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(54) SCREEN AND METHOD FOR ASSEMBLING A SCREEN

(57) The invention relates to a screen for protection against sun or rain, the screen comprising: an elongated housing with a longitudinal axis, two guides which are arranged or can be arranged at the elongated housing, wherein the guides extend substantially transverse to the longitudinal axis of the housing and substantially parallel to each other, one or more carriages movably received within and between or below the two guides, and one or more pieces of fabric each arranged between the housing and one of the one or more carriages or between two adjacent carriages, wherein a drive mechanism is arranged in each of the two guides, which is operatively connected to a driven carriage of the one or more carriages, wherein the drive mechanism is adapted for moving the driven carriage between an extended and retracted state, wherein a drive is arranged within the housing, adapted for driving the drive mechanism in each of the two guides, wherein the drive and the drive mechanism of each of the two guides are configured, such that the drive and drive mechanism of each of the two guides are directly coupled upon the installation of each of the two guides.

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Description

BACKGROUND

[0001] The invention relates to a screen for protection against sun or rain. Additionally, the invention relates to a method for constructing a screen.

[0002] Such a screen is known from for example EP 1 964 998 B1. The screen comprises pieces of fabric on carriages, which are moveable along a pair of guides; means for providing a belt drive along the guides, comprising a drive pulley in each guide for transmitting a movement to the belt; and a transmission for transmitting a synchronous rotation to the drive pulleys of which each is provided with an own drive shaft, wherein the transmission comprises a transmission shaft independent of each of the drive shafts, wherein a gearing is arranged between the transmission shaft and each of the drive shafts for transmitting the synchronous rotation to the drive pulleys.

[0003] In retracted state, the carriages are positioned against each other, against the housing, and the pieces of fabric hang garland-wise under it. In use, the carriages with pieces of fabric are moved away from the housing by the belt drive in the guides, until the pieces of fabric are tight and offer the desired protection.

SUMMARY OF THE INVENTION

[0004] A disadvantage of these types of screens is that at the location where the guides and the housing come together, a number of structural functions must be realized: the attachment of the guides and taking up the weight of carriages and the guides with pieces of fabric; providing a pivot point through which the inclination of the screen can be adjusted; transmitting power from the drive towards belt drive in the guide; and adjusting the drive mechanisms such that the carriages are parallel to the housing. The known screens have complex constructions for realizing these structural functions.

[0005] It is an object of the present invention to provide an simplified screen, an easier to build screen or an alternative screen.

[0006] According to a first aspect, the invention provides a screen for protection against sun or rain, the screen comprising: an elongated housing with a longitudinal axis, two guides which are arranged or can be arranged at the elongated housing, wherein the guides extend substantially transverse to the longitudinal axis of the housing and substantially parallel to each other, one or more carriages movably received within and between or below the two guides, and one or more pieces of fabric each arranged between the housing and one of the one or more carriages or between two adjacent carriages, wherein a drive mechanism is arranged in each of the two guides, which is operatively connected to a driven carriage of the one or more carriages, wherein the drive mechanism is adapted for moving the driven carriage between an extended and retractedd state, wherein a drive is arranged within the housing, adapted for driving the drive mechanism in each of the two guides, wherein the drive and the drive mechanism of each of the two guides are configured, such that the drive and drive mechanism of each of the two guides are directly coupled upon the installation of each of the two guides.

[0007] With the screen according to the invention, it is possible to arrange each of the guides in the housing of the screen, wherein during the installation of each of the guides the drive mechanism thereof and the drive within the housing are directly coupled. When the drive is coupled with the drive mechanism in a respective guide, the drive can drive the drive mechanism and the screen is usable. Installation of a guide and coupling thereof with the drive, thus, can be carried out in a single action. The synchronization of the carriages can also be restored if necessary by lifting a guide, whereby the drive and the drive mechanism can be disconnected momentarily. The screen according to the invention is thus easier to assemble than the known screen.

[0008] Further, the screen of the invention has a simple construction, since the drive and the drive mechanisms of each guides are directly connected. This is advantageous since the screen according to the invention is thus a simplified screen in comparison to the known screen.

[0009] It is noted that in the context of the present patent application, the driven carriage has to be understood as the front or leading carriage. In other words, the carriage which is located the furthest away from the housing.

[0010] In an embodiment, the drive mechanism of each guide comprises a first drive wheel arranged at the end of the respective guide facing the housing. In a further embodiment thereof, the drive in the housing has two second drive wheels, wherein each of the two second drive wheels is adapted for engaging the first drive wheel of one of the two guides. By bringing each of the two second drive wheel into engagement with the first drive wheel of the drive mechanism of a respective guide, a direct transmission between the drive and the drive mechanism in each of the guides is achieved.

[0011] In the context of the present patent application, the two second drive wheels can be formed by two gear sprockets, such as plastic sprockets, arranged at the opposite ends of a tube, such as a smooth steel tube.

[0012] In an embodiment, the first drive wheel is a first toothed drive wheel and the two second drive wheels are second toothed drive wheels. An advantage of this embodiment is that a reliable transmission is realized due to the first toothed drive wheel and one of the second toothed drive wheels engaging in one another.

[0013] In an embodiment, the drive within the housing has a drive tube with a toothed outer circumference, and a tube motor arranged within the drive tube and operatively coupled to the drive tube for driving it in rotation, wherein the drive tube is adapted for engaging the first drive wheel of the two guides. Preferably, the drive tube is one toothed aluminum extrusion profile. An advantage

of this embodiment is that the use of one toothed aluminum extrusion profile as drive tube reduces the number of required components to a minimum, such that, among others, less assembly time is needed for building the screen.

[0014] In an embodiment, the drive mechanism of each of the guides is a belt drive mechanism, wherein the drive mechanism has a first toothed rotary wheel at the end facing the housing, a second toothed rotary wheel at the end facing away from the housing, and a toothed belt tensioned by the first and second toothed rotary wheel. In an embodiment thereof, the first toothed rotary wheel and the first drive wheel are arranged substantially parallel to each other. Preferably, the first toothed rotary wheel and the first drive wheel are arranged substantially coaxial with respect to each other. An advantage of arranging the first toothed rotary wheel and the first drive wheel coaxially is that transmitting the movement from the drive to the drive mechanism and driving the drive mechanism of the respective guide is accomplished by substantially the same components of the respective guide. Therefore, the number of required components in the guides can be limited.

