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(54) **SUNSCREEN**

(57) A sunscreen (1), comprising a frame (2) at which a closing wall (103) is placed, which is divided, respectively, into a lower and upper portion (104, 105) mutually pivoted by means of a knee (106) and adapted to pass from a stretched configuration to a retracted configuration; the closing wall (103) also presents louvres (11) capable to rotate from a vertical configuration, in which they block the passage of light, to a horizontal configuration, in which they allow it. Said sunscreen (1) provides that:
- the upper portion (105) comprises, respectively, two upper primary and secondary arms (3, 3', 7, 7');
- the lower portion (104) comprises, respectively, two lower primary and secondary arms (4, 4', 8, 8').

The louvres (11) extend between the secondary arms (7, 7', 8, 8') and at the lateral ends of each louvre (11) a small arm (12) is present. Said sunscreen (1) also provides that the second end of the lower primary arms (4, 4') is pivoted to a primary spool (5, 5') engaged to a lifting belt (13, 13'), whose motion is controlled by at least one motor means (16) and that the second end of the lower secondary arms (8, 8') is pivoted to a movable pin (9, 9').

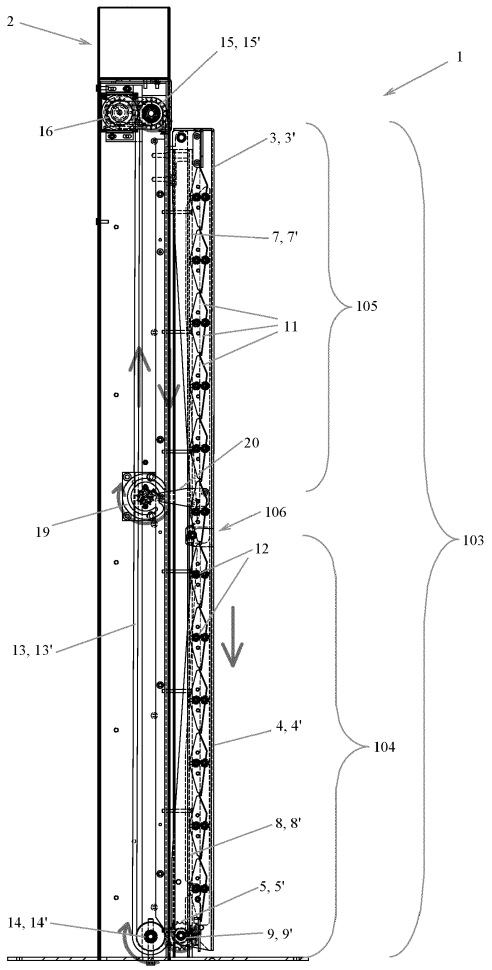

Fig. 1

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Description

[0001] The present invention concerns a sunscreen.

[0002] It is customary to use sunscreens to protect the indoor environments of buildings from direct sunlight. These are very popular architectural elements that can simply consist of fixed structures placed on the facades of the buildings to avoid excessive heating in the warmer months. Sunscreens often comprise adjustable shutters to allow the control of the amount of light passing through them, allowing the sunlight at higher angle or in summertime to be blocked entirely, but allowing the sunlight at lower angle or in wintertime to reach the indoor environments.

[0003] While the sunscreens placed at windows can be fixed, those positioned on doors must provide the possibility of allowing the user to pass through the door and usually the louvres used to block the sunlight can be raised and lowered at will by users.

[0004] The louvres of a classic sunscreen can therefore be regulated both vertically, to allow users to pass through, and angularly, to regulate the amount of sunlight that can enter the building.

[0005] In addition to the function of regulating the temperature of a building, sunscreens also perform a safety function. In fact, they are made of resistant materials such as wood or, preferably, metal, and comprise extremely robust structures that create a barrier against thieves or other malicious people trying to break into the building for fraudulent purposes.

[0006] It is clear, however, that once the louvres of a sunscreen have been raised completely, it no longer offers any protection to the building against the sun or other weather agents. In the event that a user decides to leave the doorway clear, for example to enter and exit the building several times in a short period of time, it would still be useful to have a structure that prevents precipitation from entering the building.

[0007] The most important document of the state of the art is US9249615 B2 which illustrates (the references in parentheses apply to this document) a sunscreen (par. [0008] and [0010]), comprising a frame (fig. 2, element (1); par. [0020]), which has a passage opening at which a closing wall (fig. 1) is placed, which is divided into a lower portion (3) and an upper portion (2), mutually pivoted by means of a knee (5) and adapted to pass from a stretched configuration (figs. 1 and 3), in which said portions are substantially aligned vertically, to a retracted configuration (fig. 2), in which the lower portion is retracted on the upper portion by folding the knee and vice versa; the closing wall also presenting a plurality of louvres capable, when the aforesaid portions are in a stretched configuration, to rotate from a vertical configuration, in which they block the passage of light through the sunscreen (implied figures, par. [0020], [0023] and [0024]), to a horizontal configuration, in which they allow the passage of said light (fig. 6).

[0008] A similar device is also described in document JP H0759867 B2 which provides (the references in parentheses apply to this document) a sunscreen (summary and fig. 5), which comprises a frame (fig. 5, element (6)) which has a passage opening at which a closing wall is placed (fig. 5) which is divided into a lower portion (figs. 5 and 6, implicit characteristics) and an upper portion (figs. 5 and 6, implicit characteristics), mutually pivoted by means of a knee (fig. 4, element (3)) and adapted to pass from a stretched configuration (fig. 1), in which said portions are substantially aligned vertically, to a retracted configuration (fig. 6), in which the lower portion is retracted on the upper portion by folding the knee and vice versa; the closing wall also presenting a plurality of louvres (1) capable, when the aforesaid portions are in a stretched configuration, to rotate from a vertical configuration, in which they block the passage of light through the sunscreen (implicit, fig. 3), to a horizontal configuration, in which they allow the passage of said light (fig. 1).

[0009] Such a device is also described in DE 3335429 A1.

[0010] Object of the present invention is to realise a device which is realised with a better, as well as more practical and simpler, conformation with respect to similar devices known in the state of the art.

