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## (54) Motorised window frame

(57) A lift and slide wing comprising, at its lateral edge, a recess in which are housed operational mechanisms for releasing the wing from the counter-edge of the frame and allowing it to open. In the recess of the wing (2) moreover actuation means for actuating the aforementioned operational mechanisms are housed, such actuation means comprising an electric motor (16) which actuates a worm screw (19) with which a nut (20), which can translate parallel to said screw, is thread-engaged. The nut (20) is connected integral in translation with connection rods (23,24) having rack portions that are engaged with gearwheels (21,22) having square-shaped tangs inserted with prismatic engagement inside the follower of said operational mechanisms.

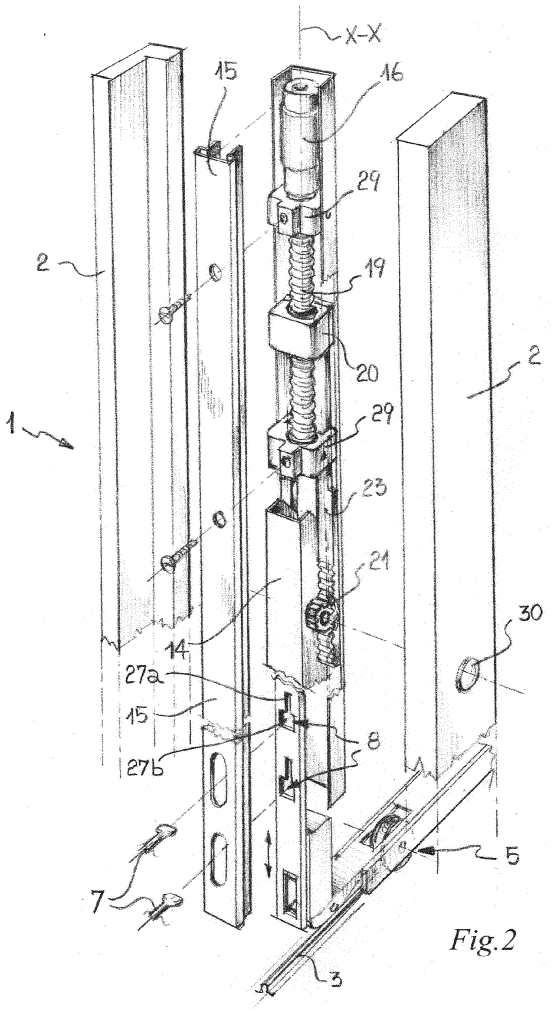


*Fig.2*

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## Description

**[0001]** The present invention refers to a window frame in accordance with the preamble of claim 1, like for example a door, a window or a French window, preferably of the sliding type.

**[0002]** In the field of construction, window frames that are intended to be applied to the wall structure of a building are known to be used, just as it is also known that there is the need of being able to motorise their opening and closing movement.

**[0003]** The motorisation of the window frames does not represent *per se* a problematic aspect, since for this purpose actuation means are widespread comprising electric motors and lever mechanisms that are suitable for guiding the opening and closing movement of the door or of the window.

**[0004]** It is more problematic to motorise doors or windows that are equipped at one edge with engagement elements, such as a spring-latch or a hooking pawl, which are suitable for engaging with a corresponding matching portion of the counter-edge of the jamb. Indeed, the motorisation of the opening and closing movement leads to the possibility of being able to also control these engagement elements, the actuation of which is generally slaved to the rotation of a handle or grip having a prismatic rotating shaft, in jargon called "square", that is inserted and supported in rotation by the follower, that is to say by a driven mechanical member, of an operational mechanism, such a follower being able to be actuated rotationally so as to operate the actuation of the operational mechanism itself. The rotating seat of the operational mechanism is cinematically connected to the engagement element (for example the spring-latch) so as to reversibly actuate it from an engagement condition to a releasing condition consequent to a rotation of the handle.

**[0005]** Although there are different types of operational mechanisms, they all share the fact that:

- they are housed in a recess foreseen in the lateral edge of the wing, that is to say the side of the wing that is intended to be in abutment against the counter-edge of the jamb of the window frame, thus being accessible for maintenance or replacement of such a lateral edge and
- they have bulk dimensions, substantially standardised, that are suitable for allowing them to be housed embedded in the structural steel of the vertical upright which identifies the aforementioned lateral edge of the upright of the wing.

**[0006]** The requirement to be satisfied is that of being able to interface the motorisation means with the aforementioned known engagement means, so as to be able to motorise the opening of the wing without having to modify the structure and the operation of such engagement devices.

**[0007]** With particular reference to slide wings with large dimensions, the weight of which easily exceeds 200 Kg, in order to open these, it is foreseen for there to be lift and slide devices that are capable of lifting the slide wing from the runner so as to allow it to slide. Basically, these per se known devices, make it possible to lift the wing with respect to the lower runner so that during the sliding of the wing the contact between the wing and lower runner occurs only by means of rolling means which the bottom of the wing is provided with.

**[0008]** In the case of the aforementioned window frames with lift and slide devices for the wing, the manual lifting operation of the wing is controlled through the rotation of the opening handle or grip, the square of which engages with a rotating seat of a suitable displacement mechanism. Such *per se* known displacement devices which in addition to controlling the release of possible engagement elements such as a lockbolt, a hook or a spring-latch, determine the vertical movement along the lateral edge of the wing of a control rod having its free end cinematically coupled with the lifting device of the wing foreseen in the lower part of the wing so as to obtain the reversible lifting of the wing.