[0015] In an embodiment, each of the guides comprises one or more attachment members for attachment thereof to the housing. In an embodiment thereof, the housing comprises for each of the guides a console for attachment of the respective guide to the housing.

[0016] In an embodiment, each console is provided with an attachment plate for attachment of the console to at least the housing, and one or more receiving brackets with a receiving recess for rotatably receiving the one or more attachment members of the respective guide. In practice, the console can be attached to the housing and to the wall to which the housing is mounted by means of the attachment plate. An advantage of this embodiment is that at least one of the guides can be lifted easily to adjust the position and/or orientation of the one or more carriages with respect to the housing.

[0017] A further advantage of this embodiment is that a pivot point is provided for pivoting the two guides with respect to the housing. In this way, the inclination of the fabric can be easily adjusted.

[0018] In an embodiment, the one or more attachment members are arranged coaxial with respect to the first toothed rotary wheel and the first drive wheel. An advantage of this embodiment is that the constructive functions which must be realized at the location where the guides and the housing meet, are fulfilled by the same components, while the driving function is retained at any angle of the screen without the need for any adjustment. These constructive functions involve attachment of the guides and absorbing the weight of the carriages and the guides with pieces of fabric; providing a pivot point, whereby the inclination of the fabric can be adjusted; transmitting the movement of the drive to the drive mechanism in each guide; and adjusting the drive mechanism such that the carriages are parallel to the housing. Assembling of the screen, therefore, is limited to installing preassembled guides into a preassembled housing. Hereby an advantageous simplification of the screen with limitation of the number of parts in the screen is achieved. Additionally, assembling the screen has become easier.

[0019] In an embodiment, one of the first toothed drive wheel and the two second toothed drive wheels is/are produced from plastic, and the other one of the first toothed drive wheel and the two second toothed drive wheels is/are produced from aluminum. An advantage of the use, for example, of a plastic first toothed drive wheel and an aluminum second toothed drive wheel is that wear due to engagement of the first toothed drive wheel and the second toothed drive wheel is kept to a minimum. In addition, little to no maintenance is required, since, for example, it is not necessary to lubricate the first and second drive wheels.

[0020] From a second aspect, the invention provides a method for assembling a screen according to the first aspect of the invention, the method comprising the steps of: positioning a housing; and attaching the two guides, wherein the drive and the drive mechanism of each of the two guides are configured in such way that at attaching each of the two guides, preferably at each provided angle of the screen to the ground, the drive and the drive mechanism of each of the two guides are coupled directly.

[0021] This method has at least the same advantages as that are mentioned in relation to the screen according to the first aspect of the invention.

[0022] In an embodiment, the method comprises the step of adjusting the drive mechanisms of the two guides to position the one or more carriages substantially parallel to the housing. In an embodiment thereof, the step of adjusting the drive mechanisms comprises the steps of lifting at least one of the guides and adjusting the drive mechanism of the at least one guide. An advantage of this embodiment is that the position and/or orientation of the one or more carriages with respect to the housing can be adjusted in a simple manner.

[0023] The various aspects and features described and shown in the specification can be applied, individually, wherever possible. These individual aspects and features can be made subject of divisional patent applications. This is in particular applicable to the aspects and features described in the attached dependent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] The invention will be elucidated on the basis of an exemplary embodiment shown in the attached drawings. Shown is in:

Figure 1 a screen with a housing and a first guide, a second guide and a fabric in an extended state according to an embodiment of the invention;

Figure 2 a partial side view of the screen of figure 1 in retracted state;

Figure 3 an isometric view of a first guide of figure 1;
Figures 4A - 4B an isometric view of a part of the housing and the second guide from figure 1 and a cross-section according to plane IVB, respectively; and
Figures 5A - 5B an isometric view of a drive wheel, a first toothed drive wheel, a toothed belt, a console, and a rotor in coupled and uncoupled state, respectively.

DETAILED DESCRIPTION OF THE INVENTION

[0025] A screen 1 for protection against sun or rain according to an embodiment of the invention is shown in figure 1. The screen 1 comprises a housing 2, for example, for attaching the screen 1 to a non-shown wall of a house. A first guide 3 and a second guide 4 are arranged to the housing 2. The first guide 3 and the second guide 4 are arranged parallel to each other and are extending substantially transversal to the housing 2. Carriages 5 are arranged between the first guide 3 and the second guide 4 of which the opposite ends are received movably within the first guide 3 and the second guide 5. Pieces of fabric 6 are arranged between the housing 2 and the adjacent carriage 5 and between adjacent carriages 5. The combination of the pieces of fabric 6 and carriages 5 constitute a fabric 7 for protecting the underlying space, when the fabric 7 is in the extended state, as show in figure 1.

[0026] As shown in figure 1, a cross-beam 8 is arranged at the ends of the first guide 3 and the second guide 4 facing away from the housing 2. A supporting pillar 9 for supporting at least the first guide 3 and the second guide 4 with respect to a non-shown underground is arranged at the cross-beam 8 near the end of each of the first guide 3 and the second guide 4 facing away from the housing 2.

[0027] In another non-shown embodiment, the screen 4 can be hung up in an existing construction without the use of supporting pillars 9.

[0028] A partial side view of the screen 1 in retracted state is shown in figure 2, in which the housing 2, the first guide 3 and the pieces of fabric 6 are shown. When the screen is in the retracted state, the carriages 5 are placed substantially against each other and are moved towards the housing 2. The pieces of fabric 6, in side view, hang below the first guide 3 and the second guide 4, thereby forming bags. In other words, the pieces of fabric hang garland-wise below the first guide 3 and the second guide 4, seen in side view.

[0029] As shown in figure 3, the first guide 3 has an elongated guiding body 40. The guiding body 40 is provided with an elongated slot 42 at the side facing the other guide 3,4. The elongated slot 31 is adapted for movably receiving an end of each of the carriages 5. A cavity 43 extending between the first side 44 and the longitudinally opposite second side 45 is provided within the elongated guiding body 40. An endless toothed belt 46 extending beyond each of the first side 44 and the second side 45 is provided within the cavity 43. The endless toothed belt 46 is tensioned between a first toothed rotary wheel 47 at the first side 44, and a second toothed rotary wheel 48 at the second side 45. A tensioning device 49 is arranged at the second side 45, which tensioning device 49 is connected with the second toothed rotary wheel 48 for maintaining tension of the endless toothed belt 46. The endless toothed belt 46 is in operative communication with at least the carriage 5 which is furthest away from the housing 2, when the screen 1 is in the extended position.

