



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
20.05.2020 Bulletin 2020/21

(51) Int Cl.:
E06B 11/04 (2006.01) **E06B 11/02** (2006.01)
E05F 15/635 (2015.01) **E06B 3/92** (2006.01)
E05F 17/00 (2006.01)

(21) Application number: **19208502.5**

(22) Date of filing: **12.11.2019**

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

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(30) Priority: **16.11.2018 IT 201800010397**

(54) **SLIDABLE GATE**

(57) Slidable gate which comprises a first slidable panel (2) and a second slidable panel (3), actuation means (14) mechanically connected to the first slidable panel (2) in order to drive the movement thereof, and a transmission system (18) placed to connect between the first slidable panel (2) and the second slidable panel (3) in order to move the latter to be displaced with relative motion with respect to the first slidable panel (2). The transmission system (18) comprises: a fixed rack (19) intended to be fixed to the ground; a first toothed wheel

(20) mounted on the first slidable panel (2) and engaged with the fixed rack (19), in a manner such that the first toothed wheel (20) is rotated by the fixed rack (19) during the displacement of the first slidable panel (2); motion transformation means (21), which are mechanically connected to the first toothed wheel (20) in order to receive a rotary motion from the latter, and are mechanically connected to the second slidable panel (3) in order to move the latter with a rectilinear motion.

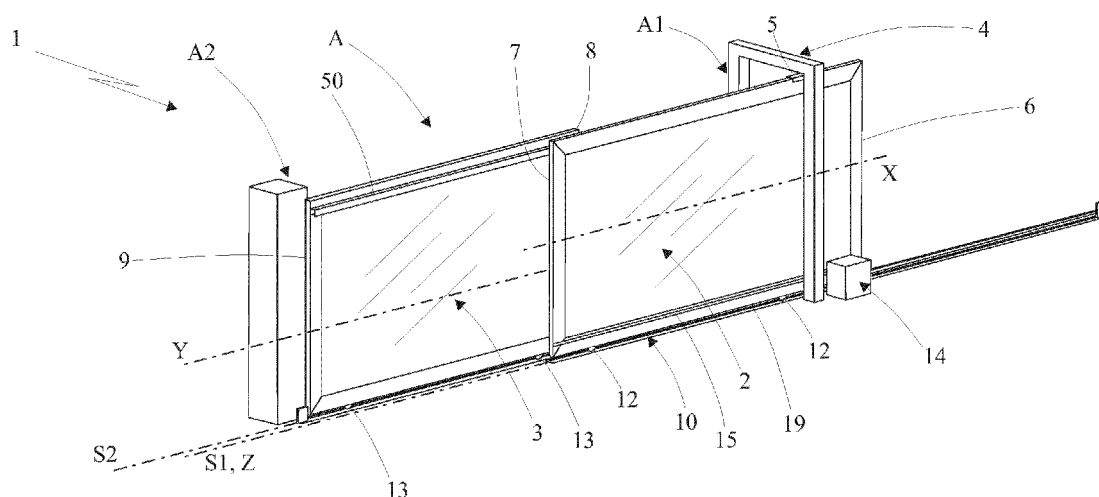


Fig. 1

Description

Field of application

[0001] The present invention regards a slidable gate according to the preamble of the independent claim 1.

[0002] The present slidable gate is advantageously inserted in the field of production of gates and of accessories for gates, and in general of structural elements employable for delimiting an access passage, vehicle-accessible or pedestrian, for access to a property, construction, company, building or garden.

[0003] In particular, the present gate can have considerable size, especially for access to an industrial building, or it can have limited size for residential applications, and it can also be made of metal or of another material and can allow viewing therethrough, partially or totally.

[0004] More in detail, the present slidable gate is of so-called "telescopic" type, being provided with two or more slidable panels that are movable with respect to each other in order to close or open the access passage.

State of the art

[0005] The slidable gates of known type conventionally comprise a slidable panel on the lower part provided with multiple idle wheels in line that are engaged on a rail fixed to the ground.

[0006] Conventionally, the movement of the gate is obtained in an automated manner, by means of a motor placed alongside the gate itself.

[0007] Presently, the slidable gates with automated movement conventionally comprise a rack, which is fixed on one side of the slidable panel for the entire length of the latter, and is engaged by a pinion of the output shaft of the motor. In this manner, when the motor is actuated, the rotation of its pinion causes the displacement of the rack and, consequently, the sliding of the panel along the rail.

[0008] In particular, slidable carriages of so-called "telescopic" type are widespread on the market; these are provided with two slidable panels side-by-side each other and movable with respect to each other on corresponding rails.

[0009] Such telescopic gate is movable between an open position, in which the two slidable panels are collected one next to the other outside the bulk of the access passage, and a closed position, in which the two slidable panels are extended one after the other in a manner such to occupy the entire extension of the access passage.

[0010] More in detail, the movement of the slidable panels is driven by the motor which acts on a first of such panels, in a manner analogous to that described above for the conventional slidable gates. In addition, the telescopic gates comprise transmission means that transmit the motion from the first panel, connected directly to the motor, to the second panel, in a manner such to move the two panels in a coordinated manner during the open-

ing and closing of the gate.

[0011] More in detail, an example of known type of such transmission means comprises a system of transmitted ropes which provides for two transmission pulleys mounted on the two ends of the first panel, around which a transmission rope is wound like a ring. The latter carries fixed thereto, along its lower section, a reference bracket fixed to the ground, and carries fixed thereto, along its upper section, a connection bracket fixed to the second panel of the gate.

[0012] In operation, following the movement of the first panel by the motor, the transmission rope is moved by displacing the connection bracket from one end of the first panel to the other, hence causing a relative displacement of the second panel (fixed to the connection bracket) with respect to the first panel which allows obtaining the telescopic movement of the two panels.

[0013] This solution of known type nevertheless has several drawbacks.

[0014] A first drawback is due to the fact that the aforesaid slidable gate requires the attainment of specific structural components (such as pulleys, transmission rope, brackets) in order to build means that transmit the motion from the first panel to the second panel of the gate, hence rendering the latter structurally complex and costly to attain.

[0015] A further drawback is due to the fact that the operations of installation of the gate are relatively long and laborious since it is necessary to apply the pulleys and the transmission rope to the first panel of the gate and execute appropriate adjustment operations in order to obtain the correct tensioning of the transmission rope.

[0016] A further drawback is due to the fact that the transmission rope is susceptible of sustaining yielding or elongation over time that could bring the two panels to assume incorrect positions when the gate is closed or open.

Presentation of the invention

[0017] In this situation, the problem underlying the present invention is therefore that of eliminating the drawbacks of the prior art known up to now, by providing a slidable gate that is structurally simple and inexpensive to make.

[0018] A further object of the present invention is to provide a slidable gate with simple and quick installation.

[0019] A further object of the present invention is to provide a slidable gate that is entirely safe and reliable in operation.

[0020] A further object of the present invention is to provide a slidable gate free of frequent maintenance operations.