**[0009]** Also for motorising window frames with lift and slide devices for the wing there is the strong desire to be able to interface the motorisation means with the known devices so as to obtain the double purpose of:

- not requiring redesigning of the fittings of such components, allowing existing ones to be used and
- being able to also be applied to already existing slide wings.

**[0010]** International application WO2008099261-A1 foresees the solution of applying a motor to the slide wing so that a prismatic end tang actuated in rotation by the electric motor is engaged in the rotating seat of the operational mechanism instead of the square of the handle. Basically, this document teaches to replace the handle, with which the wings are normally equipped, with a box-shaped body inside which an electric motor is contained. This solution, although appreciated due to the possibility of being able to be used in any wing without requiring adaptations, has the drawback of having the electric motor that is arranged visible outside the wing.

**[0011]** The technical problem forming the basis of the present invention is that of devising and providing a motorised window frame which has structural and functional characteristics such as to satisfy the aforementioned requirements correlated to the motorisation of window frames of the known type, whilst at the same time avoiding the drawbacks mentioned with reference to the prior art.

**[0012]** According to the invention, such a technical problem is solved with a window frame in accordance with claim 1.

**[0013]** The characteristics and further advantages of the window frame according to the present invention shall

become clearer from the following description of some of its preferred embodiments, given as an indication and not for limiting purposes, with reference to the attached figures, in which:

- figure 1 represents a perspective view of a detail of the window frame according to the invention with a wing sliding along a runner;
- figure 2 represents a simplified exploded perspective view of a detail of the wing of figure 1, of the operational mechanisms and of the actuation means for the actuation of the operational mechanisms;

- figure 3 represents a longitudinal section view of the operational mechanisms and of the actuation means of figure 1;
- figure 4 represents a lateral view of only the operational mechanisms of figure 1;
- figure 5 represents a longitudinal cross-section view of the operational mechanisms and of the actuation means of figure 1 and
- figure 6 represents a partially sectioned plan view of some elements of the actuation means of figure 1.

**[0014]** With reference to the attached figures, reference numeral 1 generically indicates a detail of a window frame according to the present invention.

**[0015]** In the example considered here, the window frame is a window frame with a lift and slide device 5 in which a wing 2 is able to pass from a closed configuration to an open configuration through sliding of the wing itself with respect to a horizontal lower runner 3. In particular, the window frame according to the invention comprises a support frame which is intended to be fastened to the wall structure of a building and is suitable for supporting the slide wing so that it is guided along the aforementioned horizontal lower runner 3 during the movement from the closed position to an open position. It should be underlined that the sliding of the wing 2 with respect to the runner 3 of the frame occurs after the lift and slide device 5 has provided for lifting the wing 2 with respect to the runner itself.

**[0016]** In the *"lifted"* position, the contact between the wing 2 and the lower runner 3 only occurs at suitable shoes or rolling means, in the example rollers, belonging to the lift and slide device 5.

**[0017]** The slide wing 2 comprises a lateral edge 9 which, when the wing itself is in closed configuration, is in abutment against a counter-edge identified by the upright of the frame.

**[0018]** The window frame comprises removable engagement means to lock the wing 2 in the aforementioned closed configuration, preventing it from opening. Such removable engagement means comprise a plurality of hooks 7 projecting from the counter-edge towards the wing 2 so as to engage corresponding slots present in the wing 2, as shall become clearer in the rest of the description.

**[0019]** The wing 2 comprises operational mechanisms (cf. figure 4) which when actuated carry out the following operations:

- the aforementioned engagement means are released and
- the slide and lift device 5 is actuated obtaining the reversible lifting of the wing 2 with respect to the runner 3,

allowing the wing 2 to pass from the closed configuration to an open configuration by means of sliding along the lower runner 3.

**[0020]** Advantageously, the wing 2 comprises a housing, or recess, that is formed in the lateral edge 9, inside which the aforementioned operational mechanisms are housed so as to be able to be inserted, removed and accessible from the lateral edge 9.

**[0021]** The operational mechanisms specifically comprise (cf. figure 4):

- a box-shaped body 14,
- a follower 12, that is to say, a conducted mechanical member that is suitable for receiving the movement from another mechanical member, to be actuated rotationally so as to obtain the actuation of the operational mechanisms themselves, in the illustrated example, the follower 12 comprises a square through hole having a square section and
- a displacement rod 13 which is supported in the wing 2 so as to be able to translate along the lateral edge 9 of the wing and that is cinematically connected to the aforementioned follower 12 so as to be moved in translation by it along the lateral edge 9 of the wing 2, so that a rotating movement in one direction or the other of the follower 12 corresponds to a translation in a first direction or the opposite direction of the displacement rod 13 with respect to the lateral edge of the slide wing.

**[0022]** In the figures the aforementioned operational mechanisms, are shown with a box-shaped body 14 that is equipped with the aforementioned follower 12 and from which the displacement rod 13 comes out. In the present description we omit describing the cinematisms present inside the box-shaped body 14 for transforming the rotation of the follower 12 into the translation of the displacement rod 13 since these are components of many *per se* known different types and are intended for the manual actuation by means of a handle, the prismatic shaft of which, is engaged through shape-coupling with the follower that the box-shaped body is provided with.

**[0023]** In relation to the operational mechanisms, it should be highlighted how, preferably, these comprise a "C"-shaped covering structural steel 15 that projects from the box-shaped body 14 so as to extend along the aforementioned lateral edge 9 of the wing 2 so as to be flush, that is to say coplanar, with the aforementioned lateral

edge 9. The covering structural steel 15 acts as a protection and guide element for guiding the sliding of the displacement rod 13 along the edge 9 of the wing 2.