[0030] In a further non-shown embodiment of the screen 1, the elongated slot 42 can be provided on the underside of the elongated guiding body 40.

[0031] The first toothed rotary wheel 47 has a drive shaft 50 extending through the drive wheel 47. A toothed drive wheel 51 with a plurality of teeth 52 on its outer surface is arranged adjacent to the first toothed rotary wheel 47, wherein the toothed drive wheel 51 is arranged at the drive shaft 50. When the toothed drive wheel 51 is rotated, the first toothed drive wheel 51 will also rotate. By rotating the first toothed drive wheel 51, the endless toothed belt 46 is set into motion, whereby the carriage 5 connected to the endless toothed belt 46 is moved through the slot 42. Since the carriages 5 are mutually connected by the pieces of fabric 6, the following carriages 5 will move with the driven carriage 5, when the screen 1 is brought into the extended position. During bringing the screen 1 into the retracted state, the driven carriage 5 will push the remaining carriages 5 towards the housing 2. The axis of rotation 50 falls at both ends into a bearing in an attachment member 53, which is fixedly connected to guide 4 and which is rotatably mountable in the housing 2 when installing the first guide 3 into the housing 2. The attachment members 53, the first toothed rotary wheel 47 and the driving wheel 51 are coaxial with respect to each other.

[0032] The drive wheel 51 can be made of plastic or aluminum.

[0033] In the screen 1 according to the present patent application, the first guide 3 and the second guide 4 are substantially identical yet turn-symmetrical.

[0034] An isometric view of the housing 2 and the second guide 4 of the screen 1 of figure 1 is shown in Figure 4A, wherein only the described elements are shown in the figure. The housing 2 has a housing body 20 which comprises a lower housing body part 21 and an upper housing body part 22. A first end cover 24 is provided at the first end 23 of the housing 2 for covering the first end 23 of the housing 2.

[0035] As shown in Figures 4A and 4B, the lower housing body part 21 has a substantially U-shaped cross-section. A drive 25 is arranged within the lower housing body part 21. Optionally, the bottom of the lower housing body part 21 can be folded open to replace the drive 25. The drive 25 has a tube motor 26 and a drive tube 27 in which the tube motor 26 is received. The tube motor 26 is op-

eratively coupled to the drive tube 27 for driving the drive tube 27 in rotation. The drive tube 27 has a plurality of teeth 28 on its outer surface for providing a toothed outer surface. The tubular motor 26 is controllable in a manner known per se.

[0036] The drive tube 27 can be made of aluminum, and is preferably made of another material than the drive wheel 51 of the guides 3, 4.

[0037] As shown in figure 4A, the upper housing body part 22 has an abutment side 29 and an opposite internal side 30. The abutment side 29 is adapted to abut, for example, against a non-shown wall of a house. A console 31 is provided on the internal side 30 of the upper housing body part 22. The console 31 has an attachment plate 32 for attaching the console 31 to the internal side 30 and to the wall on which the screen is suspended. At the side of the attachment plate 32 facing away from the internal side, two receiving brackets 33 are provided which extend above a part of the drive 25. Each of the receiving brackets 33 has a receiving recess 34 for rotatably receiving one of the attachment members 53 of the respective guide 3, 4. A attachment bracket 35 is placed over each of the attachment members 53, which attachments brackets 35 are fixed to the receiving brackets 33 by means of screws 36.

[0038] As shown in Figure 4B, the teeth 52 of the drive wheel 51 and the teeth 28 of the drive tube 27 are in engagement. When the drive 25 is switched on, the drive tube 27 will rotate about the axis of rotation A. The movement of the drive tube 27 will be transferred to the drive wheel 51 and the first toothed rotary wheel 47 connected thereto. Due to the rotation of the first toothed wheel 47, the endless toothed belt 46 is driven and thus the driven carriage 5 connected thereto. Depending on the direction of rotation of the drive tube 27, the screen 1 is brought into the extended or retracted state.

[0039] Figures 5A and 5B schematically show the coupling of one of the first guide 3 and the second guide 4, wherein for clarification a number of parts of the screen 1 is not shown.

[0040] As shown in Fig. 5A, the respective guide 3, 4 is supplied in an assembled manner, so that the respective guide 3, 4 can be directly installed into the housing 2. In order to install the respective guide 3, 4 in the housing 2, the guide 3, 4 needs to be positioned within the housing 2 in such a manner that the attachment members 53 are above the receiving brackets 33. Thereafter, the guide 3, 4 can be lowered so that the attachment members 53 are received in the receiving recesses 34 of the receiving brackets 33, as shown in figure 5B. When the attachment members 53 are received in the receiving recesses 53, the teeth 52 of the drive wheel 51 and the teeth 28 of the drive tube 27 are in engagement and the drive wheel 51 can be driven directly.

[0041] The inclination of the first guide 3 and the second guide 4 can be adjusted as desired, wherein the drive wheel 51 remains in engagement with the drive tube 27.

[0042] The above description is included to illustrate the operation of the preferred embodiments and is not meant to limit the scope of the invention. From the above discussion, many variations will be apparent to one skilled in the art that would yet be encompassed by the scope of the present invention.

Claims

1. Screen for protection against sun or rain, the screen comprising: an elongated housing with a longitudinal axis, two guides which are arranged or can be arranged at the elongated housing, wherein the guides extend substantially transverse to the longitudinal axis of the housing and substantially parallel to each other, one or more carriages movably received within and between or below the two guides, and one or more pieces of fabric each arranged between the housing and one of the one or more carriages or between two adjacent carriages, wherein a drive mechanism is arranged in each of the two guides, which is operatively connected to a driven carriage of the one or more carriages, wherein the drive mechanism is adapted for moving the driven carriage between an extended and retracted state, wherein a drive is arranged within the housing, adapted for driving the drive mechanism in each of the two guides, wherein the drive and the drive mechanism of each of the two guides are configured, such that the drive and drive mechanism of each of the two guides are directly coupled upon the installation of each of the two guides.

