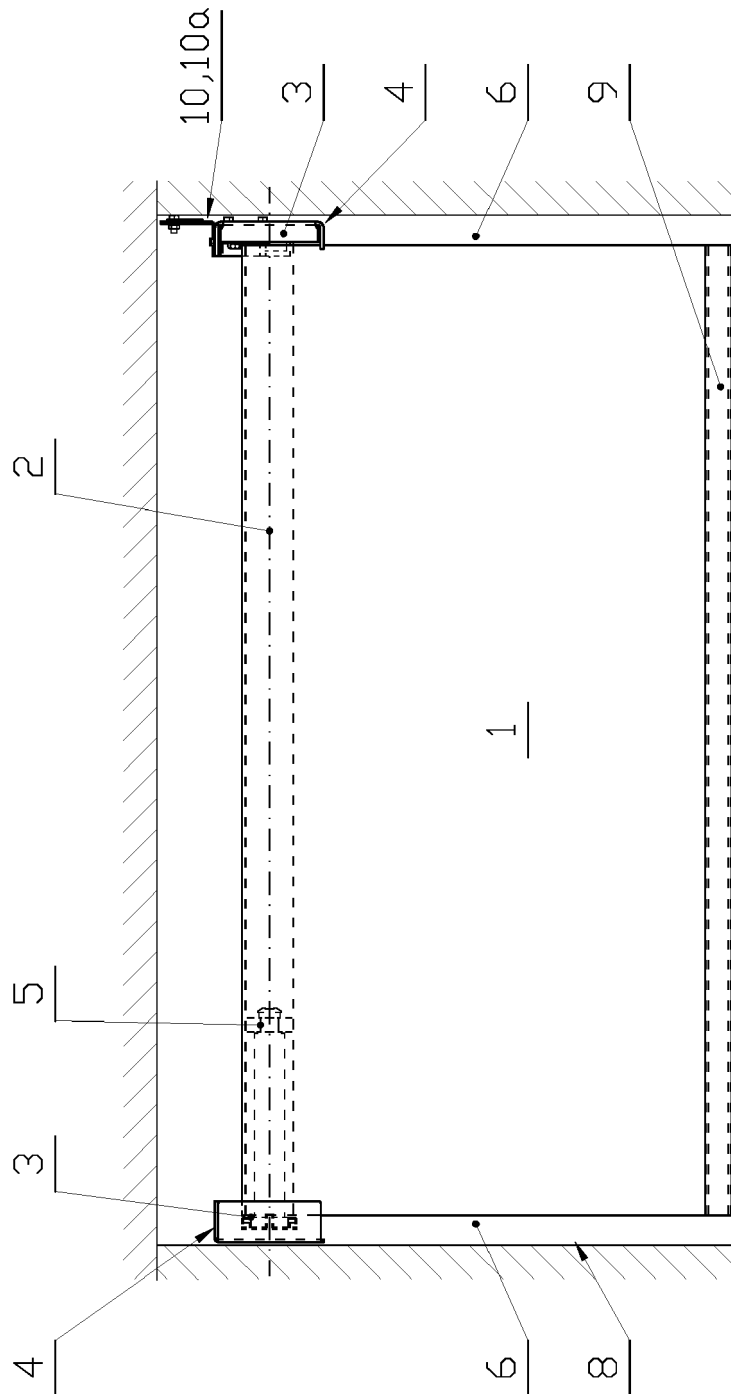


Fig. 1

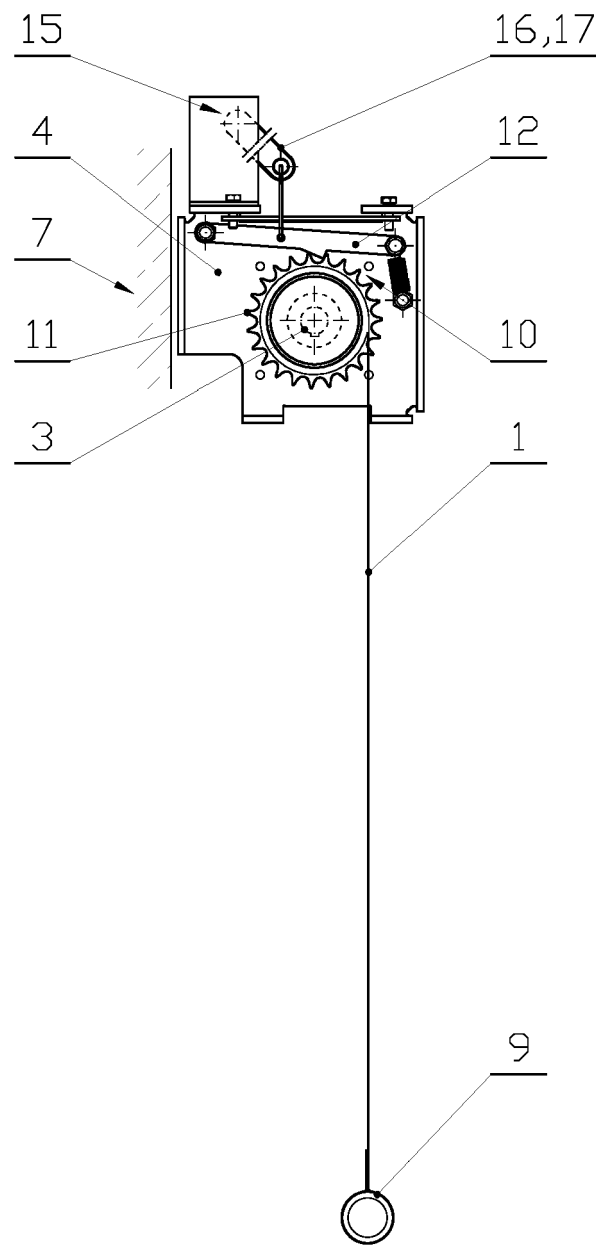


Fig. 2

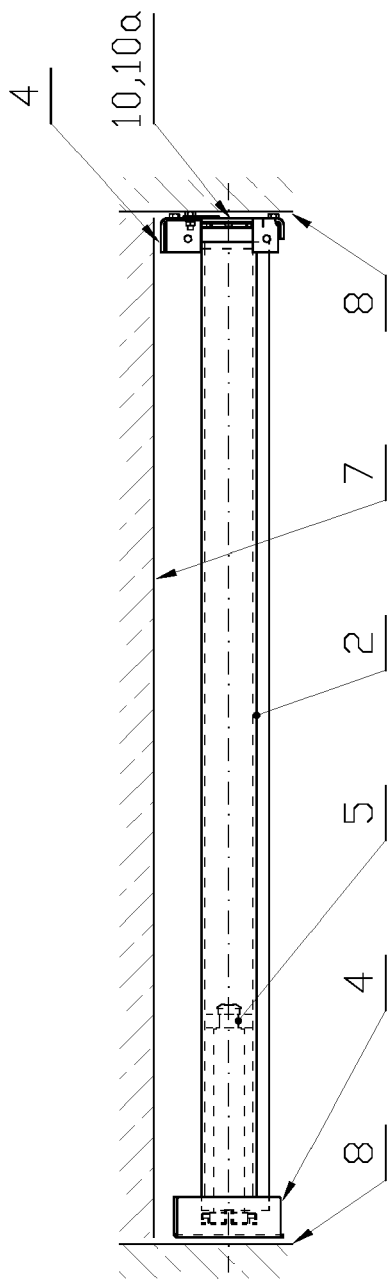


Fig. 3

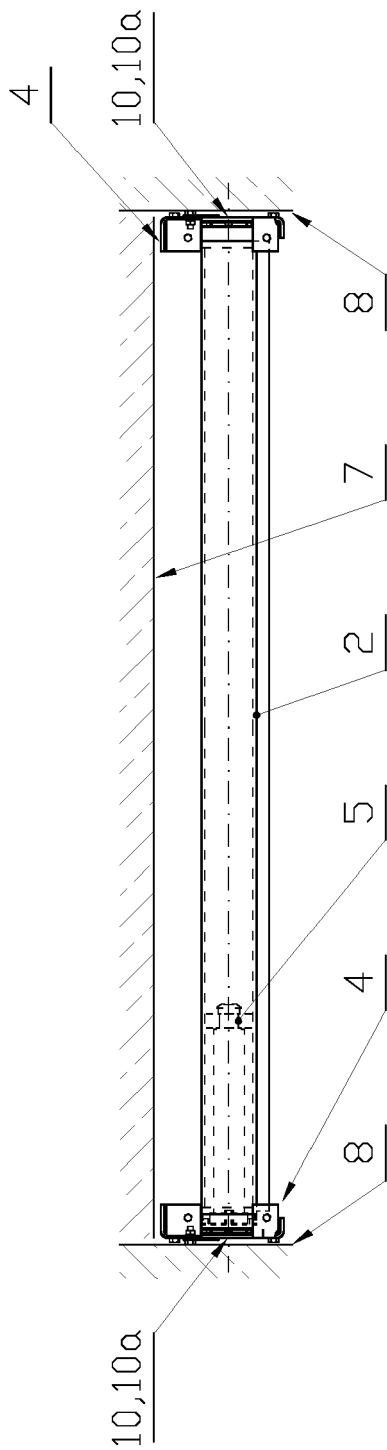