**[0024]** The window frame 1 according to the invention moreover comprises actuation means that are associated with the wing so as to determine the actuation in rotation of the follower 12 of the operational mechanisms, such actuation means comprising an electric motor 16.

**[0025]** Advantageously, the aforementioned actuation means are housed in the housing of the wing 2 and comprise:

- a support element 18 to which the electric motor is fastened and inserted in the housing so as to be integral with the wing 2;
- a worm screw 19 having set axis Y-Y supported in rotation with respect to the support element 18 and cinematically coupled with the electric motor so as to be actuated rotationally by it;
- a threaded nut 20 being engaged as screw/nut-screw with the worm screw 19, the nut 20 being supported with respect to the support element 18 so as to be able to translate along the axis of the worm screw 19 without the possibility of rotating, so that for a rotation in one direction or in the opposite direction of the worm screw 18 there is a translation in a first direction or in the opposite direction respectively of the nut 20 with respect to the support element 18;

- at least one gearwheel, in the example there are two gearwheels 21 and 22, each provided with a prismatic tang 21a and 22a, respectively, in the example a rectangular cross-section, coupled integral in rotation with the follower 12 of said operational mechanisms and
- at least a connection rod, in the example two rods 23 and 24, integral in translation with the nut 20 and supported by the support element 18 so as to be able to translate with respect to such a support element 18 together with the nut 20.

**[0026]** It should be noted that the aforementioned connection rods 23 and 24 each comprise a respective rack portion 23a, 24a which is engaged with the teeth of a respective gearwheel 21 and 22, so that a translation of the aforementioned connection rods 23 and 24, respectively, in the aforementioned first direction or in the opposite direction determines a rotation in the first direction or in the opposite direction of the respective gearwheel 21 and 22 and of the follower 12 connected to them integral in rotation.

**[0027]** In accordance with the preferred embodiment illustrated in the figures:

- the worm screw 19 extends along the support element 18, so as to be a prolongation of the drive shaft of the electric motor 16 and
- the two gearwheels 21 and 22 are brought to the follower 12 so as to be positioned on opposite parts of the follower itself with the respective prismatic tangs 21a and 22a that are inserted in the corresponding axial prismatic through seat of the follower 12. The engagement of the prismatic tangs 21a and 22a inside the axial prismatic through seat of the follower 12 ensures that the gearwheels 21 and 22 and the follower 12 are connected in such a way as to be integral in rotation. The gearwheel 21 is on the side of the follower 12 facing towards the inner side of the wing 2, whereas the gearwheel 22 is on the side of the follower 12 facing towards the outer side of the wing 2.

**[0028]** In the example, the support element 18 is in the form of a substantially "C"-shaped structural steel comprising a bottom part 18a from which project two opposite side boards, 18b and 18c, respectively. The support element 18 is completely held in the housing of the wing 2, positioned so that its concavity faces the hole of the housing itself, that is to say towards the lateral edge 9 of the wing 2.

**[0029]** Preferably, the worm screw 19, the nut 20, the connection rods 23, 24 and the two gearwheels 21, 22 are partially embedded between the side boards 18b and 18c of the support element 18.

**[0030]** The worm screw 19 is supported in rotation by two bearings carried by supports 29 that are integral with the support element 18. Such supports 29 also act as fastening points for making the covering structural steel 15 integral with the underlying "C"-shaped support element 18 integral through screws, rivets and the like.

**[0031]** As can be seen in the figures, the side wall 18b of the support element 18 is arranged so as to be closer to the inner side of the wing 2, whereas the lateral wall 18c is arranged so as to be closer to the outer side of the wing 2 and therefore of the window frame 1.

**[0032]** Advantageously, the lateral wall 18b of the support element, that is to say at the wall closest to the inner side of the wing 2, has an opening such as to allow the gearwheel 21 to be removed, parallel to its rotation axis, from the follower 12 without interfering with the structural steel of the support element 18.

**[0033]** The gearwheels 21 and 22 are kept locked together with one another with the interposition of the follower 12 by means of a threaded rod of a screw element, in the example a screw 26 that engages with respective nut-screws of the gearwheels 21 and 22 extended so as to be coaxial with the rotation axis of the gearwheels.

**[0034]** The screw 26 comprises a head from which the aforementioned threaded rod projects, said rod inserting in the nut-screws of the gearwheels 21 and 22 from the gearwheel 21, so that the head of the screw 26 is accessible only from the inner side of the wing 2.

**[0035]** The gearwheel 21 arranged at the inner side of the wing 2 has an axial through hole, also through the tang portion, equipped with a nut-screw.

**[0036]** On the other hand, in accordance with one preferred embodiment, in the gearwheel 22 arranged at the outer side of the wing 2 the nut-screw is obtained at a hole extending along the rotation axis of the gearwheel itself and having the end faced towards the inner side of the closed wing 2. Advantageously, this makes it possible to prevent the screw 26 from being accessible from the outer side of the wing 2, increasing the security of the window frame 1 from break-in attempts.

**[0037]** In accordance with the preferred embodiment illustrated in the figures, in the screw element 26, from the head, it is possible to see a first male threaded portion 26a and a subsequent male threaded portion 26b, the first male threaded portion 26a having an outside diameter larger than at least 1 mm, preferably of 2 mm, with respect to the outer diameter of the second male threaded portion 26b of the rod.