[0011] This is achieved, according to the invention, by conforming such a sunscreen to the features present in the characterising part of claim 1.

[0012] Further features of the invention are present in the dependent claims.

[0013] The invention will be better defined through the description of a possible embodiment thereof, given solely by way of non-limiting example, with the aid of the attached drawings, wherein:

- fig. 1 illustrates a side view of a sunscreen referred to in the invention in a stretched configuration;
- fig. 2 illustrates a side view of a sunscreen referred to in the invention in a retracted configuration;
- fig. 3 illustrates a step of rotation of the louvres of a sunscreen referred to in the invention;
- fig. 4 illustrates a further step of rotation of the louvres of a sunscreen referred to in the invention;
- fig. 5 illustrates a detail of a sunscreen according to the invention in which a movable pin that is located at its lower limit switch is highlighted;
- fig. 6 illustrates the detail of fig. 5 in which the primary spool, to which the movable pin is fixed, has been rotated anti-clockwise;
- fig. 7 illustrates the detail of Figs. 5 and 6 where the movable pin is at its upper limit switch;
- fig. 8 illustrates a perspective view of a sunscreen referred to in the invention in a retracted configuration.

[0014] The sunscreen 1 seen in Figs. 1-4 provides a frame 2 which has a passage opening 102 (see fig. 8) at which a closing wall 103 is placed which is divided into a lower portion 104 and an upper portion 105, mutually

pivoted by means of a knee 106 and adapted to pass from a stretched configuration (fig. 1), in which said portions 104, 105 are substantially aligned vertically, to a retracted configuration (fig. 2), in which the upper portion 105 is retracted on the lower portion 104 by folding of the knee 106.

[0015] The closing wall 103 also has a plurality of louvres 11 used to block the sunlights. Said louvres may, when the sunscreen is in the stretched configuration, rotate from a vertical configuration (fig. 1), in which they block the passage of light through the sunscreen 1, to a horizontal configuration (fig. 4), in which they allow the passage of said light.

[0016] A sunscreen configured in this way offers classic protection from the sun when it is in its stretched configuration and constitutes a canopy in its retracted configuration. In this way, even with the passage opening 102 clear, unwanted atmospheric precipitation is prevented from entering the building, at the meantime also offering protection from the sun.

[0017] In a particular embodiment thereof, the sunscreen 1 provides that, at the upper portion of the frame 2, the ends of two upper primary arms 3, 3' parallel and placed on opposite sides of the frame 2 are pivoted. Each of said upper primary arms 3, 3' is pivoted at the further end thereof to the end of a lower primary arm 4, 4', the further end of which is pivoted to a primary spool 5, 5', which can advantageously have the shape of a toothed wheel.

[0018] Two upper secondary arms 7, 7' extend in proximity and parallel to the upper primary arms 3, 3'. Each of said upper secondary arms 7, 7' is pivoted at the lower end thereof to one end of a lower secondary arm 8, 8', the further end of which is pivoted to a movable pin 9, 9', placed on the primary spool 5, 5'.

[0019] The pins connecting the upper primary and secondary arms to the lower arms constitute the knee 106 necessary for the folding of the closing wall 103.

[0020] Said movable pin 9, 9' is able to move from a lower limit switch (fig. 5) to an upper limit switch (fig. 7), following the rotation of the primary spool 5, 5'.

[0021] Between the upper and lower secondary arms 7, 7', 8, 8' there extends a plurality of louvres 11 adapted to produce shade and at the lateral ends of each louvre 11 there is an arm 12, the first end of which is fixed to the louvre 11 and pivoted on the primary arm adjacent thereto, while the remaining end is pivoted on the secondary arm adjacent thereto.

[0022] Each primary spool 5, 5' is engaged, for example by means of its teeth, to a lifting belt 13, 13' which can be in the form of a chain. The belts 13, 13' extend vertically along the sides of the frame 2 and are tensioned by idle wheels 14, 14' (figs. 5-7) located in the lower portion of the frame 2, as well as moved by movement wheels 15, 15' located in the upper portion of the frame 2 and whose motion is controlled by at least one motor means 16. This motor means 16 may consist of an electric motor or otherwise an operator may directly act on the device with his own force.

[0023] In the case of the use of a single motor, the two movement wheels 15, 15' are connected through a synchronisation shaft, so that their motion is synchronised.

[0024] On the other hand, using a two-motor configuration, in which each motor controls a movement wheel 15, 15', it is necessary to provide for an electronic synchronisation of the two motors.

[0025] As long as the movable pins 9, 9' are at the lower limit switch (fig. 5), the axes of rotation of the pins connecting the upper and lower primary and secondary arms are coincident (fig. 1). In this configuration, by moving the lifting belts 13, 13' so that the primary spools 5, 5' move upwards, it is possible to fold the knee 106 so that the lower arms 4, 4', 8 and 8' are no longer aligned vertically with the upper arms 3, 3', 7 and 7', and begin to rise and fold more and more towards themselves as far as an angle substantially equal to 180° (fig. 2).

[0026] In this way, the sunscreen 1 will be in an open configuration and will generate a kind of canopy that can shelter from the sun and from weather events such as rain, snow or hail.

[0027] In order to close the sunscreen 1, it is sufficient to move the belts 13, 13' in the opposite direction to what described above, so that the primary spools 5, 5', always held blocked by the movable pins 9, 9' placed at their lower limit switch, are dragged downwards.

[0028] When the arms are again aligned vertically, if the belts 13, 13' continue in their motion of the downward step, the primary spools 5, 5' will rotate, pushing the movable pins 9, 9' towards their upper limit switch. Since the lower secondary arms 8, 8' are pivoted to said movable pins 9, 9', together with the upper secondary arms 7, 7' following them, they will have their position modified with respect to the primary arms 3, 3', 4, 4' and the axes of rotation of the pins connecting the upper secondary arms to the lower ones will no longer coincide with those of the pins connecting the upper main arms to the lower ones, thus blocking the kinematics of the knee and causing the rotation of the arms 12.

[0029] This rotation will result in the rotation of the louvres 11, which can reach a horizontal configuration, when the movable pins 9, 9' reach their upper limit switch (fig. 7).