Brief description of the drawings

[0021] The technical characteristics of the invention, according to the aforesaid objects, can be clearly seen

in the contents of the below-reported claims and the advantages thereof will be more evident in the following detailed description, made with reference to the enclosed drawings, which represent a merely exemplifying and non-limiting embodiment of the invention, in which:

- figure 1 shows a perspective view of an example of the slidable gate, object of the present invention, in which the slidable panels are in closed position;
- figure 2 shows a perspective view of the present slidable gate, in which the slidable panels are in open position;
- figure 3 shows a side view of the present slidable gate, in which a solid line indicates the slidable panels in open position and a dashed line indicates the slidable panels in closed position;
- figure 4 shows a top plan view of the present slidable gate, in which the slidable panels are in open position;
- figure 5 shows a sectional view of the present slidable gate according to the trace V-V of figure 3;
- figure 6 shows a detail of the slidable gate illustrated in figure 5, contained within the frame VI of the figure 5 itself;
- figure 7 shows a detail of the slidable gate illustrated in figure 3, contained within the frame VII of the figure 3 itself;
- figure 8 shows a perspective view of a detail of the present slidable gate, relative to the transmission means that transmit the motion from a first slidable panel to a second slidable panel, in which the framework of the first slidable panel was removed in order to better illustrate other components of the slidable gate.

Detailed description of a preferred embodiment

[0022] With reference to the enclosed drawings, reference number 1 overall indicates an example of a slidable gate, object of the present invention.

[0023] In general, with the term gate it must be intended, without departing from the protective scope of the present patent, any one barrier, such as a door or a gate for outdoor settings, susceptible of sliding between the two provided open and closed positions, in order to carry out the conventional function of controlling an access passage A, vehicle-accessible or pedestrian, for access to a property, construction, company, building or garden.

[0024] In particular, the present slidable gate 1 is of "telescopic" type (in accordance with the term employed in the jargon of the field), being provided with two or more slidable panels movable with respect to each other in order to close or open the access passage A, as discussed in detail hereinbelow.

[0025] In particular, with reference to the example of figures 1 and 2, the access passage A is extended between a first side A1 and a second side A2, each of which delimited for example by two vertical structures, such as

a column or the edge of a wall.

[0026] In accordance with the examples of the enclosed figures, the slidable gate 1 comprises a first slidable panel 2, which is extended along a first extension direction X and is movable along a first sliding direction S1 parallel to such first extension direction X. In addition, the slidable gate 1 comprises a second slidable panel 3, which is extended along a second extension direction Y parallel to and side-by-side the first extension direction X of the first slidable panel 2 and is movable along a second sliding direction S2 parallel to such second extension direction Y.

[0027] The two slidable panels 2, 3 are movable along the corresponding sliding directions S1, S2 between a closed position (illustrated in the example of figure 1), in which the slidable panels 2, 3 are placed one after the other, occupying corresponding sections of the access passage A so as to close it, and an open position (illustrated in the example of figure 2), in which the slidable panels 2, 3 are placed one next to the other outside the access passage A so as to leave the latter free.

[0028] In particular, with reference to the example of the enclosed figures, each slidable panel 2, 3 has a main extension along its extension direction X, Y, preferably horizontal, and is extended on an extension plane passing through such extension direction X, Y and preferably vertical.

[0029] For example, each slidable panel 2, 3 comprises a framework, preferably metallic, provided with a lower strut and with an upper strut connected to each other by two or more crosspieces, and suitably closed by darkening coverage panels or by gratings.

[0030] In particular, the first and the second slidable panel 2, 3 are respectively provided with a first internal side 21 and with a second internal side 31, which, when the slidable panels 2, 3 are in the open position, are placed facing each other.

[0031] Advantageously, the slidable gate 1 comprises a support framework 4, which supports in vertical position at least the first slidable panel 2, for example by means of a guide bracket 5 provided with two series of first guide rollers 5', between which the upper strut of the first slidable panel 2 is inserted as illustrated in the example of figure 5. With reference to the example of figure 2, the support framework 4 is intended to be placed at the first side A1 of the access passage and comprises in particular a column for example provided with two legs spaced from each other, between which the slidable panels 2, 3 are susceptible of passing, and which are at the top connected by a bridge to which the guide bracket 5 is fixed.

[0032] Advantageously, the second slidable panel 3 is vertically supported at least by the first slidable panel 2, by means of for example a guide track 50 which is fixed on the second internal side 31 of the second slidable panel 3 (in particular to the upper strut of the latter), it is extended parallel to the second extension direction Y and is slidably engaged with two or more second guide rollers 50' mounted on the first internal side 21 of the first slidable

panel 2 for example by means of a support bracket 50", as illustrated in the example of figure 5.

[0033] Preferably, the first slidable panel 2 is extended along its first extension direction X between a first rear end 6 and a first front end 7, and the second slidable panel 3 is extended along its second extension direction Y between a second rear end 8 and a second front end 9.

[0034] When the slidable panels 2, 3 are in the open position, these are placed with their front ends 7, 9 at a first side A1 of the access passage A and with their rear ends 6, 8 outside the access passage A itself (as illustrated in the example of figure 2). When the slidable panels 2, 3 are in their closed position, the first slidable panel 2 is positioned with its first rear end 6 at the first side A1 of the access passage A, occupying a first section of the latter which extends from the first side A1 of the access passage A to the first front end 7 of the first slidable panel 2; in addition, the second slidable panel 3 is positioned with its second rear end 8 at the first front end 7 of the first slidable panel 2 and with its second front end 9 at the second side A2 of the access passage A in order to occupy a remaining second section of the latter (as illustrated in the example of figure 1).

[0035] Advantageously, the slidable gate 1 comprises a first rail 10, which is extended parallel to the first extension direction X in order to guide the movement of the first slidable panel 2 along the first sliding direction S1, and a second rail 11, which is extended parallel to the second extension direction Y in order to guide the movement of the second slidable panel 3 along the second sliding direction S2.

[0036] The first rail 10 and the second rail 11 are intended to be fixed to the ground (for example by means of doweling or embedding in a cement base) and are placed one next to the other, parallel to each other, without encountering each other.

[0037] In particular, with reference to the example of figure 6, each rail 10, 11 is provided with a corresponding top engagement portion 10', 11' (in particular intended to project in relief from the ground) and preferably two lateral base portions 10", 11" (intended for example to be doweled to the ground or embedded in the cement base) between which the engagement portion 10', 11' is placed, projecting upward with respect to the corresponding lateral base portions 10", 11".

[0038] The first slidable panel 2 is provided with corresponding first wheels 12 slidably constrained to the first rail 10 and the second slidable panel 3 is provided with corresponding second wheels 13 slidably constrained to the second rail 11, in a manner such to allow the corresponding slidable panels 2, 3 to be moved, following the extension of the corresponding rails 10, 11.

[0039] Advantageously, the first wheels 12 and the second wheels 13 are idly mounted at the lower strut of the framework of the corresponding slidable panel 2, 3 and are preferably placed aligned with each other along the extension direction X, Y of the corresponding slidable panel 2, 3.

[0040] In particular, with reference to the example of figure 6, the wheels 12, 13 of each slidable panel 2, 3 are inserted within the corresponding lower strut, which is provided on the lower part with suitable opening intended to be crossed by a portion of the wheels 12, 13 in order to allow the latter to be engaged with the corresponding rails 10, 11.

[0041] Preferably, each wheel 12, 13 is provided, along its tread surface, with an annular groove 12', 13' in which the engagement portion of the corresponding rail 10, 11 is inserted in order to constrain to the latter the wheel 12, 13 itself.

[0042] Suitably, the first wheels 12 and the second wheels 13 have revolution axis orthogonal to the extension plane of the corresponding slidable panel 2, 3 and in particular horizontal.