**[0038]** Correspondingly, the first gearwheel 21 has a matching nut-screw that can be coupled with the threading of the first male threaded portion 26a, whereas the second gearwheel 22 has a matching nut-screw that can be coupled with the second male threaded portion 26b, the nut-screw of the first gearwheel 21 being larger than at least 1 mm, preferably of 2 mm, with respect to the nut-screw of the second gearwheel 22.

**[0039]** Purely as an example, the aforementioned first male threaded portion 26a and the nut-screw of the first gearwheel 21 are M10 threadings whereas the second male threaded portion 26b and the nut-screw of the second gearwheel 22 are M8 threadings.

**[0040]** With reference to what has previously been described in relation to the removable engagement means to lock the wing 2 in the aforementioned closed configuration, preventing it from opening, it is worth underlining that the aforementioned slots intended to be engaged by the hooks 7 are slots 27 obtained in the displacement rod 13.

**[0041]** Preferably, in the direction along which the displacement rod 13 and the edge of the wing 2 extend, the slots 27 have a first portion 27a having a width that is greater than that of the rod of the hooks 7 and that is smaller than the width of the head of the hooks 7 and a second portion 27b in prolongation of the first portion 27a and having a width that is greater than the width of the head of the hooks 7.

**[0042]** Consequently, when the hooks 7 are arranged at the portion 27a of the slots 27 the opening of the wing 2 is prevented whereas, after the lift and slide device 5 has provided for lifting the wing 2, the hooks 7 are at the portion 27b of the slots 27, the wing 2 can move away from the counter-edge of the frame sliding along the lower runner 3 without interfering with the hooks 7.

**[0043]** It is worth underlining that, at the slots 27 the covering structural steel 15 has corresponding passages so as to allow the insertion without interference of the hooks 7, so that these can come to engage the slots 27.

**[0044]** The electric motor 16 can be powered by batteries that are housed in said window frame or, in accordance with a preferred embodiment, it foresees a power supply system through the mains equipped with a buffer battery. For this purpose, the window frame 1 according to the invention comprises wiring means (not shown in the figures) extended through the wing 2 and the frame which are suitable for ensuring the electric connection of the electric motor to the electric net. Such wiring means comprise, for example, sliding contacts, shown in the figures.

**[0045]** The window frame 1 is moreover equipped with electric transducers that are suitable for allowing the adjustment and the control of the electric motor 16.

**[0046]** In order to actuate the operation of the electric motor 16 it is foreseen for there to be electric switches or a remote control.

**[0047]** In the operation of the window frame 1, from a closed window frame configuration, by actuating the electric motor 16 a rotation in one direction of the worm screw 19 is obtained determining a corresponding translation in a first direction of the nut 20 and of the displacement rods 23 and 24 integral in rotation with it. The translation of the operational rod determines an equal rotation of the gearwheels 21 and 22 that, in turn, sets in rotation the follower 12 of the operational mechanisms and, consequently, actuates the lift and slide device 5 through the displacement rod which translates along the lateral edge 9 of the wing 2.

**[0048]** A rotation in of the electric motor 16 in the opposite direction causing the rotation of the follower 12 in the opposite direction and the lowering of the wing 2 on the lower runner 3. Consequently, since as previously explained the actuation means are accessible from the lateral edge 9 of the wing 2, in the case in which due to a mechanical failure or to a lack of electric power supply it is necessary to manually lift the wing 2 from the runner 3 in a state of emergency, it is necessary to proceed as indicated in the rest of the description:

- remove the cover lid present in the inner side of the wing 2b at the point in which the follower 12 is arranged;
- remove the screw 26 by acting with a special tool, for example an Allen wrench, on the head of the screw element 26;
- engage, with a screw, the end of a threaded rod, in the example having threadings M10, in the nut-screw of the first gearwheel 21 and pull the rod outwards so as to remove the gearwheel 21 through the opening, setting the follower 12 free from the operational mechanisms;
- engage, with a screw, the end of a second threaded rod, in the example having threadings M8, inside the nut-screw of the second gearwheel 22 and push the rod until the tang of the gearwheel 22 has come out from the follower 1;
- unscrew the end of the second threaded rod from the nut-screw of the second gearwheel 22 and free the square-sectioned through hole of the follower 12

and

- insert, in the aforementioned square-sectioned through hole of the follower 12, the square of a handle through which to actuate the operational mechanisms from the inner side of the wing.

**[0049]** As explained above, the translation of the displacement rod 13 makes it possible to free up the slots 27 from the engagement with the hooks 7, allowing the window frame 1 to be opened by making the wing 2 slide along the lower runner 3.

**[0050]** After the lift and slide device 5 has provided for lifting the wing 2 from the lower runner 3, so that the contact between wing and lower runner is ensured only by the rollers that are especially foreseen in the wing 2 itself, the sliding of the wing 2 along the runner can be obtained manually or, in accordance with a preferred embodiment, by means of further electric motor means which, for the sake of making the representation simpler, have not been illustrated in the drawings.

**[0051]** From what has been outlined above, the window frame according to the invention makes it possible to satisfy the aforementioned requirements correlated to the motorisation of the window frames of the known type, making it possible to automate the engagement/release movement of the engagement means, as well as the actuation of the lift and slide device so as to be simple and reliable, obtained by using standard types of fittings. In other words, the operational mechanisms with rotating follower and lift and slide device can be of the type found on the market, since the actuation means according to the invention are suitable for being used to actuate rotationally the follower of any operational mechanism that can be normally actuated rotationally by means of the prismatic square of a handle. Indeed, the tangs of the two gearwheels make it possible to engage, so as to be integral in rotation, the tangs of any follower having a standard prismatic hole with a square-shaped cross-section.