[0030] The louvres 11 can return to a vertical configuration simply by reversing the motion of the belts 13, 13' and then pushing the pins 9, 9' towards their lower limit switches. Advantageously, two stop elements 17, 17' and 18, 18' can be provided on each lower primary arm 4, 4' to mechanically block the movement of the lower secondary arms 8, 8', so as to avoid that the pins 9, 9' do not exceed the lower and upper limit switches.

[0031] In addition, to ensure safe and precise vertical movement of the primary spools 5, 5' in the frame 2, two vertical guides are provided in which a bearing connected to the primary spools 5, 5' is retained by a connecting shaft to guide the vertical movement of said spools.

[0032] In order to increase the safety guaranteed by

the sunscreen 1, there may be present one or more blocking spirals 19 whose rotation is regulated by the motion of a lifting belt 13, 13'. The upper portion 105 and/or the lower portion 104 have at least one pin 20 adapted to engage the blocking spiral 19. It retains the pin 20 as long as the upper portion 105 and the lower portion 104 are in a stretched configuration and, at the moment when the user wishes to open the sunscreen, it rotates following the motion of a lifting belt 13, 13', releasing said pin 20 and freeing the lower and upper portions.

[0033] In the presence of the blocking spiral 19, it is advantageous to provide guides 10, 10' on the primary spools 5, 5' which allow said spools to rotate independently of the movable pins 9, 9'. In this way the blocking spiral 19, rotating by effect of the motion of the belts 13, 13', can engage the pin 20 without the primary spools 5, 5' moving the pins 9, 9', thus preventing the louvres 11 from rotating. The sunscreen is thus safely blocked even with the louvres completely vertical.

[0034] From what has been described, it is therefore evident that the sunscreen 1 is a device that presents all the characteristics of a state-of-the-art sunscreen, guaranteeing protection from the sun and atmospheric agents even when it is completely open; moreover, it provides a greater degree of safety, by virtue of the particular technical measures described above.

[0035] Obviously, the technical design details and the components used, known in the state of the art and in evolution, can be the most varied, provided that all fall within the inventive concept defined by the following claims.

Claims

1. SUNSCREEN (1), comprising a frame (2) which has a passage opening (102) at which a closing wall (103) is placed, which is divided into a lower portion (104) and an upper portion (105), mutually pivoted by means of a knee (106) and adapted to pass from a stretched configuration, in which said portions (104, 105) are substantially aligned vertically, to a retracted configuration, in which the lower portion (104) is retracted on the upper portion (105) by folding the knee (106) and vice versa; the closing wall (103) also presenting a plurality of louvres (11) capable, when the aforesaid portions (104, 105) are in a stretched configuration, to rotate from a vertical configuration, in which they block the passage of light through the sunscreen (1), to a horizontal configuration, in which they allow the passage of said light, said sunscreen (1) **being characterized in that:**

   - the upper portion (105) comprises two upper primary arms (3, 3'), parallel to and pivoted at one end thereof on opposite sides of the upper region of the frame (2) and two upper secondary arms (7, 7') parallel to said upper primary arms (3, 3');
   - the lower portion (104) comprises two lower primary arms (4, 4'), pivoted to said upper primary arms (3, 3') at the knee (106), and two lower secondary arms (8, 8'), pivoted to said upper secondary arms (7, 7') at the knee (106);

   it being further provided that the louvres (11) extend between the upper and lower secondary arms (7, 7', 8, 8') and that at the lateral ends of each louvre (11) a small arm (12) is present, the first end of which is fixed to the louvre (11) and pivoted to the primary arm adjacent thereto, while the remaining end is pivoted on the secondary arm adjacent thereto, said sunscreen (1) **being** finally **characterized in that** the second end of the lower primary arms (4, 4') is pivoted to a primary spool (5, 5') engaged to a lifting belt (13, 13'), which extends vertically along the sides of the frame (2) and whose motion is controlled by at least one motor means (16) and that the second end of the lower secondary arms (8, 8') is pivoted to a movable pin (9, 9'), which can move from a lower limit switch to an upper limit switch; it being provided that when each primary spool (5, 5') is blocked with the pin (9, 9') at the upper limit switch, the rotation axes of the pins connecting the upper primary and secondary arms to the lower ones are not coincident, while when each primary spool (5, 5') is blocked with the pin (9, 9'), at the lower limit switch, the rotation axes of the pins connecting the upper secondary arms to the lower ones are coincident with those of the pins connecting the upper primary arms to the lower ones.

2. SUNSCREEN (1) according to claim 1, **characterized in that** it comprises two stop elements (17, 17', 18, 18') on each lower primary arm (4, 4') to mechanically block the movement of the lower secondary arms (8, 8'), so as to prevent the pins (9, 9') from exceeding the lower and upper limit switches.

3. SUNSCREEN (1), according to claim 1 or 2, **characterized by** providing at least one blocking spiral (19) whose rotation is regulated by a lifting belt (13, 13') and adapted to:

   - engage to a pin (20) integral with the upper portion (105) and/or the lower portion (104) when the upper portion (105) and the lower portion (104) are in a stretched configuration; and to
   - disengage from said pin (20) when the upper portion (105) and the lower portion (104) pass from the stretched configuration to the retracted configuration.

4. SUNSCREEN (1), according to claim 3, **characterized in that** the primary spools (5, 5') comprise a guide (10, 10') along which the movable pin (9, 9')

can slide.

5. SUNSCREEN (1), according to any one of claims from 1 to 4, **characterized in that** the belts (13, 13') are tensioned by idle wheels (14, 14') located in the lower portion of the frame (2) and moved by the motor means (16) by movement wheels (15, 15') located in the upper portion of the frame (2).

6. SUNSCREEN (1), according to claim 5, **characterized in that** the movement wheels (15, 15') are connected through a synchronism shaft.

7. SUNSCREEN (1), according to any one of claims from 1 to 5, **characterized in that** it comprises two motor means (16) that are mutually synchronized electronically.