2. Screen according to claim 1, wherein the drive mechanism of each guide comprises a first drive wheel arranged at the end of the respective guide facing the housing.

3. Screen according to claim 2, wherein the drive in the housing has two second drive wheels, wherein each of the two second drive wheels is adapted for engaging the first drive wheel of one of the two guides.

4. Screen according to claim 2 and claim 3, wherein the first drive wheel is a first toothed drive wheel and the two second drive wheels are second toothed drive wheels.

5. Screen according to claim 2, wherein the drive within the housing has a drive tube with a toothed outer circumference, and a tube motor arranged within the drive tube and operatively coupled to the drive tube for driving it in rotation, wherein the drive tube is adapted for engaging the first drive wheel of the two guides, preferably wherein the drive tube is a toothed aluminum extrusion profile.

6. Screen according to any one of the preceding claims,

wherein the drive mechanism of each of the guides is a belt drive mechanism, wherein the drive mechanism has a first toothed rotary wheel at the end facing the housing, a second toothed rotary wheel at the end facing away from the housing, and a toothed belt tensioned by the first and second toothed rotary wheel.

7. Screen according to claim 6, when dependent on claim2, wherein the first toothed rotary wheel and the first drive wheel are arranged substantially parallel to each other, preferably wherein the first toothed rotary wheel and the first drive wheel are arranged substantially coaxial with respect to each other.

8. Screen according to any one of the preceding claims, wherein each of the guides comprises one or more attachment members for attachment thereof to the housing.

9. Device according to any one of the preceding claims, wherein the housing comprises for each of the guides a console for attachment of the respective guide to the housing.

10. Device according to claims 8 and 9, wherein each console is provided with an attachment plate for attachment of the console to at least the housing, and one or more receiving brackets with a receiving recess for rotatably receiving the one or more attachment members of the respective guide.

11. Device according to claim 10, when dependent on claim 7, wherein the one or more attachment members are arranged coaxial with respect to the first toothed rotary wheel and the first drive wheel.

12. Device according to any one of the preceding claims, when dependent on claim 4, wherein one of the first toothed drive wheel and the two second toothed drive wheels is/are produced from plastic, and the other one of the first toothed drive wheel and the two second toothed drive wheels is/are produced from aluminum.

13. Method for assembling a screen according to any one of the preceding claims, the method comprising the steps of: positioning a housing; and attaching the two guides, wherein the drive and the drive mechanism of each of the two guides are configured in such way that at attaching each of the two guides, preferably at each provided angle of the screen to the ground, the drive and the drive mechanism of each of the two guides are coupled directly.

14. Method according to claim 13, further comprising the step of adjusting the drive mechanisms of the two guides to position the one or more carriages substantially parallel to the housing.

15. Method according to claim 14, wherein the step of adjusting the drive mechanisms comprises the steps of lifting at least one of the guides and adjusting the drive mechanism of the at least one guide.