[0043] Of course, without departing from the protective scope of the present patent, the present slidable gate 1 can also comprise more than two slidable panels, advantageously engaged with corresponding rails and adapted to occupy, in closed position, corresponding sections of the access passage A.

[0044] According to the invention, the slidable gate 1 comprises actuation means 14 mechanically connected to the first slidable panel 2 and actuatable for driving the latter to be moved parallel to the first sliding direction S1.

[0045] For such purpose, advantageously, the first slidable panel 2 carries, fixed thereto, an actuation rack 15 extended parallel to the first extension direction X of the first slidable panel 2 itself and preferably fixed to the lower strut of the latter, for example by means of bolting or welding.

[0046] Advantageously, the actuation means 14 of the slidable gate 1 comprise an electric motor 16 provided with an output shaft which carries, fixed thereto, an actuation pinion 17 mechanically engaged with the actuation rack 15 so as to move the first slidable panel 2 along the first sliding direction S1 with rectilinear motion parallel to such first sliding direction S1.

[0047] With reference to the example of figure 6, the actuation pinion 17 is directly engaged with the actuation rack 15. Otherwise, the actuation pinion 17 can be connected to the actuation rack 15 by means of transmission means such as toothed transmission wheels.

[0048] With reference to the example illustrated in the enclosed figures, the actuation rack 15 is fixed along the lower strut of the first slidable panel 2 with the toothing directed downward in order to be engaged with the actuation pinion 17 of the electric motor 16 having horizontal rotation axis. Of course, the actuation rack 15 can be fixed also with the toothing directed upward, or horizontally in order to be engaged on an actuation pinion with vertical rotation axis.

[0049] In any case, the actuation rack 15 will have mechanical strength susceptible of resisting the stresses to which it is subjected following the movement of the first slidable panel 2. According to the invention, the slidable gate 1 comprises a transmission system 18 placed to

connect between the first slidable panel 2 and the second slidable panel 3 in order to transmit, to the latter, a rectilinear motion parallel to the second sliding direction S2 so as to move the second slidable panel 3 to be displaced parallel to such second sliding direction S2.

[0050] In particular, the transmission system 18 is arranged in order to slide, during the opening and closing movement of the slidable panels 2, 3, the second slidable panel 3 with relative motion with respect to the first slidable panel 2, in the same sense as the latter.

[0051] In particular, the transmission system 18 is configured for moving the second slidable panel 3 with higher speed with respect to the speed of the first slidable panel 2 (with respect to a common fixed reference), in a manner such that, during the displacement from the open position to the closed position, when the first slidable panel 2 has traveled the first section of the access passage A, being placed beyond the first side A1 of the access passage A itself, the second slidable panel 3 has traveled the aforesaid first section and the second section of the access passage A being placed between the first front end 7 of the first slidable panel 2 and the second side A2 of the access passage A. Analogously, during the displacement from the closed position to the open position, when the first slidable panel 2 has traveled the first section of the access passage A, being placed outside the latter, the second slidable panel 3 has traveled the second section and the first section of the access passage A, it too being placed outside the access passage A alongside the first slidable panel 2.

[0052] In accordance with the idea underlying the present invention, the transmission system 18 of the slidable gate 1 comprises a fixed rack 19, which is extended according to a third extension direction Z parallel to the first extension direction X of the first slidable panel 2 and to the second extension direction Y of the second slidable panel 3.

[0053] Such fixed rack 19 is intended to be rigidly fixed to the ground so as to be stopped with respect to the slidable panels 2, 3 when the latter are moved.

[0054] In addition, the transmission system 18 comprises a first toothed wheel 20, rotatably mounted on the first slidable panel 2 and engaged with the fixed rack 19, in a manner such that such first toothed wheel 20 is rotated by the fixed rack 19 during the displacement of the first slidable panel 2 along the first sliding direction S1.

[0055] In particular, when the first slidable panel 2 is actuated by the actuation means 14 to be displaced along its sliding direction S1, the first slidable panel 2 moves the first toothed wheel 20 along the fixed rack 19, which consequently rotates such first toothed wheel 20 during the advancing of the latter along the fixed rack 19 itself.

[0056] With reference to figures 6-8, the transmission system 18 also comprises motion transformation means 21 mechanically connected to the first toothed wheel 20 and to the second slidable panel 3 and arranged for receiving a rotary motion from the first toothed wheel 20 (rotated by the fixed rack 19) and for transmitting a rec-

tilinear motion to the second slidable panel 3 in order to move the latter along the corresponding second sliding direction S2, so as to move the second slidable panel 3 with relative motion with respect to the first slidable panel 2 during the displacement between the open position and the closed position, as described above.

[0057] Advantageously, in accordance with the embodiment illustrated in the enclosed figures, the fixed rack 19 of the transmission system 18 is arranged on the first rail 10, on which the first slidable panel 2 of the slidable gate 1 is mounted.

[0058] In particular, the fixed rack 19 is made at the engagement portion 10' of the first rail 10. Preferably, as illustrated in detail in figures 6-8, the first toothed wheel 20 is fixed around a corresponding wheel of the first wheels 12 of the first slidable panel 2, in a manner such that, in particular, the first toothed wheel 20 has both the function of allowing the transmission of the motion from the first slidable panel 2 to the second slidable panel 3 and the function of slidably supporting the first slidable panel 2 on the first rail 10.

[0059] For example, the first wheel 12 of the first slidable panel 2 comprises two lateral discs 12" intended to rotate along opposite sides of the engagement portion 10' of the first rail 10 (in particular in abutment against the corresponding lateral base portions 10" of the latter), and between such lateral discs 12" the first toothed wheel 20 is placed (in particular within the annular groove 12' of the first wheel 12), in a manner such that the first toothed wheel 20 is engaged with the fixed rack 19 made on the engagement portion 10' of the first rail 10.

[0060] In particular, the two lateral discs 12" have diameter correlated with the diameter of the pitch line of the first toothed wheel 20 in a manner such to maintain the rotation axis of the latter at a specific height from the first rail 10 such to allow the correct engagement of the first toothed wheel 20 with the fixed rack 19.

[0061] In accordance with a different embodiment not illustrated in the enclosed figures, the first toothed wheel 20 is obtained with a component that is distinct and separate from the first wheels 12 of the first slidable panel 2, in a manner such that the first wheels 12 have the function of supporting the first slidable panel 2 and the first toothed wheel 20 has the function of allowing the transmission of the motion from the first slidable panel 2 to the second slidable panel 3.

[0062] In accordance with a further different embodiment, the fixed rack 19 is made with a component separate from the first rail 10, being placed for example between the first rail 10 and the second rail 11, parallel to the latter, and is engaged with the first toothed wheel 20 (which in this case will be separated from the first wheel 12 of the first slidable panel).

[0063] Advantageously, with reference to the examples of the enclosed figures, the first toothed wheel 20 has a first rotation axis W1 orthogonal to the extension directions X, Y of the slidable panels 2, 3 and in particular orthogonal to the lying planes of the latter, being placed

substantially horizontal.

[0064] Suitably, the fixed rack 19 of the transmission system 18 is provided with a toothing directed upward in order to be engaged by the first toothing wheel 20 mounted on the first slidable panel 2 with the first rotation axis W1 horizontal.