8. SUNSCREEN (1), according to any one of the previous claims, **characterized in that** in the frame (2) it has two vertical guides in which a bearing is retained connected to the primary spools (5, 5') by a connecting shaft to guide the vertical movement of said spools.

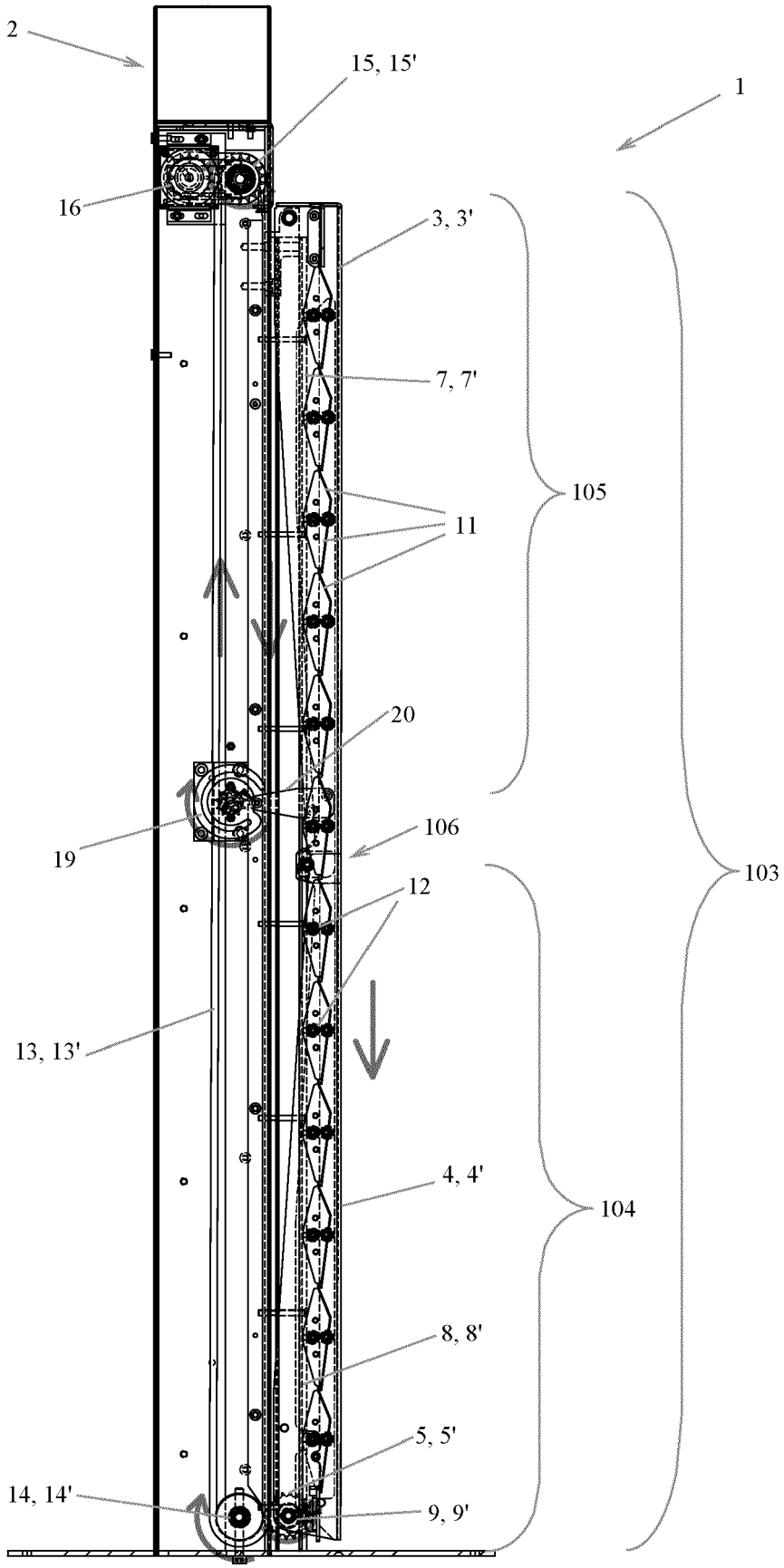

Fig. 1

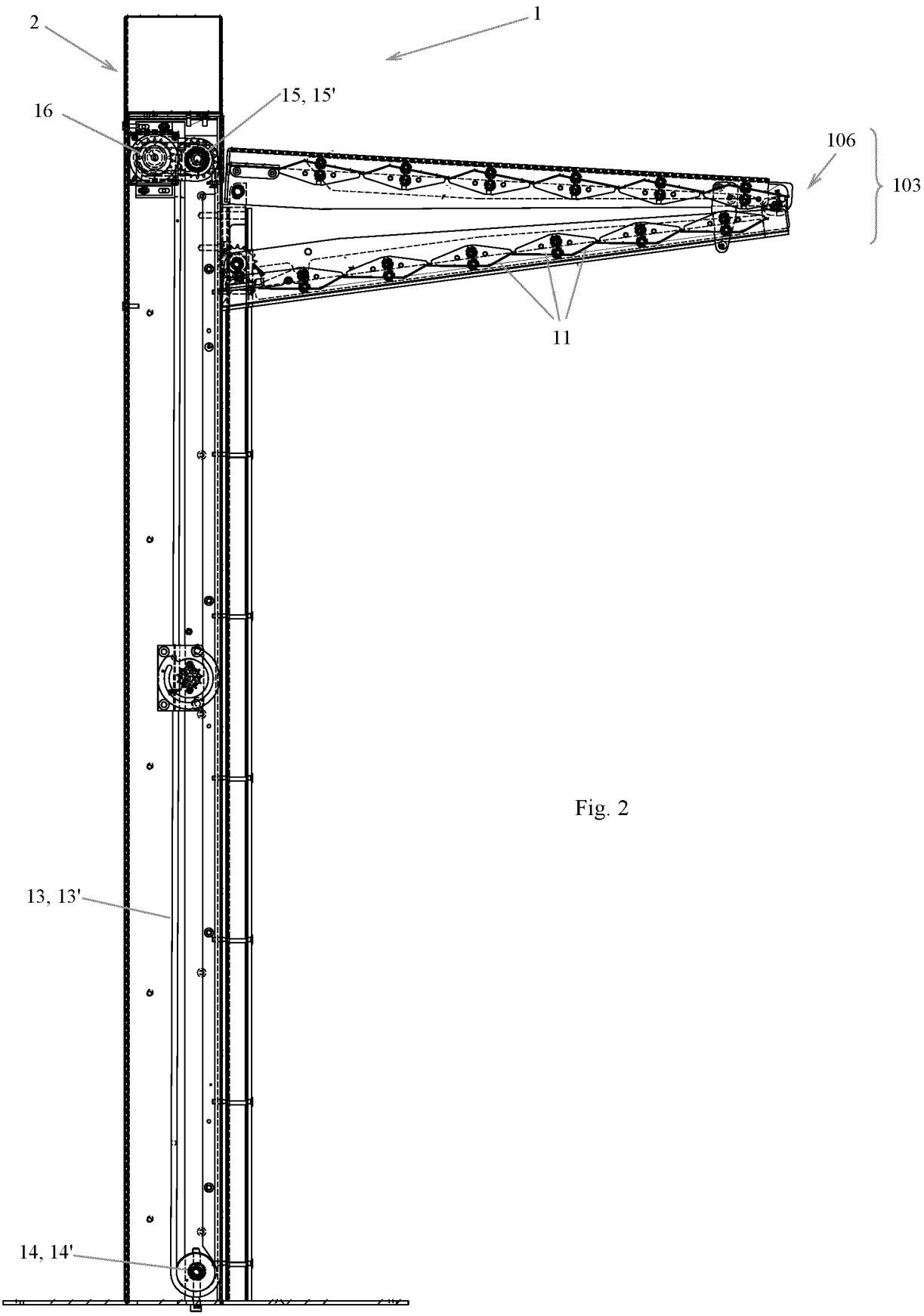

Fig. 2

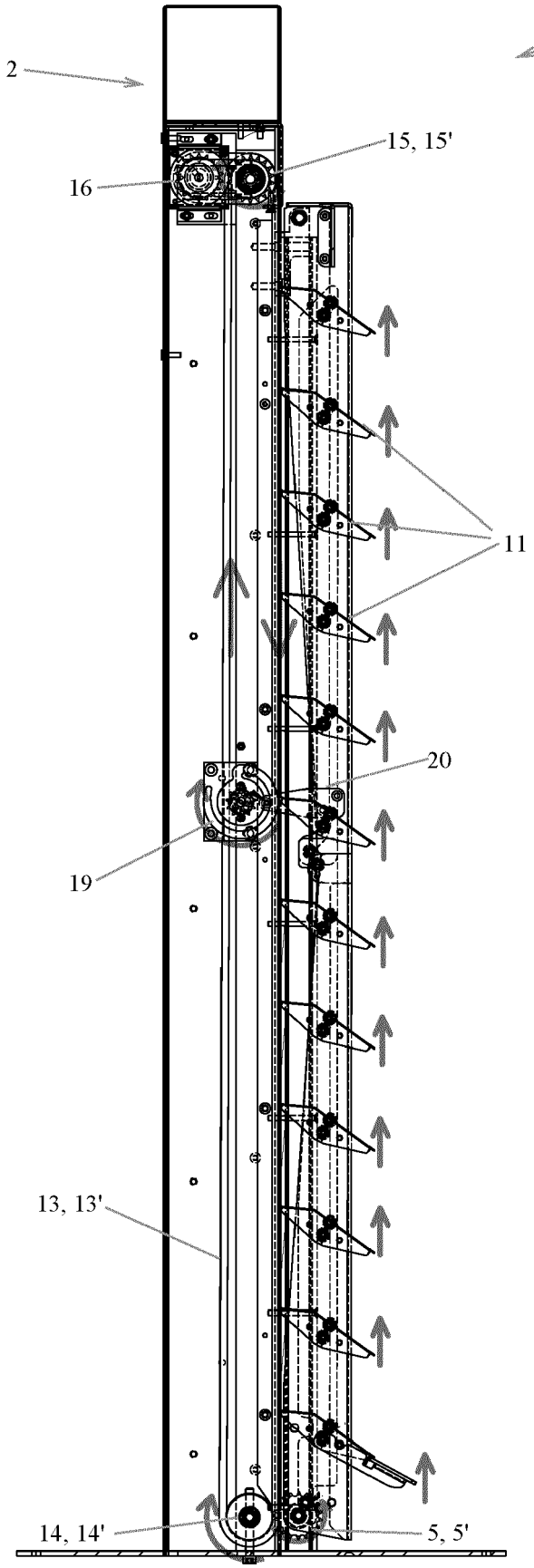