**[0052]** Of course, a man skilled in the art, with the purpose of satisfying contingent and specific requirements, can bring numerous modifications and variants to the window frame described above, all moreover covered by the scope of protection of the invention as defined in the following claims.

## Claims

1. Window frame comprising a frame suitable to be fastened to the structure of a building and a wing (2) supported by said frame so as to be movable from a closed configuration to an open configuration, wherein:

   - said wing (2) comprises a lateral edge (9) suitable to be in abutment against the counter-edge of the frame when the window frame (1) is in the closed configuration and
   - said window frame (1) comprises removable engagement means (7, 27) to lock the wing (2) in said closed configuration,
   - said wing (2) comprises operational mechanisms to be actuated to unhook said removable engagement means (7, 27) and to allow the wing (2) pass from the closed configuration to the open configuration and vice-versa,
   - said wing (2) comprises a housing at said lateral edge (9) wherein are housed said operational mechanisms so as to be accessible by said lateral edge (9),
   - said operational mechanisms comprise a follower (12) to be actuated rotationally to start said operational mechanisms and
   - said window frame (1) comprises actuation means associated with said wing (2) to actuate rotationally said follower (12), said actuation means comprising an electric motor (16),

   **characterized in that** said actuation means are held in said housing of said wing (2) and comprise:

   - a support element (18) to which is fastened the electric motor (16), said support element (18) being fixed to said wing (2);
   - a worm screw (19) having a set axis (Y-Y) supported in rotation with respect to said support element (18) and cinematically coupled to said electric motor (16) to be rotationally actuated by means of said electric motor (16);
   - a threaded nut (20) being engaged as screw/nut-screw with said worm screw (19), said threaded nut being supported so as to be able to translate along the axis of said worm screw (19) without the possibility of rotating, so that a rotation in one direction or in the opposite direction of said screw operates a translation in the first direction and in the opposite direction respectively of said nut with respect to the support element (18);
   - at least a gearwheel (21) with a tang coupled integral in rotation to said follower (12) of said operational mechanisms and
   - at least a connection rod (23) integral in translation to said threaded nut (20) and supported by said support element (18) so as to be able to translate with respect to said support element (18) together with said threaded nut (20), said connection rod (23) comprising a rack portion engaged with the teeth of said gearwheel (21), so that to the translation of said connection rod (23) in said first direction or in the opposite direction determines a rotation in the first direction or in the opposite direction of said gearwheel (21) and of the follower (12) integral to it in rotation.

2. Window frame in accordance with claim 1, wherein said support element (18) and said worm screw (19) extend along said lateral edge (9) of the wing (2).

3. Window frame in accordance with claims 1 or 2, wherein said at least one gearwheel (21) are two gearwheels (21, 22) positioned on the opposite sides of said follower (12) and having their respective tangs coupled to said follower (12) so as to be integral to it during the rotation.

4. Window frame in accordance with any one of claims 1 to 3, wherein said support element (18) is a structural steel having a bottom part from which two opposite side boards (18b, 18c) project, said structural steel being held in said housing so that its concavity faces the hole of said housing, wherein said support element (18), said worm screw (19), said threaded nut (20), said at least one gearwheel (21) and said at least one connection rod (23) are at least partially embedded between the side boards (18b, 18c) of said support element (18).

5. Window frame in accordance with claim 4, wherein at the rotation axis of said first gearwheel (21) one of said side boards (18b) of said support element (18) has an opening to allow extracting said gearwheel (21) from said follower (12) parallel to its rotation axis.

6. Window frame in accordance with claim 3, wherein:

- said gearwheels (21,22) are positioned at the opposite sides of said follower (12);
- said follower (12) comprises a through hole where to insert from opposite ends the respective tangs of said gearwheels (21,22);
- said gearwheels (21,22) being held locked to one another with the interposition of said follower (12) by means of a threaded rod of a screw element (26) which can be engaged as screw/nut-screw with threaded portions of both said gearwheels (21,22).

7. Window frame in accordance with claim 6, wherein said threaded rod comprises:

- a first male threaded portion (26a) being thread-engaged with the corresponding nut-screw obtained inside said first gearwheel (21) coaxially to its rotation axis and
- a second male threaded portion (26b) extended as a prolongation of said first threaded portion (26a) and being thread-engaged with a corresponding nut-screw obtained in the second gearwheel (22) coaxially to its rotation axis,

said first male threaded portion (26a) having an outside diameter larger than at least 1 mm, preferably 2 mm, than the outside diameter of said second male threaded portion (26b).

8. Window frame in accordance with any one of claims 1 to 7, wherein:

- said window frame (1) is a window frame with a lift and slide wing (2) and
- said operational mechanisms comprise a displacement rod (13) mounted to said wing (2) and cinematically coupled to said operational mechanisms so as to be able to translate along said lateral edge (9) of the wing (2) where to a rotating movement in one direction or the other of said follower (12) corresponds a translation in a first direction or the other of said displacement rod (13) along said lateral edge (9) of the wing (2).

9. Window frame in accordance with claim 8, wherein said engagement means comprise hooks (7) protruding from said counter-edge to engage corresponding through slots (27) obtained in said displacement rod (13), when said wing (2) is lifted with respect to the lower runner (3) being able to release said hooks (7) from said slots (27) by making the sliding wing (2) slide and move away from the counter-edge.

10. Window frame in accordance with any one of claims 1 to 9, wherein said wiring means comprise sliding contacts extended through said wing (2) and said frame to allow the electric connection of said electric motor (16) to the electric net.