[0065] Preferably, as is visible in the example of figures 6 and 7, the toothing of the fixed rack 19 is provided with engagement teeth 22, each of which has transverse section, on a plane orthogonal to the third extension direction Z, with substantially rounded form, and in particular curved. This in particular allows reducing the number of edges of the fixed rack 19 which, being placed on the ground, is tread by the vehicles and by the people who pass through the access passage A when the slidable panels 2, 3 are in open position.

[0066] Otherwise, from the example illustrated in the enclosed figures, in particular if the fixed rack 19 is separated from the first rail 10, the first toothing wheel 20 could also have the first rotation axis W1 vertical in order to be engaged with the fixed rack 19 placed with the toothing directed horizontally on one side of the slidable gate 1.

[0067] Advantageously, with reference to figures 6-8, the motion transformation means 21 of the transmission system 18 comprise a transmission rack 23 fixed to the second slidable panel 3 and mechanically connected to the first toothing wheel 20 mounted on the first slidable panel 2, in order to transform the rotary motion of the first toothing wheel 20 into the rectilinear motion of the second slidable panel 3.

[0068] In particular, the aforesaid transmission rack 23 is extended parallel to the second extension direction Y of the second slidable panel 3, preferably in a continuous manner from the second front end 9 to the second rear end 8 of the latter.

[0069] Preferably, the transmission rack 23 is positioned along the lower strut of the framework of the second slidable panel 2 and is rigidly fixed to the latter for example by means of bolting or welding.

[0070] Advantageously, the motion transformation means 21 also comprise a second toothing wheel 24, which is mechanically connected to the first toothing wheel 20 in order to receive the rotary motion and is engaged with the aforesaid transmission rack 23 in order to move the latter (and hence the second slidable panel 2) with rectilinear motion parallel to the second sliding direction S2.

[0071] In particular, the transmission rack 23 is placed on the second internal side 31 of the second slidable panel 3 and the second toothing wheel 24 is placed on the first internal side 21 of the first slidable panel 2 so as to be engaged with the transmission rack 23 itself.

[0072] With reference to the example illustrated in the enclosed figures, the second toothing wheel 24 has a second rotation axis W2, substantially horizontal (and in particular orthogonal to the lying plane of the first slidable panel 2) and the transmission rack 23 is placed with its toothing directed vertically (and in particular downward)

in order to be engaged with the second toothing wheel 24.

[0073] Advantageously, the second toothing wheel 24 of the motion transformation means 21 is coaxially fixed to the first toothing wheel 20, in particular with the first rotation axis W1 of the latter coinciding with the second rotation axis W2 of the second toothing wheel 24.

[0074] Preferably, the second toothing wheel 24 is rigidly connected to the first toothing wheel 20 by means of a drive shaft 25 coaxial with the rotation axes W1, W2 of the toothing wheels 20, 24 and fixed to the latter, for example fit by means of corresponding keys 26.

[0075] Suitably, the drive shaft 25 is rotatably mounted on the framework of the first slidable panel 2 (in particular on the lower strut of the latter) and supports the first toothing wheel 20 (advantageously with the corresponding first wheel 12) and the second toothing wheel 24.

[0076] For example, the drive shaft 25 is inserted within the lower strut of the first slidable panel 2 and is rotatably supported by the latter by means of rolling bearings 27 (e.g. ball bearings).

[0077] In particular, with reference to the embodiment of figures 6-8, the first slidable panel 2 is provided with two support plates 28 fixed on opposite sides of the first slidable panel 2 itself and in which the rolling bearings 27 connected to the drive shaft 25 are advantageously housed.

[0078] Preferably, the first slidable panel 2 comprises a protection casing 29 placed across from the second toothing wheel 24 (between the latter and the transmission rack 23) and on the upper part provided with a passage opening crossed by a portion of the second toothing wheel 24 in order to allow the latter to be engaged with the transmission rack 23 fixed to the second slidable panel 3.

[0079] Advantageously, the first toothing wheel 20 and the second first wheel 24 have equal pitch radius, in a manner such that the transmission ratio from the first toothing wheel 20 to the transmission rack 23 is 1:1. In particular, in such case, the relative speed of the second slidable panel 3, with respect to a fixed reference system with the first slidable panel 2, is equal to the speed of the latter with respect to a fixed reference system with the ground.

[0080] Advantageously, the second toothing wheel 24 (and preferably the first toothing wheel 20) is positioned at the first front end 7 of the first slidable panel 2. In this manner, when the slidable panels 2, 3 are in the open position, the second toothing wheel 24 is positioned, along the transmission rack 23, at the second front end 9 of the second slidable panel 3, and, when the slidable panels 2, 3 are in the closed position, the second toothing wheel 24 is positioned, along the transmission rack 23, at the second rear end 8 of the second slidable panel 3, in this manner it being possible to place the second slidable panel 3 as much as possible beyond the first front end 7 of the first slidable panel 2.

[0081] Preferably, the toothing wheels 20, 24 and the racks 19, 23 of the transmission system 18 are made of

rigid material, in particular metal (such as steel), having mechanical strength susceptible of resisting the stresses transmitted following the movement of the slidable panels 2, 3 of the slidable gate 1.

[0082] Of course, as already indicated above, the configuration, object of the present invention, can also be applied to slidable gates with more than two slidable panels. In such case, the transmission system 18 is repeated between the second slidable panel 3 and a third slidable panel, and so forth if further slidable panels are provided.

[0083] Even if the present slidable gate 1 is particularly suitable for the solution with rails on the ground for guiding the slidable panels (like the example illustrated in the enclosed figures), the claimed configuration can potentially also be applied to other types of gates, such as in a cantilever gate.

[0084] The invention thus conceived therefore attains the pre-established objects.

[0085] In particular, the transmission system 18 of the slidable gate 1 is attainable by means of components that are easily found on the market and are inexpensive (such as toothed wheels and racks).

[0086] In addition, the kinematic connection between toothed wheels 20, 24 and relative racks 19, 23 is simple and strong, rendering the present slidable gate particularly reliable and the installation thereof quick and easy.

Claims

1. Slidable gate (1), which comprises:

- a first slidable panel (2), which is extended along a first extension direction (X) between a first rear end (6) and a first front end (7), and is slidable along a first sliding direction (S1) parallel to said first extension direction (X);
- a second slidable panel (3), which is extended, between a second rear end (8) and a second front end (9), along a second extension direction (Y) parallel to and side-by-side said first extension direction (X), and is slidable along a second sliding direction (S2) parallel to said second extension direction (Y);
- actuation means (14) mechanically connected to said first slidable panel (2) and actuatable for driving said first slidable panel (2) to be moved parallel to said first sliding direction (S1);
- a transmission system (18) placed to connect between said first slidable panel (2) and said second slidable panel (3) in order to transmit, to said second slidable panel (3), a rectilinear motion parallel to said second sliding direction (S2) in order to move said second slidable panel (3) to be displaced parallel to said second sliding direction (S2);

wherein said actuation means (14) and said trans-

mission system (18) are adapted to move said slidable panels (2, 3) between an open position, in which said slidable panels (2, 3) are side-by-side each other, and a closed position, in which said slidable panels (2, 3) are extended one after the other with the second rear end (8) of said second slidable panel (3) positioned at the first front end (7) of said first slidable panel (2);

said slidable gate (1) being **characterized in that** said transmission system (18) comprises:

- a fixed rack (19), which is extended according to a third extension direction (Z) parallel to said first extension direction (X) and to said second extension direction (Y), and is intended to be fixed to the ground;
- a first toothed wheel (20), rotatably mounted on said first slidable panel (2) and engaged with said fixed rack (19), in a manner such that said first toothed wheel (20) is rotated by said fixed rack (19) during the displacement of said first slidable panel (2) along said first sliding direction (S1);
- motion transformation means (21), which are mechanically connected to said first toothed wheel (20) and to said second slidable panel (3), and are arranged for receiving a rotary motion from said first toothed wheel (20) and for transmitting said rectilinear motion to said second slidable panel (3) in order to move said second slidable panel (3) along said second sliding direction (S2);

wherein said motion transformation means (21) comprise:

- a transmission rack (23) fixed to said second slidable panel (3), extended parallel to said second extension direction (Y) and mechanically connected to said first toothed wheel (20);
- a second toothed wheel (24), which is positioned at the first front end (7) of said first slidable panel (2), is mechanically connected to said first toothed wheel (20) in order to receive said rotary motion and is engaged with said transmission rack (23) in order to move said transmission rack (23) with said rectilinear motion.