Fig. 3

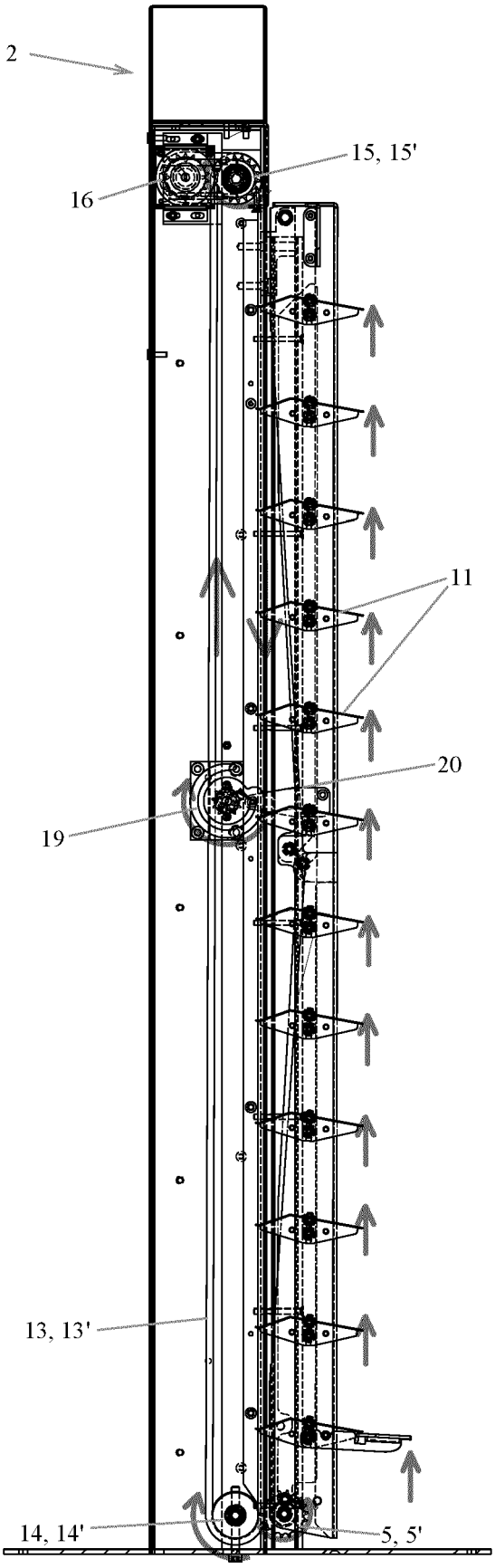

Fig. 4

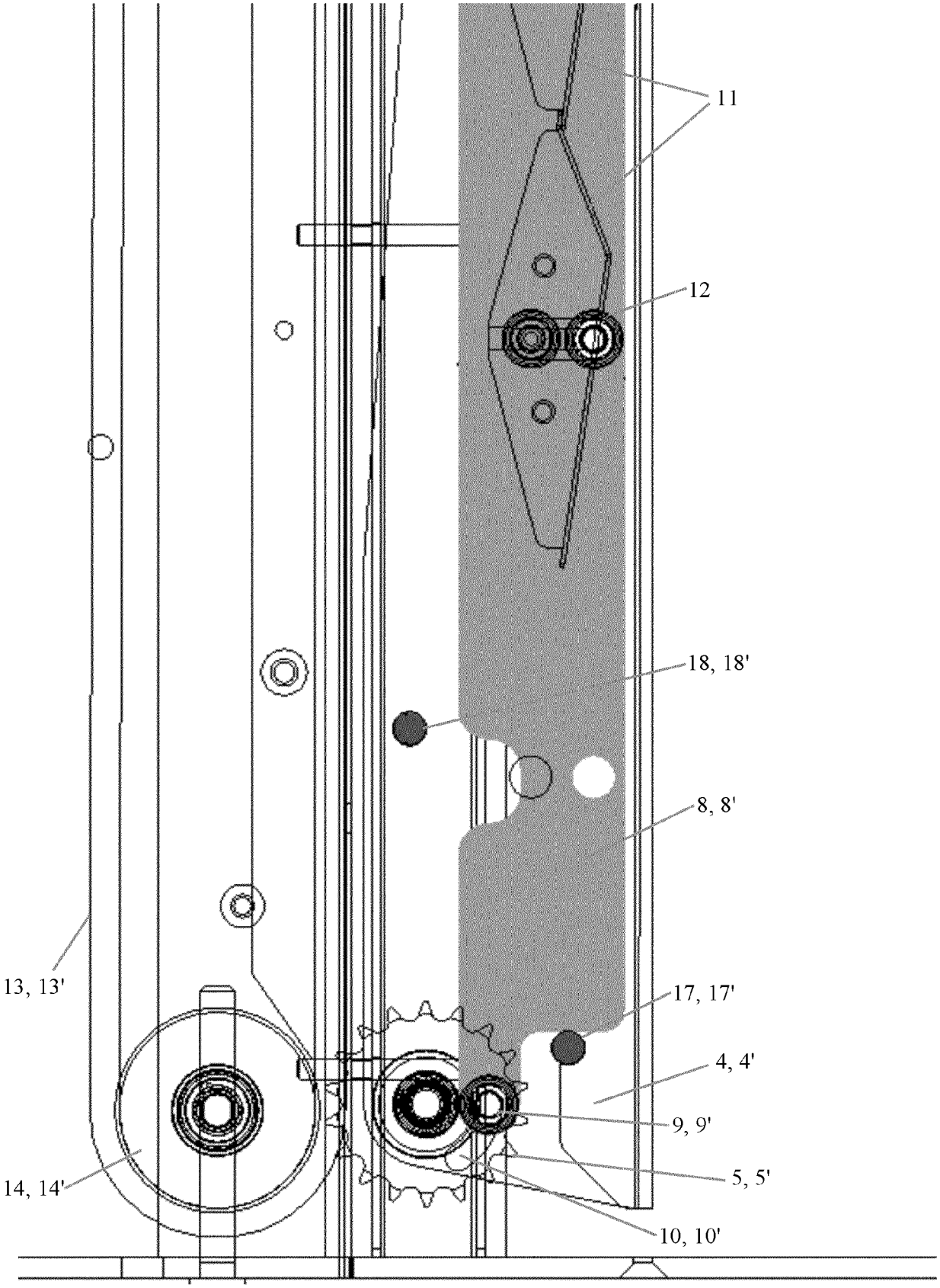

Fig. 5

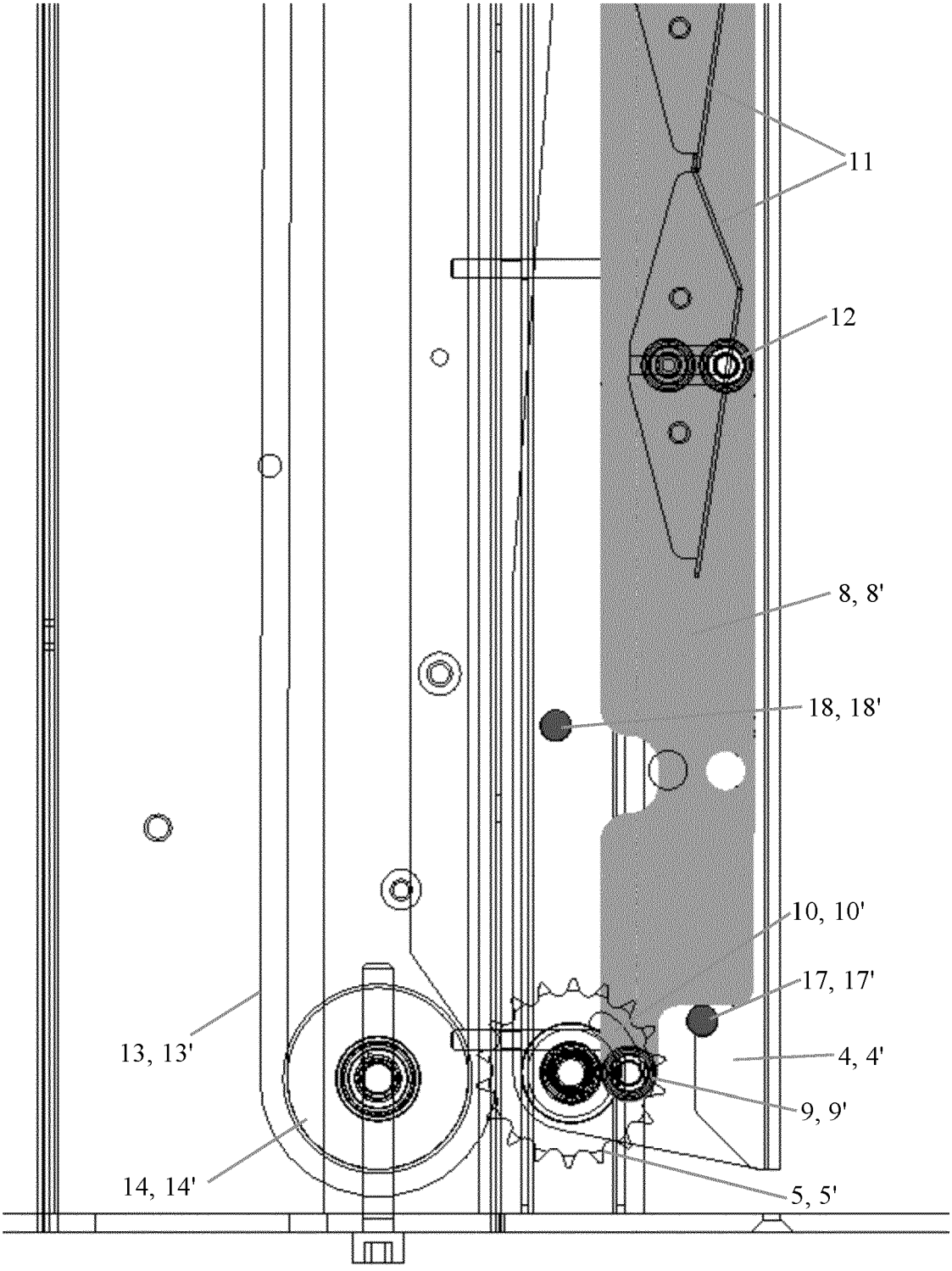

Fig. 6

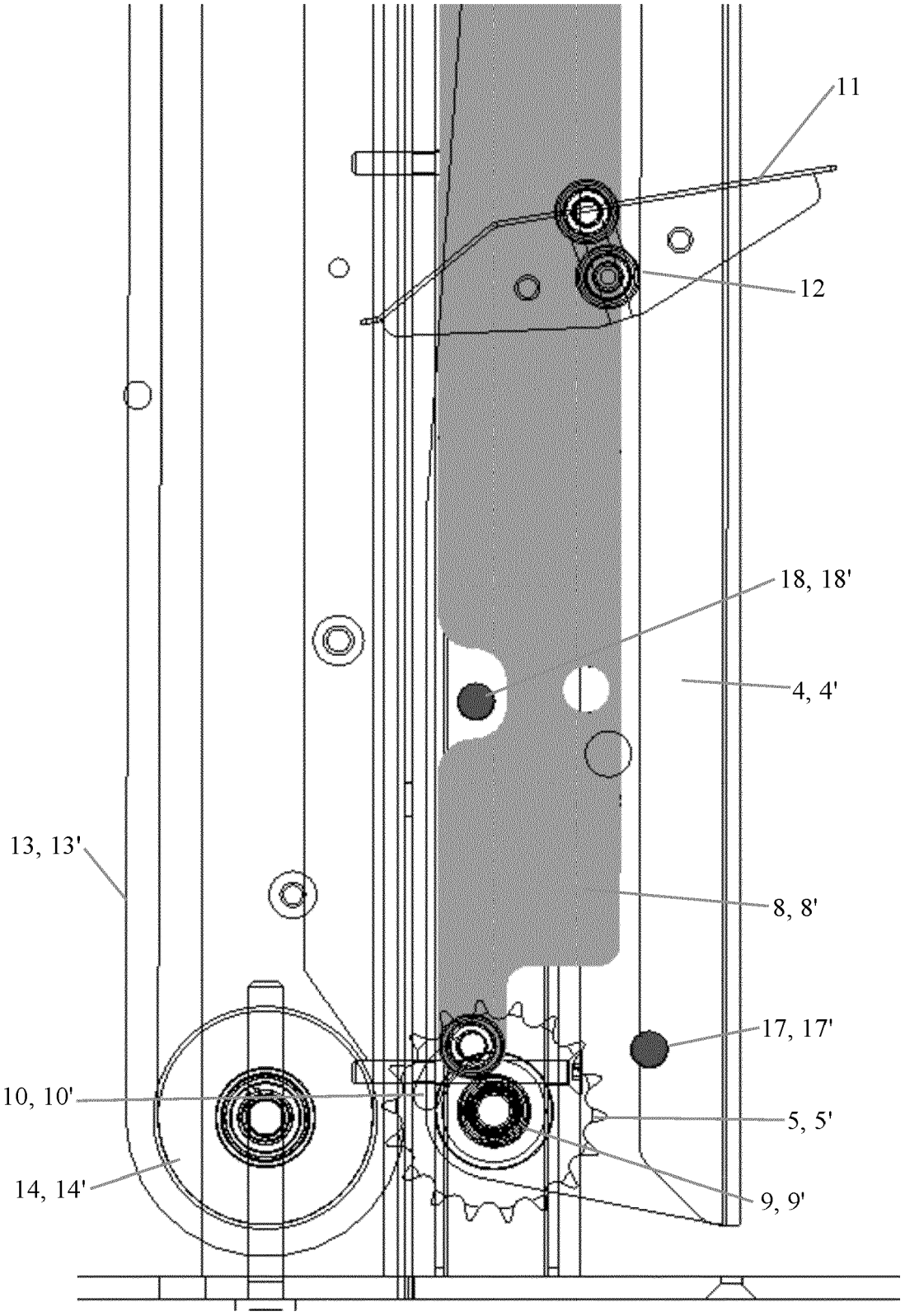

Fig. 7

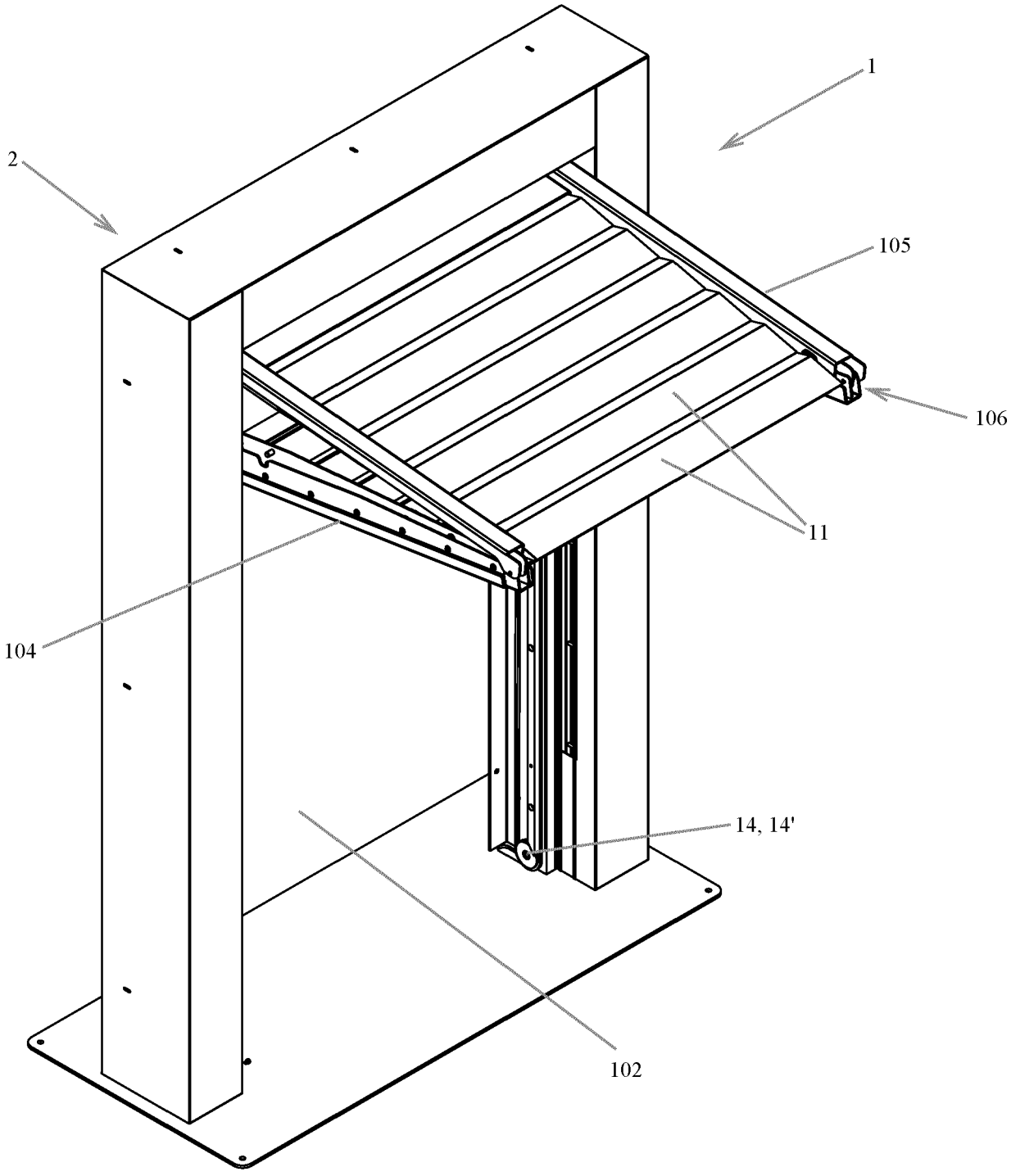

Fig. 8

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EUROPEAN SEARCH REPORT

Application Number
EP 22 17 2846