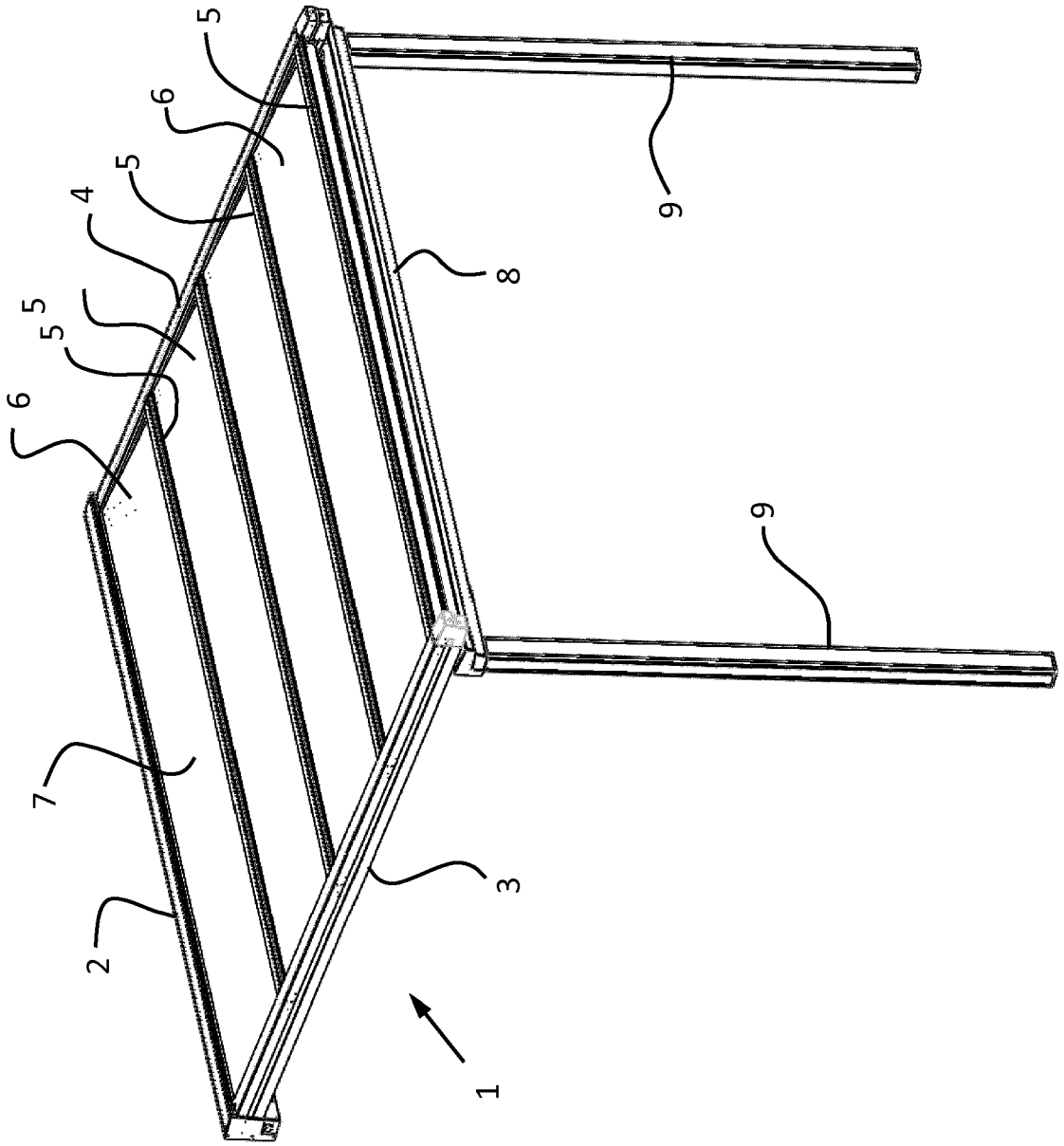

FIG. 1

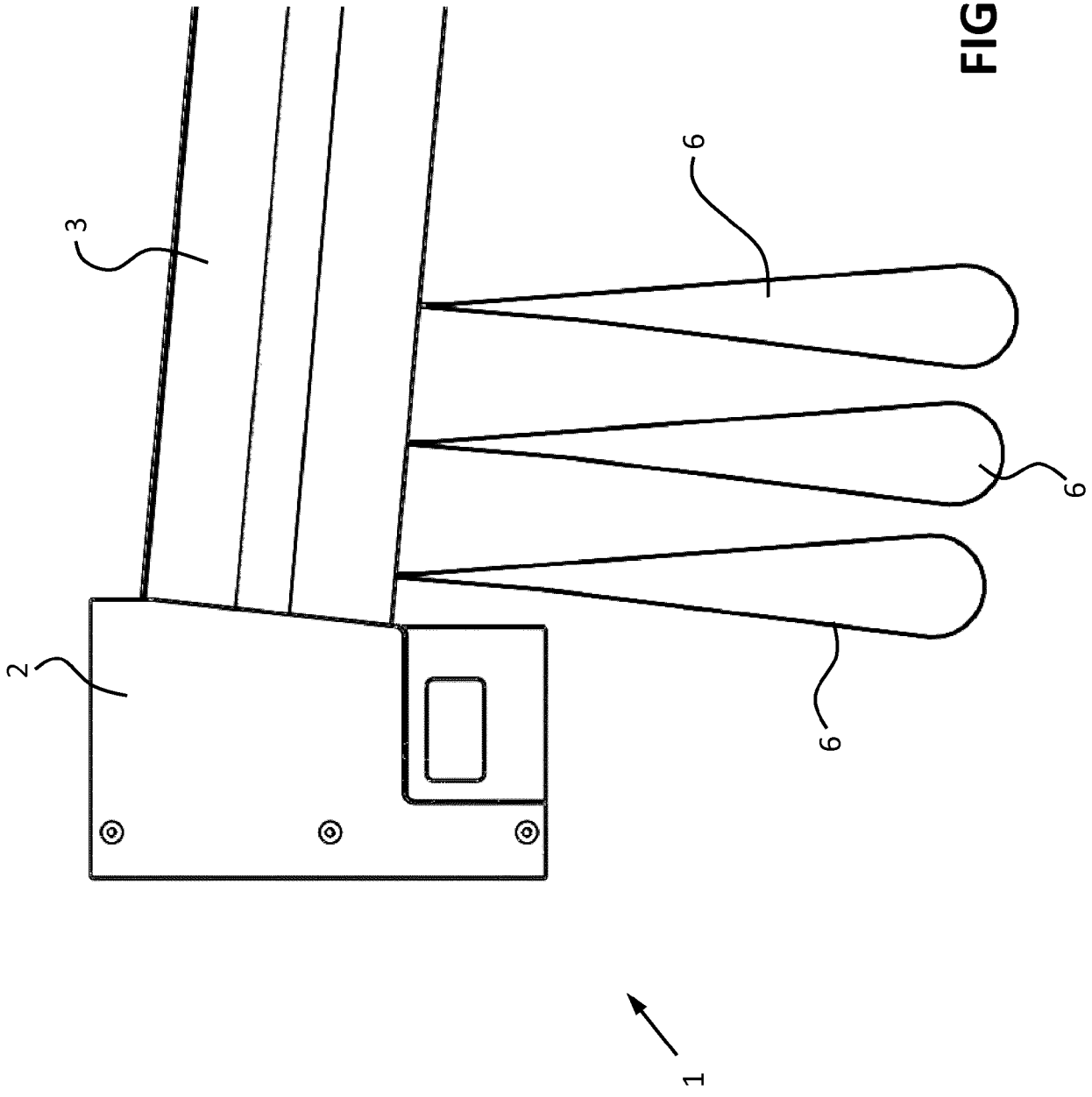

FIG. 2

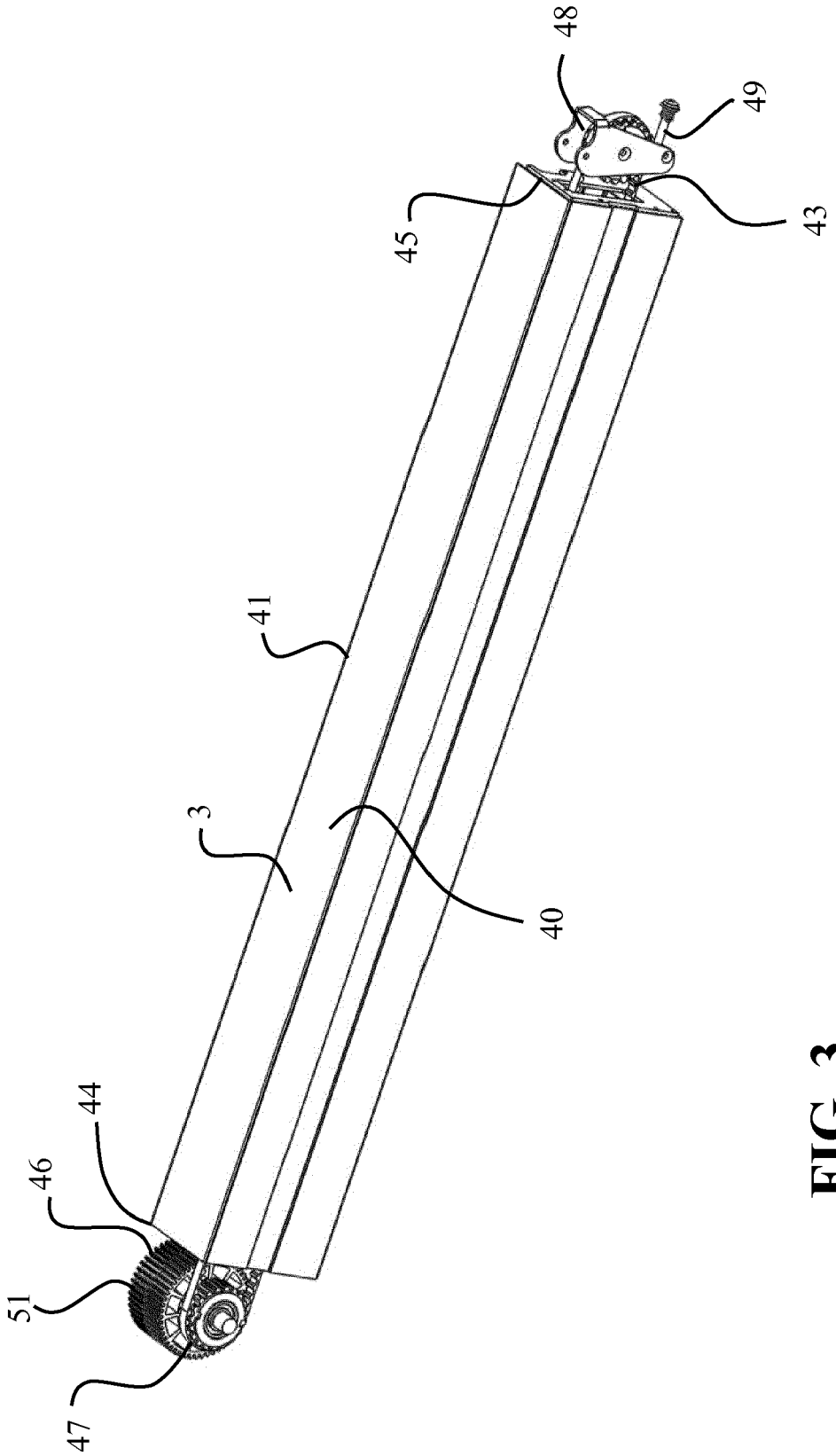