2. Slidable gate (1) according to claim 1, **characterized in that** it comprises:

- a first rail (10), which is extended parallel to said first extension direction (X) and is intended to be fixed to the ground;
- a second rail (11), which is extended parallel to said second extension direction (Y) and is intended to be fixed to the ground;

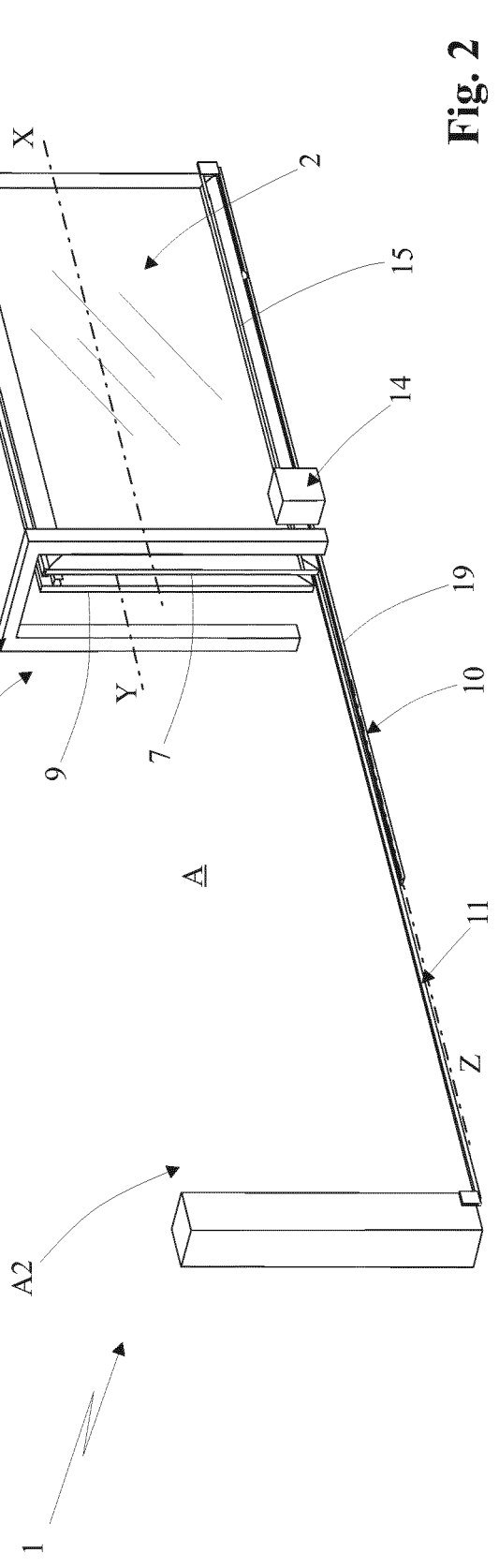
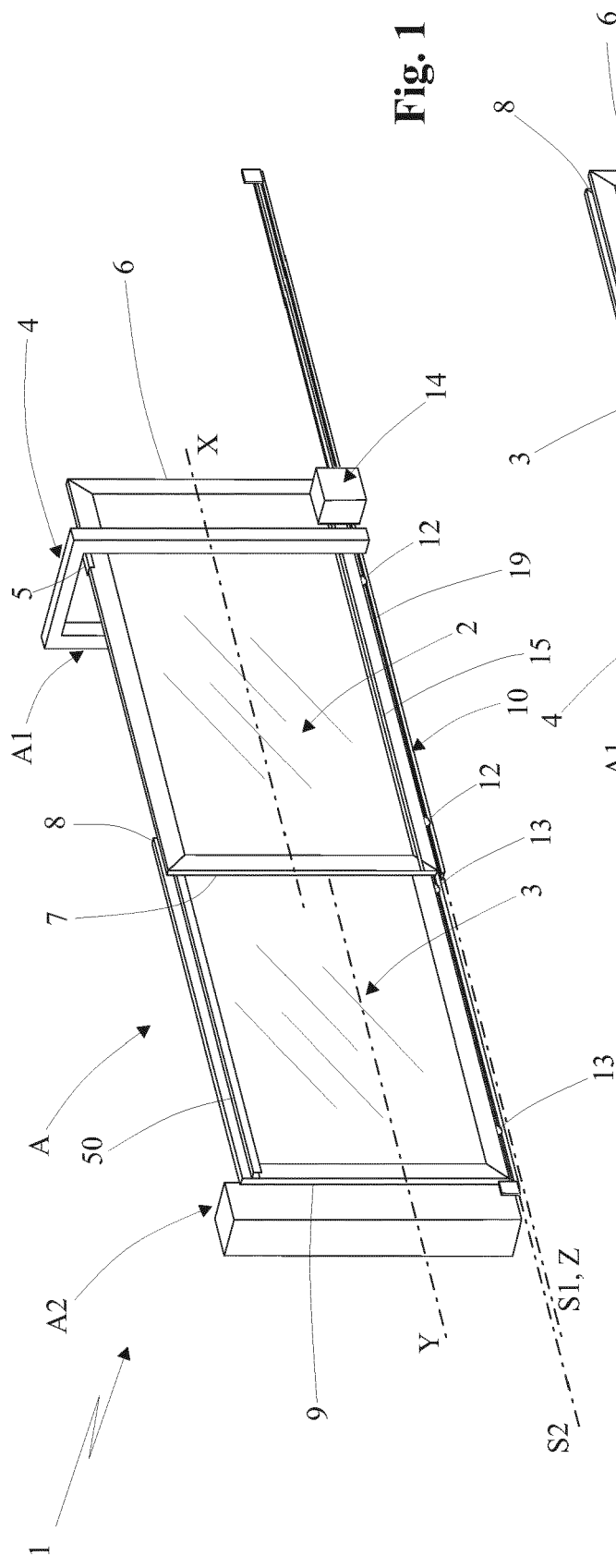
wherein:

- said first slidable panel (2) is provided with first wheels (12) slidably constrained to said first rail (10);
- said second slidable panel (3) is provided with second wheels (13) slidably constrained to said second rail (11).

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ing claims, **characterized in that** said first slidable panel (2) comprises a protection casing (29) placed in front of said second toothed wheel (24) and on the upper part provided with a passage opening crossed by a portion of said second toothed wheel (24) in a manner such that said second toothed wheel (24) is engaged with said transmission rack (23) fixed to said second slidable panel (3).