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 9 249 615 B2 (ARTETA LOREDO AGUSTIN [ES]) 2 February 2016 (2016-02-02) * figures 1,2,8,9 *	1-8	INV. E04F10/10 E06B7/086 E06B7/09
A	JP H07 59867 B2 (KENKOSHA KK; NIPPON ENGINEER MATES CORP) 28 June 1995 (1995-06-28) * abstract; figures 1,3-6 *	1-8	E06B9/06
A	DE 33 35 429 A1 (NIJS JOHANNES ALBERTUS) 19 April 1984 (1984-04-19) * the whole document *	1-8	

TECHNICAL FIELDS SEARCHED (IPC)

E04F
E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	7 September 2022	Cornu, Olivier

CATEGORY OF CITED DOCUMENTS

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07-09-2022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 9249615 B2	02-02-2016	EP 2829683 A1	28-01-2015
		ES 2426316 A1	22-10-2013
		ES 2618278 T3	21-06-2017
		US 2015052815 A1	26-02-2015
		WO 2013140003 A1	26-09-2013
JP H0759867 B2	28-06-1995	JP H0759867 B2	28-06-1995
		JP S6424990 A	26-01-1989
		KR 890002517 A	10-04-1989
DE 3335429 A1	19-04-1984	DE 3335429 A1	19-04-1984
		NL 8203764 A	16-04-1984

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Patent documents cited in the description

- US 9249615 B2 **[0007]**
- JP H0759867 B **[0008]**
- DE 3335429 A1 **[0009]**