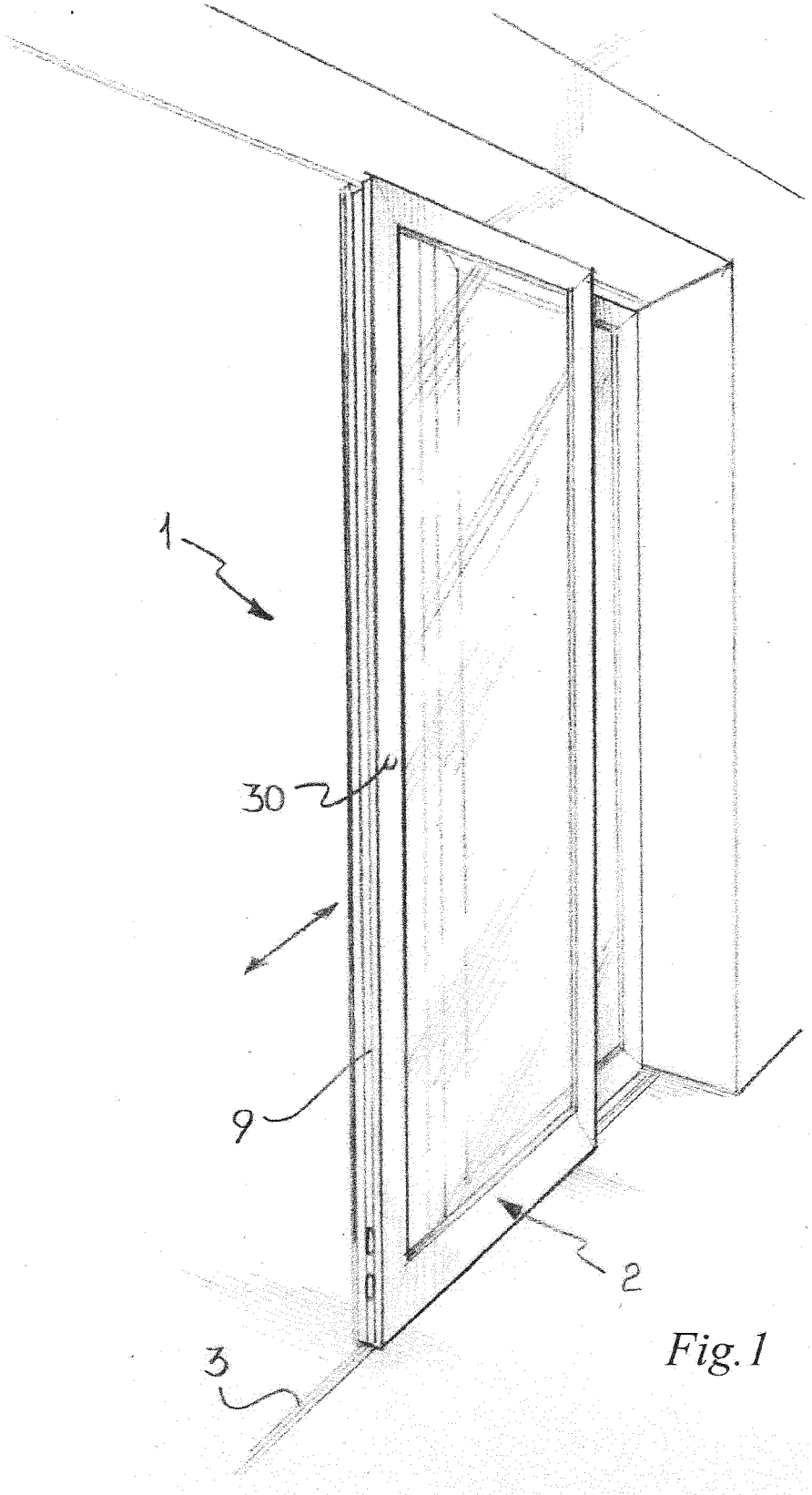



*Fig. 1*

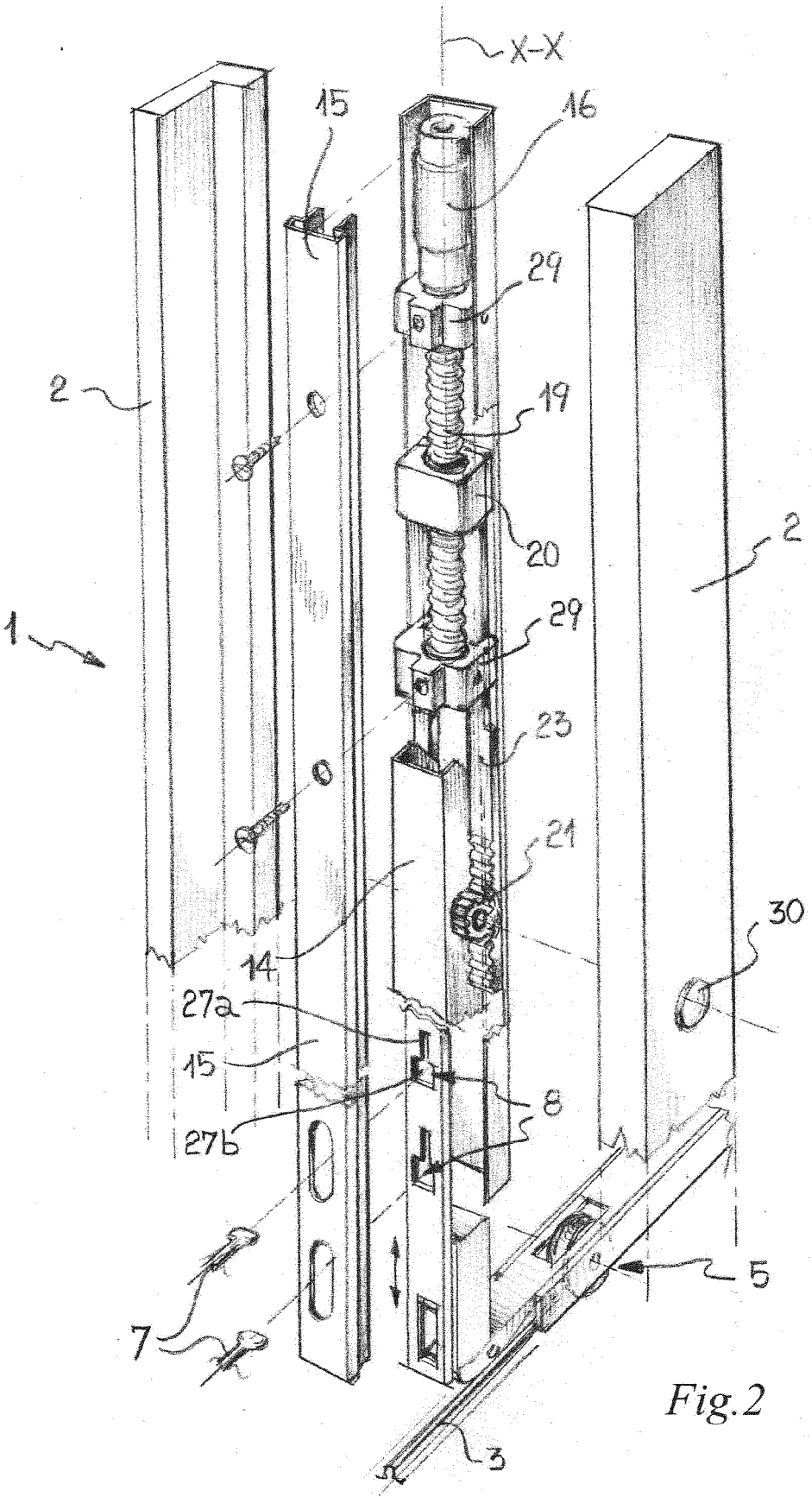



*Fig.2*

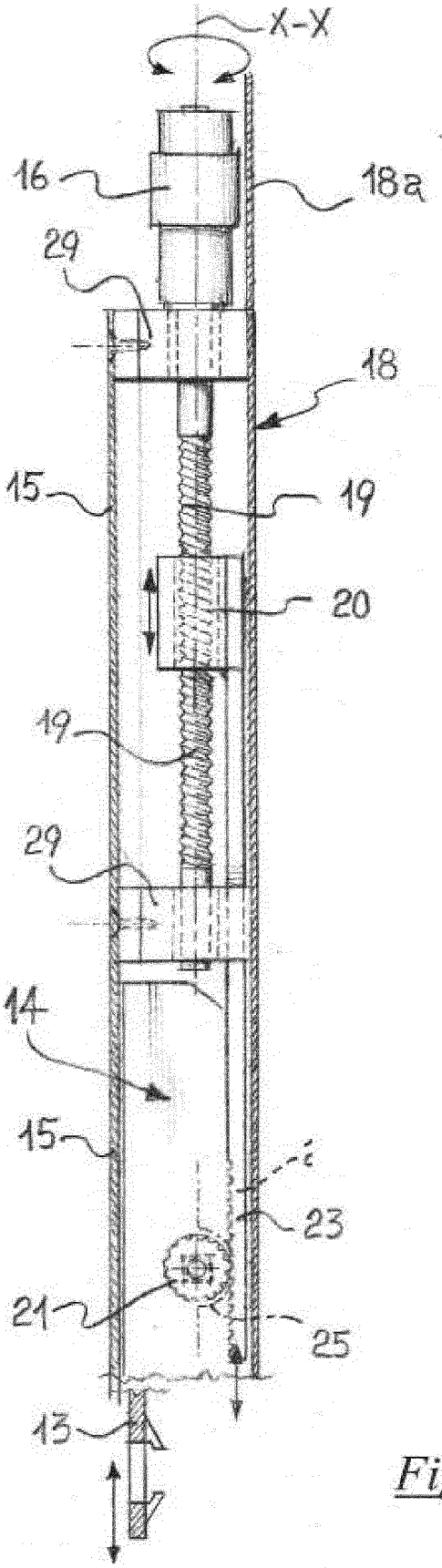



Fig.3

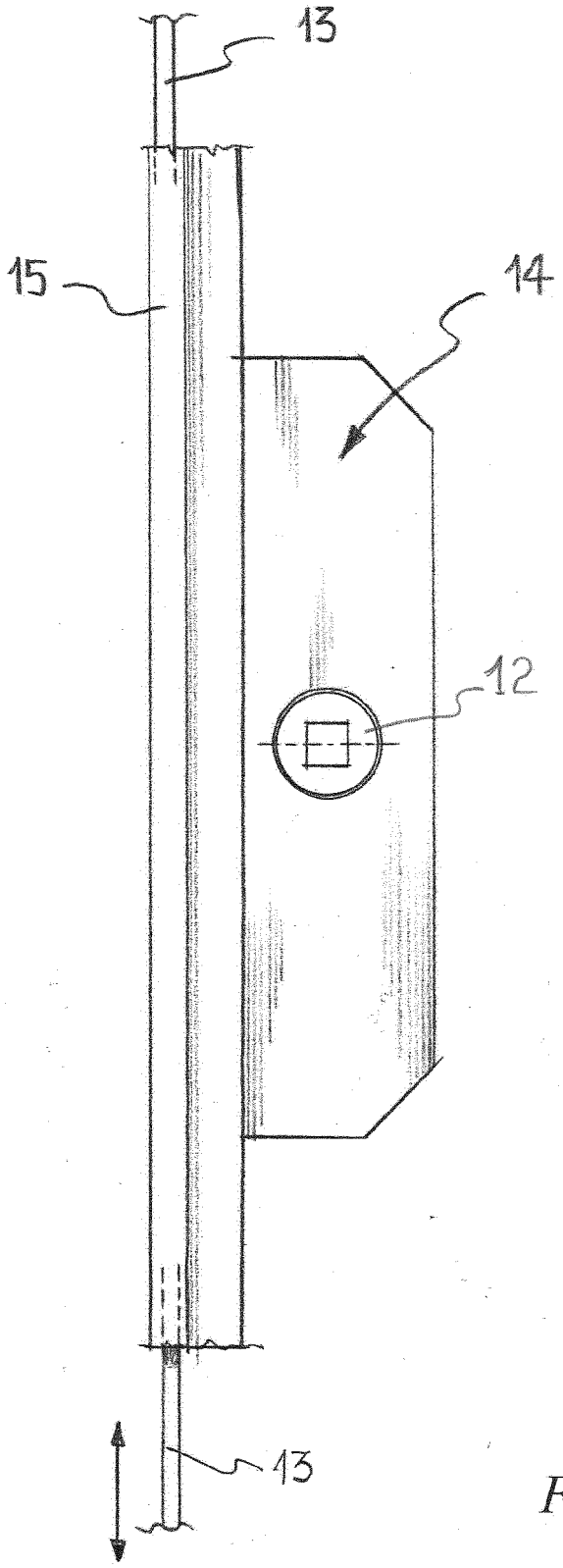