3. Slidable gate (1) according to claim 2, **characterized in that** said fixed rack (19) is arranged on said first rail (10). 10
4. Slidable gate (1) according to claim 3, **characterized in that** said said first rail (10) is provided with a top engagement portion (10') and with two lateral base portions (10'') between which said engagement portion (10') is placed, projecting upward with respect to said lateral base portions (10''); wherein said fixed rack (19) is arranged on the engagement portion (10') of said first rail (10). 15 20
5. Slidable gate (1) according to claim 3 or 4, **characterized in that** said first toothed wheel (20) is fixed around one of the first wheels (12) of said first slidable panel (2). 25
6. Slidable gate (1) according to claims 4 and 5, **characterized in that** said first wheel (12), to which said first toothed wheel (20) is fixed, comprises two lateral discs (12'') adapted to rotate along opposite sides of the engagement portion (10') of said first rail (10), and between such lateral discs (12'') said first toothed wheel (20) is placed, which is engaged with said fixed rack (19) made on the engagement portion (10') of said first rail (10). 30 35
7. Slidable gate (1) according to any one of the preceding claims, **characterized in that** said first toothed wheel (20) has a first rotation axis (W1) orthogonal to said first and second extension direction (X, Y) and substantially horizontal; wherein said fixed rack (19) is provided with a toothing directed upward and engaged by said first toothed wheel (20). 40 45
8. Slidable gate (1) according to claim 7, **characterized in that** the toothing of said fixed rack (19) is provided with a series of engagement teeth (22), each of which having transverse section, on a plane orthogonal to said third extension direction (Z), with substantially rounded form. 50
9. Slidable gate (1) according to any one of the preceding claims, **characterized in that** said second toothed wheel (24) is coaxially fixed to said first toothed wheel (20). 55
10. Slidable gate (1) according to any one of the preced-