FIG. 3

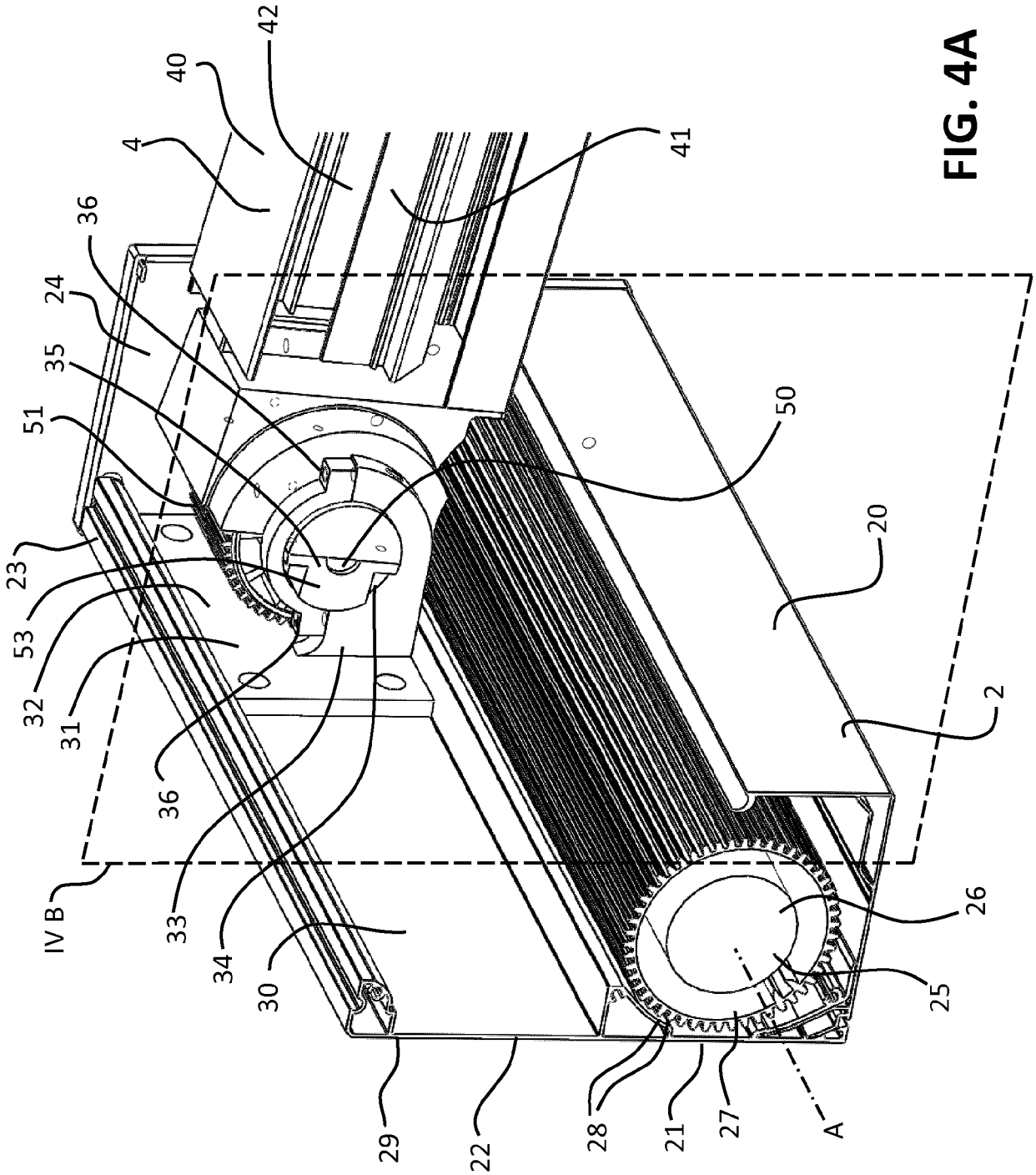
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FIG. 4A