Fig. 4

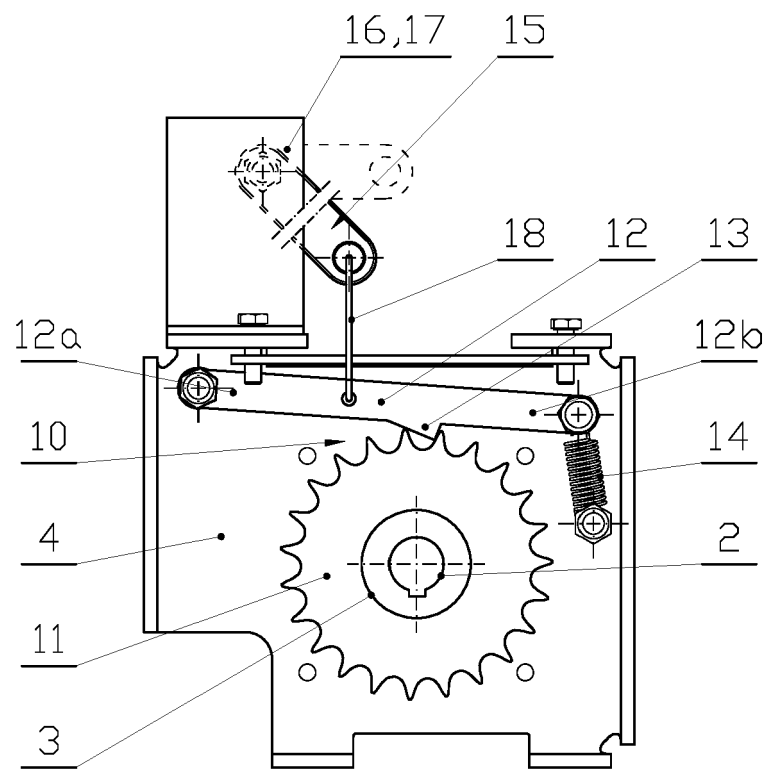


Fig. 5

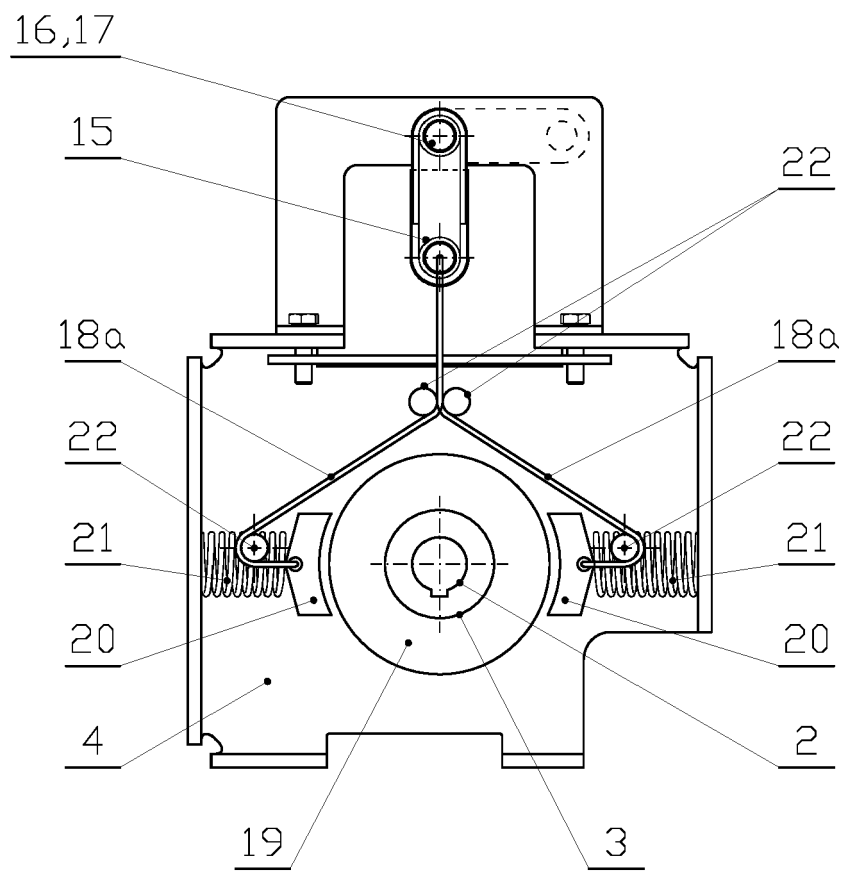


Fig. 6



EUROPEAN SEARCH REPORT

Application Number
EP 21 02 0067

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 24 June 2021	Examiner Andlauer, Dominique
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
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