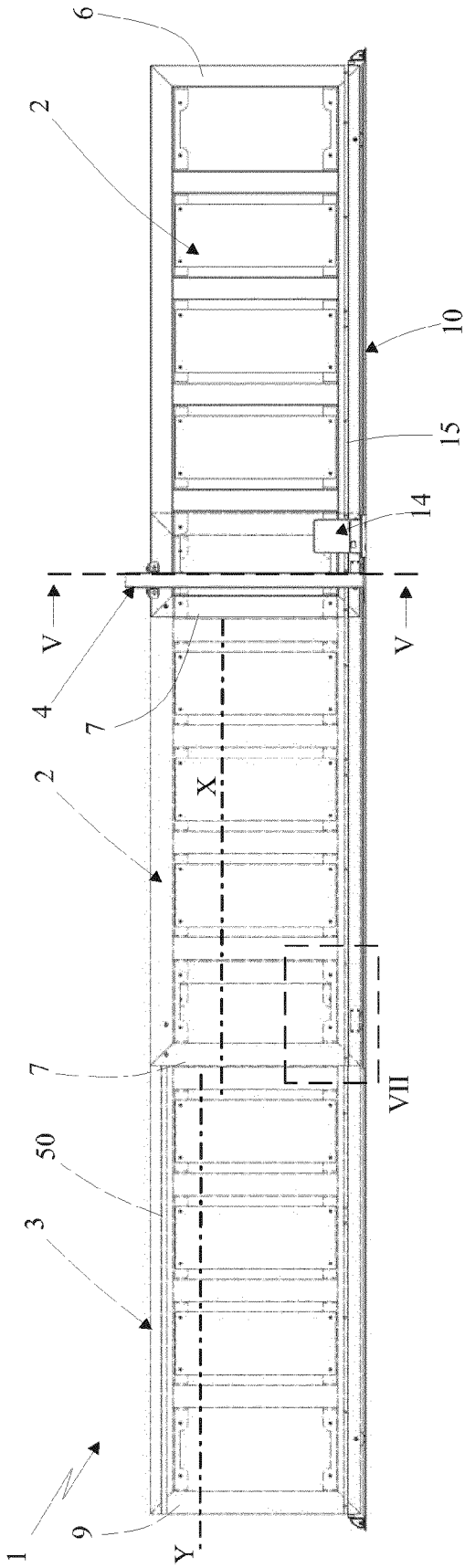


Fig. 3

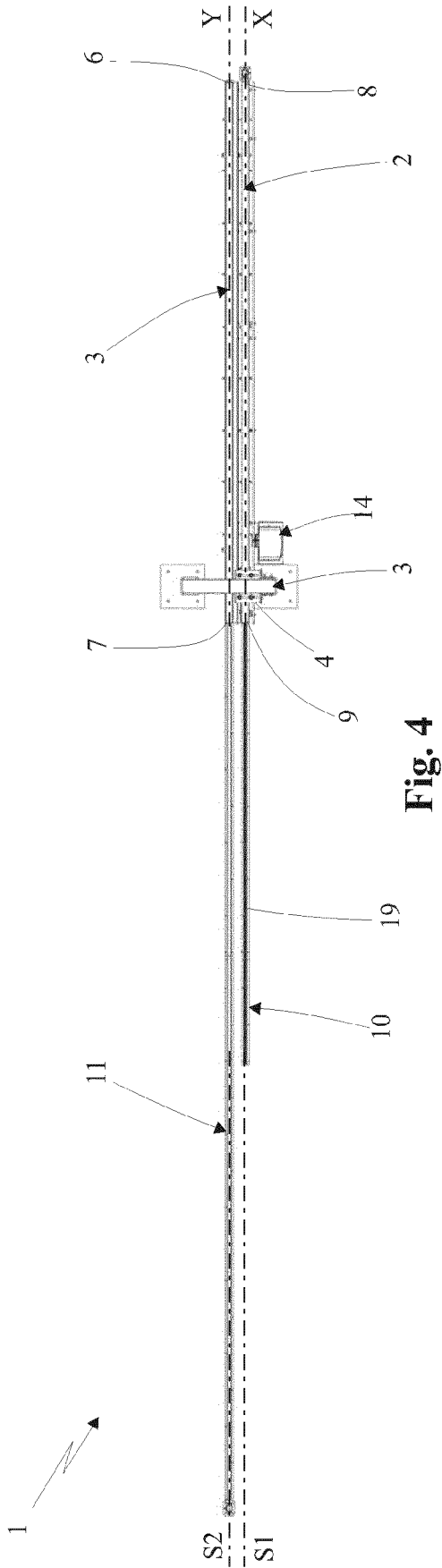


Fig. 4

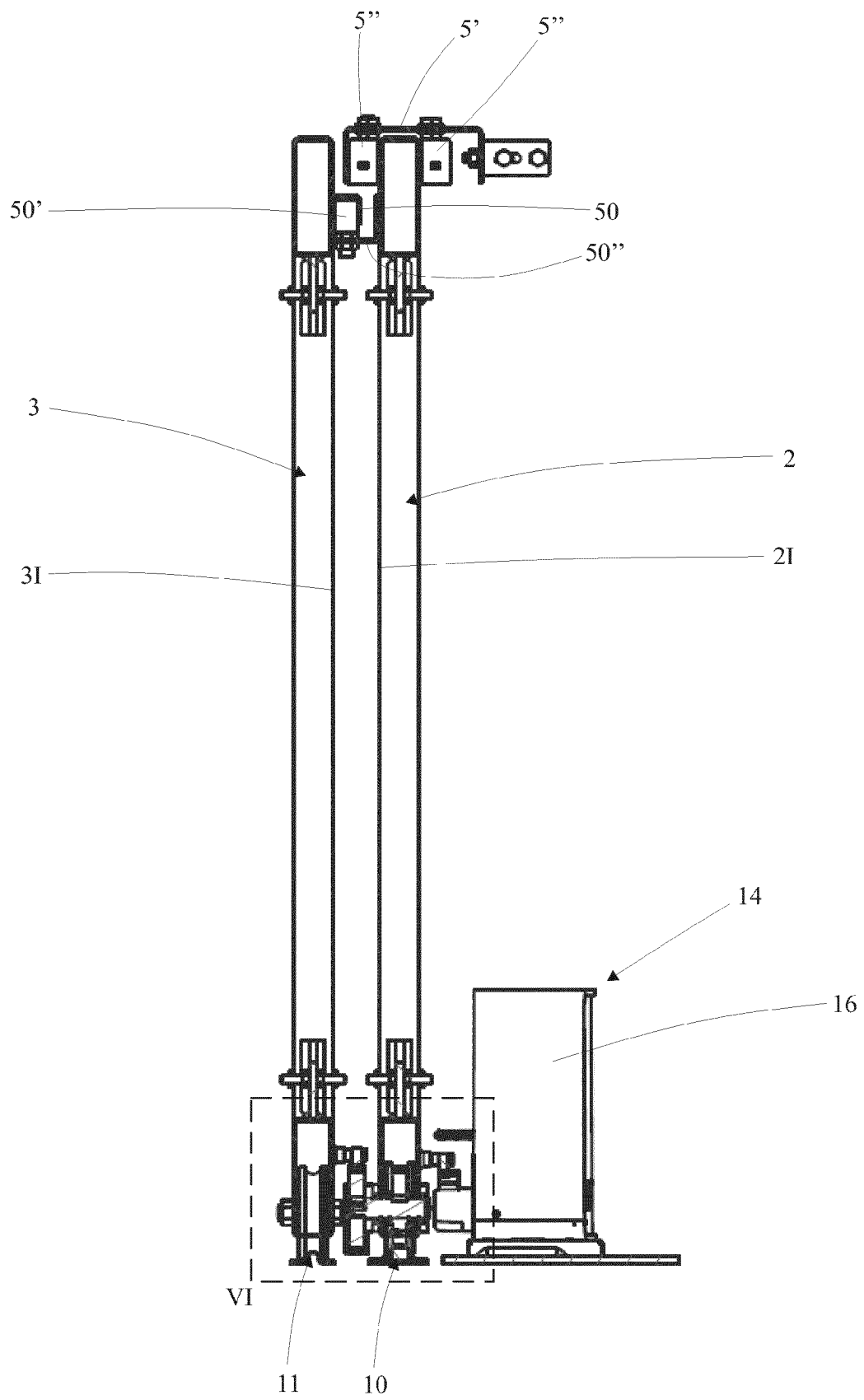
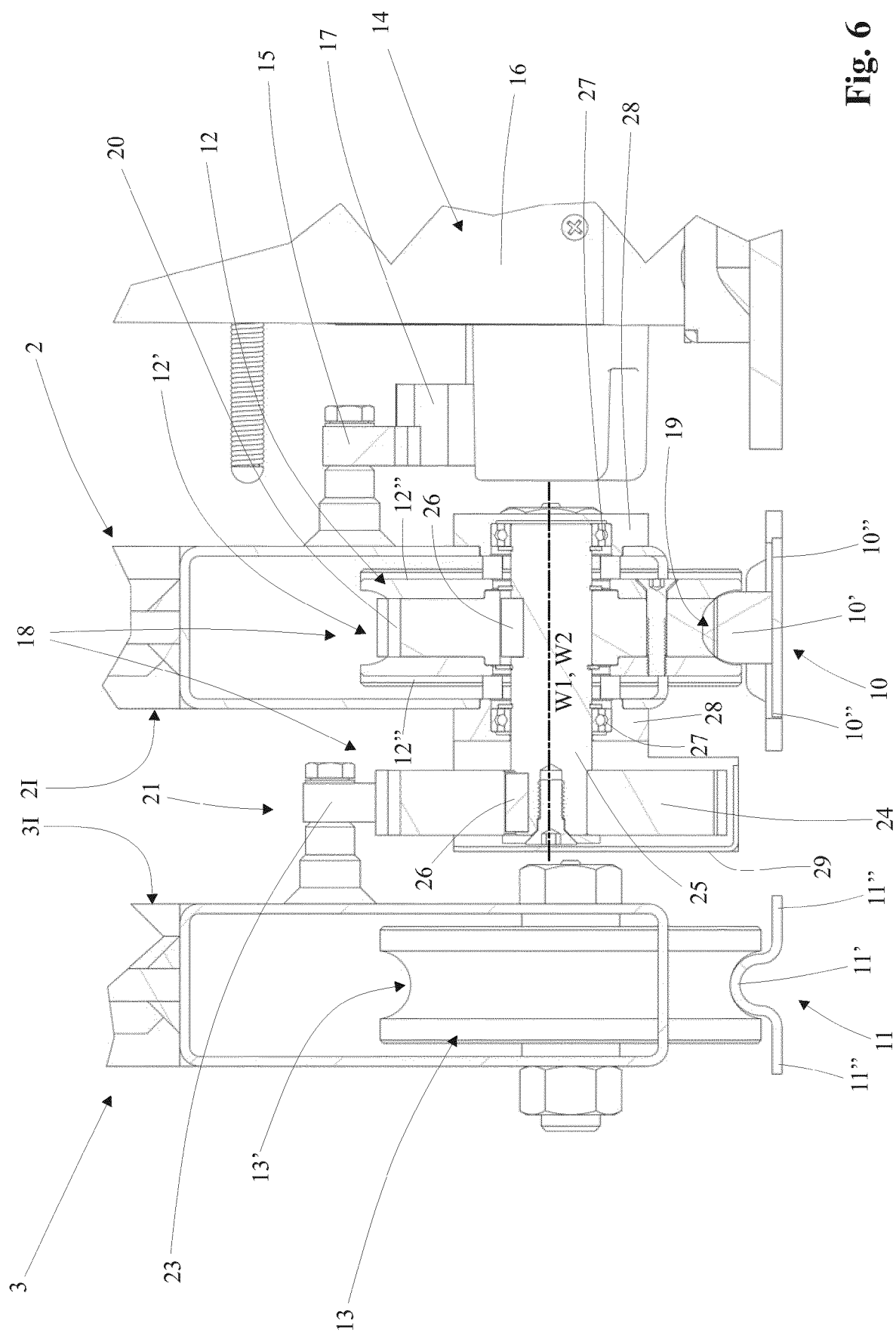