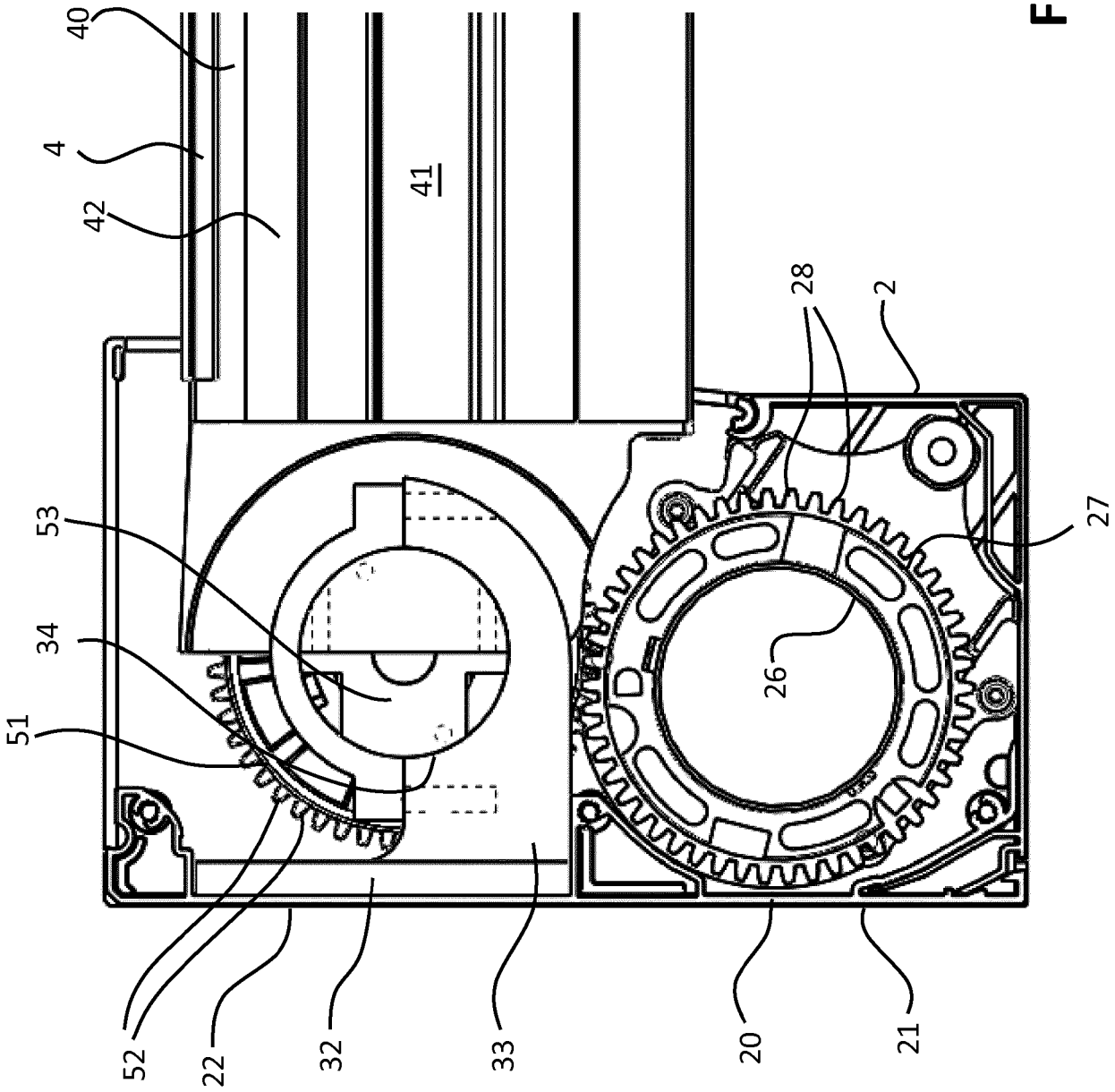

FIG. 4B

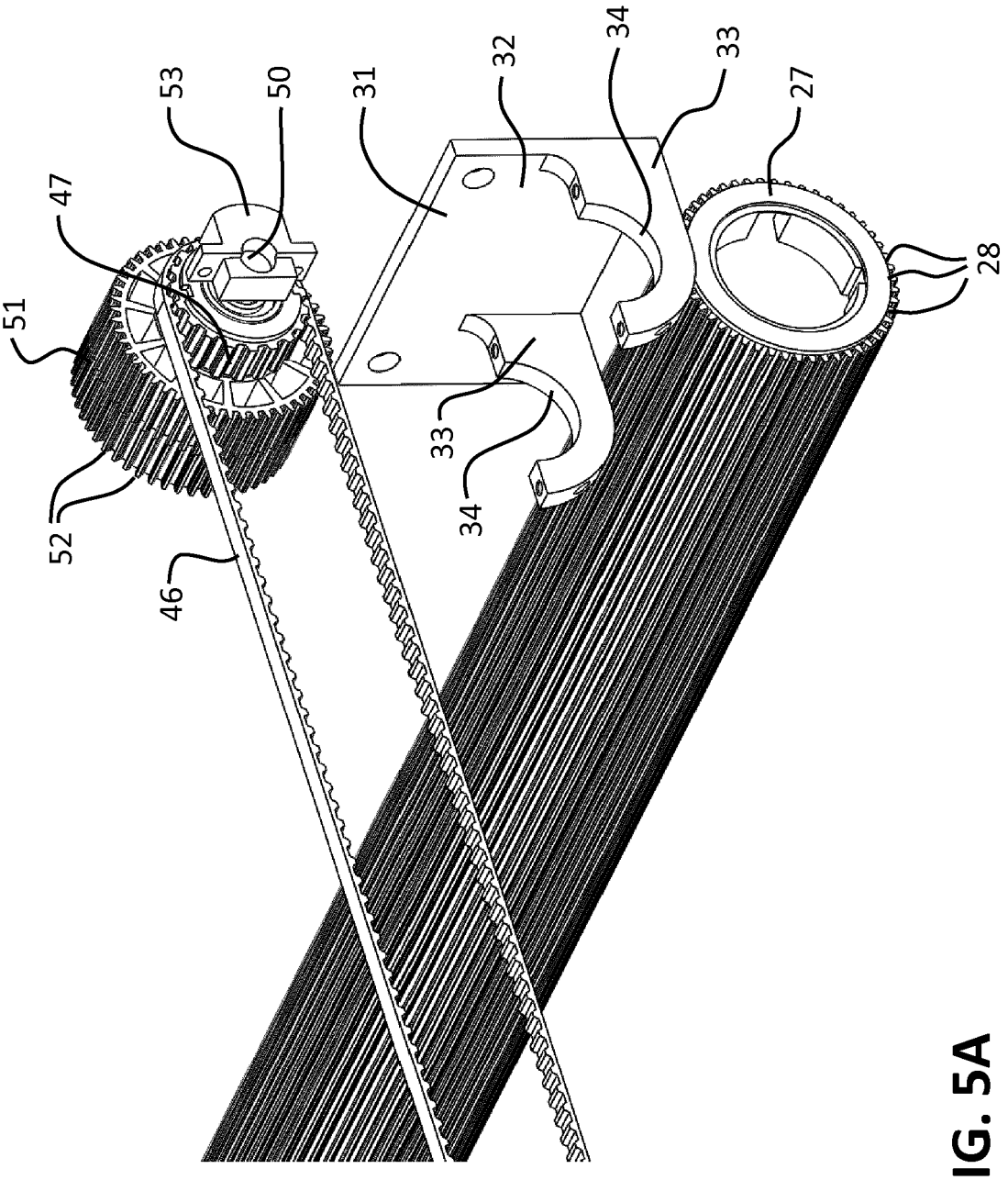

FIG. 5A

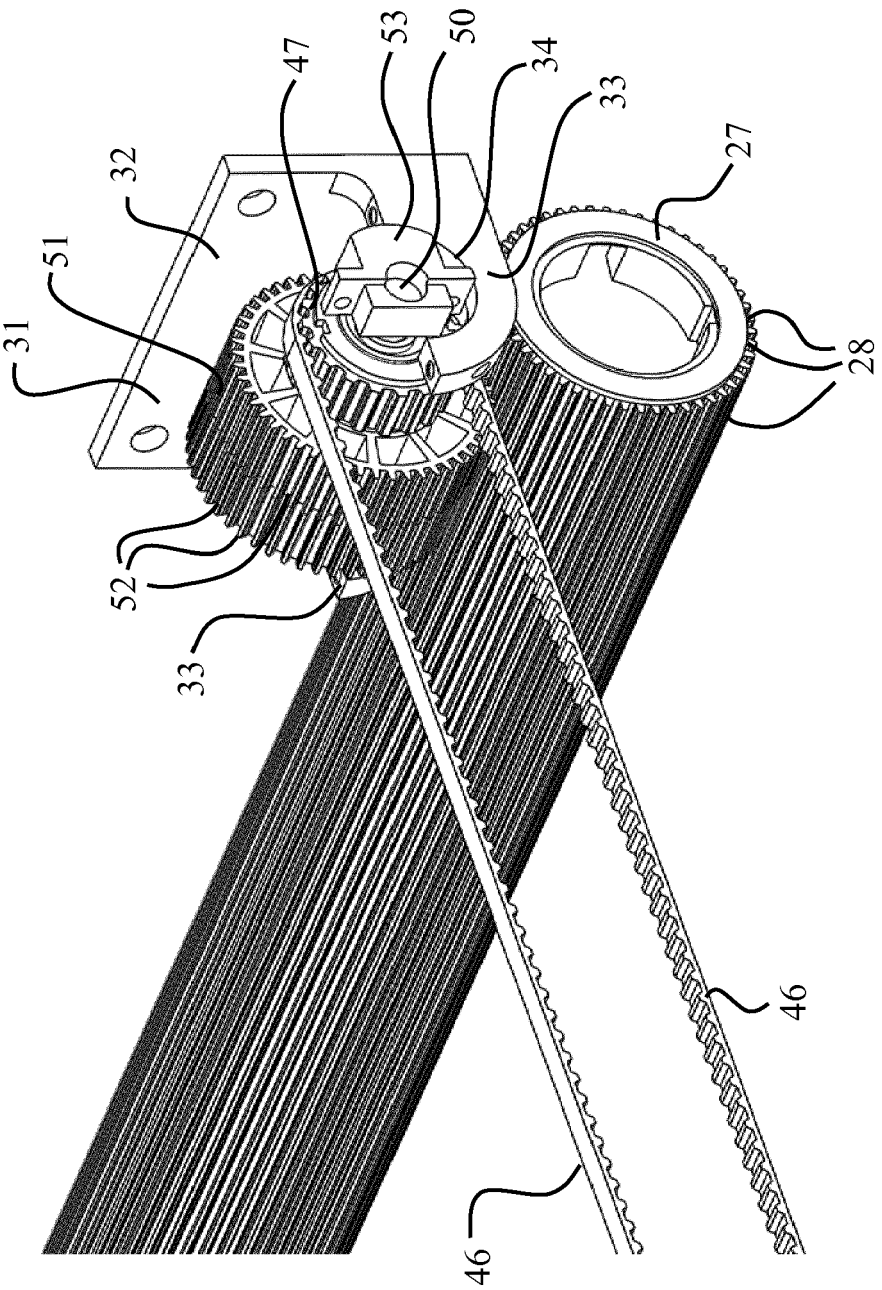

FIG. 5B

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EUROPEAN SEARCH REPORT

Application Number
EP 19 15 9718

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 Y	CN 105 464 301 A (WENZHOU ORJEER IND CO LTD) 6 April 2016 (2016-04-06) * paragraph [0018]; figures 1-3 * -----	1-4,8,9, 12-15 5-7	INV. E04F10/02
Y	WO 2015/170275 A1 (RENSON SUNPROT PROJECTS NV [BE]) 12 November 2015 (2015-11-12) * page 4, line 23 - page 5, line 14; figures 3-4 * -----	5,6	
Y	DE 199 14 543 A1 (WAREMA RENKHOFF GMBH & CO KG [DE]) 5 October 2000 (2000-10-05) * column 3, line 67 - column 4, line 27; claim 6; figures 1-2 * -----	7	

TECHNICAL FIELDS SEARCHED (IPC)

E04F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	5 June 2019	Kofoed, Peter

CATEGORY OF CITED DOCUMENTS

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05-06-2019

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