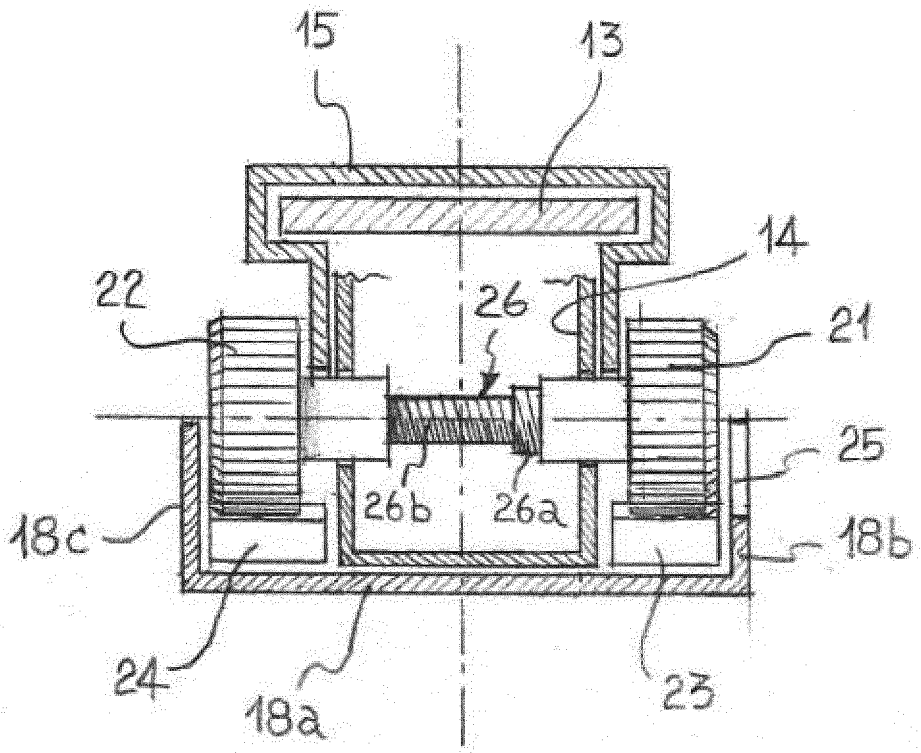



*Fig.4*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26b
26a
18c
18b
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18a
23

*Fig.5*

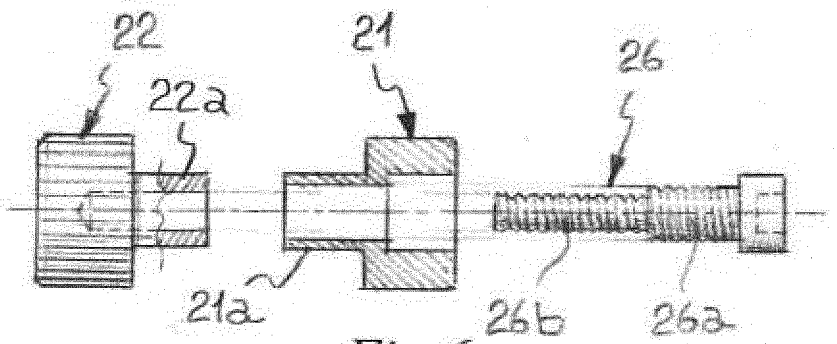
22
22a
21
26
21a
26b
26a

*Fig.6*

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Application Number
EP 12 15 2879

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