Fig. 5



Fi. 6

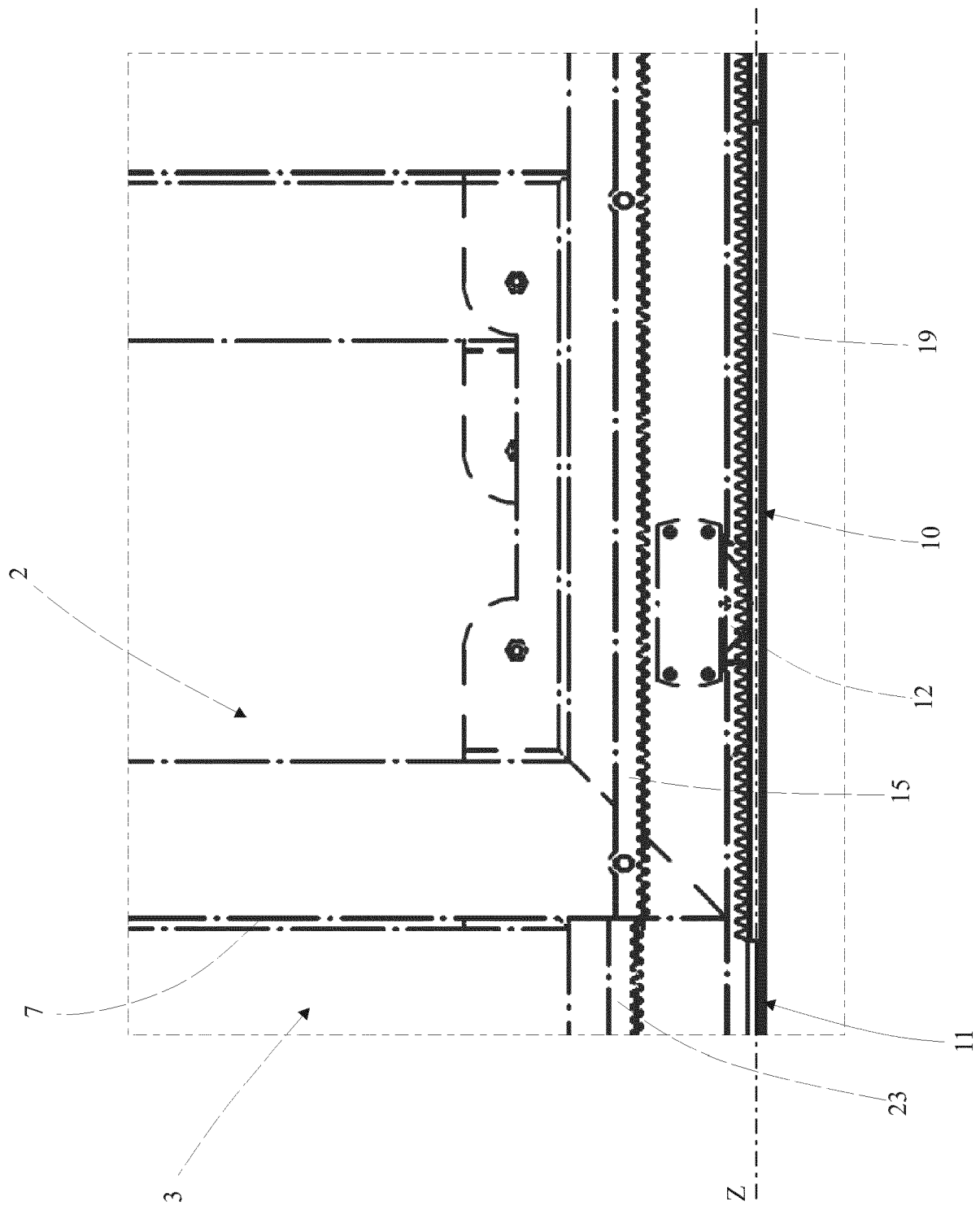
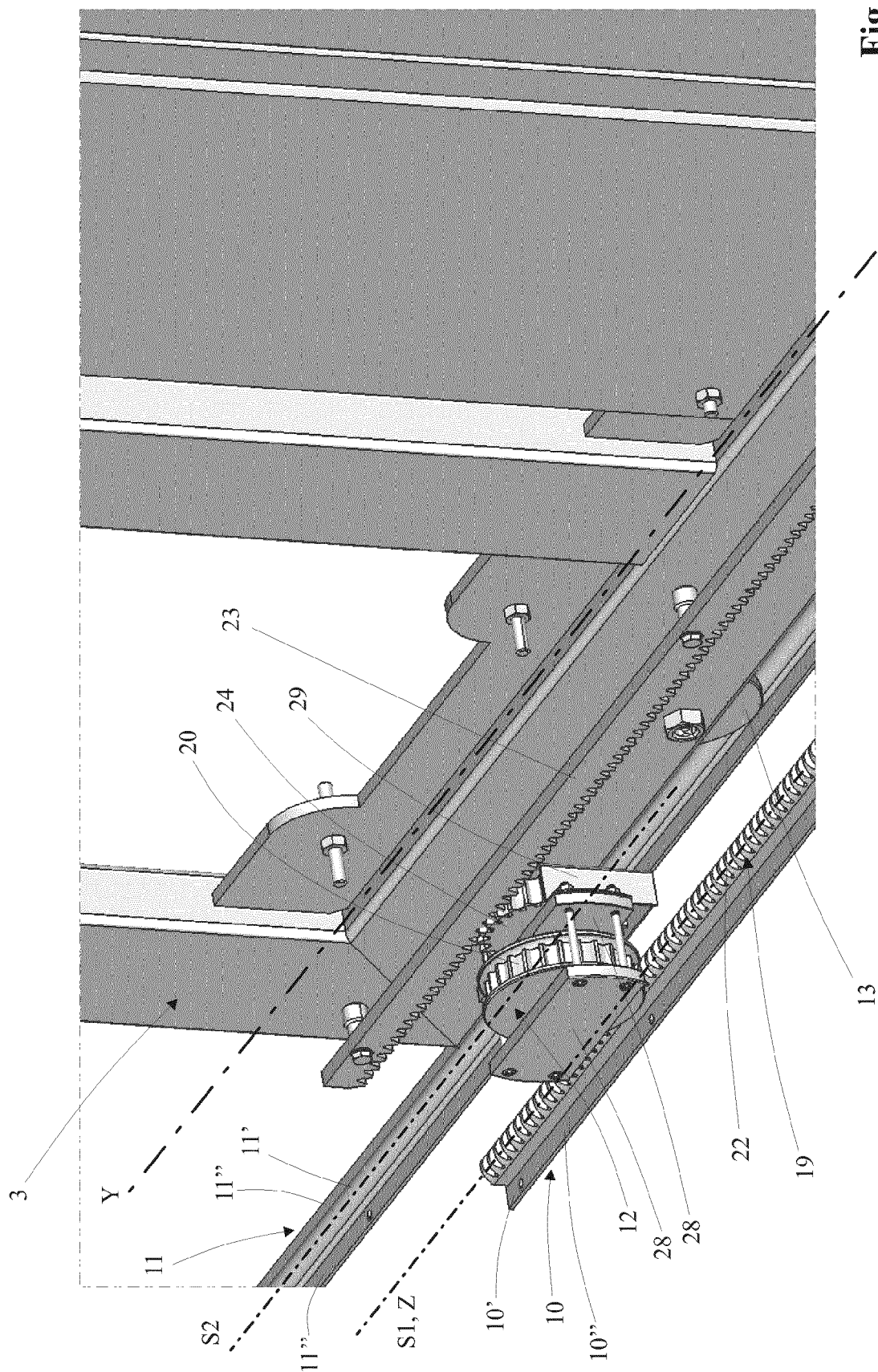


Fig. 7



Fi. 8



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Application Number
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Place of search The Hague		Date of completion of the search 12 March 2020	Examiner Jülich, Saskia
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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